

Model: All

Vehicle System: 45 - Noise, Vibration & Harshness

Region: All

Tech Note: TASCAM Audio Recorder

Tech Notes are announcements that help to communicate and track new information about Tesla Service concerns. Such concerns may or may not be VIN specific. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

This Tech Note supersedes TN-13-45-001 R1, dated 27-Sep-13. Each content change is marked by a vertical line in the left margin. Discard the previous version and replace it with this one.

All Service Centers have a TASCAM DR-05 audio recorder as part of their standard tooling. The purpose of this tool is to create recordings of Noise, Vibration, and Harshness (NVH) issues and upload them to a Toolbox session. Doing this allows Field Service Engineers and members of the NVH Engineering team to help diagnose NVH issues.

Setting Up the Recorder for the First Time

1. Insert the 2 included AA batteries into the recorder.
2. Hold down the Power/Stop button to turn on the recorder (Figure 1).

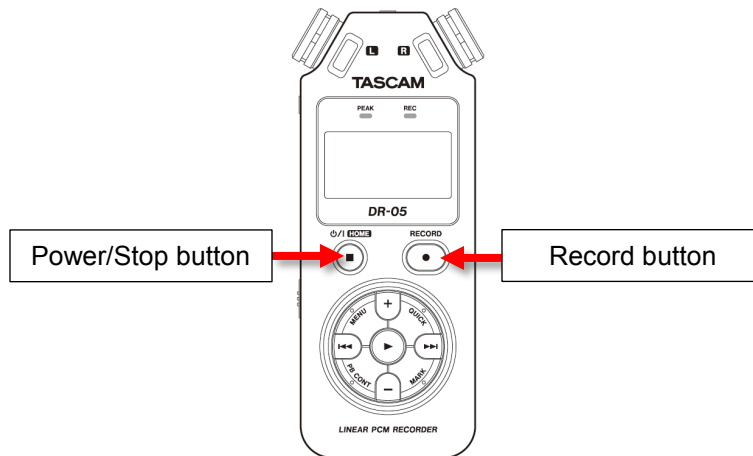


Figure 1

3. Once the recorder is on, a prompt appears to set the date and time (Figure 2). Use the left and right arrow buttons to scroll through the 6 fields (Year-Month-Day-Hour-Minute-Second), and change each value by pressing the +/- buttons (Figure 3). Once the date and time have been set, press the Play button (Figure 3).

NOTE: The recorder uses 24-hour time.

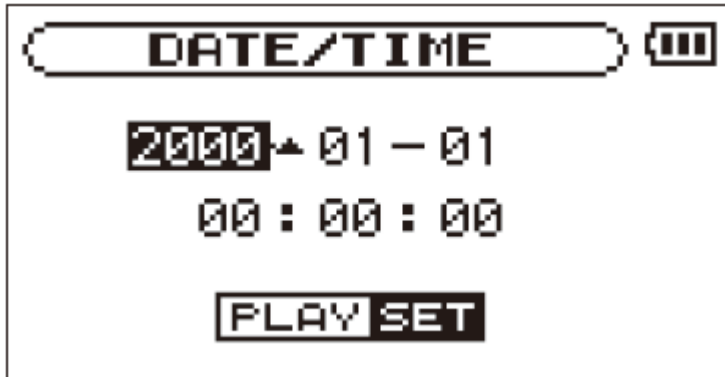


Figure 2

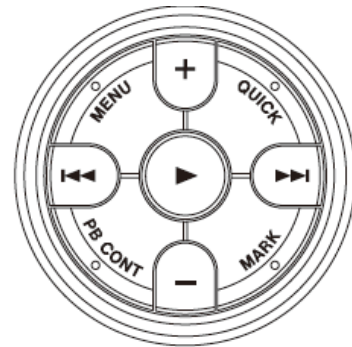


Figure 3

4. Press the Menu button, then press the Play button to open the REC SETTING menu.

5. Ensure that the following menu options are set (Table 1).

NOTE: These options are set by default. However, they are listed here in case they are ever modified.

Format	Wav 16bit
Sample	44.1k
Type	STEREO
Size	2G
Mic Power	OFF

Table 1

6. Press the Power/Stop button to exit the REC SETTING menu.

7. Turn off the recorder by pressing and holding the Power/Stop button.

Making a Recording

This section explains the basic procedure for recording an NVH issue. You might receive additional instructions from FSEs or NVH engineers, depending on what problem you are trying to diagnose. Any additional instructions override this document.

⚠ WARNING: Never operate the recorder while driving.

NOTE: Bring a pair of headphones on the test drive. The speakers on the unit are very poor quality and will not allow you to determine whether you have successfully recorded the issue.

1. Have an assistant drive the vehicle under the conditions that cause the NVH issue.

2. Turn on the recorder.

3. Press the Record button. Two graphs appear on the screen, one for the left (L) microphone and one for the right (R) microphone. The "Rec" light above the screen also flashes red.

4. Hold the recorder up to the driver's right ear, with the screen towards you.
5. Press the left arrow key to bring up the input level menu. Use the left and right arrow keys to adjust the input level so that the graphs for the left and right microphones remain near the downward facing arrow (Figure 4).

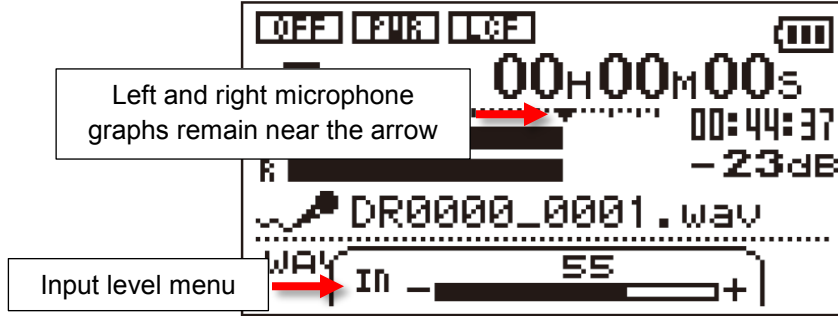


Figure 4

NOTE: Recording different sounds requires different input levels. You might receive instruction from FSEs, NVH engineers, or additional documentation to set the input level to something different when recording different NVH issues.

6. Point the microphones towards the source of the noise that you want to record and place the recorder in a stable location where there is minimal vibration (Figure 5).

NOTE: The tool uses high-performance directional stereo microphones and records best when pointed at the noise source. Avoid pointing the microphones towards noisy areas relative to the source you are attempting to record. For example, aiming the microphone directly towards a window may increase wind noise on the recording, possibly making it difficult to hear the noise you are attempting to record.



Figure 5 (Recording sound from rear of vehicle)

7. Once the correct input level has been set, press the Record button again. The “Rec” light above the screen turns solid red, and the counter on the screen begins to increment. This indicates that the tool is recording.
8. Verbally state into the microphones what the driving conditions are and what issue you are trying to record.

NOTE: This helps FSEs and NVH engineers to better assist in diagnosis when they hear the recording.

9. Before returning to the Service Center, plug headphones into the recorder “Line out” jack on the left side of the recorder.

NOTE: Do not plug the headphones into the MIC/EXT IN jack on the top of the recorder.

10. Press the Menu button, and use the +/- buttons to navigate to BROWSE. Press the Play button to see all recordings.

11. Find the most recent recording by navigating to the file name with the highest number.

12. Press the Play button to listen to the recording through the headphones.

NOTE: The recording does not need to be perfect. FSEs and NVH engineers have many tools to analyze sounds. As long as the NVH issue is audible, the recording is useful. If there is too much distortion or background noise, lower the input level and try to record the issue again.

13. Press the Power/Stop button to return to the home screen on the recorder.

14. Return to the Service Center.

Uploading a Recording to the Computer

1. Turn on the recorder and use the included USB cable to connect the recorder to a computer.

2. On the recorder, select “STORAGE” when the “USB SELECT” screen appears.

NOTE: It might take several minutes for your computer to recognize the recorder.

3. Open Windows Explorer (sometimes called “My Computer”), then double click on the icon that is labeled DR-05 (Figure 6).

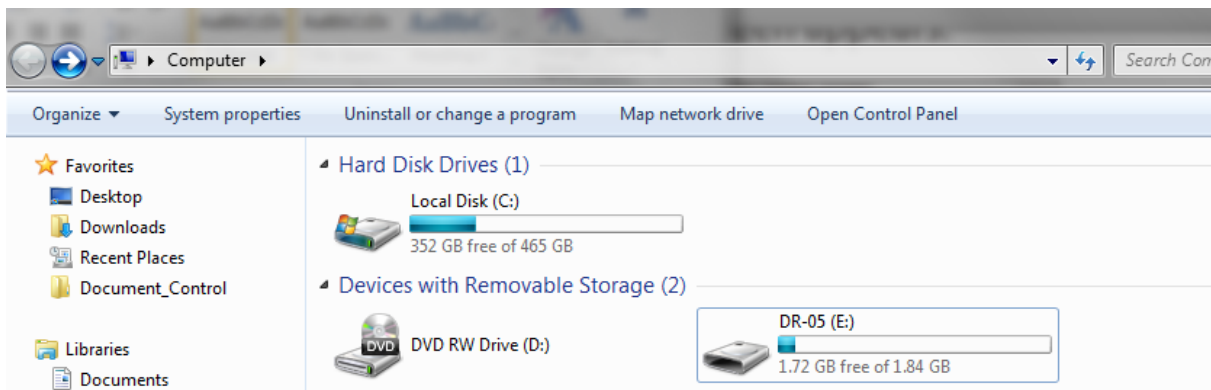


Figure 6

4. Navigate to the MUSIC directory.

5. Upload all recordings that were recorded on the most recent test drive.

NOTE: Even if a recording seems poor quality, the FSE and NVH teams might still find it useful.

6. Turn off the recorder and remove the USB cable from the computer.

NOTE: Always store the cable with the recorder. If the cable is lost, replace it with a USB to mini-USB cable, not a USB to micro-USB cable.

Uploading a Recording In Toolbox

1. If there is no Toolbox session already for this issue, create a new session.
2. Attach all recordings from the test drive.
3. Add the comment “@NVHTeam” (without the quotes). This adds the NVH engineers to the Toolbox session.
4. Add any additional comments about the test drive. If you are uploading multiple files, mention which file seems like the best example of the issue.

For additional information on using the tool, refer to the product’s user manual or contact NVHTeam@tesla.com.

For feedback on the accuracy of this document, email ServiceBulletinFeedback@tesla.com.