

# DIAL GAUGING

STORY AND PICS BY GT

GETTING THE NEEDLES SWINGING SWEETLY AFTER PLAYING WITH THE GEAR RATIOS

When testing your car's speedo, the safest and most accurate place to do it is a chassis dyno



**W**e've looked at diff-ratio changes and how it has lifted the performance of Commodores many times in the past, but we've never really studied the consequences. Unless you have a motorbike or an old VW Beetle, where the speedo is driven from a front wheel, lowering your diff ratio also makes your speedo read fast.

If you don't like driving around with an inaccurate speedo (good for nothing except slowing traffic or showing your dumber mates 'how quick she gets to 100km/h now, bro!') even though

you're only doing 90), you will need to get it recalibrated.

There are several ways to achieve this depending on your model of Commodore. Models from VB-VK had mechanically driven speedos that could be corrected by changing the speedo drive gears within the gearbox.

This was usually possible when changing to a diff gear that was available from the factory option list. Alternatively, you could install a mechanical corrector box between the gearbox and the speedo cable.

Later-model Commodores differ by having speedos that are electronically driven. A vehicle speed sensor (VSS) in the

gearbox generates an electrical signal that is used by the speedo to determine how far to swing the needle.

The VSS also has another function, and that is to supply the vehicle speed signal to the engine-management system. Holden calls this its ECM (engine control module – used in all VN/VPs and later-model manual cars) and PCM (powertrain control – with more brains for auto transmission control).

These require a vehicle speed input to control many aspects of drivability, such as engine-idle anticipation when rolling to a stop sign, auto-trans shift points and lean-cruise modes. Plus, other varied features are also affected, including airbag

deployment, power-steering assist, cruise control and preventing the boot from opening when moving.


Different models require different methods. VN and VPs have the VSS feed its pulse into the dashboard to control the speedo. The engine-management system, in turn, is fed a signal from the dashboard.

The easiest way to calibrate the speedos on these cars is to use a mechanical correction unit as seen on a carby car. In this manner, all speed-related functions 'see' the correct road-speed information that enables satisfactory functioning of cruise control, power steer and torque converter lock-up.

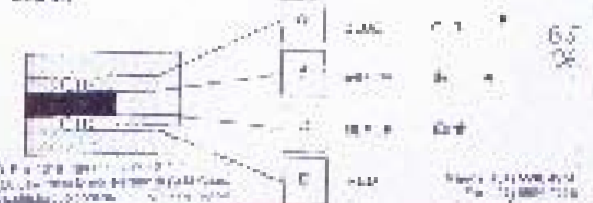
**ChipTorque**  
QUALITY FACTOR PERFORMANCE PROTECTION

**SPEEDO CORRECTION UNIT FITTING INSTRUCTIONS**

1. Turn the ignition on.
2. Disconnect the speedometer cable from the instrument cluster.
3. Connect the speedometer cable to the speedometer cable on the instrument cluster.
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There are several companies supplying little black boxes to calibrate speedos. This one is from ChipTorque. Like most, it simply splices into the speedo driver circuit between the engine-management system and the instrument cluster to enable adjustment of the number of pulses supplied by the speedo. By turning the two pots – coarse and fine – the speedo can be dialled in.



With VR and later-series cars, things are a little different. The VSS feeds its pulse to the ECM/PCM, which in turn provides an output pulse to the instrument cluster. In these cars, an electronic correction box is required in the instrument-cluster supply circuit.

This allows the driveline speed as measured by the VSS and all speed-dependant features controlled by the PCM to work together correctly. It also permits the speedo to read 'slow' to compensate for lower diff gears.

The speedo corrector unit must not be mounted between the VSS and the engine-management system (where simple logic says it should be). The relationship between engine revs and tailshaft speed will be disturbed, and this causes wide-ranging problems with PCM-controlled drivability functions.

Diff specialists should be able to point you in the direction of a specialist instrument service or performance shop that can help you with your particular car.

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The easiest place to mount the corrector box is with the management system. Like most Commodores (except Gen IIIs), this VT I has its management system mounted behind a panel in the passenger foot well.

The CT box has four wires – pulse in, pulse out (which must be connected in series between the PCM and the instrument cluster), power and earth



With the aid of a workshop manual, the wire that feeds the signal from the PCM to the dashboard was located. On this VT I V8 it was black with a white trace on the PCM, but be sure to check for your own car.

The white wire (pulse in) connects to the PCM, and the blue wire (pulse out) to the speedo. In this way it can 'correct' the signal sent from the PCM to the speedo



The PCM/speedo wire was cut close to the PCM, stripped and soldered to the corrector box's input and output leads. In the same way, a power feed (pink ignition wire) and earth (black – both tested with a test light) were found and fixed in.

It's a good idea to not cut the corrector box leads too short to make it easier to access and calibrate the unit



Voila! After about 20 minutes worth of work, the corrector box was in place. There wasn't any electrical heat-shrink tubing on hand, so we had to resort to Old Faithful insulating tape to cover up the soldered joints.

The final task before replacing the PCM and corrector box behind the kick panel was to calibrate the unit so the speedo read correctly

For accuracy, this should be done on a chassis dyno. However, if you have access to testing gear that works independently of the car's speedo – for instance a digital bike speedo mounted on one wheel of the car – and two people, it's possible to get a result on road.

The two pots on the unit are turned with a screwdriver to enable 'coarse' and 'fine' adjustment of the speedo while the car is moving



## TECH2 TO THE RESCUE

The Holden diagnostic tool, Tech2, can be used to alter the PPK (pulse per kilometre) reading in your car's dashboard system to get your speedo reading right on VT/VX generation cars.

This is a factory feature designed to enable several powertrain and cluster combos, (e.g. 220km/h and 250km/h speedos and 3.07, 3.46, 3.73 and 3.91:1 diff gears). It meant both Holden and HSV derivatives could be easily built/specified in the Holden/HSV factories.

If you're lucky, your local Holden dealer will alter your PPKs for you for a small charge. Just don't ask him about your powertrain warranty.

Police-spec Commodores, like this one, have a digital speed-readout function, and it was to this readout that the speedo was calibrated.

VN-VS Commodores with trip computer dashboards and VT-VXs have a digital speed-readout function. With the ignition off, push and hold the 'mode' and 'up' buttons while turning the ignition on to access the digital speed readout.

It's best to calibrate off the readout, not the needle



There is almost always a discrepancy between the digital speed readout and the reading off the needle. This is made even worse in this instance by the fitment of white-faced dials that required the removal of the needles to fit.

If you're building a car, arrange to have your choice of wheels and tyres fitted before you do the diff/speedo. No matter what the needle says, the digital readout will always be accurate **SC**