

INSTALLATION INSTRUCTIONS

Programmable Digital-7 TA PN 7530 1

Parts Included:

- | | |
|---------------------------------|--|
| 1 - Ignition Control, PN 75301 | 1 - 9-Pin Computer Harness |
| 1 - MSD Pro-Data+ CD | 1 - Shielded Mag Pickup Harness, PN 8862 |
| 4 - Vibration Mounts and Screws | 1 - 12-Pin Harness |
| 1 - Shielded Cam Sync Harness | 1 - Coil Harness |
| | 1 - Power Lead Harness |

Accessories (Not Supplied)

- | | |
|--|--|
| Hand Held Monitor, PN 7550 | LED Shift Light, PN 7552 |
| Inductive Cam Sync Pickup Kit, PN 7555 | Manual Launch Control w/Shift Light, PN 8736 |
| Non-Magnetic Cam Sync Pickup Kit,
PN 2346 | Single Pole/Single Throw Relay, PN 8961 |
| Manual Launch RPM Control, PN 7551 | Double Pole/Double Throw Relay, PN 8960 |

WARNING: During installation, disconnect the battery cables. When disconnecting, always remove the Negative cable first and install it last.

Note: Solid core spark plug wires cannot be used with an MSD Ignition Control.

OPERATION

DIGITAL OPERATION

The MSD Programmable Digital-7 TA uses a high speed RISC microcontroller to control the ignition's output while constantly analyzing the various inputs such as supply voltage, trigger signals and rpm. The high speed controller can make extremely quick compensations to the output voltage, multiple spark series, timing and rpm limits while maintaining accurate timing signals to better than 0.1° total accuracy and +/- 2 rpm. The circuits and controller of the ignition have been thoroughly debounced and suppressed to create protection against Electro Magnetic Interference (EMI).

CAPACITIVE DISCHARGE

The MSD features a capacitive discharge ignition design. The majority of stock ignition systems are inductive ignitions. In an inductive ignition, the coil must store energy and step up the supplied voltage to maximum strength between each firing. At higher rpm, since there is less time to charge the coil to full capacity, the secondary voltage falls short of reaching its maximum energy level which results in a loss of power or top end miss.

The MSD Ignition features a capacitor which is quickly charged to 520-535 volts and stores its energy until the ignition is triggered. With the CD design, the energy sent to the coil is always at maximum power even at high rpm.

MULTIPLE SPARKS

The MSD produces full power multiple sparks for each firing of a plug. The number of multiple sparks that occur decreases as rpm increases, however the spark series always lasts for 21° of crankshaft rotation. Above 3,300 rpm there is simply not enough "time" to fire the spark plug more than once, so there is only one powerful spark.

PROTECTION

The MSD Programmable Digital-7 TA has a built in reverse polarity protection circuit. This will protect the ignition in the event of wrong connections. It will also shut off for protection from a surge in power. The ignition will still operate once the surge or polarity is corrected.

LED INDICATOR

There is an LED that monitors the status of the Ignition. The LED will verify trigger inputs and will flash trouble codes such as a Code 2 for No Cam Sync, Code 3 for Low Battery supply voltage or Code 4 for Traction Control Detection.

CAMSHAFT SYNCHRONIZATION

This is used only in applications where the individual cylinder timing is going to be used. The 2-pin connector with a Light Blue and Light Green wire connects to a sensor that is used to synchronize or alert the Ignition as to when the number one cylinder is going to be triggered. With this information, the Ignition knows which cylinder is being fired allowing for the individual cylinder timing capabilities. A Universal Cam Sensor is available from MSD as PN 2346. MSD offers two kits to use for sync signals: Universal Cam Sensor, PN 2346 and Fiber Optic Inductive Pickup Kit, PN 7555.

TCD

The PN 75301 Ignition incorporates a unique Traction Control Detection (TCD) circuit. This software code monitors the magnetic pickup circuit for changes that would only come from an installed traction control device that would modify the signal from the mag pickup. If a modification is sensed in this circuit an Alert will be set and the status LED will flash a Code 4. This Alert will continue to flash until the ignition is kept turned On for 24 hours in order to reset. A 4000 rpm TCD Rev Limit is activated until the 24 hour TCD timer is elapsed or reset by an NHRA official.

WIRING	
Heavy Red	Ignition supply wire. Connects to battery positive (+) terminal or battery junction. Note: Do not connect to the alternator (+12v to +18v).
Heavy Black	Ignition supply Ground wire. Connects to battery negative (-) terminal or engine block.
Red	On/Off switch wiring. Connects to a switched 12 volt source (+12v to +18v).
Primary Coil Leads	
Orange	Connects to the coil positive (+) terminal. This is the only wire that makes contact to the coil positive terminal.
Black	Connects to the coil negative (-) terminal. This is the only wire that makes contact to the coil negative terminal.
WARNING: High voltage is present at the coil primary terminals. Do not touch the coil or connect test equipment to the terminals while the engine is running or cranking.	
Trigger Wires	
Violet/ Green 2-Pin	Magnetic pickup, 2-pin connector. Plugs into an MSD Distributor or Crank Trigger pickup. Violet is positive, Green is negative. Note: When this connector is used, the White wire is not connected.
White	Trigger input for electronic ignition amplifiers, an ECU's trigger or points. Note: When this wire is used, the magnetic pickup wire is not connected.

Rev Limit/Gear Select	
Dark Blue	This wire activates the Launch Rev Limit and is the main reset wire for several features of the Ignition. When 12 volts are applied to this wire it will activate the Launch Rev Limit. It also resets the shift light and gear indicator to first gear. It also will select the Launch Retard value and Gear 1 curve. Enables prerecord of History Record. Note: When this wire is activated it will override all other Rev Limits except the TCD Limit.
Light Blue	Burnout Rev Limit. When 12 volts are applied the Burnout Rev Limit is active. This also resets the Acquisition Record function. It is recommended to have this wire switched from an outside source such as the crew chief before the burnout or when staging the car.
Retard Stage Wires or Gear Select	
These three wires can be used as Retard Stage Activation and/or as a gear select wire.	
Pink	Step1 retard enabled with +12 volt input and above Step1 Rpm value and Gear 2 Select.
Violet	Step2 retard enabled with +12 volt input and above Step2 Rpm value and Gear 3 Select.
Tan	Step3 retard enabled with +12 volt input and above Step3 Rpm value and Gear 4 Select.
Note: When activated at the same time, these retard stages are added together. They are also added with any Gear Retard Curve or Boost Retard values as well. Maximum retard is 30°.	
Yellow	Shift Light output wire. It can handle up to 3 amps continuous to ground when enabled.
Brown/White	RPM/Time switch output wire. It can switch up to 3 amps continuous to ground when enabled.
Yellow/Yellow	Output for data acquisition or fuel controls. Cam Sync or Rev Limit output.
Gray	Tach output. This wire will provide the same 12 volt square wave tach signal as the tach terminal on the side of the unit.
Cam Synchronization	
Fiber Optic	This input requires the PN 7555 Inductive Sync Pickup. When this input is used, the 2-pin connector is not. Note: If this input is not used, the plug or a cover should be installed.
2-Pin Connector	
Lt Blue/Lt Green	This 2-pin plug connects to Cam Sync Sensor, PN 2346, to indicate when cylinder number one is firing. Note: When used, the fiber optic connector is not used and must be covered. Light Blue is cam (+) and Light Green (-).

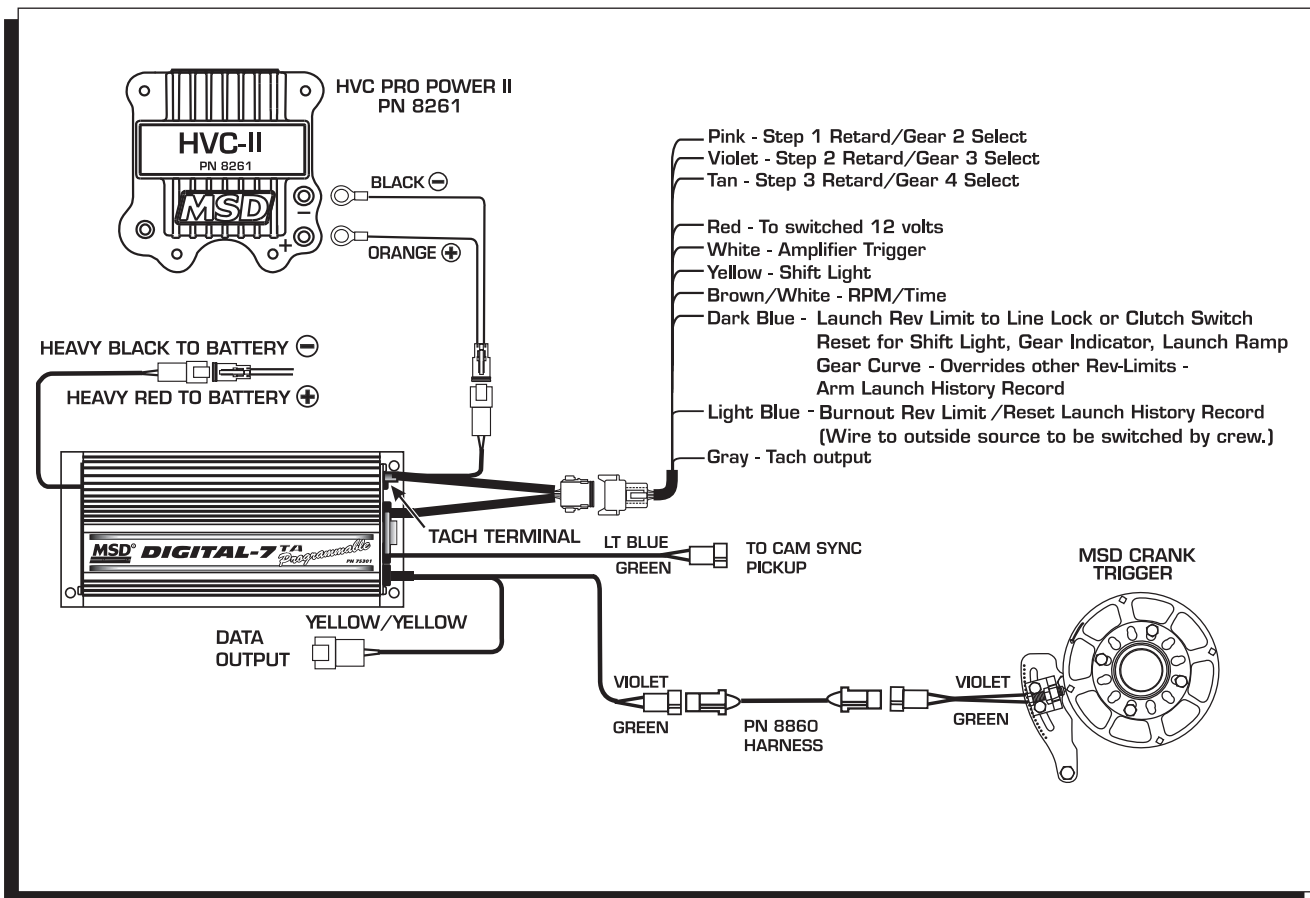


Figure 1 Wiring the Programmable Digital-7 Ignition.

PRO-DATA+

INSTALLATION OF THE PRO-DATA+ SOFTWARE

1. Insert the installation disk into your floppy disk drive.
2. In Windows, click on Start then select Run.
3. In the box type, "A:Setup" and press Enter (or whatever disk drive you are using).
4. The screen will walk you through several steps.
5. Once loaded, your monitor will have an MSD Graph View logo. Click on it to open the software.
6. A program will open. Go to the upper left corner of the screen and click on File, then Open.
7. This will open a menu of part numbers. Select "75301".
8. This will open another menu of versions. Highlight and open the "75301vxx.IGN" (xx determines the versions, such as 02). This will open the Pro-Data+ software for the Programmable Digital-7 TA Ignition.

SAVES AND TRANSFERS

Whenever a change is made to a program, it either must be saved to a file in your PC or it needs to be transferred to the ignition. You will notice that whenever you make a change to a program, the bullet next to the modified value will turn red. It will remain red until you save it to a file or to the MSD. There are two ways to save your files.

Save to MSD: This step will save any changes directly into the ignition. If you are only making one or just a couple modifications this works well.

Save to PC: This will save your changes to only show on the PC screen (indicated by a red bullet point next to any altered values). These modifications will not be active or saved until you save the file or transfer the information to the MSD.

You can create numerous files on your PC and download them for testing purposes or by saving programs you used at different races or events.

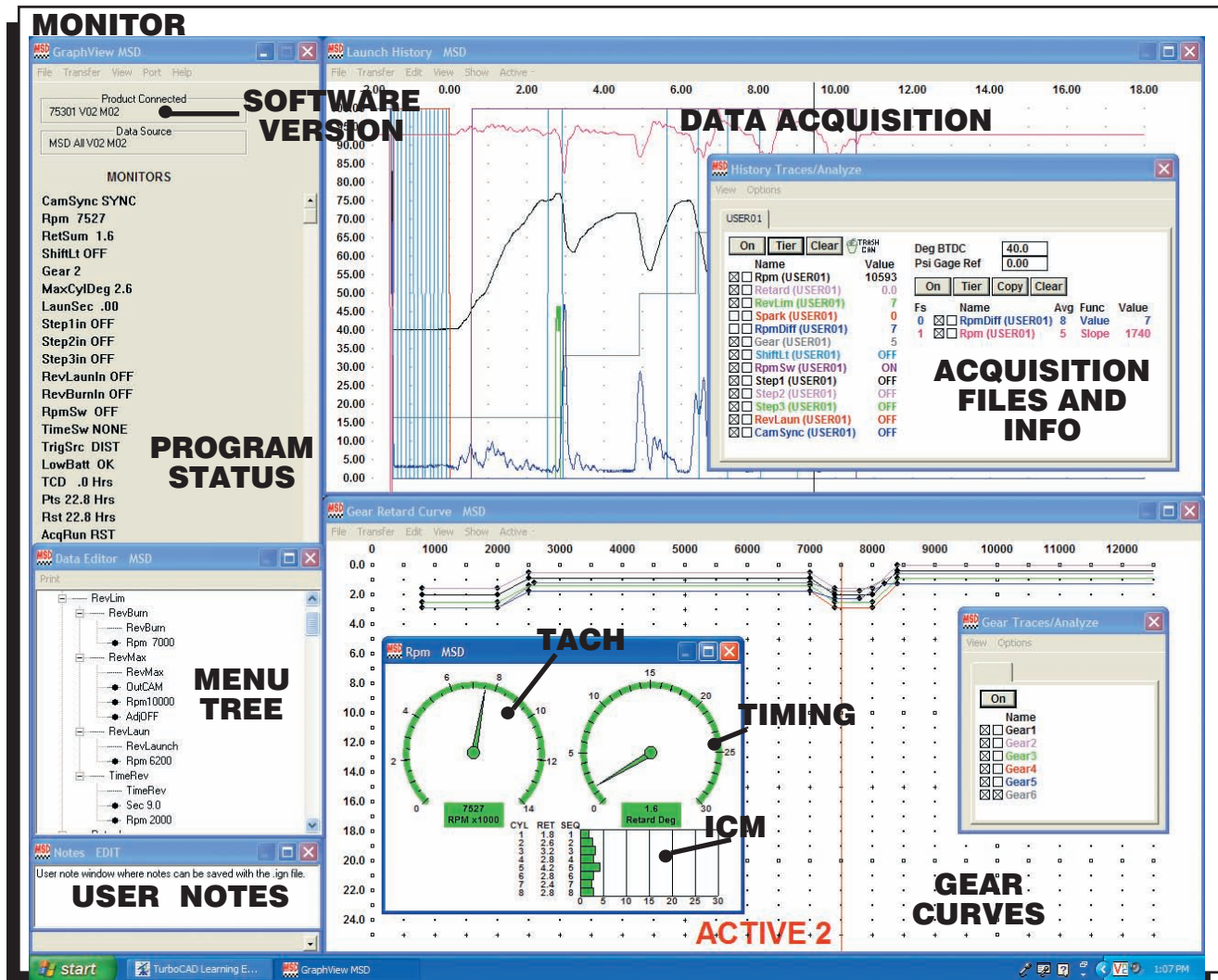


Figure 2 Pro-Data+ Screen and Program Windows.

PROGRAMMABLE FEATURES

The following explains the programmable features of the PN 75301 Ignition. The features are listed in the same order that they show on the Data Editor list in the software. Note that all of the retard amounts are cumulative and the maximum amount of retard is 30°.

STATS

Stat 1: This is only used with the Hand Held Monitors, PN 7550 and PN 7553.

REV LIMITS

Up to three different rev limits can be programmed in 100 rpm increments.

RevBurn: Burnout Rev Limit. This limit is activated when 12 volts are applied to the Light Blue wire. It is adjustable from 2,000 to 12,500 rpm.

RevLaunch: Launch Rev Limit. This limit is activated when 12 volts are applied to the Dark Blue wire. It is adjustable from 1,000 to 12,500 rpm. This Limit has priority over all the other rev limits.

RevMax: Max Speed Rev Limit. This is the overrev limit and is active whenever the Launch and RevBurn limits are off (2,000-12,500 rpm).

OutCam: Select either a Cam Sync output or a Rev Limiting output that can be used with MSD components that use rpm modules for the rev limit.

AdjOff: This program enables an automatic compensating rev limiter that will correct for trigger input offsets and variables. It can be turned On or Off.

RPM: Adjustable in 100 rpm increments from 2,000-12,500 (Rev Launch 1,000-12,500 rpm).

CONNECTING THE REV LIMITS

When you connect the Burnout, Launch and Spool Rev Limits, it is important to pay close attention due to the acquisition recording of the ignition. The Light Blue wire is responsible for resetting the Run History, as well as activating the Burnout Rev Limit. The Dark Blue is responsible for beginning to record the information and for turning on the Launch Rev Limit. The Spool limit is activated when the Dark Blue and the Light Blue wires are activated at the same time (applied to 12 volts).

- The Dark Blue wire must be removed from 12 volts after the Light Blue wire is removed from 12 volts.
- In order to reset the Run History you must be sure that the Light Blue wire is switched to 12 volts, then removed. If this wire receives 12 volts during a pass, recording of the History will be stopped.
- The Dark Blue wire arms the History Recording function when it is applied to 12 volts. When the +12 volts is removed from the Dark Blue wire the record function will begin (when the Acq menu is set to Launch). If the ACQ menu is set to LaunRev the engine rpm must be at rev limit when the Dark Blue wire is removed from +12 volt to begin the record.
- Having a reset switch for the History Record accessible to a crew person is a suggestion. This way, as the car rolls into the lights the switch could be turned on and off to ensure that it is reset and ready to record just before the car stages.

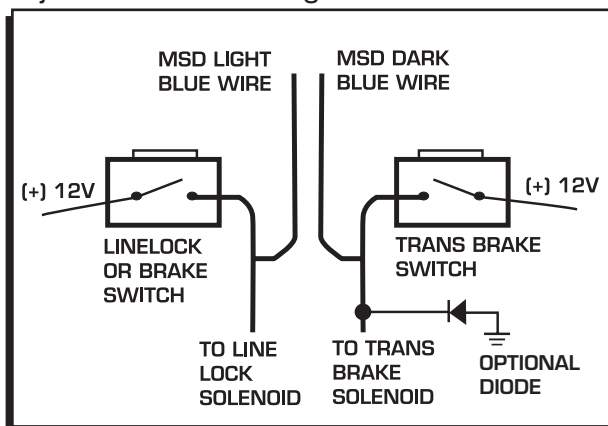


Figure 3 Typical Wiring of Rev Limits.

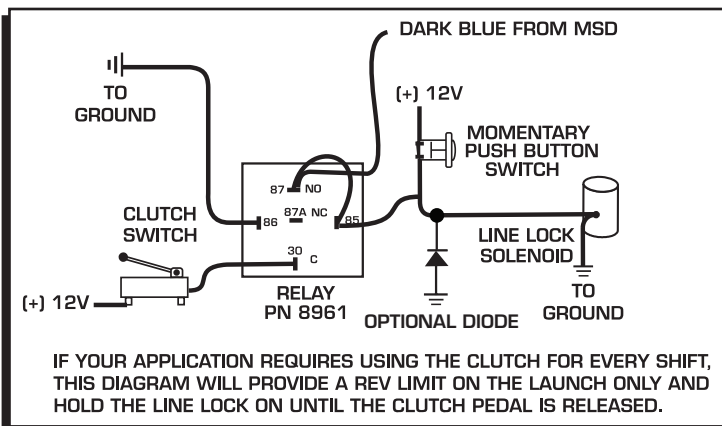


Figure 4 Launch Wiring for Clutch Cars.

Note: A diode will help interference. The diode should be rated for the max current of the solenoid.

TIMED SAFETY REV LIMIT

This provides a time activated rpm limit ramp that is designed to work as a safe shutdown. The ramp will lower the rpm to an adjustable amount, within two seconds after it is activated. The activation point ranges from 1-12.5 seconds after the Launch and the shutdown rpm value can be set from 1,000-12,500 rpm. The time before the safety RPM Limit ramp is activated begins when the Dark Blue wire is released from 12 volts, **and only if the programmed Launch Rev Limit rpm has been achieved on the starting line.**

START RETARD

Program an amount of retard that will occur while the engine is cranking. This helps reduce the load on the starter for easier cranking. It is adjustable from 0°-25° in 1° increments. This is an automatic feature and will enable below 500 rpm and will deactivate when the engine reaches above 800 rpm. Default is 10°.

LAUNCH RETARD

This is the time based retard ramp. It can be programmed from 0°-15° in 0.1° increments and from 0-2.5 seconds. When the Dark Blue Launch/Reset wire is connected to 12 volts, the retard value is activated and is added to the retard sum. When 12 volts are removed from the Dark Blue wire, the retard value begins to ramp up to 0° over the programmed time. Once the time is over, the retard will not be activated again.

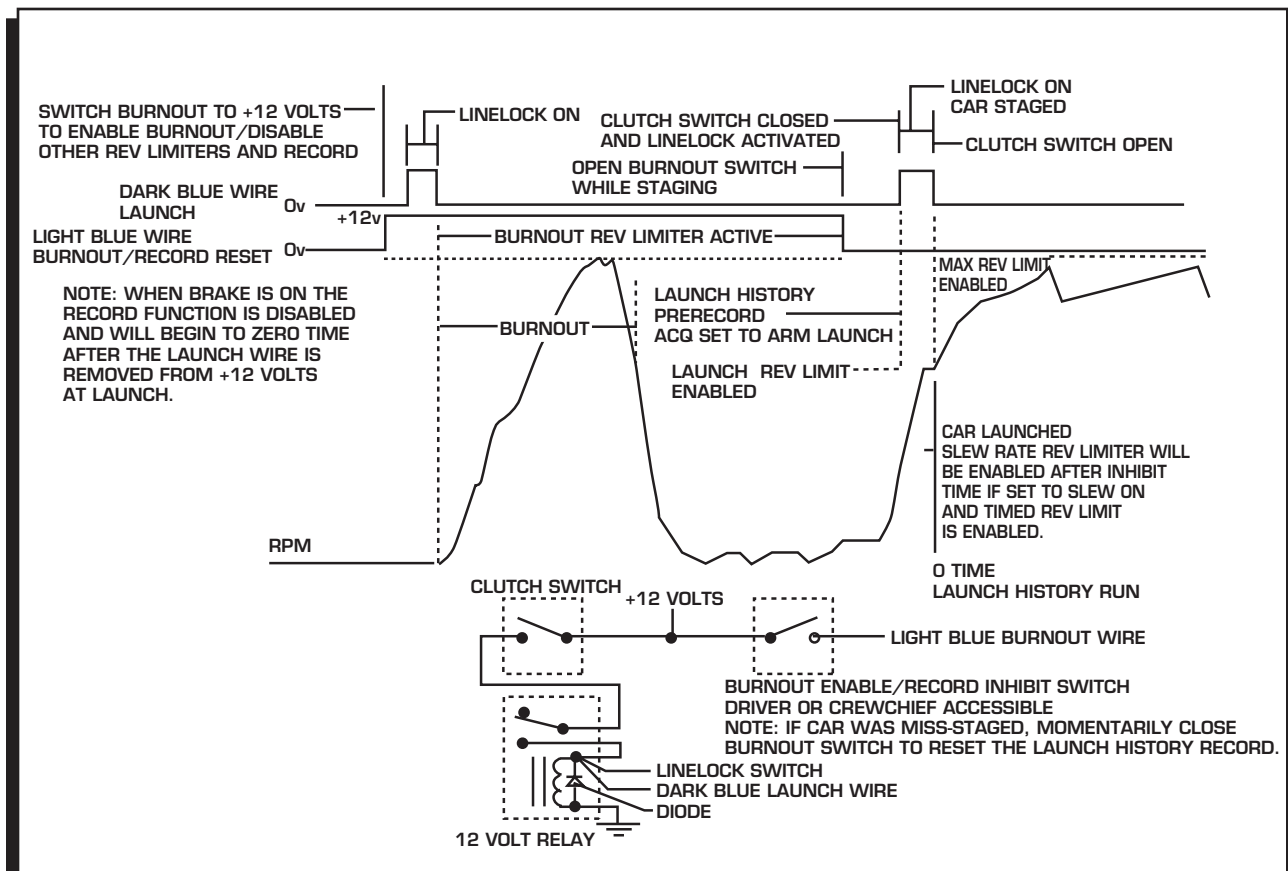


Figure 5 Clutched Car Setup for Burnout, Launch and Launch History Control.

STEP RETARDS

There are three step retards that are controlled through three corresponding activation wires or through rpm. A minimum rpm can also be programmed that must be reached before a step becomes active. A time based ramp can now be programmed to gradually bring the retard to its full On amount, or to ramp the retard amount out (back to no retard) from its setting.

Step 1 - Pink

Step 2 - Dark Brown

Step 3 - Tan

Activation through Wiring: Each step is activated when 12 volts are applied to its corresponding wire. When the steps are enabled at the same time the retard amounts are added together. The maximum retard allowed by the Ignition is a total of 30° (including other retard amounts from a launch, ICM or gear retard).

Activation through RPM: Each step retard can also be activated through rpm. In order to achieve this, 12 volts must still be applied to the corresponding step retard, and an rpm value must be selected from the Step RPM menu. When 12 volts are applied, the retard will not activate until the rpm value is reached. Note that the retard will remain active above this rpm, even when other stages are activated. It will deactivate when the rpm drops below the set amount.

Note: If you prefer to activate the step retards through the activation wires and not rpm, then the rpm value in each of the desired step menus must be set to 800 rpm.

Step Retard Off Delay: This feature will set a time based delay to deactivate the step retards. This is designed to keep the timing retarded to clear the engine of any nitrous oxide prior to deactivating the retard. It is adjustable from 0-2.5 seconds and the default is 0.5 second.

Step Retard Ramp: Each retard step can be ramped to and from its full retard amount over a time based program (Figure 6). It is adjustable from 0-2.5 seconds in 0.01 second increments. Default is 0°.

RPM: The minimum engine rpm that must be reached before a step retard is activated.

On: The amount of time it takes for the step retard to reach its Retard Degree once activated. Allows a gradual ramp On time to reach the Retard Degree. User adjustable from 0.00 to 2.50 sec. (0.01 sec increments).

Off: The amount of time it takes for the step to retard to reach NO retard once deactivated. Allows a gradual ramp Off time to reach NO Retard. User adjustable from 0.00 to 2.50 sec. (0.01 sec increments).

Deg: The amount of retard.

GEAR SELECT

The Three Step Retard wires, Pink (1), Violet (2) and Tan (3) can also be wired to indicate the first three gear changes to the ignition control. When selected from the Step Wire menu, the ignition will know that the car is in second gear when 12 volts are applied to the Pink wire, third for the Violet and fourth when the Tan wire is applied to 12 volts. By using this feature, if you lift off the throttle and get back on it, the ignition will not count it as a gear change.

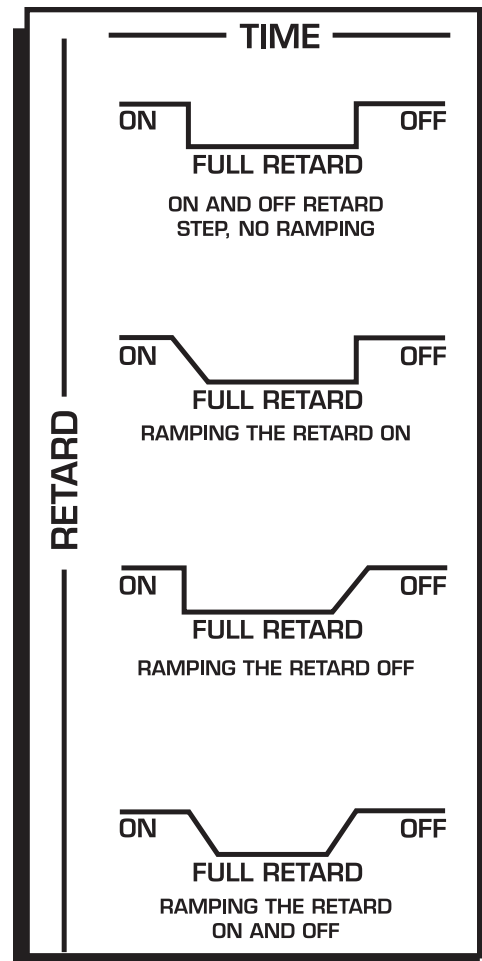


Figure 6 Ramping the Step Retards.

Note: When selected, this feature overrides the RPM Drop Gear Select values.

This is a sequenced series meaning Tan (3) will not become active until it sees 12 volts on Pink (1), and Violet (2). This way, 12 volts do not need to be removed from each wire before the following gear is selected.

Note: Five and six speed transmissions will have to use the RPM Drop functions.

GEAR RETARDS

This program provides the ability to create a run curve for each gear. Up to six different curves can be programmed from 800-12,500 rpm in 0.1° increments for every 100 rpm. You can program up to 32 different points on each Gear Map. Also, all of these points are interpolated every millisecond to create a smooth (no steps) curve.

The number of gears is adjustable under the SHIFT menu, as well as the amount of rpm drop the ignition needs to see before knowing that a different gear has been selected. Up to six gears can be programmed. You can also use the Step Retard wires as Gear Select Indicators for the first four gears.

These retards are mapped out on the Gear Retard chart of the Graph View. In the chart, go to the View pull down menu and select Trace Box. That will give you a small window to show the different color gear traces so creating a different curve for each gear is easier.

If you want the same retard curve for all gears, compose the curve, select the Edit pull down menu and copy the curve, then select Paste All.

ADVANCE

This is a Gear Shift Advance feature that is designed to advance the timing (or remove any retards) during a shift to keep the combustion chamber temperatures consistent.

Gear: Select the number of gears.

DRpm: Program the rpm drop that indicates a gear change from 200-1,500 rpm.

Deg: The amount of timing that is advanced. This is determined by how much retard is active. You cannot program more advance than the current amount of retard.

Sec: The amount of time that the advance is active. Adjustable in .01 second increments from 0-1.5 seconds.

Note: The Step Wire Gear Select program overrides the RPM Drop value for shifts.

CYLINDER COUNT

CylCnt: This is the number of cylinders of the engine. Programmable for 4, 6, 8 and Odd fire 6-cylinders (90°/150° only). Once a change has been made, turn the ignition Off and On to reset.

Tach Trigger: There are two choices for the output of the tach terminal on the end panel of the ignition. The output is a 30° duration 12 volt signal that is compatible with most tachs and data acquisition systems. The default is **Trigger** which provides the most accurate signal for rpm sensing components. The **Timing** program should only be used when spark timing data is required by an acquisition control or to fire another ignition.

INDIVIDUAL CYLINDER TIMING

Each cylinder can be retarded up to 10° in 0.1° increments. Adjustments are made through the CylDeg menu. Default for each cylinder is 0°. A Cam Sync signal for cylinder number one must be incorporated. The MSD Fiber Optic Pickup, PN 7555, is the easiest or a pickup kit could be fabricated on the cam gear (MSD Kit PN 2346).

The spark sequence, or firing order needs to be considered when selecting the ICT. You can go through the Cylinder Numbers and place them with the corresponding position, or go to the Sequence window and select from the pre-programmed firing orders.

**Spark Sequence
Degree**

Program the firing order of your engine.

Program the amount of retard of each cylinder. These retard rates are added to any other retards that are active. Max retard is 30°.

Sequence	Select a firing order:	
Program	Order	Application
1843	18436572	Most GM, Chrysler and AMC V8
1542	15426378	Most Ford V8
1372	13726548	Ford 341/400
1425	142536	Ford V6
1536	153624	Ford, Camaro, Chrysler, AMC V6
1654	165432	Most GM V6
1436	143625	Odd-fire 6-cylinder

RPM/TIME ACTIVATION SWITCH

This program lets you activate a circuit by supplying ground on the Brown/White wire (up to 3 Amps continuous). This can be activated in two ways; RPM or Time.

RPM Window: Program an rpm value to activate and deactivate a circuit from 800-12,500 rpm in 100 rpm increments.

RPM On: Rpm that the circuit is activated

RPM Off: Rpm that the circuit is deactivated

RPM Hysteresis: Built in Hysteresis allows the deactivation point to be set lower than the activation value.

Time Based: Program an activation point in 0.01 second increments after the launch. Up to 25 seconds of total time. The timer begins when the Dark Blue wire is removed from 12 volts and **only if the programmed Launch Rev Limit rpm has been achieved on the starting line.**

OnDelay: The amount of time after launch (12 volts removed from the Dark Blue wire).

OnTime: The amount of time that the switch stays activated. This can be programmed from 0-25 seconds. It will always deactivate after 25 seconds.

SHIFT LIGHT

This program lets you select the number of gears (Last Gear), program the shift light to come on when the holeshoot rpm is reached, set an rpm point for each gear and the rpm drop for the ignition to recognize as a gear shift between each gear. When the correct rpm is reached the Yellow wire is switched to ground to turn the shift light on.

Launch Light: This programs an rpm window that will illuminate the shift light when the correct rpm is reached for the holeshoot. When the rpm is in this window the light will be on solid. If the rpm goes high, the light will flash. If the rpm goes low, the light turns off.

RpmHi: The high rpm for the launch light program.

RpmLo: The low rpm for the launch light program.

ShiftLight: Program the rpm point for each gear change.

(1)Rpm First gear rpm point to shift.

(2)Rpm Second gear rpm point to shift.

(3-5 gears)

ShiftGear: Program the rpm drop between each gear that the ignition must see to recognize a shift. Programmable from 200-1500 rpm.

(1)DropRpm Rpm drop between first and second.

(2)DropRpm Rpm drop between second and third.

(3-5 gears)

Last Gear: The program lets you select the number of gears to use with the shift light from 2-6 gears. Default is five gears.

ALERTS

This is only used with the Hand Held Monitor, PN 7550. You can program an alert to interrupt the screen on the monitor. You can select which alerts to show and how often. The alerts are No Cam Sync, Low Battery and Traction Control Detection (TCD).

Fault: The number of counts that occur for a Low Voltage alert.

BrownOut 0: This is the count of low voltage resets. This should normally be set at 0.

WatchDog: The count of Watch Dog resets. This should normally be set at 0.

TCD: When a traction control device is detected an alert is set and will flash a Code 4 (a 4 blink sequence) on the end panel LED. This alert will continue to flash until the ignition is kept turned On for 24 hours in order to reset.

ACQUISITION

The Programmable Digital-7 TA Ignition Control can provide you with 18 seconds of ignition data during each pass with 2 seconds leading to the launch. Samples are taken by the microprocessor every 10-milliseconds. (The data can be averaged in the Analysis column of the Trace/Analysis window by choosing Average.) After a pass, you can recall a variety of parameters to view as they occurred

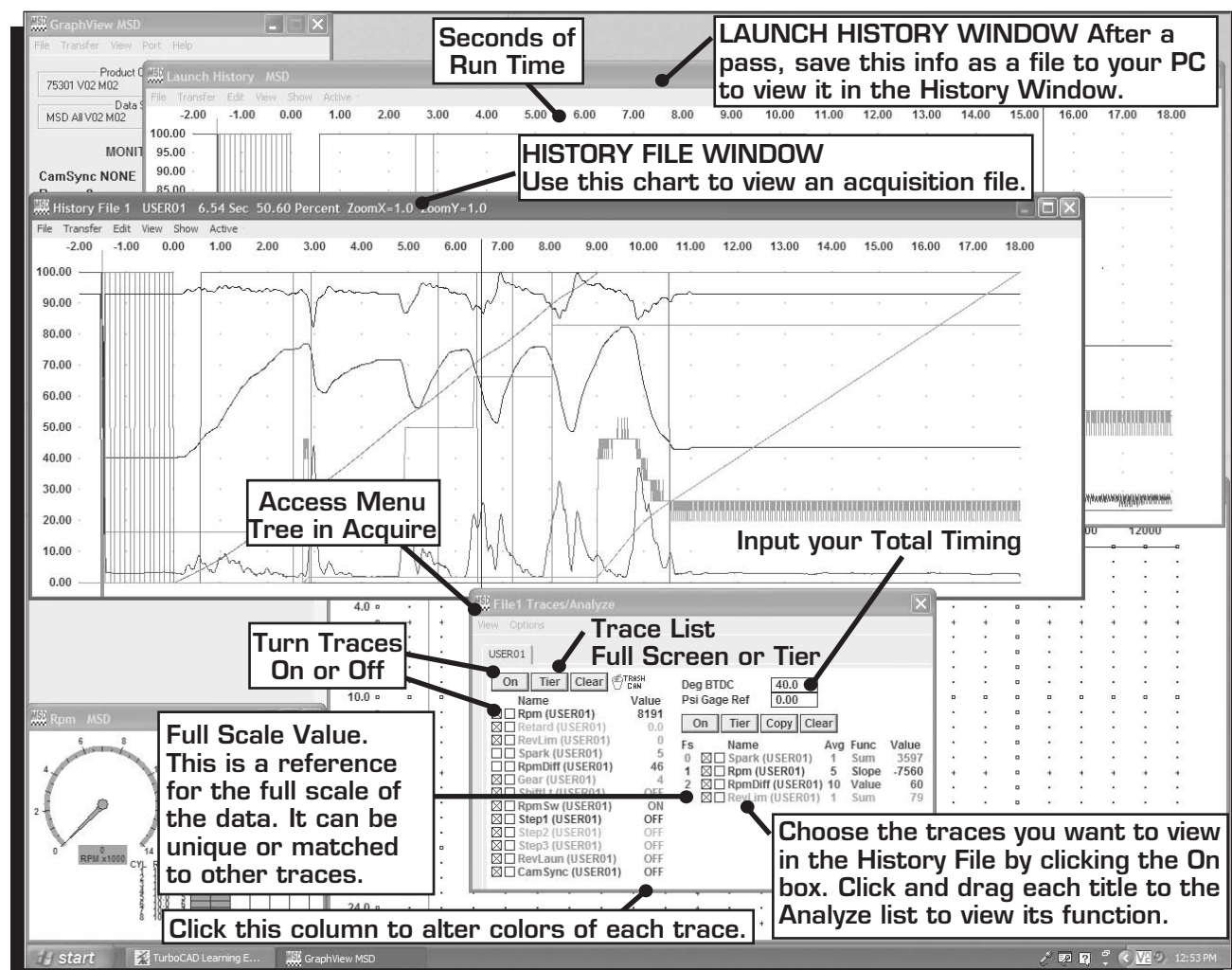


Figure 7 Acquisition Charts.

during the pass such as shift points, retards, rev limits, the number of times the rev limiter is activated and more. After each pass, the file can be saved so it can be stored and reviewed with other runs.

With the laptop connected to the ignition after a pass, turn the ignition On and go to the Launch History window (The Launch History window is listed as Plot 4 in the View pull down menu). Click on the Transfer pull down menu then select Acq to Plot. This brings the recorded information to the screen where it can be saved to the PC by clicking File, then Save As. Note that the numbers on the left side of the screen are arbitrary and there to provide a division between the spaces. The numbers that go across the top of the chart are seconds and begin at two seconds prior to the launch.

After saving the file, it can only be opened and viewed in the History File 1 screen (there are four). If this screen is not up, go to the View pull down menu on the Graph View chart and select History File 1-4 to allow opening up to four different acquisition file windows.

There is a window called the Trace/Analysis box (If it is not there when you open the History chart, go to View and select Trace/Analysis box). There is a second window available called Notes that allows you to write any important notes to that specific run. The MSD records all of the possible information shown on the left, then you decide which ones you want to view and compare. This is done by grabbing each title by clicking and dragging it to the right side column of the window. The Menu tree is also saved in the Acq file and can be viewed by clicking on View in the Trace/Analyze window then click on Acq Tree.

You can open up to two complete files with a total of 32 traces in each History screen. This allows you to be able to compare different traces or overlay multiple runs on top of each other. After you select the desired traces you can select Clear to delete the other traces to make room for other traces to compare. A selected data window can be displayed for Legends/Value of the Acq file data on the screen. Click on View and select traces.

TRACE/ANALYSIS BOX

This box allows you to select the traces that you want to view. The Trace/Analysis Box shows the 15 different traces you can monitor. The Analysis column on the right allows you to pick and choose which traces you want to analyze. The entire list of items can be copied by clicking Copy at the top of the right column, or you can click-and-drag the traces you want from the Trace side to the Analyze column. The order of the Traces can be changed by clicking and dragging each one to meet your desired order. You can select the value that it represents or is measured in, its color on the screen and when it appears. You can also open other acquisition files and bring their traces into the same Analyze graph to compare. Up to 64 traces can be shown on the graph, with 32 from the Analyze and another 32 from the Trace side.

Both columns have an On and Tier button. Clicking On, brings all of the traces to the Window. Selecting Tier positions each trace so they are not sitting atop each other. The Clear button will remove all of the traces that are not turned on. The History Analyze column also has a copy button which copies everything from the Trace window into its list.

RPM: This is important to view as a Value for engine rpm and as a Slope to show the rate of acceleration. It is recommended to copy two RPM traces into the Analyze box and set one with Value and the other with Slope.

Retard: This shows the amount of retard that is being activated. When used with the Value function it shows the amount of retard that is activated. When the BTDC function is chosen, the total timing with the retards is shown. If BTDC is selected, the current timing will be listed (the Deg BTDC space at the top of the History Analyze window must be filled out with the reference max timing as seen with a timing light).

Rpm Diff: This shows the rpm difference between cylinders or rate of change in rpm due to crankshaft deflection, or even from missfires and rev limits. The Value function should be used with an average of 5 or more.

RevLim: The Sum function should be used to show you the number of times the rev limiter is activated.

Spark: The number of sparks that occur during the run when the Sum function is selected.

Gear: This will indicate which gear the car is in throughout the pass.

ShiftLt: When the Value function is selected, this will show when the Shift Light is On or Off.

RpmSw: When the Value function is selected, this will show the RPM Activated Switch as being On or Off.

Step1: When the Value function is chosen, this will show On or Off to distinguish when the step retard is active.

Step2: Same as Step1.

Step3: Same as Step1.

RevLaunch: This shows when the launch rev limit was activated by showing On or Off.

RevBurn: This tells when the burnout rev limit was activated by showing On or Off.

Note: When Rev Launch and Rev Burn are activated at the same time, the Launch Rev Limit Valve is active.

CamSync: When value is selected, this will show On when the ignition is receiving a valid cam sync signal. It will show Off if there is no valid cam sync signal.

ANALYZE COLUMN

Deg BTDC: Key in your total timing setting in this space. With this information the History column will be able to show what the timing is when a retard or step retard is activated and assigned the BTDC function.

Value Column: There is a Value column for each trace in the History Analyze window. This lets you select how to view each trace. **Note:** Not all of the options will work with every trace.

Value: Plot the trace data in the same units as the Trace Window data.

Sum: The cumulative number of a trace. Useful to determine how many times the rev limit is activated or the total number of sparks that occur during a pass.

Slope: When used with rpm it shows the rate rpm change per second.

BTDC: Timing degrees Before Top Dead Center.

Bestfit : Scales the trace data to fit the full screen.

FS Value: This is the reference for the Full Scale of the data. It can be unique or can be matched to other traces by click and dragging a value from one trace FS to another FS. To restore a trace, click on the FS Value and a unique number is assigned.

Average Column: This column puts a filter of sorts on the data. The setting is defaulted to one, meaning that you are viewing the raw data the same as in the History Trace Window. Increasing this number averages the samples together for a cleaner, easier to read trace. This is done by averaging the trace data which is 720° (crankshaft) average data.

Color Key: To change the color of a trace, click the pointer just to the right of the value column for each trace in the Trace/Analyze box. This will bring up the color chart.

75301 Programmable Digital-7 TA

Monitor List

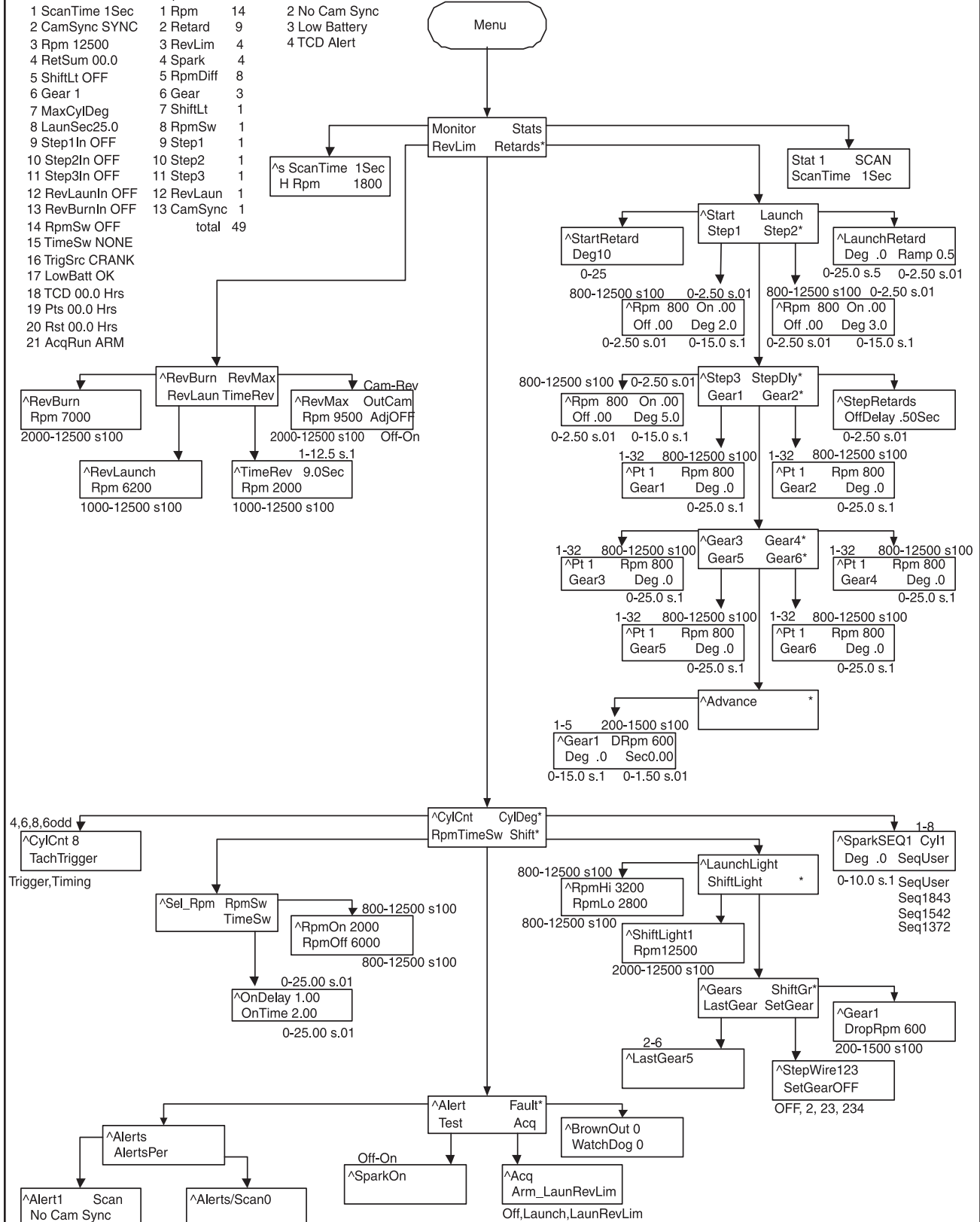
1 ScanTime 1Sec
2 CamSync SYNC
3 Rpm 12500
4 RetSum 00.0
5 ShiftLt OFF
6 Gear 1
7 MaxCylDeg
8 LaunSec25.0
9 Step1In OFF
10 Step2In OFF
11 Step3In OFF
12 RevLaunIn OFF
13 RevBurnIn OFF
14 RpmSw OFF
15 TimeSw NONE
16 TrigSrc CRANK
17 LowBatt OK
18 TCD 00.0 Hrs
19 Pts 00.0 Hrs
20 Rst 00.0 Hrs
21 AcqRun ARM

Acq List

1 Rpm 14
2 Retard 9
3 RevLim 4
4 Spark 4
5 RpmDiff 8
6 Gear 3
7 ShiftLt 1
8 RpmSw 1
9 Step1 1
10 Step2 1
11 Step3 1
12 RevLaun 1
13 CamSync 1
total 49

Alert List

2 No Cam Sync
3 Low Battery
4 TCD Alert



DEFAULT MENU

Notes: 75301V02. Uses menu 75301M02
MSD Programmable Digital-7 TA
Factory default data and menu.

75301 MO2 Monitor Stats Stat 1 RevLim RevBurn *Rpm 7000 RevMax RevMax *OutCAM *Rpm 9500 *AdjOFF RevLaun RevLaunch *Rpm 6200 TimeRev TimeRev Time 9.0 Rpm 2000 Retards Start StartRetard * Deg10 Launch LaunchRetard * Deg .0 * Ramp .50 Step1 * Rpm 800 * On .00 * Off .00 * Deg 2.0 Step2 * Rpm 800 * On .00 * Off .00 * Deg 3.0 Step 3 * Rpm 800 * On .00 * Off .00 * Deg 5.0 StepDly Step Retards * OffDelay .50Sec Gear 1 Pt 1 Rpm 800 Gear1 Deg .0 Gear2 Pt 1 Rpm 800 Gear2 Deg .0 Gear3 Pt 1 Rpm 800 Gear3 Deg .0	Gear4 Pt 1 Rpm 800 Gear 4 Deg .0 Gear5 Pt 1 Rpm 800 Gear5 Deg .0 Gear6 Pt 1 Rpm 800 Gear6 Deg .0 Advance Gear1 * (1) dRpm 600 * (2) dRpm 600 * (3) dRpm 600 * (4) dRpm 600 * (5) dRpm 600 * (1) Deg .0 * (2) Deg .0 * (3) Deg .0 * (4) Deg .0 * (5) Deg .0 * (1) Sec .00 * (2) Sec .00 * (3) Sec .00 * (4) Sec .00 * (5) Sec .00 CylCnt *CylCnt 8 *TachTrigger DylDeg SparkSEQ1 * (1) Cyl1 * (2) Cyl2 * (3) Cyl3 * (4) Cyl4 * (5) Cyl5 * (6) Cyl6 * (7) Cyl7 * (8) Cyl8 * (1) Deg .0 * (2) Deg .0 * (3) Deg .0 * (4) Deg .0 * (5) Deg .0 * (6) Deg .0 * (7) Deg .0 * (8) Deg .0 * SeqUser RpmTimeSw * SwSel RPM RpmSw *RpmOn 2000 *RpmOff 6000 TimeSw *OnDelay 1.00 *OnTime 2.00 Shift	LaunchLight *RpmHi 12,500 *RpmLo 12,400 ShiftLights ShiftLight1 * (1) Rpm12500 * (2) Rpm12300 * (3) Rpm12100 * (4) Rpm11900 * (5) Rpm11700 Gears ShiftGr Gear1 * (1) DropRpm 600 * (2) DropRpm 600 * (3) DropRpm 600 * (4) DropRpm 600 * (5) DropRpm 600 LastGr *LastGear5 SetGear StepWire 123 *SetGearOFF Alerts Alert 1 (1) (2) (3) AlertsPer *Alerts/Scan0 Fault *BrownOut 0 *WatchDog 0 Test *SparkON Acq Acq *Arm LaunRevLim Off LaunRevLim Launch
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Hand-Held Programmer/Monitor, PN 7550

This section illustrates the operation of the optional Hand-Held Programmer/Monitor and how to navigate its program menus. Reading the instructions as you operate the Programmer to become familiar with the screens and menus will assist in your programming.

The PN 7550 Programmer connects to the MSD Programmable Digital-7 TA Ignition Control with the supplied 9-pin wiring harness. It can be left connected when making passes or removed. If you choose to remove it after making changes in the program, you must go to the Save menu to store the new programs in the Ignition before disconnecting the harness.

There are six buttons on the PN 7550 (Figure 8). The top four are used for programming all of the features of the PN 75301 Ignition. The two Launch Control buttons put you directly to the Launch RPM setting adjustment for last minute starting line changes.

ENTER – This is used to open the selected field for further programming or to load a new program.

NEXT – Pressing this button moves the cursor to the next field. After making an adjustment to a program, pressing NEXT will take you to the Save menu.

Up (↑) and Down (↓) Arrows – These buttons are used to change the settings of programs such as rpm or timing. Pressing the up button increases the rate while the down arrow lowers it.

LAUNCH REV LIMITER

Pressing one of these buttons takes you directly to the RPM Launch limit for quick starting line changes. Once at this menu, use the arrow keys to adjust the rpm limit. Note that this rpm limit will automatically be saved without having to go to the Save menu.

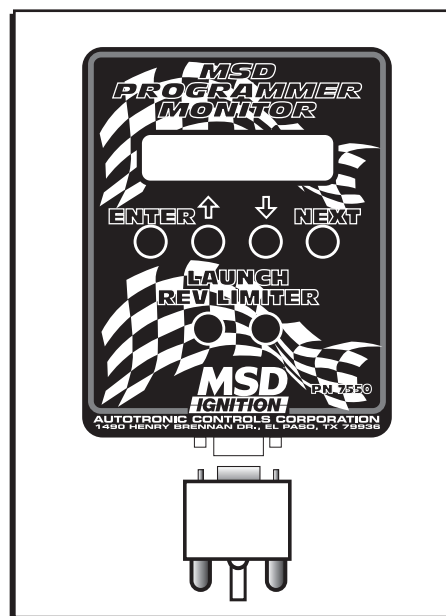


Figure 8 The Optional Hand-Held Programmer.

MENU TREE

The menu tree on page 14 shows the different screens and programs of the Ignition and Monitor. The chart on page 17 illustrates the different parameters of each section.

Display	Default	Data Low-High (step by)	Display	Default	Data Low-High (step by)
RevBurn.	7000	2000-12500 (100)	AdvSec4	0	0-1.50 (0.01)
RevMax	9500	2000-12500 (100)	RpmDrop5.	600	200-1500 (100)
OutCam.	Cam	Cam,Rev	AdvDeg5	0	0-15.0 (0.1)
AdjOff	Off	Off,On	AdvSec5	0	0-1.50 (0.01)
RevLaunch	6200	1000-12500 (100)	RpmDrop6.	600	200-1500 (100)
TimeRevSec	9.0	0.1-12.5 (0.1)	AdvDeg6	0	0-15.0 (0.1)
TimeRevRpm.	2000	1000-12500 (100)	AdvSec6	0	0-1.50 (0.01)
StartRetard	10	0-25	CylCnt	8	4,6,8,6odd
LaunchRetardDeg..	0	0-25.0 (0.5)	TachTrigger.	Trigger	Trigger-Timing
LaunchRetardRamp	0.50	0-2.50 (0.01)	RpmSwSel.	Rpm	Rpm-Time
Step1Rpm	800	800-12500 (100)	RpmOn	2000	800-12500 (100)
Step1On	0	0-2.50 (0.01)	RpmOff	6000	800-12500 (100)
Step1Off	0	0-2.50 (0.01)	OnDelay	1.00	0-25.00 (0.01)
Step1Deg	2.0	0-15.0 (0.1)	OnTime	2.00	0-25.00 (0.01)
Step2Rpm	800	800-12500 (100)	SparkSeq1	Cyl1	1-8
Step2On	0	0-2.50 (0.01)	SparkSeq2	Cyl2	1-8
Step2Off	0	0-2.50 (0.01)	SparkSeq3	Cyl3	1-8
Step2Deg	3.0	0-15.0 (0.1)	SparkSeq4	Cyl4	1-8
Step3Rpm	800	800-12500 (100)	SparkSeq5	Cyl5	1-8
Step3On	0	0-2.50 (0.01)	SparkSeq6	Cyl6	1-8
Step3Off	0	0-2.50 (0.01)	SparkSeq7	Cyl7	1-8
Step3Deg	5.0	0-15.0 (0.1)	SparkSeq8	Cyl8	1-8
StepOffDelay	0.50	0-2.50 (0.01)	SparkDeg1	0	0-10.0 (0.1)
Gear1Pt	1	1-32	SparkDeg2	0	0-10.0 (0.1)
Gear1Rpm	800	800-12500 (100)	SparkDeg3	0	0-10.0 (0.1)
Gear1Deg	0	0-25.0 (0.1)	SparkDeg4	0	0-10.0 (0.1)
Gear2Pt	1	1-32	SparkDeg5	0	0-10.0 (0.1)
Gear2Rpm	800	800-12500 (100)	SparkDeg6	0	0-10.0 (0.1)
Gear2Deg	0	0-25.0 (0.1)	SparkDeg7	0	0-10.0 (0.1)
Gear3Pt	1	1-32	SparkDeg8	0	0-10.0 (0.1)
Gear3Rpm	800	800-12500 (100)	SeqUser	User	User,1843,1542,1372
Gear3Deg	0	0-25.0 (0.1)	RpmHi	12500	800-12500 (100)
Gear4Pt	1	1-32	RpmLo	12400	800-12500 (100)
Gear4Rpm	800	800-12500 (100)	ShiftLight1	12400	2000-12500 (100)
Gear4Deg	0	0-25.0 (0.1)	ShiftLight2	12300	2000-12500 (100)
Gear5Pt	1	1-32	ShiftLight3	12100	2000-12500 (100)
Gear5Rpm	800	800-12500 (100)	ShiftLight4	11900	2000-12500 (100)
Gear5Deg	0	0-25.0 (0.1)	ShiftLight5	11700	2000-12500 (100)
Gear6Pt	1	1-32	RpmDrop1.	600	200-1500 (100)
Gear6Rpm	800	800-12500 (100)	RpmDrop2.	600	200-1500 (100)
Gear6Deg	0	0-25.0 (0.1)	RpmDrop3.	600	200-1500 (100)
RpmDrop1	600	200-1500 (100)	RpmDrop4.	600	200-1500 (100)
AdvDeg1	0	0-15.0 (0.1)	RpmDrop5.	600	200-1500 (100)
AdvSec1	0	0-1.50 (0.01)	RpmDrop6.	600	200-1500 (100)
RpmDrop2.	600	200-1500 (100)	LastGear	5	2-6
AdvDeg2	0	0-15.0 (0.1)	SetGear	Off	Off,2,23,234
AdvSec2	0	0-1.50 (0.01)	BrownOut	0	0-255
RpmDrop3.	600	200-1500 (100)	WatchDog	0	0-255
AdvDeg3	0	0-15.0 (0.1)	SparkOn	On	Off,On
AdvSec3	0	0-1.50 (0.01)	AcqArm	LaunRevLim	Off,Launch,LaunRevLim
RpmDrop4.	600	200-1500 (100)			
AdvDeg4	0	0-15.0 (0.1)			

When you first turn the ignition on, the Programmer will display a short introduction with MSD, the ignition version and other information. You can bypass this to get to the Main Menu by pressing Enter.

MAIN MENUS

The Main Menus are shown in Figure 9. Note the * on the right side of the screen. This means that there is more to this menu above or below list shown. By pressing ↓ you will get to the next part of the Main Menu. Note that three screens comprise the Main Menu.

NAVIGATING THE MENUS

To move around to the options in a menu, use the Next button. Whichever subject's first letter is flashing, that is the active choice. That is, when you press Next, the next screen will be that choice.

Also note that there is a Previous symbol (^) in the left corner of the monitor. This will take you to the previous menu. When this is flashing and you select Enter, you will be taken to the previous screen.

SAVE MENU

This is the Menu that you have to go to in order to change a program. When you hit Enter or Next after making a change in a program, it automatically takes you to the Save Menu. Note that there is another screen below the one that comes up (as indicated by the lower *). There are five choices at the Save Menu:

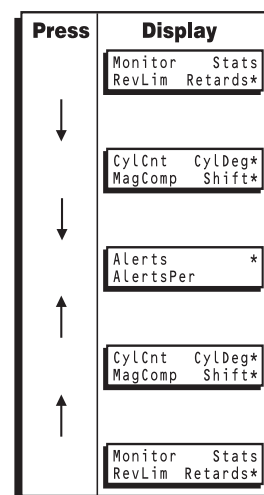


Figure 9 Main Menus.

Save	This will save the new program value in the Ignition.
Cancel	This will restore the previous value.
Default Item	This restores the program to the default value.
Default Table	Restores the complete table back to the default value. This is handy in cases such as the Launch Curve where there are numerous values.
Default Product	Entering this will restore EVERY PROGRAM back to default properties. Take note that you will start completely over by entering this!

When the Save screen comes up, the Save command is already flashing. By hitting Enter (or Next) the value will be saved and the monitor will display the new value.

RPM EXAMPLE

Following is an example of how to edit the RevMax rpm limit (Figure 10).

Main Menu: Press Next until RevLim flashes. Then press Enter.

RPM Limit Menu: Press Next until RevMax flashes, then press ENTER. This takes you to the RevMax rpm program screen.

RevMax Menu: Press Next until the RPM flashes, then push the (↑) or (↓) button until your value is shown. Then press Enter which will take you to the Save Menu.

Save Menu: Save will be flashing so press Enter. The screen will go back to the RevMax rpm value to show the new value/program.

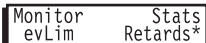
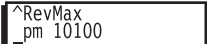
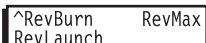
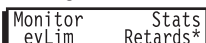
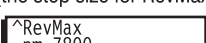
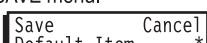
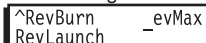
Press	Display	Press	Display	Press	Display	Press	Display
NEXT	The RevLim field is blinking. The RevLim field is selected on the Main Menu. 	ENTER	After the ENTER button is pressed, the Return field (^) is blinking on the RevMax menu. 	UP (HELD DOWN)	When the UP button is held down, the rpm value will continue to step up by 100. When the value reaches 8000 rpm, the step size will step up by 1000 Rpm. The number sequence resulting from HOLDING the UP button becomes: 7700, 7800, 7900, 8000, 9000, 10000. After releasing the UP button, the larger step is removed. Pressing the UP button again will step up by 100 (from 10000 to 10100).	ENTER	After the ENTER button is pressed, the Rpm RevMax value is saved in the Ignition and the screen displays the RevMax Rpm value. 
ENTER	After the ENTER button is pressed, the RevLim is now displayed. The Return field is blinking (^ is used for "return to previous menu"). 	NEXT	After the NEXT button is pressed, the Rpm field is blinking on the RevMax menu. 				
ENTER	After the ENTER button is pressed again, the display is returned to the Main Menu. The RevLim field is blinking. Press ENTER. 	UP	The UP and DOWN buttons can now be used to change the RevMax rpm value. After the UP button is pressed, the rpm value is larger by 100 (the step size for RevMax). 	NEXT	After the NEXT button is pressed, the SAVE menu is displayed. The SAVE field is blinking on the SAVE menu. 		
NEXT	Press NEXT until RevMax is blinking. Now the RevMax field is blinking. 						

Figure 10 Changing the Overrev RPM Setting.

PROGRAMMING A GEAR 1-5 TIMING CURVES

When using the Programmer to build a timing curve, you can program a timing value every 100 rpm. If you skip a step, the timing retard will return to the default setting (no retard) for that rpm range. You can program up to 32 different points ranging from 800-12,500 rpm in 0.1° increments. MSD built in a copy function that will program the same amount of timing for each rpm though each step still needs to be Entered. It is highly recommended to draw the timing curve on a graph and figure out the degree/rpm steps before attempting to program it into the Ignition.

Following is an example of programming a timing curve. With the timing on the engine set at 36°, we want it to be 16° at idle and begin ramping up at 1,000 rpm. By 3,000 rpm we want to be back at the full 36° (This means 1° per 100 rpm steps).

To get this incremental amount, divide the rpm range of the curve by 100 (rpm increments). Take this result and divide it by the total amount of timing changes to come up with the amount of timing that needs to be adjusted per step (100 rpm).

MAIN MENU

Press Next until Retards flashes, then press Enter.

INSTALLATION INSTRUCTIONS

FIRST RETARD MENU

Note that Gear/Curve is not listed, but there is an * on lower right of the monitor which means that there is more to this menu. Push the ↓ button to get to the next part of the menu, then click Next until Gear/Curve flashes. Press Enter.

GEAR 1/CURVE MENU

Use the Next button to get to the RPM down to 800 rpm, the lowest programmable rpm. Then use Next to maneuver to the RetDeg and use the arrows to set it to 20° of retard, then press Enter. This goes to the Save menu and select Enter again.

Instead of moving through the entire Gear/Curve menu again, press Next until Copy is active. Now by pressing Enter, you'll notice that the rpm setting is saved and the Monitor moves to the next rpm step (rpm). You only need to change the retard rate then press Copy again. Repeat this procedure for the complete curve. At Deg 0, press NEXT, and ENTER to save the programmed retard curve. Repeat this process to program Gear 2 through Gear 5 curves.

MONITOR MODE

In Scan mode the monitor will scroll through all of the settings (or the ones you choose) so you can view each parameter when the engine is running.

Service

In case of malfunction, this MSD component will be repaired free of charge according to the terms of the warranty. When returning MSD components for service, Proof of Purchase must be supplied for warranty verification. After the warranty period has expired, repair service is charged based on a minimum and maximum charge.

All returns must have a Return Material Authorization (RMA) number issued to them before being returned. To obtain an RMA number please contact MSD Customer Service at (915) 855-7123 or fax a request to (915) 857-3344. Send the unit prepaid with proof of purchase to the attention of: **MSD Ignition, Customer Service - RMA #, 12120 Esther Lama, Dock 5, El Paso, Texas 79936.**

When returning the unit for repair, leave all wires at the length in which you have them installed. Be sure to include a detailed account of any problems experienced, and what components and accessories are installed on the vehicle.

The repaired unit will be returned as soon as possible after receipt, COD for any charges. (Ground shipping is covered by warranty). All units are returned regular UPS unless otherwise noted. For more information, call the MSD Customer Service Line (915) 855-7123. MSD technicians are available from 7:00 a.m. to 6:00 p.m. Monday - Friday (mountain time).

Limited Warranty

MSD IGNITION warrants MSD Ignition products to be free from defects in material and workmanship under normal use and if properly installed for a period of one year from date of purchase. If found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of date of purchase. This shall constitute the sole remedy of the purchaser and the sole liability of MSD Ignition. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall MSD Ignition be liable for special or consequential damages.