Don’t be surprised if, in the near future, you step into the cab of some medium-duty trucks, such as an NPR, and see a shift column indicating up to six speeds. No, this isn’t some sort of clutchless standard transmission: It’s the Aisin Seiki 6-speed automatic transmission… the same unit that ATRA’s Randall Schroeder introduced in the September, 2008 issue of GEARS.

This article will review some of that material, provide additional information that applies to NPR trucks, and then cover additional information to keep these units rolling.

Dodge calls this transmission the AS68RC. In NPR trucks it’s called...
The specifications are pretty impressive. Most units will be behind Cummins diesels when installed in DC and DM 3500 Dodge trucks or the Isuzu diesel engine in the NPR trucks.

As Randall pointed out, this unit is built for heavy-duty use. The maximum engine torque rating is 730 lb-ft. The stock Cummins 6.7L TD engine is currently rated at 565 lb-ft. The 4-cylinder Isuzu 5.19L engine is rated at 440 lb-ft.

CAUTION: Some aftermarket products can increase the diesel engine’s output, which could affect the durability of the transmission.

Figure 2

Check out converters BEFORE you ship or install with HUB RUNOUT INSPECTION UNITS. And, ensure your converter quality (after welding) with AIR TEST STANDS for diagnosing leaks.

TCRS Torque Converter Balancer with automatic weight indexing, runout compensation mode, push bottom polishing and better accuracy and repeatability than ever before.

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Figure 3: AT Over Temp Light

an A465. The specifications are pretty impressive. Most units will be behind Cummins diesels when installed in DC and DM 3500 Dodge trucks or the Isuzu diesel engine in the NPR trucks.

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Dodge typically rates this transmission/chassis combination for 26,000-lb GCVW (Gross Combined Vehicle Weight*). The NPR trucks may have a GVW rating of 12,000, 14,500 or 17,900 lbs. Check the rating tags on the chassis/frame to be sure of the rating for the vehicle you’re working on. You may also find a PTO unit attached or just a blank plate, and some units are bolted to a 4WD transfer case.

* Gross Combined Vehicle Weight means the maximum weight (load) is based on the total weight of the vehicle plus the chassis and also the weight of any trailer being towed.

**Unique Control Features of AS68RC/A465**

The control unit for this transmission is a separate module or TCM. Dodge mounts its TCM on the steering column; NPR vehicles have their TCM mounted under the right side of the dash.

There is a combination O/D and tow/haul button on Dodge trucks:

- The first time you depress it, 6th gear is cancelled and the shifts are delayed.
- The second time you depress it, 5th and 6th gears are cancelled.
- When you press the button a third time, all gears are available and the shift pattern returns to normal.

NPR vehicles only have an O/D cancel button.

This unit uses two temperature sensors: One is mounted on the lower part of the valve body. The TCM uses...
the valve body temperature sensor to determine when lockup will be allowed, and, under very cold temperatures, it will also disable 5th and 6th gears.

If the valve body temperature falls below –4°F, the TCM will only allow reverse and 3rd. When the valve body temperature is between 77º – 250ºF, all gears and lockup are allowed.

The second temperature sensor is mounted on the cooler outlet line near the bellhousing. This sensor monitors the temperature of the fluid coming out of the converter — typically the hottest fluid. If this sensor registers temperatures of 284ºF, the TCM applies lockup when the engine is above 1200 RPM and disables PTO operation.

Some trucks include an optional exhaust brake system. Under normal conditions the TCM doesn’t interfere with its operation. But under these conditions the TCM will prevent exhaust braking:

- If the transmission is downshifting automatically.
- If the fluid temperature is too hot.
- If the gear selector is in park or neutral.
- During very low speeds.

The six forward speeds and reverse are developed using five clutches. Three clutch assemblies are located in the front of the unit and two clutch packs are mounted in the rear half. To control the five clutch packs, there are four pressure modulating solenoids and four on/off solenoids. These are all mounted on the valve body along with eight pressure switches.

To remove the valve body to air check the clutches, clean the valve body, or replace any electrical parts, you must first disconnect all the wiring. If you need to remove more than one solenoid, you should mark them to make sure you get them back in their original locations. (Figures 1 & 2).

The TCM has adaptive learn and torque reduction strategies. When the vehicle is operating normally, the TCM is constantly adjusting the solenoids to maintain shift quality. With CAN communication, the TCM also informs the PCM when engagements and shifts occur. The PCM uses this information to either reduce or increase the idle, and sometimes to reduce engine power during shifts.

Under certain conditions, such as engine performance problems or driving with codes stored in either the PCM or TCM, the adaptive torque reduction strategies are disabled. For this reason, after any repairs are completed, codes cleared, etc., you must take the system through a relearn procedure.

The relearn procedure is performed through the DRB scan tool on the Dodge vehicles. On NPR vehicles, you can do it manually, without a scan tool.

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Don’t Miss Out!!
Over 100 million cars on the road today support Flash Reprogramming. Auto Manufacturers are constantly updating controller software to solve problems such as false DTCs, hesitation, rough idle, emissions problems, hard starting, poor fuel economy and others. These problems plague many 5 to 8 year old cars that are no longer under warranty. Your competitors are making thousands of dollars repairing these cars by Flash Reprogramming. You should be too!!

Vehicles Supported *

General Motors and Saturn
On-Board Programming (In Vehicle):
• 1993 and newer GM Powertrain/Body/Chassis flash reprogrammable controllers
• 1996 and newer Saturn Powertrain/Body/Chassis flash reprogrammable controllers

Off-Board Programming:
• 1993 and newer GM Powertrain flash reprogrammable controllers
• 1996 and newer Saturn Powertrain flash reprogrammable controllers

Ford, Lincoln and Mercury
On-Board Programming (In Vehicle):
• 1996 and newer Powertrain/Body/Chassis flash reprogrammable controllers

Off-Board Programming:
• 1996 and newer Powertrain flash reprogrammable controllers

Chrysler, Dodge, Plymouth and Jeep
On-Board Programming (In Vehicle):
• 1996 and newer Powertrain flash reprogrammable controllers

Off-Board Programming:
• 1996 and newer Powertrain flash reprogrammable controllers

Toyota, Scion and Lexus
On-Board Programming (In Vehicle):
• 2001 and newer Powertrain flash reprogrammable controllers

*Hardware supports listed vehicles. Manufacturer Reprogramming Data Subscription(s) Required.
IMPORTANT: You should perform the relearn after any major work to the transmission. Follow all steps in order. The vehicle must remain stopped and the transmission temperature has to be between 104º – 194ºF. If you skip any steps, the AT overtemp light will blink, (Figure 3), and you’ll have to turn the ignition off and start the relearn procedure over.

1. Make sure all accessories — A/C, headlights, etc. — are turned off.
2. Set the parking brake.
3. Check the fluid level and adjust if necessary.
4. Make sure transmission temperature is between 104º – 194ºF.
5. Start the engine.
6. Move shifter from neutral to drive 5 times.
7. Connect a jumper wire between pins 4 and 11 in the data link connector. The CHECK TRANS light should start blinking (on one second and off two seconds). (Figure 4).
8. Apply the brake pedal with your left foot.
   IMPORTANT: You must keep the brake pedal applied for the rest of this procedure.
9. Verify the engine is at idle and the OD switch is pressed in (OD enabled).
10. Move the shifter from drive to manual 2, three times.
11. Make sure the CHECK TRANS light flashes on and off every 0.4 seconds.
12. Pull the OD switch out (OD disabled).
13. Verify the CHECK TRANS light blinks as shown. This is Learning step 1. (Figure 5).
14. When the CHECK TRANS light blinks fast, increase the engine speed to 1000-1500 rpm.
15. Push the OD switch in (OD enabled). Verify the CHECK TRANS light blinks slowly.
16. Wait until the CHECK TRANS light goes out. Now let the engine rpm return to idle. This is Learning step 2. (Figure 6).
17. Move the shifter to reverse.
18. Pull the OD switch out (OD disabled). Verify that the CHECK TRANS light blinks as shown. This is Learning step 3. (Figure 7).
19. When the light blinks quickly, increase the engine speed to 1000-1500 rpm.
20. Push the OD switch in (OD enabled). The CHECK TRANS light will start to blink slowly.
21. When the CHECK TRANS light starts blinking 1 second on and 2 seconds off, let the engine return to idle. Use the following light blinking pattern to verify this. This is Learning step 4. (Figure 8).
22. Place the transmission in park and release the brake.
23. Disconnect the jumper wire from the data link connector.
24. Turn the ignition off and on again. Make sure no warning lights are on.

The relearn procedure is done.
Shift columns with six speeds... they're in your future, and that future is now. Sure, these new units seem strange... even intimidating. But so did lockup converters and overdrive transmissions just a few years ago. The trick is to keep reading, and keep learning.