CML Microcircuits
COMMUNICATION SEMICONDUCTORS

Frequency Inversion Scrambling Considerations/Limitations

1. 300Hz to 3kHz audio bandpass filter

2. Scrambled audio bandwidth with 3k3Hz mixing frequency

3. Scrambled audio bandwidth with 4kHz mixing frequency

- Effective audio bandwidth reduced to 1kHz - 3k7Hz

- After scrambling, frequencies above 3kHz will be removed by the audio filtering

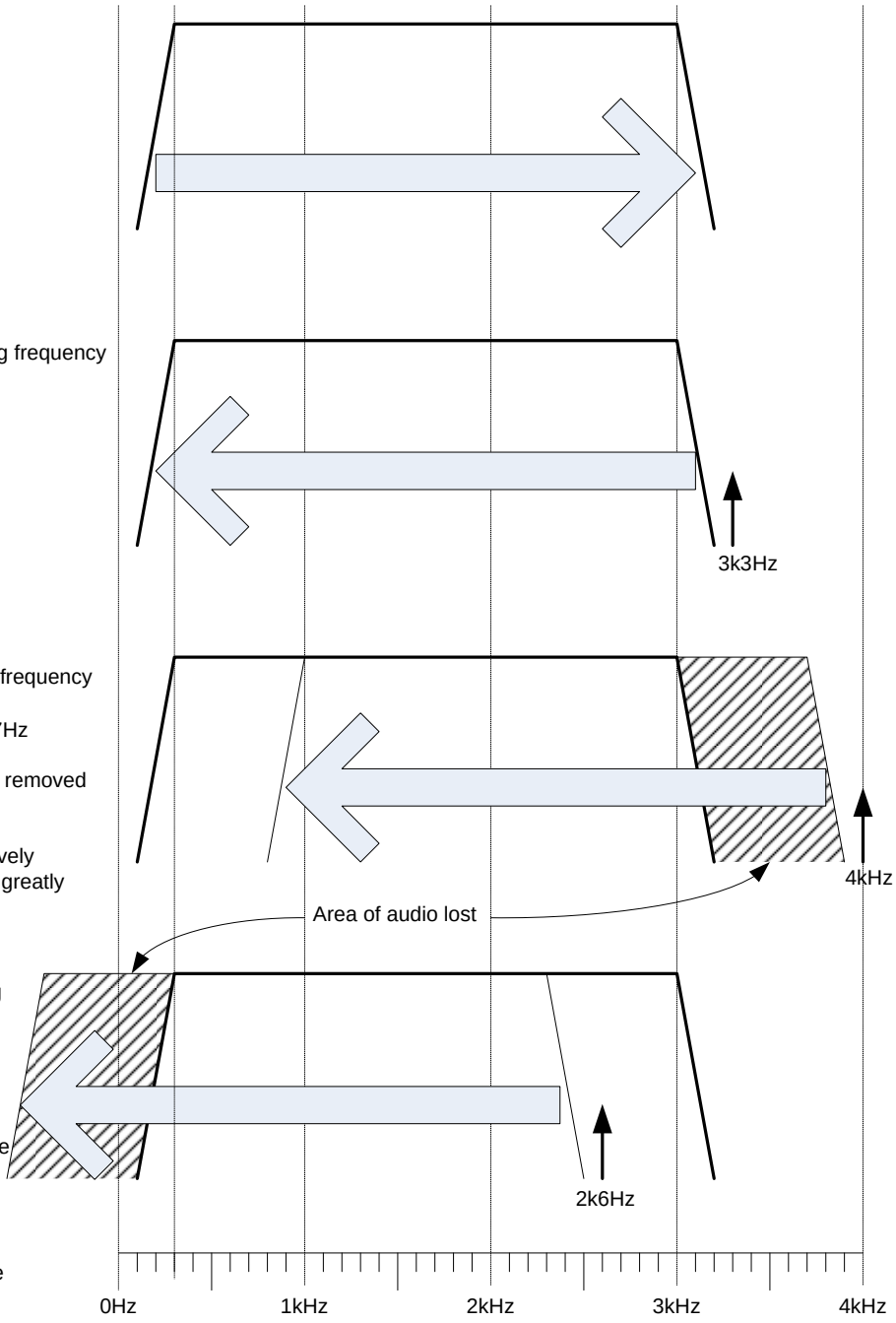
- After de-scrambling, the audio filtering will effectively remove all frequencies below 1kHz and therefore, greatly reducing the intelligibility of the recovered speech

4. Scrambled audio response with 3k6Hz mixing frequency

- Effective audio bandwidth reduced to 300Hz - 2k3Hz

- After scrambling, frequencies below 300Hz will be removed by the audio filtering

- After de-scrambling, the audio filtering will effectively remove all frequencies above 2.3kHz and therefore, there will be a small reduction in the intelligibility of the recovered speech



General Note.

In order to achieve reasonable intelligibility of the recovered scrambled/descrambled speech, based on the above examples and listening tests, there are limitations to the range of scrambler mixing frequency that can be used.

Please consider the following recommendations in connection to the CMX7031/CMX7041 Analogue TWR processors:

- The preferred Tx and Rx audio path line-up should be adopted as shown in the datasheet
- The Compand (Tx Compress and Rx Expand) functions should be enabled
- The scrambler inversion mixing frequency should be kept between 2k632Hz and 3k496Hz