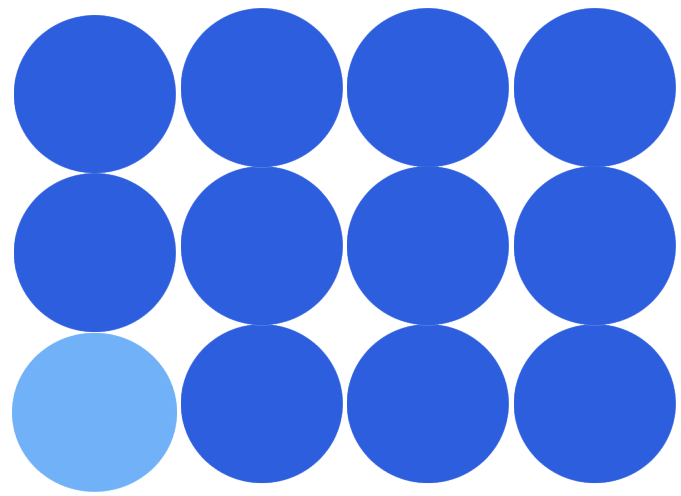


Histogram Video Core Datasheet



Features

- CPU access to histogram
- Direct Hardware access to histogram
- Up to 16 bit depth
- > 60 frames/sec
- Equalization function
- Log Equalization function
- Hardware clearing engine
- Interrupt generation



The Histogram function calculates statistics on the number of pixels for each gray level in the area of interest.

General Information

The information is calculated on a frame by frame basis as requested from software. The information can be used for calculation of image contrast and intensity equalization.

The design is fully synchronous to a single system clock input, and has an asynchronous active low system reset.

The Histogram and Statistics core has been designed to allow for easy integration into custom user applications. Configuration of the core, and access to histogram data and statistics is done through simple wire I/O and a RAM interface. Any processor bus interface can be connected to these signals so it can be configured through the customers bus interface. If desired, the core can be delivered with a simple bus interface that will provide all address decoding and read/write control.

Histogram Function

The Histogram Module will accept any size region of interest not exceeding a pixel count of $219 - 1$ pixels. Any valid video data which falls within the region of interest will be used as an address into a Dual Port RAM block. Each time a specific address is accessed, the content of the RAM at that address is incremented, thus each address location represents a bin of the histogram. At the end of a requested histogrammed frame, software can read the results from the Dual Port Memory and then set a bit indicating that the memory can be cleared, which is completed by hardware.



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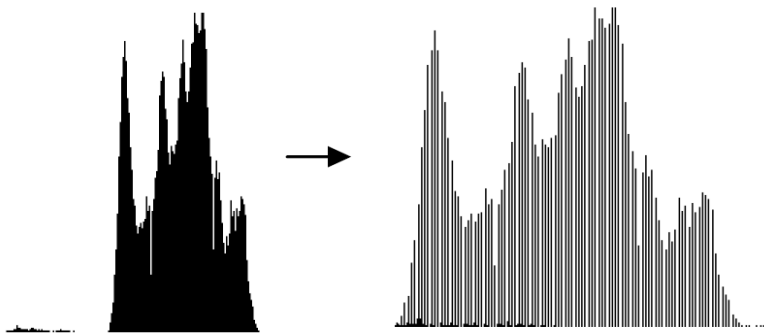
Digital Design Corporation • 3820 Ventura Dr. Arlington Hts. IL
60004 • Phone: 847-359-3828 • Fax: 847-359-5418
Website: www.digidescorp.com • E-Mail: sales@digidescorp.com

Area of Interest

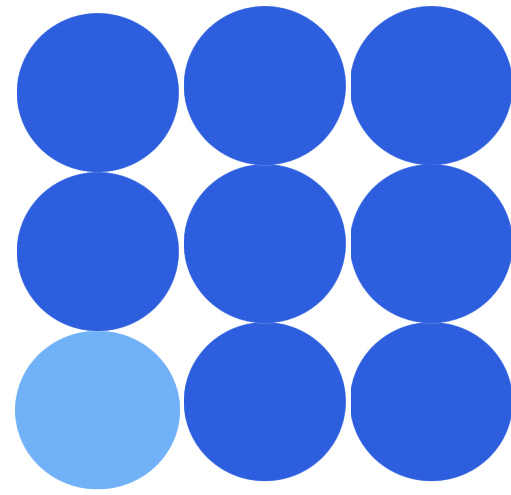
The Histogram and Statistics core allows the user to set an area of interest that is smaller than the full video frame. This is done by configuring a register. This register contains the x, y coordinates. The most significant bit in the register will indicate if the contents should be used as a start or stop coordinate. Only the pixels in the area of interest will be included when calculating the histogram.

Dual Port Operation

The Histogram and Statistics core allows the user to set an area of interest that is smaller than the full video frame. This is done by configuring a register. This register contains the x, y coordinates. The most significant bit in the register will indicate if the contents should be used as a start or stop coordinate. Only the pixels in the area of interest will be included when calculating the histogram.



Example of Contrast Stretching/Equalization using Histogram Data



Range Detection

For every frame of interest there is a minimum and maximum gray scale stored. With this information, software can determine the address range necessary to gather all histogram results. For the case where the gray scales do not span much of the spectrum, this will greatly decrease the amount of data required to be read. These registers will be reset at the beginning of each data collection.

3820 Ventura Dr.
Arlington Heights IL, 60004
Phone: 847-359-3828
Fax: 847-359-5418
www.digidescorp.com
Email: sales@digidescorp.com

For more information
contact Digital Design Corporation
sales at:

+ 1-847-359-3828

or go to our website at:

www.digidescorp.com

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