Instruction Manual



30-71XX Infinity Quick Start Guide

STOP!



THIS PRODUCT HAS LEGAL RESTRICTIONS. READ THIS BEFORE INSTALLING/USING!

WARNING! THIS IS A RACE ONLY PRODUCT MANUFACTURED AND SOLD FOR INSTALLATION ON VEHICLES DESIGNED TO BE USED SOLELY FOR COMPETITION PURPOSES. ONCE THIS PART IS INSTALLED, THE VEHICLE MAY NEVER BE USED, OR REGISTERED OR LICENSED FOR USE, ON A PUBLIC ROAD OR HIGHWAY. IF YOU INSTALL THIS PART ON YOUR VEHICLE AND USE THE VEHICLE ON A PUBLIC ROAD OR HIGHWAY, YOU WILL VIOLATE THE CLEAN AIR ACT AND MAY BE SUBJECT TO PERSONAL CIVIL OR CRIMINAL LIABILITY, INCLUDING FINES OF UP TO \$4,819 PER DAY.

IT IS THE RESPONSIBILITY OF THE INSTALLER AND/OR USER OF THIS PRODUCT TO ENSURE THAT IT IS USED IN COMPLIANCE WITH ALL APPLICABLE LAWS AND REGULATIONS. IF THIS PRODUCT WAS PURCHASED IN ERROR, DO NOT INSTALL AND/OR USE IT. THE PURCHASER MUST ARRANGE TO RETURN THE PRODUCT FOR A FULL REFUND.

THIS POLICY ONLY APPLIES TO INSTALLERS AND/OR USERS WHO ARE LOCATED IN THE UNITED STATES; HOWEVER CUSTOMERS WHO RESIDE IN OTHER COUNTRIES SHOULD ACT IN ACCORDANCE WITH THEIR LOCAL LAWS AND REGULATIONS.

WARNING!

Improper installation and/or adjustment of this product can result in major engine/vehicle damage. For technical assistance visit our dealer locator to find a professional installer/tuner near you.

Note: AEM holds no responsibility for any engine damage or personal injury that results from the misuse of this product, including but not limited to injury or death caused by

AEM Performance Electronics AEM Performance Electronics, 2205 126th Street Unit A, Hawthorne, CA 90250 Phone: (310) 484-2322 Fax: (310) 484-0152 http://www.aemelectronics.com Instruction Part Number: 10-7100 Document Build 1/20/2021

Infinity Quick Start Guide

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Introduction

Software Download Notice

The latest Infinity Tuner PC software is available for download at <u>http://www.aemelectronics.com/?</u> <u>q=products/support/software-downloads</u>.

The latest AEMData analysis software is available for download at <u>http://www.aemelectronics.com/?</u> <u>q=products/support/software-downloads</u>

The latest firmware for your Infinity ECU is available at <u>http://www.aeminfinity.com</u>. Follow the instructions in this manual to install InfinityTuner and AEMData (optional) then go directly to <u>aeminfinity.com</u> to download your firmware.

12 Month Limited Warranty

AEM Performance Electronics warrants to the consumer that all AEM ELECTRONICS products will be free from defects in material and workmanship for a period of twelve months from date of the original purchase. Products that fail within this 12-month warranty period will be repaired or replaced when determined by AEM that the product failed due to defects in material or workmanship. This warranty is limited to the repair or replacement, at AEM's discretion, of the AEM Electronics part. In no event shall this warranty exceed the original purchase price of the AEM ELECTRONICS part nor shall AEM ELECTRONICS be responsible for special, incidental or consequential damages or cost incurred due to the failure of this product.

Warranty claims to AEM ELECTRONICS must be transportation prepaid and accompanied by dated proof of purchase. This warranty applies only to the original purchaser of product and is non-transferable. All implied warranties shall be limited in duration to the said 12-month warranty period. Improper use or installation, accident, abuse, unauthorized repairs or alterations voids this warranty.

AEM ELECTRONICS disclaims any liability for consequential damages due to breach of any written or implied warranty on all products manufactured by AEM ELECTRONICS.

Warranty returns will only be accepted by AEM ELECTRONICS when accompanied by a valid Return Merchandise Authorization (RMA) number. Product must be received by AEM ELECTRONICS within 30 days of the date the RMA is issued. UEGO oxygen sensors are considered wear items and are not covered under warranty.

Please note that before AEM ELECTRONICS can issue an RMA for any electronic product, it is first necessary for the installer or end user to contact the tech line at 1-800-423-0046 to discuss the problem. Most issues can be resolved over the phone. Under no circumstances should a system be returned, or an RMA requested before the above process transpires. AEM ELECTRONICS will not be responsible for products that are installed incorrectly, installed in a non-approved application, misused, or tampered with.

Fuel Pumps installed with incorrect polarity (+&- wires crossed) will not be warranted. Proper fuel filtration before and after the fuel pump are essential to fuel pump life. Any pump returned with contamination will not be warranted.

Any AEM ELECTRONICS product, excluding discontinued products, can be returned for repair if it is out of the warranty period. There is a minimum charge for inspection and diagnosis of AEM ELECTRONICS parts which are out of warranty. Parts used in the repair of AEM ELECTRONICS electronic components will be extra. AEM ELECTRONICS will provide an estimate of repairs and must receive written or electronic authorization before repairs are made to the product.

Need additional help? Contact the AEM Performance Electronics tech department at 1-800-423-0046 or email us at tech@aemelectronics.com.

Kit Contents

- 1 x INFINITY ECU (Varies depending on kit part number)
- 1 x QUICK START GUIDE
- 2 x USB CABLE (Varies depending on kit part number)
- 1 x 4GB FLASH MEMORY DEVICE (Varies depending on kit part number)
- 10 x ECU HARNESS TERMINALS



Infinity Series 7 Contents

Background

The Infinity platform is very different from previous generation AEM EMS products. The hardware (circuit board assembly) is designed around a very advanced automotive grade microcontroller (processor or "chip"). Several layers of software reside on this chip that allow for real time firmware programming without the need to write computer code. This technology has allowed AEM to develop advanced control models never before used on other AEM EMS products. We've listened to our customers over the years and have attempted to simplify the tuning process by employing an airflow based fuel control model eliminating many of the lookup and trim tables from previous generation ECUs. The look and feel is very different and it may take some time to adjust to the new tuning environment.

Our new tuning tool, Infinity Tuner is also a brand new product built from the ground up to interface with the new hardware. It features a modular design that allows users and developers to build completely customized templates and even design "plug in" applications that can automate many tuning tasks. Unlike previous AEM Setup Wizards in older products like AEM Pro and AEM Tuner, the Infinity Tuner Setup Wizard "plug in" is a completely standalone application that will evolve with Infinity Tuner. It is much more integrated with the ECU hardware and performs complex validation checks for all requested changes.

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Among other things, Infinity Tuner is a powerful math processor. In addition to supporting standard global units and math functions, special features allow users to create completely custom conversion channels for table data. Virtually any function can be employed to display data in different formats or units. Math functions are also used for table edits. ANY MATH function can be used not just a list of pre-defined selections. Advanced users will really enjoy the flexibility this feature adds.

A built-in logging playback/controls synchronization feature allows tuners to view live plot data and make changes to their calibration values on the fly, knowing exactly where the ECU was accessing table data. For more detailed post processing of data, AEM offers its new analysis package, AEMdata.

Software

Software Installation

Minimum computer requirements:

OS - Windows XP with .NET 4.0 framework installed Ram - 2GB Processor - 1 GHz Free HD space - 600 Mb Connectivity - USB 2.0

All current Infinity Tuner software installations are available for download from AEM at http://www.aemelectronics.com/support/SoftwareDownloads

All current firmware pakgrp files are available for download from AEM at <u>http://www.aeminfinity.com</u>. You must download and save a valid pakgrp file before proceeding with the firmware update process.

- 1. Run the setup.exe. Hit Next> and follow the instructions on each page.
- 2. Read and accept the terms of agreement and pick your desired location for Infinity Tuner to be installed. Hit Next> and allow the software to complete installation.
- 3. You may now exit the Infinity Tuner installer. You can now run Infinity Tuner.

Infinity Quick Start Guide

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FAQ

What are the basic sensors needed?

In order to use the Infinity to its full potential you will need the following; Intake Air Temperature Sensor, Manifold Air Pressure Sensor, Coolant Temperature and a Wide Band Air/Fuel Ratio sensor.

Why doesn't the Infinity work with (insert vehicle or engine description here)?

We have not had the opportunity to map the Cam and Crank profiles of that engine yet. If your cam and crank matches another vehicle we do have, it will work.

What do you mean by matching the cam and crank profile to another car?

The number of teeth on a crank trigger and cam trigger let the Infinity know where the engine position is exactly. Based on that the infinity will know when to spark, and inject fuel.

Is the Infinity Waterproof?

The enclosure includes an o-ring seal. The connectors are rated to IP67. The harness side mating connectors must be assembled in accordance with Molex recommended practices to maintain this rating. See Wiring section for more information.

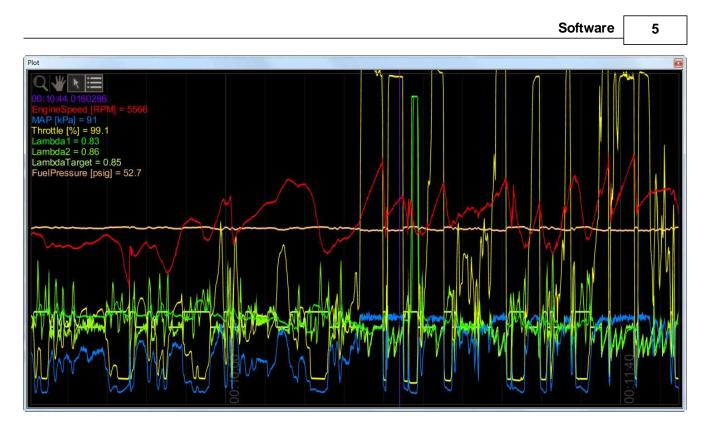
Flash Memory Functions

Changes made to calibration tables are stored on the ECU in a temporary memory location and applied immediately. In other words, while tuning live, all changes take effect immediately. They are not however immediately saved to ECUs flash memory. The menu function ECU – Commit modifications (Hot Key – CTRL + SHIFT + C) is used to save all current changes to the flash. This feature allows the user to choose what changes to save to the ECU during a tuning session. ECU – Revert modifications (Hot Key – CTRL + SHIFT + R) removes any changes not previously saved. At key off, the system will automatically commit all unsaved changes if the Key Off Commit option is checked in the Tuning Preferences Setup Wizard page. *AEM recommends disabling the Key Off Commit options once all tuning changes are made*.

AEM Infinity-6	
Basic Setup A Engine Tuning Preferences Cam/Crank Injector Setup Basic Sensors DBW Tuning Set Throttle Range Ignition Sync Advanced Setup Outputs V	Tuning Preferences Key Off Commit: If Key Off Commit is selected, the ECU will automatically save any unsaved changes when the ignition power input, Pin C1-48 is turned off. This function could take several seconds to complete. If power is removed from pin C1-10 before this action has completed, the ECU may become inoperable and require reprogramming at AEM.

Plot Data and Control

AEM supplied layout files will come pre-loaded with several "Plot Control" windows. (Users can always add, delete or edit them as desired.) These are special controls that allow real time data logging and playback. To begin a PC log, go to the Log menu and select Start recording or hit the "CTRL + L" hot key. Select Stop recording or hit the "CTRL + L" hot key again to stop logging. A dialog will ask if you want to save the data or not. If you select "Yes," you will be prompted to save the current session file. A session file contains all the current configuration and calibration data along with a log file. If you open that session file again, the file will be loaded and all plot controls will be populated with the recorded data.



Plot Window Tools

R

Selection tool: Choose this icon by clicking on it then left click and drag through the plot window to view current data values.

Pan tool: Choose this icon by clicking on it then left click and drag through the plot window to pan the data left or right. Hot Key – Left/Right arrow

Zoom tool: Choose this icon by clicking on it then left click and drag up and down to zoom in and out. Alternatively, a mouse scroll wheel can be used after selecting the zoom tool. Hot Key – Up arrow/Page up, Down arrow/Page down

III

Show legend: Displays or hides the data legend.

Additional hot keys available in plot control window:

Home – Brings you to the start of the log

End – Brings you to the end of the log

For Home and End, the current display range is kept, so if viewing 10 seconds worth of data, Home will display the first 10 seconds while End will display the last 10 seconds.

Controls Synchronization

When the plot control is populated with data, using the selection tool and dragging through the plot will cause Infinity Tuner to synchronize all control windows to the plot data. This happens when connected to the simulator offline or when connected to the ECU via USB. To go back to viewing "live" data, go to the *Log* menu and select *Goto live data*.

Infinity Quick Start Guide

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Infinity Tuner Version 2.95.6804		
File Connection Target Layout Log Wizards Hel	p Saved session: Dan11.itssn	
/ Start y Idle y VE V Injector y Lambda y IgnMap y Protect y	Boost Y BoostPID Y FlexIgn Y FlexFuel Y TC Y Gear Y Knock	
Text Grid	VETable [%]	VETable [%]
EngineSpeed [RPM] 0	100 78 77 77 76 77 78 81 86 93 101 107 108 107 104 102 1	
VE [%] 0.0	90 78 78 77 77 77 78 81 86 93 100 106 108 106 104 102 9 85 79 78 78 78 78 78 79 81 86 92 99 104 106 105 103 101 9	Table 1 th
MAP [kPa] 0	80 79 79 79 79 79 79 80 82 86 91 97 102 104 103 102 100 9	VETal
Throttle [%] 0	75 80 80 80 81 82 83 86 90 94 98 100 101 100 99 9 70 80 80 81 82 83 86 90 94 98 100 101 100 99 9 70 80 80 81 81 82 83 86 90 94 98 100 101 100 99 9 70 80 80 81 81 82 83 86 90 94 98 100 101 100 99 9	
Lambda1 0.00	70 80 81 82 83 84 84 85 87 89 91 92 93<	
LambdaTarget 0.00	<u>60</u> 79 79 80 81 82 83 84 85 85 86 87 87 88 88 88 8	
VECorReq NAN	<u>555</u> 77 78 79 80 81 82 83 83 83 83 83 82 82 82 83 8 <u>50</u> 76 76 77 78 79 80 81 81 81 80 80 79 78 77 77 77 77 77	
Lambda1 AFR 0.0		
CoolantTemp [C] 0.0	[∉] <u>40</u> 73 73 73 74 75 75 75 74 73 72 70 69 68 67 66 6	
LambdaTarget AFR 0.00	35 71 71 72 72 72 71 70 69 68 66 65 63 62 61 6 30 70 70 70 69 68 66 65 63 62 61 6	
Inj1LambdaFB 0.00	25 68 68 68 68 67 66 64 62 61 59 57 56 55 54 53 5	
SpkTiming [degBTDC] 0.0	20 67 66 66 65 64 63 61 59 57 55 54 52 51 50 49 4	
FuelPressure [psig] 0.0	15 65 65 64 62 60 58 55 53 51 50 49 48 47 46 4 10 63 63 63 62 60 58 55 53 51 50 49 48 47 46 4 10 63 63 63 60 58 56 53 50 48 47 46 44 44 4	
	5 60 61 62 61 59 57 54 51 48 46 44 44 43 42 42 4	
		a the second second
	500 750 1000 1250 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500 7	
	500/500/500/6000/6500/2000/2500/5000/6000/6	
Plot		
MAP [kPa] = 0		
Lambda 1 = 0.00		

The image above shows plot data sync'd to control windows. All table cursors update with their position relative to the logged data in the plot control. Note that in this mode, table edits are still possible.

Infinity Hot Keys - Quick Reference

Commonly used Hot Keys.

Action	Default Key
Open saved session	CTRL + SHIFT + O
Save session	CTRL + SHIFT + S
Open layout	CTRL + O
Save layout	CTRL + S
Connect USB	CTRL + SHIFT + U
Disconnect USB	CTRL + SHIFT + D
Go to main window	ESC
Toggle to next control window	ТАВ
Toggle to previous control window	SHIFT + TAB
Next layout page	CTRL + TAB

	50
CTRL + SHIFT + TAB	
CTRL + L	
CTRL + SHIFT + C	
CTRL + SHIFT + R	
CTRL + A	
=	
_	
SHIFT + =	
SHIFT + —	
CTRL + =	
CTRL + —	
U	
D	
CTRL + U	
CTRL + D	
CTRL + 0	
CTRL + 1	
н	
V	
X	
с	
E	
· · · · · · · · · · · · ·	CTRL + L CTRL + SHIFT + C CTRL + SHIFT + R CTRL + A = SHIFT + = SHIFT + CTRL + A U D CTRL + U CTRL + D CTRL + 1 H V X C

Hardware

Software

Infinity Quick Start Guide

Serial Number



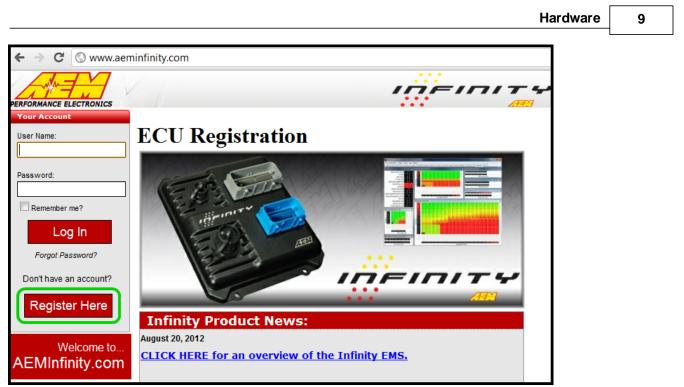
All Infinity ECUs are serialized. Be sure this identification tag stays intact. Write the number down to be safe. Infinity ECUs are programmed with cryptographically secure firmware files and each ECU has a unique file set. The serial number is used to identify the correct files for your ECU.

Account Registration

Note: Hardware part numbers shown in the screen shots below are examples only. Refer to your individual ECU part number and serial number when filling out registration information.

1) Go to http://www.aeminfinity.com and click on the "Register Here" button.

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2) Enter required information and click the "Register" button.

Your Account	Create a New Account
[Log On]	Use the form below to create a new account.
welcome to … AEMInfinity.com	Passwords are required to be a minimum of 6 characters in length.
	Account Information
	Email address
	User1@aempower.com
	Password
	•••••
	Confirm password
	•••••
	Are you an AEM Tuner?
	Yes, I am an AEM Tuner
	Register

A confirmation email will be sent to the supplied email address. Choose one of the following options:

- a. Click on the "click here" link.
- b. Or, copy the code and enter it into the Confirmation Code Box.

Infinity Quick Start Guide		
10		
🌣 🗅 From	lllllllllllllllllllllllllllllllllllll	Received
Date: Today		
🖂 AEM Int	inity Please confirm your email for your AEMInfinity account	Wed 7/18/2012 3:40 PM
AEM Infir	Firm your email for your AEMInfinity account ity /2012 3:40 PM r1@aempower.com	
Thank you f	or registering at AEMInfinity.com	
To confirm	your account <u>click here</u> .	
	s code after logging on: 389-4c67-8172-1da4cb5809e5	

3) After entering the code, click on the "Confirm" button.

PERFORMANCE ELECTRONICS	
Your Account	Confirmation
Welcome EMSUser1@aempower.com!	Email address is now confirmed. Please continue to your account page.
Member Home	
Tuner Membership	
Change Password	
Contact AEM	
Log Off	
Welcome to AEMInfinity.com	

4) Click on the "your account page" to continue with ECU registration; otherwise click the "Log Off" button.

AEM Infinity ECU Registration

1) Go to http://www.aeminfinity.com and log in to your account.



2) Click on the "Register New Product" button.

				100	=117174
Your Account Welcome EMSUser1@aempower.com! Member Home	Home	r New Product			dirent v
Tuner Membership Change Password	Your Products:				
	Serial N		Used Fo	Managemer	More Info
Log Off	Schurt	under		cts Registered	PIOLE TITO
Welcome to AEMInfinity.com					
	Firmware That	Has Been U	pdated Since Y	ou Downloaded It	
	Serial Number	Firmware	Download Date	Dowloaded Firmware Date	e Current Firmware Date
			No Firm	vare Updates	

3) Enter the Serial Number and Security Code. Serial Number is found on sticker on ECU case. Security Code is included in ECU packaging.

	y Quick Start Guide	
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	le p	ידוחודי
Your Account Welcome	Product Registration	
EMSUser1@aempower.com!	Register	
Member Home	Serial Number: 👔	
Tuner Membership	7100-9991	
Change Password	Example: XXXX-XXXX Security Code:	
Contact AEM	01000013	
Log Off	Example: XXXXXXXX	
Welcome to AEMInfinity.com	Register	

4) Enter Product Registration Information. You must first read and accept the Agreement before completing registration.

PERFORMANCE ELECTRONICS	1	ידוחוקחו
Your Account Welcome EMSUser1@aempower.com!	Add Product Serial Number 7100-9991 Status: Ready To Register	
Tuner Membership Change Password	Your Information * Address:	Product Usage Vehicle Information:
Contact AEM Log Off	123 Fake Street Address (Line 2):	•Make: Honda •Model: Civic
Welcome to AEMInfinity.com	* Zip Code:	•Year: 1998
	92656 • City: Aliso Viejo	Register *Usage Agreement:
	State: California	[Click Here to View Agreement]
	• Country: United States	Complete Registion
	• Phone Number: (555) 867-5309	* Required Fields

5) Read and then accept Usage Agreement by selecting the "I Agree" button.

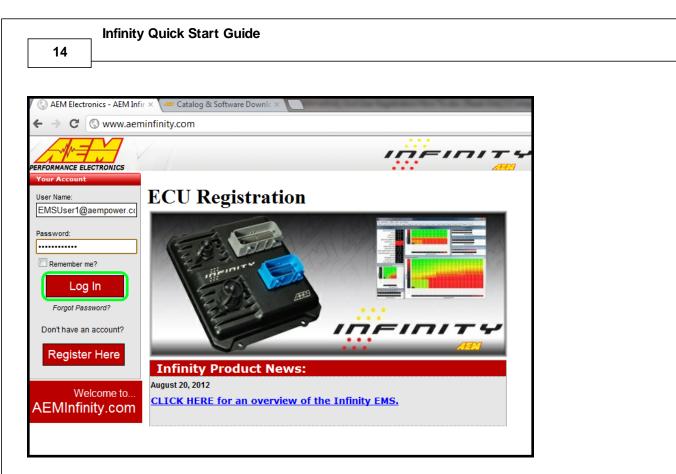
6) Click the "Complete Registration" button once the Usage Agreement has been accepted.

		ידוחוקחו
Your Account Welcome EMSUser1@aempower.com!	Add Product Serial Number 7100-9991 Status: Ready To Register	
Member Home Tuner Membership	Your Information	Product Usage
Change Password	* Address:	Vehicle Information:
Contact AEM	123 Fake Street	*Make: Honda
Log Off	Address (Line 2):	*Model: Civic
Welcome to AEMInfinity.com	* Zip Code:	*Year: 1998
	92656	
	* City:	Register
	Aliso Viejo	*Usage Agreement:
	* State:	Agreed 10/02/2012
	California 🔹	
	* Country:	Complete Registion
	United States	Registion
	* Phone Number:	
	(555) 867-5309	* Required Fields

Firmware and Configuration Updates

1) Go to http://www.aeminfinity.com and log in to your account.

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2) Locate Firmware and Configuration updates. Check for Firmware Updates since last downloaded. Click the "INFO" button to locate Firmware and Configuration files.

AEM Electronics - AEM Infi	ir ×		-	on, for the Supervisor New Y	to the Print Street Composition of
← → C 🛇 www.aen	ninfinity.com/Use	r			
				INF	10174
Your Account Welcome EMSUser1@aempower.com!	Home				iemrs.
Member Home Tuner Membership Change Password	[Register	New Product]		
	Your Products:				
Contact AEM				Management	System
Log Off	Serial Numb	er l	Jsed For	Activated	More Info
	<u>7100-9991</u>	1998	Honda Civic	10/2/2012 3:27:32 PN	1 b. (INFO >)
Welcome to AEMInfinity.com					
	Firmware That	Has Been Upd	lated Since Y	ou Downloaded It	
	Serial Number	Firmware	Download Date	Dowloaded Firmware Date	Current Firmware Date
		a .	No Firmv	vare Updates	

3) Locate the desired Configuration file and click the "Download" button. The Configuration file includes the Firmware and the Configuration files as a .pakgrp file.

ailable Softw		
File	Infinity Engine Manager Configuration	Created
Download	v96.1 Inf-10 Universal	5/20/2015 2:49:43 PM
Download	v96.1 Inf-10 Semi-Seq	5/20/2015 2:49:43 PM
Download	v96.1 Inf-10 Ford Coyote	5/20/2015 2:49:42 PM
Download	v96.1 Inf-10 Diagnostics	5/20/2015 2:49:42 PM
Download	pre-v96.1 Legacy Peripheral Firmware	5/20/2015 2:49:42 PM
Download	Infinity-10 Ford Coyote V96	11/10/2014 2:59:49 PM
Download	Infinity-10 Semi-Sequential V96	11/10/2014 2:19:05 PM
Download	Infinity-10 Output Diagnostic V96	11/10/2014 2:19:05 PM
Download	Infinity-10 Universal V96	11/10/2014 2:19:05 PM

4) Save the .pakgrp file in the AEM Infinity Tuner directory: C:/Program Files (x86)/AEM/Infinity Tuner

Organize 🔻	Open Burn New folder				:=: ▼	1
🔶 Fa	Name	Date modified	Туре	Size		
	DirectX	10/2/2012 10:29 AM	File folder			
	INI INI	10/2/2012 10:29 AM	File folder			
\$	Layouts	10/2/2012 10:29 AM	File folder			
=	Plugins	10/2/2012 10:30 AM	File folder			
🕽 Li	Sessions	10/2/2012 10:29 AM	File folder			
	WizardInstaller	10/2/2012 10:29 AM	File folder			
J -	2 Simple Layout.itlyt	6/11/2012 6:58 PM	Infinity Tuner Lay	34 KB		
8	2012-04-09 Laser UEGO lavout.itlvt	4/10/2012 5:03 PM	Infinity Tuner Lay	123 KB		
(7100-9991-32.pakgrp	10/3/2012 9:05 AM	PAKGRP File	866 KB		
🖳 Ci 💦	BarVertical.x	9/11/2012 1:02 PM	X File	16 KB		
2	🚳 cdrvxd32.dll	9/11/2012 1:03 PM	Application extens	22 KB		
P	cfg_update.exe	9/24/2012 5:48 PM	Application	1,392 KB		
P	DataTransferDII.dll	9/24/2012 5:47 PM	Application extens	92 KB		
P	GaugeRound.x	9/11/2012 1:02 PM	X File	363 KB		
P	GaugeStealthBlack256.png	9/11/2012 1:02 PM	Paint.NET Image	46 KB		
	GaugeStealthBlack512.png	9/11/2012 1:02 PM	Paint.NET Image	155 KB		
	GaugeStealthBlack1024.png	9/11/2012 1:02 PM	Paint.NET Image	563 KB		
	🖉 InfinityTuner.exe	9/24/2012 5:49 PM	Application	1,552 KB		
🖣 N	InfinityTuner.exe.config	12/1/2011 6:22 PM	XML Configuratio	1 KB		
1	Laser UEGO Test 4_10_12.itlog	4/10/2012 4:58 PM	ITLOG File	31,467 KB		
1	Laser UEGO Test 4_10_12.itssn	5/25/2012 11:16 AM	ITSSN File	105 KB		
1	Laser UEGO Test 4_10_12.itssn.v77	4/10/2012 4:58 PM	V77 File	105 KB		
1	Microsoft.VC80.CRT.manifest	12/1/2006 9:03 PM	MANIFEST File	2 KB		
	ML 00 (ML	10/0/0006 5:00 484	A	460 MD		

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aeminfinity.com file descriptions

Description of files available on aemfinity.com

The following example shows a typical list of available files on aeminfinity.com. This particular examples shows files available for an Infinity-10 ECU (now called Infinity Series 7 part number 30-7100). The list of available files varies by ECU type and firmware release version. Your list may be different.

File	Configuration	Created	
Download	v96.1 Inf-10 Universal	5/20/2015 2:49:43 PM	
Download	v96.1 Inf-10 Semi-Seq	5/20/2015 2:49:43 PM	v96.1 files (the latest version)
Download	v96.1 Inf-10 Ford Coyote	5/20/2015 2:49:42 PM	
Download	v96.1 Inf-10 Diagnostics	5/20/2015 2:49:42 PM	
Download	pre-v96.1 Legacy Peripheral Firmware	5/20/2015 2:49:42 PM	Peripheral Micro firmware compatibl with older versions
Download	Infinity-10 Ford Coyote V96	11/10/2014 2:59:49 PM	
Download	Infinity-10 Semi-Sequential V96	11/10/2014 2:19:05 PM	
Download	Infinity-10 Output Diagnostic V96	11/10/2014 2:19:05 PM	Old v96 files
Download	Infinity-10 Universal V96	11/10/2014 2:19:05 PM	

The files listed in the top highlighted box are an example of the latest files with all latest features available for this hardware platform. There are four options.

- 1. <u>v96.1 Inf-10 Universal</u> A universal pakgrp file that will work on a wide variety of different sequentially injected applications supporting up to 10 injectors and 10 coil outputs.
- <u>v96.1 Inf-10 Semi Seq</u> Same universal above but able to support semi-sequential injection setups with no cam sync
- 3. <u>v96.1 Inf-10 Ford Coyote</u> Same as universal above but able to support certain unique hardware I/O requirements of the Ford Coyote engine
- 4. <u>v96.1 Inf-10 Diagnostics</u> Unique model designed to provide custom diagnostics features for the Infinity-10 ECU.

The file listed in the second highlighted box is peripheral microcontroller firmware that is only necessary if reverting to older firmware versions after upgrading past v96.1.

The files listed on the third highlighted box are older files still available for download for this hardware platform. They do not have the latest features.

nware Upgrade - [Auto	matic Mor	de]						ſ
		Target Info	В	С		D		
vailable Images Refr	esn		010005B0 Firmware:	96.7115	Peripheral:	96. <mark>8185:</mark> 96.	8185	
	I.	Type Dynamic Model	Name 7101_6500a		Author AEM_Production	Version 96	Description No description.	
	l J							
	Ĺ	Peripheral Contr.	Zuma_Venice.8185		AEM_Production	96	No description.	
		4	11					

(A) - Available Images

À list of configuration (pakgrp) files compatible with a particular ECU. Each Infinity ECU is unique. Pakgrp files from one Infinity ECU can not be used on another Infinity ECU. Several pakgrp files are usually available for each Infinity hardware part number. Selecting one of the items in this list will populate the Image Info window with the descriptions of all files contained in the pakgrp. Appropriate files for your application must be downloaded from aeminfinity.com and saved on your PC in order to appear in this list. Only files appropriate for your ECU will be presented to you on aeminfinity.com.

(B) - Serial Number

This is a unique hardware identifier number for the ECU. Although they are related, it is not the same as the ECU serial number included on the serial number sticker.

(C) - Firmware

The version of the firmware on the primary microcontroller in the Infinity ECU. This is not necessarily the version of the firmware being loaded into the ECU. It is the version being upgraded from. In the example image above, the firmware version currently loaded on the ECU is 96.7115. The version being loaded into the ECU is 96.8192.

(D) - Peripheral

The Infinity ECU includes two different microcontrollers that require firmware. This is the version of the firmware loaded into the peripheral microcontroller.

(E) - Location

The directory location of the selected pakgrp file

(F) - Name

The file name of the selected pakgrp file

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(G) - Images

The number of files or "images" contained within the selected pakgrp file

(H) - Supported Images

The number of valid supported images contained within the selected pakgrp file

(I) - Dynamic Model

Infinity control model files are typically broken into two parts. The dynamic model file primarily contains tuning table data and calibration constants.

(J) - Firmware

The firmware for the primary microcontroller contained within the pakgrp file. This is the version being upgraded to.

(K) - Fixed Model

Infinity control model files are typically broken into two parts. The fixed model file primarily contains control logic math expressions and non-modifiable tuning constants.

(L) - Peripheral Controller

The firmware for the peripheral microcontroller contained within the pakgrp file. This is the version being upgraded to.

(M) - Keep Calibration Data

Select to keep the existing calibration data and import it into the new configuration during the upgrade process.

Pakgrp files are available to registered Infinity users at aeminfinity.com. You must download and save your pakgrp file before proceeding with the firmware update process below.

Firmware Update

BEFORE beginning the update process, be sure to have a saved copy of your tuned session file (if needed). If a power failure occurs during the update process, this is the only way to ensure that the calibration data is not lost. A power failure at certain critical points in this process could render the ECU inoperative, requiring return and repair at AEM. Ensure the PC has a full battery charge and/or is connected to AC power. This process can take <u>UP TO 4 MINUTES</u> to complete, especially if the peripheral microcontroller is updated at the same time.

If the firmware version on the ECU is older than the version supported by your current version of Infinity Tuner, a firmware upgrade will be required when you connect. Otherwise, follow the procedure outlined below.

Note: The firmware update utility is periodically revised and may not match the descriptions below. In the event of a conflict, please follow the instructions provided in the dialog windows themselves or supplemental instructions provided by AEM.

1) Connect to Infinity Tuner.

- a. Plug the USB cable from the ECU into your computer USB port and key ignition ON.
- b. Open Infinity Tuner.

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2) Click the ECU drop-down list and select "Upgrade firmware..."

File Connection	Target Layout Logging	Wizards Help US	B: Infinity-8/10/12
Page 1 Page 2 Y	Undo	[Ctrl Z]	1
	Redo	[Ctrl Y]	
	Commit modifications	[Ctrl Shift C]	
	Revert modifications	[Ctrl Shift R]	
\rightarrow	Upgrade firmware		
	Lock with password		
	Unlock password		
	Clear password		

3) The ECU should not be running an engine at this time. Select "Yes" when the warning message appears.

WARNING	X
8	The target will stop running models (not function) while updating. Continue?
	<u>Y</u> es <u>N</u> o

Begin the Firmware Upgrade process.

- a. Select the desired Configuration "Image" on the left.
 - i. If no images are present check C:\Program Files (x86)\AEM\Infinity Tuner\ and verify .pakgrp file is there. If not, visit <u>http://www.aeminfinity.com</u>, log in, and download appropriate file.
- b. Ensure "Keep Calibration Data" check-box is marked to save current calibration.
- c. Click the "Begin" button to start the upgrade process.

nware Upgrade - [Automatic vailable Images Refresh	Target Info	0005B0 Firmware	: 96.7115	Peripheral: 96	5.8185:96.	8185	
101-0001-92 101-0001-92 101-0001-93	Image Info Location: C:\Progr Name: 7101-0001-	am Files (x86)\AEM\Ini	inity Tuner \7101-0 Images: 4	001-134.pakgrp Supported Ima	ages: 4		
	Type Dynamic Model Firmware Fixed Model Peripheral Contr	Name 7101_6500a Version96_full.8192 7101_6500f Zuma_Venice.8185		Author AEM_Production AEM_Production AEM_Production AEM_Production	Version 96 96 96 96	Description No description. No description. No description. No description.	
	•						•

4) Follow the message at the bottom, and turn the ignition switch OFF when instructed to do so.

vailable Images Refresh		010005B0 Firmware:	96.7115	Peripheral: 96	5.81 <mark>85:9</mark> 6.	8185
l01-0001-92 l01-0001-93		gram Files (x86)\AEM\Infi		_		
	Name: 7101-000	1-134 Name	Images: 4	Supported Ima	version	Description
	Dynamic Model Firmware Fixed Model Peripheral Contr	7101_6500a Version96_full.8192 7101_6500f Zuma_Venice.8185		AEM_Production AEM_Production AEM_Production AEM_Production	96 96 96 96	No description. No description. No description. No description.
						1
rade (1 of 2): Successful!	Please switch target off					
			√ Ke	eep Calibration Data		Begin

vailable Images Refresh 101-0001-134	Target Info Serial Number: 01	0005B0 Firmware	e: 96.7115	Peripheral: 9	5.8 <mark>185:9</mark> 6.	8185	
101-0001-92 101-0001-93	Image Info Location: C:\Progra Name: 7101-0001-	am Files (x86)\AEM\In 134	finity Tuner \7101-0 Images: 4	0001-134.pakgrp Supported Ima	ages: 4		
	Туре	Name		Author	Version	Description	
	Dynamic Model Firmware Fixed Model Peripheral Contr	7101_6500a Version96_full.8192 7101_6500f Zuma_Venice.8185	1	AEM_Production AEM_Production AEM_Production AEM_Production	96 96 96 96	No description. No description. No description. No description.	
		111					•

If Keep Calibration Data is checked, the system will upgrade and load all usable calibration data as shown below.

01-0001-93 Image Info Location: C:\Program Files (x86)\AEM\Infinity Tuner\7101-0001-134.pakgrp Name: 7101-0001-134 Upgrading Version Upgrading Version Dynamic Model Importing N2O_lgn [deg] table data. Firmware Importing N2O_lgn [deg] table data. Fixed Model rxo1_costor Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing Calibration Data	Intervention of the second sec	IDI-0001-93 Location: C:\Program Files (x86)\AEM\Infinity Tuner\7101-0001-134.pakgrp Name: 7101-0001-124 Upgrading Type Dynamic Model Firmware Fixed Model Fixed Model Fixed Model Fixed Model F	Available Images Refresh	Target Info Serial Number: 0100	005B0 Firmware: 96.7115	Peripheral: 96	5.8 <mark>185:9</mark> 6.	8185
Type Version Description Dynamic Model Importing N2O_lgn [deg] table data. fuction 96 No description. Fixed Model 7101_0000 ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description.	Type Version Description Dynamic Model Importing N2O_lgn [deg] table data. Juction 96 No description. Fixed Model 7201_0000 ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description.	Type Version Description Dynamic Model Importing N2O_lgn [deg] table data. fuction 96 No description. Fixed Model True_corror ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing N2O_lgn [deg] table data. Importing Calibration Data Importing Calibration Data Importing Calibration Data	7101-0001-92 7101-0001-93		m Files (x86)\AEM\Infinity Tuner\7101-0001-13	34.pakgrp		
Dynamic Model Importing N2O_lgn [deg] table data. fuction 96 No description. Fixed Model Fixed Model Fixed Model Fixed Model No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. grade (1 of 2): Converting and Importing Calibration Data Importing Calibration Data Importing Calibration Data	Dynamic Model Importing N2O_lgn [deg] table data. fuction 96 No description. Fixed Model Yati_coson ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing N2O_lgn [deg] table data. Importing N2O_lgn [deg] table data. 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing Calibration Data Importing Calibration Data Importing Calibration Data Importing Calibration Data	Dynamic Model Importing N2O_lgn [deg] table data. fuction 96 No description. Fixed Model 7101_0000 ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing N2O_lgn [deg] table data. Importing N2O_lgn [deg] table data. No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing Calibration Data Importing Calibration Data Importing Calibration Data Importing Calibration Data		Name: 7101-0001-1		Supported Ima	ages: 4	
Firmware Importing N2O_lgn [deg] table data. Juction 96 No description. Fixed Model 7101_03001 AEM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Image: state of the state	Firmware Importing N2O_lgn [deg] table data. Juction 96 No description. Fixed Model Zx01_0000 ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing Calibration Data Importing Calibration Data No Importing Calibration Data Importing Calibration Data	Firmware Importing N2O_lgn [deg] table data. fuction 96 No description. Fixed Model 7101_03001 AEM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Image: state of the state		Туре			Version	Description
Firmware Importing N2O_lgn [deg] table data. Juction 96 No description. Fixed Model Tot_cooor ALM_roduction 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing Calibration Data Importing Calibration Data Importing Calibration Data Importing Calibration Data	Firmware Importing N2O_lgn [deg] table data. Juction 96 No description. Fixed Model Fixed Model Fixed Model No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing N2O_lgn [deg] table data. Model No description. No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description.	Firmware Importing N2O_lgn [deg] table data. Juction 96 No description. Fixed Model 7101_00007 ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Importing Calibration Data Importing Calibration Data Importing Calibration Data Importing Calibration Data		Dynamic Model		Juction	96	No description.
Fixed Model 7101_00001 ALM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Image: state of the state	Fixed Model Fixed Model Fixed Model Fixed Model No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Image: State of the state of th	Fixed Model 7101_00001 AEM_Production 96 No description. Peripheral Contr Zuma_Venice.8185 AEM_Production 96 No description. Image: state of the state		Firmware	Importing N2O Ign [deg] table data.	Juction	96	
grade (1 of 2): Converting and Importing Calibration Data	grade (1 of 2): Converting and Importing Calibration Data	grade (1 of 2): Converting and Importing Calibration Data		Fixed Model		roduction	96	No description.
grade (1 of 2); Converting and Importing Calibration Data	grade (1 of 2): Converting and Importing Calibration Data	grade (1 of 2); Converting and Importing Calibration Data		Peripheral Contr	Zuma_Venice.8185 AEM	Production	96	No description.
grade (1 of 2): Converting and Importing Calibration Data	grade (1 of 2): Converting and Importing Calibration Data	grade (1 of 2): Converting and Importing Calibration Data						
					III			1
					N			
			grade (1 of 2): Converting an	d Importing Calibration Data.		alibration Data		Begin
			grade (1 of 2): Converting an	d Importing Calibration Data.		alibration Data		Begin
			grade (1 of 2): Converting an	d Importing Calibration Data.		alibration Data		Begin
			grade (1 of 2): Converting an	d Importing Calibration Data.		alibration Data		Begin

nware Upgrade - [Automati	: Mode]					
Available Images Refresh	Image Info					
1000206_96.1		ram Files (x86)\AEM\Infinity Tuner\010	00206_96.1_bootadded	.pakgrp		
1000206_96.1_bootadded	Name: 01000206	_96.1_bootadded Images: 5	Supported Imag	es: 5		
	Туре	Name	Author	Version	Description	
	Boot Module	Zuma3.6869	AEM_Production	none	No description.	
	Dynamic Model	v96.1_7100_Inf10_SVN6105d	AEM_Production	96	No description.	
	Fixed Model	Version96_full.8155 v96.1 7100 Inf10 SVN6105f	AEM_Production AEM_Production	96 96	No description.	
		. Zuma_Venice_8157	AEM_Production	96	No description.	
	<	all in				×.
econnecting to target						

Note: at certain points in the process, the Infinity ECU will re-boot and attempt to connect with the PC. The time it takes to connect might vary for different PCs. If the process appears to hang at this stage, simply unplug and replug the USB comms connector. Often this will force the PC to re-enumerate the USB port and connect.

01-0001-134 01-0001-92 01-0001-93	Image Info	000580 Firmware: 96.7115 am Files (x86)\AEM\Infinity Tuner\7	Peripheral: 9 101-0001-134.pakgrp	6.8185:96.81	85
	Name: 7101-0001-	134 Images: 4	Supported Ima	ages: 4	
	Туре	Name	Author	Version D	Description
	Dynamic Model Firmware Fixed Model	7101_6500a Version96_full.8192 7101_6500f	AEM_Production AEM_Production AEM_Production	96 N	No description. No description. No description.
	Peripheral Contr	-	AEM_Production		No description.
	•				Þ.
		N			

6. When the "Peripheral Control Module image" is updated, a full power reset may be required meaning either the battery needs to be disconnected and re-connected or all harness connectors need to be removed from the ECU for at least 5 seconds, then re-connected.

Available Images Refresh Image Info Location: C:\Program Files (x86)\AEM\Infinity Tuner\01000206_96.1_bootadded.pakgrp Name: 01000206_96.1_bootadded Images: 5 Supported Images: 5 Type Name Author Version Description	
01000206_96.1 Location: C:\Program Files (x86)\AEM\Infinity Tuner\01000206_96.1_bootadded.pakgrp Name: 01000206_96.1_bootadded Images: 5 Supported Images: 5	
Type Name Author Version Description	
Boot Module Zuma3.6869 AEM_Production none No description	
Dynamic Model v96.1_7100_Inf10_SVN6105d AEM_Production 96 No description	
Firmware Version96_full.8155 AEM_Production 96 No description	
Fixed Model v96.1_7100_Inf10_SVN6105f AEM_Production 96 No description Peripheral Contr Zuma Venice 8157 AEM Production 96 No description	
I A IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	

7. When the message below is displayed, turn the ignition switch back on.

Available Images Refresh 1000206_96.1	Image Info Location: C:\Prog	ram Files (x86)\AEM\	Infinity Tuner \0100	0206_96.1_bootadded.p	akgrp	
1000206_96.1_bootadded	Name: 01000206	_96.1_bootadded	Images: 5	Supported Images	s: 5	
	Туре	Name		Author	Version	Description
	Boot Module	Zuma3.6869		AEM_Production	none	No description.
	Dynamic Model	v96.1_7100_Inf1	0_SVN6105d	AEM_Production	96	No description.
	Firmware	Version96_full.81	55	AEM_Production	96	No description.
	Fixed Model	v96.1_7100_Inf10	0_SVN6105f	AEM_Production	96	No description.
	Peripheral Contr	. Zuma_Venice_815	7	AEM_Production	96	No description.
	•		11			•
econdary Upgrade Successful! Pl	ease switch target on to	o validate secondary	upgrade			

8. When the message at the bottom indicates that it's safe to close the window, click "X" button on the top right of the window.

ilable Images Refresh 1-000 1-134 1-000 1-92		1000580 Firmwar	e: 96.7115	Peripheral: 9	6.8185:96.	8185
1-0001-93	Image Info Location: C:\Prog	ram Files (x86)\AEM\I	nfinity Tuner \7101-	0001-134.pakgrp		
	Name: 7101-0001	-134	Images: 4	Supported Im	ages: 4	
	Туре	Name		Author	Version	Description
	Dynamic Model Firmware Fixed Model Peripheral Contr	7101_6500a Version96_full.819 7101_6500f . Zuma_Venice.8185		AEM_Production AEM_Production AEM_Production AEM_Production	96 96 96 96	No description. No description. No description. No description.
	•	"				

Once the update is complete, it's good practice to cycle the ignition switch to reset the hardware. Once that is done, you can connect and begin monitoring data and/or tuning again. For applications that use a stepper motor idle valve, it's important that a full power reset be done prior to starting the engine. Turn the key off and wait at least 20 seconds before starting. This will allow the stepper valve to park and reset.

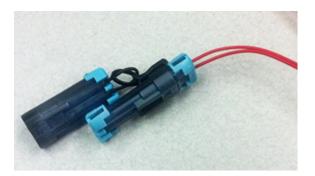
A firmware update will erase the USB log channel list stored in the ECU memory. This channel list will need to be reset before USB logging will function correctly. Go to Logging>USB Logging – Channel Setup. This dialog allows the user to select channels for USB logging. Manually select channels by left clicking on the check box or alternately by using the arrow keys to scroll through the list and the space bar key to select. Logging lists can be saved for later use by using the Save button. The Load button will load previously saved lists of channels. The Append button will append a different list of channels onto the existing list of selected channels. Note that the list of channels for logging is saved in ECU memory. Channels can't be selected offline. They can only be selected when connected to an ECU.

ECU recovery using Flash Enable connector

Although very rare, there are sometimes situations where the ECU becomes unresponsive. In most of these cases, the ECU can be recovered using the flash enable process. When Flash Enable is used, the ECU is forced into a state where it's only function is to accept firmware files and perform no other function.

- 1. Ensure ignition switch is off
- 2. Locate Flash Enable jumper included on most AEM made wiring harnesses plug jumper into Flash Enable connector

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3. Turn ignition switch on – PC should 'chime' indicating a USB connection has been established and software will display green "Unknown Board" status bar.

USB: Unknown Board

- Go ECU>Upgrade Firmware firmware update window will open. Notice that ECU is in manual firmware update mode.
- 5. Firmware update window will show list of applicable firmware files select desired firmware file (typically latest release version)
- 6. Click Begin to start firmware upload process status bar at bottom will monitor update progress
- 7. Because the ECU is in manual firmware update mode, only the first of two firmware files will be loaded. This is normal and will require re-uploading the firmware again without using Flash Enable.
- 8. Once the firmware update process is complete, exit the firmware update window and then turn the ignition switch off. ECU should shut down immediately with no main relay shutdown delay.
- 9. With ignition still off, remove Flash Enable jumper.
- 10. Turn ignition back on and reload firmware again. Notice that when not using Flash Enable, firmware update window will indicate being in Automatic Mode and both of the firmware files will be uploaded automatically.

Firmware Upgrade - [Automatic Mode]

11. One firmware update process is fully completed, import latest saved session file.

USB & Logging Connectors



The Infinity ECU includes high quality weatherproof bulkhead USB communications. The smaller connector is for PC communications. The larger connector is for logging to a USB stick on Series 5 and Series 7 ECUs only. Series 3 ECUs do not have a USB logging capability. Plug one end of a standard USB extension cable (included) into the smaller ECU connector and the other end into an open USB port on the PC. Communication is possible only when the ECU is powered up.

CAUTION

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Use care when routing USB extension cables through or around hood opening and door jambs. Cable abuse that causes an internal short can cause ECU damage.

Tuning Guide

Basic Tuning

Calibration Data

Connecting, Saving and Importing Session Data

- With the Ignition in the ON position and InfinityTuner Running, click on the Connection menu item and select Connect to USB from the dropdown list. A progress bar will be displayed as the laptop gets the calibration info from the ECU.
- 2) Open a layout file by clicking on the Layout menu item and select Open. Layout files have a .itlyt extension and should be saved in the \Documents\AEM\Infinity Tuner\Layouts folder.
- 3) Save the session file by selecting File Save session. Session files have a .itssn extension and should be saved in the \Documents\AEM\Infinity Tuner\Sessions\Base Sessions folder.

The default calibration data provided by AEM should be sufficient to start an engine with similar displacement, sensor setup, and injectors. Every vehicle must be tuned before use. AEM provided base calibration data is installed to the My Documents\AEM\Infinity Tuner\Sessions folder. To import calibration data from a saved session file, go to File > Import calibration data.

Open saved session	[Ctrl Shift O]
Save session	[Ctrl Shift S]
Import calibration data	
Exit	

Wait a few moments for the operation to complete. Status messages are displayed during the process notifying the user of each step along the way. If the import function is done while connected to an ECU, after the import is complete:

- 1) Turn the key off and wait for the main relay to power down completely. This usually takes about 10 seconds but depends on the model.
- 2) Turn the key back on.

Certain applications with CAN dash requirements must be powered down completely and restarted after an import calibration. If this is not done, error lights may appear on the dash.

Table axes

Table axis data must be strictly increasing. If the user attempts to enter values that do not follow this rule, Infinity Tuner will notify and attempt to solve the problem.

x

Cancel

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Axis Cells

The resulting cells are not strictly increasing. Do you want to increment cells to make room where necessary?

Yes

Select "Yes" to increment cells to make room. Select "No" to decrement cells to make room. Select "Cancel" to abort changes.

Г	20	105	105	105	105	105	105	407	440	44.4	44.4	44.4	44.4	440	100	400	100	99	98	98	98
	32	105	105	105	105	105	105	107		114	114	114	114	112	109	106	102				
	29	105	105	105	105	105	105	107	112	113	114	114	114	112	109	106	102	99	98	98	98
	26	105	105	105	105	105	105	107	109	111	113	114	114	112	109	106	102	99	98	98	98
	23	105	105	105	105	105	105	106	109	111	113	114	114	112	109	106	102	99	98	98	98
	20	105	105	105	105	105	105	106	108	110	113	114	114	112	109	105	101	98	98	97	97
l	17	105	105	105	105	105	105	106	107	110	112	113	112	110	107	104	100	97	97	96	96
	15	105	105	105	105	105	105	106	107	109	111	112	110	108	105	103	99	97	96	96	96
	12	105	105	105	105	105	105	105	107	108	110	111	109	107	104	102	98	95	95	94	94
	[jsd] 9 9	105	105	105	105	105	105	105	106	107	109	109	107	105	102	100	97	95	94	94	94
l	а <u>о</u>	104	104	104	104	104	104	105	105	106	107	107	105	103	101	99	97	95	95	94	94 96
	MAP 3	100	100	100 92	100 92	100 93	101 93	102 97	103 98	105 100	106	106	105	103	101	99 99	98 97	96 97	96 96	96 96	96
	0 -3	92 86	92 86	92 87	92 87	93 88	95 89	97	90	94	103 98	104 100	103 100	102	98	99 97	96	96	96 95	96 95	96
	-3 -6	00 78	00 78	07 78	79	82	84	85	92 87	94 90	90	95	96	96	90	97	90	90	95	95	95
	-0 -9	68	68	68	69	02 74	04 74	77	80	83	95 87	95 89	90	90	95	94	89	89	92 89	92 89	92 89
	-9 -9	60	60	60	61	62	67	71	74	03 77	81	84	86	87	87	86	86	85	85	85	85
	-5	54	55	55	55	57	61	66	70	73	76	79	81	82	82	82	82	81	81	81	81
	-10	51	55	55	52	53	57	62	66	69	72	75	77	78	78	78	78	78	78	78	78
	-12	48	48	48	49	50	54	58	62	65	68	71	73	74	74	74	74	74	74	74	74
	-13	46		46	47	48	52	55	59	62	65	68	70	71	71	71	71	71	71	71	71
	10	10	40	140	141	40	102	00	100	02	100	00	110								
					1																
		500	750	1000	1250	1500	2000	2500	3000					5500	6000	6500	7000	7500	8000	8500	900
										E	ingineS	peed (F	(PM]								

No

AXIS VALUES MUST BE INCREASING

These fail safes can be circumvented by importing .csv table data from Excel and/or importing calibration data from a session file that contains improper axis data. If this happens, the ECU will stop processing the model. If you suspect something like this may have happened, try importing a previously known, working session file.

Please be aware of cross-platform differences that may require additional attention after importing calibration data.

Infinity Qu 28 Jnit Preferences	uick Start Guide
Wizards •	Setup Wizard Drive By Wire Wizard Engine History Session Notes Output Diagnostics
	Units Preference

The user can select global unit preferences by going to the menu item Wizard > Units Preference...

Choose Unit System:			
U.S. SI]		
Details:			
Units	Selection		
Mass Density	kg/m³		
Number	% hp kPa		
Power			
Pressure			
Pressure (gauge)	psi (gauge)		
Resistance	Ohm		
Rotational Speed	npm mph °C µs/10 N-m		
Speed			
Temperature			
Time			
Torque			
Voltage	V		
Volume	L		

Choose a global unit system (U.S. or SI) or alternately double click on each unit category and select from available options as shown below for pressure.

				Tuning Guide	29
elect An Unit			×		
Category:		<u>Unit</u>			
Pressure		atm bar inHg kg/m² kPa mbar mmHg Pa psi			
	Ŧ		*		

Wizard Basic Setup

Wizard Design

The ECU setup wizard is designed to simplify the initial configuration of the Infinity ECU. **AEM recommends using the wizard only when connected to the ECU via USB with the power on.** Most of the setup wizards require the engine to NOT be running. Exceptions will be clearly stated in the function descriptions.

The setup wizard contains general and detailed descriptions with each major function. The most imperative functions are discussed below. Use the descriptions in the wizard to assist in the completion of all other setup features. New setup wizard features are being added constantly. Please follow the written descriptions on each wizard page as this document may not accurately represent the features included in the most recent versions.

The Setup Wizard is a stand alone application that runs in conjunction with Infinity Tuner. This software is updated periodically and its appearance and features may not completely match the descriptions below. In the event of a conflict, refer to the descriptions and instructions on the Setup Wizard pages themselves.

With the laptop connected to the Infinity ECU via USB and InfinityTuner connected, go to the Wizard menu at the top of the InfinityTuner layout and select Setup Wizard. Alternately, the hot key combination [ALT]-[w]-[w]-[w] will launch the setup wizard.

Wizard Organization

The wizard is organized into different sections with expandable menu items on the left hand pane. Use the highlighted arrow below in each section to expand the available sections.

gine	Engine displacement number of outing	lare and firing order will be used for ba	sic setup of airflow calculations, ignition	-
ining Preferences	injector mapping, and knock sensor a	ssignment.	sic setup of armow calculations, ignition	anu
m/Crank	Note that selecting Analog MAF (0-5V)	or Frequency MAF (digital) for Airflow	Calculation Method disables VE Table L	oad
ector Setup sic Sensors			s modifications to the Mass Airflow Wiza	
sic Sensors W Tunina				
t Throttle Range	Engine Displacement (L)	3.00	÷ 1	
ition Sync	Number of Cylinders	6		
Advanced Setup - 💌	a second a second s			
— Outputs — 🗸	Engine Cycle Type	4 Stroke	▼	
	Ignition Type	Sequential (Coil On Plug)	-	
	Firing Order	1-5-3-6-2-4	•	
	Airflow Calculation Method	VE]	
	Main Spark Map Load Axis Selection	MAP [kPa]	•	
	VE Table Load Axis Selection	MAP [kPa]	•	
		39		
	10		Clos	

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	Tuning Guide
Engine	
Basic	
Engine displacement, number of cyline injector mapping, and knock sensor a	ders, and firing order will be used for basic setup of airflow calculations, ignition and ssignment.
	or Frequency MAF (digital) for Airflow Calculation Method disables VE Table Load for Airflow Calculation Method disables modifications to the Mass Airflow Wizard.
Engine Displacement (L)	3.00
Number of Cylinders	6 🔹
Engine Cycle Type	4 Stroke
Ignition Type	Sequential (Coil On Plug)
Firing Order:	1-5-3-6-2-4
Airflow Calculation Method	VE
Main Spark Map Load Axis Selection	MAP [kPa]
VE Table Load Axis Selection	MAP [kPa]

Note: This wizard can not be used when the engine is running.

Engine Displacement (L)

Enter the engine displacement in liters. Min value = 0.250, Max value = 10.0

Number of Cylinders:

Enter the number of cylinders within the engine. Min value = 1, Max value = 10Possible values: 1,2,3,4,5,6,8,10

Engine Cycle Type:

Enter the engine type: 2 Stroke or 4 Stroke.

Firing Order:

Select the firing order of the engine.

Airflow Calculation Method:

Select how the airflow calculation is processed. There are 3 options:

VE: This is the default configuration. Airflow is calculated using the speed density algorithm.

0–5V MAF: Airflow is calculated using a 1-axis lookup table that has an analog (0–5V) input from a typical OEM MAF sensor.

Frequency MAF: Airflow calculated using a 1-axis lookup table that has a digital input from a typical OEM MAF sensor

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Main Spark Map Load Axis Selection:

This selection will set the load (y-axis) of the ignition maps. Note: The BaseIgnMap and FlexIgnMap must have the same load channel.

Load Axis Channels:

MAP [kPa] Throttle [%] MassAirflow [gms/s] MassAirflow [gms/rev] MAP/EBP MAP/Baro

VE Table Load Axis Selection:

This is only available if the Airflow Calculation Method is selected. It will set the load (y-axis) of the VE Table.

Load Axis Channels:

MAP [kPa] Throttle [%] MassAirflow [gms/s] MASAirflow [gms/rev] MAP/EBP MAP/Baro DBW_APP1 [%] Filtered

Tuning Preferences

Calibration data is automatically saved to ECU flash memory at key off if the "Key Off Commit" function is selected in the Tuning preferences wizard page. Proper power sequencing is critical in order to avoid problems. If power is removed from both pins C1-10 and C2-50 (Infinity 8/10/12 hardware) before this action is completed, the ECU may become inoperable and require reprogramming at AEM.

Tuning Preferences

Key Off Commit:

If Key Off Commit is selected, the ECU will automatically save any unsaved changes when the ignition power input, Pin C1 -65 is turned off.

This function could take several seconds to complete.

If power is removed from both pins C1-10 and C2-50 before this action has completed, the ECU may become inoperable and require reprogramming at AEM.

Key Off Commit 👿

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Cam/Crank

Choose the Cam/Crank timing type that will be used. The description field notes important information about edge selections and wiring requirements.

AEM Infinity-10		
Basic Setup Setup Setup Setup Setup Basic Sensors DBW Tuning Set Throttle Range	•	Cam/Crank Use the Cam/Crank wizard to select the sensor type, trigger pattern, and noise filter settings for the Cam and Crankshaft sensor inputs. *The Cam/Crank wizard will also set the CamSyncAdjust, TriggerOffset, and VR PWM table specific to your engine type. WARNING: After making changes to Cam/Crank input settings, the Ignition Timing Sync Wizard MUST be used to verify the ignition timing displayed by the ECU matches the ignition timing measured at the crankshaft with a timing light. Failure to do so may result in engine damage!
Ignition Sync Advanced Setup Accel and Decel Fuel Boost Control Engine Protection Fuel Trims Idle	Ш	Sensor Selection: * Toyota Supra (1993-1998 Turbo USDM) * deviates from the selection default values V Hide Details
Input Function Assignme Knock Setup Lambda Control Launch Antilag Launch Timer Nitrous N2O Main Rev Limiter Rev Limit 2 Step Rev Limit 3 Step Shift Cut Traction Control	•	Crank Noise Cancellation 10 Cam 1 Noise Cancellation 10 For 2 and 4 cam VVT applications only: Cam 2 Noise Cancellation 10 Cam 3 Noise Cancellation 0 Cam 4 Noise Cancellation 0
		Close
v2.96 Build 10/14/2014		

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X Select a wizard User defined wizards are displayed in blue text. Wizard Notes: . Name This wizard configures the Cam and Crank AEM EPM (Engine Position Module) sensor settings for the particular application selected. BMW E46 M3 (2001-2006) Dodge Hemi V8 (2005-2008, 36-2-2) Crank(+): C1-45, VR/Mag Dodge Viper V10 (1996-2006) Ξ Crank(-): C1-46 Dodge Viper V10 (2008-2010) Crank Edge: Falling Crank Noise Cancellation: 10 (Adjustable in DSM 1G/2G (1990-1999) Advanced Setup) GM LS Engine 24X Crank Teeth Count (per rev): 12 GM LS Engine 58X Cam(+): C1-48, VR/Mag Honda (2001-2005, K-Series) Cam(-): C1-47 Honda CBR600RR 12 Mag Crank & 3 Mag Cam Cam Edge: Falling Honda Distributor (1992-2000) Cam Noise Cancellation: 10 (Adjustable in Advanced Setup) Mitsubishi EVO 8 (2003-2005) / 9 (2006-2008) Cam Teeth Count (per cycle): 1 Nissan/Infiniti VQ35DE (2 Cam VVT) Toyota 2JZ GTE VVC Toyota Supra (1993-1998 Turbo USDM) Universal 4 Mag Crank & 1 Mag Cam Universal 4 Hall Crank & 1 Hall Cam Universal 4 Mag Crank & 1 Hall Cam Universal 4 Hall Crank & 1 Mag Cam Universal 8 Mag Crank & 1 Mag Cam OK Cancel

Additional settings exist to adjust noise cancellation. For more details see Noise Cancellation

					Tuning Guid	e 35
njector Se	tup					L
Injector S	Setup					
There is a fi phasing for e	xed offset of each injecto ng the user	f 540 degrees fo r needs to be le to designate ea	or each injector, meaning the ss than 720. Selecting 'Has	nat Injector 1 h s Secondary Ir	types, 02 feedback selection, and inject has a Phasing of 540 rather than 0 deg njectors' enables a drop-down list for e a the O2 Feedback drop-down lists to a	ees. The ach injector
Primary Fue	I Pressure F	Regulator Refer	ence Manifold Vacuum R	eference 🔻		
Primary Inje	ctor Flow W	izard Selection	:			
No wizard i	s selected o	or matched. Clic	k the Browse button to sele	ect one.		
Primary Inje	ctor Duty Li	mit	95	<u>+</u>	<u>%</u>	
					- <u></u>	
Number of Ir	njectors		8	•		
Has Second	ary Injectors	s				
Primary Fue	l Type		Gasoline		v	
▼ Hide	Fuel Prop	perties				
Primary Inje	ctor Fuel Sp	ecific Gravity	0.750	*		
Primary Inje	ctor Fuel St	oichiometric Ra	tio 14.70	▲ ▼		
Injector	Туре	Phasing	O2 Feedback			
Injector 1	Primary	0.00	Lambda 1			
Injector 2	Primary	0.00	Lambda1			
Injector 3	Primary	0.00	Lambda1			
Injector 4	Primary	0.00	Lambda 1			
Injector 5	Primary	0.00	Lambda 1			
Injector 6	Primary	0.00	Lambda 1			
Injector 7	Primary	0.00	Lambda 1			
Injector 8	Primary	0.00	Lambda 1			

Primary Injector Duty Limit

Limits the maximum duty applied to primary injectors. Min value = 0, Max value = 100

Number of Injectors

The drop down box allows the user to select the desired Number of Injectors. Min value = 2, Max value = 12

Has Secondary Injectors

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If secondary injectors will be used, select this check box. A new fuel type menu is now visible labeled Fuel Type (Secondary Injectors).

See Staged Injection for additional tuning information.

Note: If secondary injectors are being used, the option *Has Secondary Injectors* must be selected and the table must be filled out indicating any injector number greater than the number of engine cylinders as secondary. These selections must be made before restarting the ECU and closing the form; otherwise an error will occur. See image below for a typical 6 cylinder engine setup with 6 additional injectors classified as secondary. Note also the option to select a different fuel type for primary and secondary.

Fuel Type

This drop down menu contains the following setup information for primary (and secondary fuel types, if selected).

- -Gasoline
- -Ethanol
- -Methanol
- -E85
- -Flex Fuel

Fuel Properties

Fuel properties can be manually edited rather than selecting from the drop down above. Use these settings if your fuel does not match any of the default setups.

Phasing

The default injector phasing for the primary injectors is determined from the Firing Order information from the Ignition Wizard. There is a fixed offset of 540 for injectors. After this offset is added, the system checks to see if the result is less than 720. If the result of the calculation is greater than or equal to 720, it is subtracted by 720 from that result

Example:

4 cylinder 1-3-4-2 firing order: Injector 1 phasing = 0 + 540 (offset) = Injector 3 phasing = 180 + 540 (offset) = Injector 4 phasing = 360 + 540 (offset) = Injector 2 phasing = 540 + 540 (offset) =

O2 Feedback

Lambda sensor assignment is determined by assigning a value of 1 or 2 to the InjXLambdaFB channels. A value of 1 will assign the Lambda 1 sensor and a value of 2 will assign the Lambda 2 sensor. Min value = 1, Max value = 2

M Infinity-6	-	-		strength Birth & Million	of the law lies	23
— Basic Setup — 🔺	Primary Inje	ctor Fuel Ty	/pe	Gasoline	•	
ingine uning Preferences	Injector	Туре	Phasing	02 Feedback		
Cam/Crank	Injector 1	Primary	540.00	Lambda 1		
jector Setup	Injector 2	Primary	360.00	Lambda 1		
asic Sensors	Injector 3	Primary	0.00	Lambda1		
BW Tuning	Injector 4	Primary	180.00	Lambda1		
et Throttle Range						
nition Sync						
Advanced Setup - V						
- Outputs - Y						
	Injector F	low Setu	p			
			22			
	Primary Fue	el Pressure I	Regulator Refer	ance Manifold Vacuum Reference	•	
	Primary Inje	ector Flow V	lizard Selection			
	Fuel Injector	Clinic 775cc	: High Z			

Fuel Pressure Regulator Reference

Allows the user to choose the proper reference pressure for the fuel pressure regulator. The drop down menu has the following options:

Manifold Vacuum Reference: This should be selected if the fuel pressure regulator's port is connected to a vacuum or vacuum/boost source.

Atmospheric Reference: This should be selected if the fuel pressure regulator's port is open to atmosphere or if a dead end fuel system is used where fuel pressure is constant.

InjFlow	Rate [cc/r	nin]				x
499.8	499.8	499.8	499.8	499.8	499.8	4.2
20.0	40.0	50.0	60.0	80.0	100.0	1
		InjPress	ure (psig)			

38 23 Select a wizard User defined wizards are displayed in blue text. Wizard Notes: . Name Choosing this injector type modifies the 550cc Generic following tables: 750cc Generic -Primary Injector Flowrate [cc/sec] BMW E46 M3 -Primary Injector Offset [us/10] Dodge/Chrysler/Jeep P/N 05037787AA -FI_DutyCycX [%high] Fuel Injector Clinic 1050cc SP High Z -FI_OpenTimeX [us/10] Fuel Injector Clinic 1100cc High Z Fuel Injector Clinic 2150cc High Z 12 Fuel Injector Clinic 525cc High Z Fuel Injector Clinic 650cc High Z Fuel Injector Clinic 775cc High Z Fuel Injector Clinic 900cc High Z Injector Dynamics ID1000 1015cc (97 lb) Injector Dynamics ID2000 2225cc (212 lb) Injector Dynamics ID750 715cc (68 lb) Injector Dynamics ID850 885cc (84 lb) Nissan VQ35 Stock Plymouth Laser 450cc (43 lb) 3 ohm RC 1000cc P&H RC 1200cc P&H RC 1600cc P&H OK Cancel

Primary Injector Flow Selection

This database allows the user to select proper primary injector flow data.

InjFlowRate [cc/sec], 1-Axis lookup table of flow vs injector pressure.

InjOffset [us/10], 2-Axis lookup table of PW offset vs battery voltage and injector pressure

Secondary Injector Flow Selection

If Secondary Injectors were selected in the Injector Setup Wizard, this Secondary Injector Flow Selection database will be enabled. This allows the user to select proper secondary injector flow data.

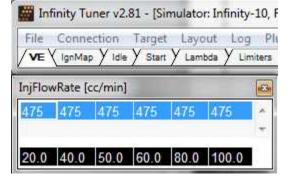
InjSecFlowRate [cc/sec], 1-Axis lookup table of flow vs injector pressure.

InjSecOffset [us/10], 2-Axis lookup table of PW offset vs battery voltage and injector pressure

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NOTE: If the Setup Wizard does not contain your specific fuel injector type, you can modify the InjFlowRate table manually. If you do not know the different flow rates at different fuel pressures, choose a flow rate (based on Manufacturers specs) at a known pressure and populate the entire row with that value. For example, you have a fuel injector that is not listed in the Wizard Selection. You know that it flows 475 cc/min at 45 psi. Select the cells in the upper row of the InjFlowRate [cc/min] table and manually input 475. This will suffice to get the car up and running, though proper flow data is ideal.

File				and the second se	out Log	
/ VE	(IgnMap	y idle	Y Start	Y Lam	b <mark>da</mark> Y Lir	niters
InjFlov	wRate [d	c/min]				8
304	413	465	515	607	860	×
20.0	40.0	50.0	60.0	80.0	100.0	



Set Throttle Range

0.	00
teps	
1. Release throttle and click t	to set the value.
1. Release throttle and click t TPS Min Volts: 0.70	to set the value. Set TPS Volts Min
 Release throttle and click to TPS Min Volts: 0.70 Hold full throttle and click to 	Set TPS Volts Min

The wizard displays a warning message to the user if the software is not connected to a hardware target.

Live TPS Volts

Text and graphical representation of the raw analog voltage is shown.

Steps

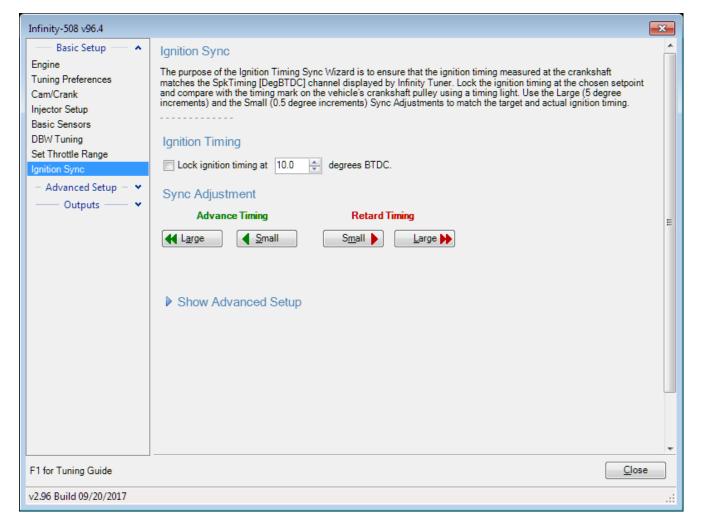
Set TPS Volts Min

Press this button when the throttle pedal is fully released. This will write the current value of Analog7 [V] to the Throttle_raw [%] Analog In conditioner and display the resultant value on the TPS Min Volts: X.XX display.

Set TPS Volts Max

Press this button after the throttle pedal is fully depresses. This will write the current value of Analog7 [V] to the Throttle_raw [%] Analog In conditioner and display the resultant value on the TPS Max Volts: X.XX display.

Ignition Sync



The engine's ignition timing must be synchronized with the Infinity Tuner's ignition timing display. This is crucial with older vehicles that have adjustable distributors, adjustable cam angle sensors, etc. Most modern engines do not utilize a manual adjustment for ignition timing. However, this wizard should always be used for verification as sensors can be frequently installed backwards or upside down. This can catch a problem before damage occurs.

Note: This wizard can only be used when the engine speed is greater than 50 RPM. The ignition timing will automatically unlock when the window is closed reverting back to the normal calculated value.

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	Tuning Guide	41
gnition Timing		
	ng, the ignition timing can be locked by checking the box. : Min value = 0, Max value = 45	
Sync Adjustment		
The window inclu	udes 4 buttons for adjusting the ignition sync settings.	
	ed Large edits the TrigOffset [degBTDC] channel in 5 degree steps. The button lab rigOffset [degBTDC] channel in 0.5 degree steps.	peled
Infinity-508 v96.4		×
 — Basic Setup — ▲ Engine Tuning Preferences Cam/Crank Injector Setup Basic Sensors DBW/ Tuning Set Throttle Range Ignition Sync Advanced Setup - ▼ — Outputs — ▼ 	Ignition Sync Ine purpose of the lightion Timing Sync Wizard is to ensure that the ignition timing measured at the crankshaft measured the timing DegBTDC) channel displayed by Infinity Turer. Lock the ignition timing at the chosen setpoint and compare with the timing mark on the vehicle's crankshaft pulley using a timing light. Use the Large (5 degree increments) Sync Adjustments to match the target and actual ignition timing. Ignition Timing □ Lock ignition timing at 10.0 ⊕ degrees BTDC. Sync Adjustments to match the target and actual ignition timing. Match Intervention More Timing Lock ignition timing at 10.0 etard Timing etard Timing etard Sync Market More Timing etard Sync Market More Timing etard Sync Market for Sync Adjustment More Sync Market More Conference Gold Sync Market More Conference More Timing for Sync Adjust for Sync Market for Sync Market for Sync Adjust for Lock for Sync Adjust for Sync Adjust for Sync Adjust	
F1 for Tuning Guide		<u>C</u> lose
v2.96 Build 09/20/2017		

Advanced Setup

Trigger Offset

This is the fine adjustment to the sync reference point, in crank degrees. Larger numbers will make the coils fire earlier (more advanced). If sync requires an offset beyond the closest crank tooth, the wizard will adjust the Cam Sync Adjust value to compensate. This will require an engine restart.

Cam Sync Adjust

This is the coarse adjustment to the sync reference point, in crank teeth. For example, each step will adjust the sync reference by 30 degrees for a 12-tooth crank trigger wheel, or 10 degrees for a 36-tooth crank trigger wheel, or 90 degrees for a 4-tooth crank trigger wheel. Larger numbers will make the coils fire earlier (more advanced). The ECU needs to be reset after making adjustments to this value, the software will notify the user when a shutdown and ECU reset is necessary.

Pickup sensor delay

This compensates for delays inherent in the crank sensor, ECU circuitry, and/or ignition system outputs. If this is not set correctly, the actual timing measured with a timing light will advance or retard by a few degrees at high RPM. Larger amounts of 'timing drift' indicate a problem with the VR crank sensor polarity, or the ignition system is not configured to work with the ECU's coil outputs. The More and Less buttons increase/decrease the SpkDelayComp [us] value in increments/decrements of 5. Min value = 0, Max value = 500

Two separate procedures are required depending on the Infinity application: Plug and Play or Universal Application.

Plug and Play

- a. In the Ignition Sync wizard, select the checkbox "Lock ignition timing at" and set the "degrees BTDC" (10.0 deg BTDC is the default).
- b. Start the engine and use a timing light to verify that the crankshaft timing matches the locked ignition timing set point (10.0 deg BTDC if using the default setting).
- c. If there is a deviation between the locked set point and the actual timing observed with the timing light, use the Sync Adjustment arrows to match the wizard-displayed value with the actual value. As the Sync Adjustment arrows are advanced or retarded, the timing observed on the crankshaft will change, while the "Lock ignition timing at 10.0 degrees BTDC" will remain constant.

Universal Application

- a. In the Ignition Sync wizard, select the checkbox "Lock ignition timing at" and set the "degrees BTDC" (10.0 deg BTDC is the default).
- b. Do NOT attempt to start the engine. Disable (unplug) the fuel injectors and/or fuel pump.
- c. While cranking the engine, use a timing light to verify that the crankshaft timing matches the locked ignition timing set point (10.0 deg BTDC if using the default setting).
- d. If there is a deviation between the locked set point and the actual timing observed with the timing light, use the Sync Adjustment arrows to match the wizard-displayed value with the actual value. As the Sync Adjustment arrows are advanced or retarded, the timing observed on the crankshaft will change, while the "Lock ignition timing at 10.0 degrees BTDC" will remain constant.
- e. If the Trigger Offset exceeds a maximum that is dependent on your timing type, an adjustment to the Cam Sync Adjust is necessary. The wizard will calculate this value and set it for you. An engine shut down and ECU reset will be necessary. Repeat this process until proper sync is achieved.
- f. Reconnect the fuel injectors and fuel pump.
- g. Once the remaining Setup Wizards have been configured, repeat the Ignition Sync process with the engine running to ensure that the crankshaft timing matches the locked ignition timing set point.

Modified Values

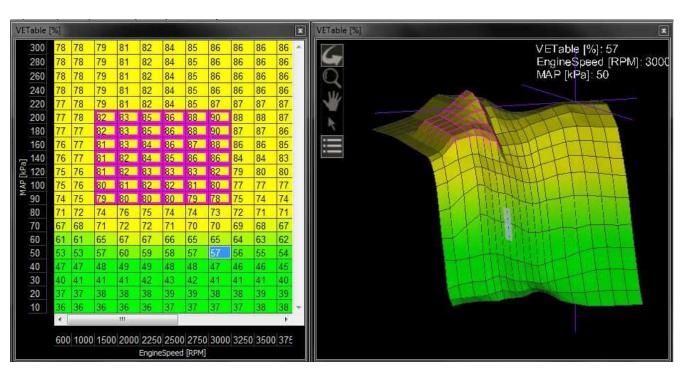
Calibration table changes that haven't been committed to flash memory are highlighted as shown below. Conditions that will reset the display are as follows:

- 1. Manually committing changes through the ECU > Commit modifications menu command
- 2. Manually committing changes using the hot key combination [Ctrl Shift C]

3. Opening and closing the Setup Wizard. Note the Setup Wizard automatically commits ALL changes to memory every time it is closed.

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4. Turning the ignition switch off when the tuning preference Key Off Commit is selected

Right Click Editing

Text Grid	X	VETable [%]																		×
EngineSpeed [RPM]	0	100	78	78	78	80	80	80	80	80	80	81	81	80	81	82	83	83	83	82	82 -
MAP [psi]	0	90	78	78	78	80	80	80	80	80	80	81	81	80	81	82	83	83	83	82	82
Throttle [%]	0.0	80	78	78	78	80	80	80	80	80	80	81	81	80	81	82	83	83	83	82	82
Lambda1 [AFR (Gasoline)]	0.00	70	78	78	78	80	80	80	80	80	79	81	81	80	81	82	83	82	82	81	81
LambdaTarget [AFR (Gasoline)]	0.00	60	78	78	78	80	80	80	80	80	79	81	80	80	81	82	82	82	82	81	81
Inj1LambdaFB	0.00	55	78	78	78	80	80	80	80	80	79	79	79	79	80	81	82	82	82	81	80
CoolantTemp [F]	0	50	78		78	80	80	80	80	80	79	79	79	79	80	80	81	82	82	80	80
AirTemp [F]	0	_ 45	78	78	78	80	80	80	80	80	79	78	78	78	79	79	80	82	81	80	79
SpkTiming [degBTDC]	0.0	종 <u>40</u>	78	78	78	80	80	80	80	80	79	78	77	77	78	78	79	81	80	79	78
Inj1Pulse [ms]	0.1	35 Juottle 30	78		79	80	80	80	79	78	Ad	ld1%					[+]	80	79	78	77
VE [%]	0.0		78	-	78	80	80	79	78	78	Su	btract 1	L%				[-]	77	76	75	74
NewVE	NAN	25	77	77	77	78	78	78	77	17	Ad	ld 10%				[Ctr	+]	73	72	72	71
		20	77	77	77	77	77	76	74	74	Su	btract 1	L0%			[Ct	rl -]	68 60	66	65	64 56
		15 10	77	76 75	76	74 69	76 67	73 62	71 60	70	Inc	rease b					[U]	46	58 45	57 45	44
		8	77 75	73	70	65	61	62 57	60 54	60 53		crease					[D]	39	38	45	36
		6	71	65	60	55	53	50	47	44		crease t				[Ctr		29	28	27	26
VETable [%]	×	4	_	57	52	48	46	45	41	37			5					22	21	20	19
VETable 10/	/1-17	2	55	45	43	40	33	29	28	28	De	crease	by 10			[Ctr	i Dj	19	18	17	16 -
9	PMJ: 3750		4		1.44	P/100	1.4	1		1	Int	erpolat	e horiz	zontally	ł		[H]		1		N.
Q			00	100	0 150	0 200	0 225	0.050	0.075	0.00	Int	erpolat	te verti	cally			[V]	FEO	0 6000	GEOU	700
			000	100	0 150	0,200	0 225	0 200	0 275	0 30	Int	erpolat	te both	(corne	ers)		[C]	0000		0000	101
											Int	erpolat	e both	(edges	5)		[E]				
R R R R R R R R R R R R R R R R R R R		Plot [No i	.og D	ataj							S	nooth (1 Colle	1		[Ctr	4.01				
	- State Lade											nooth (i		•		[Ctr					
	11.4.14										JI	100111 (o Celis	<u>k</u>		ĮCu	111				
6			-	~					1110		2 20115										

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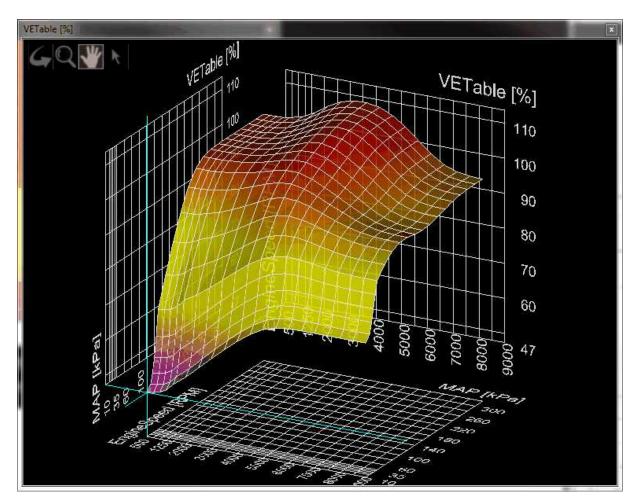
To use the right click menu for editing table values, select a portion of the table and right click. Choose from available options.

VE & Airflow Based Tuning

The Infinity ECU uses significantly different methods of calculating the fuel delivery requirements and outputs than previous AEM products.

Measured data from sensors, i.e., Manifold Absolute Pressure (MAP [kPa]), Air Temperature, Coolant Temperature, and Engine RPM, are acquired. The ECU uses this sensor data in combination with Volumetric Efficiency (VE%) to estimate airflow.

The Volumetric Efficiency is a percentage of air and fuel that actually enters the cylinder during induction relative to the volumetric capacity (rated displacement) of the cylinder under static conditions. The VE lookup table is a 2-axis lookup table, with load values (typically MAP [kPa]) versus Engine RPM. In each table cell, the Engine RPM corresponds with a specific MAP [kPa], and a Volumetric Efficiency is defined for that cell.



The Volumetric Efficiency is combined with temperature sensor data to estimate a compensated Mass Airflow. The ChargeTempBlend table dictates what ratio of air temperature to coolant temperature is used at specific Engine RPM to adjust the density of the inducted air. A higher number gives priority to Coolant Temperature, and is seen at lower Engine RPM.

												Т	uning	Guide	4	5
Charge	empBlend				-	20		K		100	190			1.20	-1	x
0.800	0.800	0.800	0.700	0.600	0.500	0.400	0.300	0.200	0.100	0.100	0.100	0.100	0.100	0.100	0.100	7 7
500	1000	1500	2000	2500	3000	3500	4000 EngineS	4500 peed [RPM]	5000	5500	6000	6500	7000	7500	8000	

Once Mass Airflow has been calculated using the tables above, the Infinity ECU will look up the Target Lambda (AFR) and then calculate the fuel requirements. Target AFR will be used as a main parameter in determining fuel injector flow rate. The LambdaTargetTable (below Left) and AFR Target Table conversion table (below Right) will have default values. Based on the calculated Mass Airflow, the Infinity ECU will attempt to add enough fuel to hit the target AFR.

Note: The calculated LambdaTarget influences the fuel delivered to the engine at all times, even when closed-loop 02 feedback is disabled.

LambdaTa	irgetTable								-	-	x
220	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	~
200	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	
175	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	
150	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	
ay 125	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	
ੀ ਦ 100	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	
80	0.920	0.920	0.940	0.990	0.990	0.990	0.920	0.920	0.920	0.920	
60	0.950	0.950	0.980	0.990	0.990	0.990	0.920	0.920	0.920	0.920	
40	0.980	0.980	0.980	0.990	0.990	0.990	0.920	0.920	0.920	0.920	
30	0.980	0.980	0.980	0.990	0.990	0.990	0.920	0.920	0.920	0.920	-
	4		A)	4	- A	12		35	- XI	- 55	F
	500	1000	1500	2000	2500	3000	3500	4000	6000	8000	
					Engines	Speed [RPM]					

Infinity	Quick	Start	Guide
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3	10.95	10.95	10.95	10.95	10.95	10.95	10.95	10.95	10.95	10.95
-0 -3	12.41 13.43	12.41 13.43	12.41 13.72	12.41 14.45	12.41 14.45	12.41 14.45	12.41 13.43	12.41 13.43	12.41 13.43	12.41 13.43
-6 -9	13.87 14.31	13.87 14.31	14.31	14.45	14.45	14.45	13.43 13.43	13.43	13.43 13.43	13.43 13.43
- <u>9</u> -10	14.31 14.31	14.31	14.31	14.45	14.45	14.45	13.43 13.43	13.43	13.43	13.43

The suggested tuning method is to set the AFR using the LambdaTargetTable or AFR Target Table to a value safe and suitable for the engine. For normally aspirated engines a value of 13.0:1 or 0.887 lambda is usually sufficient at all operating conditions. For boosted applications, the operating conditions dictate a safe AFR. Please consult a tuner knowledgeable in your engine's requirements for help. Once the target lambda (AFR) values are chosen, run the engine at as many operating conditions as possible and adjust the VE Table to reach the AFR Target Table values. Once the VE Table has been tuned to accurately reach the AFR Target Table values at all operating ranges, then you can change the AFR Target Table to use different AFR settings later. Never adjust VETable to run a different AFR, only to achieve the LambdaTarget value.

The Injector Flowrate is very important in determining the fuel requirements. The Infinity ECU uses actual Injector Flowrate [cc/min] to determine the proper injector pulse width. The InjFlowRate [cc/min] table is calibrated from the Setup Wizard: Injector Flow, however the table can be modified manually for unlisted injectors.

499.8	499.8	499.8	499.8	499.8	499.8	1
4					,	
20.0	40.0	50.0	60.0	80.0	100.0	1

Now that the base injector flow rate has been determined, the Infinity ECU applies a few more compensating factors. Wall Wetting is a function of fuel condensing in the intake manifold at the injection point. At different rates of change in the MAP [kPa] values, and at different Coolant Temperatures, fuel enrichment compensations are used to prevent lean and rich conditions during rapid manifold pressure changes. Note that this table has several different functions. It can be used for dynamic transients by nature of its "MAP Rate" x-axis. It can also be used for more steady state compensations by adjusting the values in the "middle band" of the table where MAP rate changes are very small. Positive numbers in this table will effectively add fuel to enrichen the mixture. Negative numbers have the opposite effect.

allWetting	1							Theat	-		
100.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	10.0	15.5	15.5	
2 80.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	10.0	15.5	15.5	
60.0 40.0	0.0	0.0	0.0	0_0	0.0	0.0	5.0	10_0	15.5	15.5	
40.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	15.0	23.5	23.5	
20.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	20.0	31.0	31.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	20.0	31.0	31.0	
-20.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	20.0	31.0	31.0	
	4			~							۶.
	-500.0	-200.0	-100.0	0.0	25.0	50.0	100.0	200.0	300.0	500.0	
				100	Thre	ottle Rate					

The X and Y axis inputs of the WallWetting table can be set to several different variables. These settings are found in the Setup Wizard page for Accel and Decel Fuel. Axis selections include:

Map Rate Throttle Rate Coolant Temp MAP [kPa] EngineSpeed [RPM] DBW_APP Rate

AEM Infinity-6	
Basic Setup — A Engine Tuning Preferences Cam/Crank Injector Setup	Accel and Decel Fuel The WallWetting tables can trim fuel in response to quick throttle or manifold pressure changes. They also can be used to compensate for overly-rich conditions when the throttle is closed rapidly
Basic Sensors DBW Tuning Set Throttle Range Ignition Sync Advanced Setup A Accel and Decel Fuel	WallWetting X-Axis Setup Throttle Rate WallWetting Y-Axis Setup EngineSpeed [RPM] The WallWetting table is used for Acceleration fuel enrichment to ensure crisp throttle response by compensating for fuel that is condensing in the intake manifold and wetting the manifold walls. For most vehicles, Throttle Rate should be used as one of the axis inputs and the values in the table should be higher at increased Throttle Rate-Of-Change values. If the engine runs too rich immediately after closing the throttle, use negative values to remove fuel for negative Throttle Rate-Of-Change values.
Advanced Trims Boost Control Engine Protection Idle Input Function Assign Knock Setup Lambda Control Launch Antilag	Hide Advanced Accel Setup The WallWetting2 table is a second source of acceleration fuel. Default axis inputs are Throttle Rate and Coolant Temp which allows additional accel fuel to be added when the engine is cold. The two tables are added independently; values from WallWetting2 do not depend on values from the main WallWetting table. WallWetting2 X-Axis Setup Throttle Rate WallWetting2 Y-Axis Setup CoolantTemp [C]

LamdaAfterStartTrim is a 2-axis table that is used to modify the Lambda (AFR) for specified time after starting the engine. This table adds a lambda offset for a small period of time after the engine is started. By allowing a slightly richer mixture target, it will keep the engine from stalling or running rough immediately after starting and the lambda correction to a minimum. The last column should be populated with "0" trim at operating temperatures to prevent a continuous lambda offset.

	Infinity	Quick S	Start Gu	ide		
48						
LambdaAft	erStartTri	mi				x
120.0	-0.075	-0.050	-0.025	-0.025	0.000	~
100.0	-0.075	-0.050	-0.025	-0.025	0.000	
<u> 2</u> 80.0	-0.075	-0.050	-0.025	-0.025	0.000	
ਛੇ 60.0	-0.075	-0.050	-0.025	-0.025	0.000	
날 40.0	-0.075	-0.075	-0.050	-0.025	-0.025	
8 20.0	-0.075	-0.075	-0.075	-0.050	-0.050	
0.0	-0.075	-0.075	-0.075	-0.050	-0.050	
-20.0	-0.075	-0.075	-0.075	-0.050	-0.050	-
	4	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -		m		
	1_0	5.0	10.0	15.0	20.0	Ĩ
		Aft	erStartTim	ne [s]		

Individue Ordelle Otenti Ordelle

Target Lambda

To control the engine's fuel delivery system, the Infinity can be programmed to run open loop and/or closed loop O2 feedback. Closed loop uses feedback from the oxygen sensor to make temporary, but immediate, corrections to the injection to maintain a target air fuel ratio (AFR) or lambda. The type of the O2 sensor will determine how lambda target can be controlled. Due to the nature of standard narrow band O2 sensors, the only accurate measurement that can be maintained in closed loop is Lambda 1.0. However, wideband O2 sensors can be used in almost every feedback condition.

Note that 14.64:1 is called the stoichiometric AFR for gasoline. It is the ratio where all available fuel is burned completely. For most performance applications, it is not the ideal AFR to operate the engine at all the time nor is it the AFR that creates the most power or even economy under all conditions.

When the fuel system is open loop, the O2 sensor is ignored and the injector pulse width relies on the VE Table and fuel compensators to adjust injection duration. Open loop is necessary during engine starts, when the O2 sensor has cooled below its operating temperature. It may also be necessary when coolant temperatures are low. In this state, the fuel vaporization is poor and the engine will require a richer mixture to properly operate. When under heavy load, the engine typically requires an air fuel ratio that is out of a narrow band oxygen sensor's standard range and open loop will be necessary. When the accelairflow function is triggered during hard accelerations, open loop may be necessary to help stabilize the Target Lambda. Also, when the deceleration function cuts fuel completely, target lambda will not be necessary.

LambaTargetTable

Units: Engine Load vs Engine Speed vs Lambda **Description:** This table sets the target lambda for various engine conditions.

-	odaTarge 220.0	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	
	200.0	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	
	175.0	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	
	150.0	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	
	125.0	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	0.710	01710	
	100.0	0,820	0.820	0.820	0.820	0.820	0.820	0.820	0.820	0.820	0.820	
	80.0	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	
	60.0	0,940	0.940	0.940	0.980	0,950	0.940	0.940	0.940	0,940	0.940	
	40.0	0.940	0.940	0.940	0,980	0.950	0.940	0.940	0.940	0.940	0.940	
	30.0	0.940	0.940	0.940	0.980	0.950	0.940	0.940	0.940	0.940	0.940	
		500	1000	2000	3000	4000	5000	6000	7000	8000	9000	
						EngineSp	eed [RPM]					

Tuning Target Lambda

The first step before tuning:

- 1. Open Infinity Tuner and connect to the ECU.
- 2. Open the Lambda Tab and confirm the Lambda1Cal Table is set up for the oxygen sensor used.
- 3. Open the Lambda Control Wizard and check the Lambda 1 Feedback Enable and/or Lambda Feedback Enable boxes.
- 4. Set the Lambda Feedback Max Speed. Wideband O2 sensors are accurate in most situations so this can be activated all the time, if need be.
- 5. Set the Lambda Feedback After Start Delay (typical –10 seconds).

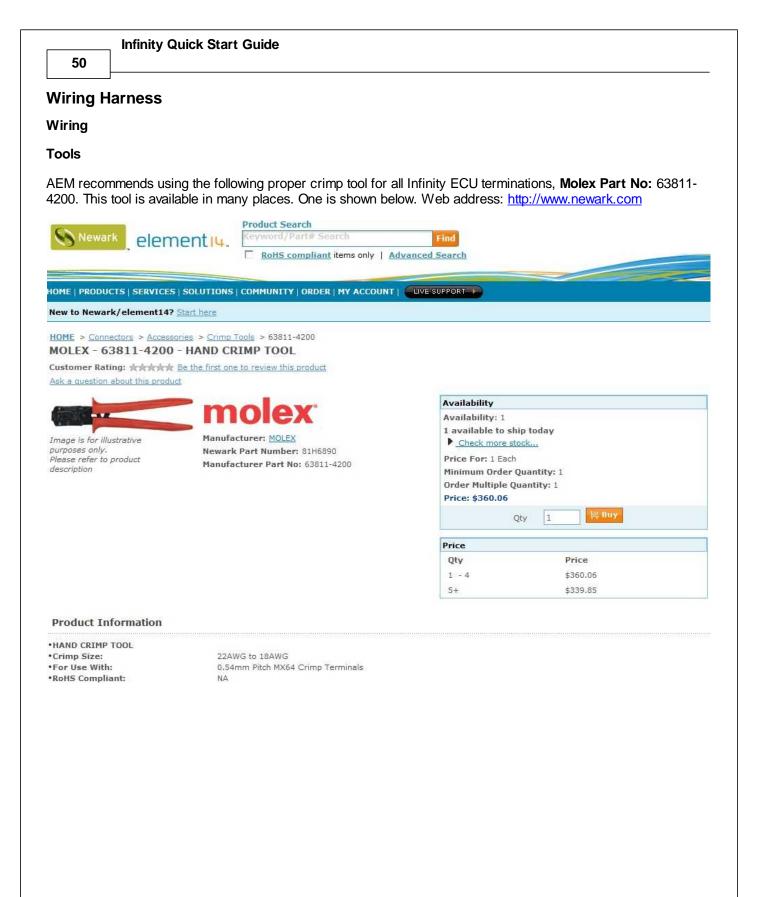
The Infinity Tuner functions are located in the **TargetLambda** tab.

- 1. Use the Lambda Control Proportional Gain by itself and set the Lambda Control Integral Gain and Lambda Control Derivative Gain to zero.
- 2. Log the channels Lambda1 (or 2) and ErrorLambda1 (or 2).
- 3. Increase the Lambda Control Proportional Gain until the point of instability or a sustained oscillation is reached.
- 4. From here, the ultimate proportional (Ku) is found.
- 5. From the log, measure the period of oscillation from peak to peak, in seconds, to obtain the critical time constant or ultimate period (Pu).
- 6. Once the values for Ku and Pu are obtained, the PID parameters can be calculated from the following equations.

Proportional, Integral, and Derivative Feedback Lambda Control Proportional Gain = 0.60 (Ku) Lambda Control Integral Gain = 2 (Kp) / Pu Lambda Control Derivative Gain = (Kp)(Pu) / 8

Note that these values are not optimal values and additional fine tuning may be required to obtain the best target lambda performance.

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		Wiring Harness	51
	quality, alternative is the following crimp ces. One is shown below. Web address	b tool, Molex Part No: 63811-1000. This too :: <u>http://www.newark.com</u>	l is
S Newark eler	Product Search Keyword/Part∉ Search ☐ <u>RoHS compliant</u> items only <u>A</u>	Find dvanced Search	
DME PRODUCTS SERVICE	ES SOLUTIONS COMMUNITY ORDER MY ACCOUNT		
ew to Newark/element14	I? Start here		
	Be the first one to review this product wer on this product <u>Read all the Q&As</u> <u>Ask a question a</u> <u>Ask a question a</u> <u>Manufacturer: MOLEX</u> <u>Newark Part Number: 85C2464</u> <u>Manufacturer Part No: 63811-1000</u>	Availability Availability: 33 33 available to ship today Check more stock Price For: 1 Each Minimum Order Quantity: 1 Order Multiple Quantity: 1 Price: \$49.49 Oty 1	
		Qty 1	
		Price Oty Price	
		1 - 4 \$49,49 5+ \$44.82	
Product Information			
Hand Crimp Tool Crimp Size: For Use With:	24AWG to 18AWG Molex 0.062" Pin & Socket Crimp Terminals		

•Series: •RoHS Compliant:

63811 NA

Idle Air Control Valve Requirements

Many Toyota, Mitsubishi, and other vehicles use an Idle Air Control Valve with a Unipolar Stepper Motor (6-pin connector) and MUST be modified. See picture below. A Bipolar Stepper Motor (e.g., GM) will have a 4-pin connector and DOES NOT need to be modified. *This info does not apply to vehicles that utilize IACV solenoids.





The 2 center pins (Black-Red wires) supply 12V power to the stepper motor in the factory setup, however these pins MUST BE DISCONNECTED before powering on the AEM Infinity ECU.



Step 1: Disconnect connector from IACV housing and gently remove the retainer from the connector.

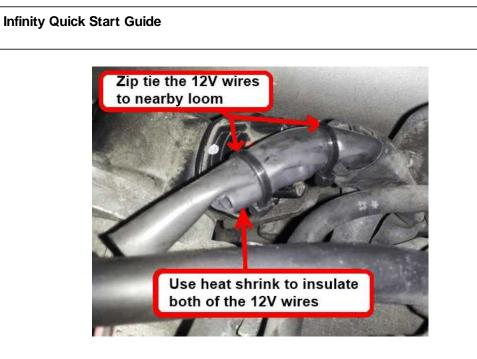
53



Step 2: Use a small flat-blade screwdriver/pick to move the terminal locks while pulling the Black-Red wires out from the backside of the connector.



Step 3: Use heat shrink to insulate both 12V wires and then zip-tie the insulated wires to a nearby loom.



Step 4: Reinstall the retainer, and then plug the connector back into the IACV.

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