CLAIMS

What is claimed is:

1. A method of decoding implemented by a video decoder, comprising:

receiving, by the video decoder, a multi-layer video bitstream including multiple layer access units within a same access unit; wherein each layer access unit of the multiple layer access units includes a picture header (PH) network abstraction layer (NAL) unit having a picture header NAL unit type (PH_NUT) and an associated video coding layer (VCL) NAL unit, wherein each layer access unit includes only one PH NAL unit, which shall precede the associated VCL NAL unit, and exactly one PH NAL unit is present for each coded picture, the PH_NUT signifying that a layer identifier (ID) of the PH NAL unit is equal to a layer ID of the associated VCL NAL unit of the layer access unit containing the PH NAL unit and a temporal ID of the PH NAL unit is equal to a temporal ID of the layer access unit containing the PH NAL unit; and

decoding, by the video decoder, a coded picture from the layer access unit to obtain a decoded picture.

2. The method of claim 1, further comprising identifying a layer of the coded picture based on the layer ID of the PH NAL unit, and identifying a position in time of the coded picture within the video bitstream based on the temporal ID of the PH NAL unit.

3. The method of any one of claims 1 to 2, wherein the associated VCL NAL unit includes a slice of the coded picture.

4. The method of any one of claims 1 to 3, wherein the PH NAL unit is a non-VCL NAL unit.

5. The method of any one of claims 1 to 4, wherein the layer ID of the PH NAL unit is designated as nuh_layer_id.

6. The method of any one of claims 1 to 5, wherein layer ID of the VCL NAL unit identifies a layer that includes the associated VCL NAL unit.

7. The method of any one of claims 1 to 6, further comprising displaying the decoded picture on a display of an electronic device.

8. A method of encoding implemented by a video encoder, the method comprising:

generating, by the video encoder, a layer access unit including a picture header (PH) network abstraction layer (NAL) unit having a picture header NAL unit type (PH_NUT) and an associated video coding layer (VCL) NAL unit, wherein the layer access unit includes only one PH NAL unit, which shall precede the associated VCL NAL unit, and exactly one PH NAL unit is present for each coded picture, the PH_NUT signifying that a layer identifier (ID) of the PH NAL unit is equal to a layer ID of the associated VCL NAL unit of the layer access unit containing the PH NAL unit and a temporal ID of the PH NAL unit is equal to a temporal ID of the layer access unit containing the PH NAL unit;

encoding, by the video encoder, the layer access unit into a video bitstream, wherein the video bitstream is a multi-layer video-bitstream including multiple layer access units within a same access unit.

9. The method of claim 8, wherein the layer ID of the PH NAL unit identifies a layer of the coded picture within the video bitstream, and wherein the temporal ID of the PH NAL unit identifies a position in time of the coded picture within a multi-layer bitstream.

10. The method of any one of claims 8 to 9, wherein the associated VCL NAL unit includes a slice of the coded picture, and wherein the PH NAL unit is a non-VCL NAL unit.

11. A decoding device, comprising:

a receiver configured to receive a multi-layer video bitstream including multiple layer access units within a same access unit; wherein each layer access unit of the multiple layer access units includes a picture header (PH) network abstraction layer (NAL) unit having a picture header NAL unit type (PH_NUT) and an associated video coding layer (VCL) NAL unit, wherein each layer access unit includes only one PH NAL unit, which shall precede the associated VCL NAL unit, and exactly one PH NAL unit is present for each coded picture, the PH_NUT signifying that a layer identifier (ID) of the PH NAL unit is equal to a layer ID of the associated VCL NAL unit

of the layer access unit containing the PH NAL unit and a temporal ID of the PH NAL unit is equal to a temporal ID of the layer access unit containing the PH NAL unit;

a memory coupled to the receiver, the memory storing instructions; and

a processor coupled to the memory, the processor configured to execute the instructions to cause the decoding device to:

decode a coded picture from the layer access unit to obtain a decoded picture.

12. The decoding device of claim 11, wherein the processor is configured to execute the instructions to cause the decoding device to identify a layer of the coded picture within the video bitstream based on the layer ID of the PH NAL unit, and identify a position in time of the coded picture within the video bitstream based on the temporal ID of the PH NAL unit.

13. The decoding device of any one of claims 11 to 12, wherein the associated VCL NAL unit includes a slice of the coded picture.

14. An encoding device, comprising:

a memory containing instructions;

a processor coupled to the memory, the processor configured to implement the instructions to cause the encoding device to:

generate a layer access unit including a picture header (PH) network abstraction layer (NAL) unit having a picture header NAL unit type (PH_NUT) and an associated video coding layer (VCL) NAL unit, wherein the layer access unit includes only one PH NAL unit, which shall precede the associated VCL NAL unit, and exactly one PH NAL unit is present for each coded picture, the PH_NUT signifying that a layer identifier (ID) of the PH NAL unit is equal to a layer ID of the associated VCL NAL unit of the layer access unit containing the PH NAL unit and a temporal ID of the PH NAL unit is equal to a temporal ID of the layer access unit containing the PH NAL unit;

encode the layer access unit into a video bitstream, wherein the video bitstream is a multi-layer video bitstream including multiple layer access units within a same access unit.

15. The encoding device of claim 14, wherein the layer ID of the PH NAL unit identifies a layer of the coded picture within the video bitstream, and wherein the temporal ID of the PH NAL unit identifies a position in time of the coded picture within the video bitstream.

16. A coding apparatus, comprising:

a receiver configured to receive a picture to encode or to receive a bitstream to decode;

a transmitter coupled to the receiver, the transmitter configured to transmit the bitstream to a decoder or to transmit a decoded image to a display;

a memory coupled to at least one of the receiver or the transmitter, the memory configured to store instructions; and

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to perform the method in any one of claims 1 to 6 or any one of claims 8 to 10.

17. The coding apparatus of claim 16, further comprising a display configured to display a decoded picture.

18. A system, comprising:

an encoder; and

a decoder in communication with the encoder, wherein the encoder or the decoder includes the decoding device, the encoding device, or the coding apparatus of any one of claims 11 to 17.

19. A means for coding, comprising:

receiving means configured to receive a picture to encode or to receive a bitstream to decode;

transmission means coupled to the receiving means, the transmission means configured to transmit the bitstream to a decoding means or to transmit a decoded image to a display means;

storage means coupled to at least one of the receiving means or the transmission means, the storage means configured to store instructions; and

processing means coupled to the storage means, the processing means configured to execute the instructions stored in the storage means to perform the method in any one of claims 1 to 7 or any one of claims 8 to 10.

20. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program that can be executed by a processor, and when the computer program is executed by the processor, the processor performs the method according to any one of claims 1 to 7 or any one of claims 8 to 10.

21. A storage medium, wherein the storage medium stores a bitstream obtained by using the method according to any one of claims 1 to 7 or any one of claims 8 to 10.

22. A program comprising program code for performing the method according to any one of claims 1 to 7 or any one of claims 8 to 10 when executed on a computer or a processor.

23. A coder comprising processing circuitry for carrying out the method according to any one of claims 1 to 7 or any one of claims 8 to 10.