Claims

1. An audio decoder device for decoding a compressed input audio signal comprising

at least one core decoder ~~(6, 24)~~ having one or more processors ~~(36, 36')~~ for generating a processor output signal ~~(37)~~ based on a processor input signal ~~(38, 38')~~, wherein a number of output channels ~~(37.1, 37.2, 37.1', 37.2')~~ of the processor output signal ~~(37, 37')~~ is higher than a number of input channels ~~(38.1, 38.1')~~ of the processor input signal ~~(38, 38')~~, wherein each of the one or more processors ~~(36, 36')~~ comprises a decorrelator ~~(39, 39')~~ and a mixer ~~(40, 40')~~, wherein a core decoder output signal ~~(13)~~ having a plurality of channels ~~(13.1, 13.2, 13.3, 13,4)~~ comprises the processor output signal ~~(37, 37')~~, and wherein the core decoder output signal ~~(13)~~ is suitable for a reference loudspeaker setup ~~(42)~~;

at least one format converter device ~~(9, 10)~~ configured to convert the core decoder output signal ~~(13)~~ into an output audio signal ~~(31)~~, which is suitable for a target loudspeaker setup ~~(45)~~; and

a control device ~~(46)~~ configured to control at least one or more processors ~~(36, 36')~~ in such way that the decorrelator ~~(39, 39')~~ of the processor ~~(36, 36')~~ may be controlled independently from the mixer ~~(40, 40')~~ of the processor ~~(36, 36')~~, wherein the control device ~~(46)~~ is configured to control at least one of the decorrelators ~~(39, 39')~~ of the one or more processors ~~(36, 36')~~ in such way that, depending on the target loudspeaker setup ~~(45)~~, the mixer ~~(40, 40')~~ of the processor ~~(36, 36')~~ is operational when the decorrelator ~~(39, 39')~~ of the processor ~~(36, 36')~~ is switched off.

2. A decoder device according to claim 1, wherein the control device ~~(46)~~ is configured to deactivate at least one or more processors ~~(36, 36')~~ so that input channels ~~(38.1, 38.1')~~ of the processor input signal ~~(38, 38')~~ are fed

to output channels (37.1, 37.2, 37.1', 37.2') of the processor output signal (37, 37') in an unprocessed form.

3. A decoder device according to claim 1 or 2, wherein the processor (36, 36') is a one input two output decoding tool, wherein the decorrelator (39, 39') is configured to create a decorrelated signal (48) by decorrelating at least one of the channels (38.1, 38.1') of the processor input signal (38, 38'), wherein the mixer (40, 40') mixes the processor input signal (38) and the decorrelated signal (46) based on a channel level difference signal (49) and/or an inter-channel coherence signal (50), so that the processor output signal (37, 37') consists of two incoherent output channels (37.1, 37.2, 37.1', 37.2').

4. A decoder device according to claim 3, wherein the control device is configured to switch off the decorrelator (36, 36') of one of the processors (36, 36') by setting the decorrelated signal (48) to zero or by preventing the mixer (40, 40') to mix the decorrelated signal (46) into the processor output signal (37) of the respective processor (36, 36').

5. A decoder device according to one of the claims 1 to 4, wherein the core decoder (6) is a decoder for both music and speech, such as an USAC decoder (6), wherein the processor input signal (38) of at least one of the processors (36, 36') contain channel pair elements, such as USAC channel pair elements.

6. A decoder device according to one of the claims 1 to 5, wherein the core decoder (24) is a parametric object coder, such as a SAOC decoder (24).

7. A decoder device according to one of the claims 1 to 6, wherein the number of loudspeakers of the reference loudspeaker setup (42) is higher than a number of loudspeakers of the target loudspeaker setup (45).

8. A decoder device according to one of the claims 1 to 7, wherein the control device (46) is configured to switch off the decorrelators (36') for at least one first of said output channels (37.1') of the processor output signal (37') and one second of said output channels (37.2') of the processor output signal (37'), if the first of said output channels (37.1') and the second of said output channels (37.2') are, depending on the target loudspeaker setup, mixed into a common channel (31.2) of the output audio signal (31), provided a first scaling factor for mixing the first of said output channels (37,1') into the common channel (31.2) exceeds a first threshold and/or a second scaling factor for mixing the second of said output channels (37.2') into the common channel (31.2) exceeds a second threshold.

9. A decoder device according to one of the claims 1 to 8, wherein the control device (46) is configured to receive a set of rules (47) from the format converter device (9, 10) according to which the format converter device (9, 10) mixes the channels (13.1, 13.2, 13.3, 13.4) of the core decoder output signal (13) into the channels (31.1, 31.2, 31.3) of the output audio signal (31) depending on the target loudspeaker setup (45), wherein the control device (46) is configured to control the at least one of the processors (36, 36') depending on the received set of rules (47).

10. A decoder device according to one of the claims 1 to 9, wherein the control device (46) is configured to control the decorrelators (39, 39') of the processors (36, 36') in such way that a number of incoherent channels of the core decoder output signal (13) is equal to the number of the channels (31.1, 31.2, 31.3) of the output audio signal (31).

11. A decoder device according to one of the claims 1 to 10, wherein the format converter device (9, 10) comprises a downmixer (10) for downmixing the core decoder output signal (13).

12. A decoder device according to one of the claims 1 to 11, wherein the format converter device (9, 10) comprises a binaural renderer (10).

13. A decoder device according to claim 12, wherein the core decoder output signal (13) is fed to the binaural renderer (9) as a binaural renderer input signal.

14. A decoder device according to claim 11 and to one of the claims 12 to 13, wherein a downmixer output signal of the downmixer (9) is fed the binaural renderer (10) as a binaural renderer input signal.

15. A method for decoding a compressed input audio signal, the method comprising the steps:

providing at least one core decoder (6, 24) having one or more processors (36, 36') for generating a processor output signal (37) based on a processor input signal (38), wherein a number of output channels (37.1, 37.2, 37.1', 37.2') of the processor output signal (37, 37') is higher than a number of input channels (38.1, 38.1') of the processor input signal (38, 38'), wherein each of the one or more processors (36, 36') comprises a decorrelator (39, 39') and a mixer (40, 40'), wherein a core decoder output signal (13) having a plurality of channels (13.1, 13.2, 13.3, 13,4) comprises the processor output signal (37, 37'), and wherein the core decoder output signal (13) is suitable for a reference loudspeaker setup (42);

providing at least one format converter device (9, 10) configured to convert the core decoder output signal (13) into an output audio signal (31), which is suitable for a target loudspeaker setup (45); and

providing a control device (46) configured to control at least one or more processors (36, 36') in such way that the decorrelator (39, 39') of the processor (36, 36') may be controlled independently from the mixer (40, 40')

of the processor ~~(36, 36')~~, wherein the control device ~~(46)~~ is configured to control at least one of the decorrelators ~~(39, 39')~~ of the one or more processors ~~(36, 36')~~ in such way that, depending on the target loudspeaker setup ~~(45)~~, the mixer ~~(40, 40')~~ of the processor ~~(36, 36')~~ is operational when the decorrelator ~~(39, 39')~~ of the processor ~~(36, 36')~~ is switched off.

16. A computer program for implementing the method of claim 15 when being executed on a computer or signal processor.