M9038A PXIe High Performance Embedded Controller

2.7 GHz 6-Core

KEYSIGHT

Introduction

The Keysight Technologies, Inc. M9038A is a high-performance, four-slot PXIe embedded PC controller with Windows 10 operating system designed for high-performance and complex, multi-chassis systems. It is well-suited for secure environments due to its front-panel, removable solid-state drive (SSD).

The embedded controller is built upon an Intel 6-Core i7-9850HE processor with 12 threads and is an excellent choice for complex applications requiring high computing power.

Key features

- Intel® Coffee Lake 6-Core i7-9850HE processor
- 4-slot PXIe controller module
- Up to 64 GB RAM Memory
- Front removable 512 GB solid state drive
- Front panel connections: one Gigabit Ethernet port, one 10 Gigabit Ethernet port, four USB 2.0 ports, two USB 3.0 ports, one GPIB connector, one DisplayPort video port, and two Thunderbolt 3.0 ports

Hardware Platform

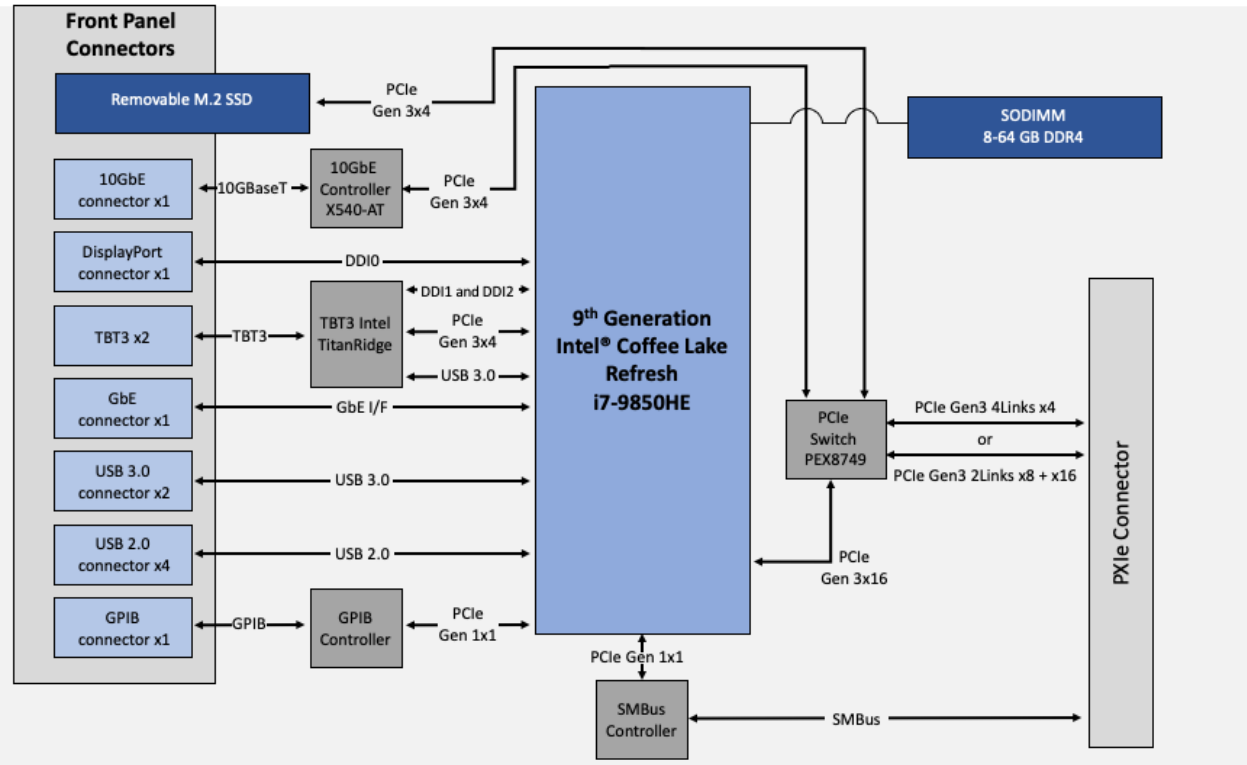

Figure 1. M9038A Block diagram

6-Core Processor

The M9038A utilizes an Intel Coffee Lake 6-Core i7-9850HE processor. The CPU can execute up to twelve threads simultaneously. The bus speed of the CPU is 8 GT/s. The M9038A has six computing engines in a single processor, allowing for the execution of independent tasks at the same time in a multi-tasking environment.

Memory

The M9038A has two 260-pin SODIMM memory sockets which support DDR4-2666 RAM. The standard configuration is 32 GB, with an upgrade option for 64 GB.

Solid-State Drive

Secure environments benefit from the easily accessible, front removable 512 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 M9038A graphics are based on the integrated UHD 630 GPU. A DisplayPort++ front panel connector is provided and offers high bandwidth monitor support. The DisplayPort++ connector can support either a DisplayPort or HDMI by using a DisplayPort adapter (user-supplied). The two Thunderbolt 3.0 ports also support display resolution up to 5K and 2x 4K (daisy-chain).

PXIe Backplane Configuration

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 data bandwidth

Security features

The M9038A has the following security features built-in:

- TPM 2.0: provides hardware-based, security related functions
- UEFI: replaces the legacy BIOS and supports Secure Boot

Software platform

The controller supports Microsoft Windows 10 (64-bit only) which is installed along with drivers (for Keysight PXIe chassis and M9038A embedded controller), Keysight I/O libraries, VISA, Keysight Connection Expert, and the I/O monitor software.

Front panel

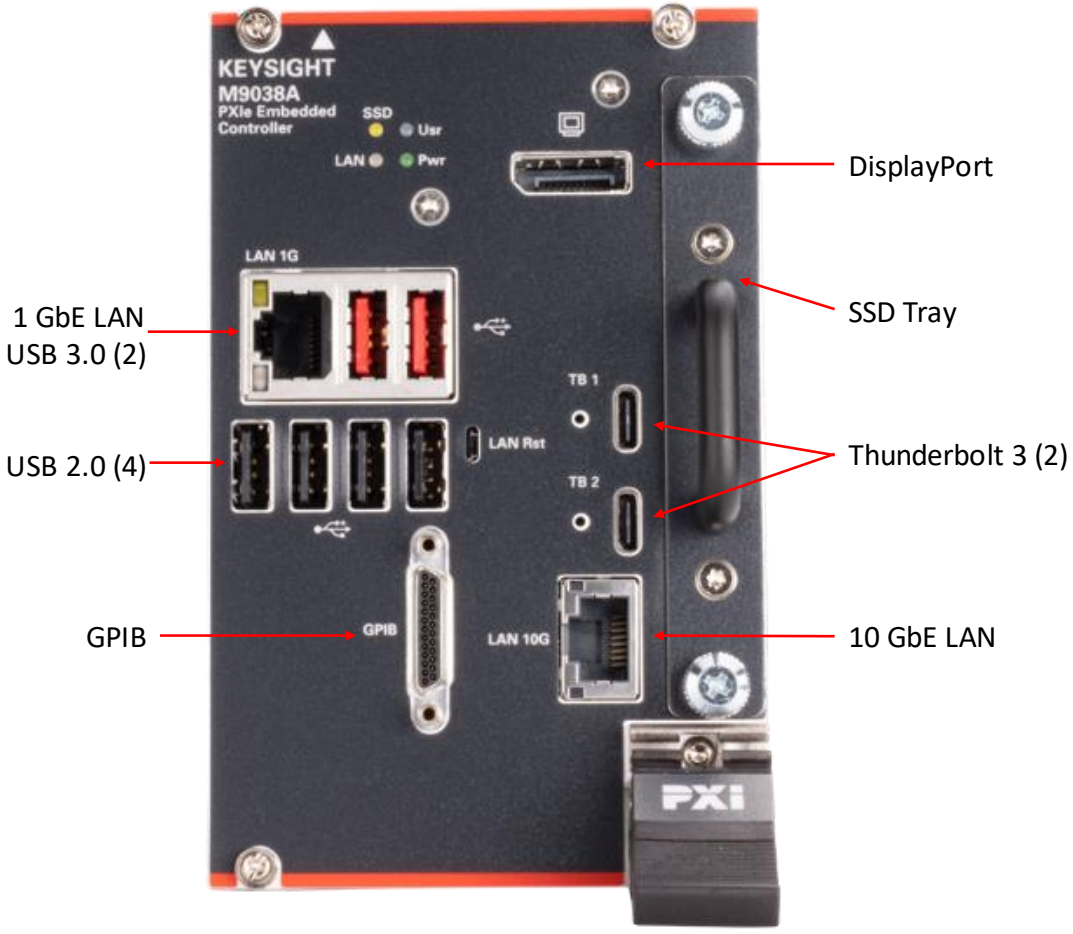

Figure 2. M9038A Front Panel

Technical characteristics

I/O Characteristics

Front panel connections		
CPU		Intel Coffee Lake i7 9850HE 6-core processor
Chipset		Intel QM 370
CPU threads		12
CPU clock frequency		2.7 GHz
Backplane speed		PCIe revision 3.0 (Gen 3)
Video type	Maximum resolution	Integrated Intel UHD Graphics 630[1]
		DP: 4096 x 2304 @ 60 Hz
		DVI: 1920 x 1200 @ 60 Hz
		Thunderbolt 3: One 5K display (max tested resolution of 5120 x 2160) and two 4K display (max tested resolution of 3840 x 2160, daisy chain)
Memory	Cache	9 MB
	RAM Type	Two DDR4-2666 260-pin SODIMM sockets
	RAM Capacity	32 GB standard, 64 GB optional
Storage	Type	NVMe M.2 SSD
	Size	512 GB
Operating system support		Windows 10 IoT Enterprise LTSC (64-bit)
Pre-loaded software		Operating system, Keysight I/O libraries, PXIe chassis driver, and M9038A drivers

Mechanical characteristics	
Dimensions	3U/4-slot PXI/CompactPCI standard
Chassis slot compatibility	PXIe system module slot (with three controller expansion slots)
Weight	1.18 kg (2.6 lbs)

DC Power requirements[2]					
DC supply	+3.3 V	+5 V	+12 V	+5 VSB Mean	Total Power
Idle (SATA, Mice & KB)	2.0 A	6.65 A	1.14 V	0.13 A	57.3 W
Full-load	2.74 A	6.68 A	3.33 A	0.13 A	83.05 W

[1] VGA, DVI, and HDMI require adapters. DisplayPort adapters to other display standards are available on the market. Maximum resolution achieved is dependent on the adapter chosen

[2] Thunderbolt Port (TB1 and TB2) USB-PD power draw is not included. Power to these ports is derived from the +12V supply.

I/O Characteristics

Front panel connections		
USB	Four USB 2.0 (type A), Two USB 3.0 ports (type A)	
Ethernet	One 10/100/1000BASE-T (RJ45), One 100/1000/10GBASE-T (RJ45)	
Video	One DisplayPort++, Two Thunderbolt-3 (TB1 & TB2)	
GPIB	Micro-D 25-pin	
Thunderbolt	Two Thunderbolt 3.0 ports (USB-C with PD 3.0) TB1 Port: Max. 37.5W, supports USB PD 5V @ 3A, 9V @ 3A, 12V @ 3A, 15V @ 2.5A, and daisy-chain capability TB2 Port: Max. 15W, supports USB PD 5V @ 3A and daisy-chain capability	
PXIe backplane		
PCIe link	Configuration	Two-link (x8 and x16) and four-link (4x4) automatically configured based on chassis configuration
	Data bandwidth	16 GB/s max to/from the processor to PXIe backplane (Gen 3 chassis)

Environmental Characteristics[3,4]

Operating and storage conditions		
Temperature	Operating 0 °C to 55 °C	Storage -20 °C to 70 °C
Maximum Relative Humidity (non-condensing)	Type tested, 95%RH up to 40°C, decreases linearly to 40% RH at 55 °C[5]	
Operating altitude	Up to 3048 m (10,000 ft)	
Storage altitude	15,000 ft (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
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, himiditiy, shock, vibration, altitude, and power line conditions.
[4] Test mthods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.
[5] From 40°C to 55°C, the maximum % relative humiditiy follows the line of constant dew point.

Definitions

Specification (spec)
Describes 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. performance of parameters covered by the product warranty and are valid for the unit's operation within the stated environmental range unless otherwise noted.
Characteristics
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 (typ)
Intended to provide additional information including the expected performance of an average unit that is not covered by the product warranty. These characteristics are shown in italics or labeled as 'typical'. Performance of a customer unit to typical specifications may or may not be measured during a calibration service. Typical describes characteristic performance which 80% of instruments will meet when operated over a 20°C to 30°C temperature range.
Nominal (nom)
A general, descriptive term that does not imply a level of performance. It is not covered by the product warranty. Nominal describes representative performance that is useful in the application of the product when operated over a 20°C to a 30°C range.These characteristics are shown in italics or labeled as 'nominal'. Performance of a customer unit to nominal specifications may or may not be measured during a calibration service.
Additional information
The data contained in this document is subject to change.

Ordering Information

Software

Supported software components	
Supported Operating systems (pre-installed)	Microsoft Windows 10 Enterprise LTSC (64-bit)
Keysight IO libraries Suite (pre-installed)	VISA Libraries, Keysight Connection Expert, IO Monitor

Hardware

Model	Description
M9038A	PXIe Embedded Controller: Intel i7, 32 GB RAM, 512 GB SSD
M9038A-M32	Standard memory, 32 GB
M9038A-M64	Memory upgrade, 64 GB
M9038A-W16	Windows 10 IoT Enterprise LTSB (64-bit)

Accessories	Description
Y1268A	Spare SSD with Carrier, Win 10/64 bit/512 GB
Y1260A	GPIB Cable
Y1269A	DP to HDMI adapter
Y1205A	USB-C Cable with Screw Lock

Related products	Description
M9019A	18-slot PXIe Chassis, Gen 3
M9046A	18-slot PXIe High Performance, Gen 3
M9010A	10-slot PXIe Chassis, Gen 3