CLAIMS

1. An apparatus to decode video data, the apparatus comprising:

a memory configured to store the video data that has been decoded; and

at least one processor coupled to the memory and configured to:

obtain a video bitstream, the video bitstream including adaptive loop filter (ALF) data;

determine a value of an ALF chroma filter signal flag from the ALF data, the value of the ALF chroma filter signal flag indicating whether chroma ALF filter data is signaled in the video bitstream;

process the value of the ALF chroma filter signal flag from the ALF data to determine that the chroma ALF filter data is signaled in the video bitstream;

determine a chroma type array variable for the at least the portion of the slice of video data;

determine an ALF chroma application parameter set (APS) identifier for the first of the one or more the chroma components of at least portion of the slice of video data based on the chroma type array variable for the at least the portion of the slice of video data;

determine a signaled ALF map for the first one of the one or more chroma components of the at least the portion of the slice of the video data based on the chroma type array variable;

enable ALF filtering for a first of one or more chroma components of at least a portion of a slice of video data; and

process the one or more chroma components of the at least the portion of the slice of video data based on the value of the ALF chroma filter signal flag.

2. The apparatus of claim 1, wherein the at least one processor is further configured to:

obtain a slice header for at least the portion of the slice of video data from the video bitstream;

determine a value of an ALF chroma identifier from the slice header, the value of the ALF chroma identifier indicating whether an ALF can be applied to one or more chroma components of the at least the first potion of the slice of video data; and

process the one or more chroma components of the at least the portion of the slice of video data based on the ALF chroma identifier from the slice header.

3. The apparatus of claim 2, wherein the value of the ALF chroma filter signal flag indicates that the chroma ALF filter data is signaled in the video bitstream, and wherein the chroma ALF filter data is signaled in an adaptation parameter set (APS) for processing the one or more chroma components of the at least the portion of the slice of video data.

4. The apparatus of claim 1, wherein the at least one processor is configured to infer that the value of the ALF chroma filter signal flag is zero when the value of the ALF chroma filter signal flag is not present in the ALF data.

5. The apparatus of claim 1, wherein the at least the portion of the slice of video data includes 4:2:0 format video data or 4:2:2 format video data.

6. The apparatus of claim 1, wherein the at least the portion of the slice of video data includes 4:4:4 format video data.

7. The apparatus of claim 1, wherein the ALF filtering for a first one of the one or more chroma components of the at least the portion of the slice of video data is based on the at least the portion of the slice of video data that includes non-4:2:0 format video data.

8. The apparatus of claim 1, wherein the at least one processor is further configured to:

determine a second signaled ALF map for a second one of the one or more chroma components of the at least the portion of the slice of video data is based on the chroma type array variable.

9. The apparatus of claim 8, wherein the at least one processor is configured to perform ALF filtering on the first one of the one or more chroma components and the second one of the one or more chroma components of the at least the portion of the slice of video data using the signaled ALF map and the second signaled ALF map.

10. The apparatus of claim 1, wherein the apparatus comprises a mobile device.

11. The apparatus of claim 1, further comprising a display configured to display one or more images based on the one or more chroma components.

12. A method of decoding video data, comprising:

obtaining a video bitstream, the video bitstream including adaptive loop filter (ALF) data;

determining a value of an ALF chroma filter signal flag from the ALF data, the value of the ALF chroma filter signal flag indicating whether chroma ALF filter data is signaled in the video bitstream;

processing the value of the ALF chroma filter signal flag from the ALF data to determine that the chroma ALF filter data is signaled in the video bitstream;

determining a chroma type array variable for the at least the portion of the slice of video data;

determining an ALF chroma application parameter set (APS) identifier for a first of the one or more the chroma components of at least portion of the slice of video data based on the chroma type array variable for the at least the portion of the slice of video data;

determining a signaled ALF map for the first one of the one or more chroma components of the at least the portion of the slice of the video data based on the chroma type array variable;

enabling ALF filtering for a first of one or more chroma components of at least a portion of a slice of video data; and

processing the one or more chroma components of the at least the portion of the slice of video data based on the value of the ALF chroma filter signal flag.

13. The method of claim 12, further comprising:

obtaining a slice header for the at least the portion of the slice of video data from the video bitstream;

determining a value of an ALF chroma identifier from the slice header, the value of the ALF chroma identifier indicating whether an ALF can be applied to the one or more–chroma components of the at least the portion of the slice of video data ; and

processing the one or more chroma components of the at least the portion of the slice based on the ALF chroma identifier from the slice header.

14. The method of claim 13, wherein the value of the ALF chroma filter signal flag indicates that the chroma ALF filter data is signaled in the video bitstream, and wherein the chroma ALF filter data is signaled in an adaptation parameter set (APS) for processing the one or more chroma components of the at least the portion of the slice.

15. The method of claim 12, further comprising inferring that the value of the ALF chroma filter signal flag is zero when the value of the ALF chroma filter signal flag is not present in the ALF data.

16. The method of claim 12, further comprising:

processing the value of the ALF chroma filter signal flag from the ALF data to determine that the chroma ALF filter data is signaled in the video bitstream.

17. The method of claim 12, wherein

the at least the portion of the slice of video data includes 4:2:0 format video data or 4:2:2 format video data.

18. The method of claim 12, wherein the at least the portion of the slice of video data includes 4:4:4 format video data.

19. The method of claim 18, wherein the enabling ALF filtering for the one or more chroma components of the at least the portion of the slice of video data is based on the at least the portion of the slice of video data that includes non-4:2:0 format video data.

20. The method of claim 12, further comprising:

determining a second signaled ALF map for a second one of the one or more components of the at least the portion of the slice of video data is based on the chroma type array variable.

21. The method of claim 20, further comprising performing ALF filtering on the first one of the one or more chroma components and the second one of the one or more components of the at least the portion of the slice of video data using the signaled ALF map and the second signaled ALF map.

22. An apparatus to encode video data, the apparatus comprising:

a memory configured to store encoded video data; and

at least one processor coupled to the memory and configured to:

generate adaptive loop filter (ALF) data;

determine a value of an ALF chroma filter signal flag for the ALF data, the value of the ALF chroma filter signal flag indicating whether chroma ALF filter data is signaled in a video bitstream;

process the value of the ALF chroma filter signal flag from the ALF data to determine that the chroma ALF filter data is signaled in the video bitstream;

determine a chroma type array variable for the at least the portion of the slice of video data;

determine an ALF chroma application parameter set (APS) identifier for a first of the one or more the chroma components of at least portion of the slice of video data based on the chroma type array variable for the at least the portion of the slice of video data; and

determine a signaled ALF map for the first one of the one or more chroma components of the at least the portion of the slice of the video data based on the chroma type array variable;

enable ALF filtering for a first of one or more chroma components of at least a portion of a slice of video data; and

process the one or more chroma components of the at least the portion of the slice of video data based on the value of the ALF chroma filter signal flag.