

# How ABSA works

The Denson DAB+U device is equipped with an **'Automatic Buffer Size Assessment'** (ABSA) function. Since the buffer size may be different in each playback device (head unit) the Denson DAB+U device detects the buffering time needed by the playback device to function correctly. Depending upon the playback device (head unit) **the buffer time may vary between 15-40 seconds.**

## Basic information on buffer size

Since the playback device (radio) is accessing the data on the media in bites, the buffer has a constantly changing size. This change can be described as a sinus-like curve on a chart. **This constantly changing value is the true reason for having a buffer**, otherwise it would be enough to feed continuous amount of data to the playback device (radio).

This chart is showing the amount of data read by the radio – time wise

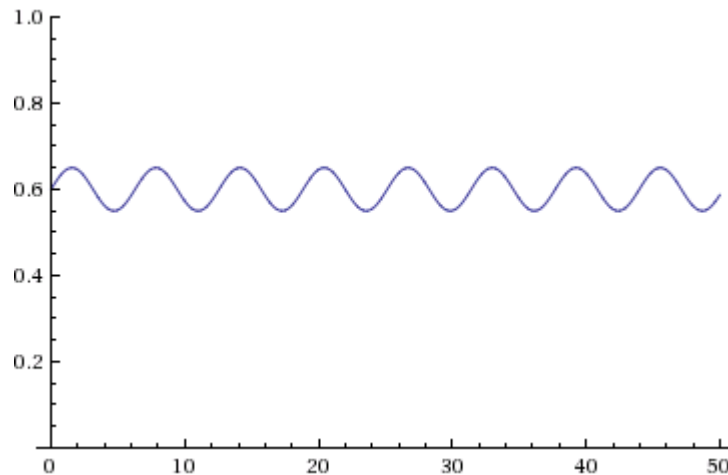


Figure 1: ideal operation – after start

The ABSA is looking for the minimum value and adjusts the buffer size to the lowest level possible – leaving a gap to be on the safe side.

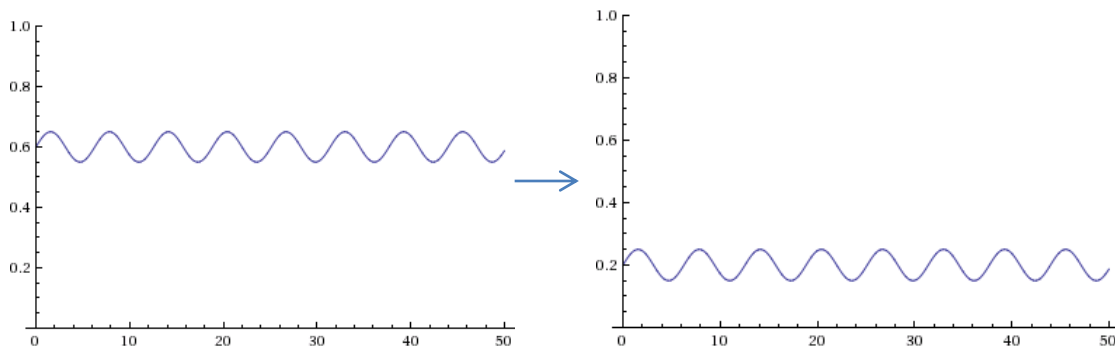


Figure 2: buffer size adjustment – to fit track changing

### Buffer following

Since the DAB+U and the playback device (radio) work on a different clock rate (frequency) the buffer set may overflow or underrun.

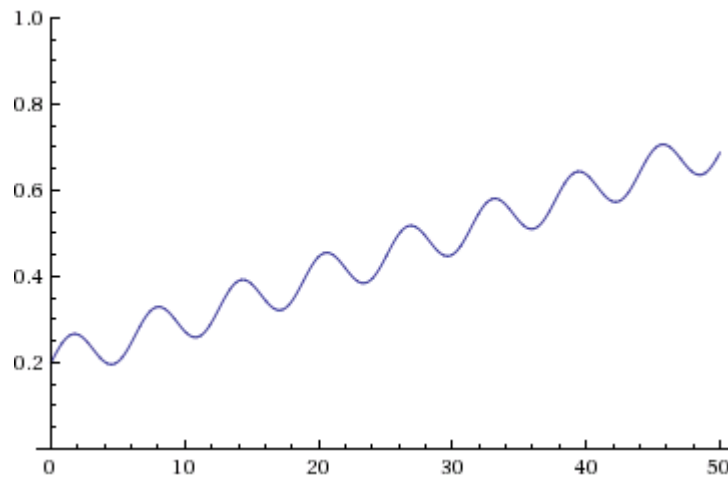


Figure 3: real operation after changing track, if the radio has a higher clock rate

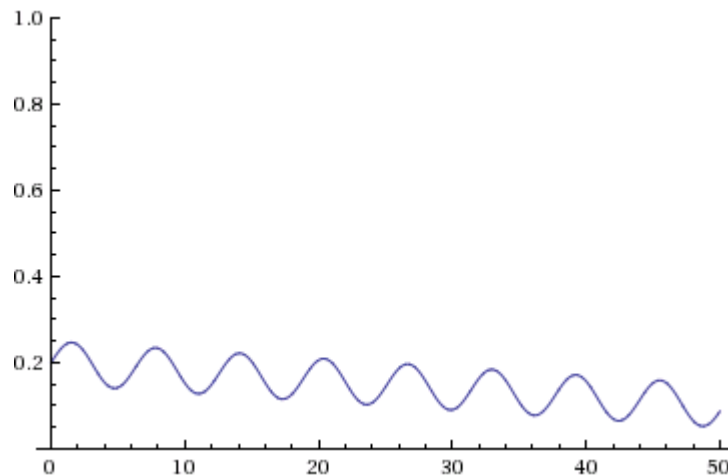


Figure 4: real operation after changing track, if the radio has a lower clock rate

Overflow and underrun cause disruption in playback. To solve this issue during playback the DAB+U device is monitoring if the lowest value of the buffer is increasing or decreasing. **If it identifies a change, it will insert extra bytes into the playback using linear interpolation, or it will subtract some – using the same method.** This eliminates underrun and overflow errors.

For example: a BMW head unit would overflow after 5 hours of playback while a Telefunken head unit would underrun after 5 hours of playback.

In real life this operation would look similar to what is shown below:

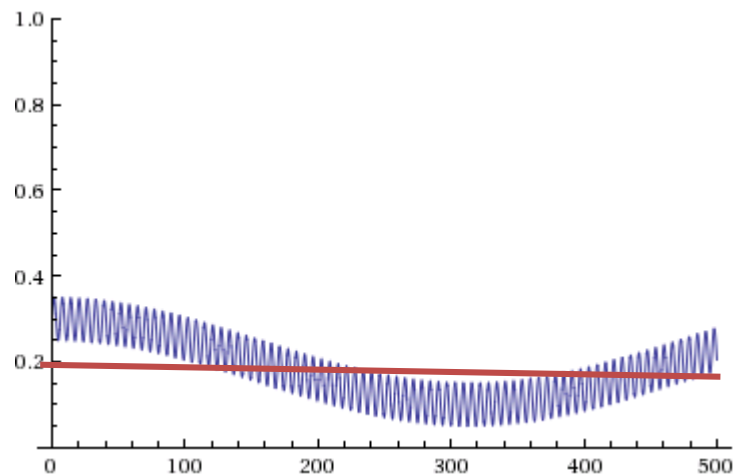


Figure 5: Long term operation with buffer following - red line shows the predefined buffer size

So if the buffer size goes under the predefined value, the device will start to produce more data causing the playback device (radio) to read relatively less, and in conclusion the buffer is getting faster. This also stands for the other way around.

**Please note that the 'Automatic Buffer Size Assessment' (ABSA) is monitoring the changes in the buffer size (according the above) for 4 minutes, so it is highly recommended to play the current station for at least 5 minutes upon first run or when connecting the device into another equipment (radio) as before or after software (firmware) upgrade.**