In our last issue of *Keep Those Trannys Rolling*, we took a brief look at what’s new in four-wheel drive systems and discussed Borg Warner’s Interactive Torque Management System (ITM 3e). In this issue, we’re going to take a closer look at the Interactive Torque Management System available in various models of the 2009 Chrysler 300, Dodge Magnum, and Dodge Charger.

These vehicles use an electronically-controlled transfer case, which eliminates the need for an electronically-controlled coupler at the rear differential as was used in other applications.

This new ITM 3e system is made up of two technologies: Active Transfer Case and Front Axle Disconnect (also known as FAD). The system uses a new design transfer case that automatically connects and disconnects the components that drive the front wheels. The all-wheel drive system operation is seamless. An indicator diagram is located between the tachometer and speedometer to show the driver which wheels are receiving power (figures 1 and 2).

**The Heart of the ITM 3e System**

The heart of the ITM 3e system is the BorgWarner 44-40 transfer case (figure 3). The Borg Warner 44-40 (BW44-40) transfer case allows torque to be applied variably to the front axle, and it has a fixed gear ratio. By allowing variable torque application between the front and rear axles, this all-wheel drive system can be driven on dry pavement without the typical driveline wind-up (crow hopping) that occurs with most four-wheel drive transfer cases.

Depending on conditions, the Drive Train Control Module (DTCM) will modulate the electronic clutch assembly within the transfer case (figure 4) to vary the amount of torque applied to the front axle, while continuing to deliver torque to the rear axle.

This BW44-40 transfer case uses...
a special MOPAR transfer case lubricant (p/n 68049954AA). The BW44-40 transfer case contains an oil pump to circulate gear lube throughout the transfer case and provide clutch cooling. The Drive Train Control Module monitors the temperature of the transfer case with a temperature sensor and is capable of disengaging the all-wheel drive system if transfer case temperature exceeds recommended limits.

**Brains of the ITM 3e System**

The Drive Train Control Module (DTCM) is the brains of this ITM 3e all-wheel drive system. In the earlier versions (2007 and 2008), the AWD control module controlled the all-wheel drive system and the electronically-controlled coupler located in the rear differential.

In the 2009 ITM 3e system, the electronically controlled coupler was eliminated, and the AWD module has been replaced with a Drive Train Control Module. The Drive Train Control Module controls the electronic transfer case, providing seamless all-wheel drive operation when needed. The DTCM communicates with the PCM, TCM and ABS control module over the CAN-C system and uses inputs from each of these systems to control the all-wheel drive system (figure 5).

**Diagnosing the ITM 3e System**

Diagnosing the new ITM 3e all-wheel drive system is pretty straightforward. Simply connect your scan tool to the DLC connector and check for codes in the PCM, TCM and ABS control module. Document all codes received from each of these modules.

Before starting your diagnosis, correct any codes in the other modules. PCM, TCM and ABS problems can interfere with the all-wheel drive system operation. After all the codes have been corrected in the other modules, access the Drive Train Control Module and retrieve any codes in memory. Here are the codes you might find in the Drive Train Control Module, and what those codes indicate:

**C1078** — Tire revolution range performance. Indicates the DTCM has received a message from the ABS control module indicating an out of range tire revolution. Check the ABS control system for wheel speed sensor codes. Repair as needed.

**C1456** — AWD clutch power control circuit low. Indicates the DTCM has detected low voltage in the AWD clutch power circuit. Check battery or system voltage. Check DTCM power and grounds. Check AWD clutch circuit. Repair as needed.

**C1457** — AWD clutch power control circuit high. Indicates the DTCM has detected high voltage in the AWD clutch power feed circuit. Check battery or system voltage. Check DTCM power and grounds. Check AWD clutch circuit. Repair as needed.

**C145D** — AWD clutch power/return control circuit open. Indicates the DTCM has detected an open circuit in the AWD clutch power or ground circuit. Check AWD clutch control circuit. Repair as needed.

**C1464** — Front axle disconnect control circuit low. Indicates the DTCM has detected low voltage in the front axle disconnect circuit. Check DTCM power and grounds. Check front axle disconnect circuit. Repair as needed.

**C1465** — Front axle disconnect control circuit high. Indicates the DTCM has detected high voltage in the front axle disconnect circuit. Check DTCM power and grounds. Check front axle disconnect circuit. Repair as needed.

**C1477** — Transfer case clutch...
over temperature. Indicates the DTCM has received a signal from the transfer case temperature sensor indicating the transfer case fluid is too hot. Check the transfer case temperature sensor circuit, wiring and connections. Check transfer case lube circuit.

C147A — Transfer case temperature sensor high. Indicates the DTCM has detected an abnormally high voltage in the transfer case temperature sensor circuit. Check temperature sensor circuit, wiring and connections. Check transfer case temperature sensor. Repair as needed.

C147B — Front axle disconnect circuit sensor performance. Indicates the DTCM has detected a performance problem in the front axle disconnect sensor circuit. Check front axle disconnect sensor circuit, wiring and connections. Repair as needed.

C147C — Front axle disconnect power supply circuit low. Indicates the DTCM has detected low voltage in the front axle disconnect power circuit. Check DTCM power and grounds. Check front axle disconnect power circuit, wiring and connections. Repair as needed.

C147D — Front axle disconnect power supply circuit high. Indicates the DTCM has detected high voltage in
the front axle disconnect power circuit. Check DTCM power and grounds. Check front axle disconnect power circuit, wiring and connections. Repair as needed.

C2100 — Battery voltage low. Indicates the DTCM has detected low voltage to the DTCM. Check battery or system voltage. Check charging system. Check DTCM power and grounds. Repair as needed.

C2101 — Battery voltage high. Indicates the DTCM has detected high voltage to the DTCM. Check battery or system voltage. Check charging system. Check DTCM power and grounds. Repair as needed.

C2112 — Sensor supply voltage circuit high. Indicates the DTCM has detected high voltage on the transfer case sensor circuit. Check DTCM power and grounds. Check sensor circuit, wiring and connections. Repair as needed.

C2201 — Internal controller failure. Indicates the DTCM has detected an internal failure. Check DTCM power and grounds. If code returns, replace DTCM.


U0100 — Lost communication with ECM/PCM. Indicates the DTCM has lost communication with the ECM/PCM. Check communication with other modules. If communication with all other modules is possible, check ECM/PCM power and grounds. Check ECM/PCM CAN C circuits, wiring and connections. Repair as needed. Possible ECM/PCM failure.

U0101 — Lost communication with TCM. Indicates the DTCM has lost communication with the TCM. Check communication with other modules. If communication with all other modules is possible, check TCM power and grounds. Check TCM CAN C circuits, wiring and connections. Repair as needed. Possible TCM failure.

U0121 — Lost communication with ABS. Indicates the DTCM has lost communication with the ABS control module. Check communication with other modules. If communication with all other modules is possible,
with FCM/TIPM. Indicates the DTCM has lost communication with the FCM/TIPM. Check communication with other modules. If communication with all other modules is possible, check FCM/TIPM power and grounds. Check FCM/TIPM CAN C buss circuit, wiring and connection. Repair as needed. Possible FCM/TIPM failure.

U0212 — Lost communication with SCM. Indicates the DTCM has lost communication with the SCM. Check communication with other modules. If communication with all other modules is possible, check SCM power and grounds. Check SCM CAN C buss circuit, wiring and connections. Repair as needed. Possible SCM failure.

U0401 — Implausible data from ECM/PCM. Indicates the DTCM has received data from the ECM/PCM that doesn’t match conditions or is out of range. Check data in ECM/PCM.

U0402 — Implausible data from TCM. Indicates the DTCM has received data from the TCM that doesn’t match conditions or is out of range. Check data in TCM.

U0415 — Implausible data from ABS. Indicates the DTCM has received data from the ABS control module that doesn’t match conditions or is out of range. Check data in ABS module.

U0429 — Implausible data from SCM. Indicates the DTCM has received data from the SCM that doesn’t match conditions or is out of range. Check data in SCM.

U0431 — Implausible data from FCM/TIPM. Indicates the DTCM has received data from the FCM/TIPM that doesn’t match conditions or is out of range. Check data in FCM/TIPM.

Refer to the appropriate service manual for your specific vehicle’s diagnostic routines.

Well, there you have it: a closer look at Chrysler’s new ITM 3e All-Wheel Drive System. With a basic understanding of how Chrysler’s new ITM 3e All-Wheel Drive System operates and a quick look at the diagnostic routines available, you should have no problem keeping those trannys rolling.
check ABS control module power and grounds. Check ABS CAN C buss circuit wiring and connections. Repair as needed. Possible ABS module failure.

U0141 — Lost communication

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