ADHOC TEKNOLOJİ A.Ş.

Precision Network Measurement & Analysis Solution

- **Precision Network Measurement & Analysis HW Module**

Highlighted Features

- Extremely precise time stamps (in picoseconds)
- Connection Delay Measurement with loopbacks
- Flow Controlled Data Storage
- Data Collection & Classification
- Statistics
- Data Analysis
- Multi-Unit Synchronization

General Features

- Measurement and Analysis system consists of the following components;
  - ADHOC FPGA HW Module, where time stamping, delay measurement and flow controlled data buffering are performed
  - An L1 Switch/Fiber Tap capable of point-to-multipoint cross-connect (purchased separately by the customer)
  - Software Module operating on a WS for permanent storage, parsing and statistic generation
  - Data analysis on different workstations are possible including single step exchange info investigation

FPGA Based Hardware Module

- Receive input packets from 14 different 10Gb SFP+ ports
- All ports are on different time domains
- Extremely precise time stamps (in picoseconds) are issued and packets are buffered
- Buffered packets are transferred to the workstation for permanent storage with a proprietary reliable protocol

Software Module

- Runs on workstation capable of high capacity data storage
- Receives time-stamped packets, stores them in HDD and builds a database for fast analysis
- Flexible and reliable communication with HW Module
- Analysis capability on stored packets
  - Delays, delay distributions and comparisons for orders from different trading devices
  - Delays and delay distributions for stock exchange feeds
  - Status building on specific times, including order book, feed times, order times and responses from the stock exchange
  - Single-step analysis in time both forward and reverse direction

Support Services

- Highly motivated and skilled engineering team for custom development
- Providing service for measurement and analysis upon request
- Providing data analysis services upon request

Customization

- Customization service for any measurement scenario to be determined by the customer

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.
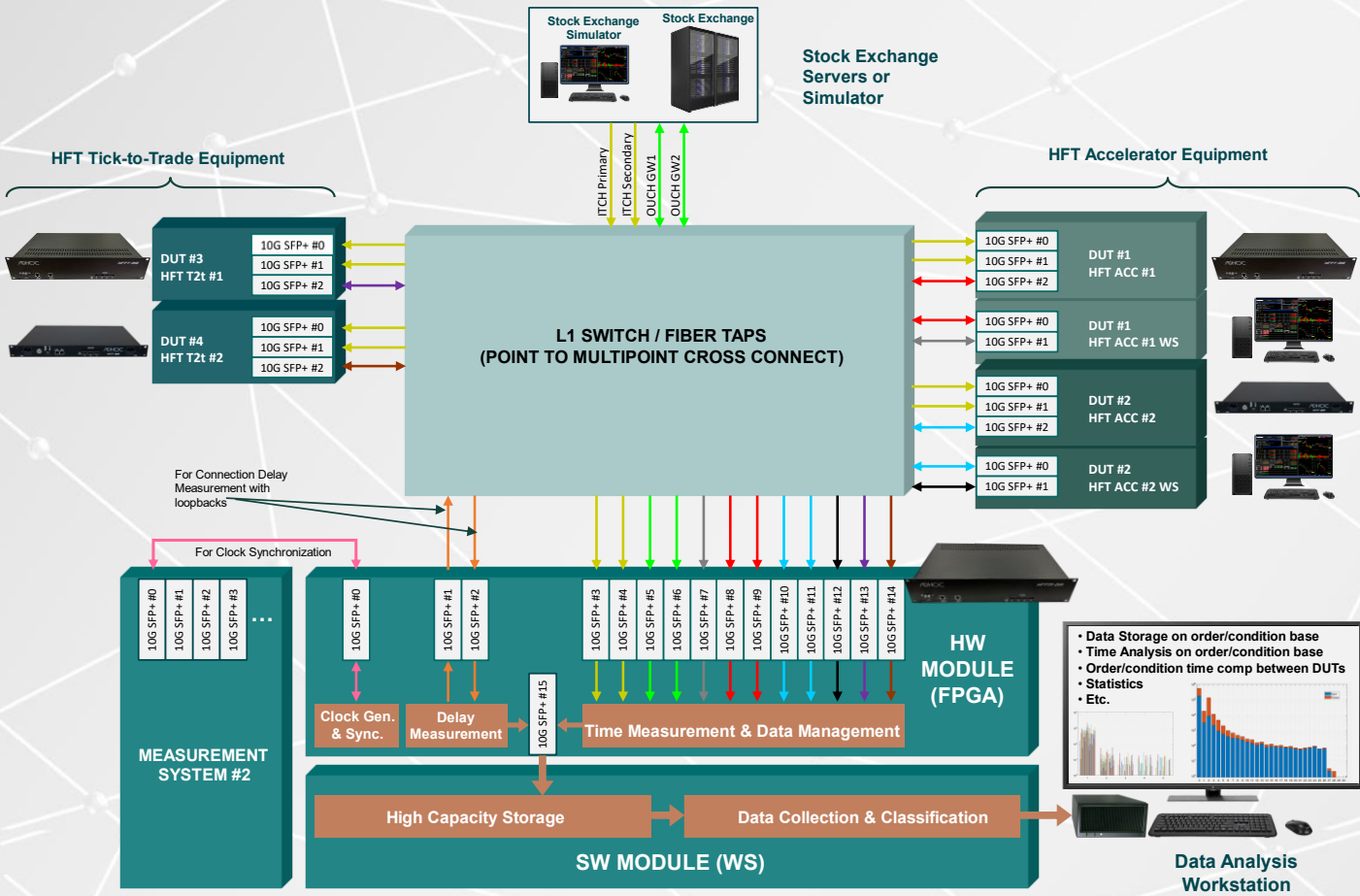
System block diagram showing Stock Exchange Servers or Simulator, HFT Tick-to-Trade Equipment, HFT Accelerator Equipment, L1 SWITCH / FIBER TAPS (POINT TO MULTIPOINT CROSS CONNECT), MEASUREMENT SYSTEM #2, HW MODULE (FPGA), SW MODULE (WS), and Data Analysis Workstation.

HW Module Interfaces

QSFP28 Ports	• 4x QSFP28 with x16 GTY supporting to 16x10/25 (4x40/100) 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
Power ON/OFF	• ON/OFF switch

HW Module Power Supply Specs

Reliability	• Redundant Power Supply
Input Voltage	• 85-264 VAC, typical, 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

HW Module Accessories

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

HW Module Mechanics

Form Factor	• 2U 19" Rackmount Form Factor
Size (W x H x D)	• 482.6 x 88.0 x 206 mm (W/Mounting Ears)
Active Cooling	• Single Fan with deducted airflow design