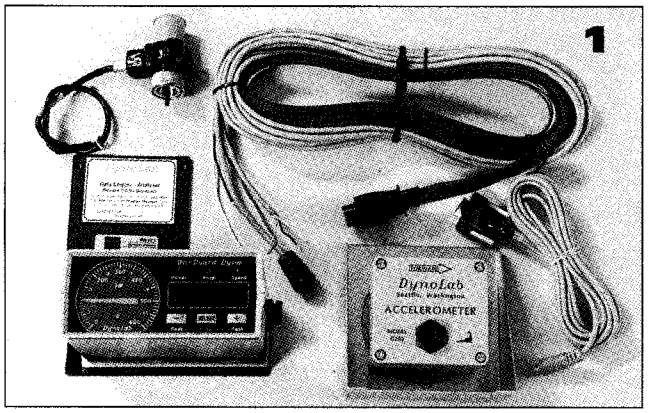
TAKE IT WITH YOU

DynoLab's On-Board Dyno Provides Accurate Real-Time Horsepower Measurement

By Miles Cook

Does the idea of an in-car device that accurately measures the horsepower output of your engine appeal to you? If so, read on. Imagine the horsepower-measuring capability of an in-ground chassis dynamometer mounted on the dashboard of your car, and you have imagined the On-Board Dyno available from Seattle, Washington-based DynoLab.

Before the On-Board Dyno existed, the only practical way to get an accurate reading of horsepower at the car's wheels was to put it on a chassis dyno. The On-Board Dyno measures the output of an engine in real time—that is, while the vehicle is moving down the road. It's this capability that allows the On-Board Dyno to, among other things, tell you how much power the engine is making at a light-throttle cruise, accelerating from a standstill or under full-throttle conditions. It will also indicate how much power is required to maintain a specific cruise speed as well as display how much braking force (measured in a negative value) your street machine delivers.

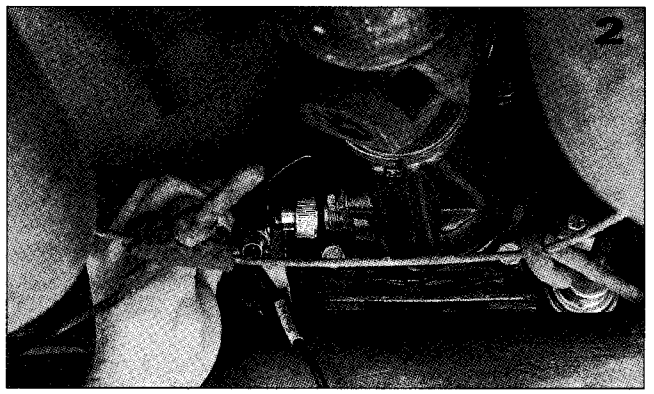


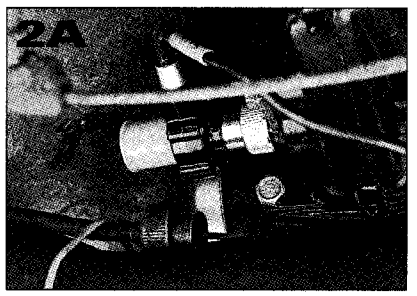
The professional nature of the On-Board Dyno (ours carried part No. STR2000-D) is apparent right when you open the package. Everything needed to get it up and running is included. Shown clockwise from the top are the speed transducer, wiring harness, data cable (which allows hooking the unit to a computer), accelerometer, computer/display unit and software disc designed by Kenner R&D (software is for optional data-logging on a separate computer). A photo speed transducer is also optional, which allows the unit to be used in cars without a speedometer hookup, such as a race car. Not shown is the included instruction book that explains everything you need to know about the dyno and how to calibrate it.

In addition, the On-Board Dyno measures more than just horsepower. In its different modes, it will display acceleration or deceleration in g-force or vehicle speed with a built-in speedometer mode. Here, it measures true vehicle speed in mph and is more accurate than the typical automotive speedo.

Installation is pretty straightforward (as shown in the photos). Once the unit is installed in a car, it needs to be calibrated, which allows specific vehicle parameters to be entered into the unit itself. Some are entered by hand while others are done automatically. Calibrations include vehicle weight; pulses-per-mile from the speed transducer; pitch-up angle of the vehicle; rotational mass of the wheels, tires and rotors; accelerometer leveling; frictional and aerodynamic drag and road noise filtering. The details of exactly how to calibrate the unit are clearly outlined in the included instruction book.

After installing the On-Board Dyno in our Cheap Street Chevelle (CC's official parts test vehicle), we were anxious to see what the car's 355 small-block was putting out at the rear wheels. Further, we wanted to see how accurate the On-Board Dyno really was, thus we used K&N's Dynojet chassis dynamometer as a baseline reference point (*see sidebar*). We were impressed with the results, and we believe you will be, too.

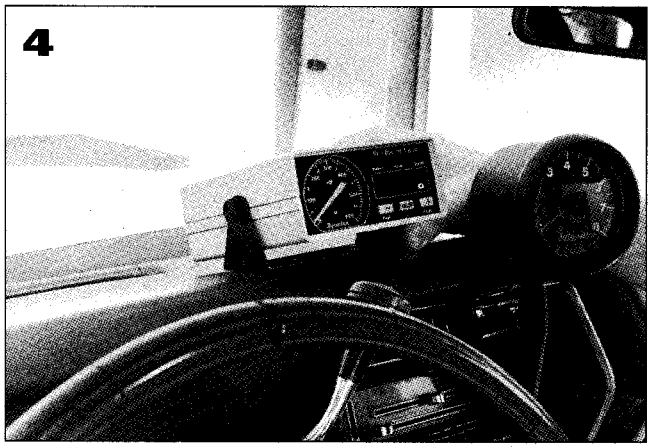




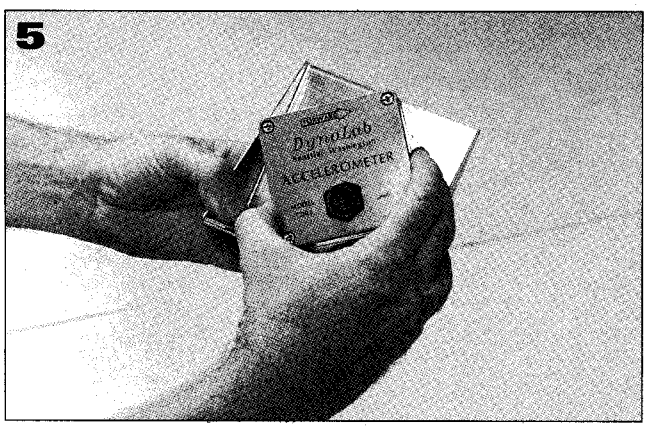
The speed transducer for many GM applications screws right into where the speedometer cable goes—in this case, on the driver's side of Cheap Street Chevelle's B&M TH350 automatic trans (*photo 2*). Once installed, screw the speedo drive cable, in series, to the other side of the transducer. However, the speedometer on our Chevelle is broken, so we didn't install the cable. We left the cap on the end of the transducer and tie-wrapped the cable out of harm's way (*photo 2A*). With the dyno, the Chevelle now has an accurate speedometer. If you have a race car with no speedo hookup on the transmission or anywhere else, then DynoLab offers an optional photo speed transducer. It uses an infrared light beam and reflective tape on the surface of the driveshaft to measure vehicle speed.

PHOTOS BY MILES COOK & JOHN KIEWICZ

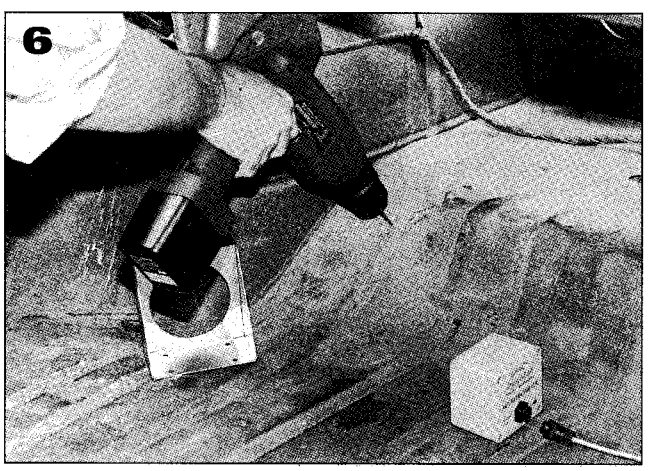
Plug the wiring harness end (with the eight-pin Weather Pack-type connector) into the back of the computer/display unit. A click will indicate the connector is locked in place. The heavy red lead coming off the harness is for a 12-volt source to power the dyno. Connect it to a power source that turns on and off with the ignition key. The heavy white lead connects to an instrument light source and the heavy black lead connects to a chassis ground.



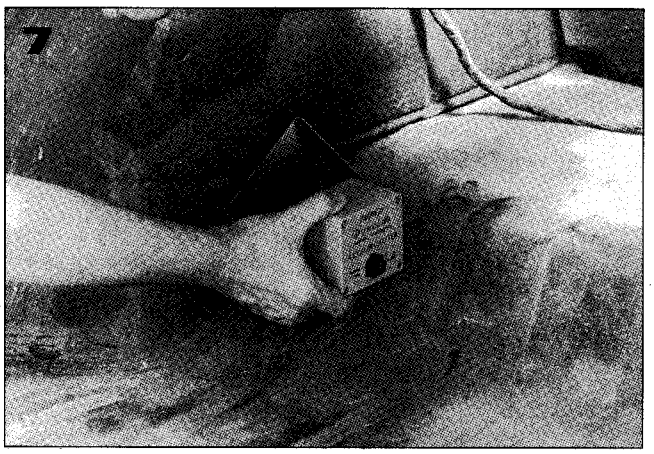
Select a mounting position for the display unit that's within view of the driver. We used double-sided tape to mount it on the Chevelle's dash, just to the right of the driver. The dyno can also be mounted to the steering column with a hose clamp passing through the two holes in the mounting bracket.



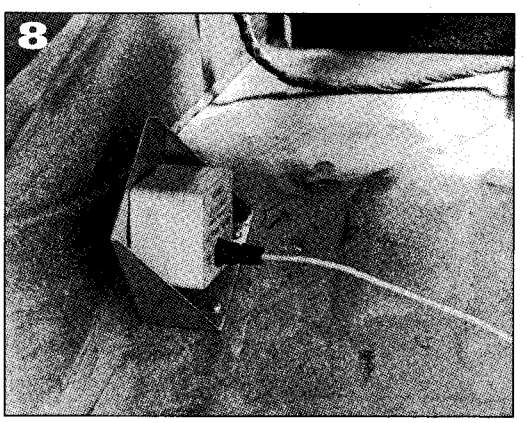
With the transducer and display unit installed, the last main component to install is the accelerometer. As shown here, it can be rotated in its mounting bracket so it can remain exactly parallel to the imaginary line that travels from the front to the rear of the car—regardless of the bracket's mounting position.



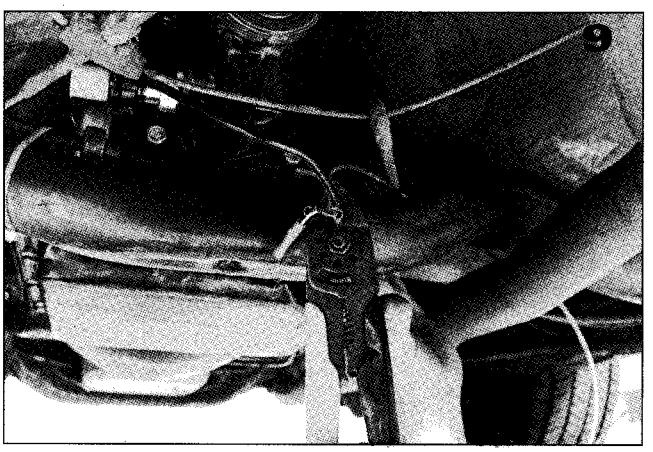
The accelerometer can be mounted on any solid surface in the car that's within reach of the wiring harness (about 20 feet of cable is supplied). The location needs to be free from harsh road and engine vibrations. DynoLab recommends using the trunk floor as a mounting location and we did just that, picking the part of the floor that ramps up from on top of the fuel tank to where the spare tire is stored. As shown here, we removed the accelerometer from the mounting bracket before installing the bracket. With the bracket in the desired position, mark the four holes with a marker and drill the hole locations in the floor, making sure you don't drill into the gas tank. Mount the bracket with sheetmetal screws. Although the accelerometer is essentially watertight, DynoLab recommends making sure the mounting location will remain as dry as possible.



Re-install the accelerometer on the bracket with the four locking screws, and make sure the arrow on the unit is pointing in the direction of forward vehicle travel. Ensuring the straightness of the unit with the naked eye is sufficient. Calibration of the accelerometer will correct for the difference, if there is any.



The installed accelerometer should look like this. The four-pin connector from the wiring harness screws into the side of the unit. The collar only needs to be finger tight. We ran the harness from the display unit along the doorsill, underneath the back seat and through to the trunk area. Removal of the back seat provided easy access for safe placement of the harness.

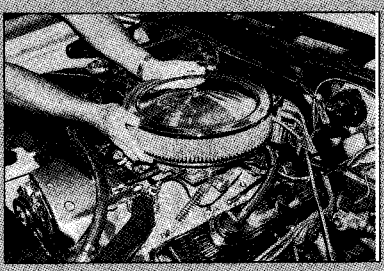


The final step involves hooking the transducer to the wiring harness. The harness starts at the back of the display unit and breaks off into two separate connections—one for the accelerometer and one for the transducer. Run the transducer connection to the transducer using a suitable hole in the floor. One possible O.E.M. hole is where the speedo cable leaves the inside of the car and travels to the transmission. When routing the harness, avoid high heat sources such as near exhaust manifolds. Also protect the harness from sharp edges when passing through or around thin sheetmetal. Coil, tie and tuck away extra cable length. DynoLab offers three types of speed transducers, and our On-Board Dyno-powered three-wire active version is the most common. Hook the harness to the transducer as follows: Connect the *bare* wire of the harness to the *black* wire of the transducer. Connect the *white* wire of the harness to the *red* wire of the transducer. Connect the *black* wire of the harness to the *white* wire of the transducer. Splice and crimp the wires together as shown. The On-Board Dyno is now ready to go, following calibration.

On-Board Dyno VS Dynojet Chassis Dyno

With the On-Board Dyno calibrated and functioning, we took our Chevelle to K&N Engineering to measure its accuracy against K&N's Dynojet chassis dyno. DynoLab claims the On-Board Dyno is accurate to within plus or minus one percent. That means that a 300hp reading will be within plus or minus 5 hp. We can report the On-Board Dyno lived up to the boast in fine fashion. We ran the car on the Dynojet chassis dyno, then drove the car on the street and got readings that were within *2 hp* of each other!

First we flogged the Chevelle's 355 small-block on the K&N chassis dyno. On one pull the car made 270 hp at 5400 rpm at the rear wheels. Immediately afterward, we jumped into the car and tested the On-Board Dyno so that weather conditions and the temperature of the car were as close as possible. With our foot on the floor in Second gear at the same 5400 rpm, the On-Board Dyno showed us the engine was making 268 hp. By the way, the On-Board Dyno can measure torque output when data logging with a computer is used. On the Dynojet, the Chevelle's engine produced an even 400 lbs-ft of torque at 3200 rpm.



While on the Dynojet, we conducted a quick experiment with a K&N air-filter element. After a couple of pulls, we swapped our generic open-element filter for the K&N—we only changed the element, not the cover or baseplate of the air cleaner. The filter produced a measurable 6hp improvement on the chassis dyno. An open-element K&N is probably worth at least 12-15 hp as compared to the factory closed-element, single-snorkel air cleaner that came on our Chevelle. The comparison of the Dynojet and the On-Board Dyno were made with the K&N filter element already installed. CC

Sources

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