

through the day. I learned he had a kidney transplant months after it happened. It didn't matter how much I scolded him, he kept this stuff to himself. Several years later I received a call from his wife that Jan was in the hospital again. When I visited him I was shocked to see that one of his legs had been amputated (due to Peripheral Artery Disease). Typical Jan, all he wanted to talk about was his Team Demolition Derby events he had created at Route 66 Raceway.

The same was true a year later when I "got the call". This time, the other leg was amputated. Again, Jan only wanted to talk about the fact that his Team Demolition Events were selling out (as I said, above all, Jan Gabriel was a businessman). A year or so later, "the call" revealed he was back in the hospital. This time, it was back to the first leg to take more off, except, during the surgery, he suffered a heart attack necessitating an emergency by-pass on the spot. Still, his interest was in how he would be able to physically maneuver at the Team Demolition Derby events, he was always the businessman. He continued on for another year, proud of his sell outs, even while undergoing dialysis three times a week and seeking a kidney transplant. By this time I was well aware of how much he suffered physically during the past decade, all without ever saying a word. Very few men could have endured what he had and still manage to succeed in business while fighting for his life. The fight came to an end, ironically, on Sunday, January 10th, 2010. Ironically, because despite his many accomplishments, he will probably best be remembered for his radio commercials promoting US-30 Drag Strip that began, in high energy, Jan Gabriel style, "SUNDAY! SUNDAY! SUNDAY!"

I guess there will be many things to remember about Jan, depending on whether you were part of his showbiz life or his Motorsport life. Story teller, television producer, promoter, advertising specialist, rock & roll DJ, racer, and television personality, he was all of these things, and more. In my mind, I will always remember, it wasn't the motorcycle racers at Santa Fe Speedway who were the toughest guys there, it was the man in the announcing booth, Jan Gabriel! Godspeed Jan.

Jan is survived by his wife Teresa and their daughter Mandee.

The last couple of years of Jan's life could have been so much better if a kidney could have been found. Organ donations are so important to the quality of life for those who need them. I can think of few

Turbo Charging For Beginners

By Benjamin Hunting

Turbocharging has long been regarded as one of the most cost-effective ways to add power to an engine. The principle behind forced induction is simple – a turbocharger compresses air in order to increase the density of oxygen per cubic inch of volume. This charged air then enters the engine, where it can combine with a greater amount of fuel and produce more power. The amount of compressed air entering an engine is measured in pounds per square in, or psi.

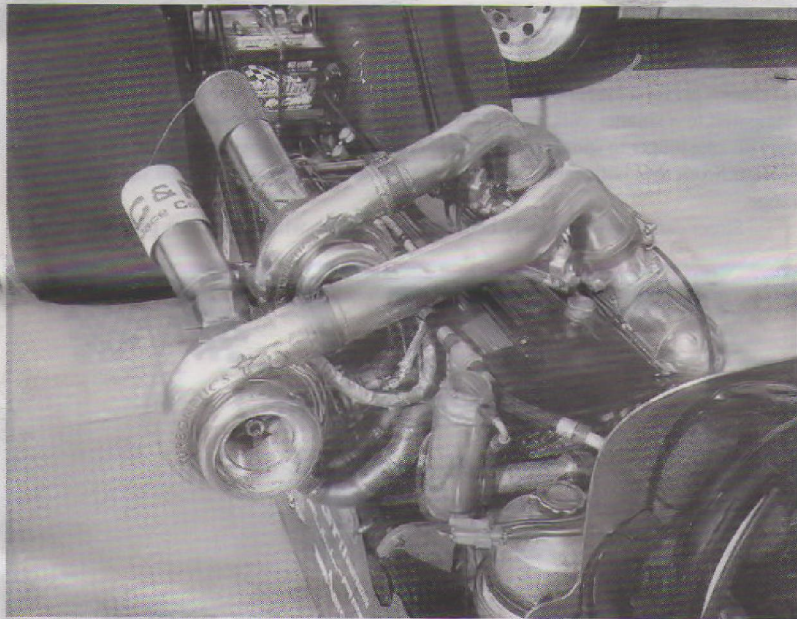
That paragraph might have been simple to write, and the concept is certainly easy to understand, but the path towards a reliable turbocharged setup that provides both the desired peak horsepower and a usable power band can be somewhat more complicated. There are many different turbo options available on the aftermarket, and what builders choose to install in their vehicles almost always needs to be evaluated on a case-by-case basis. There are no one-size-fits-all solutions in the world of turbocharging, and there also exist quite a few design factors, component choices and tuning possibilities to take into consideration when putting together a turbocharging game plan.

Let's look at some of the big picture issues surrounding turbo selection and installation for the average hot rodder or tuner.

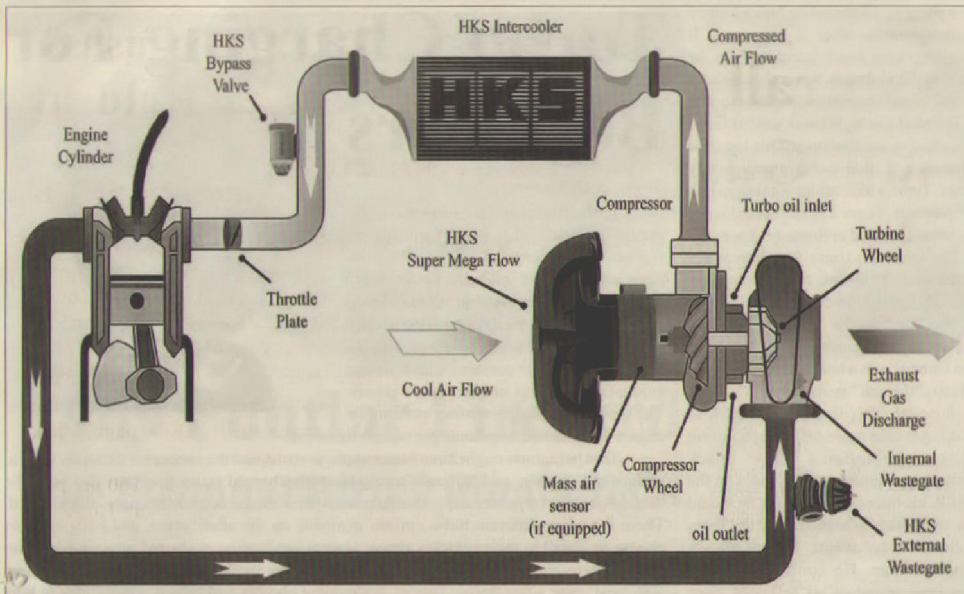
-Turbo Lag-

A common term that anyone interested in adding a turbo to their car will run into again and again is lag. Turbochargers are small turbines that are driven by the exhaust gases of the engine they are connected to. This allows them to spin faster as engine rpm's increase under load, compressing more air (also called boost) and allowing the motor to

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An exotic turbo set up here! Here is twin turbo Toyota in-line 6 cylinder dragster



provide boost at lower rpm's, as opposed to peak power at redline. This means that in the majority of cases, a smaller turbo is a better solution for a daily driven vehicle. When it comes to competitive driving, the key is to choose a turbo design that will offer peak boost in the rpm range in which the vehicle will most often be driven. Drag racers will almost always want to select the largest turbos they can fit under the hood, since peak power at redline is an important consideration. A drag platform can also be designed to use nitrous oxide in order to bridge the gap between low-end lag and high rpm boost. Road racers and autocrossers will want to find a balance between spool times and peak power, which could mean a dual turbo or mid-size turbo setup. On both the street and the track, it is not unusual to see builders experiment with sequential or twin turbos in order to more finely tune the rpm range at which boost is available.

-Dealing With Engine Stress-

Adding power through the use of a turbocharger inevitably increases the stress on an motor. Generally speaking, most modern engines can handle between 7 psi and 12 psi of boost before they require modifications to strengthen their internals. If you are looking for high peak power numbers, then you will most likely need to replace the reciprocating components of your engine with forged units, including the crankshaft, rods and pistons. Cast aluminum pistons are especially prone to cracks or holes at higher boost levels. Some drag setups might see as much as 36 psi, and may require an engine whose pistons have been altered in order to provide a lower compression ratio so as to discourage detonation and reduce the stress of combustion near the redline. As boost pressures rise, then the need for reliable fuel delivery that can meet the extra demand also becomes a critical factor. Tuning the engine so that fuel and spark are dialed in to the optimum settings for producing power under boost is one of the best ways to get the most out of a turbo installation. Relying on a stock tune while running high levels of boost can spell an early end to an engine's life expectancy. More extreme applications may require stand-alone engine management, which can significantly increase the cost of a setup.

make more power. Unfortunately, at lower engine speeds a turbocharger generally offers only minimum performance gains while it waits for exhaust pressures to build to the point where it can provide a meaningful level of boost. This is called turbo lag.

-Big Or Small?-

Understanding turbo lag will help you to determine which type of turbocharger would be the best fit for your application. As a general rule of thumb, a smaller turbo will spin up to maximum boost more quickly than a larger turbo, making them useful in real world driving situations where drivability is more important than peak power. In fact, a properly designed small turbo system can reduce lag to an almost imperceptible level, but the trade-off is that a small turbo can't provide the same level of top end power as a larger unit, due to airflow restrictions.

Bigger turbos offer jaw-dropping peak boost levels, and are better able to maintain maximum psi for a longer period. They also provide a greater volume of cooler air when compared to a smaller unit, as well as less back pressure when not on boost. However, they do take longer to spool (spin) up, and on a smaller displacement engine the lag can be so significant that noticeable horsepower gains don't appear until well up into the rpm range.

Street cars most obviously benefit from a turbo which has been properly sized to

internals. If you are looking for high peak power numbers, then you will most likely need to replace the reciprocating components of your engine with forged units, including the crankshaft, rods and pistons. Cast aluminum pistons are especially prone to cracks or holes at higher boost levels. Some drag setups might see as much as 36 psi, and may require an engine whose pistons have been altered in order to provide a lower compression ratio so as to discourage detonation and reduce the stress of combustion near the redline.

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In addition to internal considerations, turbochargers generate extra heat under your hood that your stock cooling system was not necessarily designed for. The faster a turbo spins, the more heat it produces. You may want to upgrade your radiator as well as invest in passive cooling through the hood itself. An intercooler can also help keep the tempera-

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Turbo Charging Continued...

ture of the charged air down, which in turn increases its oxygen density and improves the efficiency of a turbo setup.

-Turbo Vendors And Pricing-

There are a number of respected turbo vendors on the market with a history of producing reliable and powerful units. Many turbos are sold in kits that include all of the necessary wiring, mounting and plumbing hardware. Garret offers a full line of products ranging from the GT25 (up to 2.2 liter engines and 270 horsepower) to the large frame GT60 (6.0 liters and above, up to 2,000 horsepower). GReddy provides street tuners with a number of bolt-on kits which are perfect for entry-level or mid-range ap-

plications, while serious racers often turn to HKS for ultra-high performance units based on Garret technology. Pricing for a low-boost kit can start between \$1,500 and \$2,000 and crest above \$6,000 for drag-oriented kits.

-Putting It All Together-

A properly designed turbo system can be an excellent way to get the most bang for your buck when investing in additional horsepower for your car or truck. Careful research and not cutting any corners will go a long way towards both reducing the risk of engine damage and maximizing the amount of time a smile stays planted on your face while driving your newly modified vehicle.



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by Doug Mitchell

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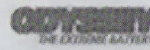
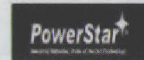
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