# Halftone Raster Packing

## Technical Note Hqn090

November 2013

GLOBAL GRAPHICS® software

## Halftone raster packing

In a 64-bit RIP the halftone data is packed in 64-bit chunks instead of 32. You can see what the raster packing unit is in the Page buffer header labelled as `/PackingUnit`. It is also available in the structure `pageHeader` for plugin interface version 20.0 or later.

If a plugin or device treats the data as a row of bytes (instead of DWORDS or QWORDS) a form of "byte reversal" may be made to correct for the way Intel machines store DWORDS in little-endian form. Therefore, if your existing plugin or device is byte-reversing each group of four bytes (for example) in a 32-bit RIP, it may need to byte reverse each group of eight in a 64-bit RIP.

**Note:** `/PackingUnit` values other than 32 or 64 refer to contone raster formats. Plugins and devices that use contone raster will not need changing because the raster packing for contone is the same for both 32-bit and 64-bit.

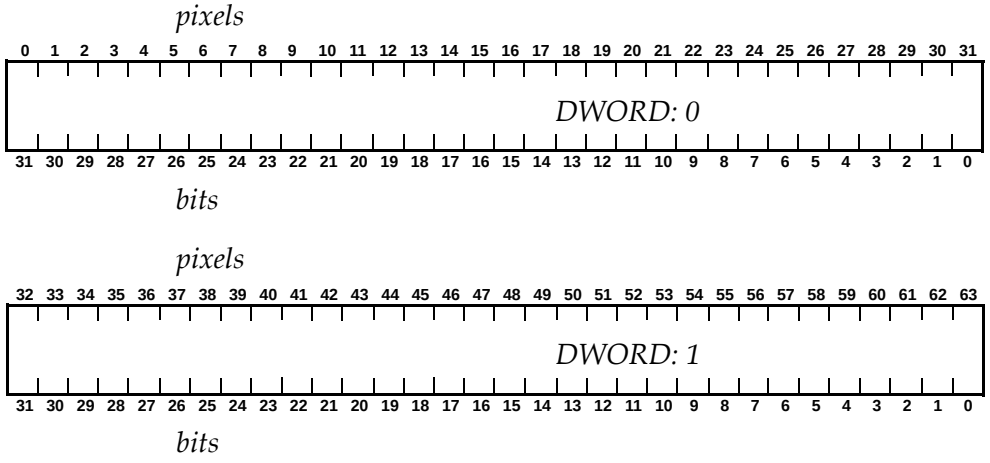
Currently, the Harlequin MultiRIP (HMR) v10.0rx supports 1-bit-per-pixel. The Harlequin Host Renderer (HHR) supports 1-, 2- and 4-bits-per-pixel.

To account for the possibility that future Harlequin RIPs might support additional packing models, the plugin or device code should check the `packingUnit` field in the `pageHeader` structure, as long as the RIP API version is high enough to support that field.

# 1-bit-per-pixel—packingUnit 32-bits

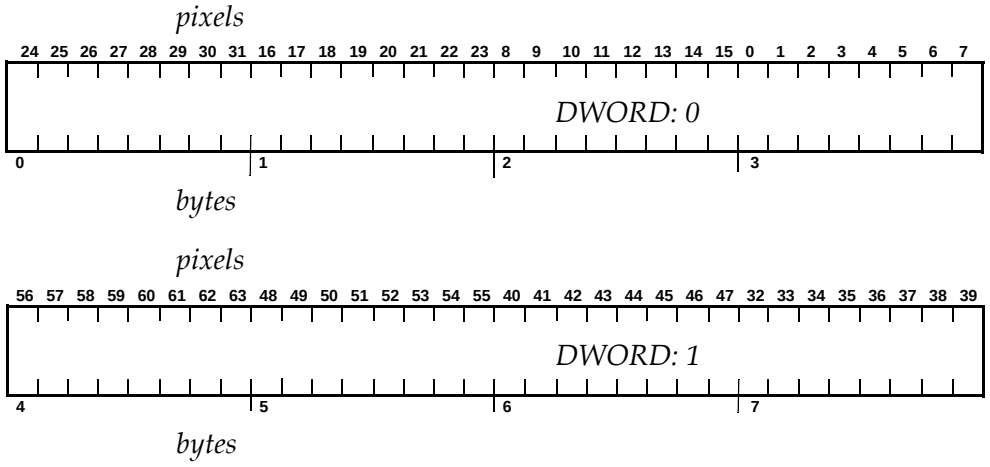
Supported by HMR v10.0rx and HHR 4.0rx.

In a 32-bit RIP each 32-bit machine-word (DWORD) in the raster has 32 bits of data, arranged with the left-most raster bit/pixel at the most significant end of the DWORD (bit 31) and the right-most raster bit/pixel at the least significant bit of the DWORD (bit 0), like this:



## 1-bit-per-pixel byte ordering on Intel machines

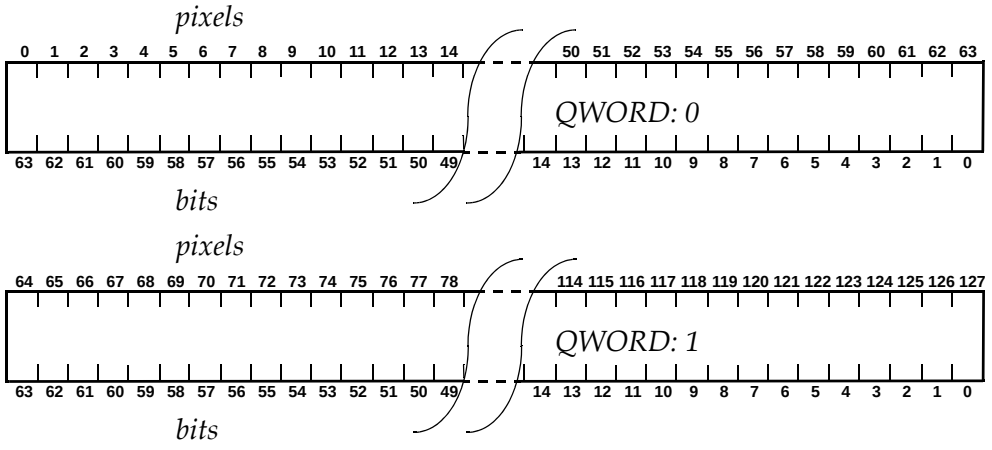
If a plugin or device treats the data as a row of bytes (instead of DWORDS or QWORDS) a form of “byte reversal” may be made to correct for the way intel machines store DWORDS in little-endian form. That is, the memory in byte order for the first two DWORDS on a 32-bit RIP, will look like this:



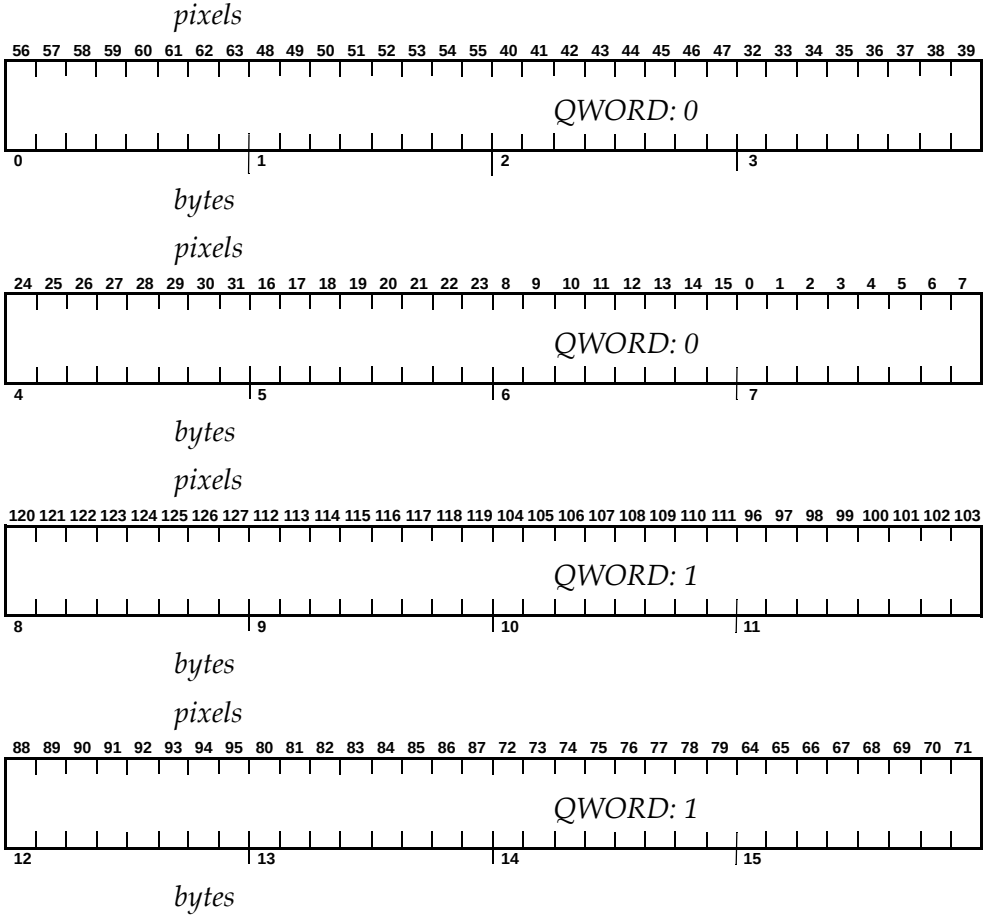
# 1-bit-per-pixel—packingUnit 64 bits

Supported by HMR v10.0rx and HHR 4.0rx.

In a 64-bit RIP each 64-bit machine-word (QWORD) in the raster has 64 bits of data, arranged with the left-most raster bit/pixel at the most significant end of the QWORD (bit 63) and the right-most raster bit/pixel at the least significant bit of the QWORD (bit 0), like this:



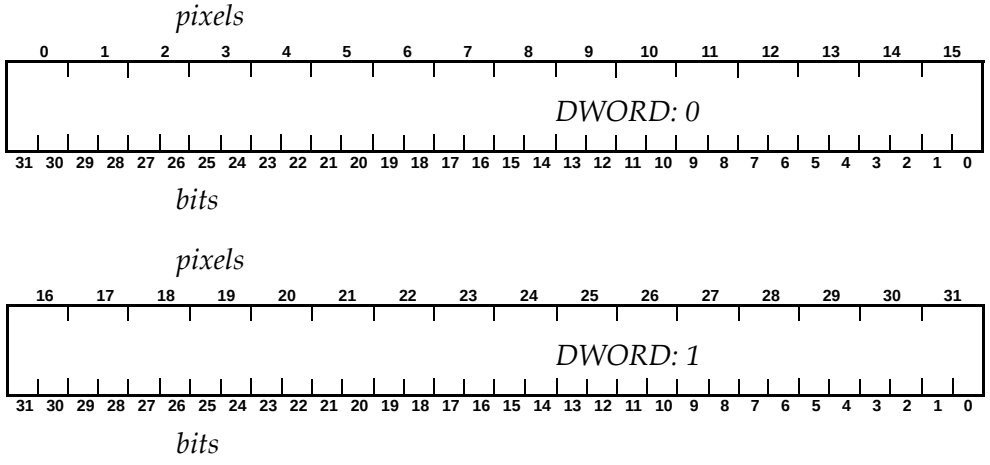
In a 64-bit RIP, the byte order for the first two QWORDS looks like this:



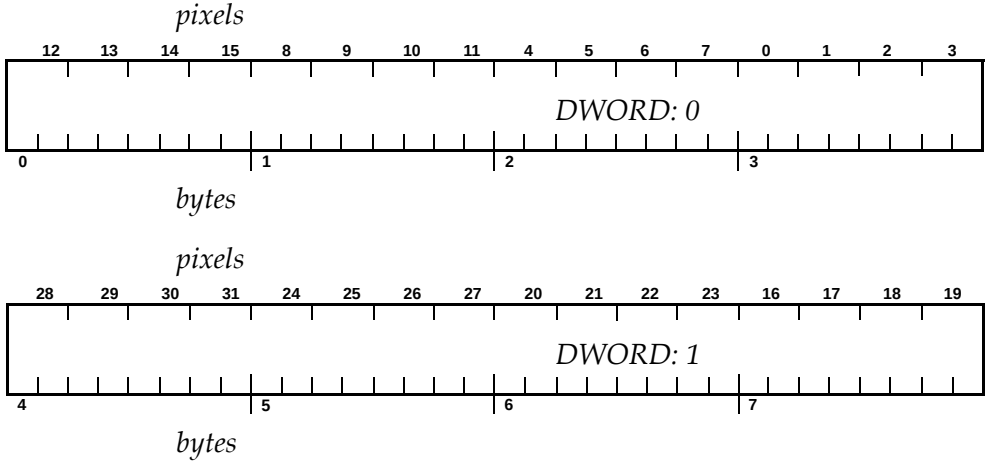
## 2-bits-per-pixel—packingUnit 32 bits

Supported by HHR 4.0rx.

Each 32-bit machine-word [DWORD] in the raster has 32 bits of data arranged with the left-most raster pixel at the most significant end of the DWORD (bits 30 and 31) and the right-most raster pixel at the least significant end of the DWORD (bits 0 and 1), like this:



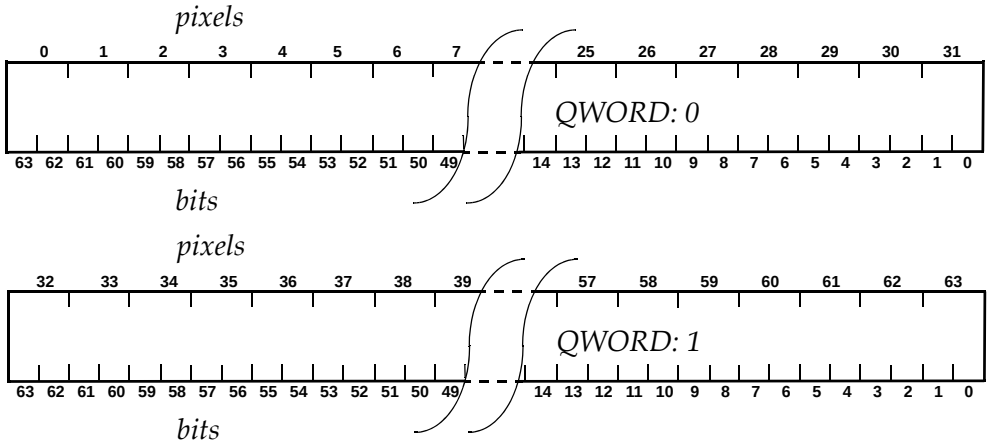

On little-endian architectures (such as Intel), if you look at memory in byte order for the first two DWORDS when 32-bit packed, it looks like this:



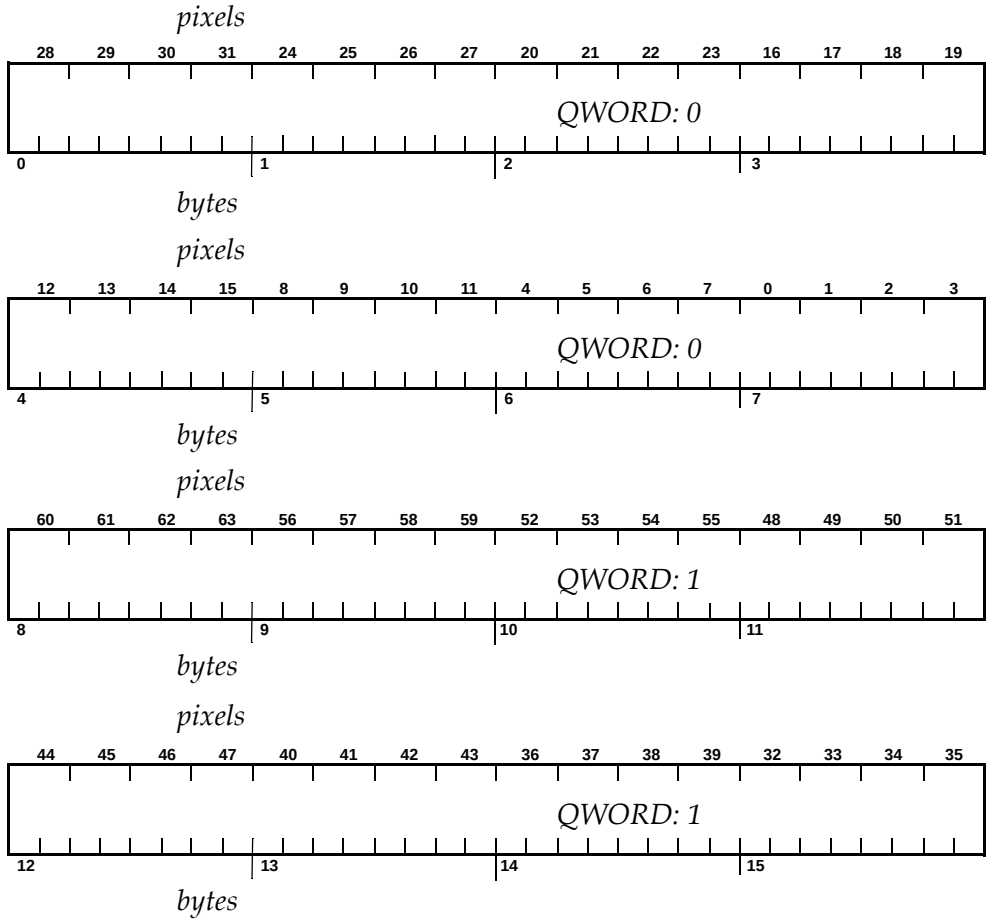
## 2-bits-per-pixel—packingUnit 64 bits

Supported by HHR 4.0rx.

Each 64-bit machine-word [QWORD] in the raster has 64 bits of data arranged with the left-most raster pixel at the most significant end of the QWORD (bits 62 and 63) and the right-most raster pixel at the least significant end of the QWORD (bits 0 and 1), like this:



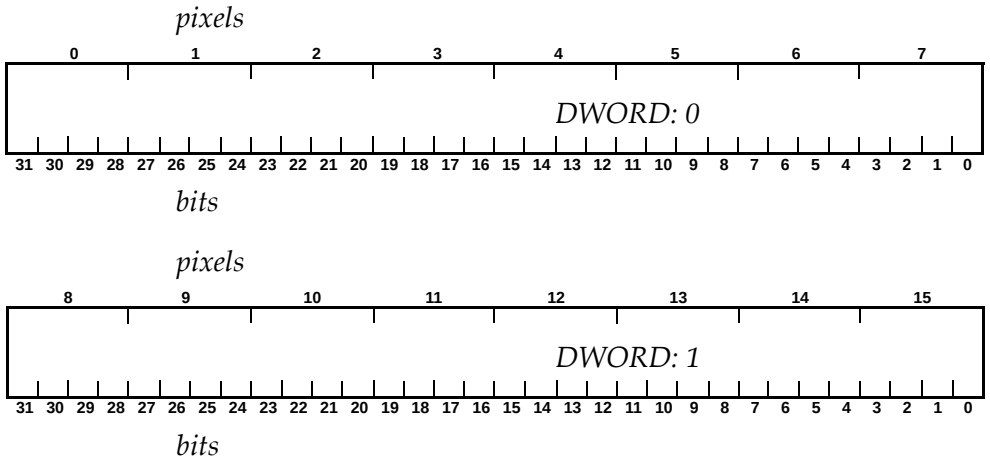
On little-endian architectures (such as Intel), if you look at memory in byte order for the first two QWORDS when 64-bit packed, it looks like this:



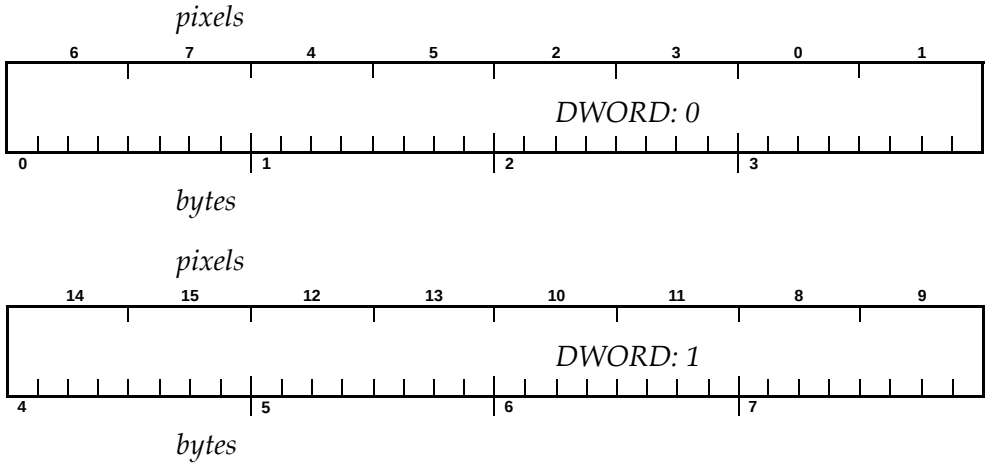
## 4-bits-per-pixel—packingUnit 32 bits

Supported by HHR 4.0rx.

Each 32-bit machine-word [DWORD] in the raster has 32 bits of data arranged with the left-most raster pixel at the most significant end of the DWORD (bits 28 to 31) and the right-most raster pixel at the least significant end of the DWORD (bits 0 to 3), like this:



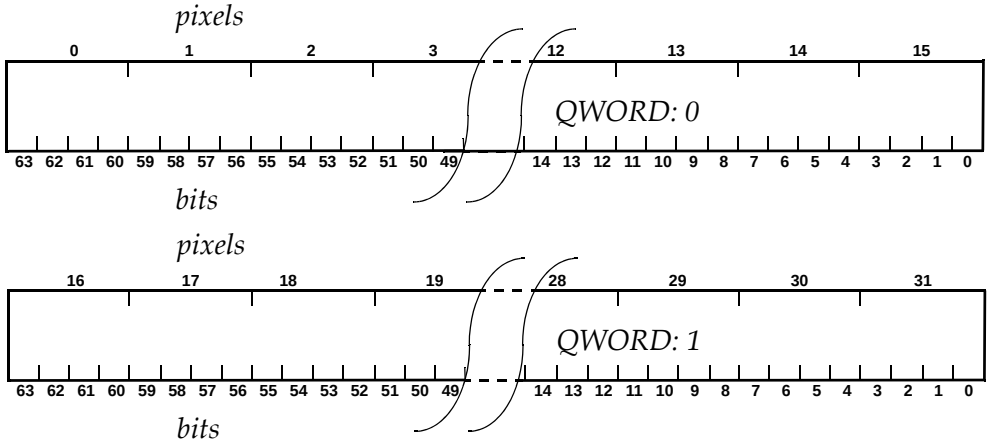

On little-endian architectures (such as Intel), if you look at memory in byte order for the first two DWORDS when 32-bit packed, it looks like this:



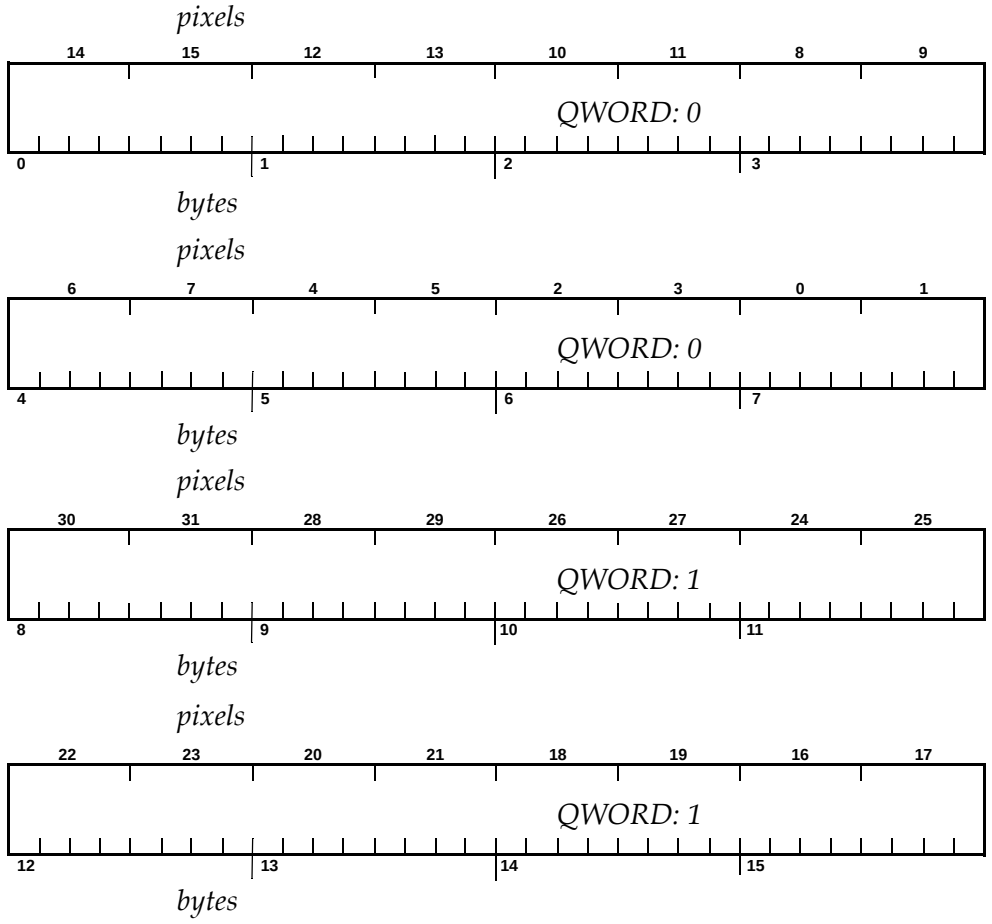
# 4-bits-per-pixel—packingUnit 64 bits

Supported by HHR 4.0rx.

Each 64-bit machine-word [QWORD] in the raster has 64 bits of data arranged with the left-most raster pixel at the most significant end of the QWORD (bits 60 to 63) and the right-most raster pixel at the least significant end of the QWORD (bits 0 to 3), like this:



On little-endian architectures (such as Intel), if you look at memory in byte order for the first two QWORDS when 64-bit packed, it looks like this:



# Document history

| Change history | | |
|---|---|---|
| v1.0 | 29.11.2013 | New Document |

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