CLAIMS

~~WHAT IS CLAIMED IS:~~

1. An apparatus for coding video data, the apparatus comprising:

memory; and

one or more processors coupled to the memory, the one or more processors being configured to:

obtain a current coding block from the video data;

~~determine control data for the current coding block;~~

determine control data for the current coding block, the control data comprising a location with a horizontal coordinate and a vertical coordinate in full-sample units, a width variable specifying a width of the current coding block, a height variable specifying a height of the current coding block, a horizontal change of a motion vector, a vertical change of the motion vector, and a base scaled motion vector;

determine one or more affine motion vector clipping parameters from the control data;

select a sample of the current coding block;

determine an affine motion vector for the sample of the current coding block; and

clip the affine motion vector using the one or more affine motion vector clipping parameters to generate a clipped affine motion vector.

2. The apparatus of claim 1, wherein the control data further comprises:

~~a location with associated horizontal coordinate and associated vertical coordinate in full-sample units;~~

~~a width variable specifying a width of the current coding block;~~

~~a height variable specifying a height of the current coding block;~~

~~a horizontal change of motion vector;~~

~~a vertical change of motion vector;~~

~~a base scaled motion vector;~~

a height of a picture associated with the current coding block in samples; and

a width of the picture in samples.

3. The apparatus of claim 2, wherein the one or more affine motion vector clipping parameters comprise:

a horizontal maximum variable;

a horizontal minimum variable;

a vertical maximum variable; and

a vertical minimum variable.

4. The apparatus of claim 3, wherein the horizontal minimum variable is defined by a maximum value selected from a horizontal minimum picture value and a horizontal minimum motion vector value.

5. The apparatus of claim 4, wherein the horizontal minimum picture value is determined from the associated horizontal coordinate.

6. The apparatus of claim 5, wherein the horizontal minimum motion vector value is determined from a center motion vector value, an array of values based on a resolution value associated with the video data, and the width variable specifying the width of the current coding block.

7. The apparatus of claim 6, wherein the center motion vector value is determined from the base scaled motion vector, the horizontal change of motion vector, the width variable, and the height variable.

8. The apparatus of claim 7, wherein the base scaled motion vector corresponds to a top left corner of the current coding block and is determined from control point motion vector values.

9. The apparatus of claim 3, wherein the horizontal maximum variable is defined by a minimum value selected from a horizontal maximum picture value and a horizontal maximum motion vector value.

10. The apparatus of claim 9, wherein the horizontal maximum picture value is determined from the width of the picture, the associated horizontal coordinate, and the width variable.

11. The apparatus of claim 10, wherein the horizontal maximum motion vector value is determined from a center motion vector value, an array of values based on a resolution value associated with the video data, and the width variable specifying the width of the current coding block.

12. The apparatus of claim 11, wherein the center motion vector value is determined from the base scaled motion vector, the horizontal change of motion vector, the width variable, and the height variable.

13. The apparatus of claim 12, wherein the base scaled motion vector corresponds to a corner of the current coding block and is determined from control point motion vector values.

14. The apparatus of claim 3, wherein the vertical maximum variable is defined by a minimum value selected from a vertical maximum picture value and a vertical maximum motion vector value.

15. The apparatus of claim 14, wherein the vertical maximum picture value is determined from the height of the picture, the associated vertical coordinate, and the height variable.

16. The apparatus of claim 15, wherein the vertical maximum motion vector value is determined from a center motion vector value, an array of values based on a block area size associated with the video data, and the height variable specifying the width of the current coding block.

17. The apparatus of claim 3, wherein the vertical minimum variable is defined by a

maximum value selected from a vertical minimum picture value and a vertical minimum motion vector value.

18. The apparatus of claim 17, wherein the vertical minimum picture value is determined from the associated vertical coordinate.

19. The apparatus of claim 18, wherein the vertical minimum motion vector value is determined from a center motion vector value, data block area size associated with the video data, and the height variable specifying the height of the current coding block.

20. The apparatus of claim 1, wherein the one or more processors are configured to:

sequentially obtain a plurality of current coding blocks from the video data;

determine a set of affine motion vector clipping parameters on a per coding block basis for blocks of the plurality of current coding blocks; and

fetch portions of a corresponding reference pictures using the set of affine motion vector clipping parameters on the per block basis for the plurality of current coding blocks.

21. The apparatus of claim 1, wherein the one or more processors are configured to:

identify a reference picture associated with the current coding block; and

store a portion of the reference picture defined by the one or more affine motion vector clipping parameters.

22. The apparatus of claim 21, further comprising a memory buffer coupled to the one or more processors, wherein the portion of the reference picture is stored in the memory buffer for affine motion processing operations using the current coding block.

23. The apparatus of claim 1, wherein the one or more processors are configured to:

process the current coding block using reference picture data from a reference picture indicated by the clipped affine motion vector.

24. The apparatus of claim 1, wherein the affine motion vector for the sample of the

current coding block is determined according to a first base scaled motion vector value, a first horizontal change of motion vector value, a first vertical change of motion vector value, a second base scaled motion vector value, a second horizontal change of motion vector value, a second vertical change of motion vector value, a horizontal coordinate of the sample, and a vertical coordinate of the sample.

25. The apparatus of claim 1, wherein the control data comprises values from a derivation table.

26. The apparatus of claim 1, wherein the current coding block is a luma coding block.

27. The apparatus of claim 1, further comprising:

a display device coupled to the one or more processors and configured to display images from the video data; and

one or more wireless interfaces coupled to the one or more processors, the one or more wireless interfaces comprising one or more baseband processors and one or more transceivers.

28. A method of coding video data, the method comprising:

obtaining a current coding block from the video data;

~~determining control data for the current coding block;~~

determining control data for the current coding block, the control data comprising a location with a horizontal coordinate and a vertical coordinate in full-sample units, a width variable specifying a width of the current coding block, a height variable specifying a height of the current coding block, a horizontal change of a motion vector, a vertical change of the motion vector, and a base scaled motion vector;

determining one or more affine motion vector clipping parameters from the control data;

selecting a sample of the current coding block;

determining an affine motion vector for the sample of the current coding block; and

clipping the affine motion vector using the one or more affine motion vector clipping parameters to generate a clipped affine motion vector.

29. The method of claim 28, wherein the ~~control data comprises:~~

~~a location with associated horizontal coordinate and associated vertical coordinate in full-sample units;~~

~~a width variable specifying a width of the current coding block;~~

~~a height variable specifying a height of the current coding block;~~

~~a horizontal change of motion vector;~~

~~a vertical change of motion vector; and~~

~~a base scaled motion vector.~~

~~30. The method of claim 29, wherein the~~ one or more affine motion vector clipping parameters comprise:

a horizontal maximum variable;

a horizontal minimum variable;

a vertical maximum variable; and

a vertical minimum variable.

~~31~~30. The method of claim ~~30~~29, wherein the horizontal minimum variable is defined by a maximum value selected from a horizontal minimum picture value and a horizontal minimum motion vector value.

~~32~~31. The ~~apparatus~~method of claim ~~31~~30, wherein the horizontal minimum picture value is determined from the associated horizontal coordinate.

~~33~~32. The method of claim ~~32~~31, wherein the horizontal minimum motion vector value is determined from a center motion vector value, an array of values based on a block area size, and the width variable specifying the width of the current coding block.

~~34~~33. The method of claim ~~33~~32, wherein the center motion vector value is determined from the base scaled motion vector, the horizontal change of motion vector, the width variable, and the height variable.

~~35~~34. The method of claim ~~34~~33, wherein the base scaled motion vector corresponds to a top left corner of the current coding block and is determined from control point motion vector values.

~~36~~35. The method of claim ~~30~~29, wherein the horizontal maximum variable is defined by a minimum value selected from a horizontal maximum picture value and a horizontal maximum motion vector value.

~~37~~36. The method of claim ~~36~~35, wherein the horizontal maximum picture value is determined from the associated horizontal coordinate, and the width variable.

~~38~~37. The method of claim ~~37~~36, wherein the horizontal maximum motion vector value is determined from a center motion vector value, an array of values based on a block area size associated with the video data, and the width variable specifying the width of the current coding block.

~~39~~38. The method of claim ~~38~~37, wherein the center motion vector value is determined from the base scaled motion vector, the horizontal change of motion vector, the width variable, and the height variable.

~~40~~39. The method of claim ~~39~~38, wherein the base scaled motion vector corresponds to a corner of the current coding block and is determined from control point motion vector values.

~~41~~40. The method of claim ~~30~~29, wherein the vertical maximum variable is defined by a minimum value selected from a vertical maximum picture value and a vertical maximum motion vector value.

~~42~~41. The method of claim ~~41~~40, wherein the vertical maximum picture value is determined from the associated vertical coordinate, and the height variable.

~~43~~42. The method of claim ~~42~~41, wherein the vertical maximum motion vector value is determined from a center motion vector value, an array of values based on a block area size associated with the video data, and the height variable specifying the width of the current coding block.

~~44~~43. The method of claim ~~30~~29, wherein the vertical minimum variable is defined by a maximum value selected from a vertical minimum picture value and a vertical minimum motion vector value.

~~45~~44. The method of claim ~~44~~43, wherein the vertical minimum picture value is determined from the associated vertical coordinate.

~~46~~45. The method of claim ~~45~~44, wherein the vertical minimum motion vector value is determined from a center motion vector value, an array of values based on a block area size associated with the video data, and the height variable specifying the height of the current coding block.

~~47~~46. The method of claim- 28, further comprising:

sequentially obtaining a plurality of current coding blocks from the video data;

determining a set of affine motion vector clipping parameters on a per coding block basis for blocks of the plurality of current coding blocks; and

fetching portions of a corresponding reference pictures using the set of affine motion vector clipping parameters on the per block basis for the plurality of current coding blocks.

~~48~~47. The apparatus of claim 28, further comprising:

identifying a reference picture associated with the current coding block; and

storing a portion of the reference picture defined by the one or more affine motion vector clipping parameters.

~~49~~48. The method of claim ~~48~~47, wherein the portion of the reference picture is stored in a memory buffer for affine motion processing operations using the current coding block.

~~50~~49. The ~~apparatus~~method of claim 28, further comprising:

processing the current coding block using reference picture data from a reference picture indicated by the clipped affine motion vector.

~~51~~50. The method of claim ~~1~~28, wherein the affine motion vector for the sample of the current coding block is determined according to a first base scaled motion vector value, a first horizontal change of motion vector value, a first vertical change of motion vector value, a second base scaled motion vector value, a second horizontal change of motion vector value, a second vertical change of motion vector value, a horizontal coordinate of the sample, and a vertical coordinate of the sample.

~~52~~51. The method of claim 28, wherein the control data comprises values from a derivation table.

~~53~~52. The method of claim 28, wherein the current coding block is a luma coding block.

~~54~~53. A non-transitory computer-readable storage medium comprising instructions stored thereon which, when executed by one or more processors, cause the one or more processors to:

obtain a current coding block from video data;

~~determine control data for the current coding block;~~

determine control data for the current coding block, the control data comprising a location with a horizontal coordinate and a vertical coordinate in full-sample units, a width variable specifying a width of the current coding block, a height variable specifying a height of the current coding block, a horizontal change of a motion vector, a vertical change of the motion vector, and a base scaled motion vector;

determine one or more affine motion vector clipping parameters from the control data;

select a sample of the current coding block;

determine an affine motion vector for the sample of the current coding block; and

clip the affine motion vector using the one or more affine motion vector clipping parameters to generate a clipped affine motion vector.

54. The method of claim 28, wherein the control data further comprises:
a height of a picture associated with the current coding block in samples; and
a width of the picture in samples.