Keysight Technologies

M9037A PXIe Embedded Controller

2.4 GHz Quad-Core

Data Sheet

KEYSIGHT
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Introduction

Product Description

The Keysight Technologies, Inc. M9037A is a four-slot PXIe embedded PC controller with Windows 7 and 10 operating systems designed for high-performance and complex, multi-chassis systems. It is also well-suited for secure environments due to its front-panel, removable solid state drive (SSD).

The embedded controller is built upon a high-performance, low power Intel i7-4700EQ 2.4 GHz processor with 8-threads supported through 4 cores and hyper-threading. It is ideal for product validation and manufacturing test.

Applications

– Aerospace and defense
– RF semiconductor
– Wireless communications
– General purpose applications
– Electronic functional test

Features

– Intel i7-4700EQ 2.4 GHz processor
– 4-slot PXI controller module
– Front removable 240 GB solid state drive
– Up to 16 GB RAM Memory
– Gen 3 PCIe®, 4- or 2-link (up to x24) configuration providing up to 16 GB/s max data bandwidth from CPU to PXIe backplane
– Front panel connection connections: four USB 2.0, two USB 3.0, two LAN (10/100/1000), two DisplayPort, one GPIB, one SMB trigger
– x8 Gen 3 PCIe IPASS connector on the front for controlling a second PXIe or AXIe chassis or connection to RAID storage

Customer values

– High performance, extended life CPU
– Controller supports connections to multi-chassis and RAID storage directly from controller without using high value instrument slots
– Intel i7 Hyper Threading and multi-core technology provides performance required for multi-threaded applications
– Preloaded with operating system, drivers and Keysight IO libraries for reduced startup time
– The removable solid state drive (SSD) offers faster boot time and mechanical reliability
– SSD can be easily removed from the front panel and secured when not in use

High Performance Hardware Platform

Based on the high performance Intel i7 processor with hyper-threading technology, the M9037A is ideal for multi-threading environments found on multi-chassis systems.
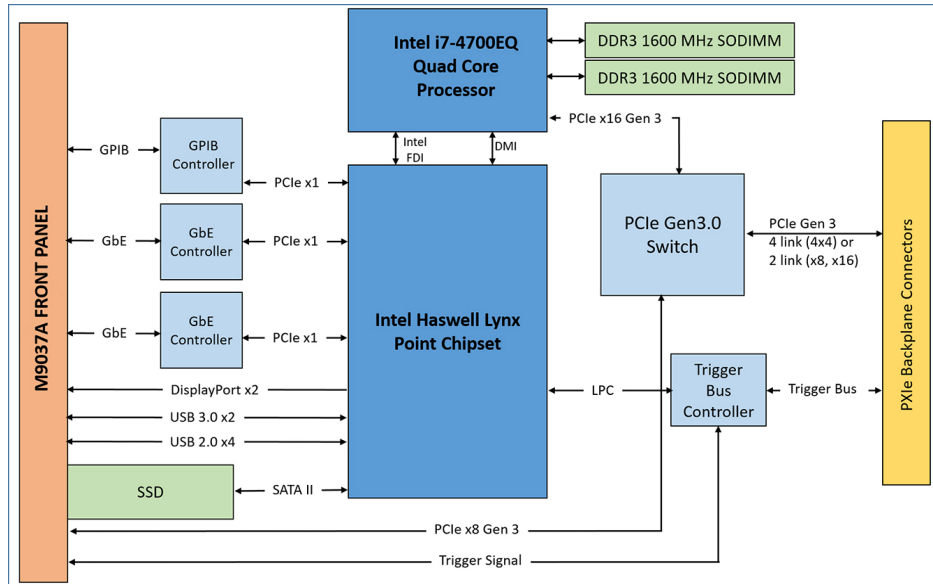

Figure 1. Keysight M9037A block diagram.

Quad-Core Processor

The Intel i7-4700EQ quad-core processor offers superior CPU, graphics, enhanced security and media performance. Built into the M9037A, it provides:
  – Lower power consumption, higher performance per watt, faster loading times for demanding applications, with best multitasking performance
  – Intel Hyper-Threading Technology offers a total of 8 simultaneous threads
  – Direct media interface (DMI) with 5 GT/s data bandwidth in each direction
  – GPU acceleration, accessible for integration with your applications, offers the benefit of significantly faster application run times.
  – Security and management functions are supported by Intel's vPro Technology

The provided Microsoft Windows 7 and 10 operating systems take full advantage of the processor's capabilities.

Memory

The M9037A has two 204-pin SODIMM memory sockets which support DDR3L-1333/1600 RAM. Each socket can support 4 GB, 8 GB or 16 GB (when available) memory modules for a total memory capacity of 32 GB. The standard configuration utilizes a single 4 GB memory module.

Solid-State Drive

Secure environments benefit from the easily accessible, front removable 240 GB solid state drive (SSD) that is secured with front panel thumb screws. The SSD provides a faster boot time and is immune to vibration damage that mechanical drives may experience.

Video

The two DisplayPort++ front panel connectors offer high band-width, built-in cable retention and multiple monitor support. Each Dual Mode DisplayPort++ connector can support either a DisplayPort or DVI-D monitor. Optional DisplayPort cables include Y1261A DisplayPort to DVI adapter, Y1262A DisplayPort cable, and Y1263A Display Port to VGA adapter. Customer supplied DVI, VGA, and HDMI adapters may also be used.

Peripheral I/O

The M9037A front panel connections include four USB 2.0 and two USB 3.0 connections, two Gigabit Ethernet ports, and GPIB. A Gen 3 x8 PCIe connector is also available for external RAID drives and multi-chassis operation. This allows PXI system expansion without requiring an additional expansion card in the host PXI chassis. Gen 3 operation is available on M9307As with a Serial Number of TW57240011 and greater. It is Gen 2 on earlier controllers.

PXI Trigger

The front panel includes a bi-directional trigger connector for routing an external trigger signal to/from the PXI backplane.

PXIe Backplane Configuration

Experience large backplane data bandwidth utilizing the x16 Gen 3 PCIe connection from the CPU to the PXIe chassis backplane. The embedded controller PCIe backplane switch provides a flexible backplane connection that can operate in a 2- or 4-link configuration.

 – The PCIe x16 Gen 3 link between CPU and backplane provides up to 16 GB/s theoretical, 14.2 GB/s practical.

Multi-Chassis Configurations

The M9037A PXIe controller with a 64-bit Windows operating system, can be used to control up to 4 PXIe or AXIe chassis in a cascade configuration. It is recommended that the controller is configured with 8 GB or more of RAM for multi-chassis operation. Embedded controllers with 32-bit operating systems will only support two chassis.

The x8 PCIe connector on the front panel can be used for cascading to a second chassis or connection to RAID storage (Gen 3).

The M9037A with 64-bit Windows 7 or 10 (options WE6 or W16) are pre-loaded with the required software for maximum multi-chassis capability. For additional information regarding multi-chassis configuration, go to **www.keysight.com/find/pxie-multichassis**

Easy maintenance and support

The M9037A can easily be updated. The SSD drive can be installed or removed via the front panel without the need for tools or to remove covers. The SSD includes a recovery partition that can be used to restore the drive to factory default conditions. With the controller uninstalled from a chassis, SODIMM memory is easily accessed and requires no tools to remove or replace.

Software platform

The controller supports Microsoft Windows 7 (32-bit or 64-bit) or Windows 10 (64-bit only) which is installed along with drivers (for Keysight PXIe chassis and M9037A embedded controller), Keysight I/O libraries, VISA, Keysight Connection Expert, and the I/O monitor software.

The external trigger can be controlled by either the IVI driver or soft front panel which are also pre-installed on the controller.
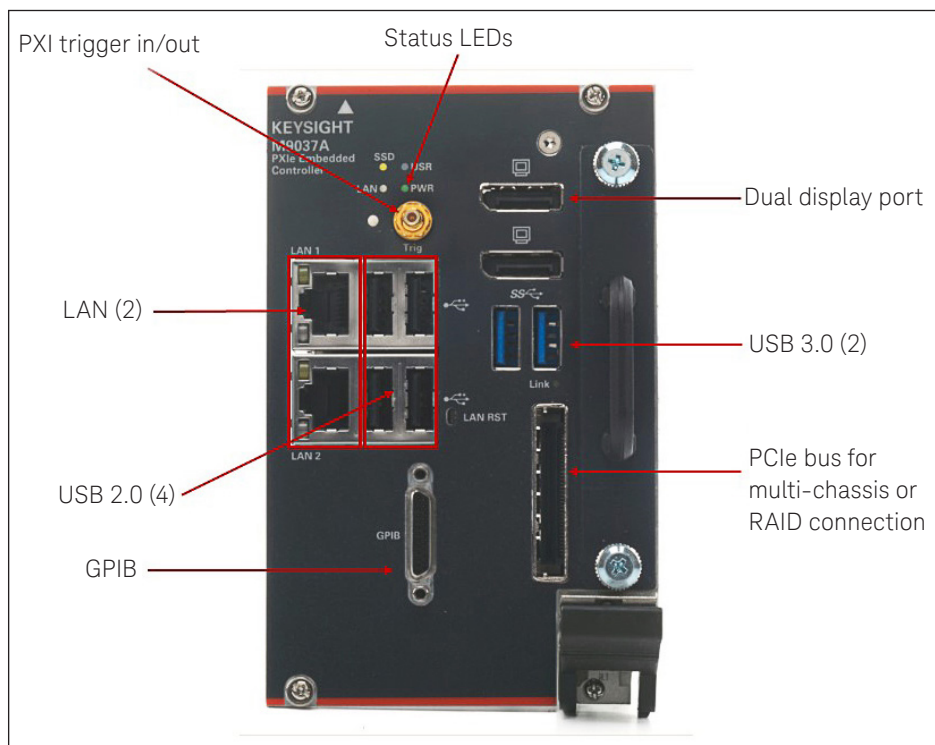

Figure 2. Front panel connections for M9037A.

Figure 3. Removable SSD, included with M9037A.

Technical Specifications and Characteristics

General characteristics		
Controller characteristics		
CPU		Intel i7-4700EQ quad-core processor
CPU threads		8
CPU clock frequency		2.4 GHz
Chipset		Mobile Intel QM57Express
Video	Type Maximum resolution	Integrated Intel HD Graphics 4600 [1] DP: 3840 x 2160 @ 60 Hz DVI: 1920 x 1200 @ 60 Hz DisplayPort adapters to other display standards are available in the market. Maximum resolution achieved is dependent on the adapter chosen.
Memory	Cache RAM type RAM capacity	6 MB Two DDR3L 1600 204-pin SODIMM sockets 4 GB standard, 8 GB or 16 GB optional for up to 32 GB maximum when 16 GB RAM becomes available [2]
Storage	Type Size	2.5" SATA 240 GB SSD
Operating system support		Windows Embedded 7 (32- and 64-bit) Windows 10 IoT Core (64-bit)
Pre-loaded software		Operating system, trigger driver, Keysight I/O libraries, PXIe chassis and M9037A drivers
Mechanical characteristics		
Dimensions		3U/4-slot PXI/CompactPCI standard
Chassis slot compatibility		PXIe system module slot (with three controller expansion slots)
Weight		1 kg (2.2 lbs)

DC power requirements					
DC supply	+3.3 V	+5 V	+12 V	+5 VSB Mean	Total (Watts)
Idle (SATA, Mice & KB)	3.0 A	2.1 A	1.6 A	0.13 A	40.3 W
Full-loading	3.0 A	3.9 A	5.3 A	0.13 A	93.7 W.

I/O characteristics		
Front panel connections		
USB		Four USB 2.0 (type A), Two USB 3.0 ports
Ethernet		Two 10/100/1000BASE-T (RJ45)
Video		Dual Mode DisplayPort++ (DVI-D, VGA, HDMI with an adapter)
GPIB		Micro-D 25-pin
PCIe connector		x8 PCIe connector (Gen 3[3])
PXI trigger		SMB (programmable direction)
PXIe backplane I/O		
PCIe link	Configuration Data bandwidth	Two-link (x8 and x16) and four-link (4x4) automatically configured based on chassis configuration 16 GB/s max to/from the processor to PXIe backplane (Gen 3 chassis)
PXI trigger bus		Selectable routing to/from all 8 PXI_TRIG lines

1. VGA, DVI, HDMI require adapters
2. 32-bit Windows 7 can only access a maximum of 4 GB of memory (physical + virtual)
3. Front panel PCIe connector is rated up Gen 3 with M9037A Serial Number TW57240011 and greater

Technical Specifications and Characteristics (continued)

Environmental characteristics [3, 4]

Operating and storage conditions

	Operating	Storage
Temperature	0°C to 55°C	-40°C to 70°C
Humidity	Type-tested at 95%, +40°C (non-condensing)	
Operating altitude	Up to 3048 m (10 kft)	
Storage altitude	15 kft (4572 m)	

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

Regulatory characteristics

Safety

IEC/EN 61010-1, 3rd Edition
Canada: CSA C22.2 No. 61010-1-12
USA: UL std no. 61010-1, 3rd 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

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

Configurations and Ordering Information

Software information

Model	Description
Supporting operating systems	Microsoft Windows 7 (32/64-bit) and Windows 10 (64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabView
Supported application development environments (ADE)	Visual Studio (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 two hours within the operating temperature range of 0 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 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 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

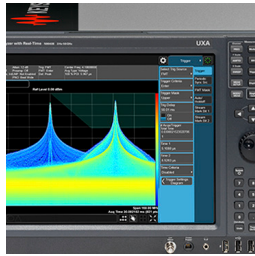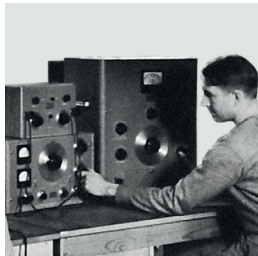| Model	Description
M9037A	PXIe embedded PC controller, Intel I7
M9037A-M08	Memory upgrade from 4 GB RAM to 8 GB RAM
M9037A-M16	Memory upgrade from 4 GB RAM to 16 GB RAM
M9037A-WE3	Microsoft Windows Embedded Standard 7 operating system (32 bit)
M9037A-WE6	Windows Windows Embedded Standard 7 operating system (64 bit)
M9037A-W16	Windows 10 IoT Core operating system (64-bit)
Y1206A	Keyboard and optical mouse
Y1260A	GPIB cable *
Y1261A	Display Port to DVI adapter
Y1262A	DisplayPort cable
Y1264A	Spare SSD with carrier: WES 7/32 *
Y1265A	Spare SSD with carrier: WES 7/64 *
Y1265B	Spare SSD with carrier: Win 10/64 10 IoT Core*

*   Will not work with M9036A controller

Related products

Model	Description
M9010A	PXIe Chassis: 10-slot, 3U, 24GB/s
M9018B	PXIe Chassis: 18-slot, 3U, 8GB/s
M9019A	PXIe Chassis: 18-slot, 3U, 24GB/s

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Published in USA, October 17, 2017
5991-3661EN
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