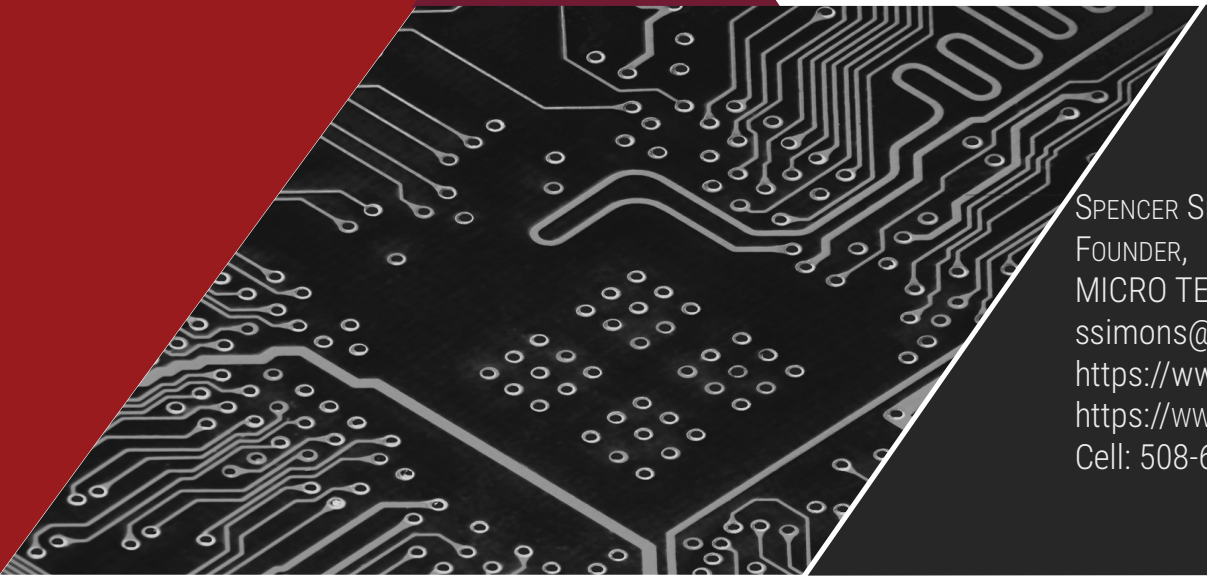
VIVIDSPARKS

MTG MICRO TECHNOLOGY GROUP

VividSparks Product Presentation



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About Us

- Founded in 1997 with the objective to serve OEM professional sales service
- We have distribution network in automotive, computing, consumer products, military, etc.
- We provide regional representation service and key account management service

VIVIDSPARKS MTG MICRO TECHNOLOGY GROUP

About VividSparks

- VividSparks is a high-speed computing technology company that specializes in fabless semiconductors
- They are oriented towards solving fundamental problems in arithmetic circuit designs
- At VividSparks, their technology is built with the goal of delivering high performance to users with minimum power consumption possible

VividSparks Technology

- VividarithmetiK is a next generation arithmetic co-processor that computes basic arithmetic functions such as addition,subtraction, multiplication, division, square root, trigonometric functions, compare and convert instructions using a new number system called POSIT

- VividarithmetiK eliminates carry propagation in adders and multipliers using novel adder called Carry Free Adder (CFA)

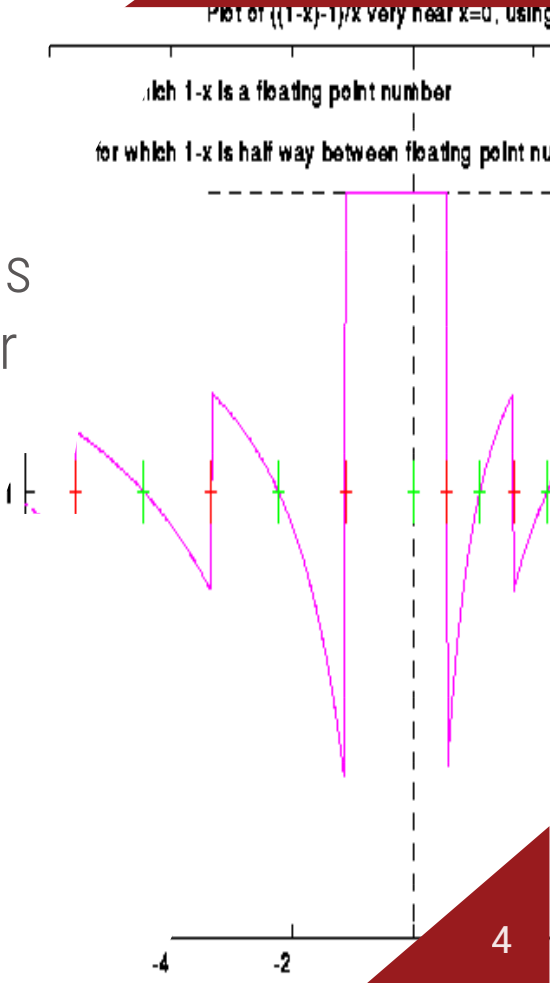
- CFA not only eliminates carry propagation but also consumes very less power and exceptionally high performance

- They build top performing chips by implementing super-fast arithmetic libraries in them rather than fabricating chip in higher technology nodes

Powered By VIVIDARITHMETIK

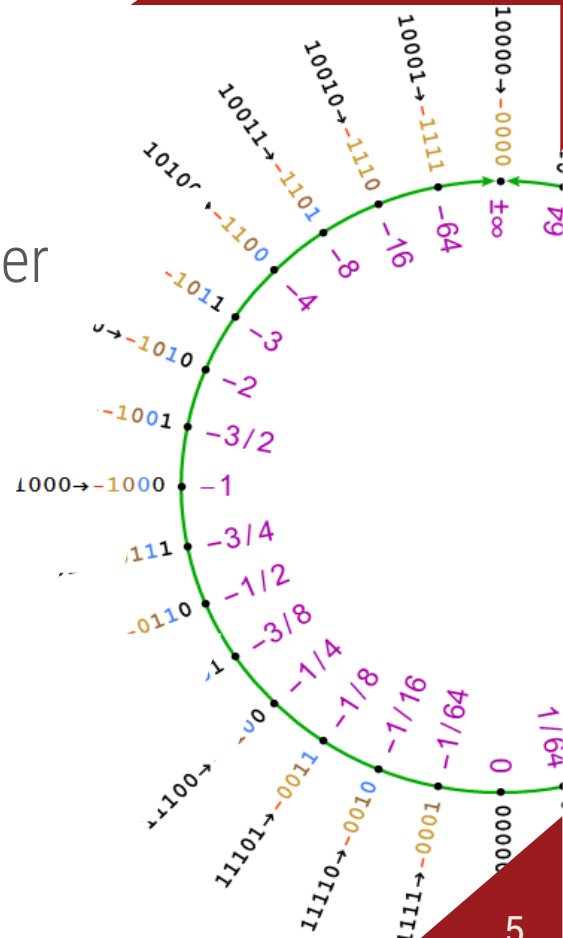
Problem

AI, HPC, machine learning, graphics computing, video processing applications demand high math computing with lesser data width, highly accurate result yet deliver higher performance.



Solution

POSIT number system require half data width compared to floating point number system, more accurate results, large dynamic range, much reduced power consumption yet deliver higher performance and large dynamic range.



VividSparks F1 Products

High Performance Computing (HPC) Co-Processor

Provides server-class performance that is also un-matched in it's efficiency and size

- Designed for HPC applications undertaking complex computing tasks
- Provides support for high end mathematical functions
- Provides more accurate results than Floating Point number system

POSIT GPU

Premium GPU architecture configurable up to 512 cores

- Flexible architecture with parameterization of different POSIT configurations
- More POSIT operations per watt
- Supports Floating Point equivalent POSIT instructions
- Supports CUDA equivalent programming model

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VividSparks F1 Products

Artificial Intelligence (AI) Co-Processor

Smallest, low-cost co-processor for 16-bit

- Very light weight arithmetic units best suited for AI applications
- Support for matrix multiplications and additions for Neural Network
- Flexible architecture with parameterization of processing elements

RISC-V + Posit Co-processor Unit

Cost efficient RISC-V+PCU that doesn't compromise performance

- Best suited for automotive applications
- Compatible for all RISC-V instructions
- Supported with VividSparks POSIT compiler

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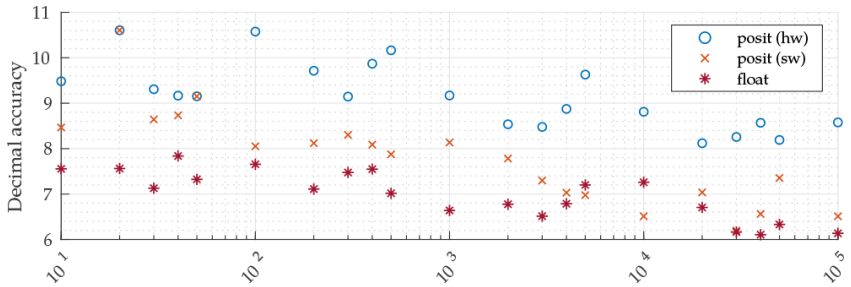
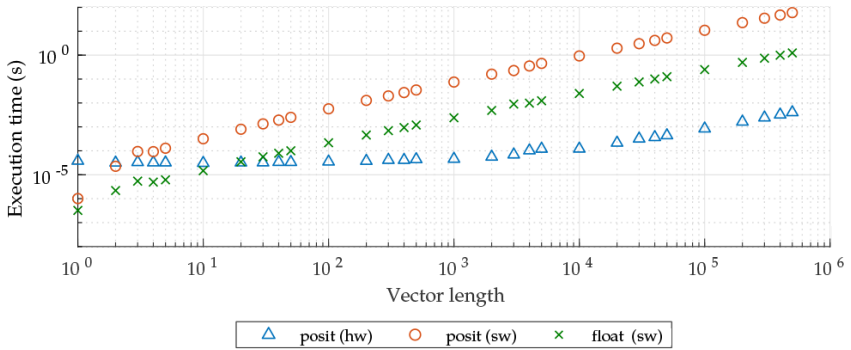
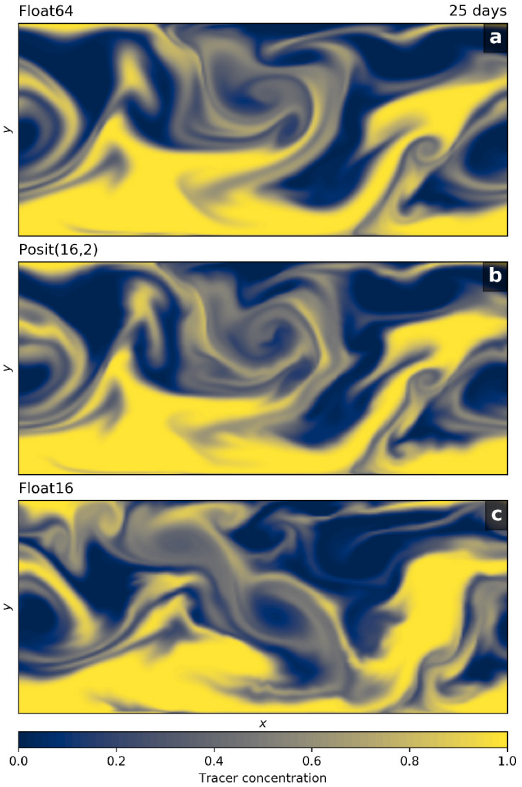
BENCHMARKS

DOT Product operation







Shallow water model

Competitive Comparison

	VividSpakrs Co-Processor (32 bit)	Intel FPU (32 bit)	AMD FPU (32 bit)	ARM FPU (32 bit)	Any Other FPU (32 bit)
Number System	POSIT	FP	FP	FP	FP
Average Latency of Operations	5	30+	20+	20+	30+
Execeptions	3	8	8	8	8
Dynamic Range	2×10^{-75} to 5×10^{74}	7×10^{-46} to 3×10^{38}	7×10^{-46} to 3×10^{38}	7×10^{-46} to 3×10^{38}	7×10^{-46} to 3×10^{38}
Carry Free Computation	Yes	No	No	No	No

Differentiation

- Their co-processor are based on POSIT number system
- Exceptionally high speed arithmetic libraries
- Eliminates carry propagation in computation
- Much better accurate result, large dynamic range and fewer exceptions than state-of-the-art Floating Point Units (FPUs)

Features and Benefits

All VividSparks' cores have the following capabilities to compute the following arithmetic operations with different POSIT configurations which are suited for different solutions.

- Sum of Products/2 independent products
- 2 independent Addition/Subtraction
- Multiply Add/Subtract
- Increment, Decrement
- 2 independent two's complement operations
- Sum of Reciprocals/2 independent reciprocals

- Sum of Inverse Square roots/2 independent Inverse Square roots
- Sum of Square roots/2 independent Square roots
- 2 independent trigonometric functions (sin, cos, tan, exp(x), log, etc.)
- 2 independent Integer to POSIT and vice versa conversions
- 2 independent compare operations
- Simple instruction pipeline

Thank you!