

# V4L2\_META\_FMT\_VSP1\_HGO ('VSPH')

Renesas R-Car VSP1 1-D Histogram Data

## Description

This format describes histogram data generated by the Renesas R-Car VSP1 1-D Histogram (HGO) engine.

The VSP1 HGO is a histogram computation engine that can operate on RGB, YCrCb or HSV data. It operates on a possibly cropped and subsampled input image and computes the minimum, maximum and sum of all pixels as well as per-channel histograms.

The HGO can compute histograms independently per channel, on the maximum of the three channels (RGB data only) or on the Y channel only (YCbCr only). It can additionally output the histogram with 64 or 256 bins, resulting in four possible modes of operation.

- In *64 bins normal mode*, the HGO operates on the three channels independently to compute three 64-bins histograms. RGB, YCbCr and HSV image formats are supported.
- In *64 bins maximum mode*, the HGO operates on the maximum of the (R, G, B) channels to compute a single 64-bins histogram. Only the RGB image format is supported.
- In *256 bins normal mode*, the HGO operates on the Y channel to compute a single 256-bins histogram. Only the YCbCr image format is supported.
- In *256 bins maximum mode*, the HGO operates on the maximum of the (R, G, B) channels to compute a single 256-bins histogram. Only the RGB image format is supported.

**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-hgo.rst, line 44)**

Unknown directive type "flat-table".

```
.. flat-table:: VSP1 HGO Data - 64 Bins, Normal Mode (792 bytes)
   :header-rows: 2
   :stub-columns: 0

   * - Offset
     - :cspan:`4` Memory
   * -
     - [31:24]
     - [23:16]
     - [15:8]
     - [7:0]
   * - 0
     -
     - R/Cr/H max [7:0]
     -
     - R/Cr/H min [7:0]
   * - 4
     -
     - G/Y/S max [7:0]
     -
     - G/Y/S min [7:0]
   * - 8
     -
     - B/Cb/V max [7:0]
     -
     - B/Cb/V min [7:0]
   * - 12
     - :cspan:`4` R/Cr/H sum [31:0]
   * - 16
     - :cspan:`4` G/Y/S sum [31:0]
   * - 20
     - :cspan:`4` B/Cb/V sum [31:0]
   * - 24
     - :cspan:`4` R/Cr/H bin 0 [31:0]
   * -
     - :cspan:`4` ...
   * - 276
     - :cspan:`4` R/Cr/H bin 63 [31:0]
   * - 280
     - :cspan:`4` G/Y/S bin 0 [31:0]
   * -
     - :cspan:`4` ...
   * - 532
```

```
- :cspan: `4` G/Y/S bin 63 [31:0]
* - 536
- :cspan: `4` B/Cb/V bin 0 [31:0]
* -
- :cspan: `4` ...
* - 788
- :cspan: `4` B/Cb/V bin 63 [31:0]
```

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v41\[linux-master] [Documentation] [userspace-api] [media] [v41]pixfmt-meta-vspl-hgo.rst, line 95)**

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```
.. flat-table:: VSP1 HGO Data - 64 Bins, Max Mode (264 bytes)
   :header-rows: 2
   :stub-columns: 0

   * - Offset
     - :cspan: `4` Memory
   * -
     - [31:24]
     - [23:16]
     - [15:8]
     - [7:0]
   * - 0
     -
     - max(R,G,B) max [7:0]
     -
     - max(R,G,B) min [7:0]
   * - 4
     - :cspan: `4` max(R,G,B) sum [31:0]
   * - 8
     - :cspan: `4` max(R,G,B) bin 0 [31:0]
   * -
     - :cspan: `4` ...
   * - 260
     - :cspan: `4` max(R,G,B) bin 63 [31:0]
```

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v41\[linux-master] [Documentation] [userspace-api] [media] [v41]pixfmt-meta-vspl-hgo.rst, line 120)**

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```
.. flat-table:: VSP1 HGO Data - 256 Bins, Normal Mode (1032 bytes)
   :header-rows: 2
   :stub-columns: 0

   * - Offset
     - :cspan: `4` Memory
   * -
     - [31:24]
     - [23:16]
     - [15:8]
     - [7:0]
   * - 0
     -
     - Y max [7:0]
     -
     - Y min [7:0]
   * - 4
     - :cspan: `4` Y sum [31:0]
   * - 8
     - :cspan: `4` Y bin 0 [31:0]
   * -
     - :cspan: `4` ...
   * - 1028
     - :cspan: `4` Y bin 255 [31:0]
```

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\userspace-api\media\v41\[linux-master] [Documentation] [userspace-api] [media] [v41]pixfmt-meta-vspl-hgo.rst, line 145)**

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```
.. flat-table:: VSPl HGO Data - 256 Bins, Max Mode (1032 bytes)
  :header-rows: 2
  :stub-columns: 0

  * - Offset
    - :cspan:`4` Memory
  * -
    - [31:24]
    - [23:16]
    - [15:8]
    - [7:0]
  * - 0
    -
    - max(R,G,B) max [7:0]
    -
    - max(R,G,B) min [7:0]
  * - 4
    - :cspan:`4` max(R,G,B) sum [31:0]
  * - 8
    - :cspan:`4` max(R,G,B) bin 0 [31:0]
  * -
    - :cspan:`4` ...
  * - 1028
    - :cspan:`4` max(R,G,B) bin 255 [31:0]
```