AUDIO SYSTEM

DESCRIPTION

1. RADIO WAVE BAND

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

Frequency 30	kHz 300	kHz 3 Mł	Hz 30 M	1Hz 300	MHz
Designation	LF	MF	HF	VHF	
Radio wave	LW	AM (MW)	SW	FM (UKW)	
Modulation	Amplitude modulation			Frequency modu	lation

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 through AM can be received in 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.



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".

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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.

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".

. Tape Player/Head Cleaning: MAINTENANCE

Raise the cassette door with your finger. Next, using a pencil or similar object, push in the guide.

) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



5. 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.

6. 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.



(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) Conventionally, a new product developed by a manufacture could not be used due to a lack of compatibility with other manufactures products. Because of this new standard, users can enjoy compatible products provided for them timely.

The above descriptions are the objectives to introduce AVC-LAN. By this standardization, development of new products will no longer cause systematic errors. Thus, this is very effective standard for a product in the future.

HINT:

- When +B short or GND short is detected in AVC-LAN circuit, communication stops. Accordingly the 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, navigation ECU is the master unit.)
- The car audio system using AVC-LAN circuit has a diagnosis function.
- 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.

7. DIAGNOSIS FUNCTION

Error codes over tuner and connected equipment are displayed on the screen of tuner.

 (a) Starting and Finishing Diagnosis Mode
 With the audio system OFF and the ignition switch in ACC, while simultaneously pressing the preset buttons "1" and "6", push "DISC" or "CD" 3 times.

HINT:

- A beep sound 3 times and the system goes on to the Service Check Mode.
- System check and diagnosis memory check is performed in the Service Check Mode and the check result is displayed in ascending order of the component codes.
- It may take about 40 sec. to complete these checks.



- (b) Displaying Result in Service Check Mode (For checking the system condition at present and in the past)
 - (1) By the "SEEK" switch operation, confirm the check result of each component.



Code No. (physical address) List

Code No. (physical address)	Equipment name	
190	Radio receiver assembly (Audio head unit)	
440	Power amplifier	

- (2) If "CHEC" or "ECHm" is detected in a component, activate the Detail Display mode and check its DTC.
- (3) To restart the Service Check, press the preset button "1".
- (4) To exit the diagnosis mode, press "DISC" or "CD" for 2 sec. or more, or turn the ignition switch OFF.

(c) DISPLAYING RESULTS

Results for each check are displayed as follows:

(): Meaning

- good (Normal)
- No DTC is detected for both "System Check Confirmation" and "Diagnosis Memory Response".
 nCon(No connection)
- Although identified by the system at the time of registration, it has transmitted no response when the diagnosis mode is started.
- CHEC(Check) If this is displayed, activate the Detail Display Mode and Check the DTC.
- ECHn(Exchange) -ditto-
- OLd (Old Version)

An old version diagnosis system applies to this component.

- nrES (No Response) In spite of response identified when the diagnosis mode is started, no diagnostic information has been responded.
- (d) Detail Display Mode (For displaying DTC of erratic components)
 - (1) While "CHEC" or ECHn" is displayed, press the preset button "2" to go on to the Detail Display Mode.
 - (2) By the "SEEK" switch operation, "the system check result (SYS)" and "the diagnosis memory response result (COdE)" can be displayed.
 - (3) Refer to the diagnosis code list and inspect the defective part(s).
 - (4) Press the preset button "3" to return to the Service Check Mode.

(e) Service Check Mode



(f) DISPLAY IN DETAIL DISPLAY MODE

Segment for DTC	Meaning	Display Order by "SEEK UP" button operation (Reverse order when operating "SEEK DOWN" button)
Sys	System check result	Physical address \rightarrow DTC
COdE	Diagnosis memory response result	Physical address \rightarrow DTC \rightarrow Auxiliary code \rightarrow Connection check number \rightarrow Number of occurrence

(g) Deleting DTC memory (Deleting DTC stored in the past)

(1) After repairing defective part(s), start the diagnosis mode.

(2) Press the preset button "5" for 2 sec. or more. (Display: "CLr")

HINT:

When DTC memory is completely deleted, a beep sounds once.

(3) Pressing the preset button "1", perform the Service Check again and confirm that no error is displayed for all component codes.

8. DIAGNOSTIC TROUBLE CODE CHART

Terms	Meaning
Physical address	Three-digit code (shown in hexadecimal) which is given to each component comprising the AVC - LAN Corresponding to the function, individual symbols are specified
Logical address	Two-digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC - LAN.

Physical address: 440 Power amplifier

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication control)	21	ROM Error	Abnormal condition of ROM is de- tected.	Replace power amplifier.
01 (Communication control)	22	RAM Error	Abnormal condition of RAM is de- tected.	Replace power amplifier.
01 (Communication Control)	D6	Absence of Master	Component in which this code is re- corded has been disconnected from system with ignition in ACC or ON. Or, when this code was re- corded, power amplifier was dis- connected.	 Check harness for power supply system of radio receiver assembly. Check harness for communication system of radio receiver assembly. Check harness for power supply system of power amplifier. Check harness for communication system of power amplifier.
01 *6 (Communication Control)	D7	Connection Check Error	Component in which this code is re- corded has been disconnected from system after engine start. Or, when this code was recorded, power amplifier was disconnected.	 Check harness for power supply system of radio receiver assembly. Check harness for communica- tion system of radio receiver as- sembly. Check harness for power supply system of power amplifier. Check harness for communica- tion system of power amplifier.
01 (Communication Control)	DC	Transmission Error	Transmission to component shown by auxiliary code has been failed. (This code does not necessarily mean actual failure.)	If same auxiliary code is recorded in other component(s), check harness for power supply and communica- tion system of components shown sub code.
01 (Communication Control)	DD	Master Reset (Momentary Interruption)	After engine is started, power amplifier was disconnected from system.	 Check harness for power supply system of power amplifier. Check harness for communication system of power amplifier. If error occurs frequently, replace power amplifier.
01 (Communication Control)	DF	Master Error	Due to defective condition of com- ponent with a display, master func- tion is switched to audio equip- ment . Error occurs in communica- tion between sub-master (audio) and master component.	 Check harness for power supply of power amplifier. Check harness for communica- tion system of power amplifier. Check harness for communica- tion system between power amplifi- er and sub-master component.

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01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error is detected in ON/OFF control command from power amplifier.	Replace power amplifier.
01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	• Since this DTC is provided for en- gineering purpose, it may be de- tected when no actual failure exists.

*6: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Physical address: 190 Radio receiver assembly

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication Control)	21	ROM Error	Error is detected in internal ROM.	Replace radio receiver assembly.
01 (Communication Control)	22	RAM Error	Error is detected in internal RAM.	Replace radio receiver assembly.
01 *3 (Communication Control)	D8	No Response to Connection Check	Component shown by auxiliary code is or had been disconnected from system after engine start.	 Check harness for power supply system of component shown by auxiliary code. Check harness for communica- tion system of component shown by auxiliary code.
01 *2 (Communication Control)	D9	Last Mode Error	Component operated (sounds and/ or images were provided) before en- gine stop is or has been discon- nected with ignition switch in ACC or ON.	Check harness for power supply system of component shown by auxiliary code. Check harness for communication system of component shown by auxiliary code.
01 (Communication Control)	DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Detected when sound and picture does not change by button operation.	 Check harness for power supply of component shown by auxiliary code. Check harness for communica- tion system of component shown by auxiliary code. If error occurs again, replace component shown by auxiliary code.
01 *2 (Communication Control)	DB	Mode Status Error	Dual alarm is detected.	 Check harness for power supply of component shown by auxiliary code. Check harness for communica- tion system of component shown by auxiliary code.
01 *4 (Communication Control)	DC	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not nec- essary mean actual failure.)	• If same auxiliary code is recorded in other component, check harness for power supply and communica- tion system of components shown sub code.

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01 *5 (Communication Control)	DD	Master Reset (Momentary Interruption)	After engine is started, multi-dis- play assembly was disconnected from system.	 If this error occurs frequently, re- place multi-display assembly.
01 *5 (Communication Control)	DE	Slave Reset (Momentary Interruption)	After engine is started, slave com- ponent was disconnected from sys- tem.	 Check harness for power supply of component shown by auxiliary code. Check harness for communica- tion system of component shown by auxiliary code.
01 *6 (Communication Control)	DF	Master Error	Due to defective condition of radio receiver assembly, master function is switched to audio equipment. Error occurs in communication be- tween sub-master (audio) and ra- dio receiver assembly.	 Check harness for power supply of multi-display assembly. Check harness for communica- tion system of radio receiver as- sembly. Check harness for communica- tion system between radio receiver assembly and sub-master compo- nent.
01 *2 (Communication Control)	E1	Audio processor ON error	While source equipment is operat- ing, AMP output is stopped.	 Check harness for power supply of multi-display assembly. Check harness for communica- tion system of radio receiver as- sembly.
01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from radio receiver assembly.	 Replace radio receiver assembly.
01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	• Since this DTC is provided for en- gineering purpose, it may be de- tected when no actual failure exists.
60 (Radio receiver assembly)	43	AM Tuner Error	Abnormal condition is detected in AM tuner. Inspect radio receiver assembly.	Replace radio receiver assembly.
60 (Radio receiver assembly)	44	FM Tuner Error	Abnormal condition is detected in FM tuner.	Replace radio receiver assembly.
61 (Cassette switch)	40	Mechanical or Media Error	Malfunction due to mechanical fail- ure is identified. Or, cassette tape is cut or entangled.	Inspect cassette tape.
63 (In-dash CD changer)	47	CD High Temp	High temperature is detected in CD changer.	Replace radio receiver assembly.
63 (In-dash CD changer)	48	CD Excess Current	Excess current is applied to CD changer.	Replace radio receiver assembly.

*2: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.

*3: It is stored when 180 sec. has passed after the power supply connector is pulled out after engine start.

*4: It may be stored when the engine key is turned again 1 min. after engine start.

*5: It may be stored when the engine key is turned again after engine start.

*6: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.