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VTCM Operating Manual Table of Contents

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1. Introduction:

Congratulations on the purchase of your VTCM System! I hope this product will help increase your enjoyment of your LX Vehicle. So let's get started...

Please follow these instructions carefully and do not hesitate to contact me with any questions. Email: TRStone_00@hotmail.com or call 661 -236 -1997.

2. Disclaimer:

As much as I hate to say it, here it is...

This product comes with no warranties or guarantees of any kind. Both installation and use of this system in any vehicle is done at the risk of the owner / operator of the vehicle. The developer / seller of this system cannot be held responsible for any loss, damages or injury caused either directly or indirectly by the installation or use of this system. The system is intended for off road use only. Be advised that the system will produce changes in the drivability of your vehicle. Extreme care and caution should be taken when using this system on wet or snow covered surfaces.

3. VTCM Overview:

a. Basic System Definition:

The definition of the VTCM system is pretty straight forward. The VTCM will deliver a custom shift strategy while the car is in manual stick mode. In addition to shifting, it also manipulates shift firmness. The shift strategy is based on configuration settings that can be adjusted by the user. The system has two "Modes" that can be configured for different driving styles. The driver can move between modes while operating the vehicle. An RGB LED is used to give the driver visual indication of system operation.

- Mode0 = "OFF";
- Mode1 or Mode2 = "ON" with a Status of either "Engaged" or "Paused"

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b. Hierarchy of Shifting Control:

The shifting control of the car is done in the following order.

- While in “D” the TCM will control shifting and firmness (OEM Control)
- While in Manual mode the driver of the car has highest priority over shifting. If the VTCM senses the driver is shifting the car, the VTCM status will go into “Pause” (or stand-by) while the driver controls shifting.
- If VTCM status is “Engaged”, the VTCM will shift the car for the driver.
- Firmness enhancement is always delivered while the car is in Manual mode regardless of how shifts are being made.
- When in Mode0: “OFF”, the VTCM shifting and firmness control is completely disabled.

4. VTCM Operation:

a. System Status LED:

Driving a car with the VTCM requires some indication of its state of operation. Without it, the driver would be “Guessing” as to what the VTCM is doing and what mode it’s in... The colors displayed by the LED are configurable. However, the following is a list of the “Out Of Box” colors and what they mean....

With the Car in “Manual - Stick” mode...

- **OFF** (Dark): >> Mode0 “VTCM OFF” (Fully Disabled)
- **GREEN** (Solid) >> Mode1 “Engaged”
- **GREEN** (Pulsing) >> Mode1 “Paused / Stand-By”
- **RED** (Solid) >> Mode2 “Engaged”
- **RED** (Pulsing) >> Mode2 “Paused / Stand-By”
- **YELLOW**: Transmission Shifting Sequence Is In Progress

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b. Driver Control Methods:

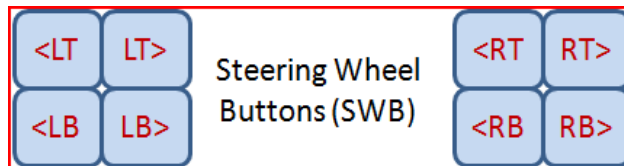
The driver has control over the VTCM operation using either the Cruise Control Wand (CCW) or Steering Wheel Buttons (SWB)... Keep in mind the VTCM system is only “Controllable” while the car is in “Manual Shift Mode”. If the car is in “D” (Automatic Drive) the VTCM’s ability to shift the car is disabled.

With the Car in “Manual - Stick” mode the driver can...

- Change Modes between Mode0, Mode1, or Mode2. **Note: The VTCM will “Remember” the last mode it was in when the car key is cycled off. It will return to that same mode the next time the car is started.*
- Move in, and out of, “Pause / Stand-by”. **Note: If the driver initiates a shift using the shift lever, The VTCM will enter into “Pause” automatically. At that point it will remain paused until the driver “Re-Engages” it.*

The following actions will produce the following effects... **Note: VTCM Cruise Control Wand (CCW) control movements only work when the Cruise Control is off.*

- CCW Upward: = Move Mode Up.
- CCW Downward: = Move Mode Down.
- CCW Push Away = (Pause / Un-Pause) **Toggles in and out of Pause*
- CCW Pull Toward = (Pause / Un-Pause) **Only on some models*



- SWB (<LT + RT>) = Move Mode Up.
- SWB (<LB + RB>) = Move Mode Down.
- SWB (<LT + RB>) = (Enter Pause)
- SWB (<LB + RT>) = (Exit Pause)

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c. Operation Examples:

The following is a short list of examples on how the driver might interact with the VTCM....



- Traffic is thick and you decide you want direct control of the shifting. This could be done in one of two ways...
 - If you want to stay in the current gear, you could initiate Pause mode using either the CCW or the SWB Methods.
 - If you would rather be in a different gear, you could simply use the slap shift lever to get in the desired gear. The VTCM would sense this and enter Pause mode on its own...
 - Once you are done shifting on your own you simply re-engage the VTCM by Un-Pausing it.
- You're slowly driving up a long steep hill and the VTCM is moving back and forth between 2nd & 3rd gear. You would rather stay in 2nd gear and hold higher RPMs at ~ 2800. While the car is in 2nd you pause the VTCM using the CCW. At the top of the hill it levels off you begin to accelerate. You can then Un-Pause the VTCM and it will start shifting the car again. In this case the Pause is acting as a temporary "Gear Hold".
- Your favorite "watering hole" is up the canyon road a ways. Prior to having a cold one you decide to have some fun. You switch the VTCM to mode2 using either the CCW or SWB Methods. You have mode2 tuned for higher shift points and longer float... The car immediately downshifts, the RPMs come up, the gas gauge drops, and your smile gets bigger.... After washing the smile from your face with a cold one you can drive home like a Granny in mode1 and listen to your favorite tunes... If you really want to putt home slowly just put the car in "D". But be careful, you might get depressed with the stock shifting schedule...

**Disclaimer: In no way do I endorse "Drinking & Driving" or "Reckless Driving". This example is a simple attempt at trying being humorous. Just making this disclaimer is funny in itself.*

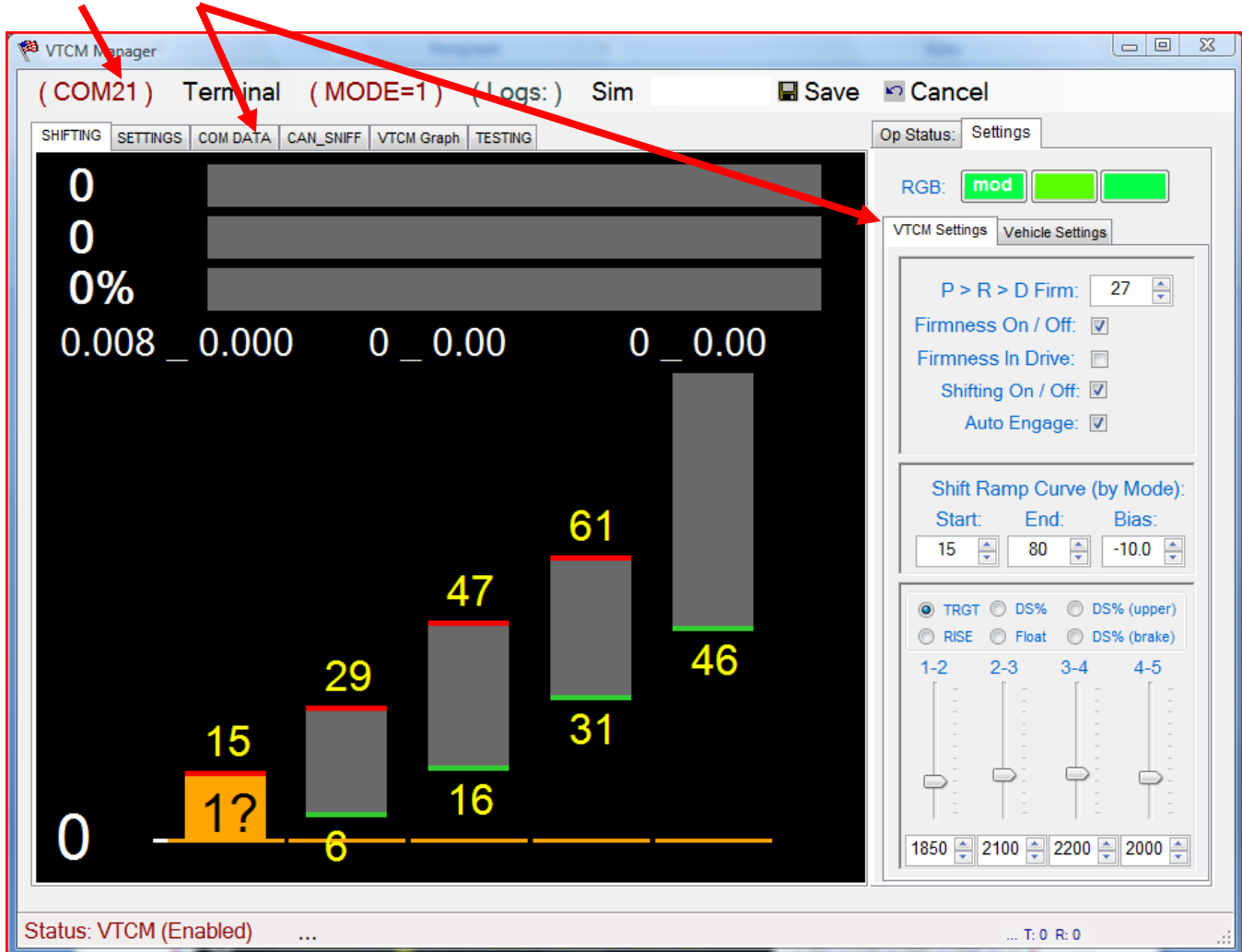
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5. VTCM Manager Overview:

The Manager App is a program designed to manage the configuration files used by the VTCM controller.... It also has other features that interact with the controller directly.

You MUST run the Manager (exe)  VTCM_Manager.exe from inside the VTCM Controller. Plug the controller into  VTCM_Manager.txt your computer and launch the manager from with-in the controller's memory space.

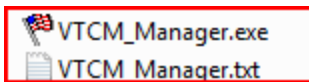
MENUS & TABS are the main navigation parts to the Managers Interface.



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a. Application Size:

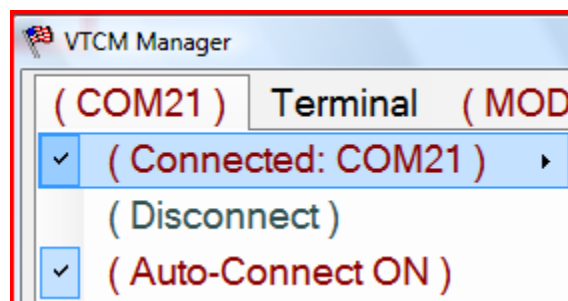
If you open the VTCM Manager and find that the Manager is too big for your computer screen, you can resize it. To do this you need to close the manager and open the file called "VTCM_Manager.txt".



In this text file you will see a setting named "APP_SIZE=1". To make the app smaller set it to "APP_SIZE=.8", the Manager will now open at 80% of its previous size.

b. COM Port Connection:

Be sure your manager is properly connected to your controller through the valid COM Port. If you are not sure if it is connected properly please read the "Software Install" section of the system Installation Instructions. COM Port numbers are unique for each computer. Yours may not be 21.



6. VTCM Settings & Adjustments:

a. Common Settings: (Not Mode Related)

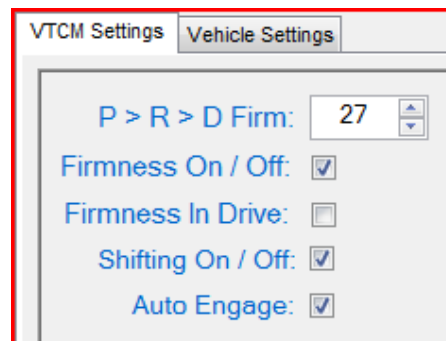
Common settings are held in the configuration file named "COMMON.txt". These are settings that are not related to any single mode. i.e.(tire diameter). Adjust these settings for your car and click "Save" in the Menu bar. Everything on the "Vehicle Settings" tab is common settings.



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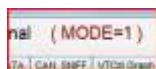
More common settings can be found on the “VTCM Settings” Tab. They are as follows...

- PRD Firm: This setting is the level of firmness engagement you will feel when placing the car into Reverse or Drive. It’s designed to remove the engagement lag.
- Firm On/Off: Disables & Enables Firmness Enhancement.
- Firm in Drive: Set if you want to apply firmness enhancement while the car is in “Automatic” D Mode of operation.
- Shifting On/Off: Disables the VTCM shifting program.
- Auto Engage: Will automatically engage the Manual-Stick when the car is first placed in “D” from either Park or Neutral. *Note: If your preference is to have the VTCM engaged most of the time you will want this set. That way when you place the car into drive the VTCM will automatically engage by itself.

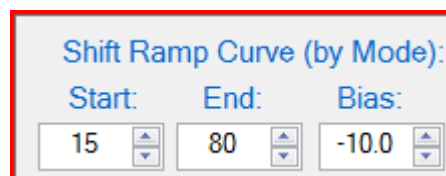


b. Shifting Settings:

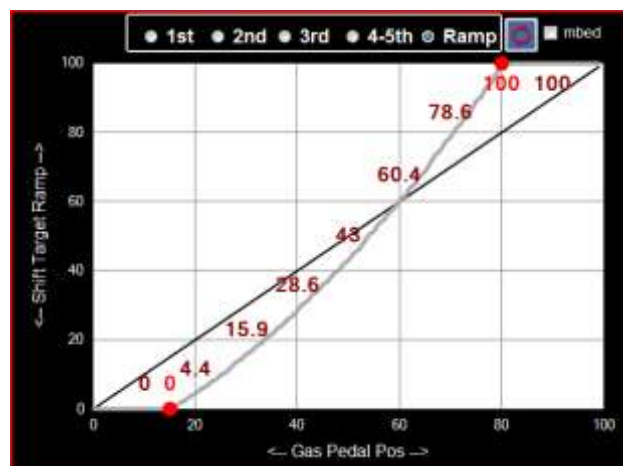
Shift control settings are “MODE” settings. They are held in configuration files named “MODE1.txt” and “MODE2.txt”. The current mode being adjusted is displayed in the Menu header.



The VTCM shifts the car based on MPH Targets. The target up-shift speeds are increased to a maximum for each gear as the driver increases the gas pedal position.



These targets are increased based on a ramp. In the graph you can see the black line as a flat linear ramp from 0-100%. The Shift Ramp Curve settings alter the ramp used to increase the targets. In this case the ramp starts at 15% and ends at 80% of pedal travel. The negative bias creates a negative curve in the slope. This curve will produce Max RPM shifts at 80% pedal position.



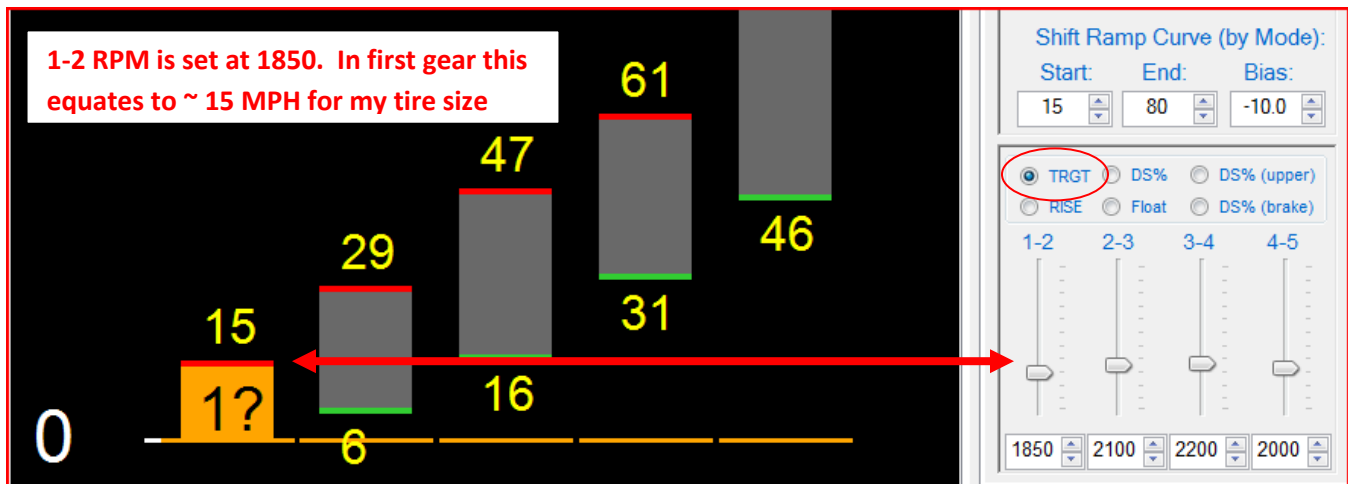
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Click on the “Sim” Menu item to open a pop-up dialog box. This dialog box is used when testing adjustment settings. It allows you to “Fake” values for the Gas, Speed, RPM, and Brake.

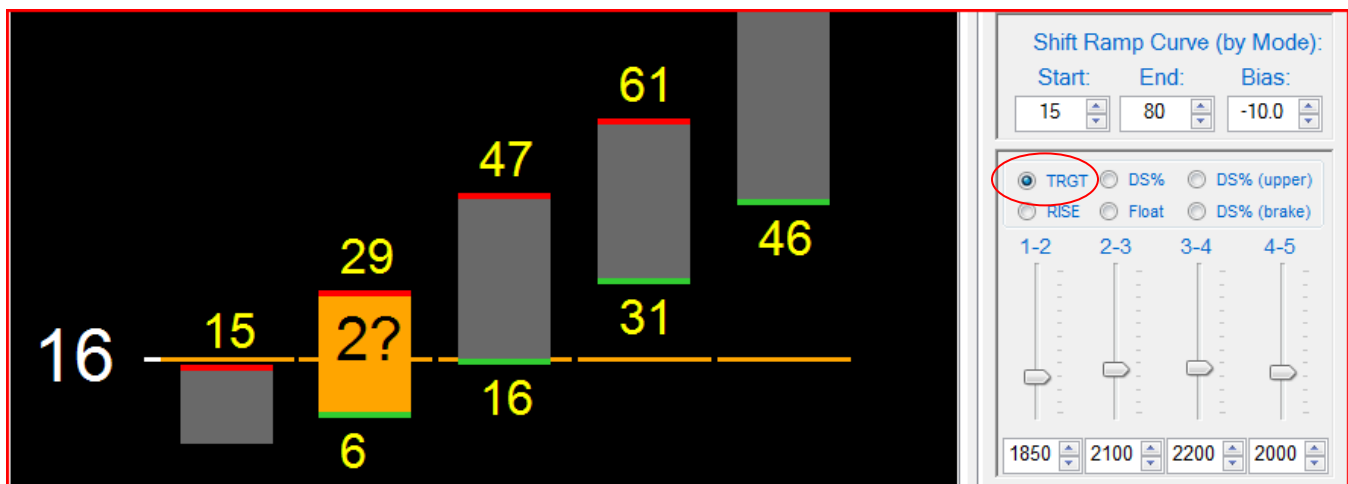


RISE (Ignore it and don't change it). I'll most like hard code it into the app and remove it from the manager someday...

TRGT (Target RPM) sets what the up-shift speed will be with 0% Gas pedal position.



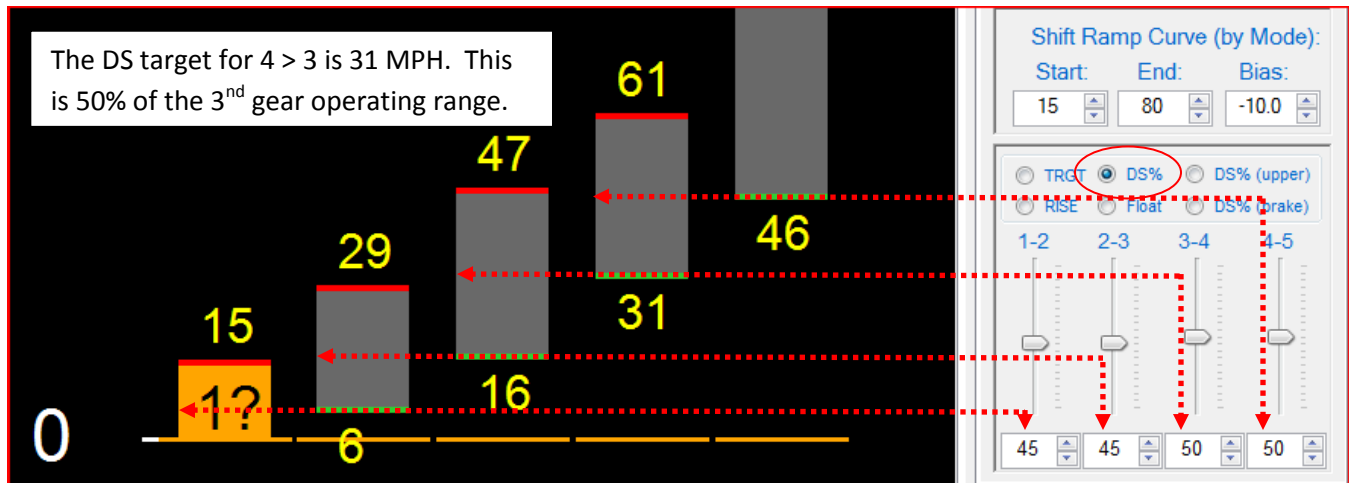
If you recall the ramp curve does not begin till 15% gas pedal position. So in an example where you pressed the gas to only 10%, the car would accelerate in 1st gear to a speed of 16MPH before an up-shift to 2nd gear is triggered.



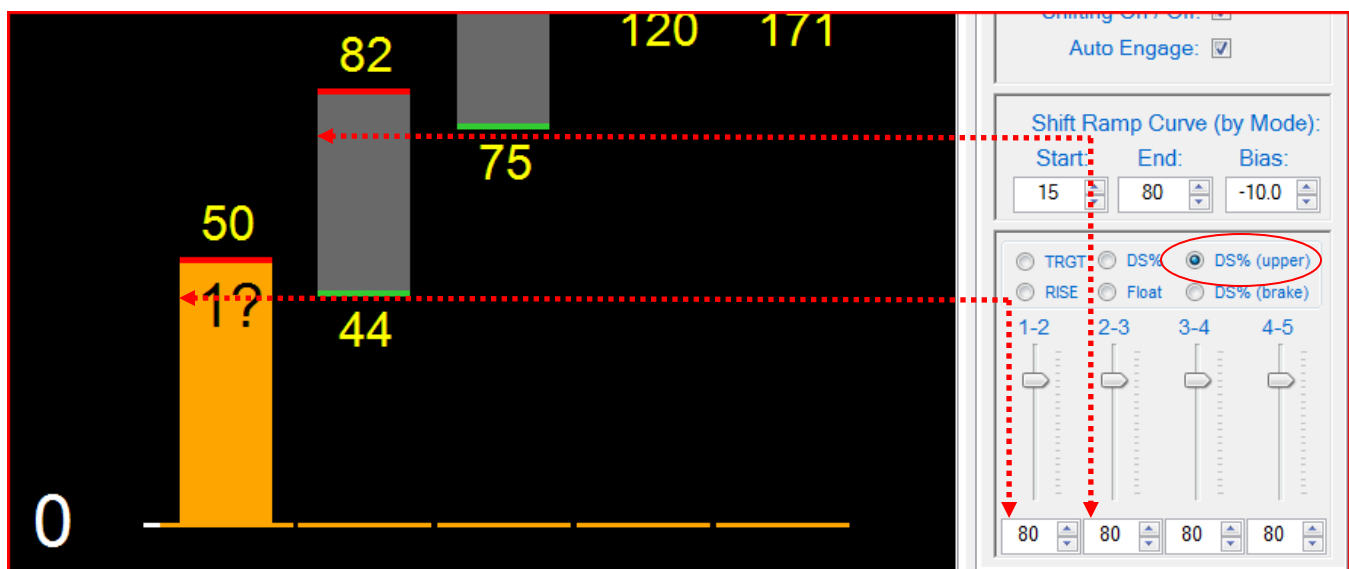
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DS% (Downshift %) sets what percentage of the previous gear will the car downshift into when your foot is off the Gas & off the Brake. Think of this as “Coasting DS Points”.

In the example below you can see that 4th gear will downshift into 3rd gear at 50% of 3rd gears operating range.



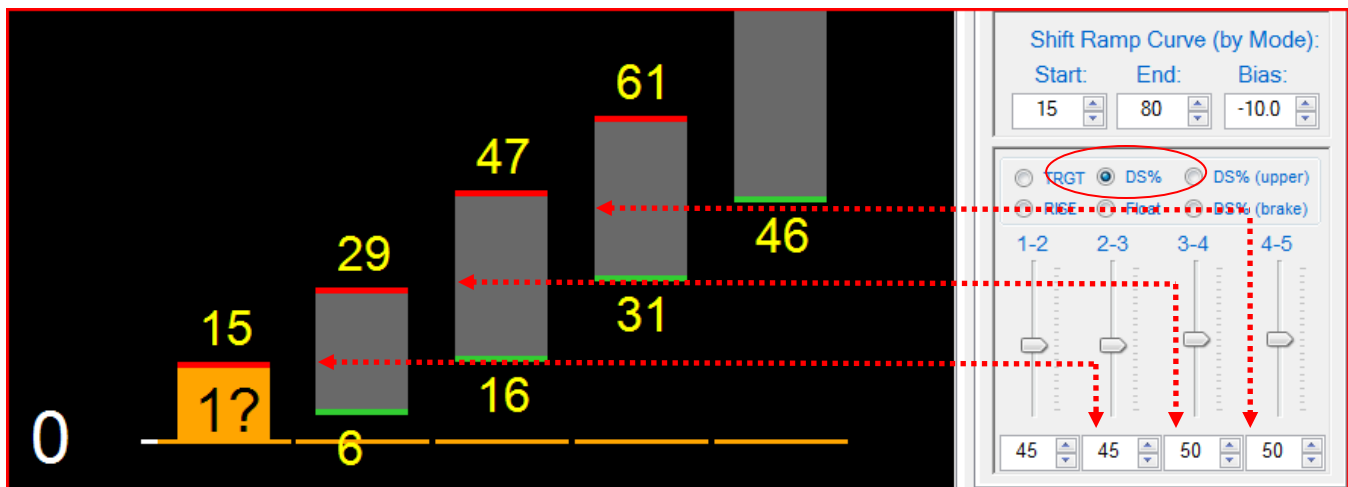
DS% (upper) (Downshift % @ Max Throttle) sets what percentage of the previous gear will the car downshift into when we are at full throttle. Think of this as “Kick-down Targets”. So in the example below, the DS% of 2nd gear downshift to 1st gear increased from 45% to ~ 80% of the first gears operating range.



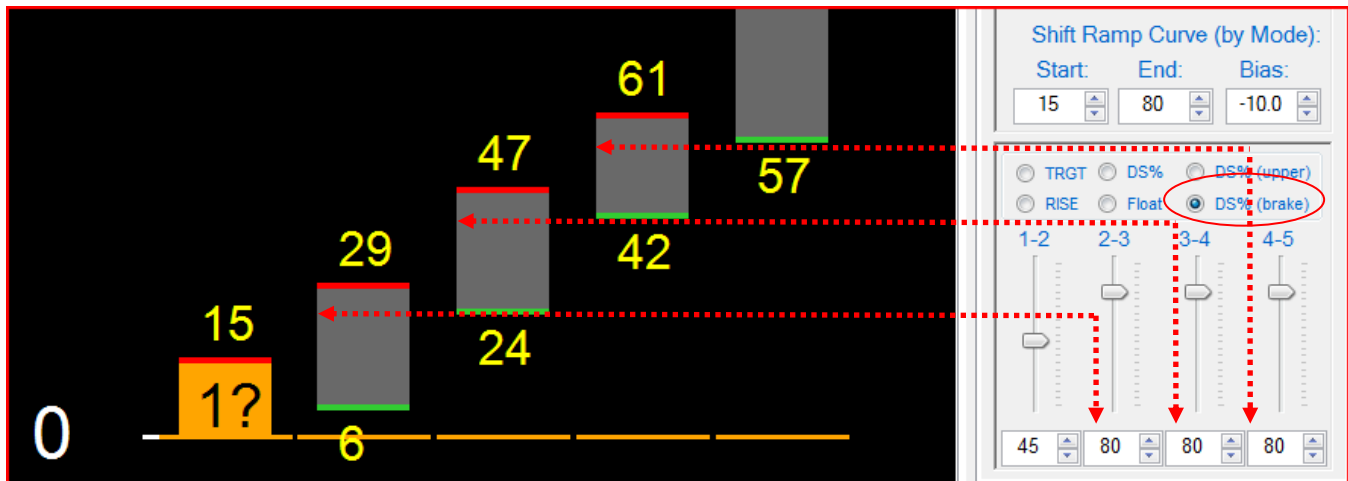
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DS% (brake) (Downshift % with Brake ON) sets what percentage of the previous gear will the car downshift into when the Brake is applied. Think about it... If you driving along and you let your foot off the gas and are coasting you probably do not want to induce a downshift. But if you hit the brake, why not trigger a downshift earlier than normal. So in the example below you can see that when you apply the brake, the 3rd to 2nd gear DS% is increased from 45% (16 mph) to 80% (24 mph)

Brake OFF (If in 3rd @ 20MPH, the gear would hold in 3rd)



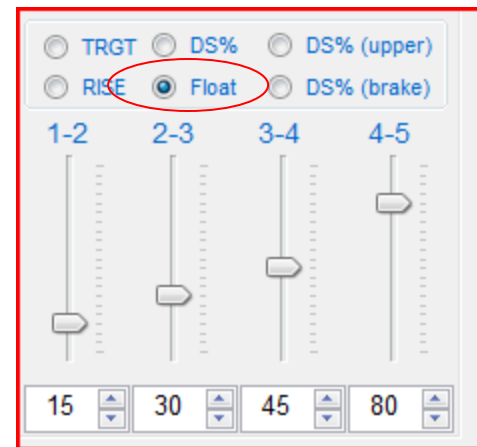
Brake ON (If in 3rd @ 20MPH, 3rd would downshift to 2nd)



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Float (Rate of Target decrease after an Increase). In short, float is dampener, or delay. Float is an odd thing to describe so I'll try and explain using examples. Consider the effect of rapidly increasing and decreasing gas pedal position. The MPH Targets would rise and fall as fast as the calculations are processed. You could in effect trigger a kick-down by pressing on the gas, only to let off the gas and produce an immediate up-shift again. The car would be shifting like crazy.

I have a much higher float setting for 5th gear. This is because the difference between 4th gear and 5th gear is small. Only .17 ratio difference... 5th is an overdrive. So I have it set with an aggressive kick-down % and a high float. That translates into "It will kick-down from 5th to 4th at low pedal position and then take ~ 10 seconds to produce an up-shift again. But it requires me to have a very calm pedal position for the full 10 seconds.



I find it annoying to press the gas in 5th, have the car kick-down and move out, take my foot off the gas for only a second, and have the thing bog back into overdrive just as I'm about to press the gas again...

To see float in action do the following...

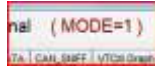
- Open the simulator dialog
- Set MPH = 70
- Move the gas pedal to 100%
- Immediately move the gas to 0%
- Observe... (Try it again but as things are floating down click the brake on and off)

Float kicks in within 10 MPH of an up-shift target. And float will freeze if you apply the brake. Why would you want the car to up-shift while braking? Float takes some getting used to at first. In time you come to depend on it. If you want to hold off an impending up-shift (just tap the gas) and you buy yourself some more time before it up-shifts 😊

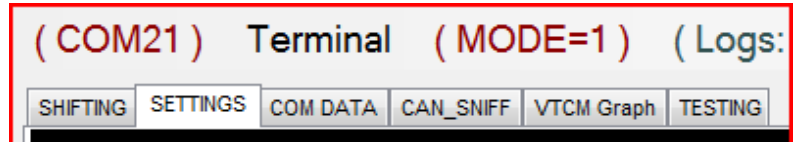
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c. Firmness Settings:

Firmness settings are “MODE” settings. They are held in configuration files named “MODE1.txt” and “MODE2.txt”. The current mode being adjusted is displayed in the Menu header.

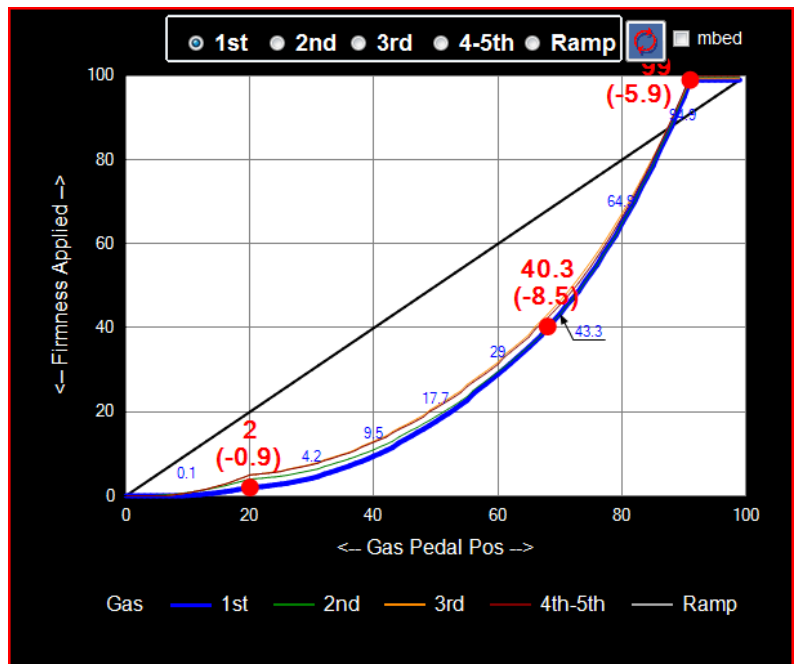


To adjust firmness settings you need to select the “SETTINGS” tab in the main tab set. I know, I know, it should be labeled “firmness Settings”



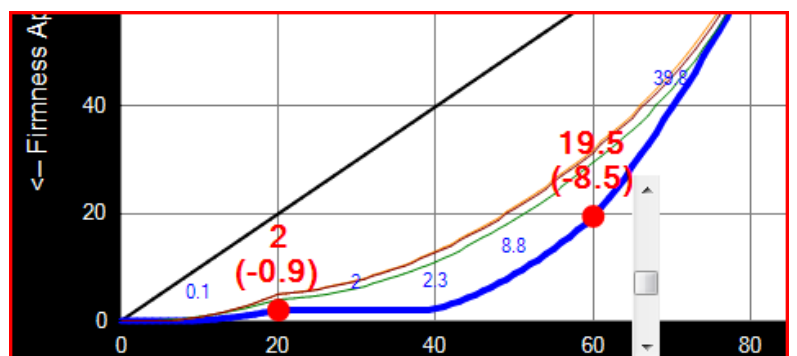
Firmness is a curve adjustment for each gear. You select the radio button at the top for what gear you would like to adjust.

Each firmness curve delivers firmness enhancement based on the gas pedals position on the linear ramp. i.e. the firmness enhancement for 1st gear @ 60% gas pedal position = 29% of max.



To make adjustments to the curve you grab and drag the three “Hot Spot Handles”.

To the right you can see that I dragged the 2nd hot spot to a new position. My curve is not looking to good now...



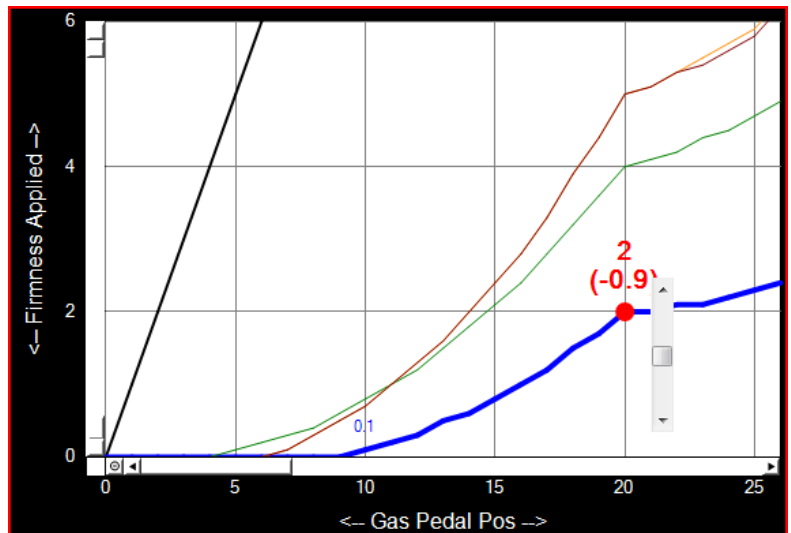
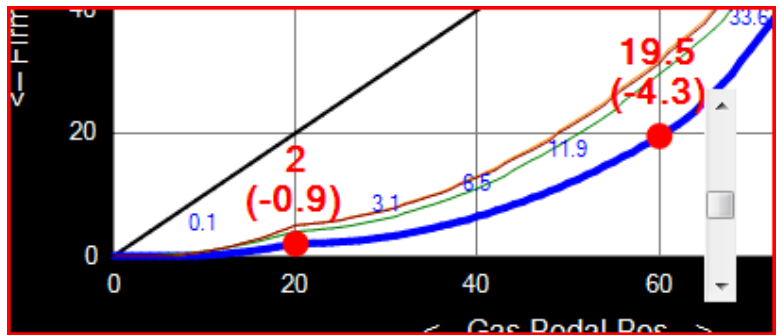
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Right mouse click on the hotspot opens a “Bias Adjustment Slider”. Use the slider to adjust the curves bias setting.

Moving the hotspots and adjusting the bias is the two handles you have in defining the firmness curves you want for each gear.

But what about trying to make adjustments to that first hotspot? How do I go from 2 to 1.8?

Click in the white area to the left of that spot and drag a small square around it. When you release it will “Zoom-in” on that smaller grid. Keep zooming in as necessary.



When you’re done double click anywhere in the white are and you will return to normal screen resolution.

Remember to click “SAVE” to save your changes. Click “Cancel” to discard them.

**Warning: I do not recommend making any adjustments while driving the car. This is especially true with firmness as it can be VERY DISTRACTING. If you do want to make adjustments I tend to try and pay exact attention to what I want to change... i.e. 3rd to 4th up-shift is harsh at 40% gas pedal. Low end feels good... With that I could open the manager and make an adjustment to the curve at that exact condition. OR Get a passenger to make the adjustments while you drive. TIP! When you are making adjustments in the car you can feel the effect of the change BEFORE you save it? If it is no good, click “Cancel”.*

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As you can imagine making specific adjustments can be somewhat confusing at first. So until you understand it all better try and make small moves. Also, keep in mind that many things will adjust other things. There is sometimes more than one way to get an effect too...

Here's an example... Let's say you want your shift points to be higher at mid throttle. So you decide to increase your TRGT settings. But what you find is now the RPMs go very high under light throttle and not much has changed at mid throttle. That's because you changed the low throttle Targets... So how do you make the targets at mid throttle higher but keep the targets the same at low throttle? Answer: Change the slope of the ramp. By reducing the negative bias the slope becomes steeper in the middle. In other words, you targets will be higher in the middle more than they were. But be careful... You will have just made your kick-downs more aggressive also...

7. Other Features & Miscellaneous Stuff:

a. Data Logging:

b. CAN Sniffing:

c. Operational Monitor:

d. Configuration Files: