UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

ACQIS LLC, a Texas limited liability company, Plaintiff, v. MITAC COMPUTING TECHNOLOGY CORPORATION and MITAC HOLDINGS CORPORATION, a Taiwan corporation, Defendant.	**Civil Action No. 6:20-cv-00962** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff ACQIS LLC ("Plaintiff" or "ACQIS"), by its attorneys, hereby alleges patent infringement against Defendants MiTAC Computing Technology Corporation ("MiTAC Computing") and MiTAC Holdings Corporation ("MiTAC Holdings") (collectively, "Defendants" or "MiTAC") as follows:

INTRODUCTION

1. This is an action for patent infringement under the United States Patent Laws, 35 U.S.C. § 1 *et seq.* Beginning in the late 1990s, Dr. William Chu founded ACQIS and invented a variety of pioneering computer technologies that employed serial transmission along low voltage differential signal (LVDS) channels to dramatically increase the speed at which data can be transmitted while also reducing power consumption and noise. Dr. Chu's inventions have become foundational in the computer industry, and are found in a variety of data transmission systems,

including PCI Express (PCIe) and/or USB 3.x[1] transactions.

2. MiTAC has infringed and continues to infringe, directly and/or indirectly, the following patents owned by ACQIS: U.S. Patent Nos. 9,529,768 ("'768 patent"), 9,703,750 ("'750 patent"), 8,977,797 ("'797 patent"), 8,756,359 ("'359 patent"); RE44,654 ("'654 patent"); RE44,739 ("'739 patent"); RE43,602 ("'602 patent"); RE42,984 ("'984 patent"), 8,626,977 ("'977 patent"); RE45,140 ("'140 patent"), and 9,529,769 ("'769 patent") (collectively, the "ACQIS Patents"). Copies of the ACQIS Patents are attached to this Complaint as **Exhibits 1-11**.

3. Specifically, MiTAC has directly and/or indirectly infringed and continues to infringe the ACQIS Patents through: (1) the manufacture, use, offering to sale, and/or sale in the United States, and/or the importation into the United States, of infringing computer products; (2) the practice of claimed methods of the ACQIS Patents by using and/or testing computer products in the United States; (3) the importation into the United States of computer products made abroad using ACQIS's patented processes; and (4) the inducement of third parties to engage in the activity described above with knowledge of the ACQIS Patents and of the third parties' infringing actions.

4. ACQIS seeks damages and other relief for MiTAC's infringement of the ACQIS Patents. ACQIS is entitled to past damages because, without limitation, it has provided actual notice to MiTAC and for method claims which do not require marking

THE PARTIES

5. Plaintiff ACQIS LLC, is a limited liability company organized and existing under the laws of the State of Texas, with offices at 411 Interchange Street, McKinney, Texas 75071. A related entity, ACQIS Technology, Inc., is a corporation organized under the laws of the State of Delaware, having its principal place of business at 1503 Grant Road, Suite 100, Mountain View,

[1] As used herein, "USB 3.x" refers to USB 3.0 and subsequent versions, including USB 3.1, USB 3.2, and any other subsequent versions.

California 94040. ACQIS LLC is operated from California, where its President, Dr. William Chu, resides. Dr. Chu is also the Chief Executive Officer of ACQIS Technology, Inc.

6. Defendant MiTAC Computing is a Taiwan corporation with its global headquarters located at 3F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076, Taiwan, R.O.C.

7. Defendant MiTAC Holdings is a Taiwan corporation with its global headquarters located at Bldg. B, No. 209 Nangang Rd., Sec.1, Nangang Dist., Taipei City, Taipei City, TW-114, Taiwan, R.O.C.

8. Defendants are part of the same corporate structure and distribution chain (together with other MiTAC subsidiaries, affiliates, and intermediaries) with respect to the manufacture, use, offering to sell, and/or sale of infringing computer products and with respect to the importation into the United States of infringing computer products and of computer products made abroad using patented processes claimed in the ACQIS Patents.

9. On information and belief, MiTAC manufactures and imports server computer products and related accessories into the United States, which are then offered for sale and sold through a variety of outlets to consumers throughout the United States, including within this judicial District.

JURISDICTION AND VENUE

10. This is an action for patent infringement under the United States patent laws, 35 U.S.C. § 101 *et seq*.

11. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

12. This Court has personal jurisdiction over the Defendants consistent with the requirements of the Due Process Clause of the United States Constitution and the Texas Long Arm

Statute. On information and belief, have purposefully manufactured and/or distributed computer products that infringe the ACQIS Patents, or that were made abroad using patented processes claimed in the ACQIS Patents, through established distribution channels with the expectation that those products would be sold in the United States, State of Texas, and in this District. Further, Defendants have (themselves and/or through the activities of subsidiaries, affiliates, or intermediaries) committed and continue to commit acts of patent infringement in the United States, State of Texas and this District, including by making, using, offering to sell, and/or selling infringing computer products in the United States, State of Texas and this District; importing infringing computer products and/or computer products made abroad using ACQIS's patented processes into the United States for sale in the State of Texas and this District; and/or inducing others to commit acts of patent infringement in the United States, State of Texas and this District. Accordingly, MiTAC has established minimum contacts within Texas and purposefully availed itself of the benefits of Texas, and the exercise of personal jurisdiction over MiTAC would not offend traditional notions of fair play and substantial justice. In addition, or in the alternative, this Court has personal jurisdiction over MiTAC pursuant to Federal Rule of Civil Procedure 4(k)(2).

13. Venue is proper in this District pursuant to 28 U.S.C. § 1391(c)(3) because Defendants do not reside in the United States and thus may be sued in any judicial district in the United States pursuant to 28 U.S.C. § 1391(c)(3).

FACTUAL BACKGROUND

Dr. Chu and the ACQIS Patents

14. Dr. William Chu has been a prolific innovator in the computing industry since the 1970s.

15. In 1976, Dr. Chu received his Ph.D. in Electrical Engineering from the University of California, Berkeley.

16. Dr. Chu then began working in semiconductor design for American Microsystems, Inc. from 1976 to 1977, and then for Zilog, Inc. from 1977 to 1982.

17. In 1982, Dr. Chu founded Verticom, Inc., which developed innovative technologies relating to video transmission over telephone lines. Verticom also developed graphics products for the PC computer-aided design (CAD) market. Verticom's success resulted in its stock being listed on the NASDAQ exchange in 1987. In 1988, Verticom was acquired by Western Digital Imaging, Inc.

18. Dr. Chu served as Vice President of Engineering for Western Digital from 1988 to 1991, overseeing a development team in the desktop and portable graphics chip division. In the course of his work at Western Digital, Dr. Chu in 1988 started the company's portable graphics chip business, which became #1 in the portable graphics chip market by 1991. Dr. Chu also led Western Digital to achieve the #1 market share in the PC graphics market in 1990.

19. After Western Digital, Dr. Chu worked for Acumos, Inc. from 1991 to 1992 as a Vice President managing engineering for computer graphics chip development. Acumos was acquired by Cirrus Logic, Inc. in 1992.

20. Dr. Chu then worked for Cirrus Logic from 1992 to 1997, first as a General Manager in the Desktop Graphics Division and later as Co-President of the Graphics Chip Business Unit. During Dr. Chu's time at Cirrus Logic, the company achieved #1 market share in the PC graphics chip market.

21. In 1998, Dr. Chu founded ACQIS Technology, Inc. to pursue his vision of developing a small, portable computer module that could be interchangeably connected with a

variety of different peripheral consoles. In the course of this development effort, Dr. Chu recognized the need for a better interconnection between the core computing module and a peripheral console. Such interconnections traditionally conveyed peripheral component interconnect (PCI) bus transactions in parallel using a large number of signal channels and connector pins. This made it difficult to employ LVDS channels, which are more "cable friendly," consume less power, and generate less noise. Dr. Chu wanted to develop an interconnection system that was scalable, used connectors with low pin counts, was power-efficient, high performing, and easily extendible for future computing needs and technologies. This development work resulted in a large family of patents now owned by ACQIS, which disclose and claim a variety of pioneering inventions relating to improved, high-performance and low power consuming interconnection technologies for computer modules.

22. After several decades in the industry, Dr. Chu is now a named inventor of approximately forty-one (41) U.S. Patents.

23. Among the patent portfolio covering Dr. Chu's inventions and owned by ACQIS are the ACQIS Patents asserted in this case.

24. The '768 patent, entitled "Computer System Including CPU or Peripheral Bridge Directly Connected to a Low Voltage Differential Signal Channel that Communicates Serial Bits of a Peripheral Component Interconnect Bus Transaction in Opposite Directions," was duly and legally issued on December 27, 2016, from a patent application filed March 13, 2014, with William W.Y. Chu as the sole named inventor. The '768 patent claims priority to U.S. Provisional Patent Application No. 60/134,122, filed on May 14, 1999.

25. The '750 patent, entitled "Computer System Including CPU or Peripheral Bridge Directly Connected to a Low Voltage Differential Signal Channel that Communicates Serial Bits

of a Peripheral Component Interconnect Bus Transaction in Opposite Directions," was duly and legally issued on July 11, 2017, from a patent application filed October 9, 2014, with William W.Y. Chu as the sole named inventor. The '750 patent claims priority to U.S. Provisional Patent Application No. 60/134,122, filed on May 14, 1999.

26. The '797 patent, entitled "Method of Improving Peripheral Component Interface Communications Utilizing a Low Voltage Differential Signal Channel," was duly and legally issued on March 10, 2015, from a patent application filed October 10, 2012, with William W.Y. Chu as the sole named inventor. The '797 patent claims priority to U.S. Provisional Patent Application No. 60/134,122, filed on May 14, 1999.

27. The '359 patent, entitled "Computer System Including CPU or Peripheral Bridge to Communicate Serial Bits of Peripheral Component Interconnect Bus Transaction and Low Voltage Differential Signal Channel to Convey the Serial Bits," was duly and legally issued on June 17, 2014, from a patent application filed January 17, 2013, with William W.Y. Chu as the sole named inventor. The '359 patent claims priority to U.S. Provisional Patent Application No. 60/134,122, filed on May 14, 1999.

28. The '654 patent, entitled "Data Security Method and Device for Computer Modules," was duly and legally issued on December 17, 2013, from a reissue application filed October 10, 2012, with William W.Y. Chu as the sole named inventor. The '654 patent is a reissue of U.S. Patent No. 6,643,777, which issued on November 4, 2003, from a patent application filed May 14, 1999. The '654 patent claims priority to U.S. Patent Application No. 09/312,199, filed on May 14, 1999.

29. The '739 patent, entitled "Data Security Method and Device for Computer Modules," was duly and legally issued on January 28, 2014, from a reissue application filed May

21, 2013, with William W.Y. Chu as the sole named inventor. The '739 patent is a reissue of U.S. Patent No. 6,643,777, which issued on November 4, 2003, from a patent application filed May 14, 1999. The '739 patent claims priority to U.S. Patent Application No. 09/312,199, filed on May 14, 1999.

30. The '602 patent, entitled "Data Security Method and Device for Computer Modules," was duly and legally issued on August 21, 2012, from a reissue application filed November 10, 2011, with William W.Y. Chu as the sole named inventor. The '602 patent is a reissue of U.S. Patent No. 6,643,777, which issued on November 4, 2003, from a patent application filed May 14, 1999. The '602 patent claims priority to U.S. Patent Application No. 09/312,199, filed on May 14, 1999.

31. The '984 patent, entitled "Data Security Method and Device for Computer Modules," was duly and legally issued on November 29, 2011, from a reissue application filed September 16, 2009, with William W.Y. Chu as the sole named inventor. The '984 patent is a reissue of U.S. Patent No. 6,643,777, which issued on November 4, 2003, from a patent application filed May 14, 1999. The '984 patent claims priority to U.S. Patent Application No. 09/312,199, filed on May 14, 1999.

32. The '977 patent, entitled "Computer System Including CPU or Peripheral Bridge to Communicate Serial Bits of Peripheral Component Interconnect Bus Transaction and Low Voltage Differential Signal Channel to Convey the Serial Bits," was duly and legally issued on January 7, 2014, from a patent application filed July 27, 2012, with William W.Y. Chu as the sole named inventor. The '977 patent claims priority to U.S. Provisional Patent Application No. 60/134,122, filed on May 14, 1999.

33. The ’140 patent, entitled “Data Security Method and Device for Computer Modules,” was duly and legally issued on September 16, 2014, from a reissue application filed December 17, 2013, with William W.Y. Chu as the sole named inventor. The ’140 patent is a reissue of U.S. Patent No. 6,643,777, which issued on November 4, 2003, from a patent application filed May 14, 1999. The ’140 patent claims priority to U.S. Patent Application No. 09/312,199, filed on May 14, 1999.

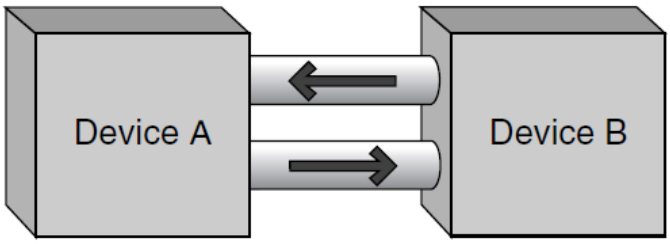
34. The ’769 patent, entitled “Computer System Including CPU or Peripheral Bridge Directly Connected to a Low Voltage Differential Signal Channel that Communicates Serial Bits of a Peripheral Component Interconnect Bus Transaction In Opposite Directions,” was duly and legally issued on December 27, 2016, from a patent application filed February 26, 2016, with William W.Y. Chu as the sole named inventor. The ’769 patent claims priority to U.S. Patent Application No. 11/097,694, filed on March 31, 2005.

35. The inventions claimed in the ACQIS Patents enable computers to operate faster with better efficiency through faster interconnections including between the core computing power modules and any connected consoles.

36. The claims in the ACQIS Patents generally relate to computers and computer systems that employ CPUs coupled to LVDS channels that convey various types of data (*e.g.*, PCI bus transactions, USB 3.x data, and/or digital video data) in a serial bit stream using pairs of unidirectional channels to convey the data in opposite directions.

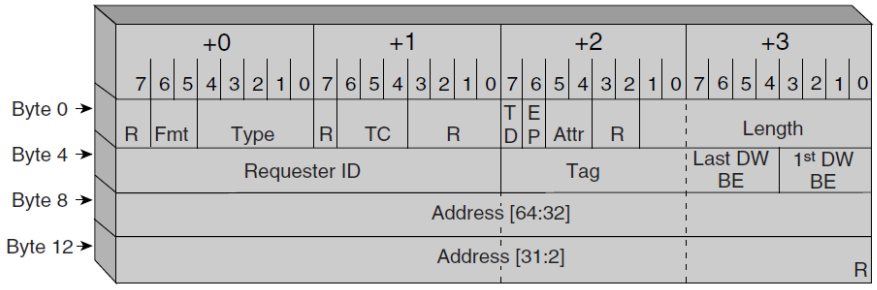
37. Over the years, Dr. Chu’s inventive developments have become more and more widely used in computing technologies. One prime example is the computing industry’s adoption of PCI Express, which post-dates Dr. Chu’s inventions but embodies Dr. Chu’s patented interconnection invention by using “high speed, low voltage, differential serial pathway for two

devices … to communicate simultaneously by implementing dual unidirectional paths between two devices[.]"



See Introduction to PCI Express – A Hardware and Software Developers Guide, Intel Press (2003), at 1-2 ("There are certain times in the evolution of technology that serve as inflection points that forever change the course of events. For the computing sector and communications, the adoption of PCI Express, a groundbreaking new general input/output architecture, will serve as one of these inflection points.").

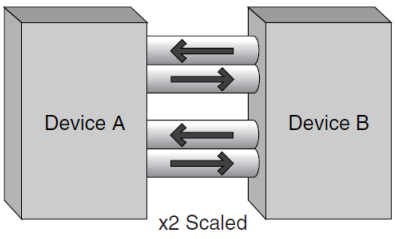
38. PCI Express connections transmit data packets known as transaction layer packets (TLP) that include data bits, address bits, and byte enable (BE) information bits.



Id. at 93-114.

39. In sum, PCI Express connections are LVDS channels that convey data bits, address bits, and byte enable information bits of a PCI bus transaction in a serial bit stream using pairs of unidirectional, differential signal lanes to convey the information in opposite directions, allowing the connection to be scalable and dramatically reducing the pin-count required for connectors, as well as other benefits. "Currently PCI Express defines the following configuration of serial links:

x1, x2, x4, x8, x12, x16, and x32. … An x2 configuration indicates two serial paths to and from a device[.]"



	Value Proposition	Benefits
I/O Simplification	• Scalable width and frequency • Higher bandwidth	• Superior performance • Enable evolving applications
High Performance	• Consolidate system I/O • Unity proliferated segments	• Standard I/O modules • Improve TTM and reduce TCO
Layered Architecture	• Layered Architecture .. Longevity • Reliability, Availability, Serviceability • Advanced Power Management • Works in existing PCI Environment	• Reduced returns • Improved service and support • Smooth software changes
Next Gen Multimedia	• Virtual channels • QoS and Isochrony	• Improved multimedia • "Glitch less" audio and video
Ease of Use	• New Form Factors • Innovative Designs • Hot Plug / Hot Swap	• SImple to Install / upgrade • Increased miniaturization

Figure 4.1 PCI Express Benefits

Id. at 3, 50.

40. Another example of a computer-to-peripheral interconnection that embodies Dr. Chu's patented invention is the USB 3.x connection. The "Super Speed" USB 3.0 architecture uses at least two pairs of unidirectional, point-to-point differential signal paths. Each pair includes a transmit path and a receiving path, thus transmitting the USB data packet information in opposite directions.

3.1.4 USB 3.0 Architecture Summary

USB 3.0 is a dual-bus architecture that incorporates USB 2.0 and a SuperSpeed bus. Table 3-1 summarizes the key architectural differences between SuperSpeed USB and USB 2.0.

Table 3-1. Comparing SuperSpeed to USB 2.0

Characteristic	SuperSpeed USB	USB 2.0
Data Rate	SuperSpeed (5.0 Gbps)	low-speed (1.5 Mbps), full-speed (12 Mbps), and high-speed (480 Mbps)
Data Interface	Dual-simplex, four-wire differential signaling separate from USB 2.0 signaling Simultaneous bi-directional data flows	Half-duplex two-wire differential signaling Unidirectional data flow with negotiated directional bus transitions
Cable signal count	Six: Four for SuperSpeed data path Two for non-SuperSpeed data path	Two: Two for low-speed/full-speed/high-speed data path
Bus transaction protocol	Host directed, asynchronous traffic flow Packet traffic is explicitly routed	Host directed, polled traffic flow Packet traffic is broadcast to all devices.

Universal Serial Bus 3.0 Specification, Rev. 1.0 (Nov. 12, 2008), at 3-1 to 3.5. In sum, USB 3.x connections are LVDS channels using two unidirectional, differential signal pairs that transmit

USB protocol data packets in opposite directions.

41. Intel's Direct Media Interface (DMI) channel is similar to PCIe and implements four serial lanes that all use differential signaling constituting 2 transmit lanes and 2 receive lanes and, therefore, transmitting data in opposite directions. *See* https://www.intel.com/content/dam/www/public/us/en/documents/white-papers/ia-introduction-basics-paper.pdf. *See also* https://en.wikipedia.org/wiki/Direct_Media_Interface ("DMI shares many characteristics with PCI Express, using multiple lanes and differential signaling to form a point-to-point link.").

42. Each claim of the ACQIS Patents is a patentable, valid, and enforceable invention that is novel and non-obvious over the prior art.

43. ACQIS has not authorized or licensed MiTAC to practice any of the inventions claimed in the ACQIS Patents.

MiTAC's Infringing Products

44. MiTAC is a multinational conglomerate of JDM / ODM / OEM / OPM (Original Product Manufacture) companies that engage in the design and R&D, manufacturing, testing, assembling, marketing, and servicing of a variety of computer products, including without limitation servers, motherboards, embedded systems, and panel computers. MiTAC sells such products all over the world, including the United States. MiTAC imports infringing server, motherboard, embedded system, and panel computer products through an established distribution channels with the expectation that those products would be sold in the United States, State of Texas and this District.

45. MiTAC has directly infringed, and continues to infringe, one or more claims of each of the ACQIS Patents under at least 35 U.S.C. §§ 271(a) and (g), by making, using,

offering to sell, and/or selling within the United States, and/or importing into the United States computer products that embody the claimed inventions of Dr. Chu, and/or by importing into the United States computer products that were made abroad using patented processes claimed in the ACQIS Patents.

46. The MiTAC servers fall into one of two categories. Some of the MiTAC servers are configured and operate in substantially the same way as the Thunder HX FA77-B7119 as an example for illustrative purposes. These include, without limitation:

- Tempest CX S5630, including, but not limited to S5630GMRE, S5630GMR, and S5630GMRE-L2;
- Thunder CX TN200-B7108, including, but not limited to TN200-B7108-X4L and TN200-B7108-X4S;
- Thunder HX FA77-B7119, including, but not limited to B7119F77V14HR-2T-N, B7119F77V10E4HR-2T-N, B7119F77V4HR-2T-N, B7119F77V14HR-2T55-N, B7119F77V10E4HR-2T55-N, and B7119F77V4HR-2T55-N;
- Thunder HX FT48B-B7100, including, but not limited to B7100F48BV10HR-N; Thunder HX FT48T-B7105, including, but not limited to B7105F48TV4HR-2T-G, B7105F48TV4HR-2T-N, and B7105F48TV8HR-2T-G;
- Thunder HX FT77D-B7109, including, but not limited to B7109F77DV14HR-2T-NFZ, B7109F77DV10E4HR-2T-NFZ, and B7109F77DV4HR-2T-NFZ;
- Thunder HX FT83-B7119, including, but not limited to B7119F83V12HR-2T-NS, B7119F83V12HR-2T-N, B7119F83V8E4HR-2T-NS, and B7119F83V8E4HR-2T-N; Thunder HX GA88-B5631, including, but not limited to B5631G88V2HR-2T-N;
- Thunder SX FA100-B7118, including, but not limited to B7118F100V100HR;

- Transport SX FT70-B7100, including, but not limited to B7100F70V26HR;
- Thunder SX GT62B-B5539, including, but not limited to B5539G62BV6E4H-2T, B5539G62BV6E4H, B5539G62BV6E4HR-2T, and B5539G62BV6E4HR.
- Thunder SX GT62F-B5630, including, but not limited to B5630G62FV2E8HR, B5630G62FV6E4HR, B5630G62FV10HR, and B5630G62FV6E4H;
- Transport SX GT62H-B7106, including, but not limited to B7106G62HE10HR;
- Transport SX GT90-B7113, including, but not limited to B7113G90V12E4HR and B7113G90U12E4HR;
- Transport SX TN70A-B7106, including, but not limited to B7106T70AV26HR and B7106T70AU24V2HR;
- Thunder SXTN70E-B7106, including, but not limited to B7106T70EV12HR and B7106T70EV8E4HR;
- Thunder SX TN76-B7102, including, but not limited to B7102T76V12HR-2T-N, B7102T76V12HR-2T-G, and B7102T76V8E4HR-2T-N;
- TYAN TN70B-B7086, including, but not limited to B7086T70BV8E4HR and B7086T70BV12HR;
- TYAN GT86A-B7083, including, but not limited to B7083G86AV12-HE and B7083G86AV8;
- TYAN GN70-B7086, including, but not limited to B7086G70V6E2HR and B7086G70V8HR;
- TYAN GA80-B7081, including, but not limited to B7081G80V4HR-2T-N, B7081G80V4HR-2T-X, B7081G80V4HR-N, B7081G80V4HR-X; and

- TYAN FT48A-B7070, including, but not limited to B7070F48AW16HR and B7070F48AV4HR-N.

47. Likewise, as shown further below, other MiTAC servers are configured and operate in substantially the same way as explained below using the Transport SX GT62F-B8026 (including, but not limited to, B8026G62FE10HR and B8026G62FV10HR-LE) as an example for illustrative purposes. These include, without limitation:

- Transport HX GA88-B8021, including, but not limited to B8021G88V2HR-2T-N and B8021G88V2HR-2T-RM-N;
- Transport HX TN76A-B8242, including, but not limited to B8242T76AV26HR-2V, B8242T76AV18E8HR-2V, and B8242T76AV2E24HR-2V;
- Transport HX TN83-B8251, including, but not limited to B8251T83E8HR-2T-N;
- Transport SX GT62F-B8026, including, but not limited to B8026G62FE10HR and B8026G62FV10HR-LE;
- Transport SX TN70A-B8026, including, but not limited to B8026T70AV16E8HR, B8026T70AV8E16HR, and B8026T70AE24HR;
- Transport SX TN70A-B8026, including, but not limited to B8026T70AV26HR-LE, B8026T70AV18E8HR, and B8026T70AV2E24HR;
- Transport SX TN70E-B8026, including, but not limited to,B8026T70EV10E4HR;
- Transport SX TS65A-B8036, including, but not limited to B8036T65AV28HR-LE and B8036T65AV12E16HR;
- Transport SX TS65-B8036, including, but not limited to B8036T65V10E4HR and B8036T65V12E2HR-LE.

48. The products described above are collectively referred to as the "Accused Servers."

49. The MiTAC motherboards fall into one of two categories. Some of the MiTAC motherboards are configured and operate in substantially the same way as the Micro-ATX Form Factor PH10FEU ("PH10FEU") as an example for illustrative purposes. These include, without limitation:

- Micro-ATX Form Factor PH10LU and PH10SU;
- Thin Mini-ITX Form Factor PH11CMI, PH12CMI, PH13CMI;
- Thin Mini-ITX Form Factor PH12LI;
- Thin Mini-ITX Form Factor PH11SI, PH12SI, PH13SI; and
- Thin Mini-ITX Form Factor PH12FEI, PH13FEI, PH14FEI.

50. Likewise, as shown further below, other MiTAC motherboards are configured and operate in substantially the same way as explained below using the Mini-ITX Form Factor PD14RI ("PD14RI") as an example for illustrative purposes. These include, without limitation:

- Thin Mini-ITX Form Factor PD10AI;
- Thin Mini-ITX Form Factor PD10BI and PD11BI;
- Thin Mini-ITX Form Factor PD10RI;
- 3.5" SBC Form Factor including, but not limited to, PD10AS, PD10KS, and PD11KS; and
- COM Express Compact Size (Type 6) Form Factor PD10KC.

51. The products described above are collectively referred to as the "Accused Motherboards."

52. The MiTAC embedded system products are configured and operate in substantially the same way as the Pluto E220 as an example for illustrative purposes. These include, without limitation:

- S300-10AS and S310-11KS;

- E300 and E400; and
- E220 and E230.

53. The products described above are collectively referred to as the "Accused Embedded Systems."

54. The MiTAC panel computers fall into one of three categories. Some of the MiTAC panel computers are configured and operate in substantially the same way as the Maestro M840 ("M840") as an example for illustrative purposes. These include, without limitation:

- M830i;
- M840;
- M3070;
- M3080; and
- D150-L, and D150-S.

55. Likewise, as shown further below, other MiTAC panel computers are configured and operate in substantially the same way as the Maestro M1070 ("M1070") as an example for illustrative purposes. These include, without limitation:

- M830; and
- M1080.

56. Likewise, as shown further below, other MiTAC panel computers are configured and operate in substantially the same way as explained below using the D151-11KS as an example for illustrative purposes. These include, without limitation:

- M200 and M200i;
- D210-10RI and D210-11KS; and
- D150-B.

57. The products described above are collectively referred to as the "Accused Panel Computers."

58. The Accused Servers, Accused Motherboards, Accused Embedded Systems, and Accused Panel Computers are collectively referred to as the "Accused Products."

59. The Accused Products that MiTAC imports into the United States are manufactured outside the United States using one or more processes claimed in the ACQIS Patents.

60. The Accused Products include products made, used, offered for sale, sold within the United States, and/or imported into the United States at least since ACQIS provided MiTAC with actual notice of its infringement on or around May 14, 2018.

61. The Accused Products also include products made using the processes claimed in the ACQIS Patents and imported into the United States within the six years preceding the date of this Complaint.

62. The Accused Products also include products that are used to perform one or more methods claimed in the ACQIS Patents within the six years preceding the date of this Complaint.

The Accused Servers

63. The Thunder HX FA77-B7119 is a modular computer system that can run various server operating systems.

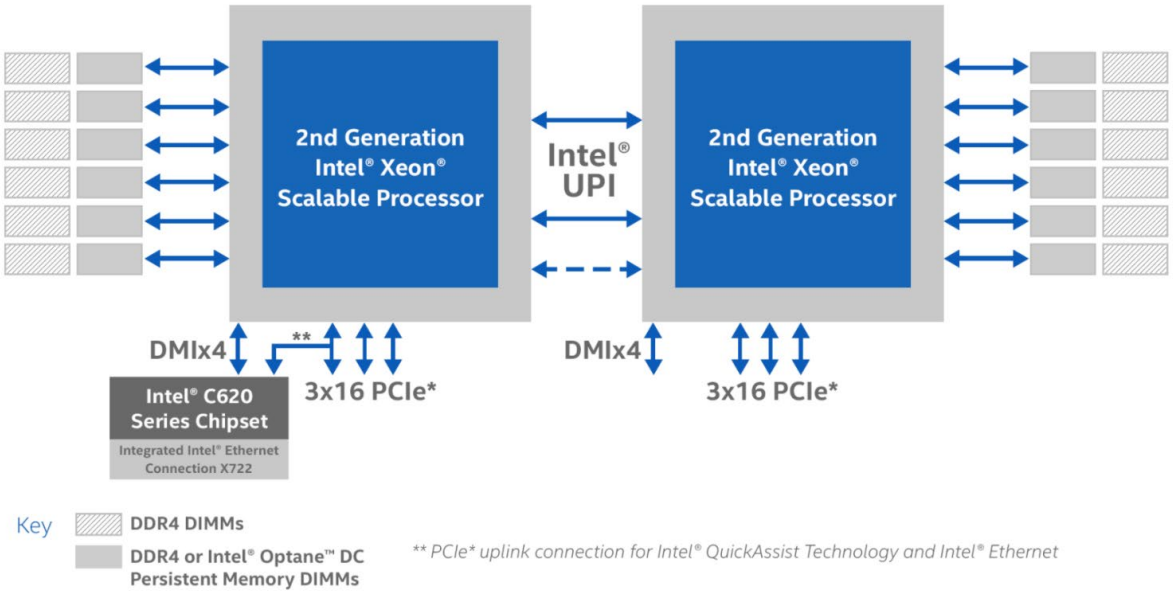
https://www.tyan.com/Barebones_FA77B7119_B7119F77V14HR-2T-N

64. The Thunder HX FA77-B7119 uses Intel® Xeon® Processor Scalable Family, which have integrated interface controllers on a single chip to drive the PCIe channels connected to the processor.[2]

Supported CPU Series	Intel Xeon Scalable Processor / 2nd Gen Intel Xeon Scalable Processor

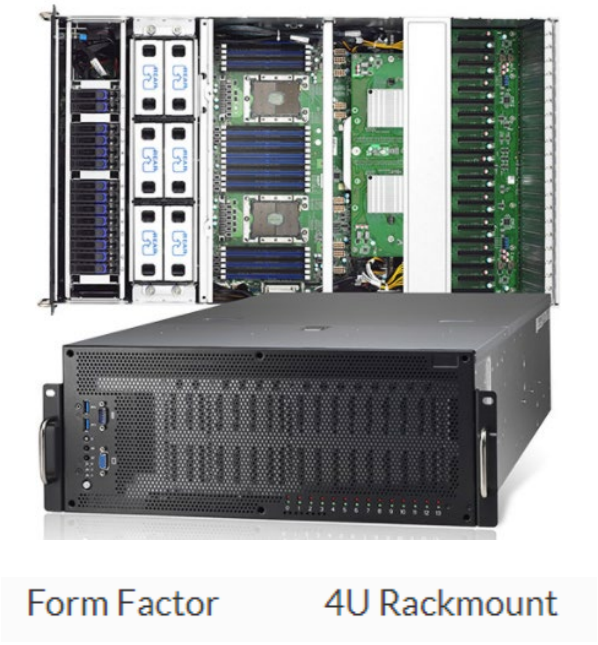
https://www.tyan.com/Barebones_FA77B7119_B7119F77V14HR-2T-N

[2] The Tyan-branded servers use an Intel® Xeon® Processor E5-2600 v3/v4, which is substantially similar to Intel® Xeon® Processor Scalable Family in all relevant respects.



https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html

65. The Thunder HX FA77-B7119 includes a variety of connectors that can couple the CPU to a console, external cable, or external peripheral:



Expansion Slots	Pre-install TYAN Mezz. Card (PCI-E Gen3)	(1) M7076-X540-2T LAN mezz. card w/ (2) 10GbE ports (deployed on (1) PCI-E Gen3 x16 OCP 2.0 slot)

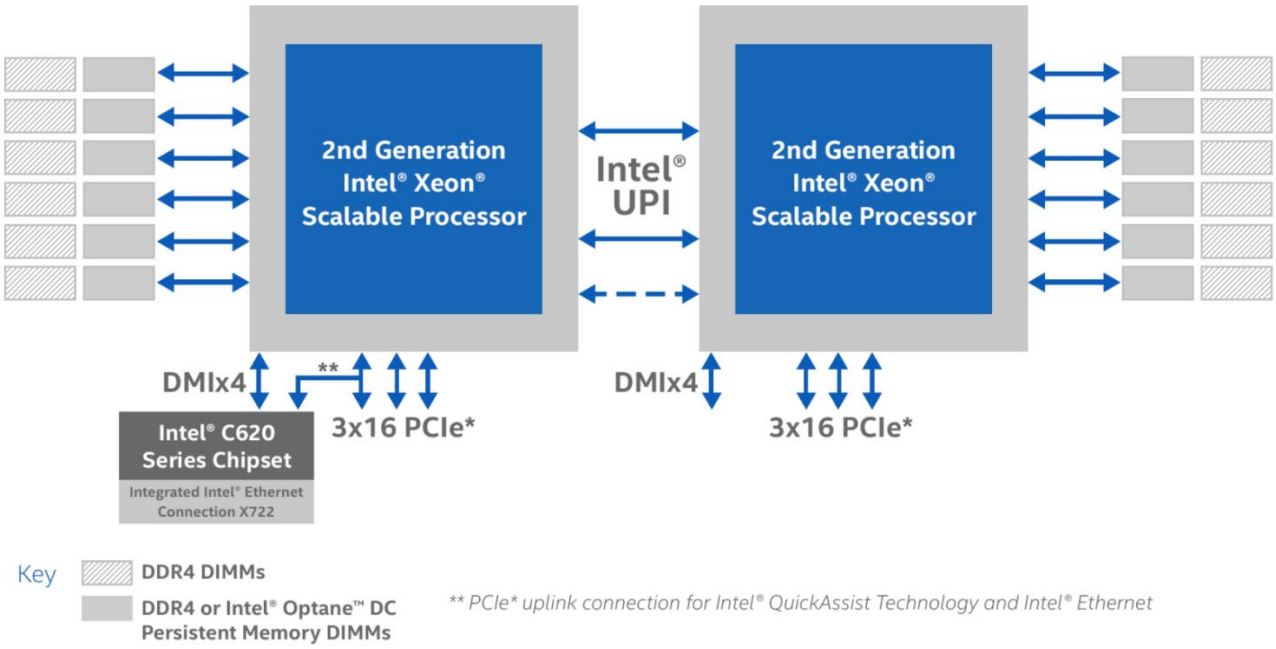
Power Supply	Type	CRPS
	Input Range	AC 100-127V/12A / AC 200-240V/9.48A
	Frequency	50-60 Hz
	Output Watts	3,000 Watts (100-127Vac input) / 4,800Watts (200-240Vac input)
	Efficiency	PFC / 80 plus Platinum
	Redundancy	3+1

https://www.tyan.com/Barebones_FA77B7119_B7119F77V14HR-2T-N

66. The Intel processors employed in the Thunder HX FA77-B7119 directly connect to a variety of LVDS channels that convey data bits in a serial stream using unidirectional pairs of lanes transmitting data in opposite direction, including Intel's DMI and PCIe channels.

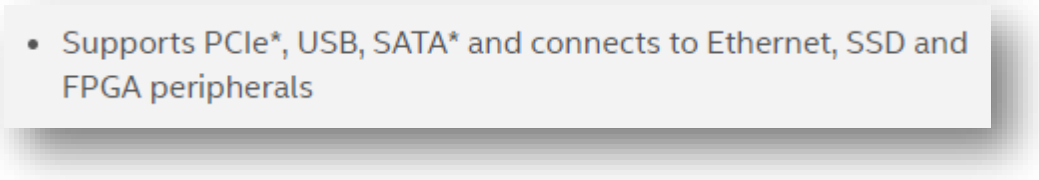
- Dual-Socket Intel 2nd Gen Xeon® Scalable Processors
- Supports Single CPU Deployment with 10GPU
- (24) DIMM slots supporting up to 3TB DDR4-2667
- (14) Hot-Swap 2.5" SATA 6G drive bays
- (10) Double-Width PCIex16 slots for GPUs
- (1) PCIex16 slot for NIC up to 100Gb/s
- AST2500 BMC with Redfish support

https://www.tyan.com/Barebones_FA77B7119_B7119F77V14HR-2T-N



https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html

67. The Intel processors employed in the Thunder HX FA77-B7119 also connect to LVDS channels that convey USB data packets through pairs of unidirectional differential signal paths in opposite directions—USB 3.x ports.

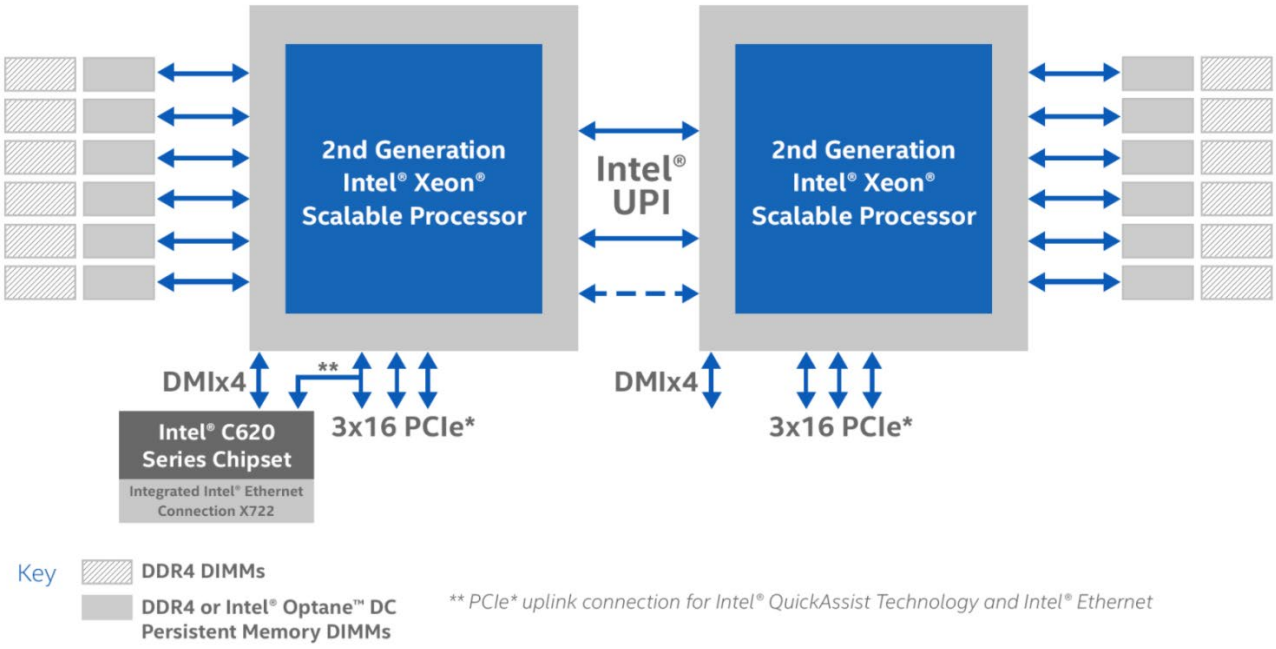


https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html

68. The Thunder HX FA77-B7119 has system memory directly coupled to the CPU.

Memory	Supported DIMM Qty	(12)+(12) DIMM slots
	DIMM Type / Speed	DDR4 RDIMM/RDIMM 3DS/LRDIMM/LRDIMM 3DS 2933/2666 / DDR4 JEDEC NVDIMM 2666 / Intel Optane DC Persistent Memory Module (DCPMM)
	Capacity	Up to 1,536GB RDIMM/LRDIMM & 3,072GB RDIMM 3DS/LRDIMM 3DS *Follow latest Intel DDR4 Memory POR
	Memory channel	6 Channels per CPU
	Memory voltage	1.2V
	Notification	DDR4-2933 speed only supported with 2nd Gen Intel Xeon Scalable Processor (codename: Cascade Lake) and in a 1 DIMM per channel configuration. / Intel Optane DC Persistent Memory Module (DCPMM) only supported with specific 2nd Gen Intel Xeon Scalable Processor (codename: Cascade Lake). Please contact Tyan Technical Support for more detail.

https://www.tyan.com/Barebones_FA77B7119_B7119F77V14HR-2T-N



https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html

69. The Thunder HX FA77-B7119 has a mass storage hard drive coupled to the CPU.

Storage	SATA	Connector	(2) Mini-SAS HD (8 ports)
		Controller	Intel C621
		Speed	6Gb/s
		RAID	RAID 0/1/10/5 (Intel RSTe)
	sSATA	Connector	(2) SATA-III / (1) Mini-SAS HD (4 ports)
		Controller	Intel C621
		Speed	6Gb/s
		RAID	RAID 0/1/10/5 (Intel RSTe)

https://www.tyan.com/Barebones_FA77B7119_B7119F77V14HR-2T-N

- Supports PCIe*, USB, SATA* and connects to Ethernet, SSD and FPGA peripherals

https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html

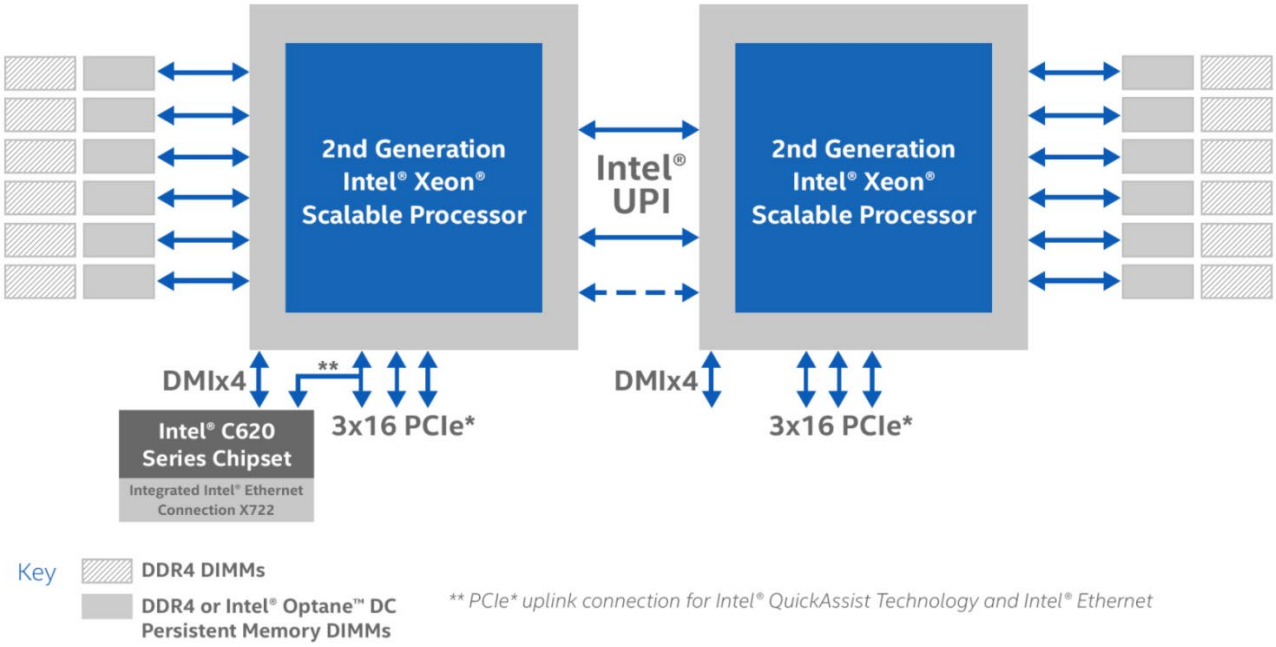
70. The Intel processors used in the Thunder HX FA77-B7119 have a peripheral bridge called the C621 chipset PCH connected to the CPU via the DMI, which has an integrated controller.[3] The C621 Chipset is part of the Intel C620 Series. *See* https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-

[3] The Tyan-branded servers use an Intel® C612 Chipset, which is substantially similar to Intel® C621 Chipset in all relevant respects.

chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html ; and https://ark.intel.com/content/www/us/en/ark/products/97340/intel--c621-chipset .html

Chipset	PCH	Intel C621
	Switch IC	(2) PLX PEX8796

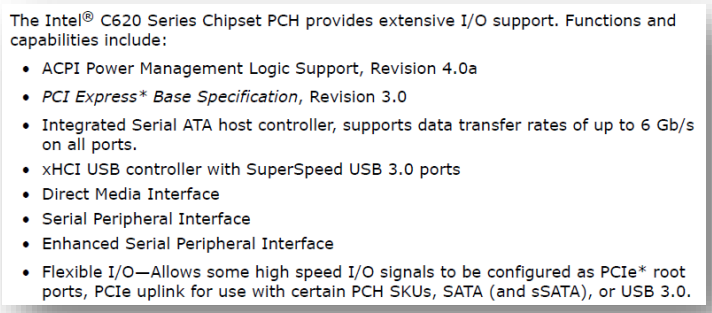
https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html



https://www.intel.com/content/www/us/en/design/products-and-solutions/processors-and-chipsets/cascade-lake/2nd-gen-intel-xeon-scalable-processors.html

The Intel Xeon Processor Scalable Family is the next generation of 64-bit, multi-core server processor built on 14-nm process technology. The processor supports up to 46 bits of physical address space and 48 bits of virtual address space. The processor is designed for a platform consisting of at least one Intel Xeon Scalable Family processor and the Platform Controller Hub (PCH). Included in this family of processors are integrated memory controller (IMC) and an Integrated I/O (IIO) on a single silicon die.

Intel® Xeon® Processor Scalable Family Datasheet, Vol. 1, p. 7 (May 2018 Doc. No. 336062-003)

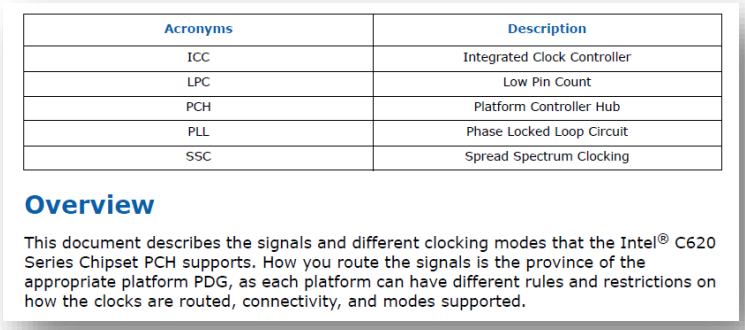


The Intel® C620 Series Chipset PCH provides extensive I/O support. Functions and capabilities include:

- ACPI Power Management Logic Support, Revision 4.0a
- *PCI Express* Base Specification*, Revision 3.0
- Integrated Serial ATA host controller, supports data transfer rates of up to 6 Gb/s on all ports.
- xHCI USB controller with SuperSpeed USB 3.0 ports
- Direct Media Interface
- Serial Peripheral Interface
- Enhanced Serial Peripheral Interface
- Flexible I/O—Allows some high speed I/O signals to be configured as PCIe* root ports, PCIe uplink for use with certain PCH SKUs, SATA (and sSATA), or USB 3.0.

Intel® C620 Series Chipset Platform Controller Hub Datasheet, p. 34, 38 (May 2019 Doc. No. 336067-007US)

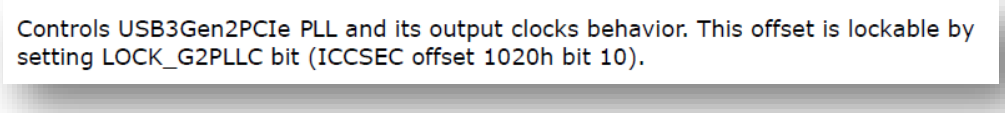
71. The Intel C621 PCH used in the Thunder HX FA77-B7119 has an Integrated Clock Controller (ICC) that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies.



Acronyms	Description
ICC	Integrated Clock Controller
LPC	Low Pin Count
PCH	Platform Controller Hub
PLL	Phase Locked Loop Circuit
SSC	Spread Spectrum Clocking

Overview

This document describes the signals and different clocking modes that the Intel® C620 Series Chipset PCH supports. How you route the signals is the province of the appropriate platform PDG, as each platform can have different rules and restrictions on how the clocks are routed, connectivity, and modes supported.



Controls USB3Gen2PCIe PLL and its output clocks behavior. This offset is lockable by setting LOCK_G2PLLC bit (ICCSEC offset 1020h bit 10).

8.6.2 100-MHz Differential Clocks

CLKOUT_NSSCCAP[1:0] are a pair of 100 MHz differential clocks that can have spread spectrum enabled and disabled on them independently of the rest of the 100 MHz differential clocks. This can be done because these clocks are sourced from a different PLL than the rest of the 100 MHz clocks. One effect of this is that these clocks can not be used to drive the BLCK inputs on the CPU, drive clock inputs to PCIe slots/devices that connect to the CPU, or clocks inputs to PCIe slots/devices that connect to the PCH. They are best considered independent clocks that can be used by components that do not need them to be used for transferring data between the CPUs and the PCHs. For example, if you had a SAS controller on the board that needed 100 MHz non-spread clocks for transferring data between the controller and the hard drives, the CLKOUT_NSSCCAP clocks could be used for this purpose.

The rest of the clocks (CLKOUT_ITPXDP, CLKOUT_PLAT[1:0], CLKOUT_SRC_N/P_[15:0]) are all generated by the same PLL, and operate the same with regards to spread spectrum. SSC is either on for all these clocks, or off. The PLL for these clocks also provides the clocking for USB3. The USB3 specification requires SSC to be turned on with a certain range, resulting in these clocks all, by default, having spread spectrum enabled operating in that mode. It is possible to disable SSC on these clocks, but that will end up in non-compliance with the USB3 specification.

While all are 100 MHz clocks, there are some differences between the clocks with regards to power and ground connections. For connections to the CPU BCLKs, CLKOUT_SRC clocks must be used. See the appropriate Platform Design Guide for more details on clock selection.

In Platform Hybrid mode, it is possible to use either the CLKOUT_SRC clocks to drive the clock buffers, or the CLKOUT_PLAT[1:0] can be used. The preference would be to use the CLKOUT_SRC clocks. Again, see your PDG for guidelines.

All 100 MHz differential clocks are only active in the S0 state. When in Sx state, they will be driven low.

The CLKOUT_SRC clocks can have their outputs enabled/disabled either via FITC setups, HECI commands or with the SRCCLKREQ# pins. The SRCCLKREQ# pins are a good option for PCIe slots as they can be used to externally enable or disable the output of the CLKOUT_SRC pins depending on whether a card is in the slot or not.

Intel® C620 Series Chipset Platform Controller Hub Datasheet, p. 98-116 (May 2019 Doc. No. 336067-007US)

72. The Intel Xeon Scalable processor used in the Thunder HX FA77-B7119 also has integrated clock circuitry that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions through the PCIe channels based on the different clock frequencies.

Clock multiplying within the processor is provided by the internal phase locked loop (PLL), which requires a constant frequency BCLK{0/1/2}_DP, BCLK{0/1/2}_DN input, with exceptions for spread spectrum clocking. DC specifications for the BCLK{0/1/2}_DP, BCLK{0/1/2}_DN inputs are provided in Section 2.8.3.7.

System Reference Clock (BCLK{0/1/2}) Signals

Signal Name	Description
BCLK{0,1,2}_DN/DP	Reference Clock Differential input. These pins provide the required reference inputs to various PLLs inside the processor, such as Intel UPI and PCIe. BCLK0, BCLK1 and BCLK2 run at 100 MHz from the same clock source.

Intel® Xeon® Processor Scalable Family Datasheet, Vol. 1, p. 15, 56 (May 2018 Doc. No. 336062-003)

73. Transport SX GT62F-B8026 is a modular computer system that can run various server operating systems.

https://www.tyan.com/Barebones_GT62FB8026_B8026G62FV10HR-LE

74. The Transport SX GT62F-B8026 uses an AMD® EPYC™ 7001/7002 Series Processor, which has integrated interface controllers on a single chip to drive the PCIe channels connected to the processor.

Supported CPU Series	(1) AMD EPYC™ 7001/7002 Series Processor

https://www.tyan.com/Barebones_GT62FB8026_B8026G62FV10HR-LE

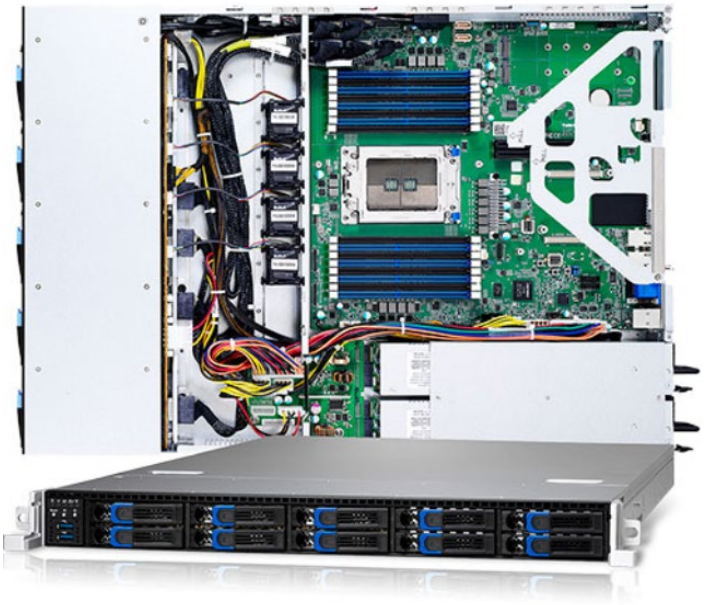
AMD Infinity Architecture is a hybrid multi-die architecture that is reaching new heights with AMD EPYC™ 7002 Series processors. AMD Infinity Architecture now decouples two streams: eight dies for the processor cores, and one I/O die that supports security and communication outside the processor. With the agility to deliver the leading-edge process technology for CPU cores while letting I/O circuitry develop at its own rate, new capabilities can be brought to market faster with EPYC™ because its die design is not monolithic. This has allowed EPYC™ to race to leadership in the market and continue to innovate in the future.

https://www.amd.com/en/processors/epyc-7002-series

The use of multiple dies and a fast fabric interconnect allows for a system-on-chip (SoC) design that eliminates the need for many external support chips and the I/O latencies they induce. This balanced system approach gives you an abundance of resources so that you can match workloads and resources and make the best use of capital. You'll find that 1- and 2-socket servers with AMD EPYC processors satisfy most of your workload needs, helping you increase density and reduce capital, power, and cooling expenses. You can also optimize your software licensing costs. Whether you need 8 cores per processor or 64, you'll get the same "all in" feature set–I/O, memory, memory bandwidth, and security capabilities–to accelerate workloads and help safeguard information.

https://www.amd.com/system/files/documents/LE-70001-SB-InfinityArchitecture.pdf

75. The Transport SX GT62F-B8026 includes a variety of connectors that can couple the CPU to a console, external cable, or external peripheral.



Form Factor		1U Rackmount
Power Supply	Type	RPSU
	Input Range	AC 100-240V/9A
	Frequency	50-60 Hz
	Output Watts	650 Watts
	Efficiency	80 plus Platinum
	Redundancy	1+1

https://www.tyan.com/Barebones_GT62FB8026_B8026G62FV10HR-LE

76. The AMD processors employed in the Transport SX GT62F-B8026 connect directly to LVDS channels that convey data bits in a serial stream using unidirectional pairs of lanes transmitting data in opposite directions, including PCIe channels.

AMD EPYC™ is the first and only current x86-architecture server processor supporting PCIe 4.0[6]. PCIe 4.0 delivers double the I/O performance over PCIe 3.0. You can use 128 lanes of I/O to double the network bandwidth that ties together HPC clusters and satisfies voracious needs for east-west bandwidth. For other application needs and in virtualized environments, you can connect with higher speed to GPU accelerators, NVMe drives, and you can even use integrated disk controllers to access spinning disks without the typical bottleneck of a PCIe RAID controller.

https://www.amd.com/en/processors/epyc-7002-series

77. The AMD processors employed in the Transport SX GT62F-B8026 also connect to LVDS channels that convey USB data packets through pairs of unidirectional differential signal paths in opposite directions—USB 3.x ports.

USB	(2) USB3.0 ports (@ rear) / (2) USB3.0 ports (@ front)

https://www.tyan.com/Barebones_GT62FB8026_B8026G62FV10HR-LE

An On-die Server Control Hub makes EPYC a True SoC

Every server requires a control hub to handle the run-of-the-mill I/O interfaces found on almost all systems. "Why not incorporate a hub on the server die itself, rather than use a discrete chip?" AMD's engineers asked. Control hubs often consume five to eight watts, and in the discrete case much of that power just goes into inter-chip communications. The EPYC team put a Server Control Hub (SCH) on the "Zeppelin" die, and tied it into the Scalable Control Fabric, where it can observe the activity of all the chips and links in the system. It provides four USB 3.0 ports, two SMBus ports, platform clock generation, along with a few other goodies everyone notices only when they're absent. This simplifies the design of EPYC motherboards, and saves a few watts as well, as compared with competitive platforms that still require external control hubs.

https://www.amd.com/system/files/documents/The-Energy-Efficient-AMD-EPYC-Design.pdf

78. The Transport SX GT62F-B8026 has system memory directly coupled to the CPU.

Memory	Supported DIMM Qty	(16) DIMM slots
	DIMM Type / Speed	DDR4 ECC RDIMM/LRDIMM 2666/2400
	Capacity	Up to 1,024GB RDIMM/LRDIMM
	Memory channel	8 Channels per CPU
	Memory voltage	1.2V

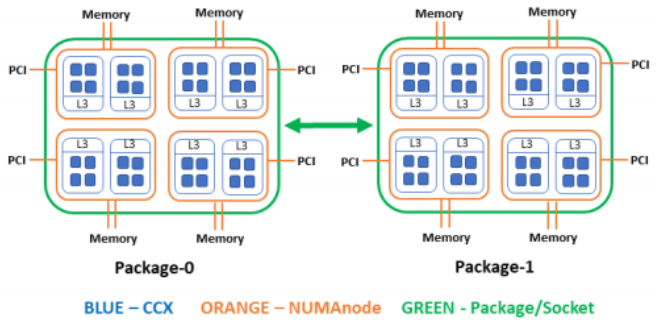
https://www.tyan.com/Barebones_GT62FB8026_B8026G62FV10HR-LE

EPYC 7002 series has 8 memory channels, supporting 3200 MHz DIMMs yielding 204.8 GB/s of bandwidth vs. the same class of Intel Scalable Gen 2 processors with only 6 memory channels and supporting 2933 MHz DIMMs yielding 140.8 GB/s of bandwidth. 204.8 / 140.8 = 1.454545 - 1.0 = .45 or 45% more. AMD EPYC has 45% more bandwidth. Class based on industry-standard pin-based (LGA) X86 processors. ROM-11

https://www.amd.com/system/files/documents/AMD-EPYC-7002-Series-Datasheet.pdf

6.1 CPU Layout

The following diagram shows a simplified schematic of a dual-socket AMD server.

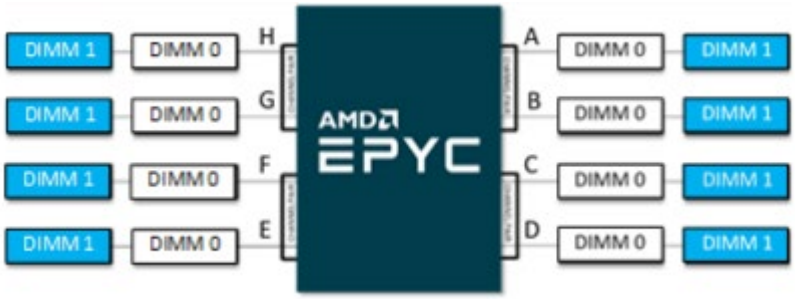


There is a rich hierarchy within the EPYC CPU which we explain here.

Each socket is comprised of 4 silicon dies (NUMA nodes, or 'Zeppelins') shown in orange. Eacl Zeppelin

- provides 2 memory channels, i.e. 8 memory channels per socket
- provides PCIe gen3 slots (each OEM individually decides how to present/consume these resources)
- Is connected to the remaining 3 Zeppelins within the socket via the internal Global Memory Interconnect, or "Infinity Fabric". This enables each NUMA node to access the memory and PCI capabilities associated with its counterparts both within the socket and between sockets

http://developer.amd.com/wp-content/resources/56420.pdf



https://developer.amd.com/wp-content/resources/56502_1.00-PUB.pdf

79. The Transport SX GT62F-B8026 has a mass storage hard drive directly coupled to the CPU.

Storage	SATA	Connector	(10) SATA
		Controller	Direct from AMD EPYC CPU
		Speed	6Gb/s
		RAID	N/A
		Notification	The 2 right-most SATA SSDs/HDDs (#8 & #9) are not available when AMD EPYC™ 7002 Series Processors deployed in all configurations. Please contact Tyan Technical Support for more details.
	NVMe	Connector (M.2)	(2) 22110/2280/2260/2242 (by PCI-E & SATA interface)
		Notification	2 onboard M.2 connectors shall support NVMe only when AMD EPYC™ 7002 Series Processors deployed in all configurations. Please contact Tyan Technical Support for more details.

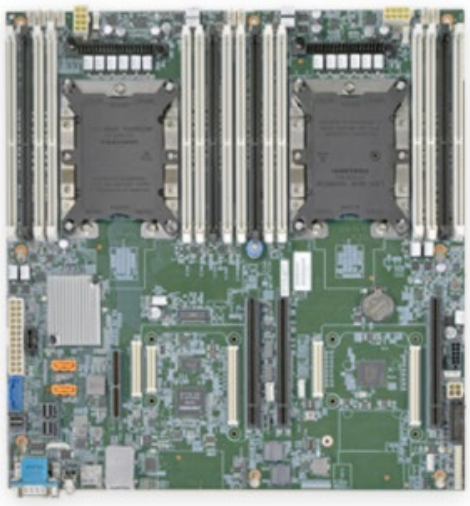
https://www.tyan.com/Barebones_GT62FB8026_B8026G62FV10HR-LE

80. The AMD® EPYC™ 7001/7002 Series Processor used in the Transport SX GT62F-B8026 includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies. The AMD® EPYC™ Processor Family processors include multiple PLLS to facilitate granular frequency changes for CPU cores and I/O for better efficiency.

https://www.amd.com/system/files/documents/understanding-power-management.pdf

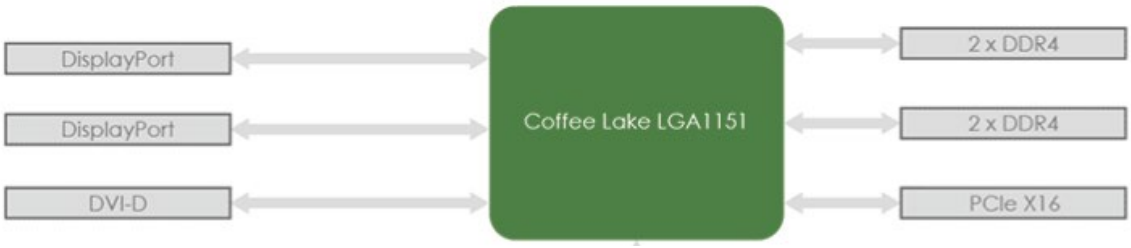
The Accused Motherboards

81. The PH10FEU is a printed circuit board.



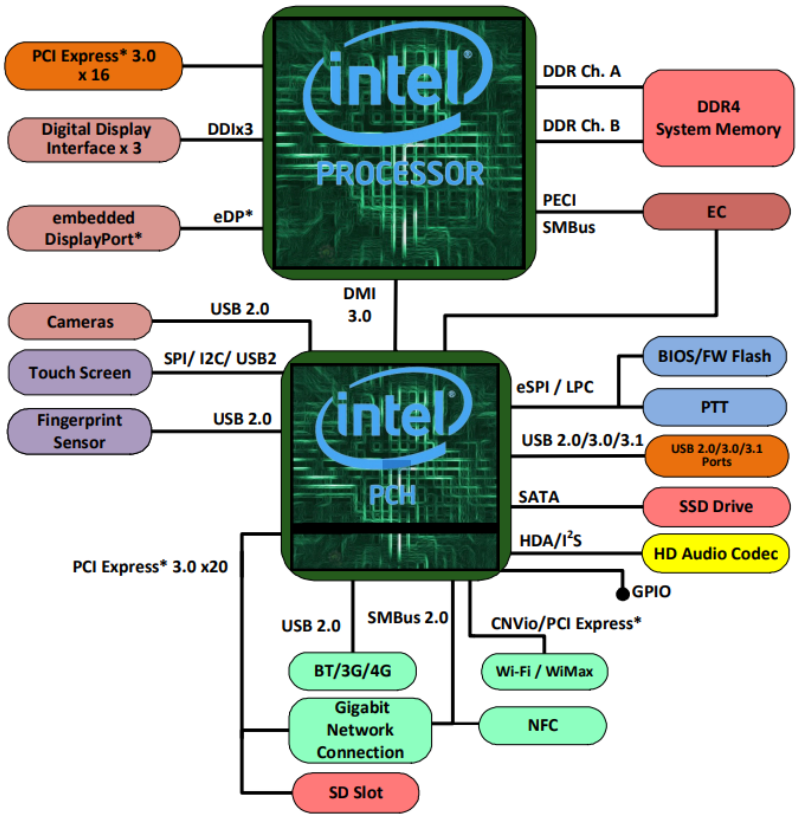
https://www.mitacmct.com/IndustrialMotherboard%3DPH10FEU%3DPH10FEU%3Ddescription%3DEN

82. The PH10FEU uses a 9th & 8th Gen Intel® Coffee Lake LGA1151 Socket Processor, Core i7/i5/i3 6-core TDP Max. 95W, Core i9 8-core TDP Max 35W ("Intel® Coffee Lake LGA1151 processor").[4]The Intel® Coffee Lake LGA1151 has integrated interface controllers on a single chip to drive the PCIe channels connected to the processor.



https://www.mitacmct.com/IndustrialMotherboard%3DPH10FEU%3DPH10FEU%3Ddescription%3DEN

[4] The PH10LU and PH12LI use a 4th Gen Haswell Intel® Core™ i Series LGA1150 Socket Processor; the PH10SU uses a 7th/6th Gen Intel® Core™ i Series LGA1151 Socket Processor; the PH11CMI, PH12CMI, and PH13CMI use a 10th Gen Intel® Comet Lake LGA1200 Socket Processor; the PH11SI, PH12SI, and PH13SI use a 7/6th Gen Intel Kaby Lake / Skylake LGA1151 Socket Processor. Each is substantially similar to the 9th & 8th Gen Intel® Coffee Lake LGA1151 Socket Processor in all relevant respects.



8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006).

83. The Intel® Coffee Lake LGA1151 processor employed in the PH10FEU directly connects to LVDS channels that convey data bits in a serial stream using unidirectional pairs of lanes transmitting data in opposite direction, including the Intel® Coffee Lake LGA1151 processor's DMI and PCIe channels, thereby increasing data throughput.

- Intel® Coffee Lake Core i7/i5/i3/Pentium/Celeron LGA1151 processors
- Intel® Q370 / H310 Chipset
- Intel® vPro technology supported
- 4 x DDR4 DIMM, support up to 64GB
- Support triple display for 2 x DisplayPort and DVI
- Support PCIe X16 (Gen 3) slot, 2 x PCIe X4 (Gen 3) slot, and M.2 slot
- 6 x SATAIII (support RAID 0, 1, 5, 10 w/ Q370)
- 2 x Intel® Gigabit Ethernet
- 4 x USB 2.0, 2 x USB 3.0, 4 x USB3.1 (Gen 2), 4 x COM
- ATX power input

https://www.mitacmct.com/IndustrialMotherboard%3DPH10FEU%3DPH10FEU%3Ddescriptio

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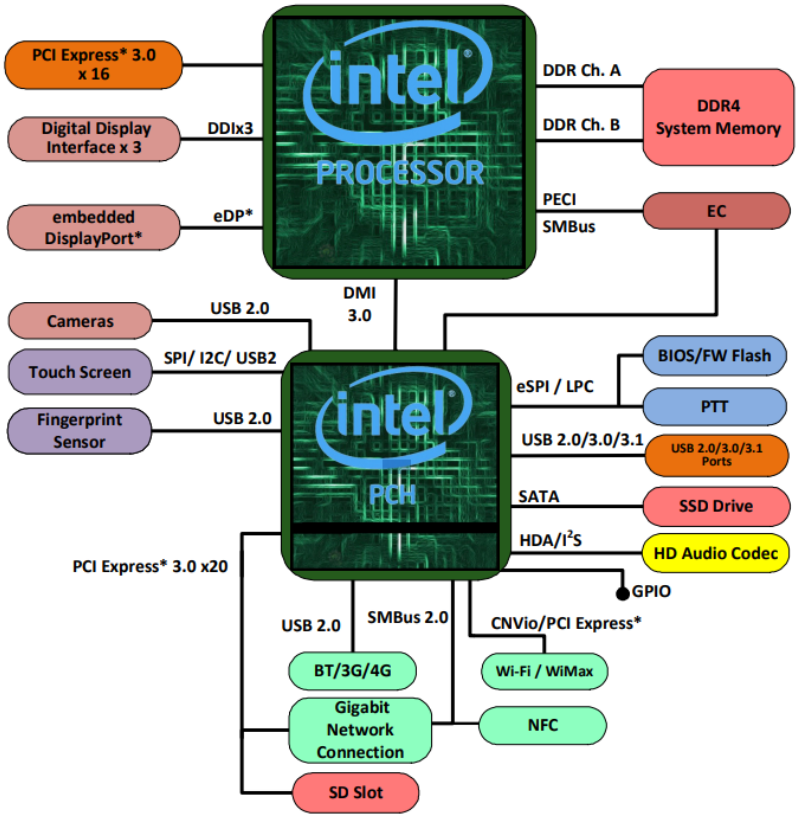
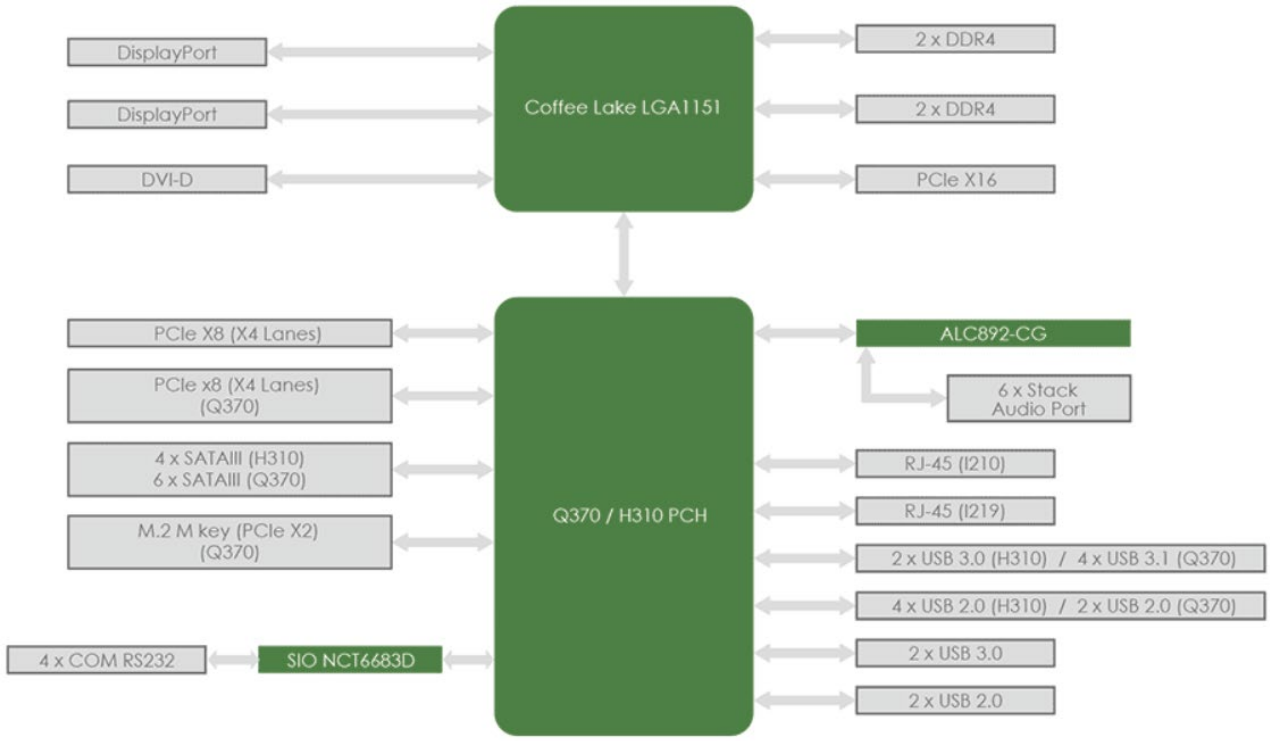


8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006).

84. The PH10FEU has system memory directly coupled to the CPU.

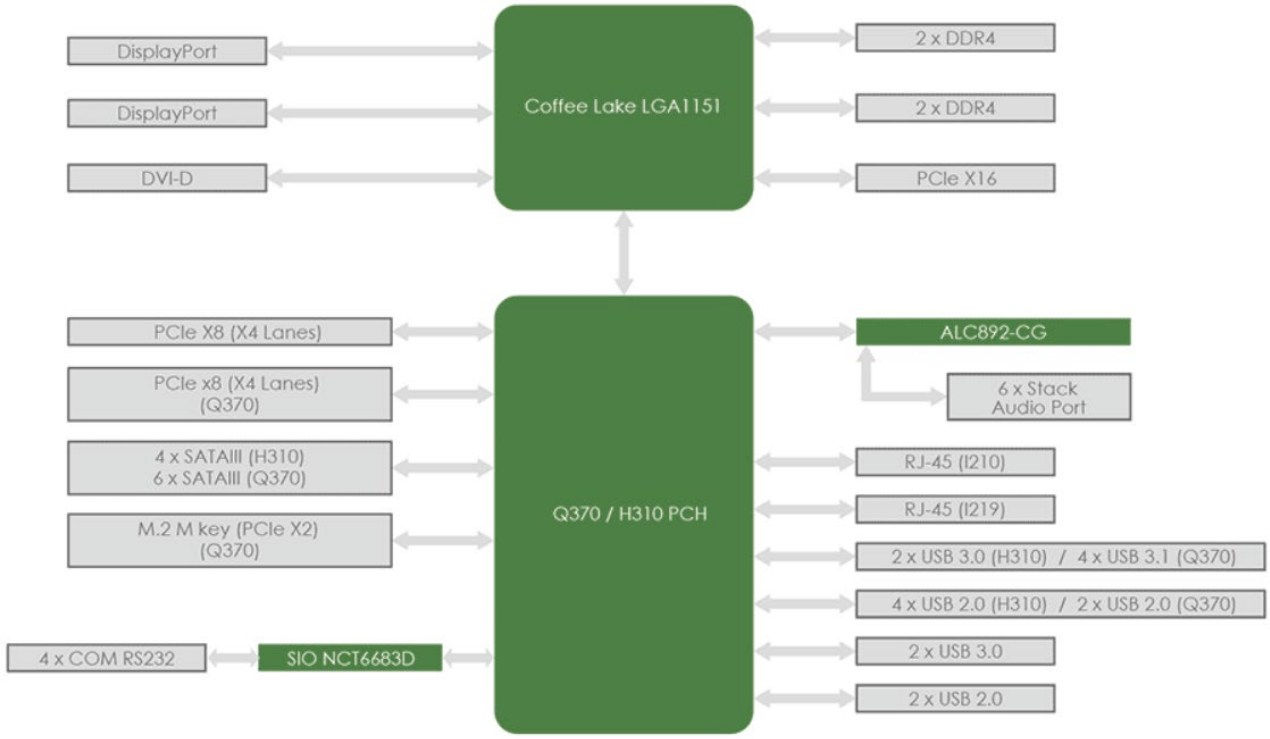


https://www.mitacmct.com/IndustrialMotherboard%3DPH10FEU%3DPH10FEU%3Ddescription%3DEN

85. The Intel processors used in PH10FEU has a peripheral bridge called the Q370/H310 PCH connected to the CPU via the DMI, which has an integrated interface controller.[5]

See https://ark.intel.com/content/www/us/en/ark/products/133282/intel-q370-chipset.html

[5] The PH10LU and PH12LI use an Intel® Q87 Chipset; the PH10SU uses an Intel® Q170 Chipset; the PH11CMI uses an Intel® H410; the PH12CMI and PH13CMI use an Intel® Q470E; the PH11SI uses an Intel® H110; the PH12SI, and PH13SI use an Intel® Q170. Each is substantially similar to the Q370/H310 PCH in all relevant respects.



https://www.mitacmct.com/IndustrialMotherboard%3DPH10FEU%3DPH10FEU%3Ddescription%3DEN

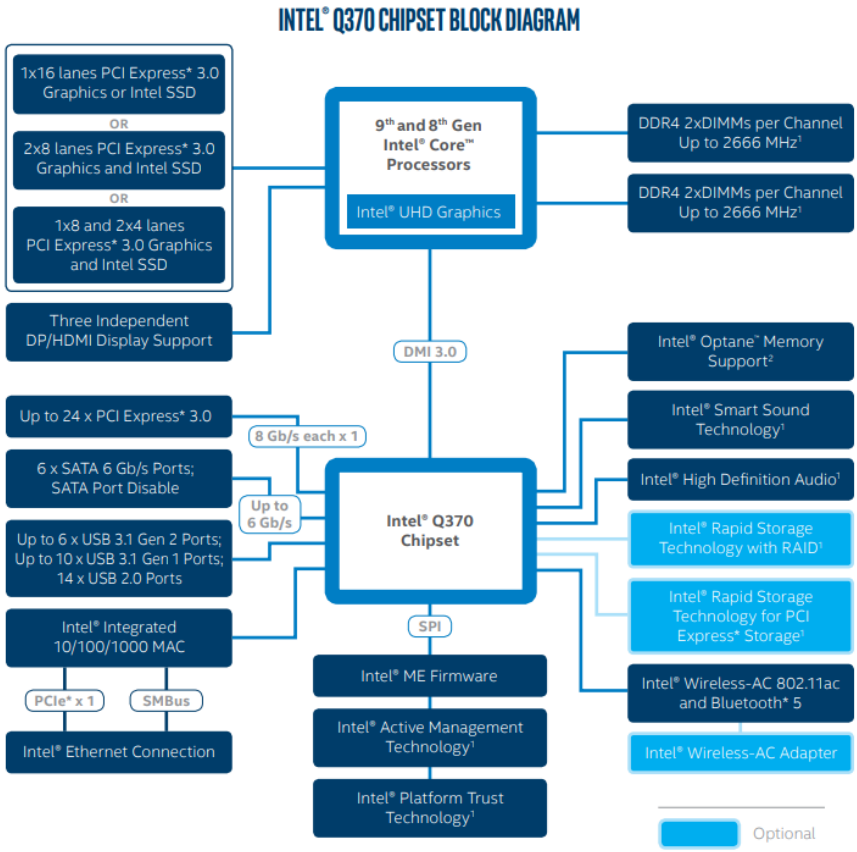
Table 1-1. Processor Lines

Processor Line[1]	Package	Base TDP	Processor IA Cores	Graphics Configuration	On-Package Cache	Platform Type
U-Processor Line	BGA1528	28W	4	GT3	128 MB	1-Chip
			2			
		15W	4	GT2		
H-Processor Line	BGA1440	45W	4	GT2	N/A	2-Chip
			6			
			8			
S-Processor Line (DT)	LGA1151	35W, 65W, 95W,127W	8	GT2	N/A	2-Chip
		35W, 65W, 95W	6			
		35W, 62W, 65W, 91W	4			
		35W, 54W, 58W	2			
		35W, 54W, 58W	2	GT1		
		95W	8	GT0		
		95W, 65W	6			
		91W, 65W	4			

Notes:
1. Processor Lines offering may change.
2. In general, 8th and 9th Gen Intel® Core™ Processor pairs with Intel® 300 Series Chipset Families Platform Controller Hub. S-Processor Line (DT) SKUs may also pair with Intel® Z370, H310c, or B365 chipset SKUs.

Throughout this document, the 8th and 9th Gen Intel® Core™ Processor families may be referred to simply as "processor". Intel® 300 Series Chipset Families Platform Controller Hub (PCH) may be referred to simply as "PCH".

8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 10 (Rev. 006, July 2020 Doc. No. 337344-006)



https://www.intel.com/content/dam/www/public/us/en/documents/product-briefs/q370-chipset-product-brief.pdf

86. The Q370/H310 PCH used in the PH10FEU has an Integrated Clock Controller (ICC) that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies.

25.6 General Features

- The PCH Integrated Clock Controller (ICC) generates and supplies all the PCH reference clocks for internal needs and it provides the complete platform system clocking solution.
- All of the ICC PCH internal reference clocks and all of the single-ended and differential clock outputs are generated from an external 24 MHz crystal through the PCH XTAL_IN/OUT pins, where the crystal accuracy is required to be less than 100 ppm.
  - Note: ppm stands for parts per million, and it indicates how much a crystal's frequency may deviate from the nominal value.
- CLKOUT_PCIE_P/CLKOUT_PCIE_N 100MHz PCIe* 3.0 compliant differential output clocks support CLKREQ# based power management
- CLKOUT_LPC[1:0] single-ended output clocks support CLKRUN# based power management, they require no external loop back clock for internal logic, and they only support a single load configurations.
- System Power Management support includes shutdown of all PCH ICC Phase Locked Loops (PLL), PCH ICC internal and external clocks, and includes the shutdown of the external crystal source.

Intel® 300 Series and Intel® C240 Series Chipset Family Platform Controller Hub Datasheet – Volume 1 of 2, p. 194 (Rev. 006, September 2019 Doc. No. 337347-006)

87. The Intel® Coffee Lake LGA1151 processor used in PH10FEU also has integrated clock circuitry that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions through the PCIe channels based on the different clock frequencies.

The processor supports the following:

- Hierarchical PCI-compliant configuration mechanism for downstream devices.
- Traditional PCI style traffic (asynchronous snooped, PCI ordering).
- PCI Express* extended configuration space. The first 256 bytes of configuration space aliases directly to the PCI Compatibility configuration space. The remaining portion of the fixed 4-KB block of memory-mapped space above that (starting at 100h) is known as extended configuration space.
- PCI Express* Enhanced Access Mechanism. Accessing the device configuration space in a flat memory mapped fashion.
- Automatic discovery, negotiation, and training of link out of reset.
- Peer segment destination posted write traffic (no peer-to-peer read traffic) in Virtual Channel 0: DMI -> PCI Express* Port 0.
- 64-bit downstream address format, but the processor never generates an address above 512 GB (Bits 63:39 will always be zeros).
- 64-bit upstream address format, but the processor responds to upstream read transactions to addresses above 512 GB (addresses where any of Bits 63:39 are nonzero) with an Unsupported Request response. Upstream write transactions to addresses above 512 GB will be dropped.
- Re-issues Configuration cycles that have been previously completed with the Configuration Retry status.
- PCI Express* reference clock is 100 MHz differential clock.

2.2.2 PCI Express* Architecture

Compatibility with the PCI addressing model is maintained to ensure that all existing applications and drivers operate unchanged.

The PCI Express* configuration uses standard mechanisms as defined in the PCI Plug and-Play specification. The processor PCI Express* ports support Gen 3.
At 8 GT/s, Gen3 operation results in twice as much bandwidth per lane as compared to Gen 2 operation. The 16 lanes port can operate at 2.5 GT/s, 5 GT/s, or 8 GT/s.

Gen 3 PCI Express* uses a 128b/130b encoding which is about 23% more efficient than the 8b/10b encoding used in Gen 1 and Gen 2.

The PCI Express* architecture is specified in three layers – Transaction Layer, Data Link Layer, and Physical Layer. Refer the *PCI Express Base Specification 3.0* for details of PCI Express* architecture.

8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families

Datasheet – Volume 1 of 2, p. 29-30 (Rev. 006, July 2020 Doc. No. 337344-006)

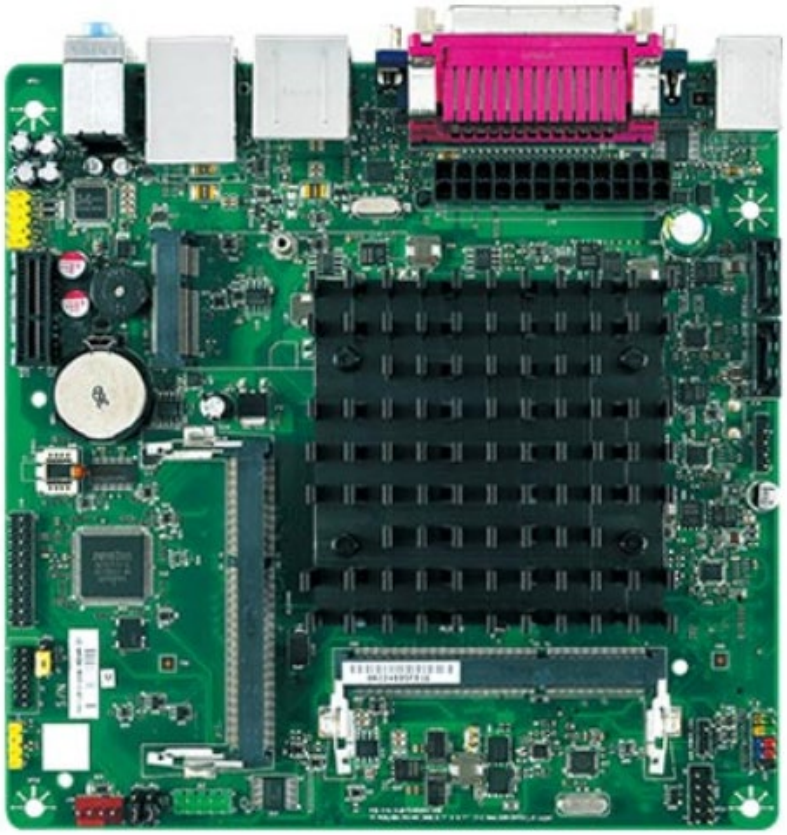
https://www.intel.com/content/dam/www/public/us/en/documents/datasheets/8th-gen-core-family-datasheet-vol-1.pdf

88. The PH10FEU comprises a network controller coupled to the central processing unit.

Ethernet	Intel® I219-LM Giga LAN + Intel® I210-AT Giga LAN

https://www.mitacmct.com/IndustrialMotherboard%3DPH10FEU%3DPH10FEU%3Ddescription%3DEN

89. The PD14RI is a printed circuit board.



https://www.mitacmct.com/IndustrialMotherboard_PD14RI_PD14RI

90. The PD14RI uses an Intel® Celeron® Processor N3060, which has integrated interface controllers on a single chip to drive the PCIe channels connected to the processor.[6]

PROCESSOR	Intel® Celeron® Processor N3060 (2M Cache, up to 2.48 GHz)

https://www.mitacmct.com/IndustrialMotherboard_PD14RI_PD14RI

PCI Express Revision ?	2.0
PCI Express Configurations ‡ ?	1x4/2x2/1x2 + 2x1/4x1
Max # of PCI Express Lanes ?	4

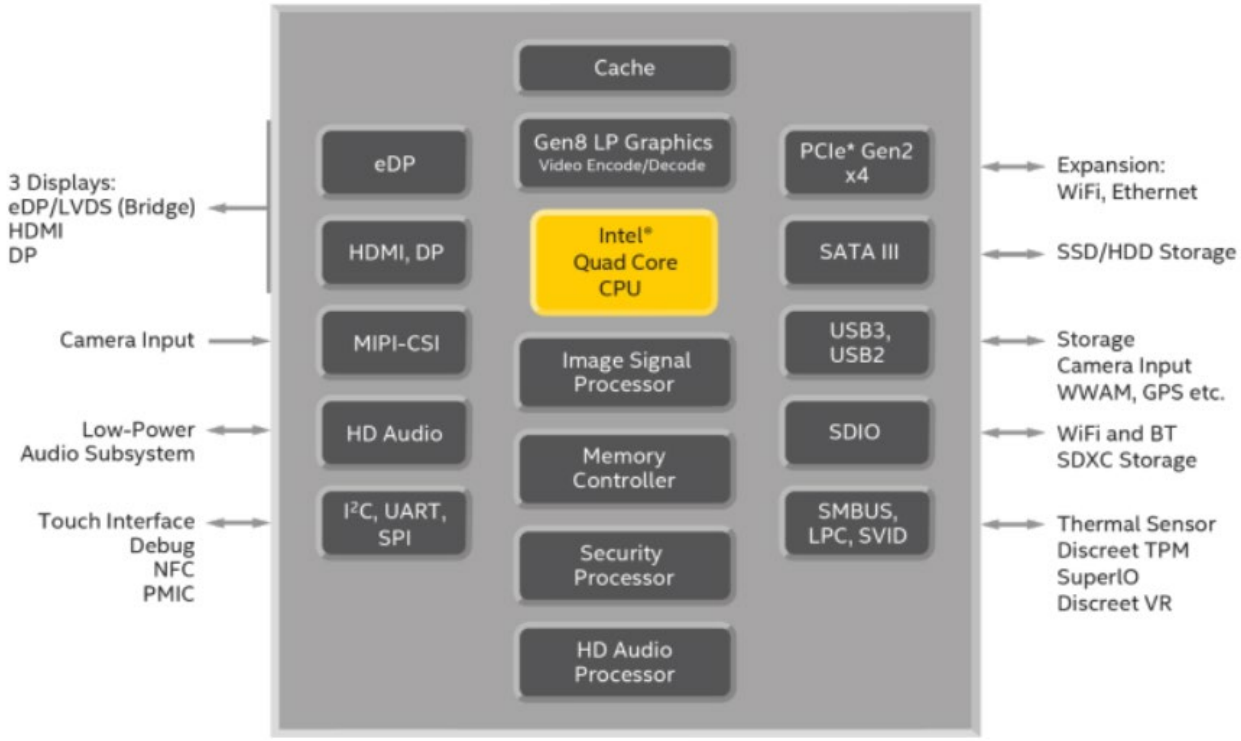
https://ark.intel.com/content/www/us/en/ark/products/91832/intel-celeron-processor-n3060-2m-cache-up-to-2-48-ghz.html

Interface	Category	SoC Features
PCI Express*	Interface	PCIe* 2.0
	Signaling Rate	5.0 or 2.5 GT/s operation per root port
	No. Lanes	4 Lanes and up to 4 PCIe* root ports
	Flexible Root port configurations	Support (4)x1 - (1)x2,(2)x1 - (1)x4 - (2)x2 Default option: (4)x1
	Interrupts and Events	Legacy (INTx) and MSI Interrupts General Purpose Events Express Card Hot-plug Event System error Events
	Power Management	Link State support for L0s, L1, L2 Power down in ACPI S3 state - L3
	Other	Support Virtual Channel for VC0 only

[6] The PD10AS and PD10AI use an Intel® Apollo Lake-M N3350 processor; the PD10KS, PD11KS, and PD10KC use an Intel® Kaby Lake-U i3-7100U processor; and the PD10BI and PD11BI use an Intel® Bay Trail processor. Each is substantially similar to the Intel® Celeron® Processor N3060 in all relevant respects.

N-Series Intel® Pentium® Processors and Intel® Celeron® Processors Datasheet – Volume 1 of 3, pg. 24 (February 2016 Doc. No. 332092-022)

91. The Intel® Celeron® Processor N3060 processor employed in the PD14RI directly connects to LVDS channels that convey data bits in a serial stream using unidirectional pairs of lanes transmitting data in opposite direction, including the Intel® Celeron® Processor N3060 processor's PCIe channels, thereby increasing data throughput.

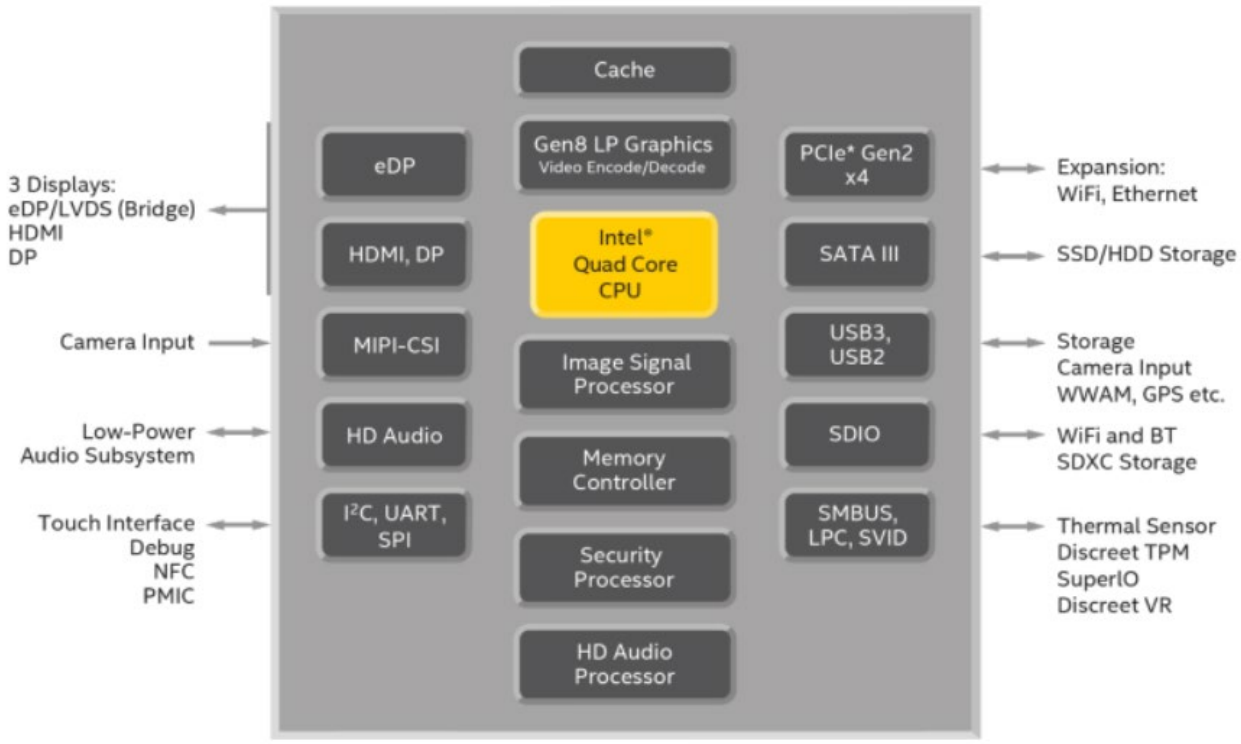


https://www.intel.com/content/www/us/en/embedded/products/braswell/specifications.html

92. The PD14RI has system memory directly coupled to the CPU.

SYSTEM MEMORY	DDR3L 1600MHz / 2 x 204-pin SO-DIMM / Max. 8GB (Non-ECC)

https://www.mitacmct.com/IndustrialMotherboard_PD14RI_PD14RI



https://www.intel.com/content/www/us/en/embedded/products/braswell/specifications.html

93. The Intel® Celeron® Processor N3060 processor used in PD14RI also has integrated clock circuitry that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies.

> The N-series Intel® Pentium® processor and Intel® Celeron® processor families are the Intel Architecture (IA) SoC that integrates the next generation Intel® processor core, Graphics, Memory Controller, and I/O interfaces into a single system-on-chip solution.

N-Series Intel® Pentium® Processors and Intel® Celeron® Processors Datasheet – Volume 1 of 3, pg. 17 (February 2016 Doc. No. 332092-022)

94. The Pluto E220 is a computer.

OVERVIEW

Mitac's Pluto E220 is built with the latest generation of Intel's Baytrail processor. The fanless chassis design gives it the flexibility to adapt to every workspace and environment. It has multiple I/O connectivity from a legacy parallel port, legacy PS/2 mouse and keyboard connector, and dual display via HDMI and DVI-I. Can be VESA mounted or sit vertically on a stand.

https://mitxpc.com/products/e220

95. The Pluto E220 comprises a variety of connectors configured to couple to a console, external cable, or external peripheral.

Expansion Slots	1 x Mini PCI-E (Occupied by Wireless Adapter)
Rear Panel I/O	1 x 19V DC-IN 2 x PS/2 Keyboard/Mouse 1 x Parallel Port 1 x VGA 1 x HDMI 1.4 2 x Serial COM (RS232) 2 x RJ45 GbE LAN 4 x USB 2.0
Front Panel I/O	1 x Power Button w/ LED 1 x HDD Status LED 2 x Audio I/O 1 x USB 2.0 1 x USB 3.0

https://mitxpc.com/products/e220

96. The Pluto E220 uses an Intel® Celeron® J1900 processor, which comprises an integrated central processing unit (CPU) and graphics subsystem in a single chip.[7]

CPU	Intel Celeron J1900 2.00 - 2.42 GHz 4 Cores/4 Threads 10W TDP, 2MB Cache
Video	Intel HD Graphics 688 - 854 MHz Supports Dual Display via HDMI and DVI-I

https://mitxpc.com/products/e220

Processor Graphics

Processor Graphics ‡	Intel® HD Graphics for Intel Atom® Processor Z3700 Series

[7] The S300-10AS uses an Intel® Apollo Lake-M N4200; the S310-11KS uses a 7th Gen Kaby Lake Intel® Core™ i ULV Processor; the E230 uses an Intel® Apollo Lake J3455 processor. Each is substantially similar to the Intel® Celeron® J1900 processor in all relevant respects.

https://ark.intel.com/content/www/us/en/ark/products/78867/intel-celeron-processor-j1900-2m-cache-up-to-2-42-ghz.html

Table 1-1. SoC Features (Sheet 1 of 3)

Interface	Category	SoC
CPU	Number of Cores	4
	Burst Speed	Up to 2.6 GHz
	ULFM/LFM/HFM	800 MHz/800 MHz/Up to 2.0 GHz
Package	Type	31x24 mm^2 Type-3
	I/O count	682
	Ball count	1296
	Minimum Ball pitch	0.593 mm
	Z-height	1.318 mm +/-0.092
Graphics	Gen	Gen9-LP
	Frequency	Up to 800 MHz
	Execution Units	Up to 18

Intel® Pentium® and Celeron® Processor N- and J- Series Datasheet – Volume 1 of 3, pg. 17 (August 2016 Doc. No. 334817-001)

97. The Pluto E220 comprises processors that connect directly to a variety of differential signal channels that output digital video signals through a connector.

Video	Intel HD Graphics 688 - 854 MHz Supports Dual Display via HDMI and DVI-I

https://mitxpc.com/products/e220

Intel® Pentium® and Celeron® Processor N- and J- Series is the Intel Architecture (IA) SoC that integrates the next generation Intel processor Core, Graphics, Memory Controller, and I/O interfaces into a single System-on-Chip (SoC) solution.

Intel® Pentium® and Celeron® Processor N- and J- Series Datasheet – Volume 1 of 3, pg. 11 (August 2016 Doc. No. 334817-001)

98. The Pluto E220 comprises a Low Voltage Differential Signal (LVDS) channel directly extending from the integrated central processing unit and graphics subsystem to convey

encoded address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial bit stream, wherein the LVDS channel comprises a first unidirectional, differential signal pair to convey data in a first direction and a second unidirectional, differential signal pair to convey data in a second, opposite direction.

Expansion Slots	1 x Mini PCI-E (Occupied by Wireless Adapter)
Rear Panel I/O	1 x 19V DC-IN 2 x PS/2 Keyboard/Mouse 1 x Parallel Port 1 x VGA 1 x HDMI 1.4 2 x Serial COM (RS232) 2 x RJ45 GbE LAN 4 x USB 2.0
Front Panel I/O	1 x Power Button w/ LED 1 x HDD Status LED 2 x Audio I/O 1 x USB 2.0 1 x USB 3.0

https://mitxpc.com/products/e220

Expansion Options

PCI Express Revision ?	2.0
PCI Express Configurations ‡ ?	X4, X2, X1
Max # of PCI Express Lanes ?	4

https://ark.intel.com/content/www/us/en/ark/products/78867/intel-celeron-processor-j1900-2m-cache-up-to-2-42-ghz.html

99. The Pluto E220 comprises a serial bit channel that couples to the connector, wherein the serial bit channel is adapted to transmit data packets in accordance with a Universal Serial Bus (USB) protocol wherein the integrated central processing unit and graphics subsystem outputs digital video display signals.

Expansion Slots	1 x Mini PCI-E (Occupied by Wireless Adapter)
Rear Panel I/O	1 x 19V DC-IN 2 x PS/2 Keyboard/Mouse 1 x Parallel Port 1 x VGA 1 x HDMI 1.4 2 x Serial COM (RS232) 2 x RJ45 GbE LAN 4 x USB 2.0
Front Panel I/O	1 x Power Button w/ LED 1 x HDD Status LED 2 x Audio I/O 1 x USB 2.0 1 x USB 3.0

https://mitxpc.com/products/e220

Expansion Options	
PCI Express Revision ?	2.0
PCI Express Configurations ‡ ?	X4, X2, X1
Max # of PCI Express Lanes ?	4

https://ark.intel.com/content/www/us/en/ark/products/78867/intel-celeron-processor-j1900-2m-cache-up-to-2-42-ghz.html

100. The Pluto E220 comprises system memory directly connected to the CPU.

Memory	2 x DDR3L SODIMM slot 1866MHz 8GB Maximum Capacity Non-ECC/Unbuffered Memory

https://mitxpc.com/products/e220

101. The Pluto E220 comprises a mass storage device coupled to the central processing unit.

Drive Support	1 x 2.5" SATA Drive Bay 1 x mSATA

https://mitxpc.com/products/e220

102. The Pluto E220 comprises a second LVDS channel comprising two sets of unidirectional, differential signal pairs transmitting data serially in opposite directions, wherein the second LVDS channel is a point-to-point data communication link.

Expansion Slots	1 x Mini PCI-E (Occupied by Wireless Adapter)
Rear Panel I/O	1 x 19V DC-IN 2 x PS/2 Keyboard/Mouse 1 x Parallel Port 1 x VGA 1 x HDMI 1.4 2 x Serial COM (RS232) 2 x RJ45 GbE LAN 4 x USB 2.0
Front Panel I/O	1 x Power Button w/ LED 1 x HDD Status LED 2 x Audio I/O 1 x USB 2.0 1 x USB 3.0

https://mitxpc.com/products/e220

Expansion Options

PCI Express Revision ?	2.0
PCI Express Configurations ‡ ?	X4, X2, X1
Max # of PCI Express Lanes ?	4

https://ark.intel.com/content/www/us/en/ark/products/78867/intel-celeron-processor-j1900-2m-cache-up-to-2-42-ghz.html

103. The Intel® Celeron® J1900 processor used in the Pluto E220 includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies.

104. The M840 is a computer.

21.5" All In One System / Intel® 8th & 9th core i

Maestro M840 is the sleek, stylish and multi-touched panel PC, powered by latest Intel Coffee Lake platform for best computing and graphic performance. It is equipped with rich features like 21.5" full HD panel, 10 point touch screen, high-quality stereo sound output, 2 system color to choose and 2 aluminium stand options. All of these are aiming at fulfilling multi-purpose applications in different environments or scenarios like self-service terminals, Interactive signage, or stylish commercial and education pc.

https://www.mitacmct.com/IndustrialPanelPC=M840=M840=description=EN

105. The M840 comprises a variety of connectors configured to couple to a console, external cable, or external peripheral.

I/O Interface

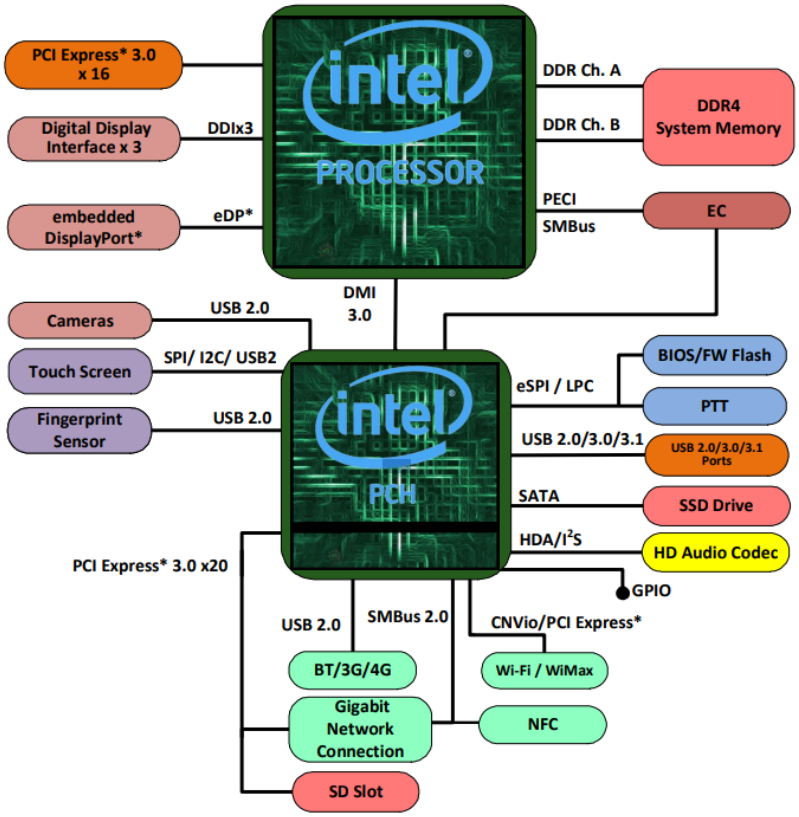
https://www.mitacmct.com/IndustrialPanelPC=M840=M840=description=EN

106. The M840 uses an 8th Gen Intel® Coffee Lake LGA1151 Socket Processor, which comprises an integrated central processing unit (CPU) and graphics subsystem in a single chip.[8]

PROCESSOR	8th Gen Intel® Coffee Lake LGA1151 Socket Processor, TDP Max. 65W / NOTE:Don't support F spec CPU; ex ix-xxxxF
CHIPSET	Intel® H310

[8] The D150-L uses an 4th Gen Intel® Haswell LGA1150 Socket Processor and the D150-S Intel® Kaby Lake processor. Each is substantially similar to the 8th Gen Intel® Coffee Lake LGA1151 Socket Processor in all relevant respects.

https://www.mitacmct.com/IndustrialPanelPC_M840_M840

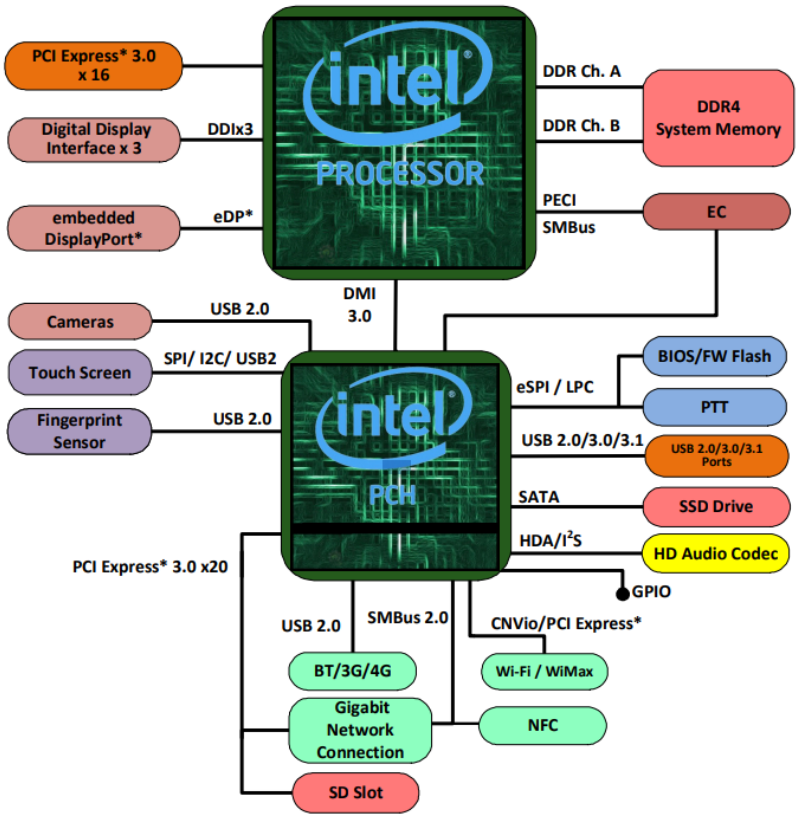


8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006)

107. The M840 comprises processors that connect directly to a variety of differential signal channels that output digital video signals through a connector and an LVDS channel.

Model	Chipset	DisplayPort	HDMI	USB 3.0 / 2.0 / Card Reader	Line-out / Mic-in	M.2 2230 E key / M.2 2280 M key	LAN	RS232	Wifi / BT	Power
M840-12FEI-H310-M2	H310	1	1	4 / 2 / 1	1 / 1	1 / 1	1	0	Optional	DC-in 19V

https://www.mitacmct.com/IndustrialPanelPC_M840_M840



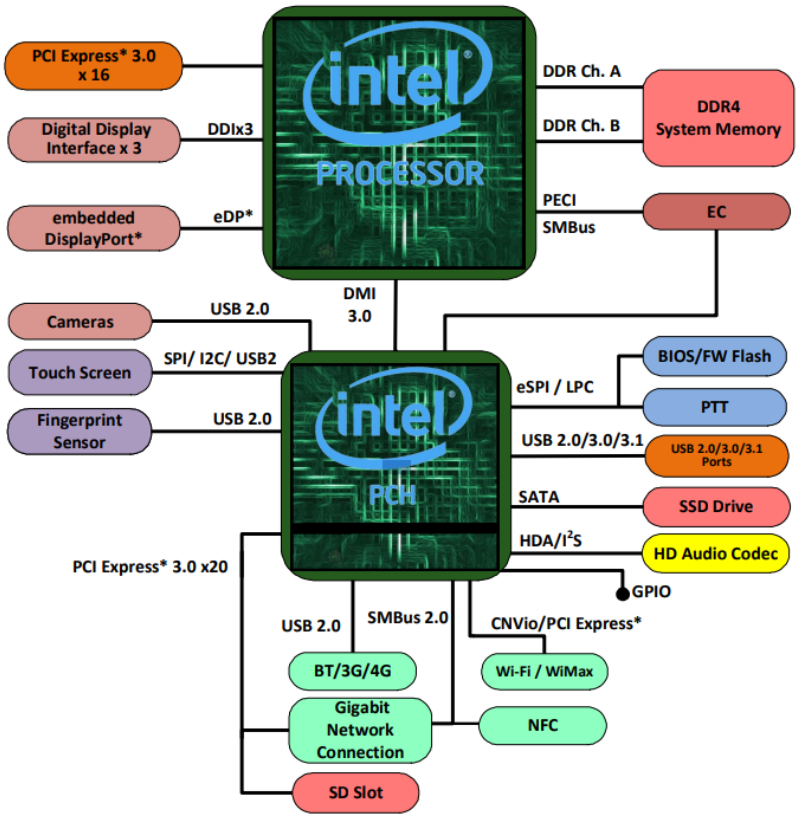
8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006)

108. The Intel processors used M840 has a peripheral bridge called the Intel® H310 connected to the CPU via the DMI, which has an integrated interface controller.[9]

PROCESSOR	8th Gen Intel® Coffee Lake LGA1151 Socket Processor, TDP Max. 65W / NOTE:Don't support F spec CPU; ex ix-xxxxF
CHIPSET	Intel® H310

https://www.mitacmct.com/IndustrialPanelPC_M840_M840

[9] The D150-L uses an Intel® Q87 the D150-S uses an Intel® Q170. Each is substantially similar to the Intel® H310 in all relevant respects.



8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006)

Expansion Options

PCI Express Revision ?	3.0
PCI Express Configurations ‡ ?	x1, x2, x4
Max # of PCI Express Lanes ?	24

I/O Specifications

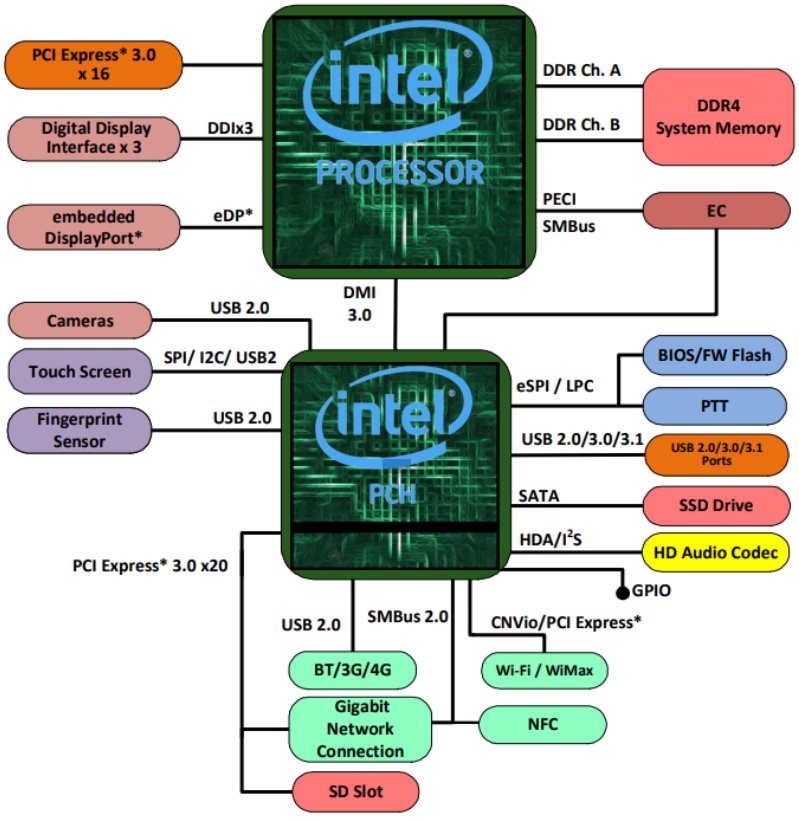
# of USB Ports	14
USB Configuration	10 Total USB 3.1 Ports - Up to 6 USB 3.1 Gen 2 Ports - Up to 10 USB 3.1 Gen 1 Ports 14 USB 2.0 Ports

https://ark.intel.com/content/www/us/en/ark/products/133282/intel-q370-chipset.html

109. The M840 comprises a Low Voltage Differential Signal (LVDS) channel directly extending from the integrated central processing unit and graphics subsystem to convey encoded address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial bit stream, wherein the LVDS channel comprises a first unidirectional, differential signal pair to convey data in a first direction and a second unidirectional, differential signal pair to convey data in a second, opposite direction.

Model	Chipset	DisplayPort	HDMI	USB 3.0 / 2.0 / Card Reader	Line-out / Mic-in	M.2 2230 E key / M.2 2280 M key	LAN	RS232	Wifi / BT	Power
M840-12FEI-H310-M2	H310	1	1	4 / 2 / 1	1 / 1	1 / 1	1	0	Optional	DC-in 19V

https://www.mitacmct.com/IndustrialPanelPC_M840_M840

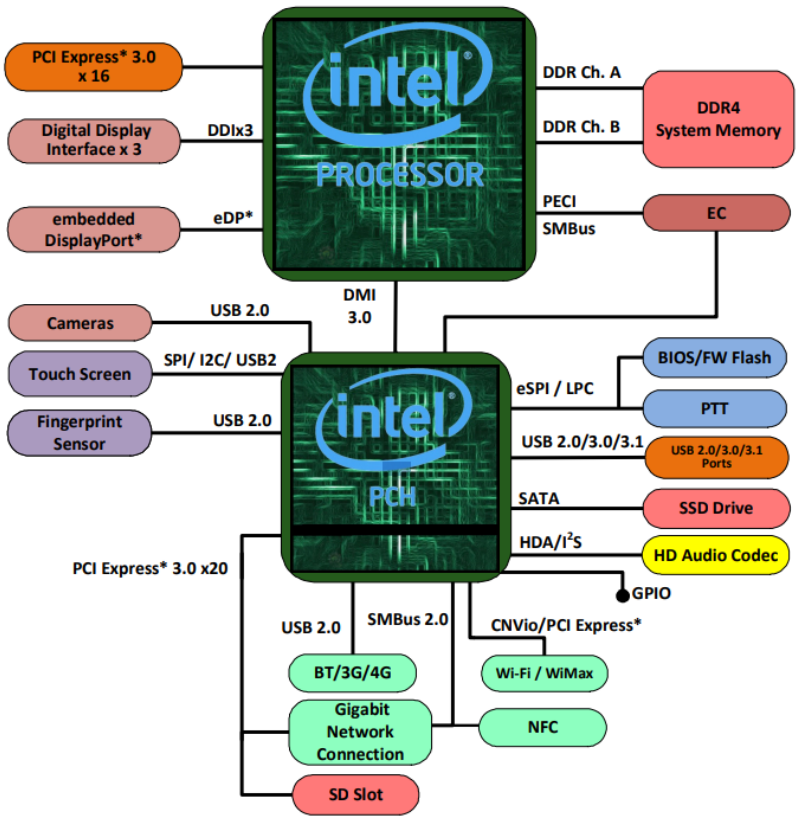


8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006)

110. The M840 comprises a serial bit channel that couples to the connector, wherein the serial bit channel is adapted to transmit data packets in accordance with a Universal Serial Bus (USB) protocol wherein the integrated central processing unit and graphics subsystem outputs digital video display signals.

Model	Chipset	DisplayPort	HDMI	USB 3.0 / 2.0 / Card Reader	Line-out / Mic-in	M.2 2230 E key / M.2 2280 M key	LAN	RS232	Wifi / BT	Power
M840-12FEI-H310-M2	H310	1	1	4 / 2 / 1	1 / 1	1 / 1	1	0	Optional	DC-in 19V

https://www.mitacmct.com/IndustrialPanelPC_M840_M840

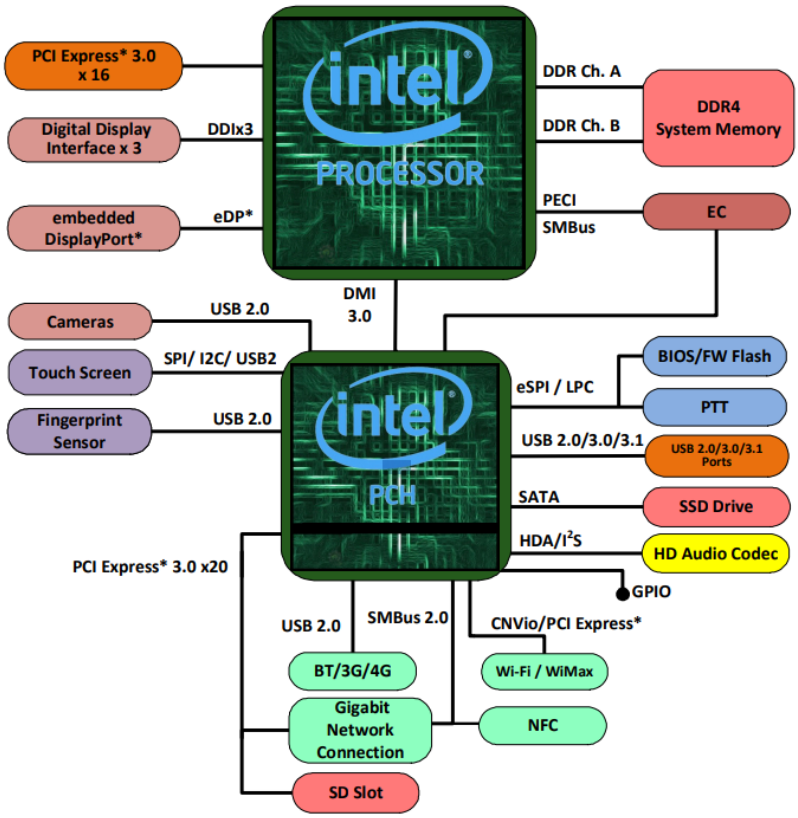


8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006)

111. The M840 comprises system memory directly connected to the CPU.

SYSTEM MEMORY	DDR4 2666MHz / 2 x 260-pin SO-DIMM / Max. 32GB (Non-ECC)

https://www.mitacmct.com/IndustrialPanelPC_M840_M840

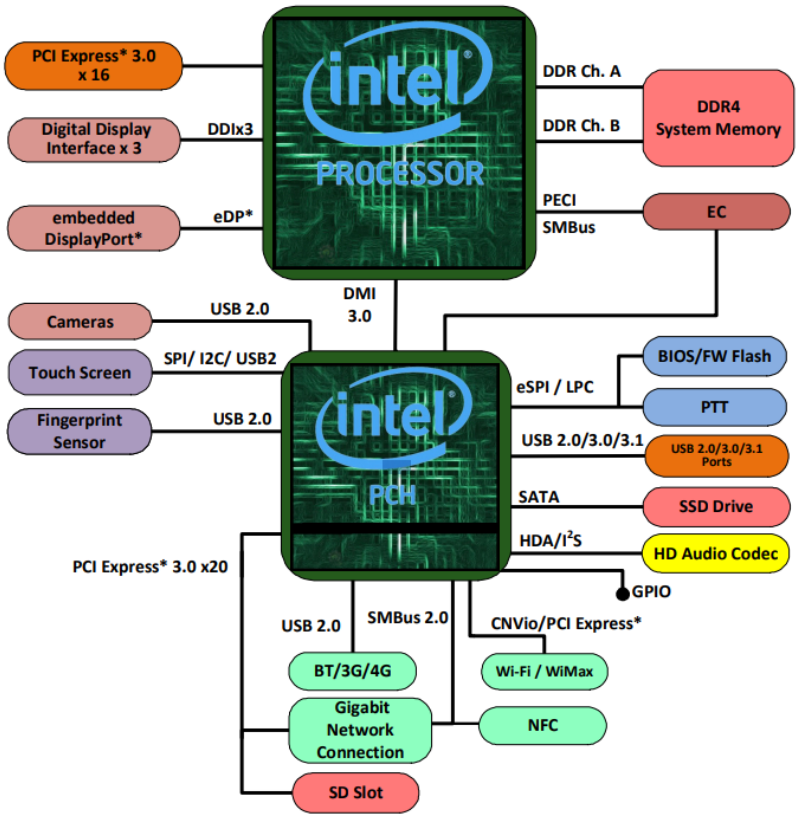


8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006)

112. The M840 comprises a mass storage device coupled to the central processing unit.

STORAGE	1 x SATA 2.5" / 3.5" HDD / SSD bay

https://www.mitacmct.com/IndustrialPanelPC_M840_M840



8th and 9th Generation Intel® Core™ Processor Families and Intel® Xeon® E Processor Families Datasheet – Volume 1 of 2, p. 11 (Rev. 006, July 2020 Doc. No. 337344-006)

113. The M840 comprises a second LVDS channel comprising two sets of unidirectional, differential signal pairs transmitting data serially in opposite directions, wherein the second LVDS channel is a point-to-point data communication link.

Model	Chipset	DisplayPort	HDMI	USB 3.0 / 2.0 / Card Reader	Line-out / Mic-in	M.2 2230 E key / M.2 2280 M key	LAN	RS232	Wifi / BT	Power
M840-12FEI-H310-M2	H310	1	1	4 / 2 / 1	1 / 1	1 / 1	1	0	Optional	DC-in 19V

https://www.mitacmct.com/IndustrialPanelPC_M840_M840

114. The Intel processors used in the M840 have an Integrated Clock Controller (ICC) that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus

transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies.

115. The M1070 is a computer.

M1070

21.5" All In One System / Intel® 7th & 6th core i

Maestro 1070 AIO is an elegant all-in-one PC, powered by latest Intel Skylake / Kabylake platform for best computing and graphic performance along with Windows 10 compatibility. Features are 21.5" Full HD panel, 10 point touch screen, high-quality stereo sound output and HD-in input display, these are also all aiming at fulfilling all of your PC demands in different user scenarios, whether in your business or at home.

Not only feature-rich, Maestro 1070 are also designed to delivery the best flexibility and user-friendly experience to let user can very easily access the internal system for DIY or component upgrade. All of these to make Maestro 1070 maximize all your desires on PC in one.

https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070

116. The M1070 comprises a variety of connectors configured to couple to a console, external cable, or external peripheral.

I/O Interface

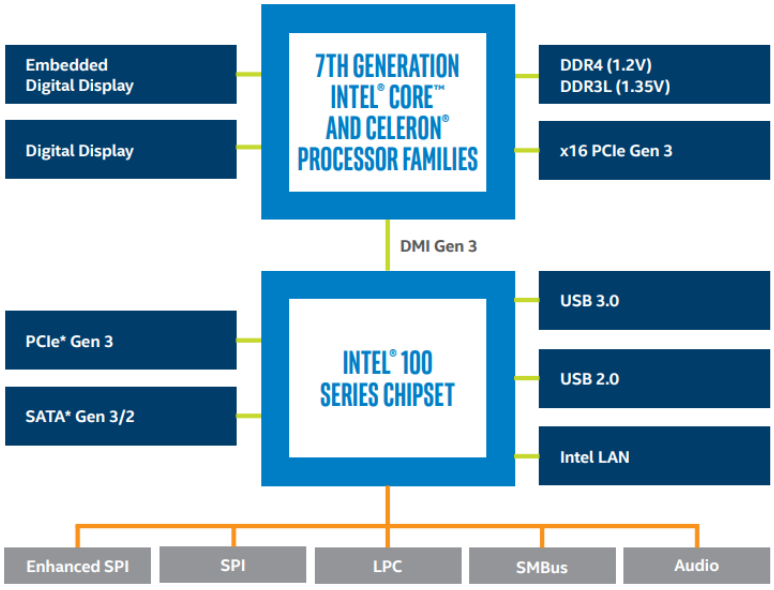
1 ODD	5 DC-in	9 HDMI
2 Card Reader	6 USB 3.0	10 Line-out
3 USB 2.0	7 USB 3.0	11 Mic-in
4 Giga LAN	8 VGA	

https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070

117. The M1070 uses an Intel® Kaby Lake processor, which comprises an integrated central processing unit (CPU) and graphics subsystem in a single chip.[10]

PROCESSOR	7 / 6th Gen Intel® Kaby Lake / Skylake LGA1151 Socket Processor, TDP Max. 65W
CHIPSET	Intel® H110

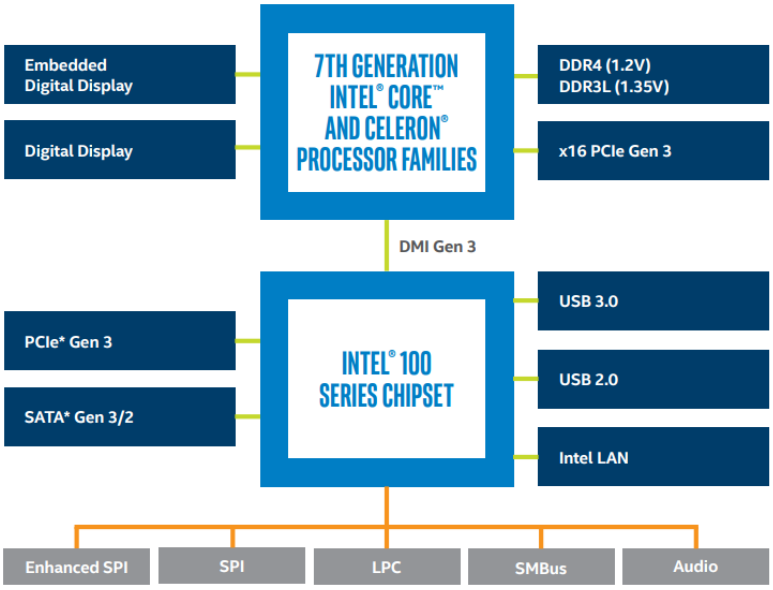
https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070



https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

118. The M1070 comprises processors that connect directly to a variety of differential signal channels that output digital video signals through a connector and an LVDS channel.

[10] The M840, M3070, and M3080 use an 8th Gen Intel® Coffee Lake LGA1151 Socket Processor and the D150-L uses a 4th Gen Intel® Haswell LGA1150 Socket Processor. Each is substantially similar to the Intel® Kaby Lake processor in all relevant respects.



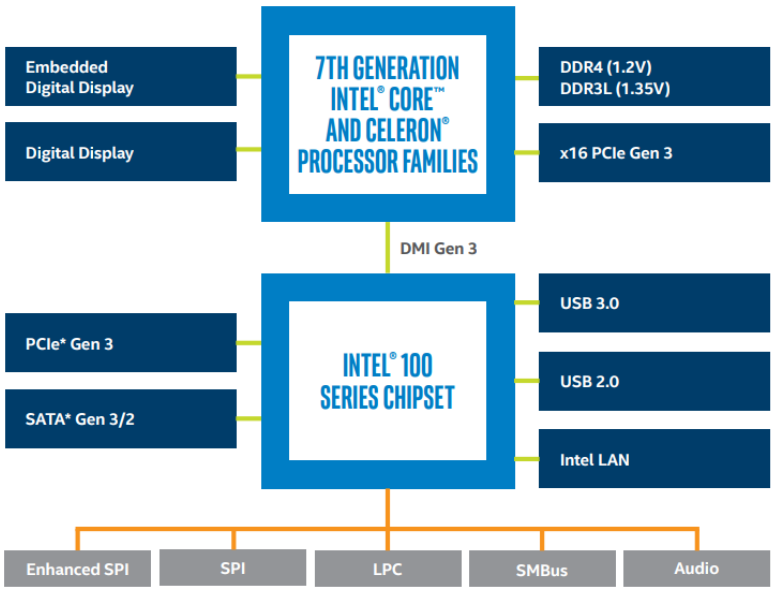
https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

119. The Intel processors used M1070 has a peripheral bridge called the Intel® H110 connected to the CPU via the DMI, which has an integrated interface controller.[11]

PROCESSOR	7 / 6th Gen Intel® Kaby Lake / Skylake LGA1151 Socket Processor, TDP Max. 65W
CHIPSET	Intel® H110

https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070

[11] The M840, M3070, and M3080 use an Intel® H310 and the D150-L uses an Intel® Q87. Each is substantially similar to the Intel® H110 in all relevant respects.

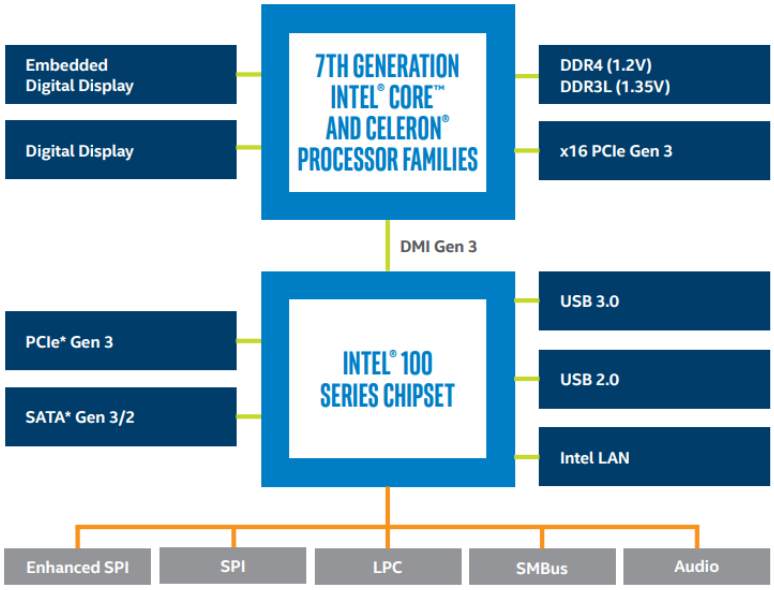


https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

120. The M1070 comprises a Low Voltage Differential Signal (LVDS) channel directly extending from the integrated central processing unit and graphics subsystem to convey encoded address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial bit stream, wherein the LVDS channel comprises a first unidirectional, differential signal pair to convey data in a first direction and a second unidirectional, differential signal pair to convey data in a second, opposite direction.

Model	Chipset	VGA	Display Port	HDMI	USB 3.0 / 2.0 / Card Reader	Line-out / Mic-in	mini PCIe Full / Half size	M.2 2230 E key / M.2 2242 M key	LAN	Wifi / BT	Power
M1070-11SI-H110-PE	H110	1	0	1	4 / 2 / 1	1 / 1	1 / 1	0 / 0	1	Optional	DC-in 19V
M1070-11SI-H110-M2	H110	1	0	1	4 / 2 / 1	1 / 1	0 / 0	1 / 1	1	Optional	DC-in 19V

https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070

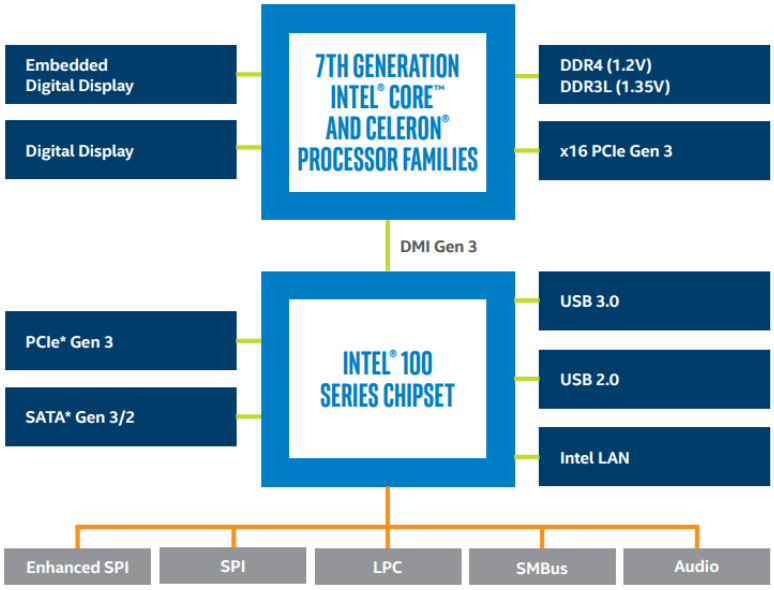


https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

121. The M1070 comprises a serial bit channel that couples to the connector, wherein the serial bit channel is adapted to transmit data packets in accordance with a Universal Serial Bus (USB) protocol wherein the integrated central processing unit and graphics subsystem outputs digital video display signals.

Model	Chipset	VGA	Display Port	HDMI	USB 3.0 / 2.0 / Card Reader	Line-out / Mic-in	mini PCIe Full / Half size	M.2 2230 E key / M.2 2242 M key	LAN	Wifi / BT	Power
M1070-11SI-H110-PE	H110	1	0	1	4 / 2 / 1	1 / 1	1 / 1	0 / 0	1	Optional	DC-in 19V
M1070-11SI-H110-M2	H110	1	0	1	4 / 2 / 1	1 / 1	0 / 0	1 / 1	1	Optional	DC-in 19V

https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070

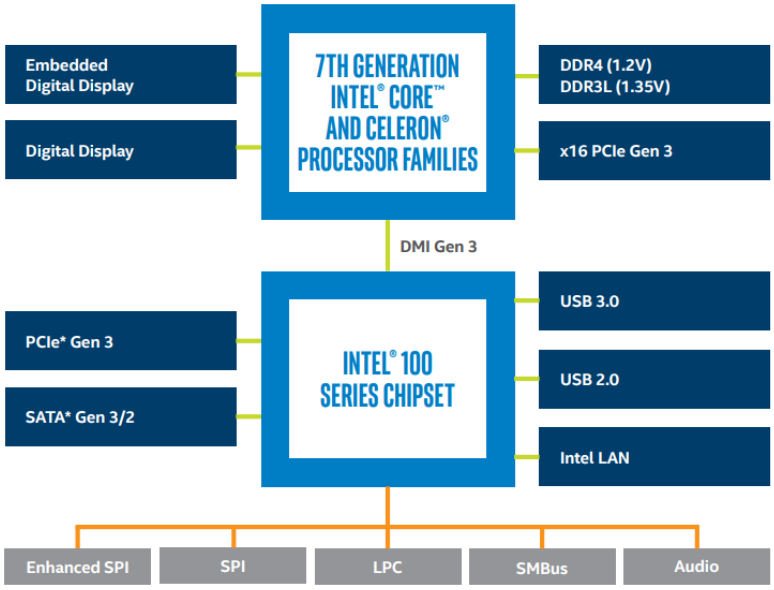


https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

122. The M1070 comprises system memory directly connected to the CPU.

PROCESSOR	7 / 6th Gen Intel® Kaby Lake / Skylake LGA1151 Socket Processor, TDP Max. 65W
CHIPSET	Intel® H110
SYSTEM MEMORY	DDR4 2133MHz / 2 x 260-pin SO-DIMM / Max. 32GB (Non-ECC)

https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070

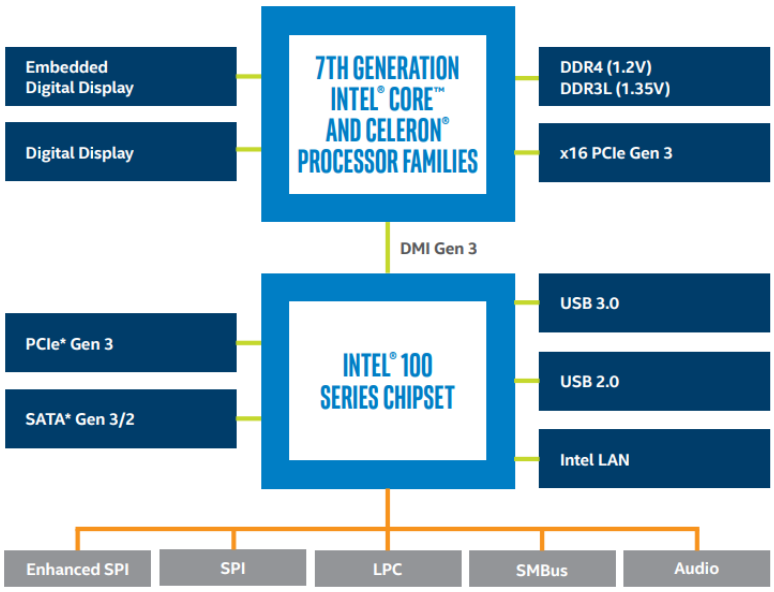


https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

123. The M1070 comprises a mass storage device coupled to the central processing unit.

EXPANSION SLOT	Mini PCIe Half size (PCIe / USB) / Mini PCIe Full size (PCIe / USB / SATA)
STORAGE	1 x SATA 2.5" / 3.5" HDD / SSD bay

https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070

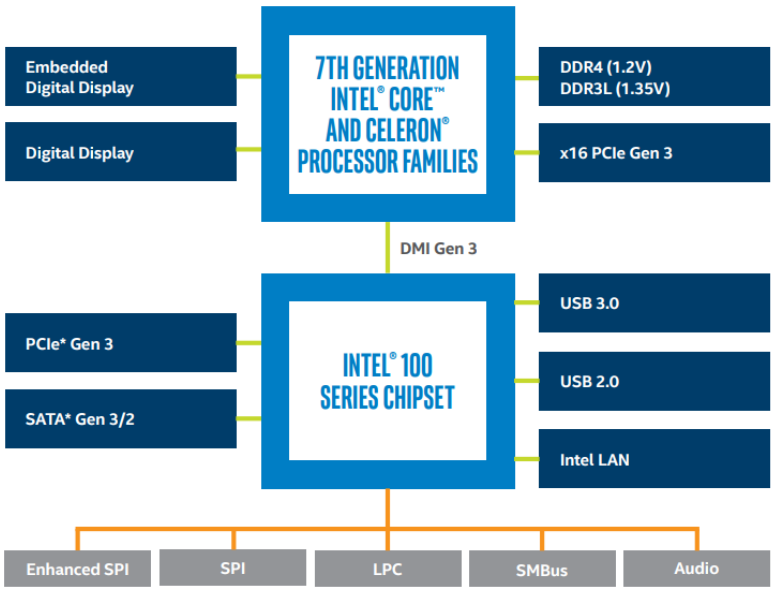


https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

124. The M1070 comprises a second LVDS channel comprising two sets of unidirectional, differential signal pairs transmitting data serially in opposite directions, wherein the second LVDS channel is a point-to-point data communication link.

Model	Chipset	VGA	Display Port	HDMI	USB 3.0 / 2.0 / Card Reader	Line-out / Mic-in	mini PCIe Full / Half size	M.2 2230 E key / M.2 2242 M key	LAN	Wifi / BT	Power
M1070-11SI-H110-PE	H110	1	0	1	4 / 2 / 1	1 / 1	1 / 1	0 / 0	1	Optional	DC-in 19V
M1070-11SI-H110-M2	H110	1	0	1	4 / 2 / 1	1 / 1	0 / 0	1 / 1	1	Optional	DC-in 19V

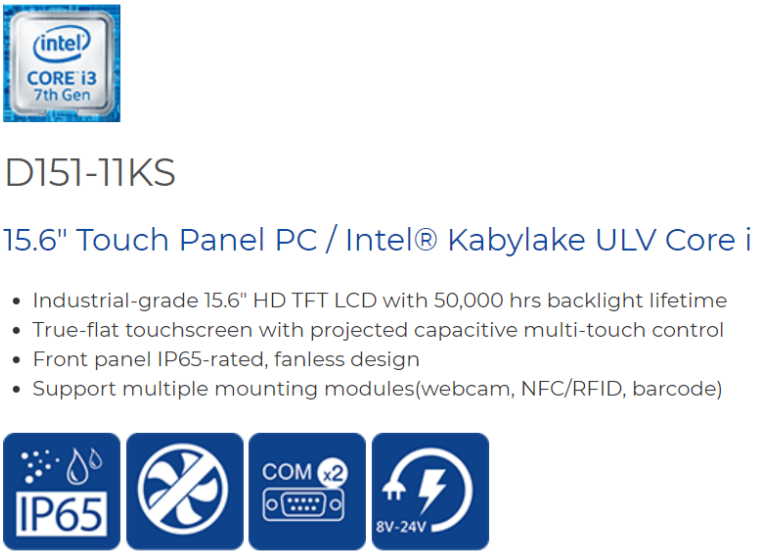
https://www.mitacmct.com/IndustrialPanelPC_M1070_M1070



https://www.intel.com/content/www/us/en/embedded/products/kaby-lake-s/overview.html (7th Generation Intel® Core™ and Celeron® Desktop Processor Family with Intel® H110, and Intel® Q170 Chipsets: Platform Brief)

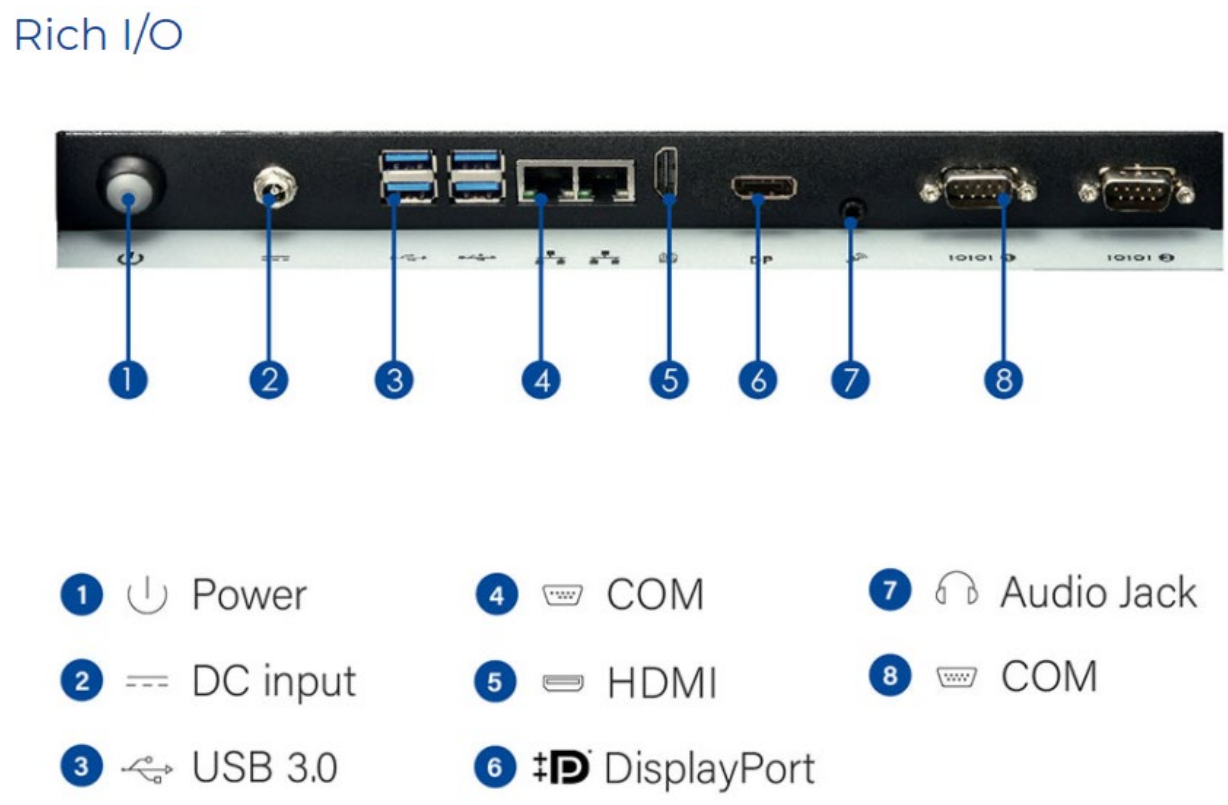
125. The Intel® Kaby Lake processor used in the M1070 has an Integrated Clock Controller (ICC) that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies.

126. The D151-11KS is a computer.



https://www.mitacmct.com/IndustrialPanelPC_D151-11KS_D151-11KS

127. The D151-11KS comprises a variety of connectors configured to couple to a console, external cable, or external peripheral.



https://www.mitacmct.com/IndustrialPanelPC=D151-11KS=D151-11KS=description=EN

128. The D151-11KS uses an 7th Gen Intel® Kaby Lake-U i3-7100U, which comprises an integrated central processing unit (CPU) and graphics subsystem in a single chip.[12]

PROCESSOR	7th Gen Intel® Kaby Lake-U i3-7100U(Dual Core, 3MB Cache, 2.40 GHz) / option: 7th Gen Kaby Lake celeron 3965U / i5-7300U / i7-7600U / option: 6th Gen Skylake celeron 3955U / i3-6100U / i5-6300U / i7-6600U
CHIPSET	Intel® SoC Integrated

https://www.mitacmct.com/IndustrialPanelPC_D151-11KS_D151-11KS

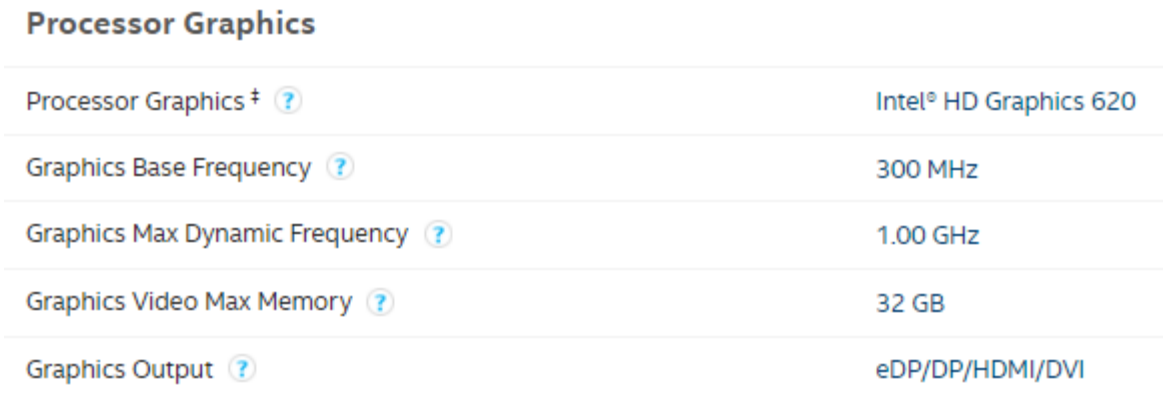
Processor Graphics

Processor Graphics ‡	Intel® HD Graphics 620
Graphics Base Frequency	300 MHz
Graphics Max Dynamic Frequency	1.00 GHz
Graphics Video Max Memory	32 GB
Graphics Output	eDP/DP/HDMI/DVI

https://ark.intel.com/content/www/us/en/ark/products/95442/intel-core-i3-7100u-processor-3m-cache-2-40-ghz.html

129. The M1070 comprises processors that connect directly to a variety of differential signal channels that output digital video signals through a connector and an LVDS channel.

[12] The M200 and M200i use an Intel® Celeron® Processor N2930 processor; D210-10RI uses an Intel® Celeron® Processor N3160; and D150-B uses an Intel® Bay Trail Celeron® Processor J1900; and the D150-L uses an 4th Gen Intel® Haswell LGA1150 Socket Processor. Each is substantially similar to the 7th Gen Intel® Kaby Lake-U i3-7100U in all relevant respects.



Processor Graphics

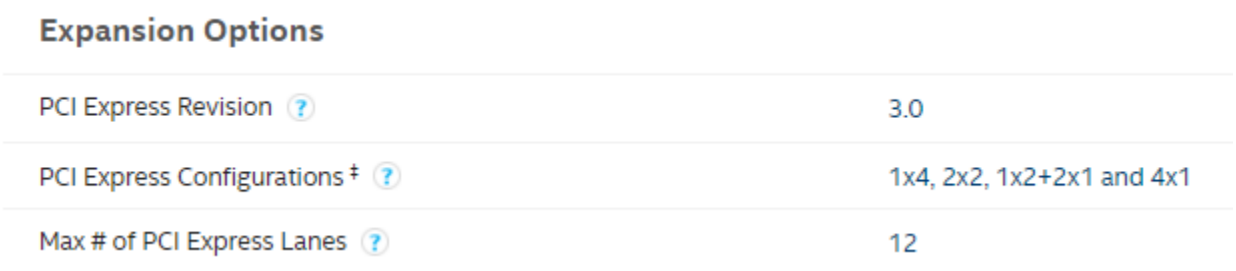
Processor Graphics ‡	Intel® HD Graphics 620
Graphics Base Frequency	300 MHz
Graphics Max Dynamic Frequency	1.00 GHz
Graphics Video Max Memory	32 GB
Graphics Output	eDP/DP/HDMI/DVI

https://ark.intel.com/content/www/us/en/ark/products/95442/intel-core-i3-7100u-processor-3m-cache-2-40-ghz.html

130. The D151-11KS comprises a Low Voltage Differential Signal (LVDS) channel directly extending from the integrated central processing unit and graphics subsystem to convey encoded address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial bit stream, wherein the LVDS channel comprises a first unidirectional, differential signal pair to convey data in a first direction and a second unidirectional, differential signal pair to convey data in a second, opposite direction.

I/O PORT	2 x RJ45 / 1 x Audio Jack (combo Line-out + Mic-in) / 1 x RS232 / 1 x RS232 / 422 / 485 / 1 x DisplayPort 1.2 / 1 x DC Jack / 4 x USB 3.0 / 1 x HDMI 1.4
EXPANSION SLOT	M.2 2230 E key (PCIe, USB 2.0) / Mini PCIe Full size (PCIe / USB / SATA)

https://www.mitacmct.com/IndustrialPanelPC_D151-11KS_D151-11KS



Expansion Options

PCI Express Revision	3.0
PCI Express Configurations ‡	1x4, 2x2, 1x2+2x1 and 4x1
Max # of PCI Express Lanes	12

https://ark.intel.com/content/www/us/en/ark/products/95442/intel-core-i3-7100u-processor-3m-cache-2-40-ghz.html

131. The D151-11KS comprises a serial bit channel that couples to the connector, wherein the serial bit channel is adapted to transmit data packets in accordance with a Universal Serial Bus (USB) protocol wherein the integrated central processing unit and graphics subsystem outputs digital video display signals.

Model	CPU	VGA	Display Port	HDMI	USB 3.0 / 2.0	Line-out / Mic-in	RS232	LAN	Wifi / BT	Power
D151-11KS-3965U	Celeron 3965U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V
D151-11KS-7100U	Core i3-7100U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V
D151-11KS-7300U	Core i5-7300U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V
D151-11KS-7600U	Core i7-7600U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V

I/O PORT	2 x RJ45 / 1 x Audio Jack (combo Line-out + Mic-in) / 1 x RS232 / 1 x RS232 / 422 / 485 / 1 x DisplayPort 1.2 / 1 x DC Jack / 4 x USB 3.0 / 1 x HDMI 1.4
EXPANSION SLOT	M.2 2230 E key (PCIe, USB 2.0) / Mini PCIe Full size (PCIe / USB / SATA)

https://www.mitacmct.com/IndustrialPanelPC_D151-11KS_D151-11KS

132. The D151-11KS comprises system memory directly connected to the CPU.

SYSTEM MEMORY	DDR4 2133 / 2400MHz / 2 x 260-pin SO-DIMM / Max. 32GB (Non-ECC)

PROCESSOR	7th Gen Intel® Kaby Lake-U i3-7100U(Dual Core, 3MB Cache, 2.40 GHz) / option: 7th Gen Kaby Lake celeron 3965U / i5-7300U / i7-7600U / option: 6th Gen Skylake celeron 3955U / i3-6100U / i5-6300U / i7-6600U
CHIPSET	Intel® SoC Integrated

https://www.mitacmct.com/IndustrialPanelPC_D151-11KS_D151-11KS

133. The D151-11KS comprises a mass storage device directly coupled to the central processing unit.

STORAGE	1 x SATA 2.5" HDD / SSD bay
PROCESSOR	7th Gen Intel® Kaby Lake-U i3-7100U(Dual Core, 3MB Cache, 2.40 GHz) / option: 7th Gen Kaby Lake celeron 3965U / i5-7300U / i7-7600U / option: 6th Gen Skylake celeron 3955U / i3-6100U / i5-6300U / i7-6600U
CHIPSET	Intel® SoC Integrated

https://www.mitacmct.com/IndustrialPanelPC_D151-11KS_D151-11KS

134. The D151-11KS comprises a second LVDS channel comprising two sets of unidirectional, differential signal pairs transmitting data serially in opposite directions, wherein the second LVDS channel is a point-to-point data communication link.

Model	CPU	VGA	Display Port	HDMI	USB 3.0 / 2.0	Line-out / Mic-in	RS232	LAN	Wifi / BT	Power
D151-11KS-3965U	Celeron 3965U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V
D151-11KS-7100U	Core i3-7100U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V
D151-11KS-7300U	Core i5-7300U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V
D151-11KS-7600U	Core i7-7600U	0	1	1	4 / 0	1 combo jack	2	2	Optional	DC-in 8~24V

I/O PORT	2 x RJ45 / 1 x Audio Jack (combo Line-out + Mic-in) / 1 x RS232 / 1 x RS232 / 422 / 485 / 1 x DisplayPort 1.2 / 1 x DC Jack / 4 x USB 3.0 / 1 x HDMI 1.4
EXPANSION SLOT	M.2 2230 E key (PCIe, USB 2.0) / Mini PCIe Full size (PCIe / USB / SATA)

https://www.mitacmct.com/IndustrialPanelPC_D151-11KS_D151-11KS

135. The 7th Gen Intel® Kaby Lake-U i3-7100U processor used in the D151-11KS has an Integrated Clock Controller (ICC) that includes PLL circuitry, which generates different clock frequencies to convey the PCI bus transactions and USB transactions through the PCIe and USB channels based on the different clock frequencies.

MiTAC's Infringement

136. In view of the foregoing facts concerning the technical features and functionalities of the Accused Products (*see* ¶¶ 63-135), and on information and belief, when MiTAC manufactures the Accused Products with peripheral bridges, it necessarily improves the speed and performance of the peripheral data communication in its computer products by using a method of manufacturing that includes the following steps: (a) connecting a CPU directly to a peripheral bridge on a printed circuit board; (b) directly connecting to the peripheral bridge one or more LVDS channels with pairs of unidirectional lanes that convey data in serial bit streams in opposite directions; and (c) providing a connector with an LVDS channel to facilitate data communication with external peripherals using two unidirectional serial lanes to transmit data in opposite directions, including USB protocol data.

137. On information and belief, MiTAC performs the foregoing manufacturing steps outside the United States to make the Accused Servers and then imports the Accused Servers into the United States to be marketed and sold.

138. Through making, using, selling, offering for sale, and importing the Accused Products with the features and functionalities alleged above, MiTAC has and continues to infringe one or more of the claims in each of the ACQIS Patents.

139. MiTAC's infringing conduct has caused injury and damage to ACQIS and ACQIS' licensees, and will continue to cause additional severe and irreparable injury and damage to ACQIS and ACQIS' licensees unless enjoined by this Court.

ACQIS Provided MiTAC Actual Notice of its Infringement

140. On or around May 14, 2018, ACQIS notified MiTAC, pursuant to 35 U.S.C. § 287(a), of all of the ACQIS Patents and MiTAC's infringement thereof based on the Accused

Products. Specifically, ACQIS' letter identified all of the ACQIS Patents asserted herein and described the applicability of the ACQIS Patents to the PCI Express, USB 3.0, and other computer interface technologies. ACQIS's letter specifically identified MiTAC's various servers, motherboards, embedded systems, and panel computers, including various models of the Accused Products addressed herein as using ACQIS' patented technologies. ACQIS also described the enforcement history of ACQIS's patent portfolio, and specifically noted a prior lawsuit enforcing ACQIS patents related to the presently-asserted ACQIS Patents, which resulted in a significant jury verdict against IBM.

141. ACQIS invited MiTAC to discuss potential licensing arrangements to allow MiTAC to continue to utilize the patented technologies in the ACQIS patent portfolio, including the ACQIS Patents.

142. Although MiTAC responded to ACQIS's May 14, 2018, letter, it continues to make, import, and sell the Accused Products identified in ACQIS's letter in willful violation of ACQIS' patent rights, or at the very least in reckless disregard of ACQIS' patent rights.

143. Upon receiving actual notice of the ACQIS Patents and how they apply to the MiTAC's server products, MiTAC chose to ignore its own infringement and the infringement that it was inducing others to commit through the use of the Accused Products.

144. MiTAC's choice to continue making and selling the infringing Accused Products, is egregious and exceptional.

145. MiTAC's conduct constitutes willful infringement of the ACQIS Patents, beginning at least as early as May 14, 2018.

MiTAC's Indirect Infringement

146. MiTAC indirectly infringes the ACQIS Patents under 35 U.S.C. § 271(b) by inducing third parties, such as importers, resellers, customers, and end users, to directly infringe the ACQIS Patents by using, offering for sale, selling and/or importing the Accused Servers in this District and elsewhere in the United States. For example, MiTAC's 2019 Annual Report indicates that subsidiaries located in the United States are responsible for "assembly, sales of computer peripherals, software and hardware and related products" which, upon information and belief, includes the Accused Products.

147. On information and belief, MiTAC took affirmative steps to induce third parties to commit those direct infringing acts. MiTAC did so by, at least actively promoting the Accused Products for the U.S. market. For example, on information and belief, for the Accused Products sold in the United States, MiTAC pursues and obtains approval from U.S. and state regulatory agencies to allow sales of such MiTAC Products in the United States. MiTAC competes for business in the United States. MiTAC's website offers support for U.S. consumers of the Accused Products and identifies related U.S. offices. MiTAC subsidiaries also have an office in Austin, Texas. MiTAC has taken these acts despite knowledge of the ACQIS Patents and the infringement by the Accused Products, MiTAC knows and specifically intends that its customers will sell the infringing Accused Products in the United States or cause the Accused Products to be sold in the United States.

148. MiTAC's customers directly infringe the ACQIS Patents by importing the Accused Products into the United States, offering to sell and selling the Accused Servers in the United States, and using the Accused Servers in the United States.

149. MiTAC further induces direct infringement of the ACQIS Patents by providing instruction and direction to end users of the Accused Servers about how to use the Accused Products in a manner that infringes one or more claims of the ACQIS Patents. MiTAC knows and specifically intends that end users will use the Accused Products in an infringing manner as directed by MiTAC. MiTAC has configured the Accused Products in such a manner that direct infringing use necessarily occurs upon operation of the Accused Products in their normal, intended manner without any specific action of the end user other than turning on the product.

150. MiTAC has induced others' direct infringement as stated above despite actual notice that the Accused Products infringe the ACQIS Patents, as set forth herein. MiTAC therefore has caused its purchasers and end users to directly infringe the ACQIS Patents with knowledge of the ACQIS Patents and with the specific intent, or at the very least willful blindness, that the purchasers and end users will directly infringe. MiTAC knew the acts it induced (like importation, U.S. sales, and use by its customers) constituted infringement.

151. MiTAC contributorily infringes the ACQIS Patents under 35 U.S.C. § 271(c). MiTAC knew about the ACQIS Patents prior to this complaint. MiTAC's products are especially made or especially adapted for use that results in an infringement of the ACQIS Patents. MiTAC's products include features that are not staple articles of commerce suitable for substantial non-infringing uses. MiTAC's products are a material part of the invention of the ACQIS Patents. MiTAC's products are also sold, offered for sale, and used in configurations that do not have substantial non-infringing uses. The intended, normal use of the Accused Products results in infringement of the ACQIS Patents.

152. MiTAC's acts of indirect infringement as stated herein have caused injury and damage to ACQIS and ACQIS' licensees, and will continue to cause additional severe and

irreparable injury and damage to ACQIS and ACQIS' licensees in the future if not enjoined by this Court.

COUNT I
INFRINGEMENT OF U.S. PATENT NO. 9,529,768

153. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 152 of this Complaint in support of its first cause of action as though fully set forth herein.

154. Pursuant to 35 U.S.C. § 282, the claims of the '768 patent are presumed valid.

155. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '768 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing the Accused Servers.

156. MiTAC's direct infringement of the '768 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers, Accused Embedded Systems, and Accused Panel Computers is shown by way of the exemplary Thunder HX FA77-B7119 and Transport SX GT62F-B8026 servers and Pluto E220, M840, M1070, and D151-11KS embedded systems and panel computers as set forth in paragraphs 35-41, 63-80, and 94-135 above, which demonstrates infringement of at least claim 13 of the '768 patent by showing:

(a) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS are computers;

(b) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS have integrated central processing units (CPU) and interface controllers in a single chip;

(c) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS computers have a first Low Voltage Differential Signal

(LVDS) channel directly extending from the interface controller to convey address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial bit stream, wherein the first LVDS channel comprises first unidirectional, multiple, differential signal pairs to convey data in a first direction and second unidirectional, multiple, differential signal pairs to convey data in a second, opposite direction; and

(d) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS have system memory directly coupled to the CPU and interface controller.

157. ACQIS' infringement allegations against the Accused Servers are not limited to claim 13 of the '768 patent, and additional infringed claims will be identified through infringement contentions and discovery.

158. MiTAC's direct infringement of the '768 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Motherboards is shown by way of the exemplary PH10FEU motherboards as set forth in paragraphs 35-41 and 81-88 above, which demonstrates infringement of at least claim 10 of the '768 patent by showing:

(a) The PH10FEU is a printed circuit board;

(b) The PH10FEU comprises a central processing unit;

(c) The PH10FEU comprises a peripheral bridge directly coupled to the central processing unit without any intervening Peripheral Component Interconnect (PCI) bus;

(d) The PH10FEU comprises a low voltage differential signal (LVDS) channel directly extending from the peripheral bridge comprising two unidirectional, serial channels of multiple differential signal line pairs to convey data in opposite directions, wherein the LVDS channel conveys address and data bits of a PCI bus transaction in serial form;

and

(e) The PH10FEU comprises a network controller coupled to the central processing unit.

159. ACQIS' infringement allegations against the Accused Motherboards are not limited to claim 10 of the '768 patent, and additional infringed claims will be identified through infringement contentions and discovery.

160. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '768 patent and the infringement alleged herein.

161. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150 constitute induced infringement of at least claims 10 and 13 of the '768 patent pursuant to 35 U.S.C. § 271(b).

162. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claims 10 and 13 of the '768 patent under 35 U.S.C. § 271(c).

163. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

164. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

165. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT II
INFRINGEMENT OF U.S. PATENT NO. 9,703,750

166. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 165 of this Complaint in support of its second cause of action as though fully set forth herein.

167. Pursuant to 35 U.S.C. § 282, the claims of the ’750 patent are presumed valid.

168. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the ’750 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing the Accused Servers.

169. MiTAC’s direct infringement of the ’750 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers, Accused Embedded Systems, and Accused Panel Computers is shown by way of the exemplary Thunder HX FA77-B7119 and Transport SX GT62F-B8026 servers and Pluto E220, M840, M1070, and D151-11KS embedded systems and panel computers as set forth in paragraphs 35-41, 63-80 and 94-135 above, which demonstrates infringement of at least claim 4 of the ’750 patent by showing:

(a) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS are computers;

(b) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS have integrated central processing units (CPU) and interface controllers in a single chip;

(c) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS have a first Low Voltage Differential Signal (LVDS) channel directly extending from the interface controller to convey address bits, data bits, and

byte enable information bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial bit stream, wherein the first LVDS channel comprises a first unidirectional, differential signal pair to convey data in a first direction and a second unidirectional, differential signal pair to convey data in a second, opposite direction;

(d) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS have system memory directly coupled to the integrated central processing unit and interface controller;

(e) the interface controller of the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS comprises Phase-Locked Loop (PLL) clock circuitry capable of generating different clock frequencies;

(f) the interface controller of the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS configures the first LVDS channel to convey the PCI bus transaction at different data transfer rates based on the different clock frequencies generated by the PLL clock circuitry; and

(g) and the interface controller of the Thunder HX FA77-B7119, Transport SX GT62F-B8026, Pluto E220, M840, M1070, and D151-11KS comprises a connector adapted to convey a serial bit stream of Universal Serial Bus (USB) protocol data packets in a second Low Voltage Differential Signal (LVDS) channel comprising two unidirectional, differential signal pairs that transmit data in opposite directions.

170. ACQIS' infringement allegations against the Accused Servers, Accused Embedded Systems, and Accused Panel Computers are not limited to claim 4 of the '750 patent, and additional infringed claims will be identified through infringement contentions and discovery.

171. MiTAC's direct infringement of the '750 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Motherboards is shown by way of the exemplary PH10FEU and PD14RI motherboards as set forth in paragraphs 35-41 and 81-93 above, which demonstrates infringement of at least claim 25 of the '750 patent by showing:

(a) The PH10FEU and PD14RI are printed circuit boards;

(b) The PH10FEU and PD14RI comprise an integrated central processing unit and interface controller in a single chip;

(c) The PH10FEU and PD14RI comprise a Low Voltage Differential Signal (LVDS) channel directly extending from the integrated central processing unit and interface controller to convey address bits, data bits, and byte enable information bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial form, wherein the LVDS channel comprises first unidirectional, multiple, differential signal line pairs to convey data in a first direction and second unidirectional, multiple, differential signal line pairs to convey data in a second, opposite direction; and

(d) The PH10FEU and PD14RI comprise a socket for a system memory module directly coupled to the integrated central processing unit and interface controller.

172. ACQIS' infringement allegations against the Accused Motherboards are not limited to claim 25 of the '750 patent, and additional infringed claims will be identified through infringement contentions and discovery.

173. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '750 patent and the infringement alleged herein.

174. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claims 4 and 25 of the '750 patent pursuant to 35 U.S.C. § 271(b).

175. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claims 4 and 25 of the '750 patent under 35 U.S.C. § 271(c).

176. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

177. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

178. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT III
INFRINGEMENT OF U.S. PATENT NO. 8,977,797

179. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 178 of this Complaint in support of its third cause of action as though fully set forth herein.

180. Pursuant to 35 U.S.C. § 282, the claims of the '797 patent are presumed valid.

181. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '797 patent in violation of 35 U.S.C. § 271(g) by using one or more of the methods claimed in

the ’797 patent to manufacture the Accused Servers and then importing, selling, offering to sell, and/or using the Accused Servers in the United States.

182. The Accused Servers made using the methods claimed in the ’797 patent are not trivial or nonessential components of other products and are not materially changed by subsequent processes.

183. MiTAC’s direct infringement of the ’797 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers and Accused Panel Computers is shown by way of the exemplary Thunder HX FA77-B7119 server and M840 and M1070 panel computers as set forth in paragraphs 35-41, 63-72, 104-114, and 115-125 above, which demonstrate that to manufacture the Thunder HX FA77-B7119, M840, and M1070, MiTAC perform the following actions, which results in direct infringement of at least claim 7 of the ’797 patent upon importation and/or sale of the Thunder HX FA77-B7119, M840, and M1070 in the United States:

(a) MiTAC improves the storage data throughput of the Thunder HX FA77-B7119, M840, and M1070, which are computers;

(b) MiTAC connects a Central Processing Unit (CPU) directly to a peripheral bridge on a printed circuit board of the Thunder HX FA77-B7119, M840, and M1070;

(c) MiTAC connects a Low Voltage Differential Signal (LVDS) channel directly to the peripheral bridge on the printed circuit board of the Thunder HX FA77-B7119, M840, and M1070, the LVDS channel comprising two unidirectional, serial channels that transmit data in opposite directions;

(d) MiTAC increases data throughput of the serial channels of the Thunder HX FA77-B7119, M840, and M1070 by providing each channel with multiple pairs of differential

signal lines;

(e) MiTAC conveys encoded address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in serial form over the serial channels of the Thunder HX FA77-B7119, M840, and M1070 to preserve the PCI bus transaction;

(f) MiTAC couples the peripheral bridge to a mass storage device through the LVDS channel on the Thunder HX FA77-B7119, M840, and M1070; and

(g) MiTAC applies power to the Thunder HX FA77-B7119, M840, and M1070 computer system.

184. ACQIS' infringement allegations against the Accused Servers and Accused Panel Computers are not limited to claim 7 of the '797 patent, and additional infringed claims will be identified through infringement contentions and discovery.

185. MiTAC's direct infringement of the '797 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Motherboards is shown by way of the exemplary PH10FEU and PD14RI motherboards as set forth in paragraphs 35-41 and 81-93 above, which demonstrates infringement of at least claim 14 of the '797 patent by showing:

(a) MiTAC improves the data throughput of the PH10FEU and PD14RI, which are motherboards;

(b) MiTAC mounts a Central Processing Unit (CPU) on the PH10FEU and PD14RI;

(c) MiTAC connects a Low Voltage Differential Signal (LVDS) channel directly to the CPU on the PH10FEU and PD14RI, the LVDS channel comprising two unidirectional, serial channels that transmit data in opposite directions;

(d) MiTAC increases the data throughput of the serial channels of the PH10FEU and PD14RI by providing each channel with multiple pairs of differential signal lines;

(e) MiTAC conveys encoded address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in serial form over the serial channels of the PH10FEU and PD14RI to preserve the PCI bus transaction; and

(f) MiTAC couples the CPU to a peripheral device attached to the PH10FEU and PD14RI through the LVDS channel.

186. ACQIS' infringement allegations against the Accused Motherboards are not limited to claim 14 of the '797 patent, and additional infringed claims will be identified through infringement contentions and discovery.

187. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '797 patent and the infringement alleged herein.

188. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claims 7 and 14 of the '797 patent pursuant to 35 U.S.C. § 271(b).

189. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claims 7 and 14 of the '797 patent under 35 U.S.C. § 271(c).

190. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

191. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

192. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT IV
INFRINGEMENT OF U.S. PATENT NO. 8,756,359

193. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 192 of this Complaint in support of its fourth cause of action as though fully set forth herein.

194. Pursuant to 35 U.S.C. § 282, the claims of the '359 patent are presumed valid.

195. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '359 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing the Accused Servers.

196. MiTAC's direct infringement of the '359 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers and Accused Panel Computers is shown by way of the exemplary Thunder HX FA77-B7119 and Transport SX GT62F-B8026 servers and M840, M1070, and D151-11KS panel computers as set forth in paragraphs 35-41, 63-80, and 104-135 above, which demonstrates infringement of at least claim 6 of the '359 patent by showing:

(a) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, M840, M1070, and D151-11KS are computers;

(b) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, M840, M1070, and D151-11KS have a connector that is configured to couple to a console;

(c) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, M840, M1070, and D151-11KS have a central processing unit;

(d) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, M840, M1070, and D151-11KS have a first Low Voltage Differential Signal (LVDS) channel directly extending from the central processing unit, comprising a first unidirectional, differential signal line pair to convey data in a first direction and a second unidirectional, differential signal line pair to convey data in a second, opposite direction; and

(e) the Thunder HX FA77-B7119, Transport SX GT62F-B8026, M840, M1070, and D151-11KS have a second LVDS channel that can couple to the console through the connector, comprising two unidirectional, differential signal line pairs to convey data in opposite directions, wherein the second LVDS channel is adapted to transmit data packets in accordance with a Universal Serial Bus (USB) protocol.

197. ACQIS' infringement allegations against the Accused Servers and Accused Panel Computers are not limited to claim 6 of the '359 patent, and additional infringed claims will be identified through infringement contentions and discovery.

198. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '359 patent and the infringement alleged herein.

199. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 6 of the '359 patent pursuant to 35 U.S.C. § 271(b).

200. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 6 of the '359 patent under 35 U.S.C. § 271(c).

201. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

202. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

203. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT V
INFRINGEMENT OF RE44,654

204. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 203 of this Complaint in support of its fifth cause of action as though fully set forth herein.

205. Pursuant to 35 U.S.C. § 282, the claims of the '654 patent are presumed valid.

206. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '654 patent in violation of 35 U.S.C. § 271(g) by using one or more of the methods claimed in the '654 patent to manufacture the Accused Servers and then importing, selling, offering to sell, and/or using the Accused Servers in the United States.

207. MiTAC's direct infringement of the '654 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers and Accused Panel Computers is shown by way of the exemplary Thunder HX FA77-B7119 server and M840 and M1070 panel computers as set forth in paragraphs 35-41, 63-72, and 104-125 above, which demonstrates infringement of at least claim 23 of the '654 patent by showing:

(a) MiTAC increases the external data communication speed of the Thunder HX FA77-B7119, M840, and M1070, which are computers;

(b) MiTAC connects a Central Processing Unit (CPU) directly to a peripheral bridge on a printed circuit board of the Thunder HX FA77-B7119, M840, and M1070;

(c) MiTAC connects a first Low Voltage Differential Signal (LVDS) channel directly to the peripheral bridge on the printed circuit board, the first LVDS channel comprising two unidirectional, serial channels that transmit data in opposite directions to the Thunder HX FA77-B7119, M840, and M1070;

(d) MiTAC provides a connector for the Thunder HX FA77-B7119, M840, and M1070 for connection to a console;

(e) MiTAC provides a second LVDS channel in the Thunder HX FA77-B7119, M840, and M1070 to couple to the console through the connector, the second LVDS channel comprising two unidirectional, serial channels that transmit data in opposite directions; and

(f) MiTAC enables Universal Serial Bus (USB) protocol data on the Thunder HX FA77-B7119, M840, and M1070 to be conveyed over the second LVDS channel.

208. ACQIS' infringement allegations against the Accused Servers are not limited to claim 23 of the '654 patent, and additional infringed claims will be identified through infringement contentions and discovery.

209. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '654 patent and the infringement alleged herein.

210. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 14 of the '654 patent pursuant to 35 U.S.C. § 271(b).

211. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 14 of the '654 patent under 35 U.S.C. § 271(c).

212. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

213. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

214. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT VI
INFRINGEMENT OF NO. RE44,739

215. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 214 of this Complaint in support of its sixth cause of action as though fully set forth herein.

216. Pursuant to 35 U.S.C. § 282, the claims of the '739 patent are presumed valid.

217. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '739 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing the Accused Servers.

218. MiTAC's direct infringement of the '739 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers, Accused Embedded Systems, and Accused Panel Computers is shown by way of the exemplary Transport SX GT62F-B8026, Pluto E220, and D151-11KS servers, embedded systems, and panel computers as set forth in paragraphs 35-41, 73-80, 94-103, and 126-135 above, which demonstrates infringement of at least claim 14 of the '739 patent by showing:

(a) The Transport SX GT62F-B8026, Pluto E220, and D151-11KS are computers;

(b) the Transport SX GT62F-B8026, Pluto E220, and D151-11KS have a central processing unit directly connected to a first Low Voltage Differential Signal (LVDS) channel comprising two unidirectional, differential signal pairs to transmit Universal Serial Bus (USB) Protocol data in opposite directions;

(c) the Transport SX GT62F-B8026, Pluto E220, and D151-11KS have main memory directly connected to the central processing unit;

(d) the Transport SX GT62F-B8026, Pluto E220, and D151-11KS have a connector to couple to an external cable; and

(e) the Transport SX GT62F-B8026, Pluto E220, and D151-11KS have a second LVDS channel comprising two unidirectional, differential signal pairs to transmit data in opposite directions, wherein the second LVDS channel couples to the connector.

219. ACQIS' infringement allegations against the Accused Servers, Accused Embedded Systems, and Accused Panel Computers are not limited to claim 14 of the '739 patent, and additional infringed claims will be identified through infringement contentions and discovery.

220. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '739 patent and the infringement alleged herein.

221. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 14 of the '739 patent pursuant to 35 U.S.C. § 271(b).

222. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 14 of the '739 patent under 35 U.S.C. § 271(c).

223. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

224. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

225. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times

the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT VII
INFRINGEMENT OF RE43,602

226. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 225 of this Complaint in support of its seventh cause of action as though fully set forth herein.

227. Pursuant to 35 U.S.C. § 282, the claims of the '602 patent are presumed valid.

228. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '602 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing the Accused Servers.

229. MiTAC's direct infringement of the '602 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers and Accused Embedded Systems is shown by way of the exemplary Transport SX GT62F-B8026 server and Pluto E220 embedded system as set forth in paragraphs 35-41, 73-80, and 94-103 above, which demonstrates infringement of at least claim 14 of the '602 patent by showing:

(a) the Transport SX GT62F-B8026 and Pluto E220 are systems for information transactions, comprising:

(b) the Transport SX GT62F-B8026 and Pluto E220 comprise a console comprising a power supply connection, and a first low voltage differential signal (LVDS) channel comprising two sets of unidirectional, serial bit channels to convey address and data bits of Peripheral Component Interface (PCI) bus transaction in opposite directions;

(c) the Transport SX GT62F-B8026 and Pluto E220 comprise a computer module configured to couple to the console, the computer module comprising a central processing unit (CPU) comprising an interface controller integrated with the CPU as a single chip, a main memory directly coupled to the CPU, a mass storage device directly coupled to the CPU, and a second LVDS channel directly extending from the CPU, the second LVDS channel comprising two sets of unidirectional, serial bit channels to convey data in opposite directions;

(d) wherein the CPU is configured to couple to the console through the second LVDS channel; and

(e) wherein the computer module is configured to receive power from the power supply connection upon coupling of the computer module to the console.

230. ACQIS' infringement allegations against the Accused Servers and Accused Embedded Systems are not limited to claim 14 of the '602 patent, and additional infringed claims will be identified through infringement contentions and discovery.

231. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '602 patent and the infringement alleged herein.

232. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 14 of the '602 patent pursuant to 35 U.S.C. § 271(b).

233. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 14 of the '602 patent under 35 U.S.C. § 271(c).

234. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

235. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

236. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT VIII
INFRINGEMENT OF RE42,984

237. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 236 of this Complaint in support of its eighth cause of action as though fully set forth herein.

238. Pursuant to 35 U.S.C. § 282, the claims of the '984 patent are presumed valid.

239. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '984 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing the Accused Servers.

240. MiTAC's direct infringement of the '984 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Servers is shown by way of the exemplary Thunder HX FA77-B7119 as set forth in paragraphs 35-41 and 63-72 above, which demonstrates infringement of at least claim 40 of the '984 patent by showing:

(a) The Thunder HX FA77-B7119 is a computer system:

(b) the Thunder HX FA77-B7119 comprises a console;

(c) the console of the Thunder HX FA77-B7119 comprises a power supply and a first low voltage differential signal channel comprising two sets of unidirectional, serial bit channels to transmit data in opposite directions;

(d) the Thunder HX FA77-B7119 comprises a computer module coupled to the console;

(e) the computer module of the Thunder HX FA77-B7119 comprises a central processing unit to operate on a varying clock frequency to vary a power consumption of the central processing unit while in operation;

(f) the computer module of the Thunder HX FA77-B7119 comprises a mass storage unit coupled to the central processing unit;

(g) the computer module of the Thunder HX FA77-B7119 comprises a second low voltage differential signal channel comprising two sets of unidirectional, serial bit channels to transmit data in opposite directions;

(h) the computer module of the Thunder HX FA77-B7119 comprises a peripheral bridge directly coupled to the central processing unit without any intervening Peripheral Component Interconnect bus, the peripheral bridge comprising an interface controller to output a serial bit stream that is conveyed over the second low voltage differential signal channel;

(i) wherein the interface controller of the Thunder HX FA77-B7119 is coupled to the console through the second low voltage differential signal channel; and

(j) wherein the computer module of the Thunder HX FA77-B7119 is configured to receive power from the power supply.

241. ACQIS' infringement allegations against the Accused Servers are not limited to claim 40 of the '984 patent, and additional infringed claims will be identified through infringement contentions and discovery.

242. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '984 patent and the infringement alleged herein.

243. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 14 of the '984 patent pursuant to 35 U.S.C. § 271(b).

244. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 14 of the '984 patent under 35 U.S.C. § 271(c).

245. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

246. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

247. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT IX
INFRINGEMENT OF U.S. PATENT NO. 8,626,977

248. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 247 of this Complaint in support of its ninth cause of action as though fully set forth herein.

249. Pursuant to 35 U.S.C. § 282, the claims of the ’977 patent are presumed valid.

250. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the ’977 patent in violation of 35 U.S.C. § 271(a) by making, using, selling, offering to sell, and/or importing the MiTAC Accused Embedded Systems and Accused Panel Computers.

251. MiTAC’s direct infringement of the ’977 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Embedded Systems and Accused Panel Computers is shown by way of the exemplary Pluto E220, M840, and M1070 as set forth in paragraphs 35-41 and 94-125 above, which demonstrates infringement of at least claim 1 of the ’977 patent by showing:

(a) the Pluto E220, M840, and M1070 are computers;

(b) the Pluto E220, M840, and M1070 comprise a variety of connectors configured to couple to a console;

(c) the Pluto E220, M840, and M1070 comprise an integrated central processing unit (CPU) and graphics subsystem in a single chip;

(d) the Pluto E220, M840, and M1070 comprise a Low Voltage Differential Signal (LVDS) channel directly extending from the integrated central processing unit and graphics subsystem to convey encoded address and data bits of a Peripheral Component Interconnect (PCI) bus transaction in a serial bit stream, wherein the LVDS channel

comprises a first unidirectional, differential signal pair to convey data in a first direction and a second unidirectional, differential signal pair to convey data in a second, opposite direction; and

(e) the Pluto E220, M840, and M1070 comprise a serial bit channel that couples to the connector, wherein the serial bit channel is adapted to transmit data packets in accordance with a Universal Serial Bus (USB) protocol wherein the integrated central processing unit and graphics subsystem outputs digital video display signals.

252. ACQIS' infringement allegations against the Accused Embedded Systems and Accused Panel Computers are not limited to claim 1 of the '977 patent, and additional infringed claims will be identified through infringement contentions and discovery.

253. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '977 patent and the infringement alleged herein.

254. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 1 of the '977 patent pursuant to 35 U.S.C. § 271(b).

255. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 14 of the '977 patent under 35 U.S.C. § 271(c).

256. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

257. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

258. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT X
INFRINGEMENT OF RE45,140

259. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 258 of this Complaint in support of its tenth cause of action as though fully set forth herein.

260. Pursuant to 35 U.S.C. § 282, the claims of the '140 patent are presumed valid.

261. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '140 patent in violation of 35 U.S.C. § 271(g) by using one or more of the methods claimed in the '140 patent to manufacture the Accused Embedded Systems and Accused Panel Computers and then importing, selling, offering to sell and/or using the Accused Embedded Systems and Accused Panel Computers in the United States.

262. MiTAC's Accused Embedded Systems and Accused Panel Computers that are made using the methods claimed in the '140 patent are not trivial or nonessential components of other products and are not materially changed by subsequent processes.

263. MiTAC's direct infringement of the '140 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Laptops is shown by way of the exemplary

Pluto E220 and M1070 as set forth in paragraphs 35-41, 94-103, and 115-125 above, which demonstrate that to manufacture the Pluto E220, M840, and M1070, MiTAC necessarily performs the following actions, which results in direct infringement of at least claim 35 of the '140 patent upon importation and/or sale of the Pluto E220 and M1070 in the United States:

(a) MiTAC performs a method of improving the performance of the Pluto E220, M840, and M1070, which are computers;

(b) MiTAC obtains an integrated Central Processing Unit (CPU) and graphics controller in a single chip for the Pluto E220, M840, and M1070;

(c) MiTAC connects a first Low Voltage Differential Signal (LVDS) channel directly to the integrated CPU and graphics controller in the Pluto E220, M840, and M1070, wherein the LVDS channel comprises two unidirectional, serial bit channels that transmit data in opposite directions;

(d) MiTAC connects a Differential Signal channel directly to the integrated CPU and graphics controller to output video data in the Pluto E220, M840, and M1070;

(e) MiTAC provides a connector for the computer for connection to an external peripheral in the Pluto E220, M840, and M1070; and

(f) MiTAC provides a second LVDS channel to couple to the connector in the Pluto E220, M840, and M1070, the second LVDS channel comprising two unidirectional, serial bit channels that transmit data in opposite directions.

264. ACQIS' infringement allegations against the Accused Embedded Systems and Accused Panel Computers are not limited to claim 35 of the '140 patent, and additional infringed claims will be identified through infringement contentions and discovery.

265. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '140 patent and the infringement alleged herein.

266. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 35 of the '140 patent pursuant to 35 U.S.C. § 271(b).

267. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 35 of the '140 patent under 35 U.S.C. § 271(c).

268. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

269. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

270. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

COUNT XI
INFRINGEMENT OF U.S. PATENT NO. 9,529,769

271. ACQIS incorporates by this reference the allegations set forth in paragraphs 1 through 270 of this Complaint in support of its eleventh cause of action as though fully set forth herein.

272. Pursuant to 35 U.S.C. § 282, the claims of the '769 patent are presumed valid.

273. In view of the foregoing facts and allegations, including paragraphs 35-41 and 44-135 above, MiTAC has directly infringed and continues to directly infringe one or more claims of the '769 patent in violation of 35 U.S.C. § 271(g) by using one or more of the methods claimed in the '769 patent to manufacture the Accused Embedded Systems and Accused Panel Computers and then importing, selling, offering to sell, and/or using the Accused Embedded Systems and Accused Panel Computers in the United States.

274. The Accused Embedded Systems and Accused Panel Computers made using the methods claimed in the '769 patent are not trivial or nonessential components of other products and are not materially changed by subsequent processes.

275. MiTAC's direct infringement of the '769 patent through its manufacture, use, offers to sell, sales, and importation of the Accused Panel Computers is shown by way of the exemplary M840 panel computers as set forth in paragraphs 35-41 and 104-114 above, which demonstrate that to manufacture the M840, MiTAC performs the following actions, which results in direct infringement of at least claim 19 of the '769 patent upon importation and/or sale of the M840 in the United States:

(a) The M840 is a computer capable of external peripheral data communication;

(b) MiTAC obtains an integrated Central Processing Unit (CPU) with a graphics controller in a single chip for use in the M840;

(c) MiTAC connects a unidirectional differential signal channel directly to the integrated CPU and graphics controller to output digital video data in the M840;

(d) MiTAC provides a connector for external peripheral data communication in the M840;

(e) MiTAC provides a first Low Voltage Differential Signal (LVDS) channel to convey Universal Serial Bus (USB) protocol data through the connector, wherein the LVDS

channel comprises two unidirectional, serial bit channels that transmit data in opposite directions in the M840; and

(f) MiTAC provides a second LVDS channel through the connector to convey digital video data in the M840.

276. ACQIS' infringement allegations against the Accused Panel Computers are not limited to claim 19 of the '769 patent, and additional infringed claims will be identified through infringement contentions and discovery.

277. As early as around May 14, 2018, and at least as of the filing of this Complaint, MiTAC had actual notice of the '797 patent and the infringement alleged herein.

278. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-150, constitute induced infringement of at least claim 19 of the '769 patent pursuant to 35 U.S.C. § 271(b).

279. MiTAC's actions as alleged herein, including those alleged in paragraphs 140-145 and 151-152, constitute contributory infringement of at least claim 19 of the '769 patent under 35 U.S.C. § 271(c).

280. The above-described acts of direct and induced infringement committed by MiTAC have irreparably harmed ACQIS and ACQIS' licensees, and will continue to irreparable harm ACQIS and ACQIS' licensees unless enjoined.

281. ACQIS is entitled to recover all damages sustained as a result of MiTAC's wrongful acts of infringement, but in no event less than a reasonable royalty pursuant to 35 U.S.C. § 284.

282. MiTAC's infringement as described herein has been and continues to be willful and exceptional. Accordingly, ACQIS is entitled to recover enhanced damages up to three times

the amount found or assessed at trial pursuant to 35 U.S.C. § 284 as well as its attorneys' fees pursuant to 35 U.S.C. § 285.

JURY TRIAL DEMANDED

ACQIS LLC, hereby demands a trial by jury on all claims and issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff ACQIS LLC respectfully requests that this Court grant the following relief to ACQIS LLC:

A. enter judgment that MiTAC has infringed, both directly and indirectly, one or more claims of each of the ACQIS Patents and continues to infringe those claims through: (1) the manufacture, use, offering to sell, and/or sale in the United States, and/or the importation into the United States, of infringing computer products; (2) the practice of claimed methods of the ACQIS Patents by using and/or testing computer products in the United States; and (3) the importation into the United States of computer products made abroad using patented processes claimed in the ACQIS Patents; and/or (4) the inducement of third parties to engage in, and/or contributing to the engagement of third parties in, such infringing activity with knowledge of the ACQIS Patents and of the third parties' infringing actions;

B. enter judgment that such infringement is willful;

C. enter judgment awarding ACQIS monetary relief pursuant to 35 U.S.C. § 284 in an amount adequate to compensate for MiTAC's infringement of the ACQIS Patents to be determined at trial, but not less than a reasonable royalty, awarding ACQIS all pre- and post-judgment interest and costs, and awarding ACQIS enhanced damages for MiTAC's willful infringement of the ACQIS Patents;

D. enter an order that MiTAC pay to ACQIS ongoing royalties in an amount to be

determined for any infringement occurring after the date that judgment is entered;

E. enter an order, pursuant to 35 U.S.C. § 285, declaring this an exceptional case and awarding to ACQIS its reasonable attorneys' fees; and

F. enter an order awarding to ACQIS such other and further relief, whether at law or in equity, that this Court seems just, equitable, and proper.

Dated: October 15, 2020.

Respectfully submitted,

By: */s/ Paige Arnette Amstutz*

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