Keysight M9036A
PXIe Embedded Controller
2.4 GHz Dual-Core, 4 GB

Data Sheet

Challenge the Boundaries of Test Keysite Modular Products

KEYSIGHT TECHNOLOGIES

Introduction

Overview

The Keysight Technologies, Inc. M9036A is an embedded PXIe PC controller which enables a compact platform solution. With the 2-link, 2x8 Gen 2 backplane configuration, it is an ideal match for the Keysight M9018A PXIe chassis.

Product description

The Keysight M9036A is a three-slot module that can be used to build compact PXIe systems. It easily integrates into hybrid test systems using GPIB, USB, and LAN with the built-in front panel interfaces.

The embedded controller is built upon a mid-performance Intel Core i5 dual-core processor with Hyper-Threading Technology and is designed for applications in multi-tasking environments.

Applications

- Aerospace and defense
- Communications
- General purpose applications
- Electronic functional test

Features

- Intel Core i5-520E 2.4GHz processor
- 3-slot PXIe controller module
- 160 GB solid-state drive
- 4 GB RAM memory with 8 GB option
- Gen 2 PCIe®, 4- or 2-link configuration providing up to 4 GB/s max data bandwidth between links
- Front panel connections with USB (4), 10/100/1000 LAN (2), DVI-I, GPIB, ExpressCard 34, and SMB trigger connector
- Support for Microsoft Windows 7 (32 and 64 bit) and Windows XP (32-bit)

Customer values

- Supports transportable applications
- Fast data transfer rates across the backplane
- Intel Hyper-Threading Technology provides performance required for multi-threaded applications
- Preloaded with operating system, drivers, and Keysight I/O libraries for reduced startup time
- Solid-state drive for improved mechanical reliability
- Specifically designed for PXIe systems that provide a choice between embedded and external controllers

Easy Setup ... Test ... and Maintenance

Hardware platform

Hardware overview

Based on the Intel i5 processor with Hyper-Threading Technology, the M9036A is ideal for modular applications requiring the compact size of an embedded computer.

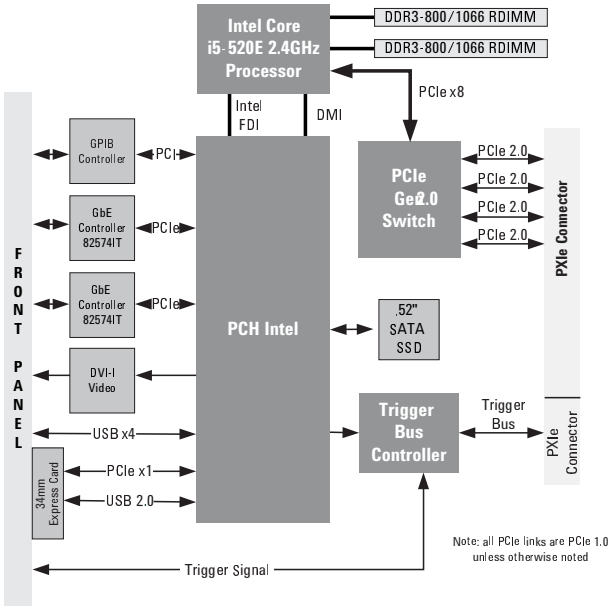


Figure 1. Keysight M9036A block diagram

Dual-core processor

The M9036A architecture is built on the Intel i5-520E dual-core processor. This processor utilizes the Intel Hyper-Threading Technology with a total of four simultaneous threads. Use a multi-tasking operating system, such as Microsoft Windows 7, to take full advantage of capabilities of this processor. The processor also utilizes the direct media interface (DMI) with 1 GB/s data bandwidth in each direction.

Memory

The M9036A has two 204-pin SODIMM memory sockets which support DDR3-800/1066 RAM. Each socket can support memory modules up to 4 GB for a total memory capacity of 8 GB. The standard configuration utilizes a single 4 GB memory module with an option to add a second 4 GB module.

Solid-state drive

A 160 GB solid state drive is included standard with the M9036A. This drive provides superior mechanical reliability compared to a conventional rotating hard drive.

Video

The DVI-I connector on the front panel supports both digital (DVI) and analog (VGA) monitors. When using an analog monitor, a DVI-to-VGA adapter is required (provided with the computer).

Peripheral I/O

The M9036A front panel contains connectors for USB 2.0, DVI-I video, Gigabit Ethernet, and GPIB. The computer also includes an ExpressCard/34 interface which provides I/O flexibility. This can be used to connect the embedded controller to a second Keysight M9018A chassis using the Keysight M9045A for example.

PXI trigger

The front panel contains a bi-directional trigger connector which can be used to route an external trigger signal to/from the PXI backplane.

PXIe backplane configuration

The embedded controller utilizes a Gen 2 PCIe switch to provide a flexible backplane connection that can operate in either a 2- or 4-link configuration. When installed in the Keysight M9018A PXIe chassis and operating in a 2-link (2x8) configuration, it will enable x8 slots in the chassis to communicate peer-to-peer at Gen 2 speeds without involving the CPU itself. This PCIe backplane switch is also connected to the CPU via a Gen 1, x8 PCIe link. Therefore, data transfers to/from memory will operate at Gen 1 speeds.

Easy maintenance and support

The M9036A is easy to maintain or upgrade. The SSD and memory can be removed without removing the covers. The SSD also contains a recovery partition that can be used to restore the drive to the factory default conditions.

Software platform

The embedded controller supports Microsoft Windows operating systems and comes with the selected operating system installed. Keysight I/O libraries, including VISA, Keysight Connection Expert, and I/O monitor, are also pre-installed.

The external trigger is controlled with a driver or soft front panel which are also pre-installed on the computer.

Technical Specifications and Characteristics

General characteristics	
Controller characteristics	
CPU	Intel i5-520E dual-core
CPU threads	4
CPU clock frequency	2.4 GHz
Chipset	Mobile Intel QM57Express
Video	
Type	Integrated Intel graphics
Maximum resolution	DVI:1920x1200 (60Hz) or VGA: 2048 x 1536 (75Hz)
Memory	
Cache	3 MB
RAM type	Two DDR3-800/1066 204-pin SODIMM sockets
RAM capacity	4 GB standard, 8 GB optional, 8 GB maximum*
Storage	
Type	2.5" SATA II SSD
Size	160 GB
Operating system support	Windows 7 (32- and 64-bit)
Pre-loaded software	Operating system, trigger driver, and Keysight I/O libraries
Mechanical characteristics	
Dimensions	3U/3-slot PXI/CompactPCI standard
Chassis slot compatibility	PXIe system module slot (with two or more controller expansion slots)
Weight	1 kg (2.2 lbs)

DC power requirements					
DC supply	+3.3 V	+5 V	+12 V	-12 V	+5 V_{AUX}
DC current requirements *(typ)*	0.72 A	0.54 A	0.9 A	0	0.11 A
DC current requirements (max)	0.75 A	0.76 A	2.81 A	0	0.12 A
Power dissipation (max)	40.6 W				

I/O characteristics	
Front panel connections	
USB	Four USB 2.0 (type A)
Ethernet	Two 10/100/1000BASE-T (RJ45)
Video	DVI-I (VGA with DVI/VGA adapter)
GPIB	Micro-D 25-pin
ExpressCard	ExpressCard 34 mm slot
PXI trigger	SMB (programmable direction)
PXIe backplane I/O	
PCIe link	
Configuration	2x8 or 4x4 (automatically configured based on chassis configuration)
Data bandwidth	2 GB/s max to/from the processor 4 GB/s max between PCIe backplane links (2-link mode)
PXI trigger bus	Selectable routing to/from all 8 PXI_TRIG lines

** 32-bit Windows 7 and Windows XP can only access a maximum of 4 GB of memory (physical + virtual)*

Technical Specifications and Characteristics

Environmental characteristics [1, 2]		
Operating and storage conditions		
	Operating	**Storage**
Temperature	0°C to 55°C	-20°C to 70°C
Humidity	Type-tested at 95%, +40°C (non-condensing)	
Altitude	Up to 4600 m (15000 ft)	
Vibration		
Operating random vibration: type-tested at 5 to 500 Hz, 0.21 g rms		
Survival random vibration: type-tested at 5 to 500 Hz, 2.09 g rms		

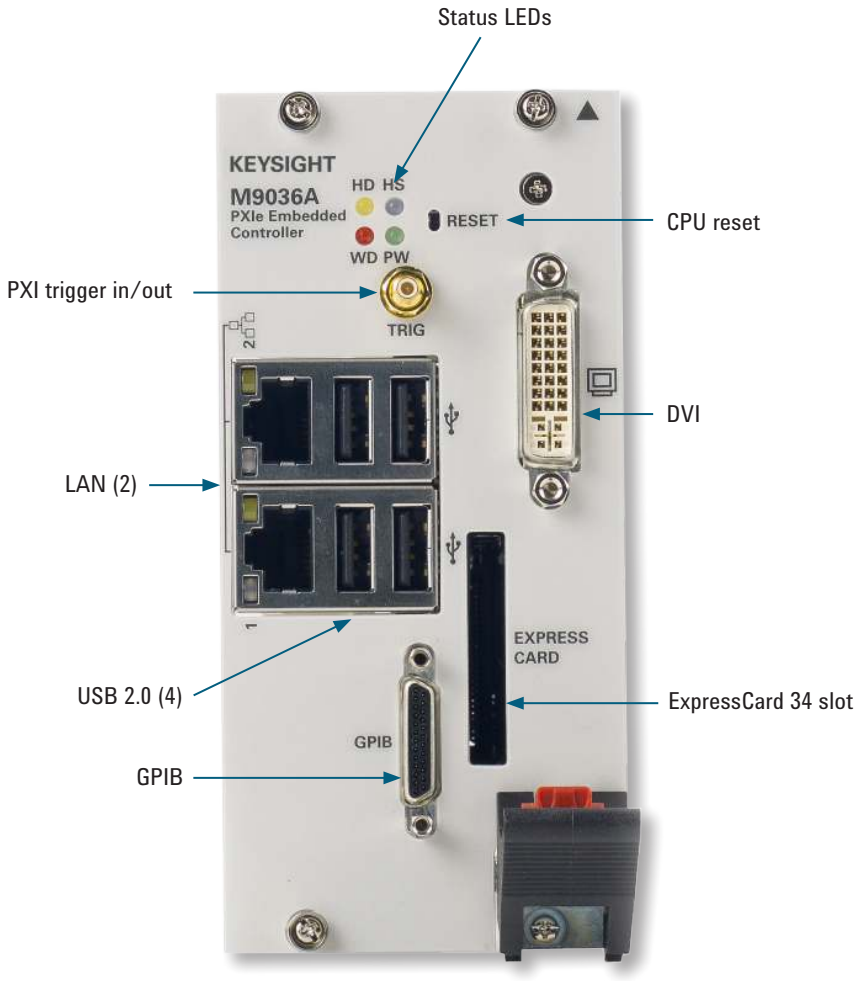
1. Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation and end-use; those stresses include but are not limited to temperature, humidity, shock, vibration, altitude, and power line conditions.

2. Test methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.

Regulatory characteristics
Safety
Complies with European Low Voltage Directive 2006/95/EC IEC/EN 61010-1, 2nd Edition Canada: CSA C22.2 No. 61010-1-04 USA: UL std no. 61010-1, 2nd Edition
EMC
Complies with European EMC Directive 2004/108/EC IEC/EN 61326-1 CISPR Pub 11 Group 1, Class A AS/NZS CISPR 11 ICES/NMB-001 This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme Cet appareil ISM est conforme a la norme NMB-001 du Canada

Technical Specifications and Characteristics

Front panel connections



Multi-Chassis Configuration

The M9036A with a 64-bit Windows 7 operating system can be used to control up to four M9018A chassis in either a cascade or star configuration. It is recommended that the controller is configured with 8 GB of RAM for multi-chassis operation. Embedded controllers with a 32-bit operating system will only support two chassis.

Multi-chassis operation requires M9018A Driver Revision 1.3.x.1 and Keysight I/O Libraries Suite 16.3 Update 1. A M9036A with the Windows Embedded Standard 7 operating system (options WE3 and WE6) is pre-loaded with this required software. For controllers with Windows 7 Pro and Windows XP, the required software can be downloaded from keysight.com (www.keysight.com/find/M9018A and www.keysight.com/find/iolibs).

For more detailed information about multi-chassis configuration, go to www.keysight.com/find/pxie-multichassis.

Configuration and Ordering Information

Software information

Model	Description
Supported operating systems	Microsoft Windows 7 (32/64-bit) Microsoft Windows XP (32-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabView
Supported application development environments (ADE)	VisualStudio (VB.NET, C#, C/C++), LabVIEW, LabWindows/CVI, MATLAB
Keysight IO Libraries	Includes: VISA Libraries, Keysight Connection Expert, IO Monitor

Definitions for specifications

Specifications describe the warranted performance of calibrated instruments that have been stored for a minimum of 2 hours within the operating temperature range of 0 °C to 50 °C, unless otherwise stated, and after a 45 minute warm-up period. Data represented in this document are specifications unless otherwise noted.

Characteristics describe product performance that is useful in the application of the product, but that is not covered by the product warranty. Characteristics are often referred to as Typical or Nominal values.

- *Typical describes characteristic performance, which 80% of instruments will meet when operated over a 20 °C to 30 °C temperature range. Typical performance is not warranted.*
- *Nominal describes representative performance that is useful in the application of the product when operated over a 20 °C to 30 °C temperature range. Nominal performance is not warranted.*

Note: All graphs contain measured data from several units at room temperature unless otherwise noted.

Ordering information

Model	Description
M9036A	PXIe embedded PC controller
M9036A-M08	Memory upgrade from 4 GB RAM to 8 GB RAM
M9036A-WE3	Microsoft Windows Embedded Standard 7 Operating System (32-bit)
M9036A-WE6	Microsoft Windows Embedded Standard 7 Operating System (64-bit)
M9036A-WXP	Downgrade to Microsoft Windows XP Operating System (32-bit)
M9036-31301	GP-IB cable for the M9036A Embedded Controller
M9036-34101	DVI-to-VGA Adapter
M9036-55501	4 GB RAM module for the M9036A Embedded Controller

Related products

Model	Description
M9018A	18-slot PXIe chassis

Warranty

Advantage Services: Three Year Warranty	
Keysight Advantage Services is committed to your success throughout your equipment's lifetime	
R-51B-001-3C	1 year return-to-Keysight warranty extended to 3 years

Figure 2. Accessories included with the M9036A

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www.axiestandard.org
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www.lxistandard.org
LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.

www.pxisa.org
PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.

Three-Year Warranty
www.keysight.com/find/ThreeYearWarranty
Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.

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