ADHOC TEKNOLOJİ A.Ş.

www.adhocteknoloji.com

HFFT-02D
Multi-FPGA Low Latency HFT Platform

The lowest latency (76 ns) was achieved in STAC-T1 tests with the HFFT-02X series under high-stress market scenarios.
https://stacresearch.com/news/ADHC240918

Highlighted Features

- Versal Premium VP1202/VP1502 Adaptive SoCs
- Ultra-fast FPGA-to-FPGA interconnect with sub-10ns latency communication channels
- Low latency SRAMs for T2t application
- Multi-FPGA and Multi-Device clock synchronization
- Allows indigenous C++ trading algorithms to be implemented by customer using on-chip 6 ARM processors for lowest latency SW algorithm trading
- Simultaneously independent usage as Tick-to Trade, Accelerator or Pre-Trade Risk Control

Interfaces

QSFP28 Ports	• Three independent 3x QSFP28 with x12 GTYP supporting to **36**x10-25 or **9**x40-100 Gbps
RJ-45 Ports	• 1x 10/100/1000 Mbps Ethernet for System Debug and Control • 10/100 Mbps Ethernet to Platform Management Board for System Health Monitor and Control
USB Port	• JTAG and Console Serial Port for each FPGA
PPS IN/OUT	• Multi-device Synchronization
Indicators	• Info RGB LED for Power Status and DONE • RGB LED for Communication Link Status
ON/OFF Button	• Illuminated latched switch

Power Supply Specifications

Reliability	• Redundant Dual Supply
Input Voltage	• 85-264 VAC Typical 115/230 V • 120-370 VDC
Input Frequency	• 47-63 Hz Typical 50/60 Hz
Input Connector	• IEC320-C14 Filtered/Fused Inlet
Power Consumption	• Less than 120W in ADHOC T2t App.
Management	• Platform Management Board monitors and controls the system

Accessories

Power Cords	• 2 x AC Power Cord
Other Cables	• F/O cables • Ethernet Cables • USB Cable

Mechanics

Form Factor	• 1U 19” Rackmount Form Factor
Size (W x H x D)	• 482.6 x 44.0 x 266 mm (W/Mounting Ear)
Active Cooling	• Triple Fan with optimized airflow • Reversable airflow direction for reverse mounting

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HFFT-02A FPGA (Versal™ Premium) Based Ultra Low Latency HFT Solution

- **FPGA-Based Ultra Low Latency Tick-to-Trade**
- **FPGA-Based Ultra Low Latency SW Tick-to-Trade**
- **FPGA-Based Ultra Low Latency Accelerator**

Highlighted Features

- Optimized for ultra low and deterministic latency (Parser, Synchronizer, Order Book Generation, Trigger Generation, Algorithm, Order Generation, TCP)
- Allows indigenous trading algorithms to be implemented by customer using on-chip micro-processor for lowest latency SW algorithm trading
- Supports HFT Tick-to-Trade, SW Tick-to-Trade and Accelerator applications simultaneously

General System Level Features

- FPGA Based HW Module processes two ITCH feeds simultaneously
- Scalable HW allows multiple FPGA boards to support more instruments
- Generates single ITCH feed by combining primary and secondary feeds for accelerating WS trading algorithms
- Multiplexing two additional order lanes (unlimited TCP sessions) with FPGA orders to support fastest switch free operation
- Recording control messaging, market data feeds, inbound and outbound orders with time stamp for analysis and back testing

Tick-to-Trade Features

- Optimized for ultra low and deterministic latency (Parser, Synchronizer, Order Book Generation, Trigger Generation, Algorithm, Order Generation, TCP)
- Built-in algorithms running on FPGA generate orders with minimum latency
- Customer trading algorithms (under NDA) can be implemented on FPGA for ultra-low latency T2t trading
- Customer trading algorithms can also be implemented by customer in FPGA CPU cores (ARM A72), enabling nano-second delay SW algorithms
- Up to 60 instruments per FPGA can be supported
- Supports multiple TCP sessions for order generation
- Supports HFT Tick-to-Trade, SW Tick-to-Trade and Accelerator applications simultaneously

Accelerator Features

- Optimized for ultra low and deterministic latency (Parser, Synchronizer, Order Book Generation, Trigger Generation)
- Price changes are sent to WS together with other information including current quantities
- SolarFlare NIC used for direct user space DMA
- Delay optimized SW Module receives price updates and triggers trading algorithms
- HW Module creates the trigger in nanoseconds after the market data command causing it. SW Module triggers Trading Software with a minimum possible delay depending on WS performance

Adhoc Teknoloji A.Ş. is a startup engineering company located in Ankara, Türkiye. The company specializes in high-performance communication solutions, driven by its highly motivated engineering team.

Adhoc Teknoloji A.Ş. is focused on High Frequency Trading Solutions, including FPGA-based Tick-to-Trade systems, Accelerators, Fast Software Order Book Generation, Market Data Simulator, Market Order Simulator and FPGA-based Precision Network Measurement & Analysis Solution.

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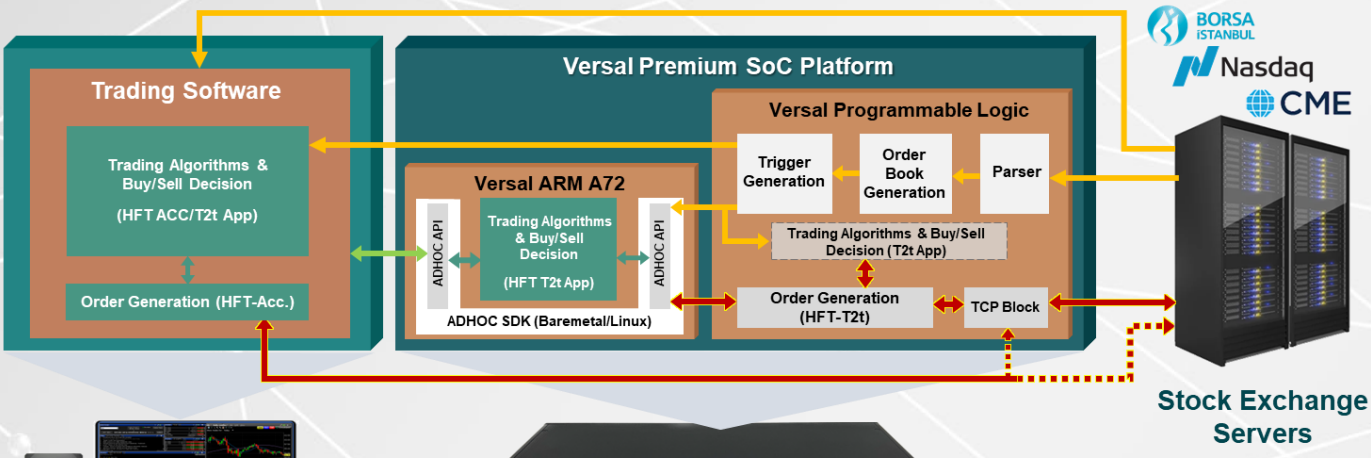

Trader Workstation

ADHOC, Ultra Low Latency HFT Products

- FPGA-Based Ultra Low Latency Tick-to-Trade (T2t)
- FPGA-Based Ultra Low Latency SW Tick-to-Trade (SW-T2t)
- FPGA-Based Ultra Low Latency Accelerator (Acc)

Interfaces

QSFP28 Ports	• 3x QSFP28 with x12 GTYP supporting to 12x10/25 (3x40/100) Gbps
RJ-45 Ports	• 1x 10/100/1000 Mbps Ethernet System Debug and Control • 10/100 Mbps Ethernet to Platform Management Board Power Monitor and Control
Micro USB Port	• Console Serial Port
Indicators	• Info RGB LED for Power Status and DONE • RGB LED for Communication Link Status
ON/OFF Button	• Illuminated latched switch

Power Supply Specifications

Reliability	• Redundant Power Supply
Input Voltage	• 85-264 VAC, typically 115/230 V • 120-373 VDC (optional)
Input Frequency	• 47-63 Hz, typically 50/60 Hz
Input Connector	• IEC 60320 C14 Filtered/Fused Inlet
Power Consumption	• Less than 50W
Management	• Platform Management Board monitors and controls the system

Accessories

Power Cables	• 2 x AC Power Cable
Other Cables	• F/O and DAC QSFP cables • Ethernet Cables • Micro USB Cable

Mechanics

Form Factor	• 1U 19” Rackmount Form Factor
Size (W x H x D)	• 482.6 x 44.0 x 206 mm (W/Mounting Ears)
Active Cooling	• Double Fan and ducted airflow design

Support Services

- Highly motivated and skilled engineering team for custom development
- Support for customer SW algorithm development for best performance
- Measurement of performance for optimization
- Support for selection & tuning of Workstation for Accelerator application

Customization

- ADHOC can also implement your indigenous trading algorithms directly on FPGA for ultra low latency T2t trading
  - Algorithms will not be shared with any other customer

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