Keysight Technologies
Audio Skip Test for MP3 Players Using U2300A Series High-Density Multifunction USB DAQ

Application Note

KEYSIGHT TECHNOLOGIES

Introduction

More and more consumers are turning to MP3 or MP4 players. With the growing number of MP3 or MP4 manufacturers in the business, these players have become low-margin, mass-produced items. There are many ways to test an MP3 player. One major dependency in testing is the common computer interface (normally USB) to load the audio.

It is crucial to inspect the quality of these players after assembly. This application note examines how MP3 player manufacturers can use the audio skip test for aging testing.

Quality Check (QC) for Manufacturing and Production

During QC, a 1 kilohertz single-tone (sine wave) test signal is loaded into the MP3 player and set to playback continuously for a period of time to observe and verify that there is no audio skip sound (for example, 20 hours). The actual time taken is the testing specification for the QC. This period of time differs from company to company. The following paragraph explains the test setup for this QC method.

In this test setup, the MP3 player is the electronics under test (EUT) set. The audio output of the player is connected to a 16-ohm load. This load simulates the earphone's impedance. The load is then connected to a noise meter, which is also known as a distortion meter or a fl utter meter. The noise meter displays the frequency that is captured at the input channel. The noise meter has a BNC voltage output that is connected to a DAQ device, which is linked to the PC through a USB interface. The DAQ provides an analog–to–digital conversion (ADC) so that the data acquired can be logged into the PC for post–analysis purposes. The voltage output port will send a voltage level that corresponds to the frequency of the measured signal. The voltage varies with respect to variations in the frequency of the measured signal.

Battery Charging Test Setup

In battery charging test setup, the load is replaced with the battery charger. Similar to the discharge test setup, the charge properties of the battery are also acquired from measurements taken during the switch-on (charging) and switch-off (open circuit) time intervals. The battery charging voltage is being fed to the DAQ device and recorded in the PC.

Figure 2 illustrates the charging characteristics of the battery. Note that both graphs (Figure 1 and Figure 2) show the recovery behavior after the charging or discharging activity.

Figure 1 shows measured signals from four EUT sets. Figure 2 shows the four channels that are equivalent to the four EUT sets. The top signal has a sound skip: A glitch of more than 1 kHz is detected during the test. In other words, this EUT failed the QC test due to the slight voltage variation.

The failure, however, is dependent on the tolerance of frequency in the company's specifications.

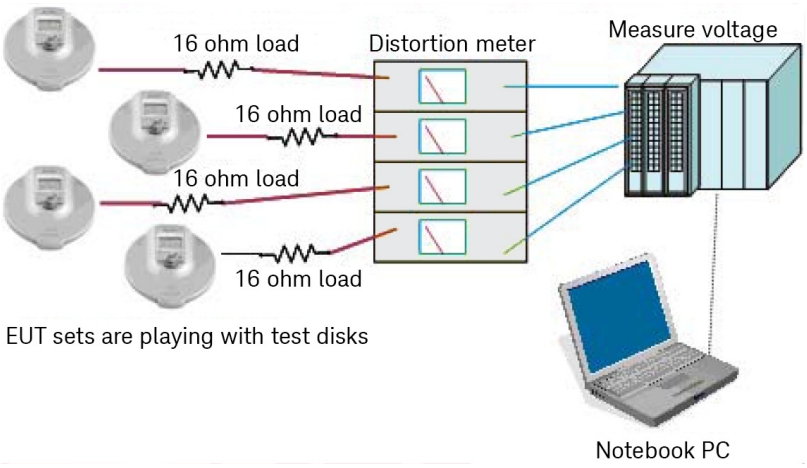

Figure 1 Quality check test setup

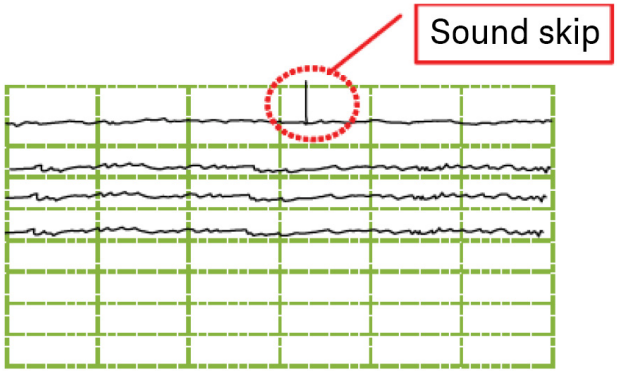

Figure 2 Four measured signals with detected sound skip on one channel

Advantages of Keysight's USB DAQ Device in QC Testing

- Because USB is the most common interface that comes with PCs nowadays, no additional hardware is needed, unlike GPIB.
- With a USB DAQ device, the tested signal is sent directly to the PC. It is possible to generate test reports or post–analysis results with the data acquired via programming.
- The DAQ device comes with many analog channels. This makes it possible to test many EUTs simultaneously and at the same time increases test throughput.
- Its ease of use and small size are among the added features that make our DAQ device useful for QC tests.

Conclusion

The DAQ device presents a simpler and more affordable solution for QC test requirements
in the production of MP3 players.

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