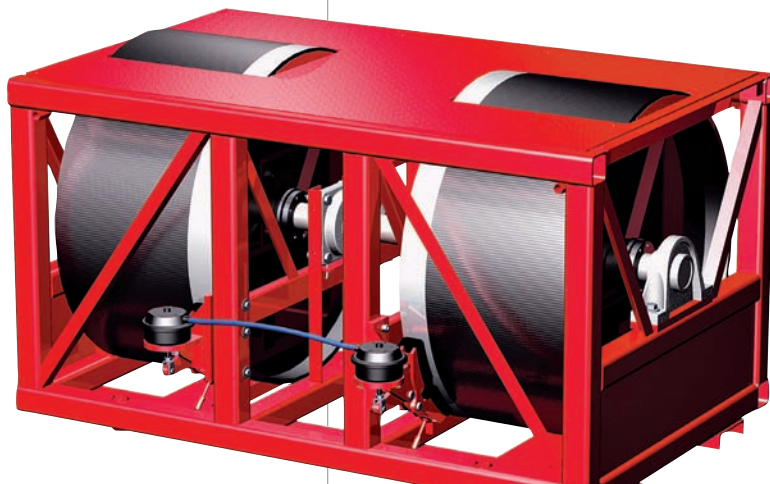


The Dynojet 248 is the chassis dyno that started the dyno revolution. Dynojet now offers an upgraded version of the original 248 called the 248X, as well as a heavy-duty version, the 248HW, which is designed for testing turbo diesel truck applications equipped with dual rear wheels.



WORDS: RICHARD HOLDENER / PHOTOS: RICHARD HOLDENER

# THE MISSING LINK

DYNOJET DATA LOGGING IS THE NEW LINK TO FINDING POWER ON THE CHASSIS DYNO

3  
TIME NEEDED: 2.5 HOURS

A TRUE PERFORMANCE ENTHUSIAST WILL IMMEDIATELY RECOGNIZE THE NAME DYNOJET, AS THEY HAVE ALL BUT REVOLUTIONIZED THE PERFORMANCE INDUSTRY. WHILE TODAY'S ENTHUSIASTS MAY WELL TAKE THE LOCAL AVAILABILITY OF A DYNOJET CHASSIS DYNO FOR GRANTED, THOSE INDIVIDUALS WHO GREW UP DURING THE DARK DAYS OF THE TEST-AND-TUNE PROCESS HAVE A MUCH GREATER APPRECIATION FOR WHAT DYNOJET PROVIDES.



**DYNOJET**  
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North Las Vegas, NV 89081  
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www.dynojet.com

GOT A HOT IMPORT? THERE IS NO BETTER WAY TO DETERMINE THE POWER OUTPUT OFFERED BY PERFORMANCE COMPONENTS THAN TESTING ON THE DYNOJET CHASSIS DYNO.

It was this very information that allowed this author to win his first road race championship, even though modifications to my '95 B16A-powered Del Sol were very limited due to the stringent class rules. Ported heads, aftermarket cams and high-compression pistons were all no-no's. In fact, you couldn't even run adjustable cam sprockets. Hours were spent on the Dynojet to test each little performance tune, and it took nearly 500 dyno runs before we finally managed to produce a championship-winning combination, one horsepower at a time.

Such a history with Dynojet is more of a dependence, which causes me to shudder when I learn of stories involving enthusiasts who install a turbo kit, only to go immediately ripping down the road at full boost. With no dyno testing, no air/fuel meter and not even a fuel pressure or exhaust gas temperature gauge to help monitor what catastrophes may await, such action is only asking for problems. We all did it at one time or another, but that doesn't make it right. With my dyno experience, I won't even drive a new combination down the street without knowing that the air/fuel ratio and timing curves are spot-on. And driving with boost on an unknown combination? Not on your life. Even on our low-buck bone yard boost B-series project—where we applied turbo components pirated from a local wrecking yard to a Honda motor—we spent plenty of time on the Dynojet to tune the new combination and reported as such. This is not the place to cut corners. If you're short on cash, you would be miles ahead to leave off the

**DUE TO ITS AFFORDABLE PRICE, POWER MEASUREMENT CAPACITY AND SMALL SIZE, THE NEW 224X HAS BECOME DYNOJET'S BEST-SELLING AUTOMOTIVE CHASSIS DYNO (SHOWN WITH OPTIONAL FOUR-POST LIFT).**

trick billet components and save the scratch for proper dyno tuning.

What Dynojet provided the auto industry was credibility, and they quickly began popping up everywhere. One need only look back at the power issues that Mazda had with the RX-8 to witness the viability of the chassis dyno. Armed with a slew of dyno results, RX-8 owners made enough of a ruckus while demonstrating that their rotaries fell short of Mazda's promised performance.

As a tool, the Dynojet not only provides enthusiasts (and journalists) with the ability to verify performance claims made by manufacturers, but the manufacturers also have the ability to enhance and test their own products while verifying the power made by such upgrades. Soon, most of the industry came to rely on chassis dyno results, and in addition to verification, it was teamed with new tuning software to maximize safe power levels with nearly any combination. This, of course, ushered in a brand-new phrase known as "dyno-tuned."

Not long after the introduction of tuning software, shops began using their



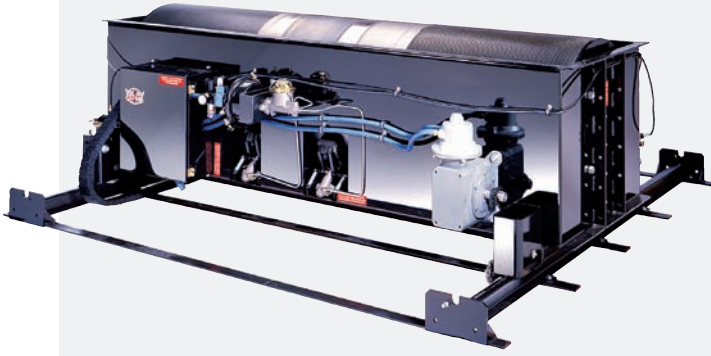
dyno results to compete via the Internet, and that's how Ethernet bench racing sessions evolved. So as the chassis dyno became an aftermarket mainstay, we thought it wise to take a closer look at the Dynojet to see what they might have in store for us today.

By starting the dyno revolution, Dynojet became a household name, but it takes more than history in this business to keep a product on top. Staying ahead of the rest, especially with so many qualified, high-tech competitors, requires a continual commitment to technology. Dynojet operators have long been able to provide horsepower and torque figures, combined with real-time

air/fuel readings, and now Dynojet decided to take things to another level. While correlating horsepower and torque figures with the air/fuel data is handy for tuning, today's vehicles have become increasingly more complex. The sophisticated new computers make testing all the more difficult, or at least testing to achieve both accurate and repeatable results. With the ECU constantly monitoring and altering both the air/fuel and timing values using a variety of sensors, just making repeatable back-to-back runs (with no hardware changes) has become increasingly more difficult. If the engine isn't repeatable within a



THE HOT NEWS FROM DYNOJET IS THE AVAILABILITY OF THE LOAD CONTROL SYSTEM, WHICH NOW ALLOWS USERS TO RUN SWEEP, STEP AND LOADED ROLL-ON TESTING. A SIMPLE CLICK OF THE MOUSE IS ALL THAT'S REQUIRED TO SWITCH TO INERTIA MODE.



Offered as an upgrade to existing Dynojet chassis dynos, the 224X AWD system will allow chassis dyno testing of AWD applications.

horsepower or two, how do you properly test components that may offer only a 3-4hp gain? The answer is obvious—you cannot.

This was of great importance when testing our championship-winning Civic, and it shows why care must be taken to ensure the repeatability of all the variables. Obviously, the best way to monitor the variables is with data logging. For years, Dynojet has been able to provide horsepower and torque numbers and correlate them with the air/fuel ratio at a given engine speed. Using this data, tuners could pinpoint specific areas that need adjustment. With greater computer sophistication, more information is now required for proper tuning, and to help in the acquisition of that data, Dynojet released their new Data-Link system.

The Data-Link provides Dynojet operators with the ability to monitor all

OBD-II data (for all makes) from the service link and download it through the WinPEP 7 software. This allows the operator to compare all of the OBD-II data to the power, torque and air/fuel curves already supplied by the Dynojet.

Imagine, in addition to monitoring the usual horsepower, torque and air/fuel data, enthusiasts can now view and overlay elements like spark advance, inlet air temperature and coolant temperature. In fact, any of the parameters provided by the OBD-II port can be viewed and logged, and then (using WinPEP 7 software) they can be charted against the power, torque and air/fuel curves. This Data-Link system provides the ability to ensure that all parameters that ultimately affect the air/fuel and timing curves remain consistent between runs.

The new Data-Link module allows users to

determine not only that there were changes in the power curve, but why these changes occurred. It will likewise allow tuners to ensure that each dyno run is made at the exact same air and coolant temperatures, thus ensuring identical ignition curves. Naturally, we had to put this new Data-Link system to the test, so we decided to run the author's '01 Ford Focus ZX3 on the dyno.

While the Focus had been previously equipped with an FMAX turbo system, it was currently stock. Despite the lack of modifications, we were able to put

tem, we were able to determine that the air intake temperature was dramatically changing, which caused a sizable drop in ignition timing. Having access to the inlet air temperature and ignition advance readings allowed us to make the necessary changes by removing the cone filter in the engine compartment. Running the stock air box and cold air pickup produced perfectly repeatable power curves. Once the engine began producing repeatable power on every run, we were free to make the necessary performance modifications. But were it not for

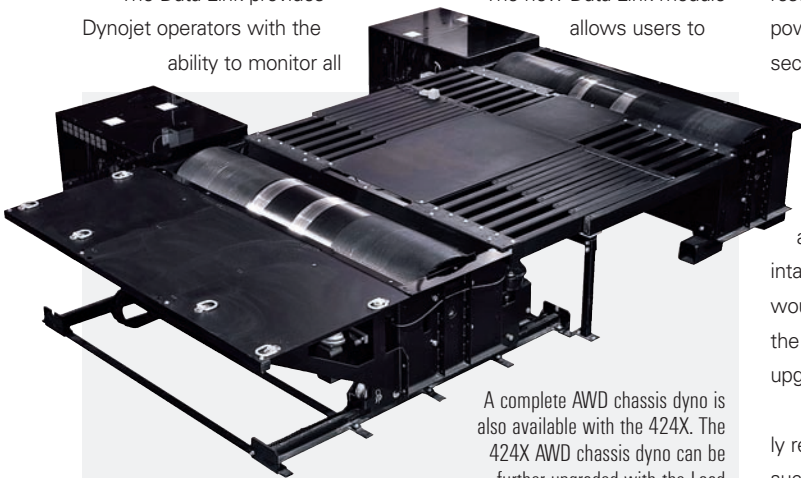


## THE DYNOJET CHASSIS DYNOS CAN BE CONFIGURED FOR ABOVE-GROUND USE WITH THE OPTIONAL FOUR-POST ROTARY LIFT.

the Data-Link system to good use. Running the 2.0-liter Zetec three successive times, with no changes to the combination, resulted in a significant drop in power from the first pull. On the second and third runs, the engine lost as much as 10 hp, which obviously does not provide a stable baseline. Consider that if we were to install a performance modification like an air intake or long-tube header, it wouldn't be possible to determine the affected power offered by the upgrade.

As the motor must be perfectly repeatable before attempting such measurable changes, by using the Dynojet Data-Link sys-

tem, we might be tempted to attribute the power gain (or loss) to the performance part. This could well be where some of the over-inflated power gains come from that we read about on the Internet. Using the lower of the two power curves, the power offered by the air intake or header would have been exaggerated by an extra 10 hp. The reverse, however, is also true as it is possible to show no performance gain, which could be attributed to the part itself. The Data-Link system provides a wealth of information, and as far as we are concerned, it should be considered mandatory for tuning any modern motor.



A complete AWD chassis dyno is also available with the 424X. The 424X AWD chassis dyno can be further upgraded with the Load Control system.

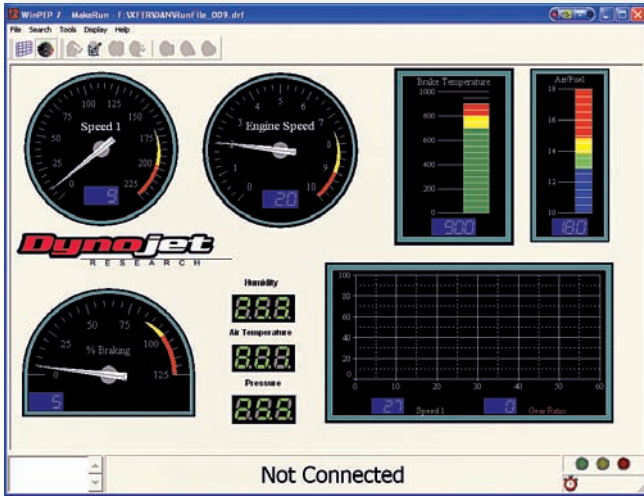


THE DYNOJET CAN ALSO BE CONFIGURED FOR IN-GROUND USE.

While Dynojet was ushering in the age of chassis dyno testing, their systems proved not to be faultless. Two major complaints that lodged against their chassis dyno systems included the lack of load control and external data, in addition to that provided by the new Data-Link. Having run more than my fair share of turbo and blower tests, I had long wished that the information provided by the Dynojet software included things like boost pressure, inlet air and even exhaust gas temperatures. I obviously wasn't alone in my desire for more data as Dynojet recently introduced their new Thermocouple Amp, used to enhance the capabilities of their existing modules. The Thermocouple Amp is able to convert any Type-K thermocouple into a 0-5V-based analog signal. This allows the use of any Type-K Thermocouple to measure exhaust gas temperature, cylinder head temperature or even intake air temperature (before or after an intercooler). Imagine being able to determine the effect that changes in exhaust gas temperature have on the response rate of a turbocharger, or how the ignition timing affects the EGT. Another pair of helpful modules offered by Dynojet include the four-channel analog and EZ-RPM modules. The four-channel analog allows users to log four separate 0-5V sensors (such as boost, fuel or oil pressure) and compare them to the power and air/fuel. The EZ-RPM module provides a tach signal via the cigarette lighter.

With the new Data-Link, Thermocouple Amp and EZ-RPM module, Dynojet operators should have no shortage of information, but what about the complaints that the Dynojet was just an inertia dyno and did not offer the ability to run loaded testing?

While it's true that the original 248C Dynojet that started the chassis dyno revolution only offered inertia testing, Dynojet now offers not only load control, but also all-wheel-drive chassis dynos. Currently, Dynojet offers the 224X, 424X,



RUNNING THE DYNOJET CHASSIS DYNO HAS NEVER BEEN EASIER THANKS TO THE NEW USER-FRIENDLY WINPEP 7 SOFTWARE.

248X and 248HW chassis dynos. The 224X is available as an inertia dyno with the optional load control. According to Dynojet, their load control systems incorporate an ultra-precise and consistent eddy current load absorption unit. The system utilizes an integrated torque cell to quantify the power

wheel-drive applications, allowing shops to cater to the WRX, EVO and other performance AWD applications. Like the 224X, the 424X AWD dyno system is capable of measuring up to 1,500 hp per dyno at each pair of wheels. The 424X is even more impressive in that the system is adjustable for



The brains behind the Dynojet was this Dynamometer EX+ hardware. The package included an atmospheric sensing module, an rpm module and a dynamometer input/output module. The CPU module contained a 32-bit processor, which acquired data from the expansion modules and communicated this data to the user-supplied computer running the WinPEP software.

absorption. The tests can then be reviewed and analyzed through the impressive and user-friendly WinPEP 7 software. Dynojet understands that time is money in a performance shop, and they've ensured that their quick and effective calibration routine for the load-absorption unit can be accomplished in under a minute. Like all of their inertia dynos, the load control can be configured for either in- or above-ground installation.

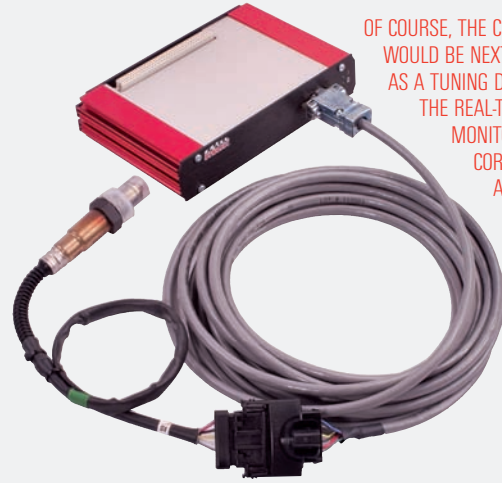
The 424X is essentially a pair of 224X dynos that are linked to provide testing for full-time, all-

wheelbase. Running on an extendable track, the distance between the two dynos can be adjusted to accommodate changes in wheelbase from 88 inches to 140 inches, although custom systems are available to increase this dimension. Comprised of a pair of 224X dynos, the 424X is capable of running at speeds up to 200 mph and can be further upgraded with the new Load Control systems.

The Load Control system allows operators to perform step, sweep and loaded roll-on tests. The Load Control also allows

users to run closed-loop testing by targeting the engine speed, vehicle speed or percentage of load. The load control units are securely attached to the rollers by way of a splined shaft. This eliminates issues such as belt slippage or failure and helps to ensure superior repeatability. Switching the Load Control system back into inertia mode requires no more than a

capable of running at 200 mph and supporting up to 2,000 wheel hp, making it perfect for serious race applications. The 248HW was designed specifically for testing vehicles with dual rear wheels, with axle weights up to 10,000 lbs. The 248HW is wider and offers an increased axle weight limit compared to the standard 248X, thus making it perfect for



OF COURSE, THE CHASSIS DYNO WOULD BE NEXT TO WORTHLESS AS A TUNING DEVICE WITHOUT THE REAL-TIME AIR/FUEL MONITORING SYSTEM. CORRELATING THE AIR/FUEL CURVE TO THE POWER OUTPUT AND RPM ALLOWS FOR PRECISION TUNING.

simple click of the mouse. With a combined capacity of 3,000 hp, the 424X and 424LC AWD dynos can handle any AWD application to come their way.

In addition to the 2WD, AWD and Load Control versions of the 224 and 424 chassis dynos, Dynojet also offers a pair of 248 models. The 248X is basically an upgraded version of the original 248C. The 248X is

testing those crazy turbo diesel trucks that have become so popular. Dynojet has also teamed up with MSD, Nitrous Express and K&N performance filters to produce a PERKS program for Dynojet owners. The PERKS program allows Dynojet operators to maximize their profit margins by purchasing directly from the manufacturers at a substantial



Though the preferred position for the oxygen sensor is in the exhaust pipe or header before the catalytic converter, it can be employed as a tailpipe sniffer using this dedicated pump.



The most exciting new piece of equipment offered by Dynojet is this Data-Link module for OBD-II applications. The Data-Link device provides real-time data from the OBD-II port on all '96 and newer vehicles, allowing Dynojet operators to log all of the available data, which we employed while testing our '01 Ford Focus.

discount. From the looks of their current offerings, there's little doubt that Dynojet is serious about staying on top of their game.

After testing the Data-Link system, we decided to run a quick test on the new Thermocouple Amp and four-channel analog module. To properly demonstrate the merits of the ability to data-log boost and inlet air temperature (among other variables), we needed a turbo motor. Using a built '87 Chevy Sprint Turbo, we decided to put the new systems to work by testing the merits of a new air-to-water intercooler. The 1.0-liter Suzuki turbo motor was factory-equipped with a turbo and air-to-air intercooler. Using the Thermocouple Amp and four-channel analog module, we were able to determine that the boosted motor provided a maximum 7.5 psi of boost. The data also showed that the temperature exiting the turbo was 195 degrees while the stock air-to-air intercooler dropped this to 145 degrees.

After swapping on the new air-to-water intercooler, the boost remained constant at 7.5 psi, and the outlet remained at 195 degrees, but the new intercooler dropped the temperature to just 73 degrees, using ambient water as cooling medium. After substituting ice water, the discharge temps dropped to a chilly 48 degrees.

Using the new systems from Dynojet, we were able to demonstrate that the inlet temps actually decreased with engine speed using the new air-to-water intercooler and increased with the factory air-to-air intercooler. If information is power, then the new Data-Link system will make the Dynojet a much more powerful tool. **Hci**