

INSPECTION

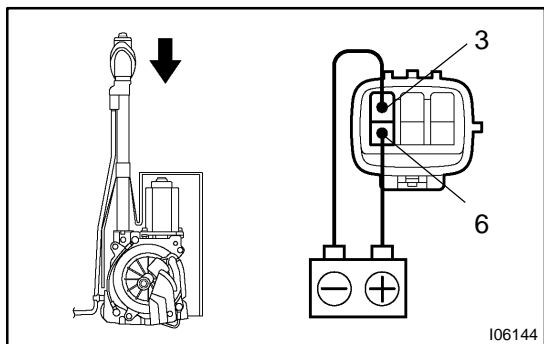
1. Auto Antenna Models:

INSPECT ANTENNA MOTOR

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 6.
- (b) Check that the motor turns (moves upward).

NOTICE:

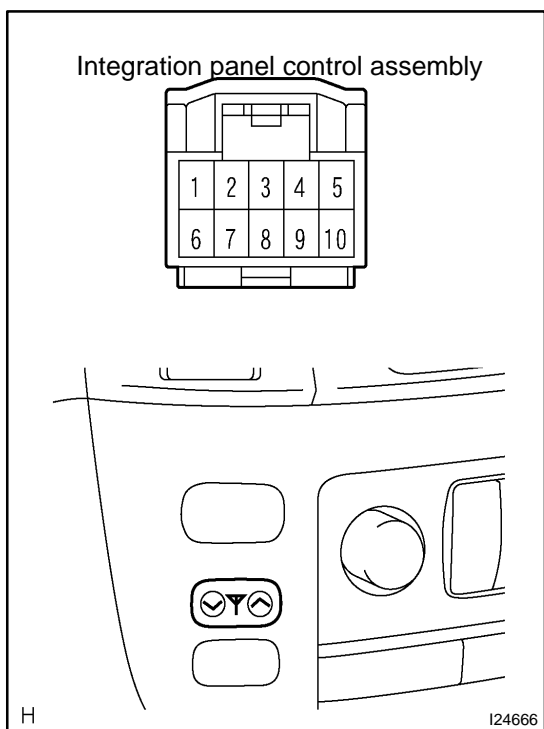
These tests must be done quickly (within 3 - 5 seconds) to prevent the coil from burning out.



- (c) Then, reverse the polarity, check that the motor turns the opposite way (moves downward).

NOTICE:

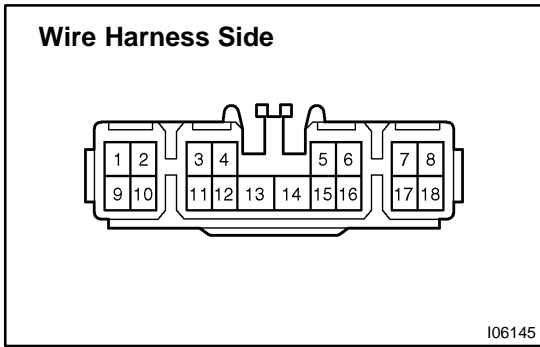
These tests must be done quickly (within 3 - 5 seconds) to prevent the coil from burning out.



2. INSPECT ANTENNA SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
UP button FREE	4 - 5	No continuity
UP button Pushed in	4 - 5	Continuity
DOWN button FREE	9 - 5	No continuity
DOWN button Pushed in	9 - 5	Continuity

If continuity is not as specified, replace the switch.



**3. Auto Antenna Models:
INSPECT ANTENNA MOTOR CONTROL RELAY CIRCUIT**

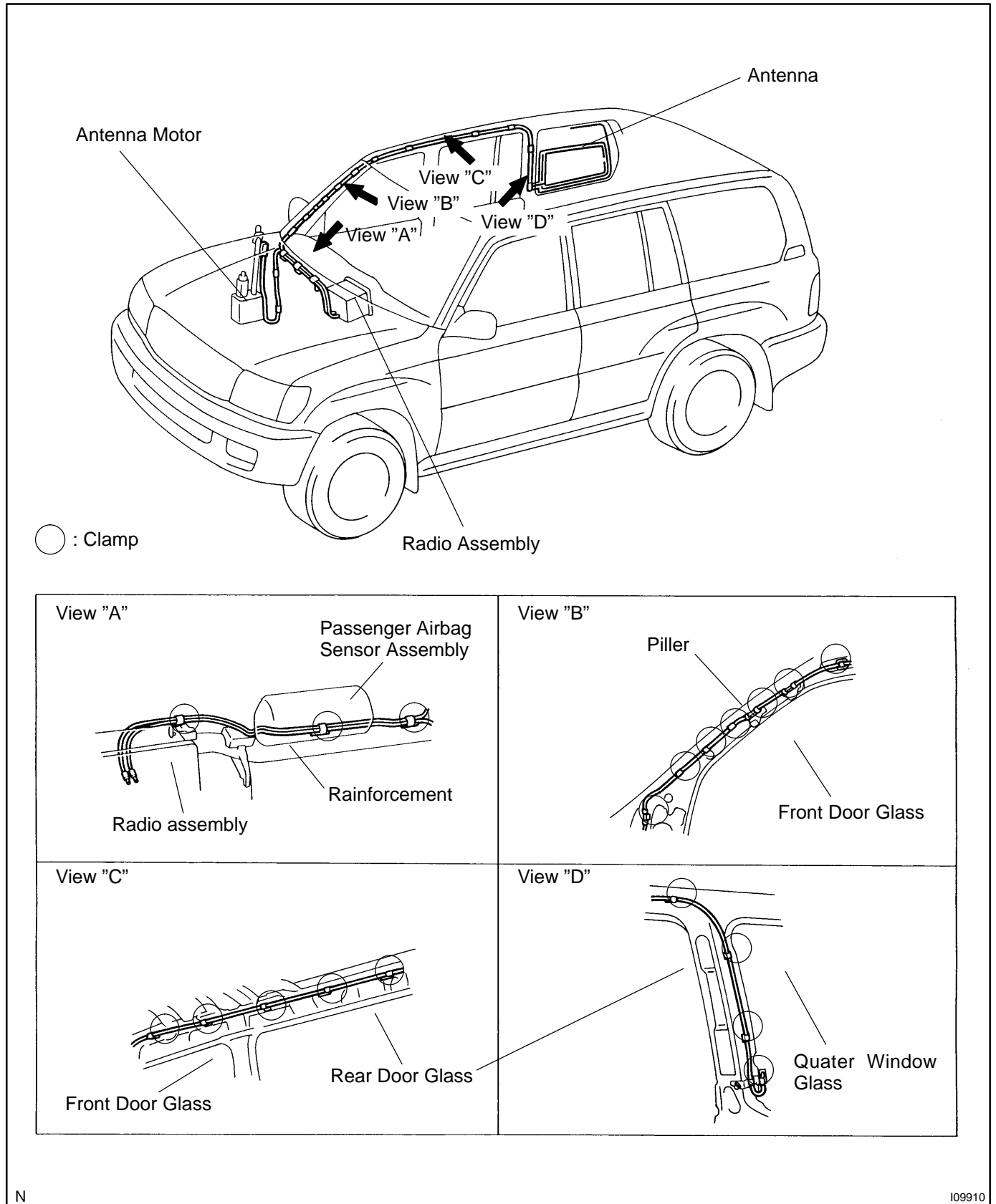
Disconnect the connector from the relay and inspect the connector on wire harness side, as shown in the chart on the next page.

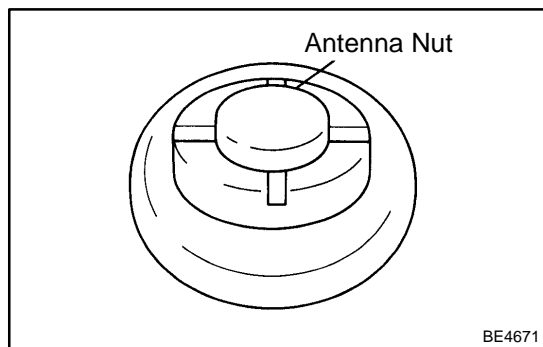
Tester connection	Condition	Specified condition
1 - Ground	Antenna "UP" switch OFF	No continuity
1 - Ground	Antenna "UP" switch ON	Continuity
5 - Ground	Constant	Continuity
9 - Ground	Antenna "DOWN" switch OFF	No continuity
9 - Ground	Antenna "DOWN" switch ON	Continuity
4 - Ground	Constant	Battery positive voltage
7 - Ground	Ignition switch ACC or LOCK	No voltage
7 - Ground	Ignition switch ON	Battery positive voltage
17 - Ground	Ignition switch LOCK	No voltage
17 - Ground	Ignition switch ACC or ON	Battery positive voltage

If circuit is as specified, replace the relay.

ANTENNA LOCATION

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REPLACEMENT

1. Auto antenna models: REMOVE ANTENNA ROD

HINT:

Do this operation with the battery negative (-) cable connected to the battery terminal.

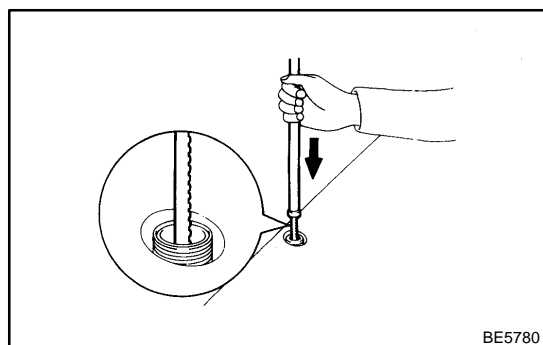
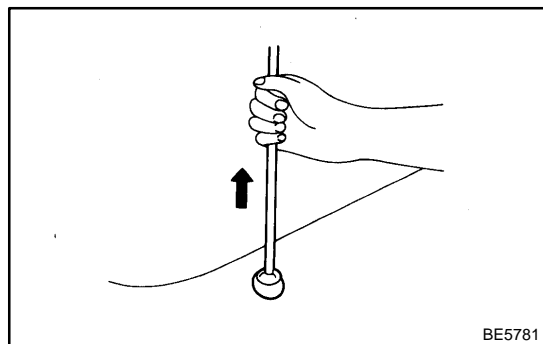
- (a) Remove the antenna nut.
- (b) Turn the radio switch "ON" position.
- (c) Turn the antenna switch to "UP".
- (d) Catch the antenna rod by hand and turn the radio switch "OFF".
- (e) Try again to turn the radio switch "ON" and antenna switch "UP".
- (f) Remove antenna rod.

HINT:

The rod will extend fully and be released from the motor antenna.

NOTICE:

To prevent body damage when the antenna rod is released, hold the rod while it comes out.



2. Auto antenna models: INSTALL ANTENNA ROD

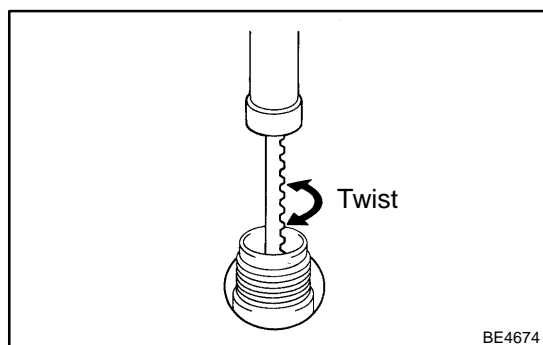
- (a) Insert the cable of the rod until it reaches the bottom.

HINT:

- When inserting the cable, the teeth on the cable must face toward the rear of the vehicle.
 - Insert the antenna approx. 350 mm.
- (b) Turn the radio switch to "OFF".

HINT:

- In case the cable is not wound, twist it, as shown in the illustration.
 - Even if the rod has not retracted fully, install the antenna nut and inspect the antenna rod operation. It will finally retract fully.
- (c) Inspect the antenna rod operation by pushing the radio wave band select buttons.



AUDIO SYSTEM DESCRIPTION

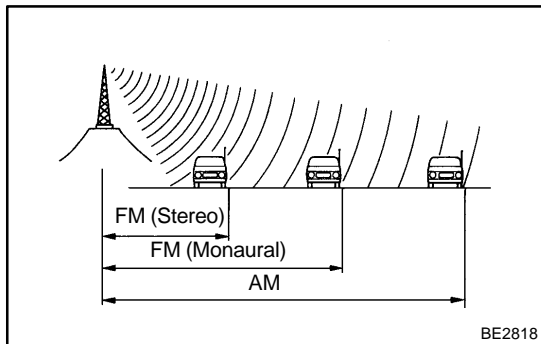
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1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM		FM	
Modulation	Amplitude modulation			Frequency modulation	

LF: Low Frequency
 MF: Medium Frequency
 HF: High Frequency
 VHF: Very High Frequency

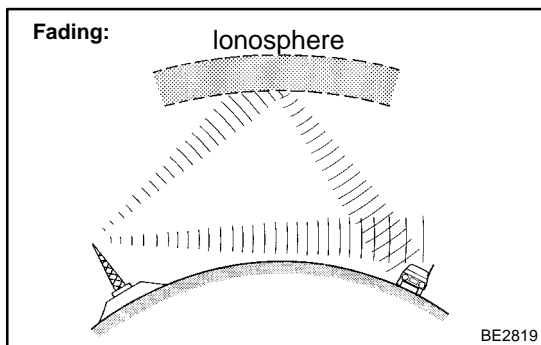


2. SERVICE AREA

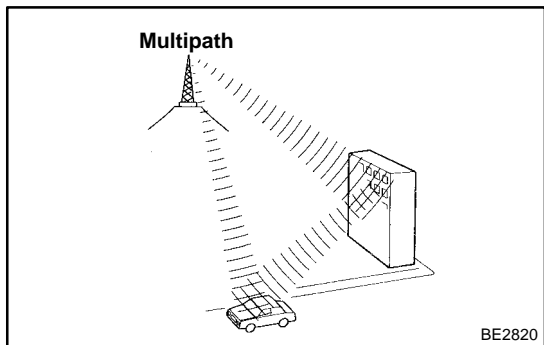
There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even though AM can be received very clearly. Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference ("noise") easily.

3. RECEPTION PROBLEMS

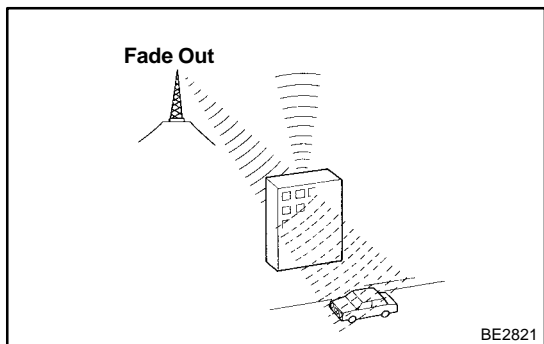
Besides the problem of static, there are also the problems called "fading", "multipath" and "fade out". These problems are caused not by electrical noise but by the nature of the radio waves themselves.



- (1) Fading
 Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle's antenna directly. This type of interference is called "fading".



- (2) **Multipath**
One type of interference caused by the bounce of radio waves off of obstructions is called "multipath". Multipath occurs when a signal from the broadcast transmitter antenna bounces off buildings and mountains and interferes with the signal that is received directly.



- (3) **Fade Out**
Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called "fade out".

4. NOISE PROBLEMS

- (a) **Questionnaire for noise:**
It is very important for noise trouble shooting to have good understanding of the claims from the customers. Refer to the following questionnaire to diagnose the problem accurately.

AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	There is a possibility that the same program is broadcasted from different local stations, and that might be listening a program from other station.
	Noise occurs only at night.	Strong possibility of the beat from a distant broadcasting.
FM	Noise occurs while driving on a particular area..	Strong possibility of multipath noise and fading noise caused by the changes of FM waves.

HINT:
In the condition of noise occurrence does not meet any of the above questionnaire, check the problems to "Reception Problem" on the previous page.

- (b) Matters that require attention when checking:
- Noise coming into the radio usually has no harm for daily use as the noise protection is taken, and it is very rare for an extremely loud noise to come in. When extremely loud noise comes into the radio, check if the grounding is normal where the antenna is installed.
 - Check if all the regular noise prevention parts are properly installed, and if there is any installation of non-authorized parts and non-authorized wiring.
 - If you leave the radio out of tune (not turning), it is easy to diagnose the phenomenon as noise occurs frequently.
- (c) Antenna and noise:
Electronic signal received by the antenna will reach to the radio transmitting through the core wire of the coaxial cable. Any noise wave other than radio wave is mixed into this core wire, that naturally causes noise in the radio and poor sound quality. In order to prevent the noise from coming into radio, the core wire inside the coaxial cable is covered with a mesh wire called shield wire which transmits the noise to the ground.

5. COMPACT DISC PLAYER

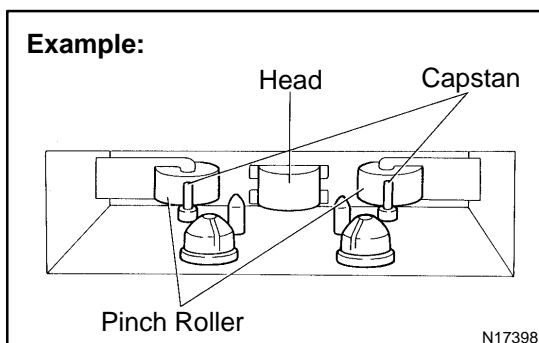
Compact Disc Players use a laser beam pick-up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc.

HINT:

Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magazine.

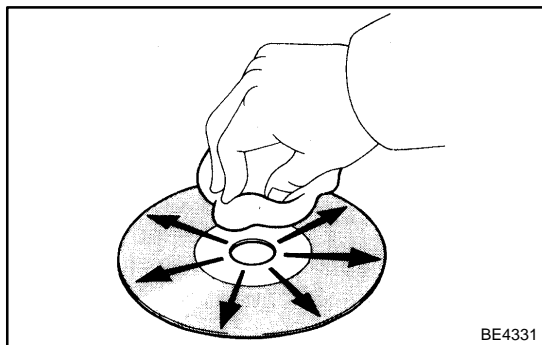
NOTICE:

CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. Tape player/head cleaning: MAINTENANCE

- (a) Raise the cassette door with your finger. Next, using a pencil or similar object, push in the guide.
- (b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



7. CD player/disc cleaning: MAINTENANCE

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

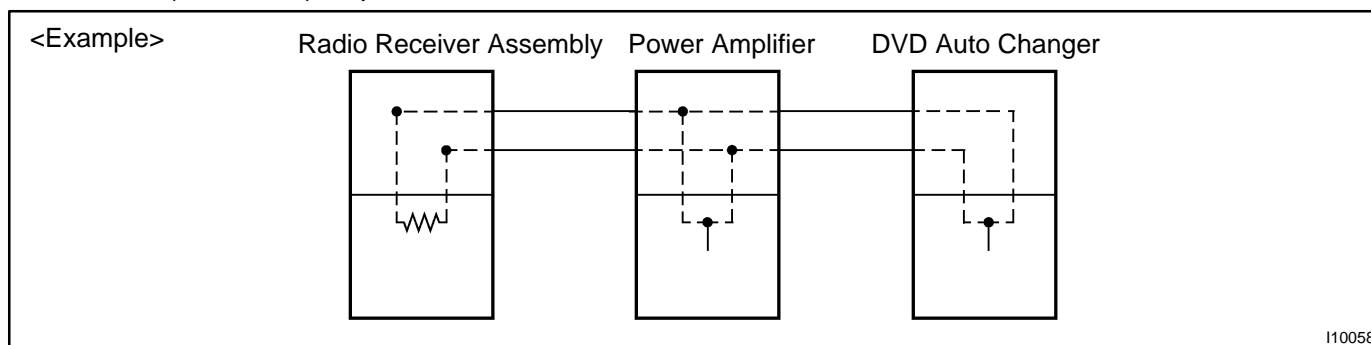
Do not use a conventional record cleaner or anti-static preservative.

8. OUTLINE OF AVC-LAN

(a) What is AVC-LAN?

AVC-LAN is the abbreviation, which stands for Audio Visual Communication-Local Area Network. This is a unified standard co-developed by 6 audio manufactures associated with Toyota Motor Corporation.

The Unified standard covers signals, such as audio signal, visual signal, signal for switch indication and communication signal. Radio receiver assembly and RSA (Rear Seat Audio) panel have a resistance (60 - 80 Ω) required for communication.



(b) Objectives

Recently the car audio system has been rapidly developed and functions have been changed drastically. The conventional system has been switched to the multi-media type such as a navigation system. At the same time the level of customers needs to audio system has been upgraded. This lies behind this standardization.

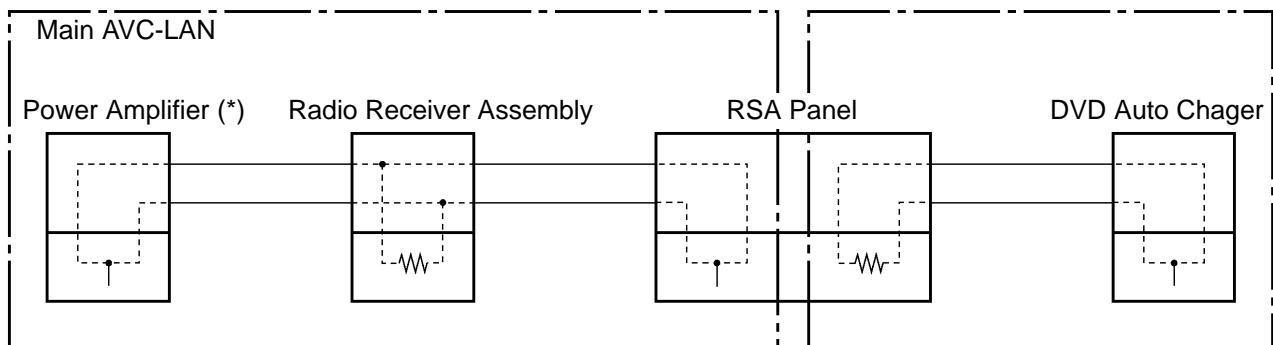
The concrete objectives are explained below.

- (1) When products by different manufactures were combined together, there used to be a case that malfunction occurred such as sound did not come out. This problem has been resolved by standardization of signals.
 - (2) Various types of after market products have been able to add or replace freely.
 - (3) Because of the above (2), each manufacture has become able to concentrate on developing products in their strongest field. This has enabled many types of products provided inexpensively.
 - (4) In general, a new product developed by one particular manufacture could not be used due to a lack of compatibility with other manufactures products. Because of this new standard, users can enjoy many compatible products from different manufacture anytime they went.
- (c) The above descriptions are the objectives to introduce AVC-LAN. By this standardization, development of new products will no longer cause systematic errors.

HINT:

- When +B short or GND short is detected in AVC-LAN circuit, communication stops. And audio system does not function normally.
- When audio system is not equipped with a navigation system, audio head unit is the master unit. When audio system is equipped with a navigation system, multi-display is the master unit.
- This system has 2 kinds of AVC-LAN, Main AVC-LAN and Sub AVC-LAN.
- RSA panel works as a master unit in the Sub AVC-LAN, but not in the Main AVC-LAN.
- The car audio system using AVC-LAN circuit has a diagnosis function.
(w/ Navigation system (see page [DI-1263](#))
- Each product has its own specified numbers called physical address. Numbers are also allotted to each function in one product, which are called logical address.

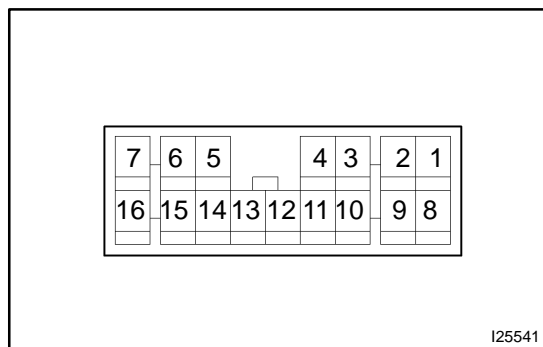
AVC-LAN:



*: Except JBL System

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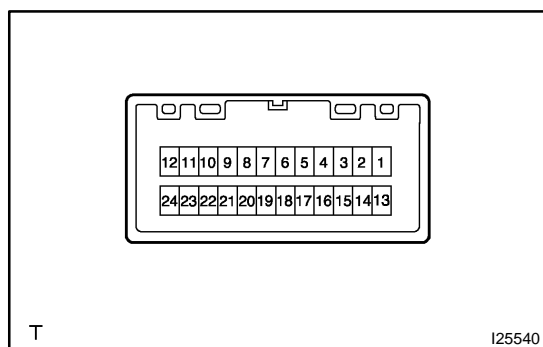
INSPECTION

1. INSPECT POWER AMPLIFIER CIRCUIT

Disconnect the connector from power amplifier and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
12 - Ground	Constant	Continuity
13 - Ground	Constant	Continuity
7 - Ground	Constant	Battery voltage
16 - Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

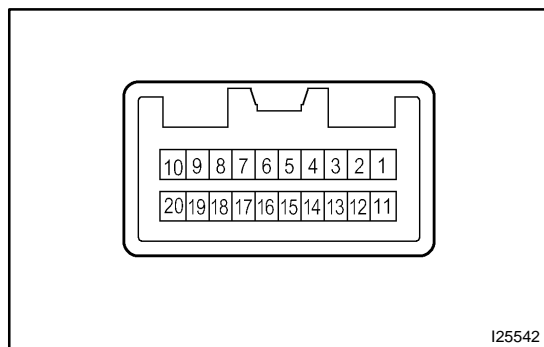


2. INSPECT REAR SEAT AUDIO CIRCUIT

Disconnect the connector from RSA controller and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
17 - Ground	Constant	Continuity
24 - Ground	Ignition switch LOCK and radio switch ON	No voltage
24 - Ground	Ignition switch ACC or ON and radio switch ON	Battery voltage
12 - Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

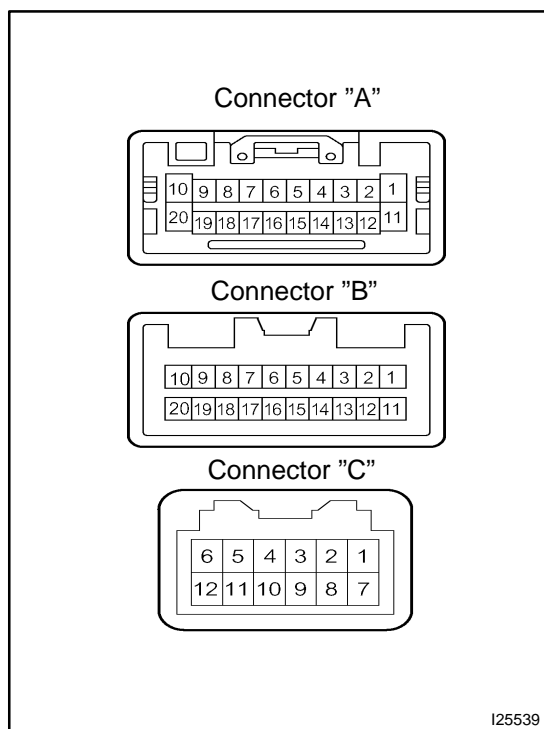


3. INSPECT DVD CHANGER CIRCUIT

Disconnect the connector from DVD changer and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
20 - Ground	Constant	Continuity
1 - Ground	Ignition switch LOCK	No voltage
1 - Ground	Ignition switch ACC or ON	Battery voltage
10 - Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT

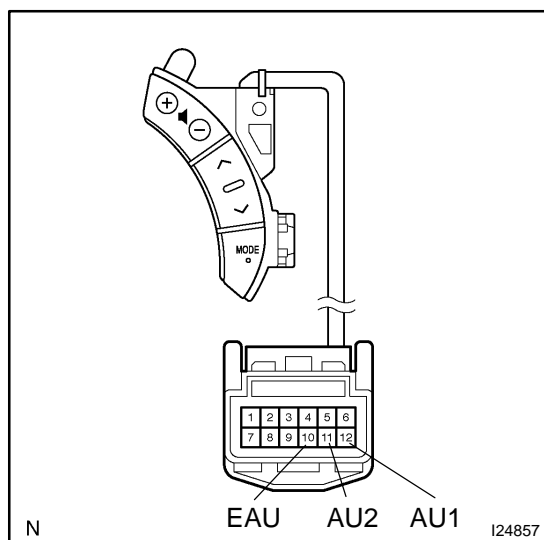
Disconnect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
A20 - Ground	Constant	Continuity
A1 - Ground	Constant	Battery voltage
A11 - Ground	Ignition switch LOCK	No voltage
A11 - Ground	Ignition switch ACC or ON	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

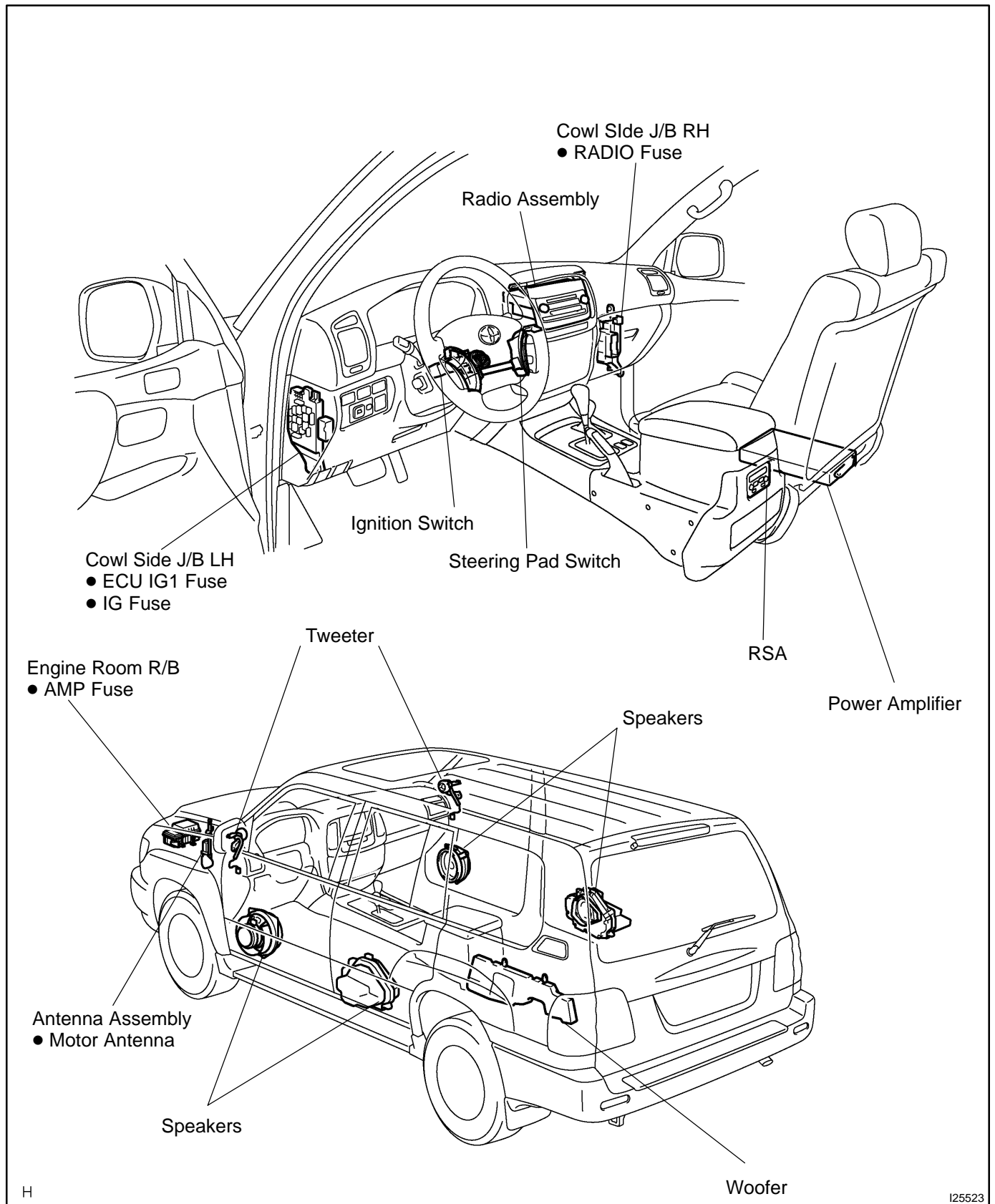
**5. INSPECT STEERING PAD SWITCH CIRCUIT**

Disconnect the connectors from the steering pad switch, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
AU1 - EAU	Do not switch position	Approx. 100 k Ω
AU1 - EAU	SEEK+ switch: push	0 Ω
AU1 - EAU	SEEK- switch: push	Approx. 0.3 Ω
AU1 - EAU	VOL+ switch: push	Approx. 1k Ω
AU1 - EAU	VOL- switch: push	Approx. 3.2 k Ω
AU2 - EAU	Do not switch position	Approx. 100 k Ω
AU2 - EAU	MODE switch: push	0 Ω

If the circuit is not as specified, inspect the circuits connected to other parts.

LOCATION



TROUBLESHOOTING

1. DIAGNOSIS FUNCTION (Main AVC-LAN)

(a) Diagnosis start-up

For shifting to diagnosis mode, turn the ignition switch ON and push the "DISC" switch 3 times while pressing "ch1" and "ch6" switches.

HINT:

To exit the diagnosis mode, push the "DISC" switch for 1.7 sec. or turn the ignition switch to ACC or OFF.

(b) Element check mode

After the diagnosis start-up, the system enters the element check mode. Check that the all elements light up.

HINT:

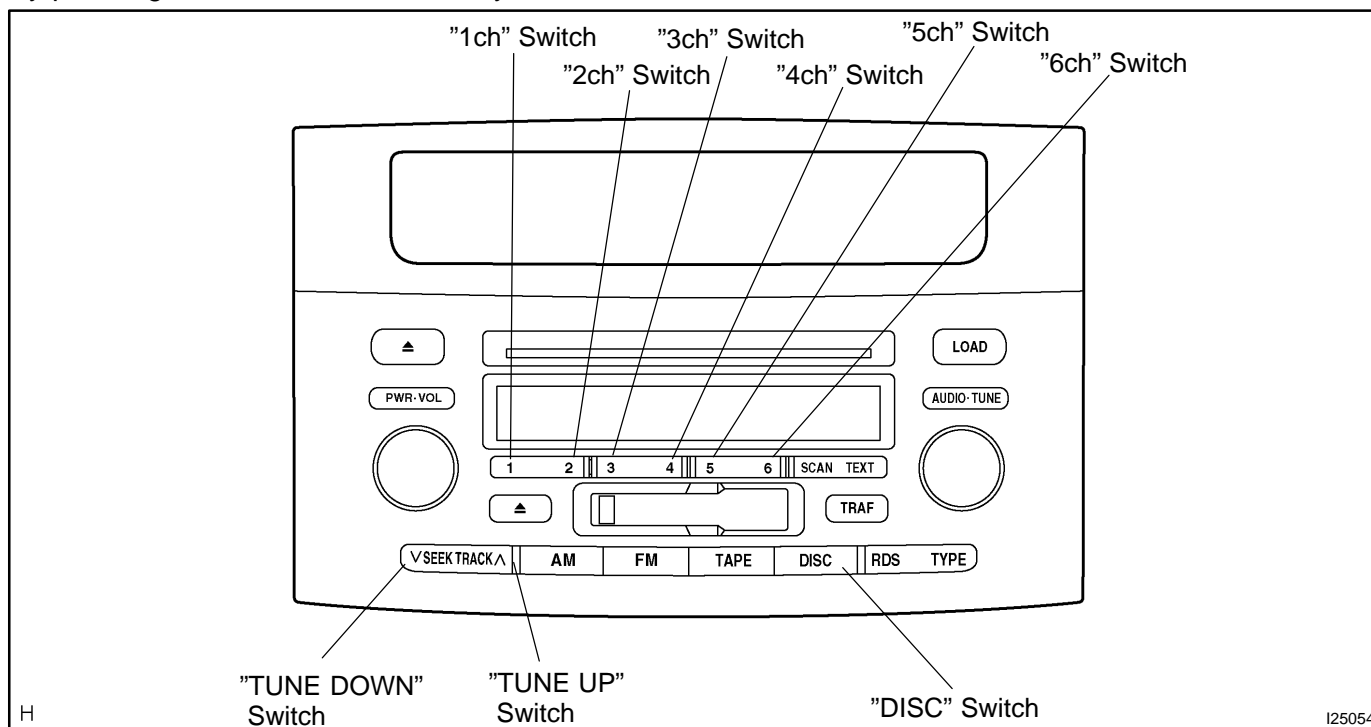
By pressing the "TUNE UP" switch, the system enters the "Service Check Mode".

(c) Switch check mode

- (1) Element check mode is started at the same time with the switch check mode.
- (2) Check that there is a beep sound when any switch is pressed.

HINT:

By pressing "TUNE UP" switch, the system enters the "Service Check Mode".



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(d) Service check mode

(1) After the element check and switch check is completed, the system enters service check mode when "TUNE UP" switch is pressed.

(2) Error codes over the tuner and connected equipments are displayed on the screen of the tuner.

Results for each check are displayed as follows:

good:

No DTC is detected for both "System Check Confirmation" and "Diagnosis Memory Response".

nCon:

The component does not respond to the "Diagnosis On Instruction" command.

Applicable to only the system where connected components are limited to be used.

ECHn:

Application of new version has been confirmed by the "Diagnosis On Check", and there is one or more DTC which indicates "Replacement" in the "System Check Result Response" or "Diagnosis Memory Response".

CHEC:

Application of new version has been confirmed by the "Diagnosis On Check", and there is no DTC which indicates "Replacement" in the "System Check Result Response" or "Diagnosis Memory Response", but one or more DTC which indicates "Check" is identified.

Old:

Application of old version is confirmed by the "Diagnosis On Check", and DTC is identified in the "System Check Result Response" or "Diagnosis Memory Response".

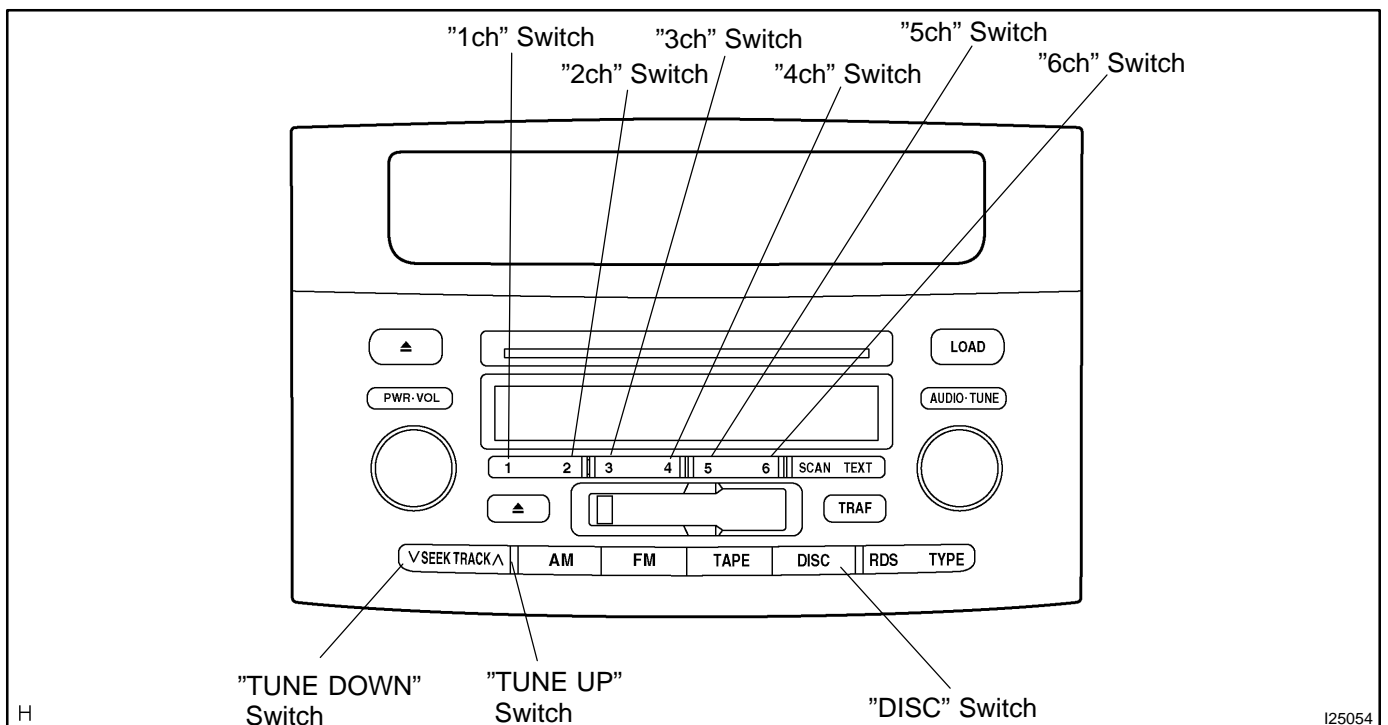
nrES:

No response is identified to the "System Check Start Instruction" and "Request for System Check Result" commands.

HINT:

Check the present and past condition of components by performing the System Check and collecting stored DTC memories.

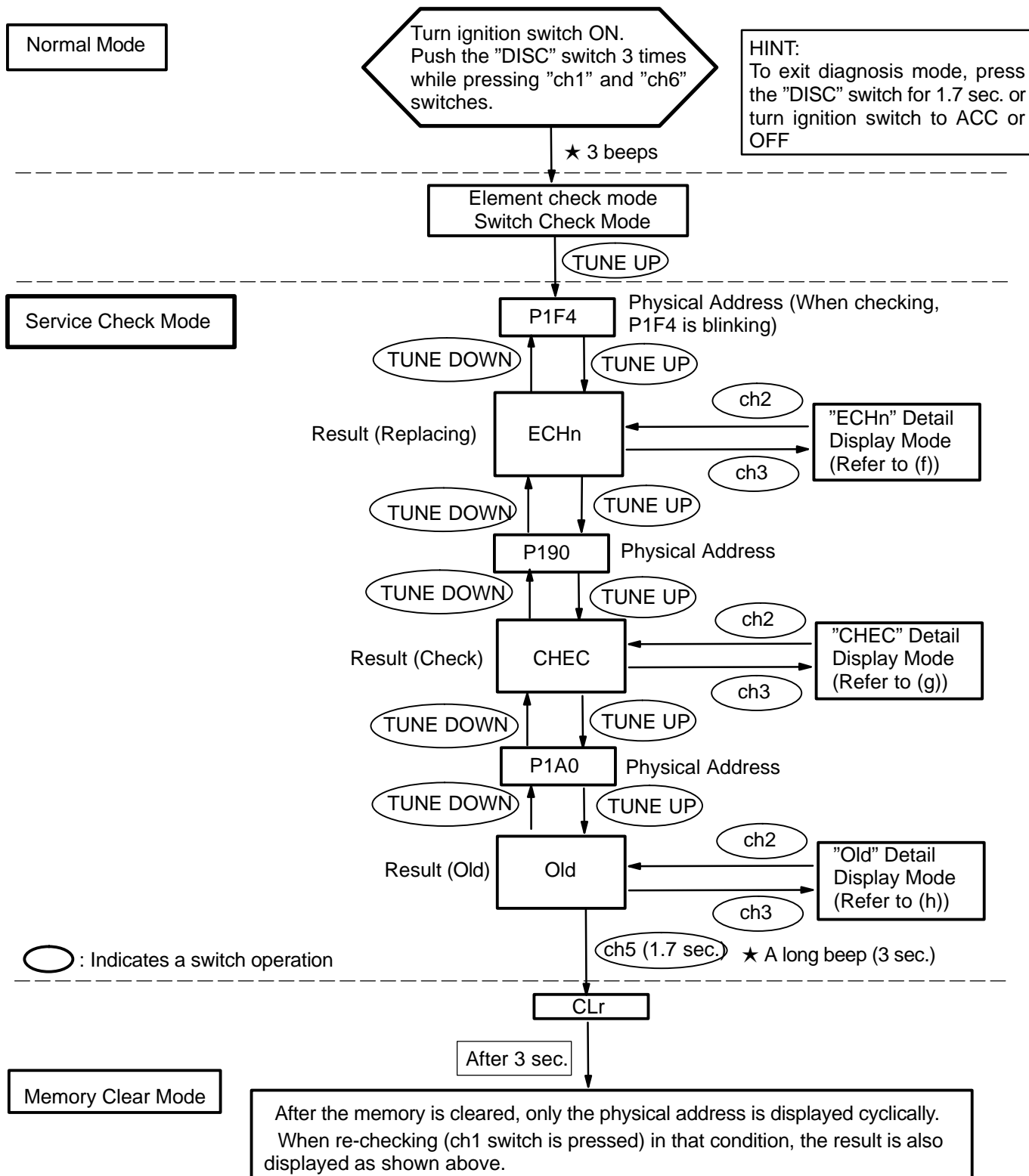
Check results are displayed as one of the following six indications: "good", "ECHn", "CHEC", "nCon", "Old" or "nrES".



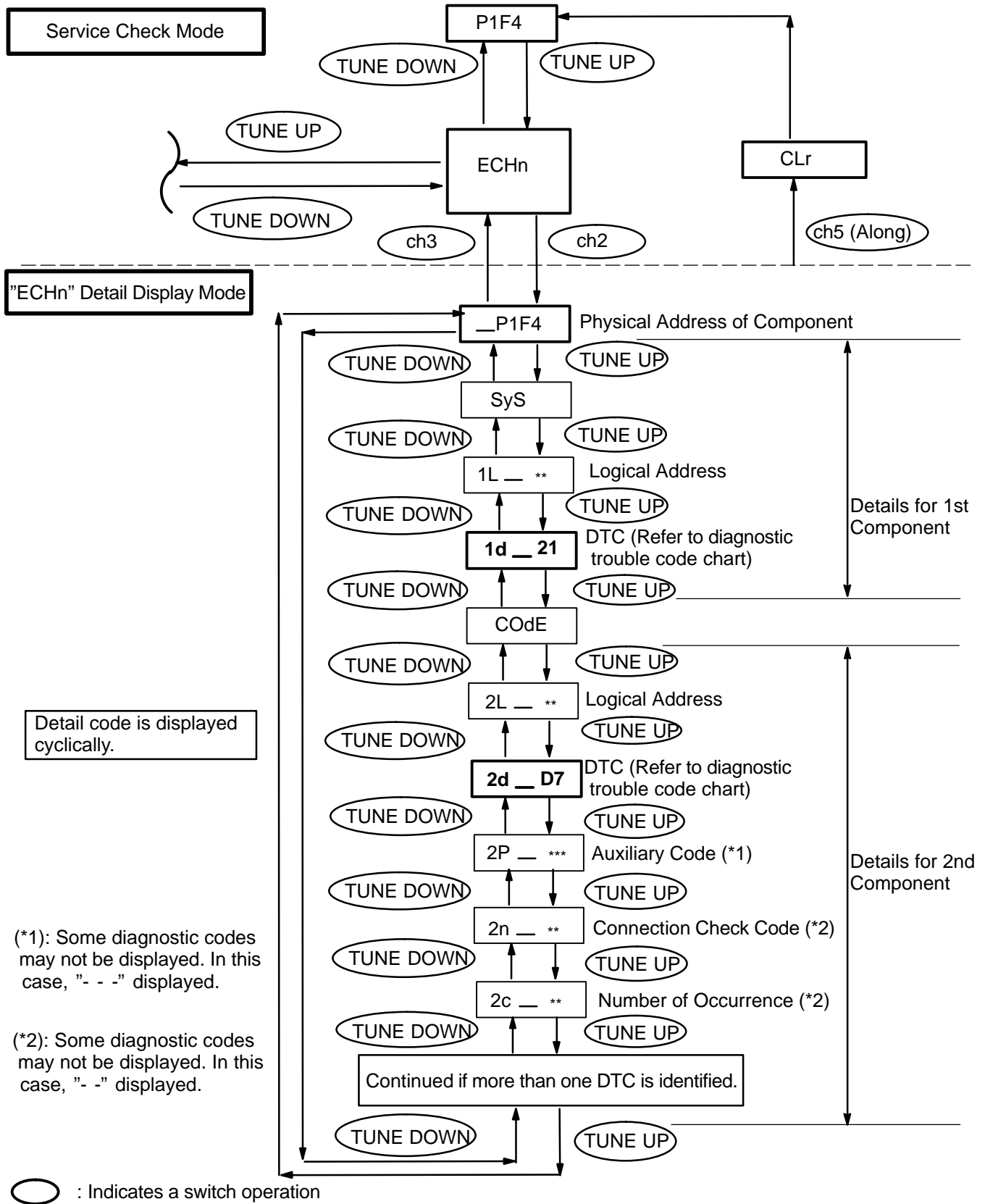
(e) Display Screen for Service Check.

Example:

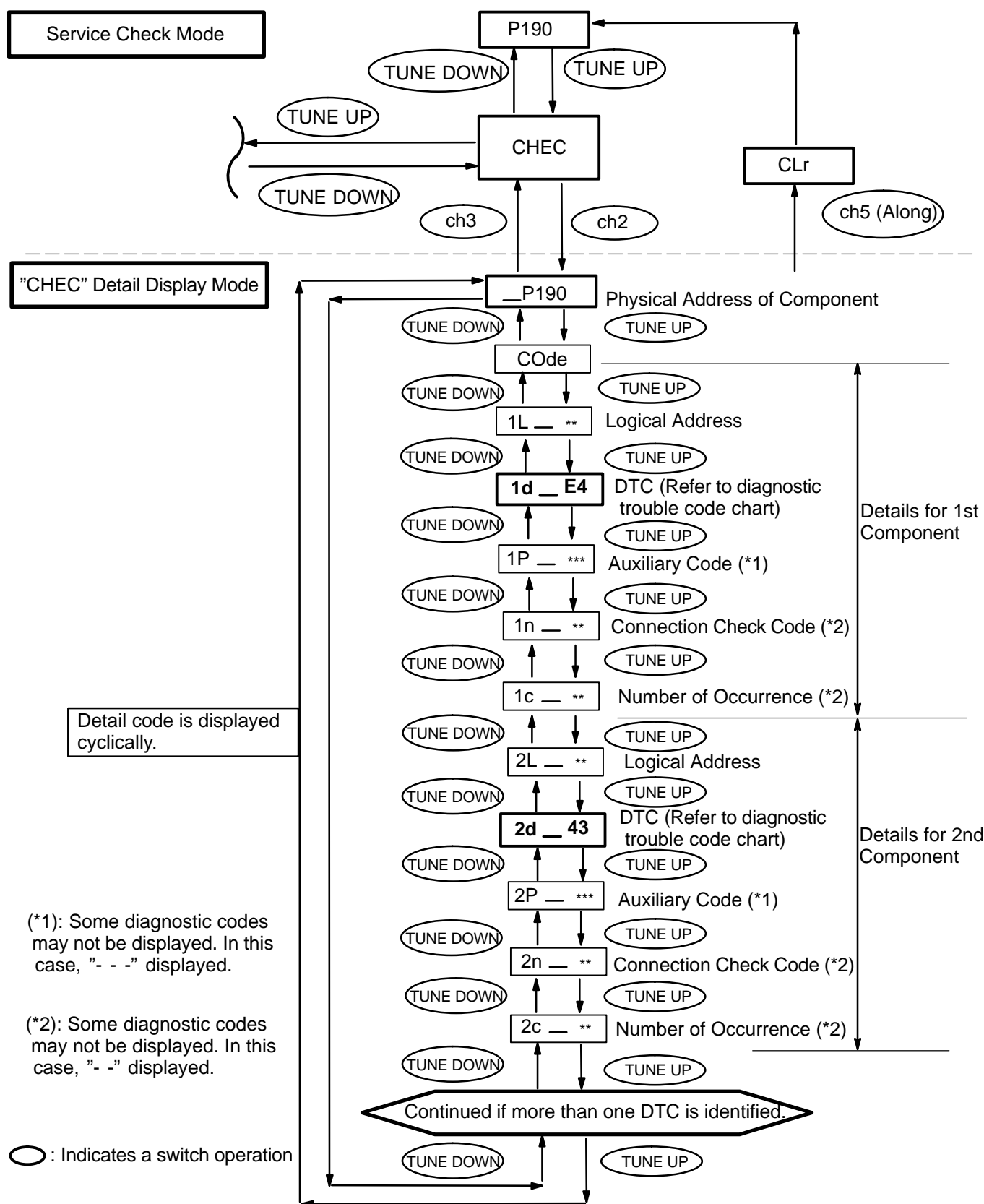
Connection parts (physical address): Radio receiver (P190), RSA ECU (P1F4), DVD player (P1A0)



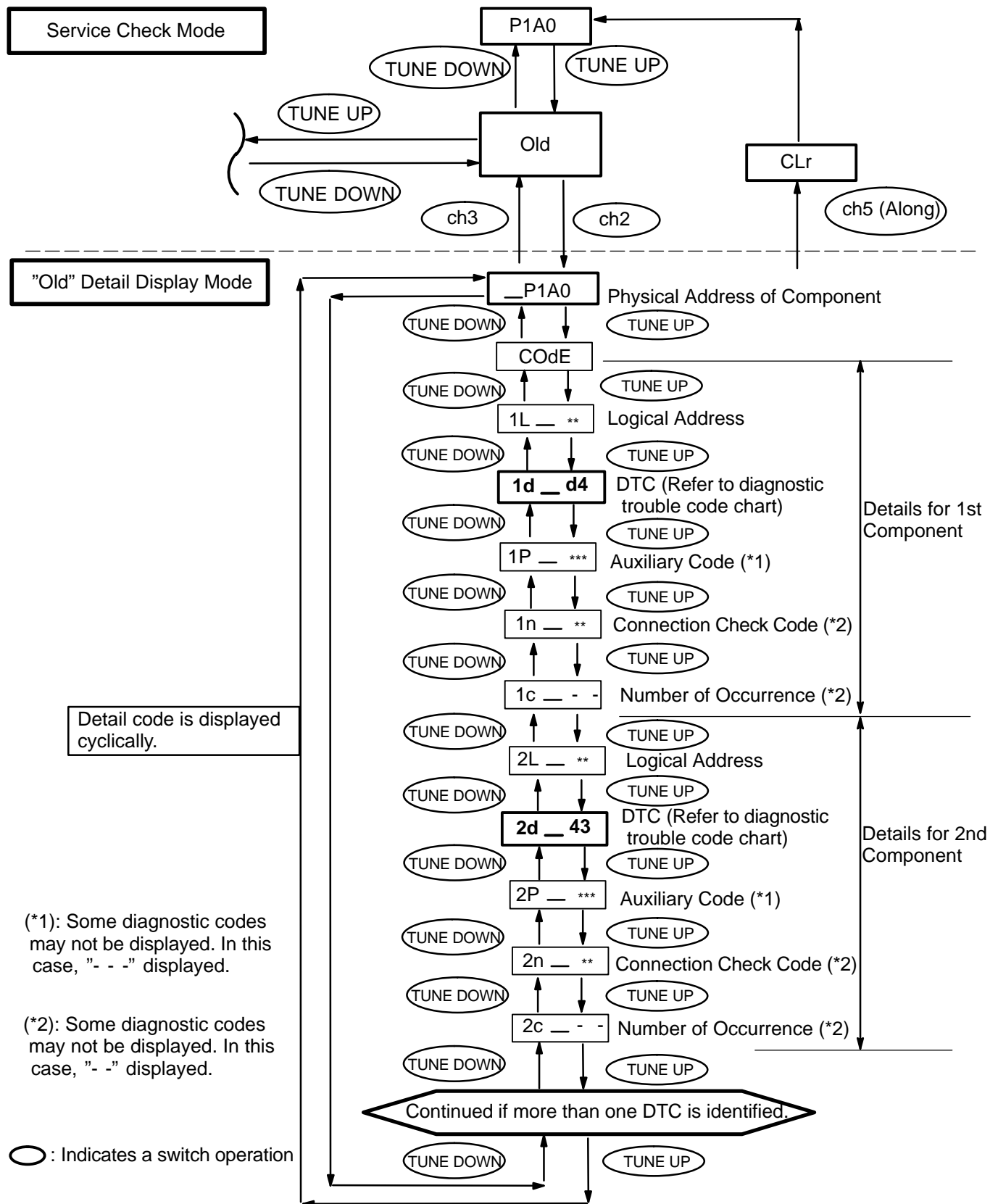
(f) "ECHn" Detail Display Mode Screen



(g) "CHEC" Detail Display Mode Screen



(h) "Old" Detail Display Mode Screen



(*1): Some diagnostic codes may not be displayed. In this case, "- -" displayed.

(*2): Some diagnostic codes may not be displayed. In this case, "- -" displayed.

2. DIAGNOSIS FUNCTION (Sub AVC-LAN)

HINT:

As starting Main AVC-LAN to operate the diagnosis mode, Sub AVC-LAN is automatically to the mode. Perform the diagnosis mode operation on the RSA panel.

(a) Element check mode

After the diagnosis start-up, the system enters the element check mode. Check that the all elements light up.

HINT:

By pressing the "TUNE UP" switch, the system enters the "Service Check Mode".

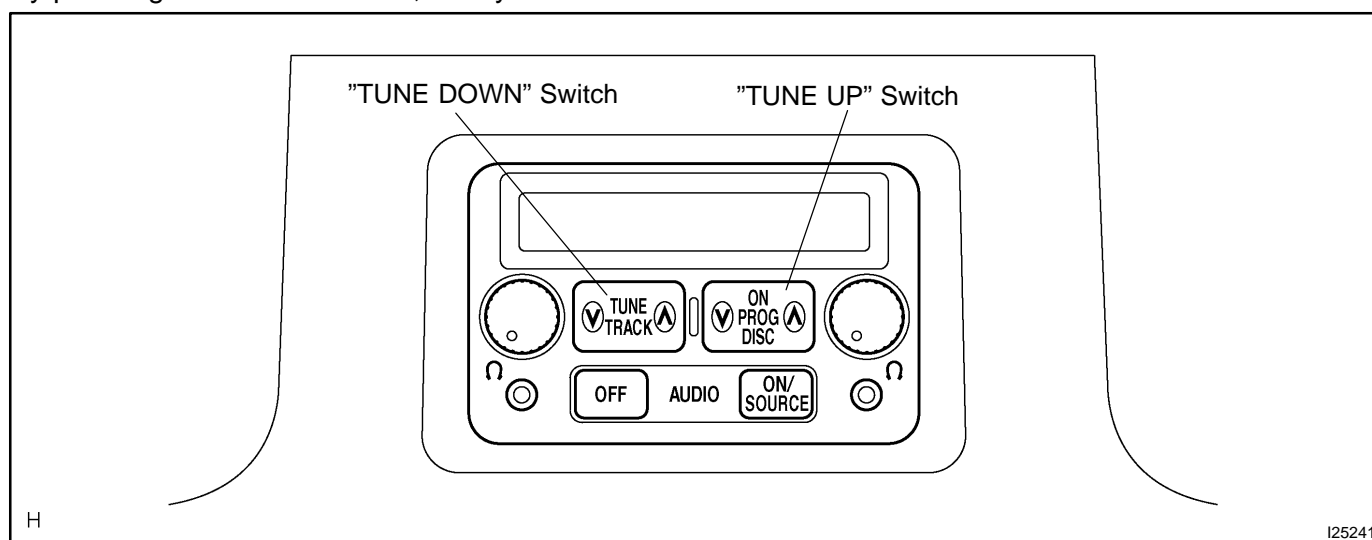
(b) Switch check mode

(1) Element check mode is started at the same time with the switch check mode.

(2) Check that there is a beep sound when any switch is pressed.

HINT:

By pressing "TUNE UP" switch, the system enters the "Service Check Mode".



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