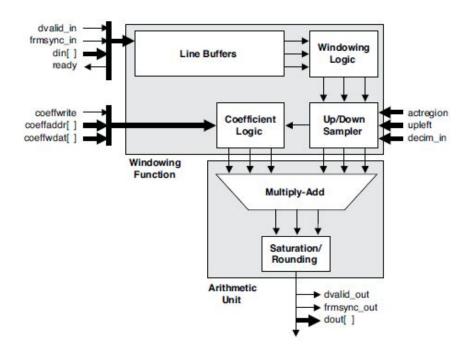## 2D FIR Filter IP Core

Overview

The **2D FIR Filter** IP core performs real-time 2D convolution of windowed portions of incoming video frames with coefficient matrices held in internal memory. Its flexible architecture supports a wide variety of filtering operations on various Lattice device families. The highly parameterized design takes advantage of the embedded DSP blocks available in Lattice FPGAs. A simple I/O handshake makes the core suitable for either streaming or bursty input video data. Coefficients may be set at compile time, or updated in system via a simple memory interface.

Features

- Single color plane
- Single-rate, interpolating, and decimating filter configurations
- Input frame size set at compile-time
- Static or dynamic zoom and pan
- User-specified 2D convolution kernel
- Separable and non-separable kernel support
- Kernel symmetry optimization
- Updatable coefficient

Performance and Resource Utilization

LatticeECP3[1]							
Configuration	Registers	LUTs	Slices	IOs	EBRs	18x18 Multipliers	f_{MAX} (MHz)
Config 1	924	2155	1412	23	2	9	129
Config 2	460	626	429	23	2	10	203
Config 3	404	622	407	23	2	6	201

for Lattice D-2010.03L-SP1 software. Performance may vary when using a different software version or targeting a different device density or speed grade within the LatticeECP3 family.

LatticeECP2M[1]

Configuration	Registers	LUTs	Slices	IOs	EBRs	18x18 Multipliers	f_{MAX} (MHz)
Config 1	919	2000	1368	2	2	9	147
Config 2	460	573	422	23	2	10	199
Config 3	401	672	431	23	2	6	209

1. Performance and utilization data are generated targeting an LFE3-17EA-7FN484C device using Lattice Diamond 1.1 and Synplify Pro for Lattice D-2010.03L-SP1 software. Performance may vary when using a different software version or targeting a different device density or speed grade within the LatticeECP3 family.

LatticeECP2[1]

Configuration	Registers	LUTs	Slices	IOs	EBRs	18x18 Multipliers	f_{MAX} (MHz)
Config 1	919	2000	1368	23	2	9	148
Config 2	460	573	422	23	2	10	201
Config 3	401	672	431	23	2	6	211

1. Performance and utilization data are generated targeting an LFE2-50E-6F484C device using Lattice Diamond 1.1 and Synplify Pro for Lattice D-2010.03L-SP1 software. Performance may vary when using a different software version or targeting a different device density or speed grade within the LatticECP2 family.

LatticeXP2[1]

Configuration	Registers	LUTs	Slices	IOs	EBRs	18x18 Multipliers	f_{MAX} (MHz)
Config 1	919	2000	1368	23	2	9	116
Config 2	460	573	422	23	2	10	159
Config 3	401	672	431	23	2	6	169

1. Performance and utilization data are generated targeting an LFXP2-40E-6F484C device using Lattice Diamond 1.1 and Synplify Pro for Lattice D-2010.03L-SP1 software. Performance may vary when using a different software version or targeting a different device density or speed grade within the LatticeXP2 family.

Ordering Information

Family	Part Number
LatticeECP3	2D-FIR-E3-U1
LatticeECP2M/S	2D-FIR-PM-U1
LatticeECP2/S	2D-FIR-P2-U1
LatticeXP2	2D-FIR-X2-U1

IP Version: 1.0

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**.