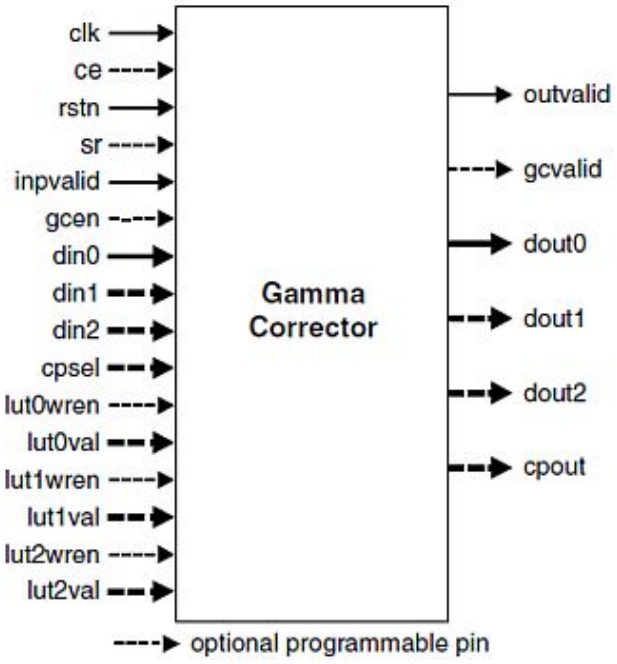
Gamma Corrector

Overview

Gamma correction is a type of pre-distortion correction made to images or video frames to offset the non-linear behavior of display systems, such as cathode ray tube (CRT) displays. A characteristic of CRT displays is that the intensity they generate is not a linear function of the input voltage. Instead, the intensity is proportional to a power of the signal amplitude, also referred to as gamma. Gamma is usually greater than 1 and therefore the displays have a lower gain at low intensities and progressively larger gain at higher intensities. The Gamma Corrector IP core multiplies the input signal with the inverse of the display transfer function which results in a linear intensity response with respect to the original input signal.

Several gamma correction methods and values are used in television and display systems. Plasma, LCOS (Liquid Crystal on Silicon) and DLP (Digital Light Processing) displays have transfer characteristics that are different from that of CRT displays. Sometimes the display itself can have linear characteristics, but a gamma transformation (usually called degamma) may be required because of an earlier gamma correction made to the incoming signal.

The Gamma Corrector IP core is a widely parameterizable, multi-color plane gamma correction system. It can support almost any custom gamma correction requirement.



Features

- Configurable number of color planes: 1 to 3
- Configurable number of bits per color plane: 4 to 12
- Option to specify gamma correction characteristics as an equation using a gamma value or by the actual mapping values of the look-up table
- Gamma correction look-up table can be run-time programmable
- Optimized gamma look-up table memory when same gamma correction is used for multiple color planes
- Gamma correction enable/disable control
- Option for sequential or parallel architecture for area or throughput trade-off
- Registered input option for input set-up time improvement

Performance and Resource Utilization

LatticeECP3[1]

IP Express User-Configurable Configuration	SLICEs	LUTs	Registers	sysMEM EBRs	f_{MAX} (MHz)
Sequential architecture, 3 color planes, same color planes	57	32	113	3	305
Parallel architecture, 3 color planes, same color planes	133	38	265	9	305
Sequential architecture, 3 color planes, different color planes	52	29	104	3	305

using this IP core in a different density, speed, or grade within the LatticeECP3 family, performance and utilization may vary.

LatticeECP2M / S[1]

IP Express User-Configurable Configuration	SLICEs	LUTs	Registers	sysMEM EBRs	f_{MAX} (MHz)
Sequential architecture, 3 color planes, same color planes	57	28	113	3	370
Parallel architecture, 3 color planes, same color planes	133	37	265	9	370
Sequential architecture, 3 color planes, different color planes	52	25	104	3	370

1. Performance and utilization characteristics are generated using LFE2M50E-7F672C and LFE2M50SE-7F672C with Lattice Diamond 1.1 software. When using this IP core in a different density, speed, or grade within the LatticeECP2M and LatticeECP2MS families, performance and utilization may vary.

LatticeECP2 / S[1]

IP Express User-Configurable Configuration	SLICEs	LUTs	Registers	sysMEM EBRs	f_{MAX} (MHz)
Sequential architecture, 3 color planes, same color planes	57	29	113	3	370
Parallel architecture, 3 color planes, same color planes	133	38	265	9	370
Sequential architecture, 3 color planes, different color planes	52	26	104	3	370

1. Performance and utilization characteristics are generated using LFE2-50E-7F672C and LFE2-50SE-7F672C with Lattice Diamond 1.1 software. When using this IP core in a different density, speed, or grade within the LatticeECP2 and LatticeECP2S families, performance and utilization may vary.

LatticeXP2[1]

IP Express User-Configurable Configuration	SLICEs	LUTs	Registers	sysMEM EBRs	f_{MAX} (MHz)
Sequential architecture, 3 color planes, same color planes	57	27	113	3	310
Parallel architecture, 3 color planes, same color planes	133	36	265	9	310
Sequential architecture, 3 color planes, different color planes	52	24	104	3	310

1. Performance and utilization characteristics are generated using LFXP2-17E-7F484C with Lattice Diamond 1.1 software. When using this IP core in a different density, speed, or grade within the LatticeXP2 family, performance and utilization may vary.

Ordering Information

Family	Part Number
LatticeECP3	GAMMA-E3-U1
LatticeECP2M/S	GAMMA-PM-U1
LatticeECP2/S	GAMMA-P2-U1
LatticeXP2	GAMMA-X2-U1

IP Version: 1.2
Evaluate: To download a full evaluation version of this IP, go to the IPexpress tool and click the IP Server button in the toolbar. All LatticeCORE IP cores and modules available for download will be visible. For more information on viewing/downloading IP please read the **IP Express Quick Start Guide**.
Purchase: To find out how to purchase the IP Core, please contact your **local Lattice Sales Office**.