

# G - TESTS W/CODES - INTRODUCTION

## 1998 Toyota Supra

1998 ENGINE PERFORMANCE  
Toyota - Self-Diagnostics - Introduction

Avalon, Camry, Celica, Corolla, Land Cruiser, LX470, RAV4,  
Sienna, Supra, Tacoma, Tercel, T100, 4Runner

### INTRODUCTION

#### \* PLEASE READ FIRST \*

If no faults were found while performing BASIC DIAGNOSTIC PROCEDURES, proceed with self-diagnostics. If no Diagnostic Trouble Codes (DTCs) are present after entering self-diagnostics, proceed to H - TESTS W/O CODES article for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.).

### SYSTEM OVERVIEW

The Engine Control Module (ECM) monitors engine operation and contains a self-diagnostic system which stores Diagnostic Trouble Codes (DTCs) and complies to On-Board Diagnostics Generation II (OBD-II) standards.

Self-diagnostic system is used to provide vehicle with an on-board diagnostic system which is capable of continuously monitoring the efficiency of emission control system, and to improve diagnosis and repair when system failures occur.

The Federal Test Procedure (FTP) sets maximum allowable emission standards. A Malfunction Indicator Light (MIL) must illuminate if a system or component either fails or deteriorates to a point where the vehicle emissions could rise above 1 1/2 times FTP standards.

If malfunction does not reoccur in 3 ignition cycles, the MIL goes off, but DTCs remain recorded in ECM memory. DTCs may only be retrieved using an On-Board Diagnostic (OBD-II) scan tool that complies with SAE standard J-1978 or Toyota scan tool connected to Data Link Connector (DLC) No. 3. The scan tool also provides freeze-frame data and can be used to clear codes.

### TWO-TRIP DETECTION LOGIC

When a malfunction initially occurs, Diagnostic Trouble Code (DTC) will be temporarily stored in ECM memory, but MIL on instrument panel will not illuminate. The second time malfunction is detected, MIL on instrument panel will illuminate, provided ignition is turned off and then back on after first malfunction was detected. This is referred to as the 2-Trip Detection Logic and only applies to specific DTCs.

NOTE: When road testing vehicle in CHECK mode (Toyota scan tool only), the Two Trip Detection Logic will not function. Also, MIL will illuminate first time a malfunction is detected.

### DATA LINK CONNECTOR

OBD-II regulations (SAE J-1850) standardizes Data Link Connector (DLC) configurations. See DATA LINK CONNECTOR (DLC) NO. 3 LOCATION table. See Fig. 1 in G - TESTS W/CODES article.

DATA LINK CONNECTOR (DLC) NO. 3 LOCATION TABLE

Application	Location
Avalon, Corolla, Land Cruiser, LX470, Supra & Tercel .....	Left Side Of Instrument Panel, Left Of Steering Column
Tacoma, T100 & 4Runner .....	Camry, Celica, RAV4, Sienna, Left Side Of Instrument Panel, Right Of Steering Column

## FREEZE-FRAME DATA

OBD-II or Toyota scan tool can be used to check freeze-frame data. The ECM records engine operating condition when a misfire, fuel trim (mixture) malfunction or other malfunction (fuel system, calculated load, coolant temperature, fuel trim (mixture), engine speed, vehicle speed, etc.) exists. If more than one fault is detected, only data from the first malfunction is recorded. Recorded data is useful for determining conditions in which the malfunction occurs.

## SELF-DIAGNOSTIC SYSTEM

### MALFUNCTION INDICATOR LIGHT (MIL) INSPECTION

**NOTE:** The CHECK engine light located on instrument cluster is known as Malfunction Indicator Light (MIL). Inspect MIL to ensure it is operational and will come on if a Diagnostic Trouble Code (DTC) is set.

1) Turn ignition on with engine off. MIL should come on and remain on. If MIL does not come on, check bulb circuit on instrument cluster and wiring circuit between MIL and ECM. See appropriate wiring diagram in L - WIRING DIAGRAMS article. See ECM LOCATION.

2) Start engine and ensure MIL goes off. If MIL remains on with engine running, a malfunction is detected. Proceed to RETRIEVING DIAGNOSTIC TROUBLE CODES.

## TESTING PROCEDURE

To ensure correct diagnosis and repair, testing should be done in the following sequence:

- \* Record Customer Complaint  
Ensure all customer complaints or observations are recorded.  
Test drive vehicle with customer when necessary for malfunction verification.
- \* Retrieve Diagnostic Trouble Codes  
Connect appropriate scan tool. Retrieve codes and record any freeze-frame data (if applicable). See RETRIEVING DIAGNOSTIC TROUBLE CODES.
- \* Clear Trouble Codes  
Clear codes. See CLEARING DIAGNOSTIC TROUBLE CODES.
- \* Visual Inspection  
Inspect all connectors of suspect circuit or component.  
Ensure all connections are clean and tight.
- \* Confirm Symptoms & Trouble Codes

Perform road test. Determine if original symptoms are still present. Retrieve codes.

- \* Diagnose & Repair Diagnostic Trouble Codes  
Perform diagnosis and repair procedures as necessary. See G – TESTS W/CODES article. If no codes are present, proceed to H – TESTS W/O CODES article for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.).
- \* Verification Procedure  
After repairs have been completed, clear all diagnostic trouble codes. See CLEARING DIAGNOSTIC TROUBLE CODES. Perform road test. Ensure no codes are present and all symptoms and/or complaints have been repaired.

## RETRIEVING DIAGNOSTIC TROUBLE CODES

**NOTE:** Diagnostic Trouble Codes (DTCs) may be retrieved using Toyota scan tool or On-Board Diagnostic (OBD-II) scan tool that complies with SAE standard J-1978. Toyota scan tool or OBD-II scan tool may be operated in NORMAL mode when retrieving trouble codes. Only Toyota scan tool may be used in CHECK mode when retrieving DTCs.

NORMAL mode is used to retrieve DTCs from Engine Control Module (ECM). CHECK mode is used to check for DTCs when operating vehicle to simulate conditions in which DTC was set. CHECK mode contains a higher sensing ability to detect malfunctions. CHECK mode helps determine malfunctions caused by poor electrical connections, which are difficult to determine using NORMAL mode.

**NOTE:** If using Toyota scan tool, when ignition switch is turned from ON to ACC or OFF position or scan tool is switched from NORMAL mode to CHECK mode, all DTCs and freeze-frame data will be erased. DO NOT switch modes until all DTCs and freeze-frame data have been recorded.

### NORMAL Mode Code Retrieval

1) Connect scan tool to Data Link Connector (DLC) No. 3. See Fig. 1 in G – TESTS W/CODES article. Turn ignition on with engine off. Turn scan tool on. Using scan tool manufacturer's instructions, check for DTCs and freeze-frame data.

2) If scan tool displays UNABLE TO CONNECT TO VEHICLE, DLC No. 3 must be checked. See DLC NO. 3 INSPECTION under SCAN TOOL PROBLEMS. If scan tool does not display UNABLE TO CONNECT TO VEHICLE, go to next step.

3) Record any DTCs and freeze-frame data displayed for system diagnosis. If driveability problem exists and no DTCs are present, go to H – TESTS W/O CODES article for diagnosis by symptom.

4) If any DTCs are present, perform appropriate DTC test under DIAGNOSTIC TESTS in G – TESTS W/CODES article. See DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION table. For more information on freeze-frame data, see FREEZE-FRAME DATA under INTRODUCTION. For information on 2-trip detection logic codes, see TWO-TRIP DETECTION LOGIC under INTRODUCTION.

5) After repairs for DTC have been completed, DTCs must be cleared from ECM memory. See CLEARING DIAGNOSTIC TROUBLE CODES. Road test vehicle to ensure all symptoms and/or complaints have been repaired.

### CHECK Mode Code Retrieval (Toyota Scan Tool Only)

1) Ensure vehicle battery is fully charged. Apply parking brake. Shift transmission/transaxle into Neutral (M/T) or Park (A/T).

Turn A/C and all accessories off. Ensure throttle valve is fully closed.

2) Turn ignition off. Connect scan tool to Data Link Connector (DLC) No. 3. See DATA LINK CONNECTOR under INTRODUCTION. Turn ignition on with engine off. Turn scan tool on.

3) Switch scan tool from NORMAL mode to CHECK mode. CHECK mode is operational if MIL on instrument cluster flashes. Start engine. If no DTCs are present, MIL will turn off. Try to simulate conditions of driveability complaint described by customer.

NOTE: If ignition switch is turned from ON to ACC or OFF position, all DTCs and freeze-frame data will be erased. DO NOT switch modes until all DTCs and freeze-frame data are recorded.

4) Record any DTCs and freeze-frame data displayed for system diagnosis. If driveability problem exists and no codes are present, go to H - TESTS W/O CODES article for diagnosis by symptom.

5) If any DTCs are present, perform appropriate DTC test. See DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION table. For more information on freeze-frame data, see FREEZE-FRAME DATA under INTRODUCTION. For information on 2-trip detection logic codes, see TWO-TRIP DETECTION LOGIC under INTRODUCTION.

6) After repairs for DTC have been completed, DTC must be cleared from ECM memory. See CLEARING DIAGNOSTIC TROUBLE CODES. Road test vehicle to ensure all symptoms and/or complaints have been repaired.

## CLEARING DIAGNOSTIC TROUBLE CODES

1) After performing repairs, clear Engine Control Module (ECM) memory of all stored Diagnostic Trouble Codes (DTCs) and freeze-frame data. DTCs and freeze-frame data may be cleared by using scan tool and scan tool manufacturer's instructions.

NOTE: If using Toyota scan tool, DTCs and freeze-frame data may be cleared by switching from CHECK mode to NORMAL mode or from NORMAL mode to CHECK mode.

2) DTCs and freeze-frame data may also be cleared by removing EFI fuse from fuse block, located in engine compartment. DTCs and freeze-frame data may also be cleared by disconnecting negative battery cable. However, other memory functions (clock, radio, alarm, seats, etc.) will be canceled and must be reset.

NOTE: Not all codes listed in the following table are used on every vehicle.

DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION TABLE

Code (1)	Description	Probable Cause
P0100 (2)	Mass Airflow (MAF) Sensor Circuit Malfunction	Open/Short Circuit, MAF Sensor Or ECM
P0101 (2)	Mass Airflow (MAF) Circuit Range/Performance Fault	MAF Sensor
P0105	Manifold Absolute Pressure (MAP) Sensor Circuit Malfunction	Open/Short Circuit, MAP Sensor Or ECM
P0106	Manifold Absolute Pressure (MAP) Sensor Circuit Mal	MAP Sensor

	Malfunction	
P0110	Intake Air Temperature (IAT) Sensor Circuit	Open/Short Circuit, IAT Sensor Or ECM
P0115	Engine Coolant Temperature (ECT) Sensor Circuit Fault	Open/Short Circuit, ECT Sensor Or ECM
P0116 (2)	ECT Sensor Circuit Range/Performance Fault	ECT Sensor Or Cooling System
P0120	Throttle Position (TP) Sensor Malfunction	Open/Short Circuit, TP Sensor Or ECM
P0121 (2)	Throttle Position (TP) Sensor Circuit Range/Performance	TP Sensor
P0125	Insufficient Coolant Temperature For Closed Loop	Open/Short Circuit Or HO2S
P0130 (2)	(3) Heated Oxygen Sensor Circuit Malfunction	HO2S Or Fuel Trim Malfunction
P0133 (2)	(3) Heated Oxygen Sensor Circuit Slow Response	HO2S
P0135 (2)	Heated Oxygen Sensor Heater Circuit Malfunction	Open/Short In Heater Circuit, HO2S Or ECM
P0136 (2)	(3) Heated Oxygen Sensor Circuit Malfunction	HO2S
P0141 (2)	Heated Oxygen Sensor Heater Circuit Malfunction	Open/Short In Heater Circuit, HO2S Or ECM
P0150 (2)	Heated Oxygen Sensor Circuit Malfunction	HO2S Or Fuel Trim Malfunction
P0153 (2)	Heated Oxygen Sensor Circuit Slow Response	HO2S
P0155 (2)	Heated Oxygen Sensor Heater Circuit Malfunction	Open/Short In Heater Circuit, HO2S Or ECM
P0156 (2)	Heated Oxygen Sensor Circuit Malfunction	HO2S
P0161 (2)	Heated Oxygen Sensor Heater Circuit Malfunction	Open/Short In Heater Circuit, HO2S Or ECM
P0171 (2)	Fuel Trim Malfunction	Too Lean
P0172 (2)	Fuel Trim Malfunction	Too Rich
P0300	Random Misfire Detected	Ignition, EGR, Fuel System Or Engine Mechanical
P0301 (2)	Cylinder No. 1 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical
P0302 (2)	Cylinder No. 2 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical

P0303 (2)	Cylinder No. 3 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical
P0304 (2)	Cylinder No. 4 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical
P0305 (2)	Cylinder No. 5 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical
P0306 (2)	Cylinder No. 6 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical
P0307 (2)	Cylinder No. 7 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical
P0308 (2)	Cylinder No. 8 Misfire Detected	Ignition System, Fuel System Or Engine Mechanical
P0325	Knock Sensor No. 1 Circuit Malfunction	Open/Short Circuit, Loose Sensor Or ECM
P0330 (2)	Knock Sensor No. 2 Circuit Malfunction	Open/Short Circuit, Loose Sensor Or ECM
P0335 (2)	Crankshaft Position (CKP) Sensor Circuit Malfunction	Open/Short Circuit, CKP Sensor, Starter Or ECM
P0336 (2)	Crankshaft Position (CKP) Sensor Circuit Range/Performance	CKP Sensor Or ECM
P0340 (2)	Camshaft Position (CMP) Sensor Circuit Malfunction	Open/Short Circuit, CMP Sensor Or ECM
P0401 (2)	Insufficient EGR Flow Detected	Open/Short EGR Circuit Or ECM
P0402 (2)	Excessive EGR Flow Detected	Open/Short EGR Circuit Or ECM
P0420 (2)	Catalyst System Efficiency Below Threshold	Catalytic Converter, Oxygen Sensor Or Circuit
P0430 (2)	Catalyst System Efficiency Below Threshold	Catalytic Converter, Oxygen Sensor Or Circuit
P0440 (2)	EVAP System Malfunction	Vapor Pressure Sensor Or Circuit, Charcoal Canister Or Faulty Vacuum Circuit
P0441 (2)	Incorrect EVAP Purge Flow	Open/Short Purge Control Circuit, Charcoal Canister Or Faulty Vacuum Circuit
P0446 (2)	EVAP Vent Control Malfunction	Open/Short VSV Circuit, Charcoal Canister Or Faulty Vacuum Circuit
P0450	EVAP Pressure Sensor Malfunction	Open/Short Vapor Pressure Sensor Circuit Or ECM
P0451	EVAP Pressure Sensor	Open/Short Vapor Pressure

	Range/Performance	Sensor Circuit Or ECM
P0500 (2)	Vehicle Speed Sensor Malfunction	Vehicle Speed Sensor Or Circuit, Instrument Cluster Or ECM
P0505 (2)	Idle Control System Malfunction	IAC Valve Or Circuit Or Air Intake Hose
P0510 (2)	Closed Throttle Position Switch Malfunction	Closed Throttle Position Switch/Circuit Or ECM
P1100 (2)	Barometric Pressure Sensor Circuit Malfunction	ECM
P1120	Accelerator Pedal Position (APP) Sensor Circuit Malfunction	Open/Short Circuit, APP Sensor Or ECM
P1121	Accelerator Pedal Position (APP) Sensor Range/Performance	APP Sensor Or ECM
P1125	Throttle Control Motor Circuit Fault	Open/Short Circuit, Throttle Control Motor Or ECM
P1126	Magnetic Clutch Circuit Fault	Open/Short Circuit, Magnetic Clutch Or ECM
P1127	Electronic Throttle Control System (ETCS) Fault	Open ETCS Power Circuit Or ECM
P1128	Throttle Control Motor Lock Fault	Throttle Control Motor, Throttle Body Or ECM
P1129	Electronic Throttle Control System (ETCS) Fault	ETCS Or ECM
P1130 (2)	Air/Fuel Ratio Sensor (AFS) Circuit Range/Performance	Open/Short Circuit, AFS Or ECM
P1133 (2)	Air/Fuel Ratio Sensor (AFS) Response Malfunction	AFS7
P1135 (2)	Air/Fuel Ratio Sensor (AFS) Heater Circuit Malfunction	Open/Short Circuit, AFS Or ECM
P1200 (2)	Fuel Pump Relay Circuit	Open/Short Relay Circuit Or ECM
P1300	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1305	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1310	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1315	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1320	Ignitor Circuit Malfunction	Ignitor Circuit To ECM,

		Ignitor, Coil Or ECM
P1325	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1330	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1335	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1340	Ignitor Circuit Malfunction	Ignitor Circuit To ECM, Ignitor, Coil Or ECM
P1349	Variable Valve Timing (VVT) System	Valve Timing, Oil Control Valve, VVT Controller Or ECM
P1400	Sub-Throttle Position Sensor Malfunction	Open/Short Circuit, Sub-Throttle Position Sensor Or ECM
P1401	Sub-Throttle Position Sensor Range/Performance Fault	Sub-Throttle Position Sensor
P1405	Turbo Pressure Sensor Circuit Malfunction	Open/Short Circuit, Turbo Pressure Sensor Or ECM
P1406	Turbo Pressure Sensor Circuit Range/Performance Fault	Turbo Pressure Sensor
P1410 (2)	EGR Valve Position Sensor Circuit Malfunction	Open/Short Circuit, EGR Valve Position Sensor Or ECM
P1411 (2)	EGR Valve Position Sensor Circuit Range/Performance	EGR Valve Position Sensor
P1500	Starter Signal Circuit Malfunction	Starter Signal Circuit, Ignition Switch, Starter Relay Or ECM
P1511	Boost Pressure Low Malfunction	Open/Short Circuit, Air Intake Leak/Blockage, Actuator Or ECM
P1512	Boost Pressure High Malfunction	Open/Short Circuit, Actuator Or ECM
P1520 (2)	Stoplight Switch Signal Malfunction	Short Circuit, Stoplight Switch Or ECM
P1600	ECM BATT Malfunction	ECM Power Source Circuit Or ECM
P1605	Knock Control ECM Malfunction	ECM
P1630	Traction Control System Malfunction	Open/Short Circuit, Throttle Control ECU Or ECM
P1633	ECM Malfunction	ECM
P1652	Idle Air Control Valve Circuit Malfunction	Open/Short Circuit, Wastegate Valve VSV Or ECM



P1656	Oil Control Valve Circuit Fault	Open/Short Circuit, Oil Control Valve Or ECM
P1658 (2)	Wastegate Valve Control Circuit Malfunction	Open/Short Circuit, Wastegate Valve VSV Or ECM
P1661 (2)	Exhaust Gas Control Valve Circuit Malfunction	Open/Short Circuit, Exhaust Gas Control Valve VSV Or ECM
P1662 (2)	Exhaust By-Pass Valve Control Circuit Malfunction	Open/Short Circuit, Exhaust By-Pass Valve VSV Or ECM
P1780 (2)	Park/Neutral Position Switch Malfunction	Park/Neutral Position Switch/Circuit Or ECM
(1) - Perform appropriate DTC test under DIAGNOSTIC TESTS in G - TESTS W/CODES article. (2) - Two-trip detection logic code. For more information, see TWO-TRIP DETECTION LOGIC under INTRODUCTION. (3) - Some models are equipped with non-heated oxygen sensors.		

## TEST PREPARATION

### Supra Turbo

1) Manufacturer recommends using Check Harness "A" (SST 09990-01000) when using DTC tests to diagnose malfunctions. Check harness "A" is a test harness that is installed between Electronic Control Module (ECM) and ECM connectors. See Fig. 1. Voltage and resistance readings are taken at check harness connectors.

NOTE: Always check and note diagnostic trouble codes prior to disconnecting ECM connector. Disconnecting ECM connector will erase codes from memory.

2) To install check harness "A", ensure ignition switch is in the OFF position. Disconnect ECM connector. See ECM LOCATION.

3) Connect check harness "A" between ECM and ECM connectors. Terminal arrangement of check connector is the same as those on the ECM. Wire colors that are specified in procedures apply to ECM connectors, but may not apply to check harness connectors. Proceed to appropriate DTC test under DIAGNOSTIC TESTS in G - TESTS W/CODES article.

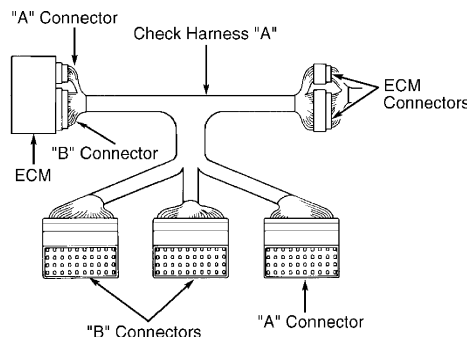


Fig. 1: Identifying Check Harness "A"  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

## TROUBLE CODE TEST DRIVE CONFIRMATION

1) On certain Diagnostic Trouble Codes (DTCs), once DTC has been cleared from ECM memory, a DTC test drive confirmation test can be performed to verify repairs made and that DTC does not reset. The test drive confirmation test will duplicate the conditions required to set specified DTCs.

2) Test drive confirmation test lists the procedure to be performed to check that DTC does not reset. Test drive confirmation tests apply only to specific DTCs. Test drive confirmation test will be included with proper DTC test in G – TESTS W/CODES article.

## ECM LOCATION

ECM LOCATION TABLE

Model	Location
Avalon & Camry	Behind Glove Box
Celica	Below Passenger's Side Of Instrument Panel, Underneath Carpet Near Center Console
Corolla	Behind Stereo On Instrument Panel, Just In Front Of Center Console
Land Cruiser & LX470	Behind Glove Box
RAV4	Behind Bottom Center Of Instrument Panel, In Front Of Console
Sienna	Passenger's Side Of Instrument Panel, Just Below Glove Box
Supra	Below Passenger's Side Of Instrument Panel, Underneath Carpet On The Floor
Tacoma & Tercel	Behind Glove Box
T100	Behind Passenger's Side Kick Panel
4Runner	Behind Glove Box

## SCAN TOOL PROBLEMS

### DLC NO. 3 INSPECTION

1) If scan tool displays UNABLE TO CONNECT TO VEHICLE when scan tool is connected, try scan tool on another vehicle. If scan tool operates on another vehicle, go to next step. If scan tool does not operate on another vehicle, problem is probably with scan tool.

2) Check DLC No. 3 for loose or damaged terminals. Ensure DLC No. 3 terminals are in correct position in connector. See appropriate wiring diagram in L – WIRING DIAGRAMS article. Repair as necessary. If connector and terminals are okay, go to next step.

3) Check voltage and resistance between ground and specified terminal on DLC No. 3. See DLC NO. 3 VOLTAGE & RESISTANCE SPECIFICATIONS table. See Fig. 2. If voltage and resistance readings are not as specified, check wiring circuit. See appropriate wiring diagram in L – WIRING DIAGRAMS article.

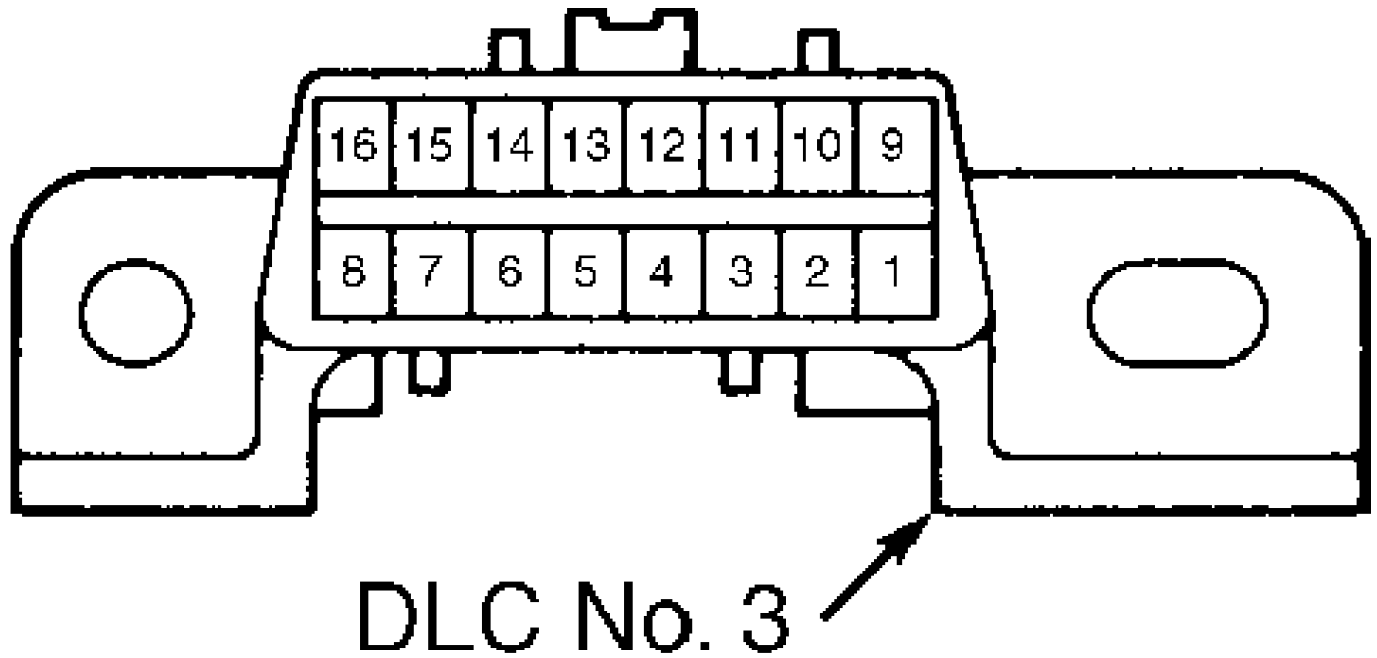
DLC NO. 3 VOLTAGE & RESISTANCE SPECIFICATIONS TABLE

Terminal No. (Application) (1)	Specification
4 (Chassis Ground)	Less Than One Ohm
5 (Signal)	Less Than One Ohm
16 (Battery Voltage)	9-14 Volts

(1) – Terminal No. 2 (Celica and RAV4) or No. 7 (all others) on DLC No. 3 provides a pulse generation during the information

transmission (BUS communication) from the Engine Control Module (ECM).

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Fig. 2: Identifying DLC No. 3 Terminals  
Courtesy of Toyota Motor Sales, U.S.A., Inc.

## SUMMARY

If no diagnostic trouble codes are present, driveability symptoms exist or intermittents exist, proceed to H - TESTS W/O CODES article for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.) or intermittent procedures.