

# **CurveMaker DFS v2.0**

## **Dyna FS Ignition Programming Software**

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**WARNING: This product is intended for use by experienced tuners only. Improper ignition tuning may cause severe engine damage, resulting in personal injury.**

### **1) Installation**

Insert the CurveMaker CD into your CD ROM drive. Open the CD in Windows Explorer. Double click on the Setup icon to begin installation. You may have to disable anti-virus software at this time.

The Setup program first checks to see if the computer has the correct Java version already installed. If it does not, the correct version is installed. Allow the Java program to be installed into the default directory.

Once this is done, there is a choice between a complete and custom installation. The custom installation allows installation of only the files needed for the ignitions you plan on programming. The complete installation installs the files for all of the ignitions.

The program will be installed to the C:\Program Files\Dynatek folder by default. Do not change this setting.

The installation program will create a Program group named "Dynatek". To find it, click the Windows Start button, then click "Programs" on the menu that appears. When you click on "Programs" another menu will appear, and "Dynatek" will be one of the choices. Click "Dynatek", and another menu will appear. This menu will contain the icons for the ignitions that were installed. Click on the icon for the ignition to be programmed, and the CurveMaker program will start.

Some computers may not be able to complete the setup program. If the setup program fails before or during the installation of the Java Virtual Machine, there is a second method to try. On the CD in a folder labeled contents, is the file: jre-1\_3\_1-09-windows-i586-i.exe. Install this program first, then restart your machine, and then run the setup program again.

### **2) Overview**

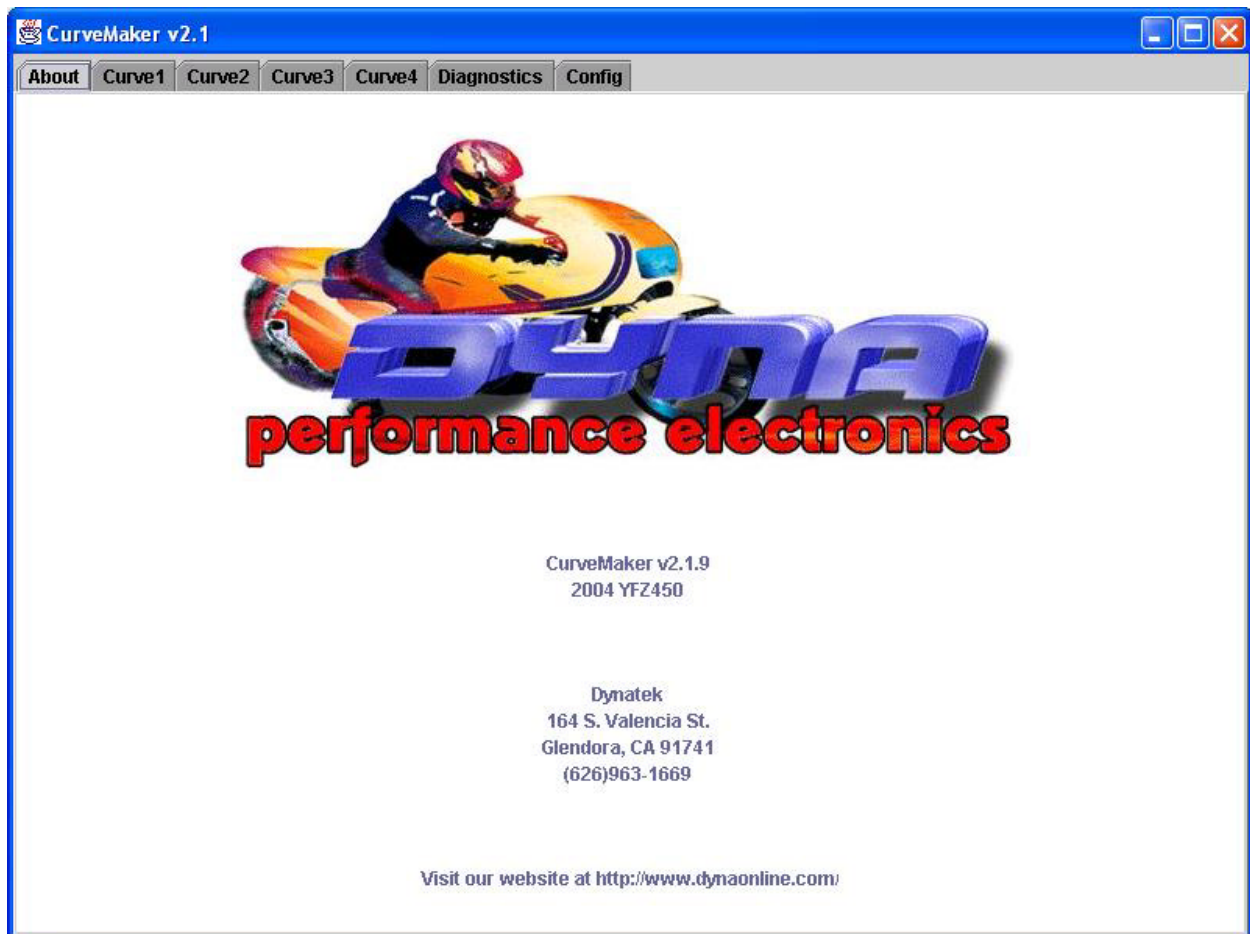
The DynaFS programmable ignition comes with standard default curves installed. With the CurveMaker software, these curves can be reprogrammed. The rev limit and other ignition specific functions can also be reprogrammed.

Once the ignition curve is programmed into the ignition, it cannot be downloaded from the ignition. This allows tuners and race teams to make their curves, program customer's ignitions with them, and still keep them proprietary.

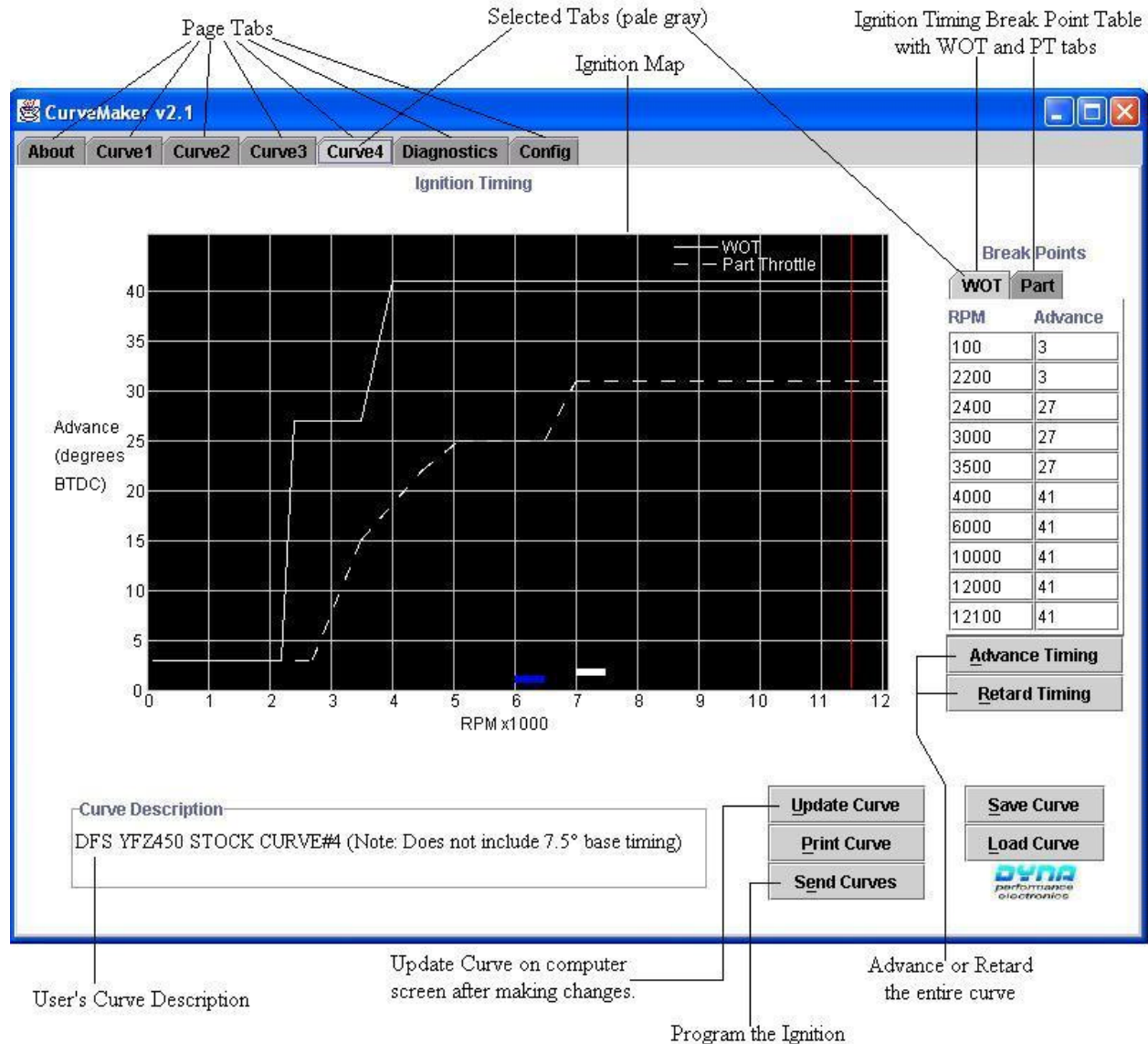
- 1 About, which is the title screen for the software,
- 2-5 Timing Curve tabs 1,2,3 &4 which shows the WOT and PT curves, as well as other settings,
- 6 Diagnostics, which shows all the operating information that the ignition records, and
- 7 Config, which is used to set Rev Limit and RPM activated switch settings, and TPS on some models.

### 3) Introduction

The About page displays the program description and contact information for Dynatek. This is the screen that the software displays initially. Example: (2004 YFZ450)



The Timing Curve pages display the ignition Timing Map, which is the wide open throttle (WOT) and part throttle (PT) advance curves created from the Ignition Timing Break Points that can be adjusted by the user. The Ignition Map also displays the programmed rev-limit as a thin vertical red line (shown here as 11,500 rpm). The Map also displays the on & off RPMs for the two separate Blue and White rpm activated window switches (more on this in the Config Tab). This page also has a user editable Curve Description field. Once all of the curves and configs are set, the ignition is programmed by pressing the Send Curves button.

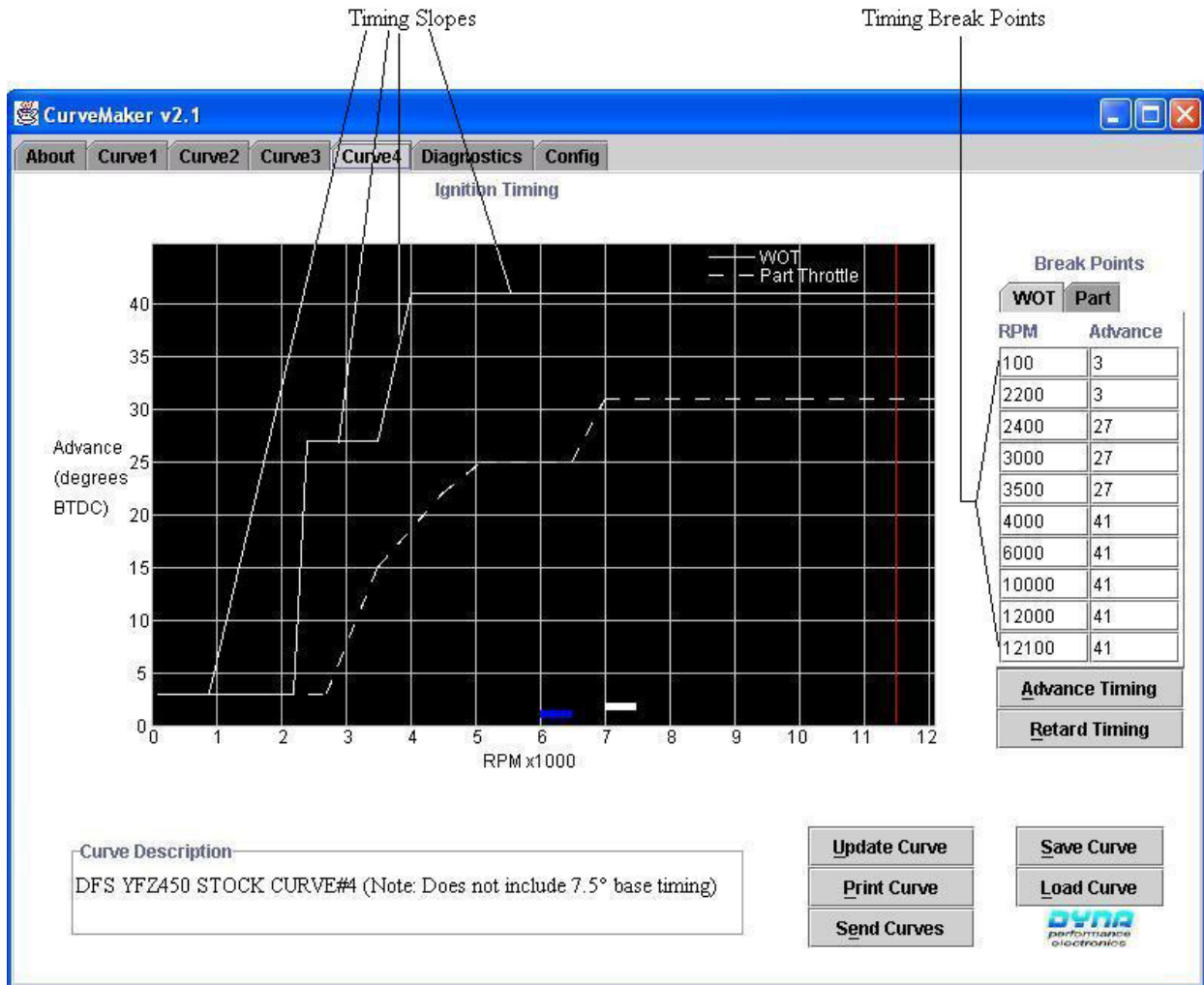


The Load and Save Curve buttons allow you to save and reload all of the information that you have programmed. It will save the WOT and PT curve for the map that is selected. The Load and Save Curve buttons will not save rev-limit information, or RPM activated switch settings, or TPS settings (tps is model specific). These settings have to be saved in the Config page. The program will always load the default curves and settings when it is first executed. The user must Load their custom curves and custom Config settings whenever the Curve Maker program is run. More on this later.

#### 4) Programming a Curve

When you reprogram the ignition, it programs all of the ignition settings with all of the information from the program. So before you program it, make sure all the curves are set as you want them, and that all of the other Config settings are correct as well.

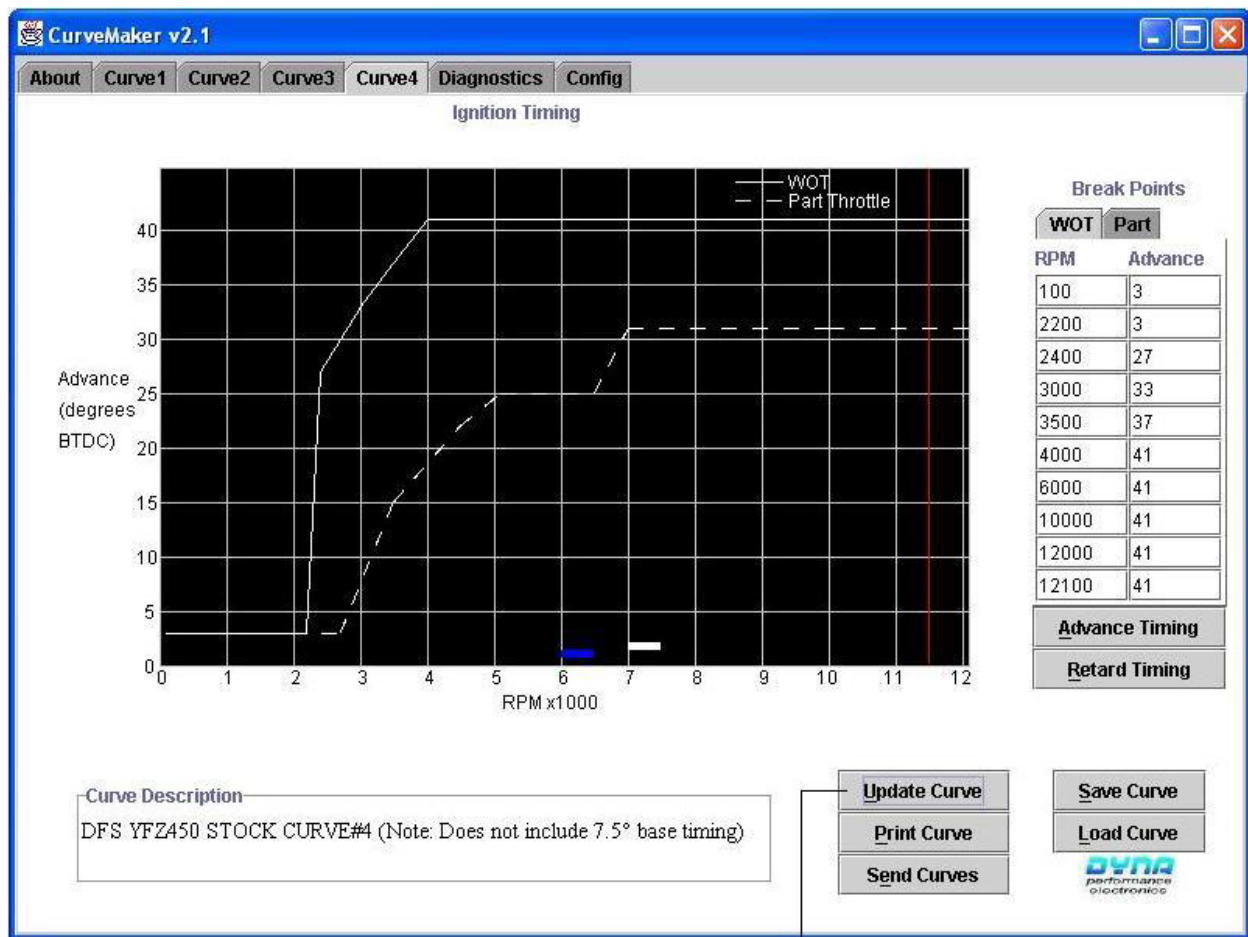
The timing curve is broken up into Wide Open Throttle (WOT) and Part Throttle (PT) timing curves. To select which of these curves to adjust, click the tab on the right side of the screen corresponding to WOT or PT. For engines not originally equipped with a Throttle Position Sensor (TPS), the WOT timing map is the one used, so adjust the WOT throttle timing curve. Each timing curve is defined by the Break Points in the table on the right side of the screen. Both the RPM and advance values can be adjusted. To adjust these values, use the mouse to click on the value you would like to change, then enter the new values. Advance can be set in one degree increments, and RPM in increments of one hundred. Once the values have been changed, click the Update Curve button to show the changes on the Timing Map.



Each ignition curve is defined by timing slopes. A timing slope connects each Break Point with the next. There is not a timing slope between two points if the ignition timing is a vertical line. For example, timing could be set at 10° flat until 1500 rpm. Then at 1500 rpm, the timing can be set for 17°. The ignition will switch, with no slope, from 10° to 17° at exactly 1500 rpm. The ignition accepts a maximum of 8 timing slopes per timing curve.

An example of changing a curve is shown in the following screen shot. The fourth and fifth point of the Wide Open Throttle curve will be modified by increasing the timing at two different RPM points. The RPM points can be changed as well as the degrees. For this example we will use the existing RPM points, but change their advance value. At 3000rpm, the advance was 27, we now made it 33°. Also, the advance at 3500rpm was 27 and now we set it to 37°. Select the "WOT" Tab to adjust the Wide Open Throttle curve. Move the mouse over the Advance value next to 3000 RPM, and click the mouse button to edit the value. Enter the new value for the Advance. Move the mouse over the rpm value, click and enter the advance change for 3500rpm.

Now the advance has been changed, but it does not show up on the Timing Map yet. To see this new change on the Timing Map, press the Update Curve button.



Click "UPDATE CURVE" after making changes to breakpoints, rpm activated switches or revlimit.

Now the updated curve is displayed. You can see that we changed the slope of the WOT advance in the 2400rpm range to the 4000rpm range. Programming the Part Throttle (PT) curve is done in the same manner.

## 5) Loading/Saving Curves

Curves can be stored to disk for reference later. Each curve is stored individually. Curves are stored into subfolders under the Dynatek folder. Each model of bike has its own separate folder for storing curves. To save a curve, make sure that the curve to be saved is the one currently displayed. Press the Save Curves button. A window will pop up asking what to name it, and where to save it. By default, it will save curves into separate folders for each model of bike. All curve files must be labeled with a ".DTK" extension.

Loading a file is done in the same manner as saving a file. Click on the Load Curve button, then choose the curve to be loaded.

Loading and Saving the Config Page is also done in the same manner. The Config's must be loaded before sending any curve to the ignition. If the users' custom Config is not loaded before sending a curve, then the Rev Limit and RPM activated switches, and TPS settings (model specific) will be programmed with the default settings.

Hint: By default, CurveMaker will start with the standard curve, and the user then has to load whichever custom curve is desired. To have a custom curve that CurveMaker loads on startup, simply name the curve "Curve 1.dtk". (There is a space between "Curve" and the numeral "1".) CurveMaker will then load this file on startup. If the curve being edited gets hopelessly confused, you can always quit the program, then restart. It will then reload the default curves, or the curve placed in "Curve1.dtk".

## 6) Printing Curves

To print the currently displayed curve, simply hit the Print Curve Button. The software automatically prints to the default system printer. The Wide Open Throttle and Part Throttle timing curves will be displayed, as well as the timing curve break points for each, and the other ignition settings.

## 7) Setting TPS (if equipped)

Some models of engines (ATV/MC/Snow/etc) utilize the stock TPS (Throttle Position Sensor) for timing changes. If your application has a TPS, the ignition can be calibrated to change the advance at desired throttle settings. To calibrate the TPS, the ignition must be plugged into the bike, and the ignition must be connected to a PC with the CurveMaker software loaded.

First, calibrate the closed throttle TPS setting.

The screenshot shows the CurveMaker v2.1 software window with the 'Config' tab selected. The interface is divided into several sections:

- Program Settings:** Includes a checkbox for 'Show all switch selectable curves on graph' and a 'Select Communication Port' dropdown menu set to 'Auto Detect'.
- Ignition Settings:** Includes 'RPM Limit' (11500) and 'Launch RPM' (4500).
- RPM Switches:** Includes four switches: 'RPM Switch 1 ON' (6000), 'RPM Switch 1 OFF' (6500), 'RPM Switch 2 ON' (7000), and 'RPM Switch 2 OFF' (7500).
- Load/Save Options:** Includes 'Load Config' and 'Save Config' buttons.
- TPS Calibration:** Includes a checked checkbox 'Calibrate TPS(must plug in ignition first)'. Below it, a table shows 'Full Throttle TPS Voltage' (4.98 V) and 'Closed Throttle TPS Voltage' (0.74 V), each with a 'Calibrate' button.
- TPS Settings:** Includes a table with 'Current TPS Voltage' (0%), 'Full TPS Point' (47%), and 'Part TPS Point' (-3%). To the right of the table are 'Set Breakpoint' buttons.
- Program Information:** A text box stating: 'This program was designed to run on a computer with a minimum 800x600 screen resolution and 16 bit color. Lower resolutions will result in a screen that appears chopped off. Some buttons will not be fully displayed, and some fields will be compressed.'

Check this box to begin calibrating TPS.  
This may cause the computer to lag.

Click on this box with the TPS closed.

Second, calibrate the full throttle (WOT) setting.

**CurveMaker v2.1**

**Config**

**Program Settings**

☐ Show all switch selectable curves on graph

Select Communication Port

Auto Detect

**Ignition Settings**

RPM Limit: 11500

Launch RPM: 4500

**RPM Switches**

RPM Switch 1 ON: 6000

RPM Switch 1 OFF: 6500

RPM Switch 2 ON: 7000

RPM Switch 2 OFF: 7500

**Load/Save Options**

Load Config

Save Config

**TPS Calibration**

☒ Calibrate TPS(must plug in ignition first)

Full Throttle TPS Voltage: 3.71 V

Closed Throttle TPS Voltage: 0.74 V

Calibrate

Calibrate

**TPS Settings**

	TPS %	TPS V
Current TPS Voltage	100%	3.71 V
Full TPS Point	67%	2.73 V
Part TPS Point	-5%	0.58 V

Set Breakpoint

Set Breakpoint

**Program Information**

This program was designed to run on a computer with a minimum 800x600 screen resolution and 16 bit color. Lower resolutions will result in a screen that appears chopped off. Some buttons will not be fully displayed, and some fields will be compressed.

Calibrate Full-Throttle TPS setting

Next, set both the TPS breakpoints (Part and Full) at which the ignition will begin to vary the advance. These breakpoints can be changed to alter the characteristics of the engine. For example, if the user wants the ignition to use the full-throttle curve for anything above 66% throttle, then the breakpoint for Full TPS Point should be set when holding the throttle at 66%. This will tell the ignition to use the WOT timing curve for any throttle setting higher than 66%. In the example below, the Part Throttle setting is set to 50%.

**CurveMaker v2.1**

**Config**

**Program Settings**

☐ Show all switch selectable curves on graph

Select Communication Port

Auto Detect

**Ignition Settings**

RPM Limit: 11500

Launch RPM: 4500

**RPM Switches**

RPM Switch 1 ON: 6000

RPM Switch 1 OFF: 6500

RPM Switch 2 ON: 7000

RPM Switch 2 OFF: 7500

**Load/Save Options**

Load Config

Save Config

**TPS Calibration**

☒ Calibrate TPS(must plug in ignition first)

Full Throttle TPS Voltage: 3.71 V

Closed Throttle TPS Voltage: 0.74 V

Calibrate

Calibrate

**TPS Settings**

	TPS %	TPS V	
Current TPS Voltage	66%	2.71 V	
Full TPS Point	66%	2.71 V	Set Breakpoint
Part TPS Point	50%	2.22 V	Set Breakpoint

**Program Information**

This program was designed to run on a computer with a minimum 800x600 screen resolution and 16 bit color. Lower resolutions will result in a screen that appears chopped off. Some buttons will not be fully displayed, and some fields will be compressed.

Finally, these settings need to be saved on your computer, and then they need to be sent to the ignition. The settings must be loaded with your calibrations before any curve is sent. Click on Save Config when calibration is complete. Don't forget to "SEND CURVES" before shutting down the program.

## 8) Programming the Ignition

Make sure that all loaded curves and settings are satisfactory before beginning the programming process. The programming process programs ALL curves and ALL settings simultaneously. Connect the DB-9 end of the cable to the serial port on the back of the PC or laptop. Plug the other end of the cable into the ignition. The bike must not be running, and the 9V Battery must be plugged in after the programming cable has been connected properly. Some bikes or quads are equipped with a 12v battery for starting, for these, the supplied 9V battery or the key-on 12v power from the bike will work.

Note: Remove the 9V battery from the ignition when not in use. The battery will go dead if left connected.

In the CurveMaker software, go to any one of the Ignition Curve pages. Press the Send Curve button. After several seconds (20-30 seconds, depending on computer) , a window will pop up stating either that the programming was

successful, or that it did not work. If the programming fails, it will give you an error message. Once programming is finished, disconnect the ignition from the programming cable, and disconnect the 9V Battery from the programming harness.

A “Curves Sent Successfully” message indicates that the curves were sent, verified, and programmed.

A “Programming Failure” message means that the ignition received the data properly, but was not able to store the data. Make sure that the battery is good (at least 8V), and the programming cable is in good shape.

A “Communication Failure” message means that the data received by the ignition was corrupted. Check the programming cable.

A “Ignition not found” message means that the ignition was not found on any available comm port on the system. Make sure the ignition is plugged securely into the programming cable, and that the programming cable is plugged securely into the PC's serial port. If all of this is good, there may be another program that has control of the comm port, so that the CurveMaker software can not use it. Dynatek can not troubleshoot problems like this that are specific to your machine. If you do not know how to resolve these types of problems, you should take the computer to a person who can. To assist in determining what comm port the ignition is on, it has been set up to send text messages to standard terminal programs, like Hyperterminal which comes with Windows. The terminal program should be set up for 9600 baud 8-N-1 communications. When the ignition receives a “control-R” character, it will respond with a text message, Example: “DFS7-12”. This will allow you to find which port the ignition is on.

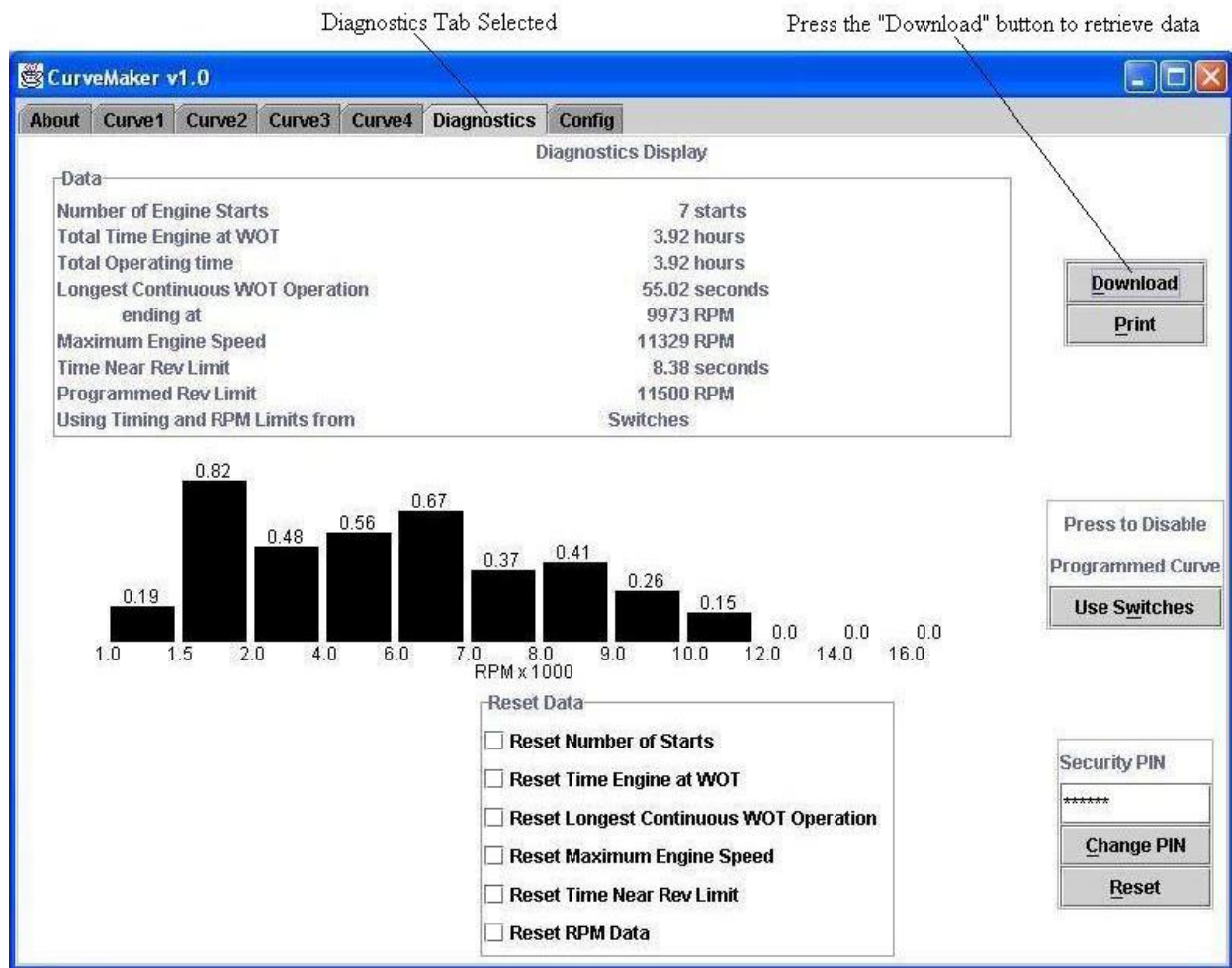
## 9) Retrieving the Diagnostic Data

**Note: This feature is application specific.** To view the diagnostics page, click on the diagnostics tab. Click on the Download button to retrieve the data in the ignition. The Diagnostic Data screen shot below shows that, since the last reset (of all data), the engine was started 7 times, the engine reached a maximum speed of 11,329 RPM, and was run for a total of 3.92 hours. The D2K4C-P does not have a throttle input, so the Total Time at WOT and Total Operating Time will be the same.

Data listed as hours is sampled every 2 ¼ minutes, and data listed as seconds is sampled twice per second. The maximum engine speed is sampled every engine revolution. The engine must be run for 2 ¼ minutes to record an engine start.

All of the data stored in the ignition, except total operating hours, can be reset. Check the boxes for the data functions to be reset, and click the reset button.

## 9) Retrieving the Diagnostic Data (con't)



## 10) Setting the Security PIN

The Security PIN is designed for the engine builder. The original pin ( PIN123 ) can be changed to a unique PIN so the end user cannot reset any of the recorded data, and cannot change the curves or rev-limits. Your custom PIN will not be saved on your computer. You must enter your custom PIN every time the program is loaded.

## 10) Setting the Security PIN (con't)

New PIN must be entered twice.

Original PIN must be entered here before the curves can be sent and the PIN can be changed.

**Data**

Number of Engine Starts	7 starts
Total Time Engine at WOT	3.92 hours
Total Operating time	3.92 hours
Longest Continuous WOT Operation ending at	55.02 seconds
Maximum Engine Speed	9973 RPM
Time Near Rev Limit	11329 RPM
Programmed Rev Limit	8.38 seconds
Using Timing and RPM Limits from	11500 RPM

**Bar Chart Data (RPM x 1000)**

RPM x 1000	Value
1.0	0.19
1.5	0.82
2.0	0.48
4.0	0.56

**Reset Data**

- ☐ Reset Number of Starts
- ☐ Reset Time Engine at WOT
- ☐ Reset Longest Continuous WOT Operation
- ☐ Reset Maximum Engine Speed
- ☐ Reset Time Near Rev Limit
- ☐ Reset RPM Data

**Security PIN**

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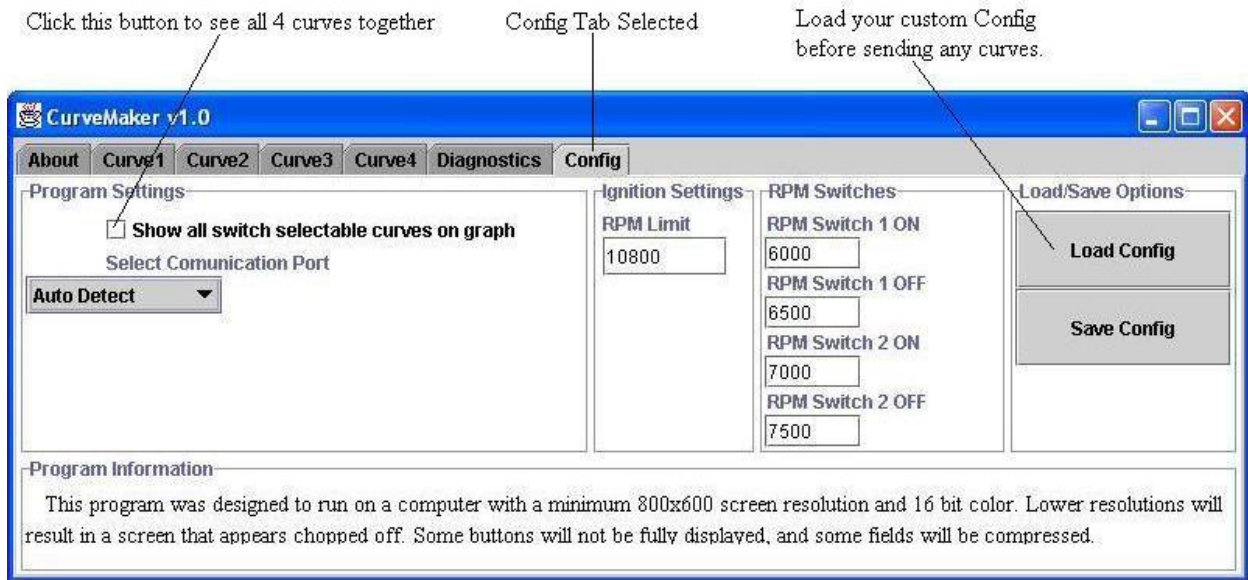
**Buttons:** Download, Print, Press to Disable Programmed Curve, Use Switches, Change PIN, Reset.

Check any or all of these boxes to before pressing the Reset button.

RESET is used to re-zero any of recorded data items (your PIN has to be entered for this function)

## 11) Config Page

The Config page stores the Rev-Limit and the RPM points for the activated switches. The Config must be loaded everytime the program is executed. If the Config is not loaded, the default settings will be sent to the ignition when the curves are sent.



## 12) Helpful Hints

Always make sure to use the description field to describe what the ignition curve is. This is saved in the curve file, so you can remember what the curve is for later.

Once the ignition is programmed, print out a copy of the curve that the ignition was programmed with for future reference.

Remember to load your custom Configs before programming any curves.

Remove the 9V battery from the programming harness when not in use. The programming harness has a circuit board in the harness that will drain the battery dead.