

Rainbow Six

THERE'S NOTHING COVERT ABOUT THE POWER DELIVERED BY MSD'S 6-MOD AND BLASTER COILS FOR TWO-VALVE 4.6s



Sometimes we wonder if the prophetic statement "time does not stand still," was first said by someone associated with the form of high performance there was back when the phrase was coined—chariots, horse and buggies, whatever.

Time, with respect to the innovations and technologies for Mustangs we experience on what seems to be a daily basis, certainly doesn't stay in one place. Manufacturers are always developing parts intended to make 'Stangs better, stronger, and faster. Our job is to make you aware of all the latest and greatest parts as soon as we find out about them.

MSD Ignition has just taken the wrap off its new 6-Mod ignition (timing) controller (PN 6011; \$411.00) for Two- and Four-Valve modulars, as well as Ford Blaster coil-on-plugs (PN 82428; \$388.60/set of eight) for SOHC 4.6s. The timing couldn't be better.

MSD's 6-Mod essentially bridges the canyon that separates modular engines and the ability to run them with carburetors. The absence of distributors in '96-to-present 'Stangs has long been a major hurdle for a happy marriage between the two, as control of ignition and timing was all but impossible to achieve when carb swaps were attempted.

Timing control is 6-Mod's forté. For a carb application, the unit assumes the same role that weights and springs take on inside a



▲ This is the mod squad we're installing on a supercharged, 4.6-powered '04 Mustang GT. The pieces include eight new MSD Blaster coil-on-plugs (PN 82428; \$388.60), a complete 6-Mod ignition controller system (PN 6011; \$411.00), and a harness for EFI (PN 88814; \$285.70).

Text and Photos by KJ Jones

Horse Sense: Running a carburetor on a mod motor is a concept we here at 5.0 Mustang & Super Fords like to think of as teaching a new dog an old trick.

MOD-MOTOR IGNITION UPGRADE

distributor. But 6-Mod isn't strictly for carb swaps; it suits street/strip 4.6s and 5.4 EFI applications. It's quickly and easily installed using an optional harness for EFI (PN 88814; \$285.70). The system is all-inclusive with a complete harness, two-bar MAP sensor, and ProData+ software. The only thing not included is the laptop computer used to program custom timing curves based on MAP or rpm and dialing-in step retards, rev limits, and two-step settings, if desired.

Our friends at Extreme Automotive have a supercharged '04 Mustang GT that's due for tuning—which is something timing plays a huge role in. We're seizing the opportunity to install and test 6-Mod and MSD's new COPs. In actuality, a Mustang with a carbureted 4.6 would be an even better test vehicle. That said, we don't have a non-EFI mod motor at our disposal, nor do we have the time to delve into a carburetor swap for this exercise.

Our plan is to try and optimize the blown EFI 'Stang's tune and

make power by using the controller's built-in timing source. This is 6-Mod's most basic adjustment method, and we recommend you use it as a starting point if you're new to laptop tuning.

With the built-in timing source, 6-Mod processes a PCM's timing and presents a new baseline timing curve that can be modified (advanced or slowed) by clicking on and dragging the dots in ProData+'s rpm or MAP tables. Data is then transferred and saved in the tables from the laptop to the 6-Mod controller unit mounted in the engine compartment. The system also offers more dynamic methods of manipulating an injected mod-motor's timing, but again, we suggest you stick with the built-in basic feature until you're more familiar and comfortable with operating 6-Mod.

Continue reading and learn more about our exploits with MSD's new 6-Mod ignition controller and the overall performance of the blown '04 when spark and timing are at their best.

ON THE DYNO

RPM	STOCK COILS			MSD BLASTER COILS			DIFFERENCE		
	POWER	TORQUE	A/F	POWER	TORQUE	A/F	POWER	TORQUE	A/F
2,750	137.33	254.88	10.40	148.62	273.92	10.50	11.29	19.04	0.10
2,803	146.22	261.98	10.44	150.71	275.24	10.51	4.49	13.26	0.07
2,890	153.66	266.94	10.44	158.66	280.23	10.51	5.00	13.29	0.07
3,004	163.24	272.86	10.46	169.61	286.34	10.55	6.37	13.48	0.09
3,092	170.30	276.55	10.46	174.83	288.21	10.61	4.53	11.67	0.15
3,192	179.06	281.70	10.67	183.81	293.97	10.65	4.75	12.27	-0.02
3,300	190.35	289.61	10.71	199.18	305.19	10.55	8.83	15.59	-0.16
3,393	201.08	297.58	10.86	208.90	312.82	10.59	7.82	15.24	-0.27
3,510	216.03	309.05	10.96	224.89	324.58	11.00	8.86	15.53	0.04
3,602	226.25	315.38	10.86	235.30	331.46	11.07	9.05	16.08	0.21
3,701	237.20	321.85	10.88	245.76	337.23	11.25	8.56	15.38	0.37
3,797	247.09	326.81	10.92	256.80	343.03	11.38	9.71	16.22	0.46
3,907	258.26	331.88	10.98	267.77	348.22	11.55	9.51	16.34	0.57
3,995	267.53	336.24	11.03	278.28	352.16	11.65	10.75	15.92	0.62
4,093	277.54	340.50	10.78	286.05	354.27	11.75	8.51	13.77	0.97
4,199	286.90	343.13	10.82	294.77	356.56	11.61	7.87	13.43	0.79
4,292	293.97	343.95	10.96	305.44	360.68	11.42	11.47	16.73	0.46
4,399	301.02	343.60	10.80	315.59	363.26	11.30	14.57	19.66	0.50
4,509	308.22	343.24	10.92	323.63	365.24	11.30	15.41	22.00	0.38
4,592	313.33	342.62	10.96	333.89	367.71	11.42	20.56	25.09	0.46
4,706	320.18	341.63	10.98	342.26	368.55	11.52	22.09	26.93	0.54
4,811	325.84	340.13	10.86	348.22	368.16	11.50	22.38	28.04	0.64
4,895	329.27	337.80	10.75	356.12	368.30	11.48	26.85	30.50	0.73
4,996	331.00	332.66	10.69	361.51	366.10	11.44	30.51	33.44	0.75
5,094	332.85	328.08	10.80	364.48	361.49	11.46	31.64	33.41	0.66
5,196	331.78	320.62	10.75	366.36	355.87	11.50	34.59	35.25	0.75
5,308	329.81	311.99	10.63	368.45	351.70	11.63	38.64	39.71	1.00
5,375	329.05	307.43	10.65	369.82	348.56	11.61	40.76	41.13	0.96

Prior to beginning our project, we tested the Vortech-blown, '04 Mustang GT on Extreme Automotive's Dynapack Evolution 4000 chassis dyno. We were trying to determine whether the swap from stock coils to MSD's Ford Blaster coil-on-plugs would make any difference in the 'Stang's rear-wheel power and torque output.

Thanks to the bigger spark blast, we saw a sizeable gain in horses and torque with MSD's coil-on-plugs. More importantly, our air/fuel mixture took a turn from being somewhat rich in the mid 10s to a more acceptable mid-11 ratio with blasters installed.



▲ The MSD Blaster COP on the right doesn't appear to be any different than a stocker. Their housings are exactly the same.



MOD-MOTOR IGNITION UPGRADE



▲ Our test Pony packs this Vortech S-Trim supercharger, which features an eight-rib belt-drive for better belt traction. The 'Stang's engine is stock, save for the blower, so boost is limited to a safe 10-pound range to ensure there are no detonation issues with 91-octane California gas.



▲ Saul "The Surgeon" Gutierrez of Extreme Automotive orchestrated our installation and dyno tests. The process begins with the removal of the air-charge cooler's tubing, which creates more than adequate access to the coils on the passenger side of the engine. Even though our test subject is equipped with a strut-tower brace, removal isn't necessary.



▲ Since we're using 6-Mod in an EFI application, this EFI harness kit is required. It includes splice-free connectors that plug directly into the crankshaft and camshaft sensors and the 6-Mod wiring harness. Also included is a tach adapter that completes the circuit between the factory harness and 6-Mod harness at the number-one cylinder. The adapter provides a tach signal to the controller based on the firing of the number-one cylinder. The controller uses this to read the engine's timing. Seven individual coil adapters that plug into the factory harness and fires coils for all other cylinders are also in the kit.



▲ Saul lays out the wiring harness from our 6-Mod controller. The harness is secured with a multi-pin WeatherPak connector and includes factory-style plugs for the cam and crankshaft sensors, each COP, and the MAP sensor.

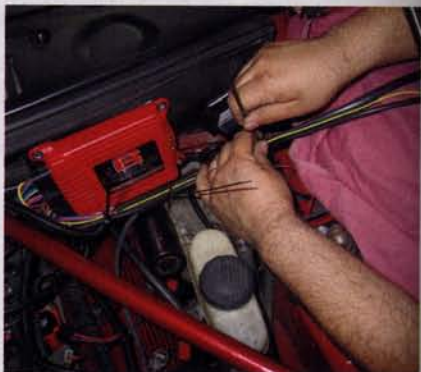


▲ Cylinder number one is the source of the tach signal that 6-Mod requires for use with EFI. This adapter (PN 88814) must be connected to the factory and 6-Mod wiring for coil number one.

◀ Ford Blaster Coil-on-Plugs bolt directly in place with no changes or mods required. The COPs provide higher voltage and greater spark energy than factory coils, thanks to MSD's patented, dual-magnet technology. By emitting spark energy directly from the coil and across the spark-plug gap instead of at the wire in the boot, combustion and engine efficiency are greatly improved with Blasters.



▲ The brown and tan harness is linked to the camshaft sensor, which is located near the top of the engine's front cover on the driver side. The crankshaft sensor is mounted at the bottom of the cover on the passenger side near the crank pulley, and it also receives a harness, which is identified by its red and black wires. Each one is plugged into the factory and 6-Mod wiring and the sensors on the engine.



▲ The unit's wiring harness is universal, so there's more than enough wire to mount a 6-Mod controller nearly anywhere in an engine compartment. Since we're not using the step-retard or two-step features, Saul isolates their wires, tapes off the ends, and zip-ties the wires together before tucking them out of sight.



▲ A good ground is essential to the proper function of any electrical component. Saul joins the ground wire of 6-Mod's harness with a hood ground on the 'Stang.

CHANGING TIMES**6-MOD W/18-DEGREES
TIMING ADVANCE**

RPM	POWER	TORQUE	A/F
2,001	99.89	250.52	10.11
2,103	101.72	242.72	10.11
2,190	104.92	240.43	10.11
2,302	109.88	239.56	10.05
2,400	114.48	239.38	10.13
2,491	120.62	243.02	10.23
2,602	130.29	251.30	10.46
2,696	138.18	257.20	10.67
2,803	147.29	263.70	10.69
2,895	154.94	268.65	10.69
2,989	162.68	273.19	10.69
3,109	173.22	279.66	10.75
3,202	182.31	285.80	10.94
3,292	191.81	292.52	10.80
3,404	205.24	302.64	10.98
3,498	216.45	310.60	10.98
3,598	229.40	320.10	11.00
3,690	239.96	326.45	11.11
3,790	251.08	332.57	11.42
3,896	263.50	339.56	11.32
4,008	277.01	346.99	11.50
4,099	287.79	352.44	11.50
4,211	300.64	358.39	11.26
4,293	309.48	361.85	11.25
4,407	319.76	364.12	11.00
4,495	327.23	365.36	11.09
4,607	335.83	365.85	10.98
4,696	342.93	366.51	11.07
4,802	350.78	366.67	11.00
4,892	356.87	366.12	10.98
5,004	363.88	364.98	10.98
5,090	367.69	362.59	10.98
5,205	371.80	358.60	11.00
5,295	374.31	354.82	11.03
5,402	376.46	349.79	10.98
5,447	377.07	347.49	10.98



▲ A nine-pin serial cable links 6-Mod with the MSD ProData+ program we installed in our laptop. Beginning on the tuning side involves plugging up and following the on-screen prompts for loading the software.



MSD's 6-Mod ignition (timing) controller proved to be a cool deal. Using the unit's built-in mode to give us a baseline, we created, stored, and transferred timing-advance and retard changes in 6-Mod's MAP and rpm tables.

Fine-tuned ignition timing proved to be a key to increasing rpm and making more horsepower; keep in mind that we use 91-octane fuel when we're on the dyno. In addition to the gains we achieved after installing hotter coil-on-plugs, it improved our blown-modular's air/fuel ratio. The mixture leaned to 11.0s under boost/3,500 rpm, from 10.7s with no timing.

In the MAP table, we began with 15 degrees timing at 0.0 MAP pressure. At 0.4 pressure on this scale, timing was advanced to 25 degrees. At this point, we tapered off timing between 0.4 and 15 MAP pressure and stored our curve with a final 18-degrees advance at Wide Open Throttle. As MAP/boost increases, it's normal to retard timing when using pump gas to ward off detonation.

On the rpm side, we also worked our way up from 15 degrees timing at 0.0 rpm and dialed in 25 degrees when the tach read 1,500 rpm. Following the same rule of retard that we adhere to with MAP, our rpm-based timing curve was tapered off to a final 10 degrees at WOT.



▲ Timing curves can be created and modified by clicking and dragging dots that are plotted on either of two tables (rpm and MAP). We adjusted timing using the system's built-in mode, which presents 6-Mod's interpretation of the engine's timing, from which advance or retard adjustments are made.



▲ We were initially concerned about how we would arrange each coil adapter around the engine to keep them from being damaged. Each adapter features a loop built into its case that allows us to slip a zip tie through it and secure the adapter to 6-Mod's harness.



▲ Our 6-Mod kit included a GM-style—we know it's wrong, but we have to go with what works best—two-bar MAP sensor. It feeds the controller the engine's vacuum pressure as load increases. A MAP sensor monitors the changes in the intake manifold or vacuum pressure during various engine operating loads and sends a corresponding signal to the PCM. **5.0**

SOURCES 5.0**Autotronics Control**

Dept 5.0
12120 Esther Lama, Ste. 114
El Paso, TX 79936
(915) 857-5200
www.msdisignition.com

Extreme Automotive

Dept 5.0
7901 Canoga Ave., Unit F
Canoga Park, CA 91304
(818) 883-8184

Snap-on Tools

www.snapon.com