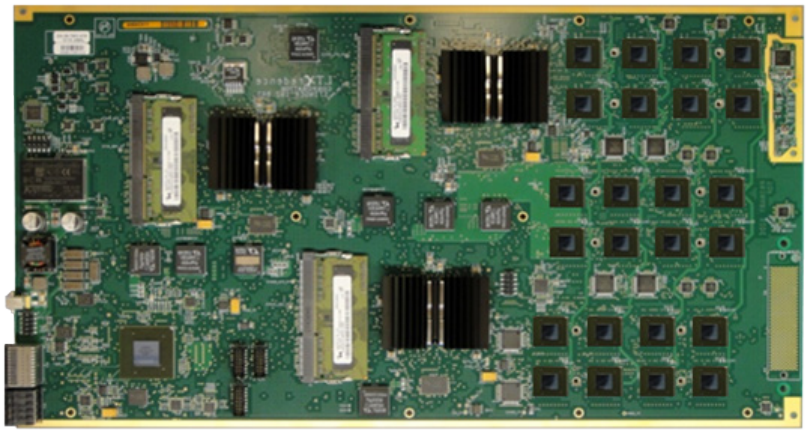
Diamond$_X$ GX1$_X$

General Purpose Digital Instrument for Digital, Analog, and MCU



The GX1$_X$ digital test instrument is designed specifically to meet the high-volume testing challenges of integrated application-specific standard-product (ASSP) devices used in personal connectivity, mobility, transportation and smart infrastructure.

Highlights

- Flexible pattern memory allocations
- Multiple pattern generation
- Transmit and receive of digitize waveforms
- Pattern synchronization and control of DC and AC analog test instruments

Features

- High channel density
- Pattern generator per 8 channels
- Reconfigurable pattern memory
- Deep capture memory
- Per-pin PMUs with remote sense capability
- Low jitter clock available on every pin
- FPGA based pattern sequencers and protocol generators
- PCI Express based data transfer
- Unison software protocol engine

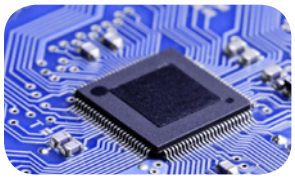
Automotive

Consumer

Flat Panel Display

IoT/IoV & Optoelectronics

Industrial & Medical



MCU

Mobility

- **192 Digital Channels per board**
- **200 MHz clocks, 200 Mbps data**
- **200 MHz sequencer**
- **256 pattern memory per pin**

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Advanced Digital Device Testing Challenges

ASSP and MCU devices require advanced digital test capability that goes beyond what was needed to test previous generation devices. Key GX1$_X$ features such as flexible pattern memory allocations, multiple pattern generation, transmit and receive of digitized wave forms; pattern synchronization and control of DC and AC analog test instruments provides the test coverage demanded by the next generation of advanced ASSP and MCU applications.

High Volume Manufacturing Challenges

Establishing the technical device test capability is only half the battle. Consumer and mobility end markets are driving a new paradigm in the IC product life cycle. The product life cycle is becoming significantly shorter with high volume production lasting 6 to 9 months. Once production starts, there is no opportunity to optimize the throughput to lower the cost of test. The GX1$_X$ features, in conjunction with the Diamondx architecture, permit optimum single-site test times and industry leading parallel test efficiencies to provide the best throughput and test economics out of the box.

High Channel Density

The 192 channels on a GX1$_X$ instrument allow high channel counts of more than 10,000 mixed-signal digital device test channels in the Diamondx scalable test system. The high resource count facilitates optimized multisite throughput by eliminating serialization of tests or sites due to shared resources.

Pattern Generator per 8 Channels

The GX1$_X$ pattern generators can run in lock-step or independently to provide efficient concurrent and multisite testing. The architecture supports multiple time domains and fractional bus capability. A fully featured set of pattern opcodes are provided for subroutines, looping, branching, triggering, keep alive, and DSP send / receive to control the pattern generators.

Reconfigurable Pattern Memory

Each channel has a 256M deep vector memory as standard. The vector memory is reconfigurable to
Reconfigurable Pattern Memory
Each channel has a 256M deep vector memory as standard. The vector memory is reconfigurable to provide efficient use of the memory for various pattern types including parallel vectors, SCAN vectors and DSP send vectors. The division of memory is determined automatically at load time. The following table shows maximum vector depth for the different vector types.

Vector Type		Max Vector Depth	Comment
Parallel		256 M	per channel
SCAN		512 M	96 scan chains per board
		16 G	3 scan chains per board
DSP Send	Parallel	256 M	per channel
	Serial	8 G	per 8 channels

Deep Capture Memory

Each channel has a 64M deep capture memory. This capture memory can be used for testing parallel / serial ADCs or other non-deterministic data sets. Additionally, this memory can be used to capture functional failures for online debugging or offline analysis in the EDA environment. The following table shows maximum capture depth for the different vector types.
waveforms for testing data converters.
In addition, the DSP S&R feature is a fundamental enabling technology for our software protocol engine.

Vector Type	Max Vector Depth	Comment
DSP Capture (parallel)	64 M	per channel
Pass / Fail Capture	31 M	per channel

- 192 Digital Channels per board
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- 200 MHz sequencer
- 256 pattern memory per pin

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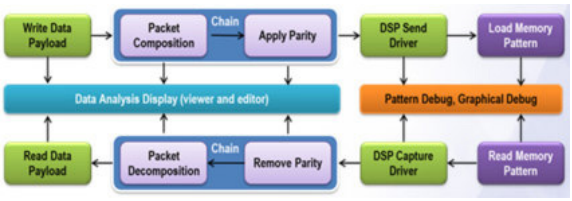
Unison Software Protocol Engine

The GX1$_X$ DSP Send and Receive (DSP S&R) feature can be used to transmit and receive digitized analog waveforms for testing data converters.



In addition, the DSP S&R feature is a fundamental enabling technology for our software protocol engine. The software protocol engine allows the user to work in data payload terms when communicating to and from the device under test. The GX1$_X$ in conjunction with the PCIe data bus architecture can quickly update send memory and read capture memory to adapt to device data in near real time. This software protocol engine is extensible through the Unison programming interface for flexibility that hardware-based solutions cannot match.

Precision PPMUs with Remote Sense

Each channel is capable of high-speed go/no-go and precision measurements of current and voltage. The go/no-go mode enables extremely fast measurements for production testing.

Many device pins are now multifunction pins, which can be configured in either mission mode or test mode. Test modes often require precision DC measurements over and above the capability of traditional PPMUs. The GX1$_X$ introduces a new feature which allows an even channel PPMU to use the adjacent odd channel as a remote sense. This capability permits higher accuracy voltage force and measurements than previous generation digital options by performing closer to typical analog tester VI instruments.

Unison Digital Software Support

The Unison software operating system runs on Linux and provides a full suite of digital & mixed-signal software tools for test program creation, debug, characterization and high-volume production. Unison allows users to interact at a high level through graphical tools and at a lower level using the C++ programming language to take advantage of the full power and flexibility of the system

All specifications are subject to change without notification and are for reference only. For detailed performance specifications, please contact Cohu.

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