

# V4L2\_META\_FMT\_VSP1\_HGT ('VSPT')

Renesas R-Car VSP1 2-D Histogram Data

## Description

This format describes histogram data generated by the Renesas R-Car VSP1 2-D Histogram (HGT) engine.

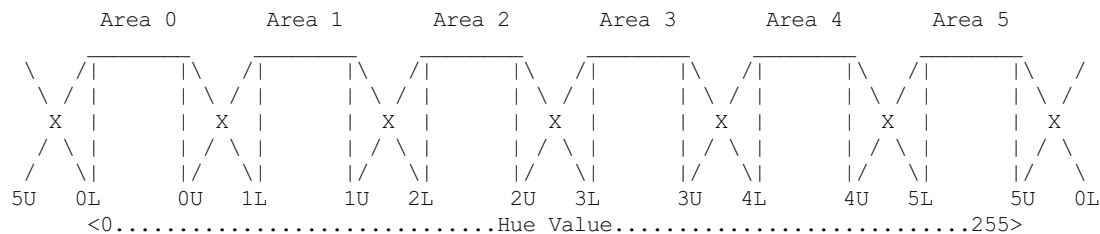
The VSP1 HGT is a histogram computation engine that operates on HSV data. It operates on a possibly cropped and subsampled input image and computes the sum, maximum and minimum of the S component as well as a weighted frequency histogram based on the H and S components.

The histogram is a matrix of 6 Hue and 32 Saturation buckets, 192 in total. Each HSV value is added to one or more buckets with a weight between 1 and 16 depending on the Hue areas configuration. Finding the corresponding buckets is done by inspecting the H and S value independently.

The Saturation position  $n$  (0 - 31) of the bucket in the matrix is found by the expression:

$$n = S / 8$$

The Hue position  $m$  (0 - 5) of the bucket in the matrix depends on how the HGT Hue areas are configured. There are 6 user configurable Hue Areas which can be configured to cover overlapping Hue values:



When two consecutive areas don't overlap ( $n+1L$  is equal to  $nU$ ) the boundary value is considered as part of the lower area.

Pixels with a hue value included in the centre of an area (between  $nL$  and  $nU$  included) are attributed to that single area and given a weight of 16. Pixels with a hue value included in the overlapping region between two areas (between  $n+1L$  and  $nU$  excluded) are attributed to both areas and given a weight for each of these areas proportional to their position along the diagonal lines (rounded down).

The Hue area setup must match one of the following constrains:

$$0L \leq 0U \leq 1L \leq 1U \leq 2L \leq 2U \leq 3L \leq 3U \leq 4L \leq 4U \leq 5L \leq 5U$$

$$0U \leq 1L \leq 1U \leq 2L \leq 2U \leq 3L \leq 3U \leq 4L \leq 4U \leq 5L \leq 5U \leq 0L$$

**Byte Order.** All data is stored in memory in little endian format. Each cell in the tables contains one byte.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v4l\linux-master) (Documentation) (userspace-api) (media) (v4l)pixfmt-meta-vsp1-hgt.rst, line 82)**

Unknown directive type "flat-table".

```
.. flat-table:: VSP1 HGT Data - (776 bytes)
   :header-rows: 2
   :stub-columns: 0

   * - Offset
     - :cspan: `4` Memory
   * -
     - [31:24]
     - [23:16]
     - [15:8]
     - [7:0]
   * - 0
     - -
     - S max [7:0]
     - -
     - S min [7:0]
   * - 4
     - :cspan: `4` S sum [31:0]
   * - 8
     - :cspan: `4` Histogram bucket (m=0, n=0) [31:0]
   * - 12
```

```
- :cspan:`4` Histogram bucket (m=0, n=1) [31:0]
* -
- :cspan:`4` ...
* - 132
- :cspan:`4` Histogram bucket (m=0, n=31) [31:0]
* - 136
- :cspan:`4` Histogram bucket (m=1, n=0) [31:0]
* -
- :cspan:`4` ...
* - 264
- :cspan:`4` Histogram bucket (m=2, n=0) [31:0]
* -
- :cspan:`4` ...
* - 392
- :cspan:`4` Histogram bucket (m=3, n=0) [31:0]
* -
- :cspan:`4` ...
* - 520
- :cspan:`4` Histogram bucket (m=4, n=0) [31:0]
* -
- :cspan:`4` ...
* - 648
- :cspan:`4` Histogram bucket (m=5, n=0) [31:0]
* -
- :cspan:`4` ...
* - 772
- :cspan:`4` Histogram bucket (m=5, n=31) [31:0]
```