

PUBLISHED: 22-OCT-2019
2020.0 DEFENDER (LE), 415-01

INFORMATION AND ENTERTAINMENT SYSTEM

SPEAKERS (G2401014)

mcx30.com

PRINCIPLES OF OPERATION

For a detailed description and operation of the information and entertainment system, refer to the relevant description and operation section of the workshop manual.

INSPECTION AND VERIFICATION

 CAUTION:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault and may also cause additional faults in the vehicle being checked and/or the donor vehicle.

 NOTES:

- If the control module or a component is at fault or may be at fault and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval program is in operation, prior to the installation of a new module/component.
- When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.
- All diagnostic equipment should comply with local legislation.
- Relevant diagnostic equipment should be regularly checked and calibrated according to the manufacturer's instructions.
- The workshop should be equipped with a full range of general equipment which is to be kept in good order and available to all suitably trained staff.
- Diagnostic equipment must meet the JLR Minimum Standards for general equipment as outlined in TOPIx.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern

2. Visually inspect for obvious signs of damage and system integrity

Visual Inspection

MECHANICAL	ELECTRICAL
■ Check all audio system modules ■ Compact disc player jammed, not loading	■ Fuses ■ Electrical harnesses

MECHANICAL	ELECTRICAL
■ Scratched/dirty compact discs ■ Speakers ■ Switch(s) stuck or damaged ■ Loose items in door pockets or glove box rattling	■ Harness connectors ■ Battery condition, state of charge

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step

4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index

5. Check the Jaguar Land Rover claims submission system for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and complete the recommendations as required

SPEAKER DIAGNOSTICS

The symptom chart below should be used when diagnosing speaker faults and must be worked through prior to replacing any speakers

REPORTED SYMPTOM	SYMPTOM DESCRIPTION	POTENTIAL CAUSES (FOR GUIDANCE ONLY)	RECOMMENDED ACTION
■ Speaker Buzz	■ Periodic high frequency sound (sounds like an insect buzzing)	■ Resonance in a trim component, for example NVH (noise, vibration and harshness) insulating cloth against speaker grill mesh ■ Lack of retention of interior and exterior trim panels ■ Loose harness/harness clips ■ Labels vibrating against trim/nearby components ■ Nearby modules vibrating against trim /BIW ■ Mechanical failure of internal speaker component	■ 1. Replicate fault and confirm audio source(s) affected: DAB/CD/Bluetooth through phone/USB through phone/USB through iPod®/AM/FM radio ■ 2. If fault is specific to one source, audio source must be investigated further as a speaker failure in this instance is less likely, for example if issue is only seen on DAB, check the module is fully functioning correctly and software is up to date ■ 3. Confirm if issue is heard on stereo and/or surround sound settings ■ 4. Isolate the customer symptom to specific vehicle area using balance and fade audio settings. Check for any loose objects in the area, for example pens, keys, coins, etc ■ 5. Check for any previous work completed in this area by referring to the Jaguar Land Rover claims submission system to help in diagnosing the issue ■ 6. Check SDD/Pathfinder/Topix for any audio related SSM/TSB and software updates. Complete the service updates as required. Retest to confirm if issue is resolved
■ Speaker Rattle	■ Sounds like loose components rattling around in / near the speaker	■ Loose trim ■ Loose items in or around speaker	■ 7. Apply pressure by hand to door/trim panel and nearby modules (i.e. switchpacks) to confirm if there is a change in symptom sound

REPORTED SYMPTOM	SYMPTOM DESCRIPTION	POTENTIAL CAUSES (FOR GUIDANCE ONLY)	RECOMMENDED ACTION
		- Loose fixings - Debris inside speaker - Loose harness	8. If issue is still present, or condition changes by applying pressure to the trim, remove internal trim and apply gentle pressure to components within the door to see if sound changes. This will also allow access to relevant speaker
Speaker Hiss / Static	Wideband noise (White Noise) / interference (such as experienced from a poorly tuned radio signal)	- Loose connection at speaker - Loose connection at amplifier - Loose connection at audio head unit/audio amplifier module - Non JLR-approved equipment installed (for example USB cables) - Damage to harness connected to the speaker - Audio amplifier fault - Audio head unit fault	9. If symptom condition is unchanged by applying pressure to the trim, examine trim to find source of audio issue and repair as appropriate using Squeaks and Rattle kit LTB00389. If audio issue is still present then move to step 10 10. Check around front face of speaker for any loose items that may be touching the speaker, for example debris, loose fixings, etc 11. Check all speaker fixing screws are secure and correctly torqued, refer to workshop manual for correct torque figures 12. Check harness assembly is not vibrating against speaker unit or nearby trim/components and that it is clipped and routed correctly 13. Check harness assembly is not trapped or impeding the speaker unit and rectify as required 14. Check harness assembly connections are fully inserted and secured to speaker and amplifier. Also check harnesses are securely connected to nearby components
Speaker Crackle	- Electrical crackling noise (such as from a loose electrical connection) - A rapid succession of short sharp noises - Electrical interference	- Loose connection at speaker - Loose connection at amplifier - Loose connection at audio head unit/audio amplifier module - Non JLR-approved equipment installed (for example USB cables) - Damage to harness connected to the speaker - Audio amplifier fault - Audio head unit fault - Internal electrical issue in speaker	15. Check for harness damage and repair/replace as required 16. If a gasket is present on speaker, without removing the speaker visually check it is correctly seated against speaker surface and not noticeably damaged 17. If audio issue is still present, remove speaker from mountings, retest speaker in hand to see if the fault is still present 18. Check for debris in speaker and remove. Retest speaker in hand 19. Check for damage to speaker and replace speaker if damage is present 20. Connect new speaker to harness, check new speaker in hand to make sure fault has been rectified. If issue has been resolved, reassemble trim with new trim retention clips 21. Check if audio issue is still present. If issue has been resolved, reassemble trim and retest. If issue is still present, contact JLR Technical Support following the guidelines in the policy and procedures manual
Speaker Distorted	No significant extraneous noise, but audio reproduction is not as expected for example is not clean sounding	- Loose trim - Non JLR-approved equipment installed (for example USB cables) - Resonance in a trim component, for example NVH (noise, vibration and harshness) insulating cloth against speaker grill mesh	

REPORTED SYMPTOM	SYMPTOM DESCRIPTION	POTENTIAL CAUSES (FOR GUIDANCE ONLY)	RECOMMENDED ACTION
		■ Lack of retention of interior and exterior trim panels, nearby harnesses/components ■ Mechanical failure of internal speaker component	

PINPOINT TESTS FOR SUSPECTED SPEAKER FAULTS



NOTE:

See separate Pinpoint Tests (below) for sub-woofer faults

PINPOINT TEST A : NO SOUND OUTPUT FROM SPEAKER(S)

A1: NO SOUND OUTPUT FROM SPEAKER(S)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check speaker operation
	Is the harness connector securely connected to the audio head unit/audio amplifier module and the speaker unit (s)? Yes Proceed to the next step GO to A2. No Reconnect wiring harness to audio head unit/audio amplifier module/speaker unit(s)

A2: NO SOUND OUTPUT FROM SPEAKER(S)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check audio head unit/audio amplifier module operation
	Is the audio head unit/audio amplifier module operational? Yes Proceed to the next step GO to A3. No Check the integrity of the power supply circuits/fuses to the audio head unit/audio amplifier module and rectify as required

A3: NO SOUND OUTPUT FROM SPEAKER(S)

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check which speakers are operational
	Are all speakers working? Yes Proceed to the next step GO to Pinpoint Test B. No

A3: NO SOUND OUTPUT FROM SPEAKER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	Use the fader control to direct audio output to different speaker locations to establish which units are non-operational. Refer to the electrical circuit diagrams and check the circuits between the audio head unit/audio amplifier module and the affected speaker units for short circuit to ground, open circuit, high resistance. Repair circuit(s) as required. If fault persists, replace non-operational speaker unit(s) as required

PINPOINT TEST B : POOR OR WEAK SOUND OUTPUT FROM SPEAKER(S)	
B1: POOR OR WEAK SOUND OUTPUT FROM SPEAKER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check connections to speaker units
	Are the connectors inserted securely into the speaker units? Yes Proceed to the next step GO toB2 . No Make sure all connectors are securely attached to the speaker units
B2: POOR OR WEAK SOUND OUTPUT FROM SPEAKER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check integrity of vehicle power supply fuses
	Are the vehicle/audio head unit/audio amplifier module power supply fuses functional? Yes Proceed to the next step GO toB3 . No Replace fuse(s) as required
B3: POOR OR WEAK SOUND OUTPUT FROM SPEAKER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check power and ground circuits to the infotainment system components
	Are all the necessary power and ground feeds present? Yes Proceed to the next step GO toB4 . No Refer to the electrical circuit diagrams and check the infotainment power and ground circuits for short circuit to ground, open circuit, high resistance. Repair circuit(s) as required
B4: POOR OR WEAK SOUND OUTPUT FROM SPEAKER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check power supply voltage at power supply connectors
	Is the power supply voltage measured at the power supply connectors between 12 and 14 volts? Yes No further action No Refer to the electrical circuit diagrams and check the infotainment power supply circuits for short circuit to ground, open circuit, high resistance. Repair circuit(s) as required. Refer to the relevant section of workshop manual and battery care manual. Check battery state of charge and starting/charging system performance and rectify as required

PINPOINT TEST C : SPEAKER VIBRATING (BUZZING) EXCESSIVELY	
C1: SPEAKER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check for extreme bass/treble settings
	Is the audio system output settings for bass and/or treble set too high? Yes Adjust settings to appropriate levels No Proceed to the next step GO toC2.
C2: SPEAKER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check speaker unit(s) fixing screws are securely fastened
	Are all speaker fixing screws fully secured to the surrounding trim? Yes Proceed to the next step GO toC3. No Tighten the fixing screws to the correct torque as directed in the workshop manual
C3: SPEAKER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check if the wiring harness is resting against the internal surface of the speaker
	Is there any cabling or other parts of the wiring harness resting against the internal surface of the speaker? Yes Re-route and secure the wiring harness so that it is not resting against any internal surfaces of the speaker No Proceed to the next step GO toC4.
C4: SPEAKER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check security of trim, harnesses and paper labels in the vicinity of the speaker units
	Are these items secure in the vicinity of the speaker units? Yes Proceed to the next step GO toC5. No Check if gentle contact with these items, where appropriate, relieves symptoms. If symptoms are relieved, mount source securely and prevent vibration
C5: SPEAKER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Remove speaker, taking care not to hold any moving parts of the assembly and not to damage the foam gaskets
	Are any objects/damage causing speaker buzz? Yes Check for obvious debris in speaker. If there is debris and no damage, remove debris and retest for buzzing – if buzzing is fixed re-fit speaker, else replace speaker. If speaker is damaged, GO toC6. No Re-fit speaker and further investigate rattle due of nearby trim, modules, harnesses and components

C6: SPEAKER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check for an obvious source of damage to prevent any replacement also becoming damaged
	Is there an obvious source of the speaker damage? Yes Remedy source of damage and fit replacement speaker No Fit replacement speaker
C7: AUDIO OUTPUT DISTORTED	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check for extreme bass/treble settings
	Is the audio system output settings for bass and/or treble set too high? Yes Adjust settings to appropriate levels No No further action

Pinpoint Tests For Suspected Sub-Woofer Faults

The pinpoint tests found below are for sub-woofer speakers only.



NOTE:

See separate Pinpoint Tests (above) for other speaker faults

PINPOINT TEST D : NO SOUND OUTPUT FROM SUB-WOOFER	
D1: NO SOUND OUTPUT FROM SUB-WOOFER	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check sub-woofer operation
	Is the harness connector securely connected to the audio amplifier module and the sub-woofer unit? Yes Proceed to the next step GO to D2. No Reconnect wiring harness to audio amplifier module/sub-woofer unit
D2: NO SOUND OUTPUT FROM SUB-WOOFER	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check Integrated Audio Module (IAM) operation
	Is the integrated audio module operational? Yes Proceed to the next step GO to D3. No Check the integrity of the power supply circuits/fuses to the integrated audio module and rectify as required. Check the integrated audio module for related DTCs and refer to the relevant DTC index

D3: NO SOUND OUTPUT FROM SUB-WOOFER	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check which sub-woofers are operational
	Are all sub-woofers working? Yes Proceed to the next step GO toD4. No Use the fader control to direct audio output to different sub-woofer locations to establish which units are non-operational. Refer to the electrical circuit diagrams and check the circuits between the audio amplifier module and the affected sub-woofer units for short circuit to ground, open circuit, high resistance. Repair circuit(s) as required. If fault persists, replace non-operational sub-woofer unit(s) as required

PINPOINT TEST E : POOR OR WEAK SOUND OUTPUT FROM SUB-WOOFER(S)	
E1: POOR OR WEAK SOUND OUTPUT FROM SUB-WOOFER	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check connections to sub-woofer units
	Are the connectors inserted securely into the sub-woofer units? Yes Proceed to the next step GO toE2. No Make sure all connectors are securely attached to the sub-woofer units
E2: POOR OR WEAK SOUND OUTPUT FROM SUB-WOOFER	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check integrity of vehicle power supply fuses
	Are the vehicle/audio amplifier module power supply fuses functional? Yes Proceed to the next step GO toE3. No Replace fuse(s) as required
E3: POOR OR WEAK SOUND OUTPUT FROM SUB-WOOFER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check power and ground circuits to the infotainment system components
	Are all the necessary power and ground feeds present? Yes Proceed to the next step GO toE4. No

E3: POOR OR WEAK SOUND OUTPUT FROM SUB-WOOFER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	Refer to the electrical circuit diagrams and check the infotainment power and ground circuits for short circuit to ground, open circuit, high resistance. Repair circuit(s) as required
E4: POOR OR WEAK SOUND OUTPUT FROM SUB-WOOFER(S)	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check power supply voltage at power supply connectors
	Is the power supply voltage measured at the power supply connectors between 12 and 14 volts? Yes No further action No Refer to the electrical circuit diagrams and check the infotainment power supply circuits for short circuit to ground, open circuit, high resistance. Repair circuit(s) as required. Refer to the relevant section of workshop manual and battery care manual. Check battery state of charge and starting/charging system performance and rectify as required

PINPOINT TEST F : SUB-WOOFER VIBRATING (BUZZING) EXCESSIVELY	
F1: SUB-WOOFER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check for extreme bass/treble settings
	Is the audio system output settings for bass and/or treble set too high? Yes Adjust settings to appropriate levels No Proceed to the next step GO to F2.
F2: SUB-WOOFER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check sub-woofer unit(s) fixing screws to body are securely fastened
	Are all sub-woofer fixing screws fully secured to the body ? Yes Proceed to the next step GO to F3. No Tighten the fixing screws to the correct torque as directed in the workshop manual
F3: SUB-WOOFER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check security of trim, harnesses and paper labels in the vicinity of the subwoofer (s)
	Are these items secure in the vicinity of the subwoofer(s)? Yes Proceed to the next step GO to F4. No Check if gentle contact with these items, where appropriate, relieves symptoms. If symptoms are relieved, mount source securely and prevent vibration

F4: SUB-WOOFER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Remove subwoofer unit(s) (do not disassemble part) and hold in hand, taking care not to hold any moving parts of the assembly and not to damage the foam gaskets
	Does buzzing persist with subwoofer unit(s) in hand? Yes Check for obvious debris in subwoofer unit(s). If there is debris and no damage, remove debris and retest for buzzing – if buzzing is fixed re-fit subwoofer unit(s), else replace subwoofer unit(s). If subwoofer unit(s) damaged, GO to F5. No Re-fit subwoofer unit(s) and further investigate rattle due of nearby trim, modules, harnesses and components

F5: SUB-WOOFER VIBRATING (BUZZING) EXCESSIVELY	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check for an obvious source of damage to prevent any replacement also becoming damaged
	Is there an obvious source of the subwoofer unit(s) damage? Yes Remedy source of damage and fit replacement subwoofer unit(s) No Fit replacement subwoofer unit(s)

PINPOINT TEST G : SUB-WOOFER AUDIO OUTPUT DISTORTED	
G1: SUB-WOOFER AUDIO OUTPUT DISTORTED	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	1 Check for extreme bass/treble settings
	Is the audio system output settings for bass and/or treble set too high? Yes Adjust settings to appropriate levels No Re-check possible sub-woofer faults GO to Pinpoint Test D.

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be set on this vehicle, please refer to Section 100-00.