

MSD **IGNITION** **INSTALLATION INSTRUCTIONS**

Programmable Digital-7 PN 7530T

Parts Included:

1 - Ignition Control, PN 7530T	1 - 9-Pin Computer Harness
1 - MSD Pro-Data+ CD	1 - Shielded Mag Pickup Harness, PN 8862
4 - Vibration Mounts & 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 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 Digital-7 Programmable 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.

WIRING	
Heavy Red	Ignition supply wire. Connects to battery positive (+) terminal or battery junction. Note: Do not connect to the alternator.
Heavy Black	Ignition supply Ground wire. Connect to battery negative (-) terminal or engine block.
Red	On/Off switch wiring. Connects to a switched 12 volt source.
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.

Accessories	
Dark Blue	<p>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.</p> <p>Note: When this wire is activated it will override all other Rev Limits except the TCD Limit.</p>
Light Blue	Burnout Rev Limit. When 12 volts are applied the Burnout Rev Limit is active.
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.
Retard Stage Wires or Gear Select	
<p>These three wires can be used as Retard Stage Activation and/or as a gear select wire.</p>	
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.
<p>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°.</p>	
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. Note, only two wires are used.
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 indicated when cylinder number one is firing. Note: When used, the fiber optic connector is not used and must be covered. Lite Blue is cam (+) and Lite Green (-).

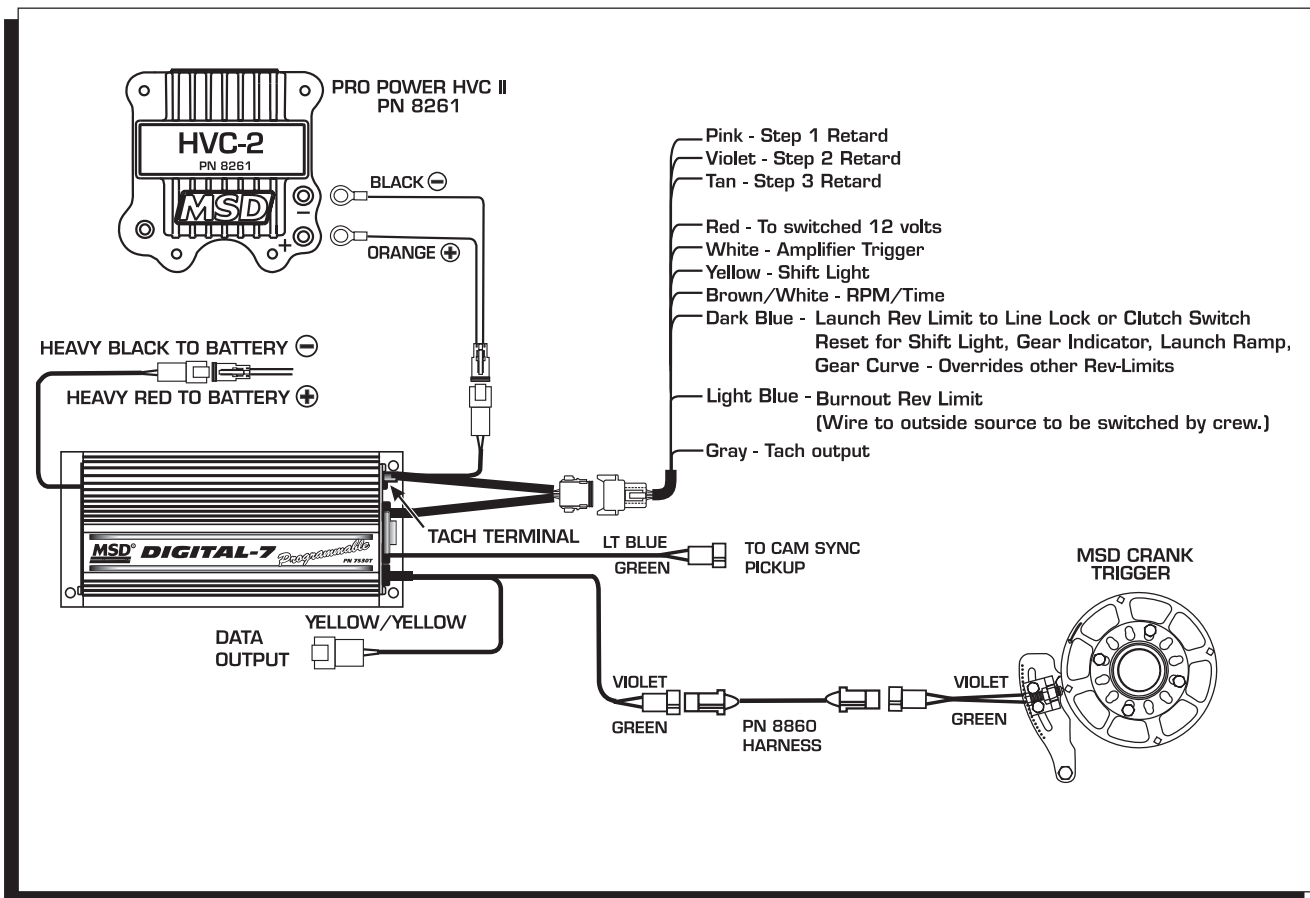


Figure 1 Wiring the Programmable Digital-7 Ignition.

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 "7530T".
8. This will open another menu of versions. Highlight and open the "7530Tvxx.IGN" (xx determines the versions, such as 22). This will open the Pro-Data+ software for the Programmable Digital-7 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.

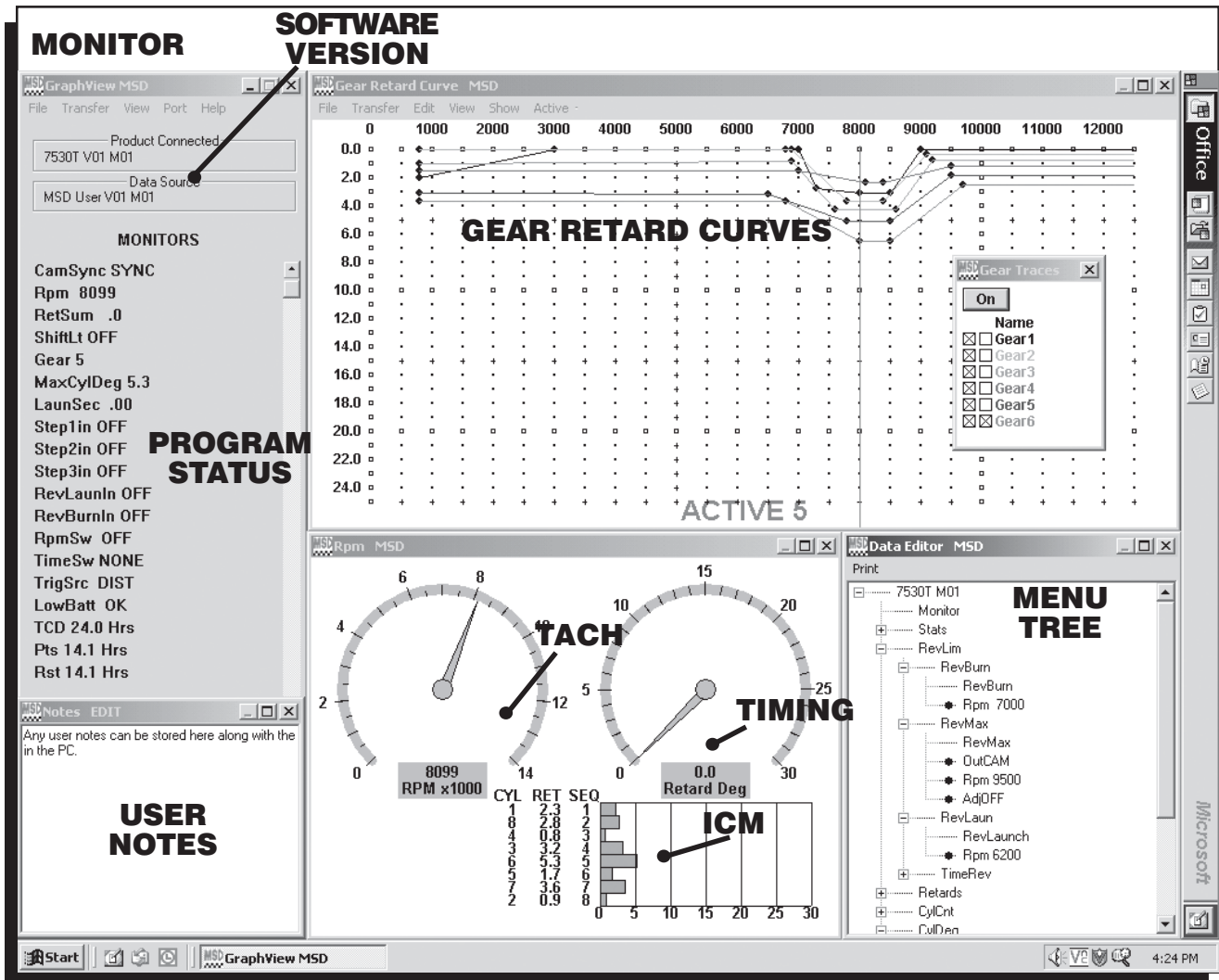


Figure 2 Pro-Data+ Screen and Program Windows.

PROGRAMMABLE FEATURES

The following explains the programmable features of the PN 7530T 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, 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 2,000 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 Holeshoot limits are off.

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 trigger input offsets and variables. It can be turned On or Off.

RPM: Adjustable in 100 rpm increments from 2,000 – 12,500.

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 burnout and the shutdown rpm value can be set from 1000-12,500 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.

TCD

The PN 7530T 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.

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 1). 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.

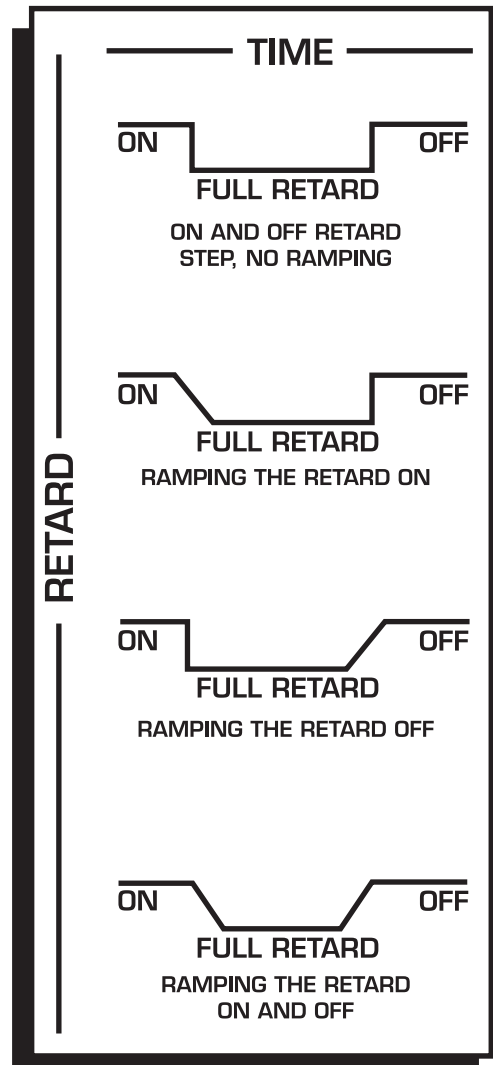


Figure 3 Ramping the Step Retards.

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.

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 12 volts 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 holeshot 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 holeshot. 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: Program the number of counts that occur for a Low Voltage alert.

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

WatchDog: The count of Watch Dog resets. This should always 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.

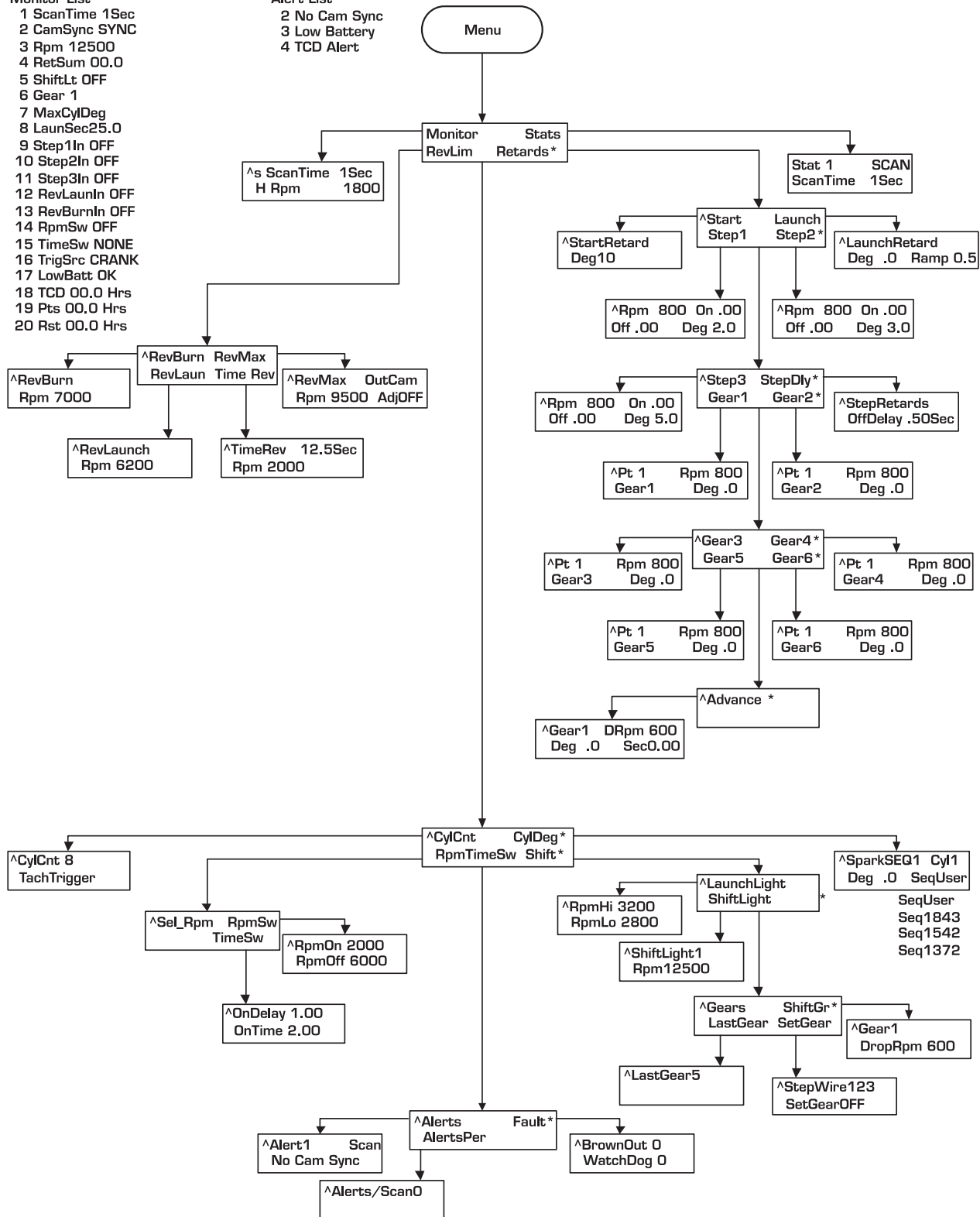
7530T M1 Digital Race Ignition

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

Alert List

- 2 No Cam Sync
- 3 Low Battery
- 4 TCD Alert



DEFAULT MENU

Notes: 7530TV1. Uses menu 7530M01
MSD Digital Race Ignition.
Factory default data and menu.

<p>7530T MO1 Monitor Stats Stat 1</p> <p>RevLim RevBurn *Rpm 7000</p> <p> RevMax RevMax *OutCAM *Rpm 9500 *AdjOFF</p> <p> RevLaun RevLaunch *Rpm 6200</p> <p> TimeRev TimeRev Time 9.0 Rpm 2000</p> <p>Retards Start StartRetard * Deg10</p> <p> Launch LaunchRetard * Deg .0 * Ramp .50</p> <p> Step1 *Rpm 800 * On .00 * Off .00 * Deg 2.0</p> <p> Step2 *Rpm 800 * On .00 * Off .00 * Deg 3.0</p> <p> Step 3 *Rpm 800 * On .00 * Off .00 * Deg 5.0</p> <p> StepDly Step Retards * OffDelay .50Sec</p> <p> Gear 1 Pt 1 Rpm 800 Gear1 Deg .0</p> <p> Gear2 Pt 1 Rpm 800 Gear2 Deg .0</p> <p> Gear3 Pt 1 Rpm 800 Gear3 Deg .0</p>	<p>Gear4 Pt 1 Rpm 800 Gear 4 Deg .0</p> <p>Gear5 Pt 1 Rpm 800 Gear5 Deg .0</p> <p>Gear6 Pt 1 Rpm 800 Gear6 Deg .0</p> <p>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</p> <p>CylCnt *CylCnt 8 *TachTrigger</p> <p>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</p> <p> * SeqUser</p> <p>RpmTimeSw * SwSel RPM RpmSw *RpmOn 2000 *RpmOff 6000</p> <p> TimeSw *OnDelay 1.00 *OnTime 2.00</p>	<p>Shift LaunchLight *RpmHi 3200 *RpmLo 2800</p> <p> ShiftLights ShiftLight1 * (1) Rpm12500 * (2) Rpm12300 * (3) Rpm 12100 * (4) Rpm11900 * (5) Rpm11700</p> <p> Gears ShiftGr Gear1 * (1) DropRpm 600 * (2) DropRpm 600 * (3) DropRpm 600 * (4) DropRpm 600 * (5) DropRpm 600</p> <p> LastGr *LastGear5</p> <p> SetGear StepWire 123 *SetGearOFF</p> <p> Alerts Alert 1 (1) SCAN (2) SCAN</p> <p> Fault *BrownOut 0 *WatchDog 0</p> <p> AlertsPer *Alerts/Scan 0</p>
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