CLAIMS

1. A method of decoding video data, the method comprising:

determining that a picture in a dynamic range adjustment (DRA) domain stored in a memory is to be output from the memory, wherein the picture in the DRA domain is useable as a reference picture, and wherein the memory is configured to store pictures that are usable as reference pictures;

subsequent to determining that the picture in the DRA domain is to be output, performing a process of outputting the picture in the DRA domain from the memory that stores the pictures that are usable as reference pictures;

at the process of outputting the picture in the DRA domain from the memory that stores the pictures that are useable as reference pictures, applying, with a video decoder, inverse DRA to the picture to at least one of perform color conversion or increase dynamic range;

sequential to the applying of the inverse DRA, applying a conformance cropping window to the picture; and

outputting, with the video decoder, the picture to a video post processor after applying the conformance cropping window and the inverse DRA.

2. The method of claim 1, wherein, sequential to applying the inverse DRA, applying the conformance cropping window comprises applying the conformance cropping window prior to applying the inverse DRA, and wherein applying inverse DRA comprises applying inverse DRA to the output from the conformance cropping window.

3. The method of claim 1, wherein, sequential to applying the inverse DRA, applying the conformance cropping window comprises applying the conformance cropping window subsequent to applying the inverse DRA, and wherein applying inverse DRA comprises applying inverse DRA and outputting for performing the conformance cropping window.

4. The method of claim 1, further comprising determining DRA parameters for blocks of the picture, wherein a first set of the DRA parameters are for a first block of the picture and a second set of the DRA parameters are for a second block of the picture, wherein values of one or more

of the first set of DRA parameters are different than values of one or more of the second set of DRA parameters, wherein applying the inverse DRA comprises:

applying the inverse DRA for the first block based on the first set of DRA parameters for the first block; and

applying the inverse DRA for the second block based on the second set of DRA parameters for the second block.

5. The method of claim 1, wherein the picture stored in the memory is a picture that was decoded and used as the reference picture prior to being output from the memory.

6. The method of claim 1, wherein, at the process of outputting the picture in the DRA domain, applying inverse DRA to the picture comprises:

multiplying a luma sample by a luma scaling factor and adding a luma offset to generate an inverse DRA mapped luma sample;

multiplying a chroma sample of a first type by a first chroma scaling factor and adding a first chroma offset to generate an inverse DRA mapped chroma sample of the first type; and

multiplying a chroma sample of a second type by a second chroma scaling factor and adding a second chroma offset to generate an inverse DRA mapped chroma sample of the second type.

7. The method of claim 1, wherein, at the process of outputting the picture in the DRA domain, applying inverse DRA to the picture comprises:

subtracting a first luma offset from a luma sample to generate an initial luma offset value;

multiplying the initial luma offset value by a luma scaling factor and adding a second luma offset to generate an inverse DRA mapped luma sample;

subtracting a first chroma offset from a chroma sample of a first type to generate an initial chroma offset value of the first type;

multiplying the initial chroma offset value of the first type by a first chroma scaling factor and adding a second chroma offset to generate an inverse DRA mapped chroma sample of the first type;

subtracting a third chroma offset from a chroma sample of a second type to generate an

initial chroma offset value of the second type; and

multiplying the initial chroma offset value of the second type by a second chroma scaling factor and adding a fourth chroma offset to generate an inverse DRA mapped chroma sample of the second type.

8. The method of claim 1, wherein determining that the picture in the DRA domain stored in the memory is to be output from the memory comprises at least one of:

determining that a bumping process is to be applied for outputting the picture in the DRA domain from the memory; or

determining based on a timing parameter that the picture in the DRA domain is to be output from the memory.

9. A device for decoding video data, the device comprising: and

a memory configured to store pictures that are usable as reference pictures including a picture in a dynamic range adjustment (DRA) domain;

a processor of a video decoder configured to:

determine that the picture in the dynamic range adjustment (DRA) domain stored in the memory is to be output from the memory that stores the pictures that are usable as reference pictures, wherein the picture in the DRA domain is useable as a reference picture;

subsequent to determining that the picture in the DRA domain is to be output, perform a process of outputting the picture in the DRA domain from the memory that stores the pictures that are usable as reference pictures;

at the process of outputting the picture in the DRA domain from the memory that stores the pictures that are usable as reference pictures, apply inverse DRA to the picture to at least one of perform color conversion or increase dynamic range;

sequential to the applying of the inverse DRA, apply a conformance cropping window to the picture; and

output the picture to a video post processor after applying the conformance cropping window and the inverse DRA.

10. The device of claim 9, wherein the video decoder comprises at least one of fixed-function or programmable circuitry, and wherein the memory comprises a decoded picture buffer (DPB) of the video decoder.

11. The device of claim 9, wherein, sequential to applying the inverse DRA, to apply the conformance cropping window, the processor is configured to apply the conformance cropping window prior to applying the inverse DRA, and wherein to apply inverse DRA, the processor is configured to apply inverse DRA to the output from the conformance cropping window.

12. The device of claim 9, wherein, sequential to applying the inverse DRA, to apply the conformance cropping window, the processor is configured to apply the conformance cropping window subsequent to applying the inverse DRA, and wherein to apply inverse DRA, the processor is configured to apply inverse DRA and output for performing the conformance cropping window.

13. The device of claim 9, wherein the processor is configured to determine DRA parameters for blocks of the picture, wherein a first set of the DRA parameters are for a first block of the picture and a second set of the DRA parameters are for a second block of the picture, wherein values of one or more of the first set of DRA parameters are different than values of one or more of the second set of DRA parameters, wherein to apply the inverse DRA, the processor is configured to:

apply the inverse DRA for the first block based on the first set of DRA parameters for the first block; and

apply the inverse DRA for the second block based on the second set of DRA parameters for the second block.

14. The device of claim 9, wherein the picture stored in the memory is a picture that was decoded and used as the reference picture prior to being output from the memory.

15. The device of claim 9, wherein, at the process of outputting the picture in the DRA domain, to apply inverse DRA to the picture, the processor is configured to:

multiply a luma sample by a luma scaling factor and add a luma offset to generate an inverse DRA mapped luma sample;

multiply a chroma sample of a first type by a first chroma scaling factor and add a first chroma offset to generate an inverse DRA mapped chroma sample of the first type; and

multiply a chroma sample of a second type by a second chroma scaling factor and add a second chroma offset to generate an inverse DRA mapped chroma sample of the second type.

16. The device of claim 9, wherein, at the process of outputting the picture in the DRA domain, to apply inverse DRA to the picture, the processor is configured to:

subtract a first luma offset from a luma sample to generate an initial luma offset value;

multiply the initial luma offset value by a luma scaling factor and add a second luma offset to generate an inverse DRA mapped luma sample;

subtract a first chroma offset from a chroma sample of a first type to generate an initial chroma offset value of the first type;

multiply the initial chroma offset value of the first type by a first chroma scaling factor and add a second chroma offset to generate an inverse DRA mapped chroma sample of the first type;

subtract a third chroma offset from a chroma sample of a second type to generate an initial chroma offset value of the second type; and

multiply the initial chroma offset value of the second type by a second chroma scaling factor and add a fourth chroma offset to generate an inverse DRA mapped chroma sample of the second type.

17. The device of claim 9, further comprising a display configured to display video data output with the video postprocessor.

18. The device of claim 9, wherein the device comprises one or more of a camera, a computer, a mobile device, a broadcast receiver device, or a set-top box.

19. The device of claim 9, wherein to determine that the picture in the DRA domain stored in the memory is to be output from the memory, the processor is configured to at least one of:

determine that a bumping process is to be applied for outputting the picture in the DRA domain from the memory; or

determine based on a timing parameter that the picture in the DRA domain is to be output from the memory.

20. A non-transitory computer-readable storage medium storing instructions thereon that when executed cause one or more processors of a video decoder of a device for decoding video data to:

determine that a picture in a dynamic range adjustment (DRA) domain stored in a memory is to be output from the memory, wherein the picture in the DRA domain is usable as a reference picture, and wherein the memory is configured to store pictures that are usable as reference pictures;

subsequent to determining that the picture in the DRA domain is to be output, perform a process of outputting the picture in the DRA domain from the memory that stores the pictures that are usable as reference pictures;

at the process of outputting the picture in the DRA domain from the memory that stores the pictures that are usable as reference pictures, apply inverse DRA to the picture to at least one of perform color conversion or increase dynamic range;

sequential to the applying of the inverse DRA, apply a conformance cropping window to the picture; and

output the picture to a video post processor after applying the conformance cropping window and the inverse DRA.

21. The non-transitory computer-readable storage medium of claim 20, wherein, sequential to applying the inverse DRA, the instructions that cause the one or more processors to apply the conformance cropping window comprise instructions that cause the one or more processors to apply the conformance cropping window prior to applying the inverse DRA, and wherein the instructions that cause the one or more processors to apply inverse DRA comprise instructions that cause the one or more processors to apply inverse DRA to the output from the conformance cropping window.

22. The non-transitory computer-readable storage medium of claim 20, wherein, sequential to applying the inverse DRA, the instructions that cause the one or more processors to apply the conformance cropping window comprise instructions that cause the one or more processors to apply the conformance cropping window subsequent to applying the inverse DRA, and wherein the instructions that cause the one or more processors to apply inverse DRA comprise instructions that cause the one or more processors to apply inverse DRA and outputting for performing the conformance cropping window.