CRUISE CONTROL SYSTEM

1996 Toyota Supra

1995-96 ACCESSORIES & EQUIPMENT
Toyota Cruise Control Systems

Supra

DESCRIPTION

WARNING: Deactivate air bag system before performing any service operation. For 1995 Supra, see AIR BAG RESTRAINT SYSTEM, for 1996 Supra, see AIR BAG RESTRAINT SYSTEM articles. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

Cruise control system consists of Cruise Control Electronic Control Unit (CC ECU), actuator and associated cables, speed sensor(s), parking brake switch, CRUISE ON-OFF (MAIN) switch, stoplight switch, clutch switch (M/T), park/neutral position switch (A/T) and related wiring. See Fig. 1. The system allows vehicle to cruise at a desired speed greater than 25 MPH.

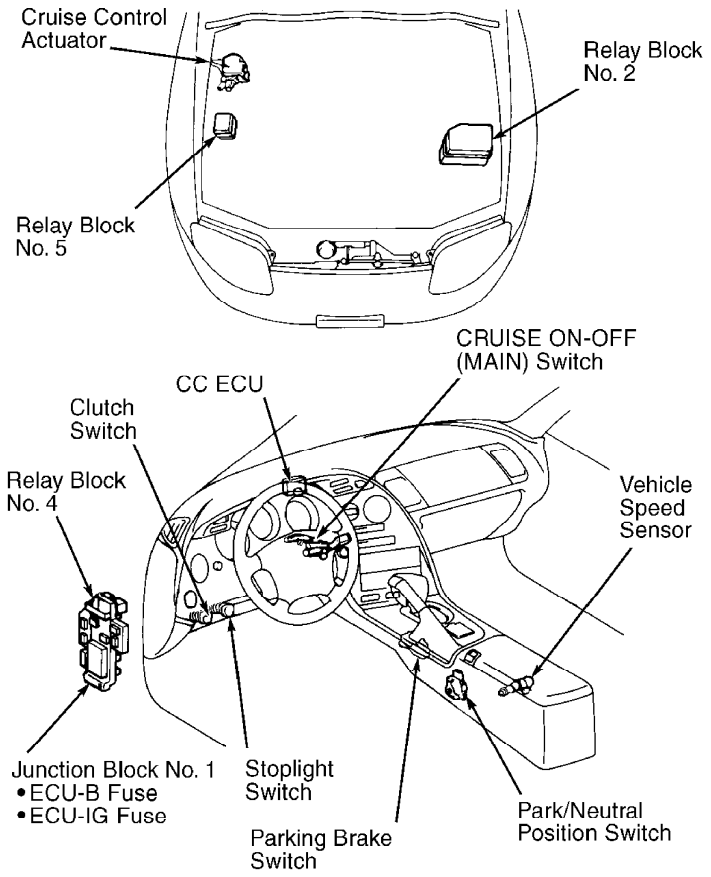

Fig. 1: Locating Cruise Control Components
Courtesy of Toyota Motor Sales, U.S.A., Inc.

OPERATION

SYSTEM

Pressing CRUISE ON-OFF (MAIN) switch turns system on. CRUISE indicator light in instrument cluster comes on when desired cruising speed is set. To set desired speed, press control lever downward in SET/COAST direction and release it. Press CRUISE ON-OFF (MAIN) switch again to turn cruise control system off.

Cancel set speed by pressing cruise control lever in CANCEL direction, pressing brake pedal, or pressing clutch pedal (M/T) or placing shift lever in Neutral (A/T). If vehicle speed falls to less than 25 MPH, set speed will automatically cancel. If vehicle speed decreases 10 MPH less than set speed, set speed will also cancel. If CC ECU detects a system malfunction, set speed will automatically cancel and CRUISE indicator light will flash several times.

Pressing cruise control lever in RES/ACC (resume/accelerate) direction allows vehicle to return to speed set before cancellation. Pressing cruise control lever in the RES/ACC (resume/accelerate) direction and keeping it there gradually increases vehicle speed. Pressing cruise control lever in SET/COAST direction and keeping it there gradually decreases vehicle speed.

ACTUATOR

Actuator consists of a motor, safety magnetic clutch, control arm and a position sensor. When actuator receives a signal from CC ECU, it engages safety magnetic clutch and activates motor. Motor causes control arm to move which will open or close engine throttle valve.

When motor rotates forward, control arm also rotates (via safety magnetic clutch, gears and drive shaft). Control arm pulls a cable connected to engine throttle valve and opens valve accordingly. When motor rotates in a reverse direction, control arm also rotates in a reverse direction and engine throttle valve closes.

Safety magnetic clutch disengages motor from control arm and shuts throttle valve when vehicle speed approaches 10 MPH or more greater than the set speed during cruise control operation, when motor malfunctions or when a circuit problem occurs. Position sensor detects rotary angle of control arm and constantly sends a signal to CC ECU.

CRUISE ON-OFF (MAIN) SWITCH

MAIN Position

CRUISE ON-OFF (MAIN) switch is the power switch for cruise control system. When ignition is turned off, CRUISE ON-OFF (MAIN) switch is also turned off. The switch remains off even when ignition is turned on again.

SET/COAST Position

When CRUISE ON-OFF (MAIN) switch is turned to SET/COAST position with CRUISE ON-OFF (MAIN) switch turned to ON position and vehicle speed greater than 25 MPH, CC ECU stores vehicle speed and maintains that speed.

When CRUISE ON-OFF (MAIN) switch is turned to SET/COAST position while in cruise control mode, actuator motor is energized to close engine throttle valve. Vehicle decelerates until switch is released. From then on, CC ECU stores new vehicle speed and maintains that speed.

RES/ACC Position

If cruise control system is canceled by any canceling switch, vehicle set speed can be resumed and controlled at the previously set speed by moving CRUISE ON-OFF (MAIN) switch to RES/ACC

(resume/accelerate) position. Set speed, however, cannot be resumed if vehicle speed drops to less than 25 MPH, which clears CC ECU speed memory.

When CRUISE ON-OFF (MAIN) switch is moved to RES/ACC (resume/accelerate) position while in cruise control mode, actuator motor is energized to open engine throttle valve. Vehicle accelerates until switch is released. From then on, CC ECU stores new vehicle speed and maintains that speed.

CANCEL Position

When CRUISE ON-OFF (MAIN) switch is turned to CANCEL position, a cancellation signal is sent from CRUISE ON-OFF (MAIN) switch to CC ECU.

CRUISE CONTROL ELECTRONIC CONTROL UNIT (CC ECU)

Cruise Control Electronic Control Unit (CC ECU) constantly monitors and compares set speed with actual vehicle speed from input sensors. When vehicle speed is greater than set speed, CC ECU activates actuator motor to close engine throttle valve, reducing vehicle speed. When vehicle speed falls to less than set speed, CC ECU activates actuator motor to open engine throttle valve, increasing vehicle speed.

CC ECU includes a self-diagnostic function. If cruise control system is canceled by any condition other than driver operation, CC ECU assumes a malfunction has occurred and may set a corresponding trouble code.

SPEED SENSOR

A speed sensor is located on extension housing of Electronically Controlled Transmission (ECT). Speed sensor rotor shaft is driven by a gear on ECT output shaft. For each shaft rotation, speed sensor sends a 4-pulse signal to the instrument cluster. This signal is sent from instrument cluster to CC ECU. CC ECU calculates vehicle speed from this pulse frequency.

SELF-DIAGNOSTIC SYSTEM

When vehicle is in cruise control mode, system will cancel due to a malfunction in actuator, speed sensor or CRUISE ON-OFF (MAIN) switch circuit. When cruise control functions are canceled, CRUISE indicator light will blink 5 times, indicating a 2-digit trouble code is stored in CC ECU memory. See CRUISE CONTROL ECU TROUBLE CODE DEFINITION table under SELF-DIAGNOSTICS. Two-digit trouble code is stored in CC ECU memory until ignition is turned off. See SELF-DIAGNOSTICS.

If a fault or symptom is present, but no trouble codes were set, a circuit function test can be performed. Circuit function test will display a one-digit function code if circuit tested is okay. See CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING.

Before proceeding with cruise control system self-diagnostics, ensure basic inspection of system connectors and harnesses has been performed. If no faults were found during basic inspection, proceed with self-diagnostics.

NOTE: Intermittent failures may cause CRUISE indicator light to flicker or come on. Light will go out after fault goes away. Fault may or may not be present at time of testing. However, a corresponding trouble code may be stored in CC ECU memory. See SELF-DIAGNOSTICS.

SELF-DIAGNOSTICS

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READING TROUBLE CODES

Codes are displayed on CRUISE indicator light as flashes. All codes are 2-digit numbers. Codes indicate current faults in system and should be serviced in order of appearance. See Fig. 2. After recording trouble codes, remove jumper wire and turn ignition off.

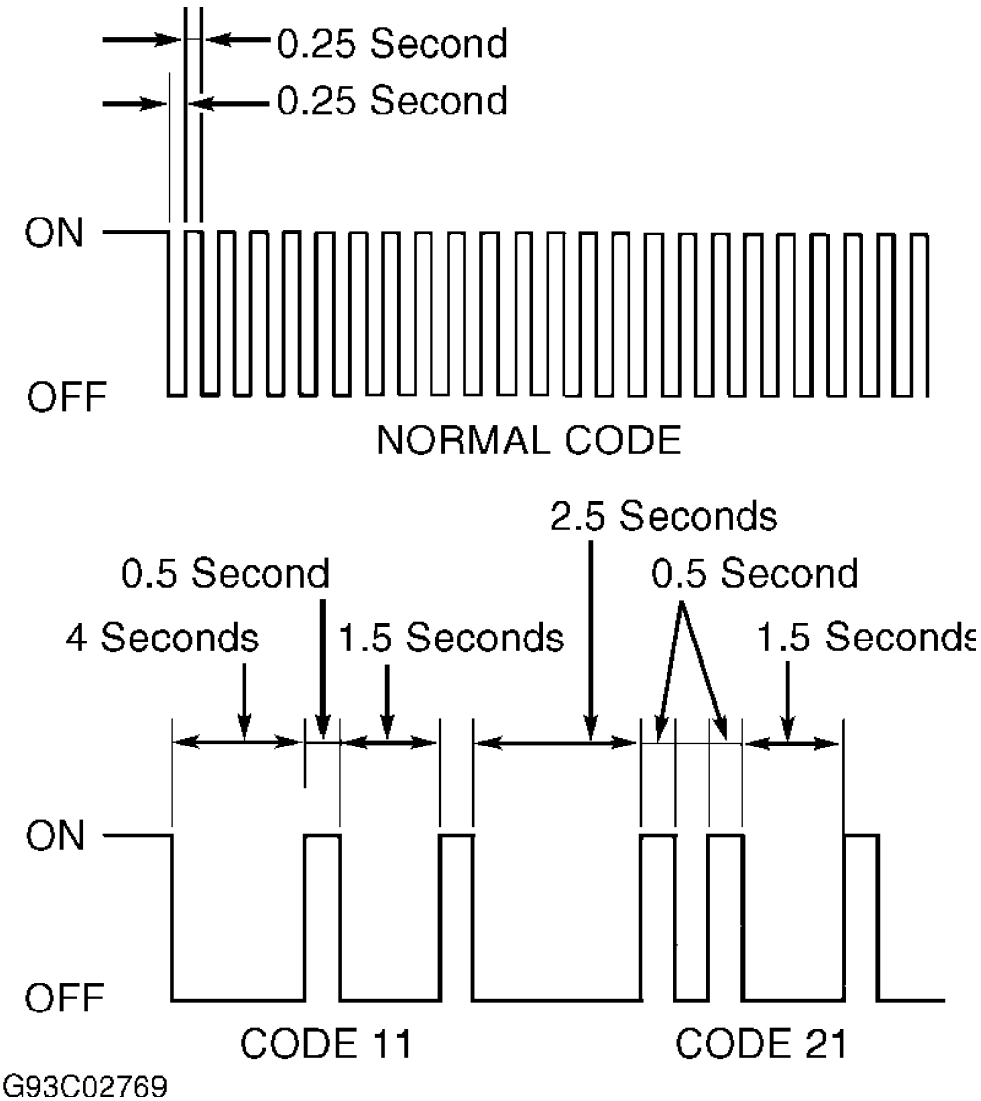

Fig. 2: Reading Service Codes
Courtesy of Toyota Motor Sales, U.S.A., Inc.

RETRIEVING TROUBLE CODES

1) Codes from CC ECU self-diagnostic system are retrieved through self-test diagnostic Data Link Connector (DLC). Test drive vehicle to allow trouble codes to set in CC ECU memory. If CRUISE indicator light begins to flash while driving or cruise control will not set or operate, check for trouble codes. Go to next step.

2) Stop vehicle and leave ignition switch in ON position. Locate Gray DLC2 under driver side of instrument panel. Connect jumper wire between DLC2 terminal No. 3/E1 (Brown wire) and terminal No. 4/Tc (Pink/Black wire). See Fig. 3.

3) If any trouble code is present, perform test(s) in order given. See CRUISE CONTROL ECU TROUBLE CODE DEFINITION table. If no trouble codes are present and CRUISE indicator light begins flashing on and off every .25 seconds, system is normal. If no codes are present, CRUISE indicator light does not flash on and off, and cruise control system malfunction still exists, perform CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING.

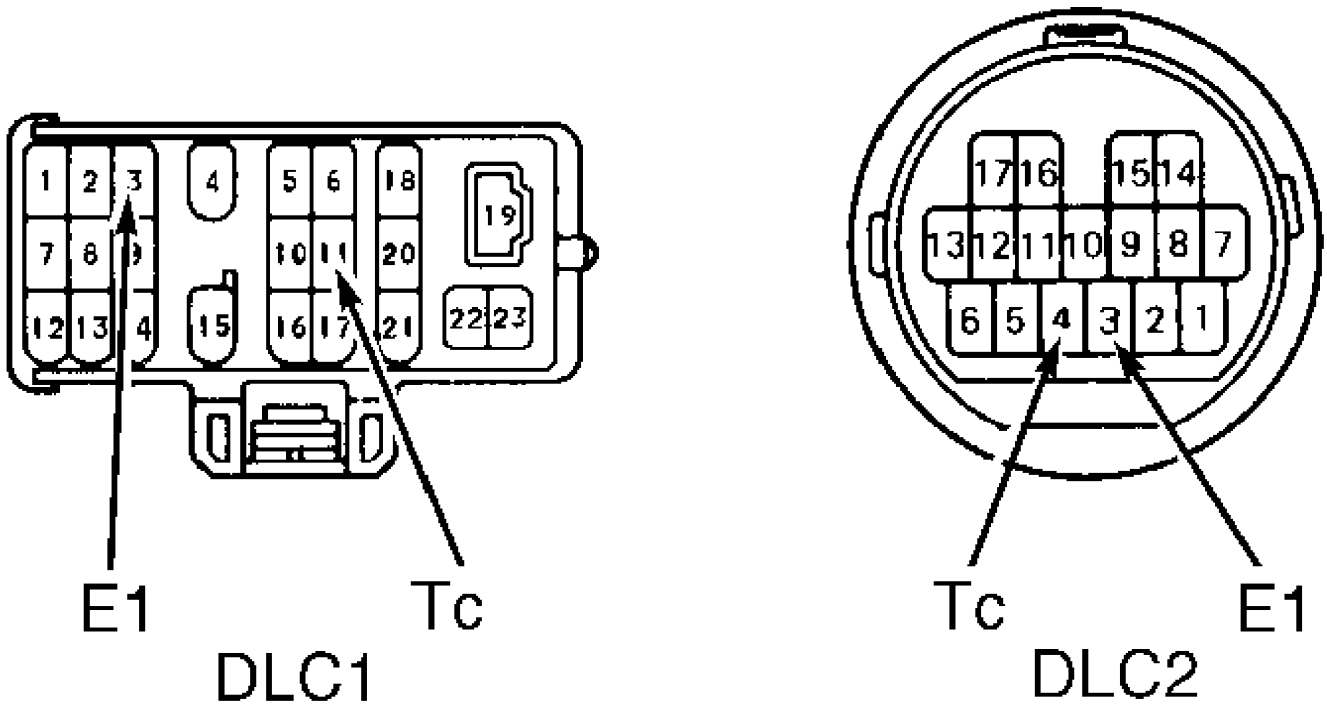

Fig. 3: Identifying DLC Terminals
Courtesy of Toyota Motor Sales, U.S.A., Inc.

CRUISE CONTROL ECU TROUBLE CODE DEFINITION TABLE

Application & Code No.	Diagnosis Problem	(1) Perform Test No.
	SUPRA	
Normal	Indicator Light Flashes On & Off	None
11	Overcurrent (Short) In Motor Circuit	1, 2, 3, 17
12	Overcurrent (Short) In Magnet Clutch Circuit	1, 2, 3, 7, 17

12	Open In Magnet Clutch Circuit For 0.8 Second	1, 2, 3, 7, 17
13	Actuator Position Sensor Detects Abnormal Voltage	1, 2, 3, 17
14	Open In Actuator Motor Circuit	1, 2, 3, 17
14	Position Sensor Signal Value Does Not Change When Motor Operates	1, 2, 3, 17
21	Speed Sensor Signal Not Sent To CC ECU For 140 Milliseconds Or Longer	4, 17
23 (2)	Vehicle Speed Decreased 10 MPH Or More Below Speed Set During Cruise Control Operation	4, 16, 17
32	Short In CRUISE ON-OFF (MAIN) Switch	5, 6, 17
34	Abnormal Voltage In CRUISE ON-OFF (MAIN) Switch	5, 6, 17
41	Faulty Cruise Control ECU	17
42	Source Voltage Drop	13, 14

(1) - Perform test numbers in order given.
(2) - If speed set can be maintained when CRUISE ON-OFF (MAIN) switch is again set to SET/COAST position, there is no malfunction.

CLEARING TROUBLE CODES

CAUTION: DO NOT disconnect vehicle battery to clear codes.

To clear codes from CC ECU memory, locate junction block No. 1 behind driver kick panel. Turn ignition off and remove ECU-B fuse for 10 seconds. See Fig. 4. This procedure erases trouble codes from CC ECU memory. Ensure normal code is displayed after repairs are completed. If problem has not been corrected, trouble code may reset in CC ECU memory upon next operation of cruise control system.

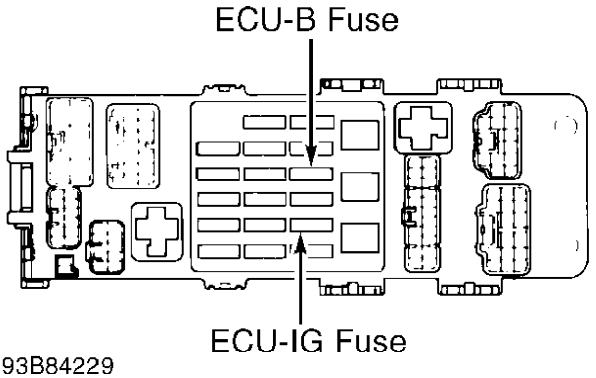

Fig. 4: Locating Fuses In Junction Block No. 1 Junction Block No. 1 - Junction Block No. 1
Courtesy of Toyota Motor Sales, U.S.A., Inc.

TROUBLE SHOOTING

CRUISE CONTROL CIRCUIT FUNCTION TEST

NOTE: Before TROUBLE SHOOTING BY SYMPTOM, perform SELF-DIAGNOSTICS. TROUBLE SHOOTING BY SYMPTOM should only be performed if no self-diagnostic trouble codes are present.

NOTE: When 2 or more trouble codes are sent to CC ECU, only lowest numbered code will be displayed.

Retrieving 1-Digit Normal Function Code

Turn ignition on. Push SET/COAST switch to ON position and hold. Set CRUISE ON-OFF (MAIN) switch to ON position. Ensure CRUISE indicator light comes on in combination meter (instrument cluster) and flashes after 3 seconds. Release CRUISE ON-OFF (MAIN) switch from SET/COAST position. Activate each circuit in order given. If other than a normal function code is displayed, go to appropriate TROUBLE SHOOTING BY SYMPTOM. If normal code is displayed and cruise control is still malfunctioning, go to appropriate TROUBLE SHOOTING BY SYMPTOM. Normal function code will be displayed by CRUISE indicator light as each circuit is activated as follows:

* SET/COAST
  Set control switch to SET/COAST position and hold. Indicator light will flash normal Code 2 if circuit function is normal. SET/COAST circuit normal function code will repeat normal Code 2.
* RES/ACC
  Set CRUISE ON-OFF (MAIN) switch to RES/ACC position and hold. Indicator light will flash normal Code 3 if circuit function is normal. RES/ACC circuit normal function code will repeat Code 3.
* CANCEL Switches
  Raise vehicle and support drive wheels off ground. Perform CANCEL switch test with engine running. Press CANCEL switch to ON and OFF positions. Depress and release brake pedal. Apply and release parking brake. On A/T models, move shift lever from Drive to Neutral. On M/T models, depress and release clutch pedal. If circuit is normal, indicator light will come on when switch is in OFF position and go off when switch is in ON position.
* Vehicle Speed Sensor
  Raise vehicle and support drive wheels off ground. Start engine and slowly depress accelerator pedal until specified speed is reached. Turn CRUISE ON-OFF (MAIN) switch to ON position. If circuit is normal, indicator light will flash on and off every .25 seconds at vehicle speeds greater than 25 MPH. At vehicle speeds of 25 MPH or less, if circuit is normal, indicator light will come on and stay on. On models with Electrically Controlled Transmission (ECT), drive vehicle at 25 MPH or less. If circuit is normal, indicator light will come on and stay on. If indicator light functions as described, this would be considered a normal code.

CLEARING FUNCTION CODES

CAUTION: Do not disconnect vehicle battery to clear codes.

Function code display will be canceled when CRUISE ON-OFF (MAIN) switch is set to OFF position.

DIAGNOSIS & TESTING

WARNING: Deactivate air bag system before performing any service operation. For 1995 Supra, see AIR BAG RESTRAINT SYSTEM, for 1996 Supra, see AIR BAG RESTRAINT SYSTEM articles. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

NOTE: Unless stated otherwise in testing procedures, perform all voltage tests using a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance. Voltage readings may vary slightly due to battery condition or charging rate. When checking harness connectors always backprobe connectors. If necessary to check connector from front side (without harness), use care not to bend connector terminals.

TEST 1, ACTUATOR MOTOR CIRCUIT

1) Disconnect actuator linkage and 7-pin actuator connector, and remove cruise control actuator. Connect positive battery lead to actuator terminal No. 5 (Red/Blue wire) and negative battery lead to actuator terminal No. 4 (Brown/Black wire). With magnet clutch activated, connect positive battery lead to actuator terminal No. 6 (Light Green wire). Connect negative battery lead to actuator terminal No. 7 (Green/Red wire). Motor operation should start and control arm should move smoothly to open position (acceleration side). When control arm reaches fully open position, ensure motor operation stops.

2) With magnet clutch activated, reverse positive and negative leads on actuator terminals No. 6 and 7. Motor operation should start and control arm should move smoothly to closed position (deceleration side). When control arm reaches fully closed position, motor operation should stop. If motor operation is not as specified, replace actuator motor and retest system. If operation is as specified, disconnect battery leads from 7-pin actuator connector and go to next step.

3) Check harness and connector between actuator motor and CC ECU. Repair or replace as necessary. If harness and connector are okay, problem still exists and no codes are present, see appropriate TROUBLE SHOOTING BY SYMPTOM. If Codes 11, 14 and 41 are displayed, replace CC ECU and retest system.

NOTE: Magnet clutch and motor circuits include a diode. If circuit shows no continuity or incorrect resistance, reverse positive and negative test leads and retest circuit.

TEST 2, ACTUATOR MAGNET CLUTCH CIRCUIT

1) Disconnect actuator linkage and 7-pin actuator connector, and remove cruise control actuator. Ensure magnet clutch moves smoothly when control arm is moved by hand (magnet clutch off). Connect positive battery lead to actuator terminal No. 5 (Red/Blue wire) and negative battery lead to actuator terminal No. 4 (Brown/Black wire). This activates magnet clutch and control arm should not move by hand. If operation is not as specified, replace actuator motor. If operation is as specified, reconnect actuator 7-pin connector and go to next step.

2) Disconnect 4-pin stoplight switch connector. Depress brake pedal (stoplight switch pin free). Ensure continuity exists between stoplight switch connector terminal No. 1 (Green/White wire) and terminal No. 2 (White wire). If continuity does not exist, replace

stoplight switch and retest system. If continuity exists, go to next step.

3) Release brake pedal (stoplight switch pin pushed in). Ensure continuity exists between stoplight switch connector terminal No. 3 (Black/White wire) and terminal No. 4 (Red/Blue wire). If continuity is not as specified, replace stoplight switch and retest system. If stoplight switch continuity is as specified, go to next step.

4) Check harness and connectors between CC ECU and stoplight switch, stoplight switch and magnet clutch, and magnet clutch and ground. Repair or replace as necessary. If harness and connectors are okay and no trouble codes are displayed, see appropriate TROUBLE SHOOTING BY SYMPTOM. If Code 12 is displayed, replace CC ECU and retest system.

TEST 3, ACTUATOR POSITION SENSOR CIRCUIT

1) Remove CC ECU with connector connected. Turn ignition on and backprobe CC ECU connector. Connect voltmeter positive lead to CC ECU connector terminal No. 24/VR2 (Light Green/Red wire). Connect voltmeter negative lead to CC ECU connector terminal No. 25/VR3 (Pink/Green wire). Move actuator control arm from closed position (deceleration side) to open position (acceleration side). Ensure voltage changes gradually from 1.3 volts (fully closed) to 4.1 volts (fully opened). If voltage is not as specified, go to next step. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM.

2) Turn ignition off, remove cruise control actuator and disconnect actuator 7-pin connector. Check resistance between actuator connector terminal No. 1 (Red/Black wire) and terminal No. 3 (Pink/Green wire). Resistance should be 2200 ohms. If resistance is as specified, go to next step. If resistance is not as specified, replace cruise control actuator and retest system.

3) Measure resistance between actuator connector terminal No. 2 (Light Green/Red wire) and terminal No. 3 (Pink/Green wire) while moving control arm from deceleration side to acceleration side. Ensure resistance changes gradually from 260 ohms (fully closed) to 2200 ohms (fully opened). If resistance is as specified, go to next step. If resistance is not as specified, replace cruise control actuator and retest system.

4) Check harness and connector between CC ECU and actuator position sensor. Repair or replace as necessary. Check for loose connections at harness and connector. If connections are okay, replace CC ECU and retest system.

TEST 4, SPEED SENSOR CIRCUIT

1) Perform VEHICLE SPEED SENSOR test under CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING. If speed sensor input signals are as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If input signals are not as specified, go to next step.

2) Locate speed sensor on transmission and remove. Disconnect 3-pin connector. Connect positive battery lead to connector terminal No. 1 (Yellow wire) and negative battery lead to terminal No. 2 (Red wire). Connect voltmeter positive lead to terminal No. 3 (Blue/Red wire) and voltmeter negative lead to speed sensor terminal No. 2. Ensure a change of 0-11 volts or more occurs 4 times per each revolution of speed sensor shaft. Replace speed sensor if operation is not as specified. If sensor operation is as specified, go to next step.

3) Check harness and connectors between CC ECU, speed sensor and combination meter (instrument cluster). Repair or replace as

necessary. Check for loose connections. If connections are okay, replace CC ECU and retest system.

TEST 5, CRUISE ON-OFF (MAIN) SWITCH CIRCUIT

1) Perform SET/COAST, RES/ACC, and CANCEL tests under CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING. If SET/COAST, RES/ACC or CANCEL input signals are as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If input signals are not as specified, go to next step.

2) Remove CC ECU with connector connected. Turn ignition on, backprobe CC ECU connector and measure voltage between CC ECU connector terminal No. 18/CCS (Blue wire) and ground with switch in specified positions. See CC ECU TO CRUISE ON-OFF (MAIN) SWITCH VOLTAGE table. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.

CC ECU TO CRUISE ON-OFF (MAIN) SWITCH VOLTAGE TABLE

Switch Position	Voltage
Off	10-14
RES/ACC On	0.7-2.5
SET/COAST On	2.3-4.6
CANCEL On	4.1-7.2

3) Turn ignition off. Disable SRS and wait 90 seconds. For 1995 Supra, see AIR BAG RESTRAINT SYSTEM, for 1996 Supra, see AIR BAG RESTRAINT SYSTEM articles in ACCESSORIES & EQUIPMENT. Remove steering wheel center pad and disconnect CRUISE ON-OFF (MAIN) switch 6-pin connector. Measure resistance between 6-pin connector terminal No. 3 (Blue wire) and terminal No. 4 (White/Black wire) with switch in specified positions. See CRUISE ON-OFF (MAIN) SWITCH RESISTANCE table. If resistance is as specified, go to next step. If resistance is not as specified, replace CRUISE ON-OFF (MAIN) switch.

NOTE: When Code 34 is displayed, ensure resistance is one megohm or greater when switch is in OFF position, especially when switching from RES/ACC position to SET/COAST position.

CRUISE ON-OFF (MAIN) SWITCH RESISTANCE TABLE

Application & Switch Position	Resistance (Ohms)
Supra	
Off	One Megohm Or Greater
RES/ACC On	60-80
SET/COAST On	180-220
CANCEL On	400-440

4) Check harness and connectors between CC ECU and CRUISE ON-OFF (MAIN) switch. Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.

TEST 6, CRUISE ON-OFF (MAIN) SWITCH

1) Remove CC ECU with connector connected. Turn ignition on. Backprobe CC ECU connector and measure voltage between CC ECU

connector terminal No. 19/CMS (Red/Yellow wire) and CC ECU connector terminal No. 13 (White/Black wire). Ensure battery voltage exists with MAIN switch in OFF position. With CRUISE ON-OFF (MAIN) switch held in ON position, ensure existence of less than 2 volts. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.

2) Turn ignition off. Disable SRS and wait 90 seconds. For 1995 Supra, see AIR BAG RESTRAINT SYSTEM, for 1996 Supra, see AIR BAG RESTRAINT SYSTEM articles in ACCESSORIES & EQUIPMENT. Remove steering wheel center pad and disconnect CRUISE ON-OFF (MAIN) switch 6-pin connector. Hold MAIN control switch in ON position. Ensure continuity exists between connector terminal No. 2 (Red/Yellow wire) and terminal No. 4 (White/Black wire).

3) Ensure no continuity exists when CRUISE ON-OFF (MAIN) switch is in OFF position. If continuity is as specified, go to next step. If continuity is not as specified, replace control switch and retest system.

4) Check harness and connectors between CC ECU, CRUISE ON-OFF (MAIN) switch and ground. Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.

TEST 7, STOPLIGHT SWITCH CIRCUIT

1) Check stoplights. If stoplight operation is okay, go to step 4). If stoplights do not operate correctly, check STOP fuse and replace if necessary. If fuse is okay, go to next step.

2) Remove stoplight switch connector. Depress brake pedal (switch pin free) and ensure continuity exists between stoplight switch terminal No. 1 (Green/White wire) and terminal No. 2 (White wire).

3) Release brake pedal (switch pin pushed in) and ensure continuity exists between stoplight switch terminal No. 3 (Black/White wire) and terminal No. 4 (Red/Blue wire). If continuity is not as specified, replace stoplight switch. If continuity is as specified, check harness and connectors in stoplight circuit. Repair or replace as necessary.

4) Perform CANCEL SWITCHES test under CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING. If stoplight input signal is as specified, go to next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If input signal is not as specified, remove CC ECU with connectors connected. Turn ignition on.

5) Using voltmeter positive lead, backprobe CC ECU connector terminal No. 1/STP+ (White wire) and ensure battery voltage exists between CC ECU connector and ground with brake pedal depressed. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 1/STP+ (White wire) and ensure battery voltage exists with brake pedal released. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 16/STP- (Green/White wire) and ensure battery voltage exists between CC ECU connector and ground with brake pedal depressed. Ensure less than one volt exists between terminal No. 16/STP- and ground with brake pedal released.

6) If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, check for open in harness and connectors between CC ECU and stoplight switch. Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.

TEST 8, IDLE SWITCH CIRCUIT

NOTE: Ensure throttle position sensor adjustment and operation are normal. See appropriate G - TESTS W/CODES article in ENGINE PERFORMANCE section. Adjust or replace throttle position

sensor as necessary.

G - TESTS W/CODES - NON-TURBO - 1995
G - TESTS W/CODES - TURBO - 1995
G - TESTS W/CODES - NON-TURBO - 1996
G - TESTS W/CODES - TURBO - 1996

1) Remove CC ECU with connectors connected. Disconnect Engine Control Module (ECM), ABS and TRAC ECU connectors.
2) Turn ignition on. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 21/IDL (Red wire) and connect negative lead to ground. Ensure battery voltage exists with throttle valve fully opened and less than 8 volts exists with throttle valve fully closed. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.
3) Disconnect Throttle Position (TP) sensor 4-pin Black connector. Measure resistance between connector terminal No. 1 (Supra 2JZ-GE, Brown/Black wire) and terminal No. 2 (Supra 2JZ-GE, Red wire). On Supra 2JZ-GTE, locate TP sensor opposite cruise control actuator cable and measure resistance between TP sensor connector terminal No. 3 (Red wire) and terminal No. 4 (Brown/Black wire).
4) Ensure one megohm resistance or more exists with throttle valve fully opened and less than 2 ohms exists with throttle valve fully closed. If resistance is as specified, go to next step. If resistance is not as specified, replace throttle position sensor.
5) Check harness and connectors between CC ECU and throttle position sensor, and between throttle position sensor and ground. Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.

TEST 9, ELECTRONICALLY CONTROLLED TRANSMISSION (ECT) CIRCUIT

1) Start engine and bring to operating temperature. Drive vehicle and ensure overdrive operation is turned on and off when overdrive ON-OFF switch is operated. If overdrive switch is okay, go to next step.
2) Remove CC ECU and disconnect connector. Turn ignition on. Using voltmeter positive lead, backprobe CC ECU harness connector terminal No. 9/OD (Brown/Black wire) with negative lead to ground. Ensure battery voltage exists. If voltage is as specified, go to next step. If voltage is not as specified, go to step 5).
3) Turn ignition off and connect CC ECU connector. Using voltmeter positive lead, backprobe CC ECU harness connector terminal No. 22/ECT (Red/Blue wire) with negative lead to ground. Bring engine to operating temperature and test drive vehicle with overdrive switch moved from ON to OFF position. Ensure less than one volt exists in overdrive ON position and battery voltage exists in overdrive OFF (3rd gear) position. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.
4) Check harness and connectors between CC ECU harness connector terminal No. 22/ECT (Red/Blue wire) and electronic controlled transmission solenoid (Red/Blue wire). Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.
5) Check harness and connectors between CC ECU harness connector terminal No. 9/OD (Brown/Black wire) and Engine Control Module (ECM) connector terminal No. 12 (Brown/Black wire). Repair or replace as necessary. If harness and connectors are okay, replace ECM/PCM.

TEST 10, PARKING BRAKE SWITCH

1) Start engine and ensure brake warning light comes on with parking brake lever pulled up. Release parking brake lever and ensure brake warning light goes out. If brake warning light is okay, go to next step. If brake warning light does not come on or go out as specified, test bulb and replace as necessary.

2) Perform CANCEL SWITCHES test under CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING. If parking brake input signals are as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If parking brake input signals are not as specified, go to next step.

3) Remove CC ECU with connectors connected. Turn ignition on. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 3/PKB (Brown/White wire) with negative lead to ground. Pull parking brake up and ensure less than one volt exists. Ensure battery voltage exists when parking brake is released. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.

4) Check harness and connectors between CC ECU and brake warning light. Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.

TEST 11, PARK/NEUTRAL POSITION SWITCH

1) Ensure starting system is operating normally. Check for starting system problems and repair as necessary. If starting system is okay, go to next step.

2) Perform park/neutral position switch test. See CANCEL SWITCHES under CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING. If park/neutral position switch input signal is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If input signal is not as specified, go to next step.

3) Remove CC ECU with connector connected. Turn ignition on. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 2 (Green/Red wire) and put negative lead to ground. Ensure less than one volt exists with shift lever in Park or Neutral, and battery voltage exists with shift lever in other positions. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.

4) Check harness and connectors between CC ECU and ST or GAUGE fuse. Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.

TEST 12, CLUTCH SWITCH

1) Ensure starting system is operating normally. Check for starting system problems and repair as necessary. If starting system is okay, go to next step.

2) Perform clutch switch position test. See CANCEL SWITCHES under CRUISE CONTROL CIRCUIT FUNCTION TEST under TROUBLE SHOOTING. If clutch switch input signal is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If input signal is not as specified, go to next step.

3) Remove CC ECU with connector connected. Turn ignition on. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 2/D (Green/Red wire) with negative lead to ground. Ensure less than one volt exists with clutch pedal depressed (switch on), and battery voltage exists with clutch pedal released (switch off). If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.

4) Check harness and connectors between CC ECU and ST or GAUGE fuse. Repair or replace as necessary. If harness and connectors are okay, replace CC ECU and retest system.

TEST 13, CC ECU POWER SOURCE

1) Locate ECU-IG fuse in junction block No. 1. See Fig. 4. Remove ECU-IG fuse and ensure fuse continuity. If fuse is okay, go to next step. If fuse is not okay, check for short between CC ECU connector terminal No. 14 (Black/Red wire) and ECU-IG fuse.

2) Remove CC ECU with connector connected. Turn ignition on. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 14/B+ (Black/Red wire). Ensure battery voltage exists between CC ECU connector terminal No. 14 and ground. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, go to next step.

3) Turn ignition off. Backprobe CC ECU connector terminal No. 13/GND (White/Black wire) and measure resistance between CC ECU connector terminal No. 13 and ground. If one ohm or less resistance is present, repair harness or connector between CC ECU connector and battery. If resistance measured is greater than one ohm, repair harness or connector between CC ECU connector terminal No. 13 and ground.

TEST 14, CC ECU BACK-UP POWER SOURCE

1) Locate ECU-B fuse in junction block No. 1. See Fig. 4. Remove ECU-B fuse and ensure fuse continuity. If fuse is okay, go to next step. If fuse is not okay, check for short between CC ECU connector terminal No. 15/BATT (White/Red wire) and ECU-B fuse.

2) Remove CC ECU with connector connected. Using voltmeter positive lead, backprobe CC ECU connector terminal No. 15/BATT (White/Red wire). Ensure battery voltage exists between CC ECU connector terminal No. 15 and ground. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM. If voltage is not as specified, repair harness or connector between CC ECU and battery.

TEST 15, TROUBLE CODE CIRCUIT

1) Locate DLC1 and DLC2. Connect voltmeter positive lead to terminal Tc and negative lead to terminal E1. See Fig. 3. Turn ignition on and ensure battery voltage exists between terminals of each DLC. If voltage is as specified, go to test for next trouble code displayed or appropriate TROUBLE SHOOTING BY SYMPTOM.

2) If battery voltage is not present, ensure no short or open exists in harness or connectors between CC ECU and DLC or between DLC and ground. If harness and connectors are okay, replace CC ECU and retest system. If harness and connectors are not okay, repair as necessary and retest system.

TEST 16, ACTUATOR CONTROL CABLE

Ensure proper installation of actuator, control cable and throttle link, and that cable and link are correctly connected. Ensure actuator and throttle link operate smoothly and that cable in not adjusted too loose or too tight. Adjust cable and/or throttle link as necessary. If control cable is too loose, vehicle will lose speed going uphill. If control cable is too tight, engine idle will be too high.

TEST 17, CC ECU GROUND

Remove CC ECU with connector connected. Ensure one ohm or less resistance exists between ground and CC ECU connector terminal No. 13/GND (White/Black wire). If resistance is as specified, replace CC ECU with a known good unit and retest system. If resistance is not as specified, disconnect CC ECU connector. Inspect ground terminals on CC ECU side and harness side of connector and terminal contact pressure. Repair or replace harness and/or connectors as necessary.

PIN VOLTAGE TESTS

Use harness connector pin testing charts to pinpoint a malfunctioning circuit. Test circuit continuity, resistance and voltages by backprobing CC ECU harness connector using a DVOM. See Figs. 5 and 6.

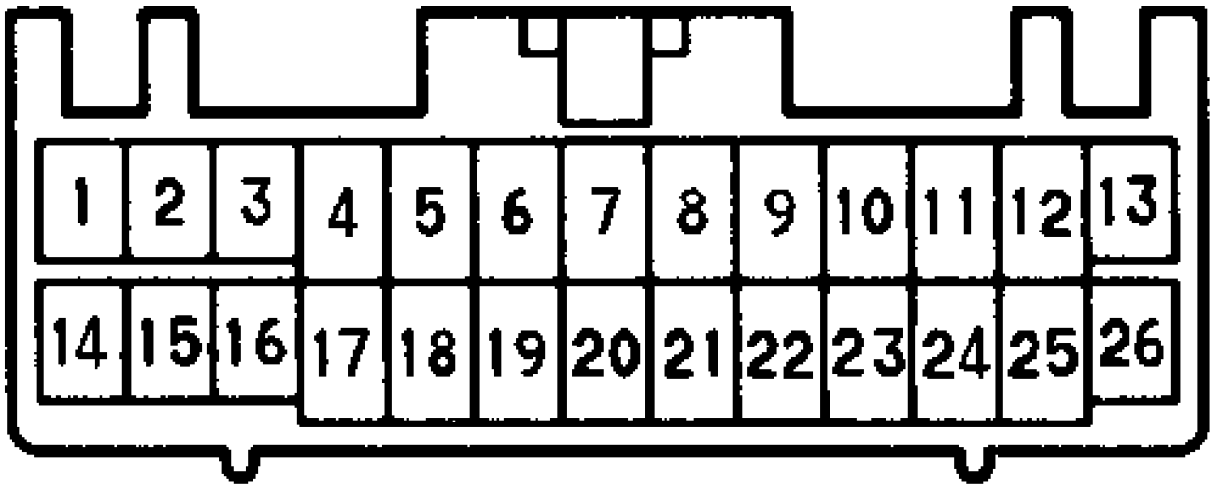

Fig. 5: Cruise Control ECU Harness & Connector Testing
Courtesy of Toyota Motor Sales, U.S.A., Inc.

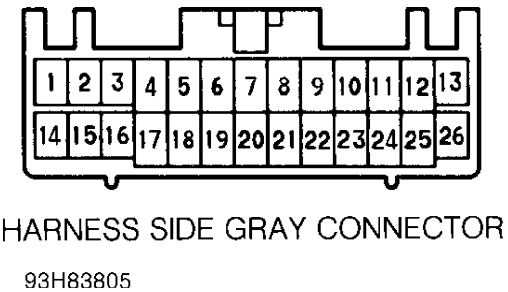

Fig. 6: Cruise Control ECU Harness Voltage Testing
Courtesy of Toyota Motor Sales, U.S.A., Inc.

WIRING DIAGRAMS

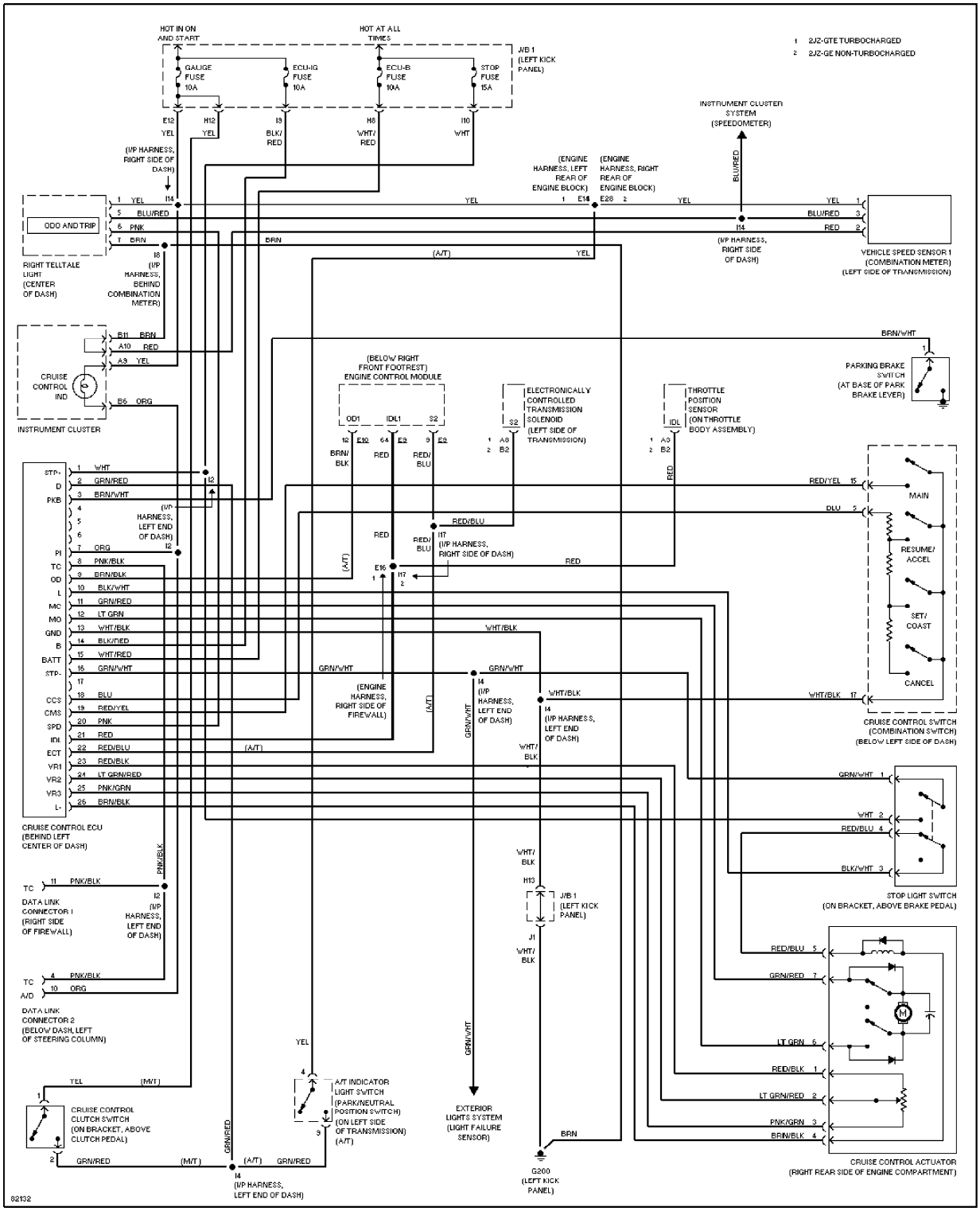

Fig. 7: Cruise Control System Wiring Diagram (1995-96)