

TABLE V
PERFORMANCE EVALUATION RESULT

Function	Effect
Anti-dive	<p>Sharp braking</p> <p>Front dive amount (braking at 0.5G)</p> <p>10 20 30 40 50 mm</p> <p>Height controlled in NORMAL AUTO Spring rate/damping force fixed at SOFT (without control): ~45 mm Height controlled in NORMAL AUTO Spring rate, damping force controlled in NORMAL AUTO: ~35 mm</p>
Anti-roll	<p>Sharp steering</p> <p>Roll amount</p> <p>1 2 3 deg</p> <p>Height controlled in NORMAL AUTO Spring rate/damping force fixed at SOFT (without control): ~2.8 deg Height controlled in NORMAL AUTO Spring rate, damping force controlled in NORMAL AUTO: ~2.2 deg</p>
Anti-squat	<p>Sharp start</p> <p>Rear squat amount (1 sec after start)</p> <p>10 20 30 mm</p> <p>Height controlled in NORMAL AUTO Spring rate/damping force fixed at SOFT (without control): ~35 mm Height controlled in NORMAL AUTO Spring rate, damping force controlled in NORMAL AUTO: ~28 mm</p>
Anti-bump	<p>Passing over 50mm bump</p> <p>Vertical acceleration under rear seat</p> <p>0.2 0.4 0.6 0.8 1.0 G</p> <p>Height controlled in NORMAL AUTO Spring rate/damping force fixed at MEDIUM (without control): ~0.9 G Height controlled in NORMAL AUTO Spring rate/damping force controlled in SPORT AUTO: ~0.7 G</p>
Response to speed	<p>Lane shift at high speed</p> <p>Roll amount</p> <p>1 2 deg</p> <p>Height fixed at NORMAL (without control): ~2.2 deg Spring rate/damping force fixed at SOFT (without control): ~1.8 deg Height controlled in NORMAL AUTO Spring rate/damping force controlled in NORMAL AUTO: ~1.5 deg</p>
Response to rough road	<p>Travelling on cant road</p> <p>Bouncing amount</p> <p>10 20 30 mm</p> <p>Height controlled in NORMAL AUTO Spring rate/damping force fixed at SOFT (without control): REAR ~28 mm, FRONT ~25 mm Height controlled in NORMAL AUTO Spring rate/damping force controlled in NORMAL AUTO: REAR ~15 mm, FRONT ~12 mm</p>

terminal in the engine compartment and the diagnosis clear terminal in the trunk room at the same time.

Results of the diagnosis are displayed in coded numbers on the MultiDisplay System to provide better readability

Change of display mode from the suspension status display to the diagnosis result display is accomplished by operating the switches of the MultiDisplay System in a manner that the driver would never attempt during normal handling.

VII. SUMMARY

1) The Toyota Electronic Modulated Air Suspension system achieves automatic control of vehicle height, spring rate, and

shock absorber damping force by the introduction of electronic technology. As a result, vehicle attitude change such as squat, roll, nose dive, pitching, and bouncing is remarkably reduced and high levels of both ride comfort and stability are achieved.

2) A 8-bit single-chip microcomputer specially developed for vehicle use is used in the ECU to achieve a high level of control. Transistors with low V_{ce} have been developed for motor drive and constructed in a single package. This contributes to increased efficiency of motor drive as well as to reduction of ECU size.

3) Vehicle height sensors and the steering sensor are of the noncontact photo-interrupter type to ensure high reliability.