

V6 Tune Kit Quick Start Guide

Revision D

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Introduction

The V6 tuning kit includes everything you need to tune your 1994/95 L32/L82 V6 car. The kit inlcudes the C.A.T.S. OBDI Tuner program, the V6 ECM Definition File and the USB/ALDL cable to connect your PC to the car for reading and reprogramming the car's PCM.

The OBDI. Tuner program is a Windows based utility developed to easily make changes to GM ECM/PCM engine and transmission control parameters. The program is designed to run on Windows XP or later operating systems.

The OBDI Tuner program presents all the important tuning parameters in clear easy to understand tables that can be directly edited via keyboard and mouse commands. Once you have made the desired changes, the program rebuilds a valid ECM/PCM file that can be used to program the ECM/PCM.

Minimum PC Requirements

The Tuner program will run on virtually any PC running Windows XP and later that has at least one USB port.

Program Installation

To install the Tuner program, download the setup program from the 'Downloads' page on the C.A.T.S. web site (<u>www.tunercat.com</u>).

Once you have the downloaded the setup program double click on it to begin the installation. To complete the installation, follow the on-screen instructions. You may be asked to restart your computer after the installation is complete. Once the installation is complete, you can delete the setup file from your PC's desktop.

If you are installing the Tuner program on a PC running Windows 7, 8, 10 or 11 then please install the program as follows:

1. Verify that you are logged on to your PC as an administrator.

2. Now double click on the setup program to install the Tuner program and follow the on-screen instructions to complete the installation.

3. After completing the installation set the Tuner program to run in compatibility mode. To do so, right click on the Tuner icon on your Desktop, Select 'Properties' from the pop-up menu and then click the 'Compatibility' tab. On the Compatibility screen check the 'Run this program in compatibility mode for' box, select the default Windows XP SP3, check the 'Run as administrator' box, click on the 'Apply' button and then click on the 'OK' button.

Registering the Program

Once the program installation is complete you should have an icon on your desktop for the Tuner program. Double click on the icon to run the Tuner program.

Sselect 'Register' from the 'Help' menu.

🕮 C.A.T.S. Engine Tuner 🛛 ECM: PCM_EE	
<u>Files Edit Tables Tools ECM Options Window</u>	<u>H</u> elp
	<u>C</u> ontents
	<u>S</u> earch
	<u>R</u> egister
	<u>A</u> bout √\$
	<u>∨</u> ersion Information

When the registration form appears, enter your Customer ID and Serial Number into the appropriate boxes. Your registration information was included in the letter enclosed in your OBDI Tuner kit.

Both the Customer ID and Serial Number are case sensitive and should be entered exactly as received. Enter your Customer ID and Serial Number carefully. Note that your Customer ID is all lower case and all the letters in your Serial Number are all upper case.

🕮 Software Registration 🛛 🗙
To obtain a valid Customer ID and Serial Number to register this software, please send a check or money order for \$69.95 to:
Computer Automotive Tuning Systems 14327 Dogwood Lane Belle Haven, VA 23306
Additional ECM Definition Files are available from C.A.T.S. at a cost of \$19.95 each.
Be sure to include the name of the software you are registering and your e-mail address for faster response.
Customer ID:
Serial Number:
<u>R</u> egister <u>A</u> bort

After entering your registration information click on the 'Register' button to complete the registration. If you entered the information correctly you will receive a message saying the registration was successful.



Click on the 'OK' button and the main OBDI Tuner screen will appear.



Installing the USB/ALDL Interface Cable Drivers

Before connecting and using your USB/ALDL Interface cable you need to install the necessary drivers. To install these drivers, exit the Tuner program To install the USB drivers, download the USB Driver setup program from the 'Downloads' page on the C.A.T.S. web site (<u>www.tunercat.com</u>). Then double click on the installation program and follow the on-screen instructions to complete the driver installation.

Select the Desired ECM Definition File

To display a list of all the installed ECM Definition Files, click on the 'ECM' menu on the main display.

🗐 C.	A.T.S.	Tuner	ECM:	ECM_	42	112
Files	Edit	Tables	Tools	ECM	Options	Windo
F	a (4	3 +	SUBSECT	✓ EC PC	M_42 M_V6	a

Select the desired ECM Definition File from the drop-down list. This tells the Tuner program what type of vehicle you will be working on. Use the 'PCM_V6' selection for these cars

Com Port Selection

When the USB/ALDL Interface Cable drivers are installed, start the Tuner program again, click on the 'Options' menu and select 'Com Port Setup' from the drop-down list.



This will display the Com Port Selection screen.

Com Port Selection	×
	Port Status
COM Port Number:	COM 2 - Available
ОК	Cancel

Click on the down arrow to the right of the Com Port Number box to select the com port that was assigned to your USB/ALDL Interface cable when you installed the drivers and then click 'OK'. The program will save this selection so you don't have to set the com port again unless you change to a different port.

Reading the PCM

To begin tuning you must first read the current calibration information from the car's PCM and load it into the Tuner program (unless you already have a baseline calibration file that you want to start with, see the 'Opening a Calibration File' section).

To read the calibration currently stored in the PCM, click on the Read PCM button select '*Read PCM*' from the '*Tools*' menu.



This will display the read PCM start screen.

🗒 Read PCM Memory	×
Connect the PCM Interface the diagnostics connecto ignition key to the ON posi	Cable to the computer and or in the vehicle. Turn the ition (engine NOT running).
OK	Cancel

Before proceeding, connect your USB/ALDL Interface cable to your PC and to the car's ALDL

connector under the dashboard.

Once the cable is connected, turn the ignition key on but DO NOT start the engine. After turning on the ignition, wait about 10 to 15 seconds to clear the GM security delay before proceeding.

Now click on '*OK*' to begin the read process. If all the connections have been properly made, the program will begin communicating with the PCM, sending the necessary instructions to start the memory read process.

The following status window will be displayed during the read process:

📳 Read PCM Memory	×
DO NOT INTERRUPT	
Status Establishing Communications	
	8

The progress meter shows the progress on the reading of the PCM as it proceeds and the Status window describes what part of the process in currently underway. Depending on the PC you are using, the programming will usually take about five minutes

When the read process is complete, the message shown below will be displayed:



Click 'OK' to complete the PCM read and close the message box. You can now disconnect the USB/ALDL Interface cable from the car and turn off the ignition.

The calibration from your PCM will now be loaded into the Tuner program and you can now view and edit the calibration parameters as needed.

Saving A Calibration File

It's a good idea to save a copy of the original stock calibration to your hard disk before making any

changes. This way, you'll have a baseline to return to if necessary.

To save a calibration file select 'Save As' from the 'File' menu.

📕 C.A.T.S. Eng	jine T	uner	E	CM
<u>Files</u> <u>E</u> dit <u>T</u> able	es T	ools	ECM	0
<u>O</u> pen				
<u>S</u> ave			F	
Save <u>A</u> s	N			
Compare File	М			
Print Table				
Print <u>G</u> raph				
Printer Setup				
<u>C</u> lose				
<u>D</u> efault Path				
E <u>x</u> it				
C:\CATS\Tuner	Asdz	.bin	1	
F:\Tnr639\\$0D\	NBiya.b	oin		

This will display the 'Save As' dialog box. Type in a file name for the calibration file in the 'File name' box and click the 'Save' button.

Save ECM Ca	ibration File As				? ×
Savejn:	🔁 Tuner	•	£	Ċ	
94_6spd.bin	i i				10
bknf.bin					
🕅 Bmjx.bin					
File <u>n</u> ame:	95ss.bin				<u>S</u> ave
Save as <u>t</u> ype:	Binary Files (*.bin)		-		Cancel

Opening a Calibration File

To open an existing Calibration (binary) file select '*Open File'* from the '*File*' menu or click on the Open File **button** on the tool bar at the top of the screen.



This will display the '*Open File*' dialog box. Select the desired file and click the '*OK*' button.

Open ECM C	alibration File			? ×
Look jn:	🔄 Tuner	•	<u>e</u>	
関 94_6spd.t	oin			
95ss.bin				
Bmix bin				
File <u>n</u> ame:	bknf.bin			Open .
Files of tupe:	Pinaru Filos (* bin)	-	_	
riles of gype.	pinaly riles (".bin)	<u> </u>	_	Cancel

The Tuner program can also open .lt1 format files.

To open an .lt1 format file, click on the drop-down arrow to the right of the 'Files of type' box and select lt1 Files (*.lt1) from the drop-down list.

Open ECM C	alibration File		? ×
Look jn:	🔄 Tuner	- 🗈 (
🔊 bknf.lt1			
🔊 bmjx.lt1			
File <u>n</u> ame:	bmjx.lt1		<u>O</u> pen
Files of type:	LT1 Files (*.lt1)	-	Cancel
	Binary Files (*.bin)		
	All Files (*.*)		

When you select a calibration file, the program will verify that it is a valid calibration file and that the correct ECM Definition File has been selected. If the incorrect configuration file has been selected an error message will be displayed. If possible, the program will indicate which ECM Definition File is required for the selected calibration.

Calibration Tuning

Once you have opened a calibration file you can view and edit the various calibration parameters. To view and edit these parameters click on the *Tables* menu and then select the desired table from the drop-down list.

🗒 C.A.T.S.	Tuner	ECM: PCM	_EE Sou	irce: D:\P	rogram F	iles\CATS	\Tune
Files Edit	Tables	Tools ECM	Options	Window	Help		
🗃 🖪 é	ECM	Switch Table					Fast O
	ECM	Constant Tab	ble				CL Mod
	Main Spark Advance Vs. RPM Vs. MAP						DFCO
	Extended Spark Advance Vs. RPM Vs. MAP						DFCO
	Sparl	k Correction \	/s. MAP Vs	. Coolant 1	ſemp.		IAC Ta
	Close	ed TPS Spark	Advance V	s. RPM			IAC Pa
	Minin	num Spark Ad	vance Vs.	RPM			IAC Of
	Cran	k Spark Adva	nce Vs. Co	olant Temp			Idle Ov
	Knoc	k Fact Attack	Data Vel D	DM .			Tdle Ur

This list will contain all the tables available for the selected ECM Definition File. When you select a table it will be displayed so you can view and edit the calibration values.

The calibration parameters are grouped into three type of tables; a Switch Table, a Constant Table and 2D and 3D tables.

Switch Type Calibration Table

The switch type calibration table will contain all the calibration items that can only have two values or states such as 'on' or 'off', or 'Enabled' or 'Disabled'. This type of table will contain calibration items such as V.A.T.S. enabled/disabled.



Constant Type Calibration Table

The Constant Table is used to present calibration values that represent single values or calibration constants such as the fuel cutoff RPM or injector flow rate.

ECM CONSTANTS	_[l×
Cylinder Volume 717.25 ml/Cyl	¢	<u> </u>
Injector Flow Rate 24.87 lbs/HR	\	
Display Injector Flow Rate 3.97 GL/HR	¥	
MAP Threshold To Enable WOT 15 Kpa	¢	
Cool Thresh For TPS For WOT (HighTemp) 118 Deg C	¢	•

2D and 3D Calibration Tables

The majority of the ECM Calibration Tables will be either 2D or 3D tables. These tables are used to display a series of values that depend on one (2D tables) or 2 other parameters (3D tables).

An example of a 2D table is the 'Initial Startup AFR Enrichment Vs. Coolant Temp.'.

💭 Initial Startup AFR Enrichment Ys. Coolant Temp. 📃 🗖 🗙							
		_					
Deg. C	AFR Corr.						
-40	4.0						
-28	3.8						
-16	3.5						
-4	3.5						
8	3.4						
20	3.2						
32	3.0						
44	2.7						
56	2.4						
68	2.0						
80	1.6						
92	0.6						
104	0.4						
116	0.6						
128	1.0						

A good example of a common 3D table would be the Main Spark Advance Vs. RPM Vs. MAP.

RPM	МАР (Кра)																
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
400	18.0	21.0	22.0	21.0	20.0	19.0	17.0	15.0	12.0	9.0	6.0	3.0	2.0	2.0	2.0	2.0	
600	22.0	25.0	26.0	24.0	22.0	21.0	19.0	17.0	15.0	12.0	9.0	6.0	2.0	-1.0	-2.0	-2.0	
800	26.0	28.5	29.5	26.0	23.0	21.5	21.0	20.5	18.5	15.5	12.5	9.5	6.0	4.0	2.0	0.0	
1000	29.0	30.5	30.5	28.0	27.0	25.5	24.0	22.0	19.5	16.5	13.5	10.5	7.0	5.0	4.0	3.0	
1200	31.0	33.0	32.5	30.0	28.0	26.0	25.0	23.5	21.0	18.0	15.5	13.0	11.0	9.0	8.0	7.0	
1400	33.0	35.0	34.0	31.0	29.0	27.5	26.0	24.5	23.0	21.0	19.0	17.0	14.5	12.0	11.0	10.0	
1600	35.0	38.0	37.0	34.0	32.0	30.0	28.5	27.0	25.0	23.0	21.0	19.0	17.0	15.0	13.5	12.0	
1800	36.0	39.0	38.5	35.5	33.5	32.0	30.0	28.5	27.0	25.5	24.0	22.0	20.0	17.5	15.5	14.0	
2000	37.0	40.0	39.5	36.5	34.5	33.5	32.0	31.0	30.0	29.0	27.5	25.0	22.5	20.0	18.5	17.0	
2200	37.0	40.0	40.0	38.0	36.5	35.0	34.0	33.5	32.5	31.5	30.0	28.0	25.0	22.5	20.5	19.0	
2400	37.0	40.0	40.0	38.5	37.0	36.0	35.5	34.5	33.5	32.5	32.0	30.0	27.0	24.5	22.5	21.0	
2800	38.0	43.0	41.0	39.0	38.0	37.0	36.5	35.5	34.5	33.5	33.0	32.0	29.5	27.0	25.5	24.5	
3200	38.0	43.0	43.0	41.0	39.5	38.5	37.5	36.5	35.5	34.5	34.0	33.5	31.5	29.0	28.0	27.0	
3600	38.0	43.0	45.0	42.0	40.5	39.5	38.5	37.5	36.5	35.5	34.5	34.0	31.5	30.0	29.0	28.0	
4000	38.0	44.0	45.0	43.5	41.5	40.0	39.0	38.0	37.0	37.0	36.0	35.0	33.0	31.0	30.0	29.0	

Early Calibrations

Please note that many of the earlier calibrations for these cars that have been superseded by GM were of a different format than the current calibration and the PCM_V6 ECM Definition File is not compatible with many of these earlier calibrations.

If some of the calibration values in the tables look strange you may have one of these earlier calibrations. If you suspect you may have an early calibration send us the VIN for the car you are working on and we can verify it for you. If you need an updated calibration file we can e-mail it to you.

Programming the PCM

Once you are finished tuning you need to load your modified calibration into the car's PCM by programming the PCM with the modified calibration. Before beginning the programming process you should save a copy of you modified calibration in case you need to make additional changes.

WARNING

If the programming process does not complete successfully it is possible to damage the PCM. Under no circumstances should you interrupt the programming process once it is started.

The following are recommendations for the successful programming of your PCM:

- Before programming the PCM, make sure you can successfully read the PCM. This is a very similar process and if that is successful, then the programming should also work fine. YOU CAN NOT DAMAGE YOUR PCM BY READING IT.
- Make sure the car battery is in good condition and fully charged. DO NOT try to program the PCM with a battery charger connected to the car battery. The correct range of the battery voltage for PCM programming is relatively narrow.
- If you're using a laptop, make sure the laptop battery is fully charged.
- Make sure you have good connections between the PC, ALDL connector and the interface cable and that they are not likely to be unintentionally disconnected during the programming process.
- Disable all power management functions on your PC.
- Disable all screen savers on the PC.
- Make sure there are no other applications (programs) running on your PC, including virus checkers.

To program a new calibration into the PCM, click on the Program PCM button into the '*Program PCM*' from the '*Tools*' menu.



This will display the Program PCM start screen.

Program PCM Memory
Connect the PCM Interface Cable to the computer and the diagnostics connector in the vehicle. Turn the ignition key to the ON position (engine NOT running).
WARNING INTERRUPTING THE PROGRAMMING PROCESS CAN DAMAGE YOUR PCM.
Before proceeding:
1. Close all other applications including virus checkers.
2. Disable any screensavers.
3. Disable all power management programs.
OK Cancel

Before proceeding, connect the USB/ALDL Interface cable to your PC. Connect the other end of the converter to the ALDL diagnostics connector in the car.

Once the cable is connected, turn the ignition key on but DO NOT start the engine. After turning on the ignition, wait about 10 to 15 seconds to clear the GM security delay before proceeding with programming.

Now click on '*OK*' to begin the PCM programming process. If all the connections have been properly made, the program will begin communicating with the PCM, sending the necessary instructions to start the memory programming process. The following status screen will be displayed during the read process:

Program PCM Memory	×
DO NOT INTERRUPT	
- Status Establishing Communications	
X	

The progress meter shows the progress on the programming as it proceeds and the Status window describes what part of the process in currently underway. Depending on the PC you are using, the programming will usually take about five minutes.

When the FLASH programming process is complete, the message shown below will be displayed:

PCM FLASH Memory Programming	X
PCM Memory Programming Complete	
ОК	

Click '*OK*' to complete the PCM programming and close the message box.

Your modified calibration has now been transferred to the PCM and is ready for testing.

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