CLAIMS

1. A method for performing high frequency reconstruction of an audio signal, the method comprising:

receiving an encoded audio bitstream, the encoded audio bitstream including audio data representing a lowband portion of the audio signal and high frequency reconstruction metadata;

decoding the audio data to generate a decoded lowband audio signal;

extracting from the encoded audio bitstream the high frequency reconstruction metadata, the high frequency reconstruction metadata including operating parameters for a high frequency reconstruction process, the operating parameters including time/frequency grid information and a patching mode parameter located in a backward-compatible extension container of the encoded audio bitstream, wherein a first value of the patching mode parameter indicates spectral translation and a second value of the patching mode parameter indicates harmonic transposition by phase-vocoder frequency spreading, wherein the encoded audio bitstream further includes a fill element with an identifier indicating a start of the fill element and fill data after the identifier, wherein the fill data includes the backward-compatible extension container, and wherein the identifier is a three bit unsigned integer transmitted most significant bit first and having a value of 0x6;

filtering the decoded lowband audio signal to generate a filtered lowband audio signal;

regenerating a highband portion of the audio signal using the filtered lowband audio signal and the high frequency reconstruction metadata, wherein the regenerating the highband portion of the audio signal includes spectral translation if the patching mode parameter is the first value and the regenerating the highband portion of the audio signal includes harmonic transposition by phase-vocoder frequency spreading if the patching mode parameter is the second value; and

combining the filtered lowband audio signal with the regenerated highband portion to form a wideband audio signal.

2. The method of claim 1 wherein the backward-compatible extension container includes inverse filtering control data to be used when the patching mode parameter equals the second value.

3. The method of claim 1 wherein the backward-compatible extension container further includes missing harmonic control data to be used when the patching mode parameter equals the second value.

4. The method of claim 1 wherein a phase shift is added to the filtered lowband audio signal after the filtering and compensated for before the combining to reduce a complexity of the method.

5. The method of claim 1 wherein the backward-compatible extension container further includes a flag indicating whether additional preprocessing is used to avoid discontinuities in a shape of a spectral envelope of the highband portion when the patching mode parameter equals the first value, wherein a first value of the flag enables the additional preprocessing and a second value of the flag disables the additional preprocessing.

6. The method of claim 5 wherein the additional preprocessing includes calculating a pre-gain curve using a linear prediction filter coefficient.

7. A non-transitory computer readable medium containing instructions that when executed by a processor perform the method of claim 1.

8. An audio processing unit for performing high frequency reconstruction of an audio signal, the audio processing unit comprising:

an input interface for receiving an encoded audio bitstream, the encoded audio bitstream including audio data representing a lowband portion of the audio signal and high frequency reconstruction metadata;

a core audio decoder for decoding the audio data to generate a decoded lowband audio signal;

a deformatter for extracting from the encoded audio bitstream the high frequency reconstruction metadata, the high frequency reconstruction metadata including operating parameters for a high frequency reconstruction process, the operating parameters including time/frequency grid information and a patching mode parameter located in a backward-compatible extension container of the encoded audio bitstream, wherein a first value of the patching mode parameter indicates spectral translation and a second value of the patching mode parameter indicates harmonic transposition by phase-vocoder frequency spreading, wherein the encoded audio bitstream further includes a fill element with an identifier indicating a start of the fill element and fill data after the identifier, wherein the fill data includes the backward-compatible extension container, and wherein the identifier is a three bit unsigned integer transmitted most significant bit first and having a value of 0x6;

an analysis filterbank for filtering the decoded lowband audio signal to generate a filtered lowband audio signal;

a high frequency regenerator for reconstructing a highband portion of the audio signal using the filtered lowband audio signal and the high frequency reconstruction metadata, wherein the reconstructing includes a spectral translation if the patching mode parameter is the first value and the reconstructing includes harmonic transposition by phase-vocoder frequency spreading if the patching mode parameter is the second value; and

a synthesis filterbank for combining the filtered lowband audio signal with the regenerated highband portion to form a wideband audio signal.