DIAMOND S Y S T E M S

COM Express® **PCIe104**

FEATURES

Easy customization and quick ship due to elimination of bulky cables and custom case design

COM Express architecture provides performance scalability and latest generation processors

Expandable with PCIe/104 and minicard I/O modules

IP67 sealed construction with fully gasketed design

MIL-STD-810 shock/vibration rated

MIL-STD-461, 704, and 1275 compliant power supply with isolation

Standard model with Core i7 11th Gen CPU + 64GB RAM

-40 to +80C operating temperature

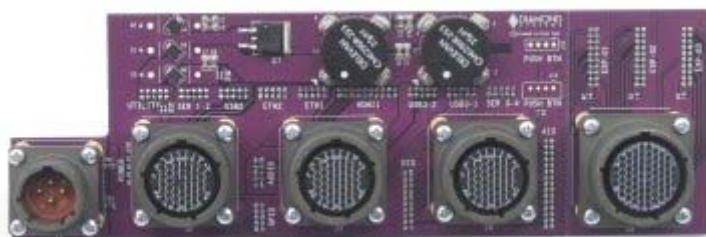10.2 x 6.7 x 3.5 in / 260 x 170 x 90mm WxDxH

5.8 lbs / 2.6Kg base model

Internal view showing JASPER COM Express carrier with expansion sockets direct-connected to panel I/O board

Top view showing COM Express module

Bottom view showing optional conduction cooled MIL-grade power supply with filtering

Panel I/O board eliminates most cables

The GEODE rugged computer system platform offers easy customization and quick availability for rugged computers due to its novel architecture that includes pre-integrated expansion connectors for easy addition of I/O, plus the use of COM Express modules to support flexible CPU choices. With GEODE you can add up to 3 I/O boards in the system without requiring any change to the enclosure or cabling. The elimination of custom enclosure and cabling design effort dramatically reduces up-front costs and delivery times, and the resulting use of common components across multiple product configurations helps keep production costs down and facilitates the production of small quantities for pilot or small-run programs.

The COM is thermally coupled to the top surface of the enclosure with a conduction cooling heat spreader and mounting plate. (Heat spreader removed for illustration purposes, normally present in the open rectangle in the mounting plate)
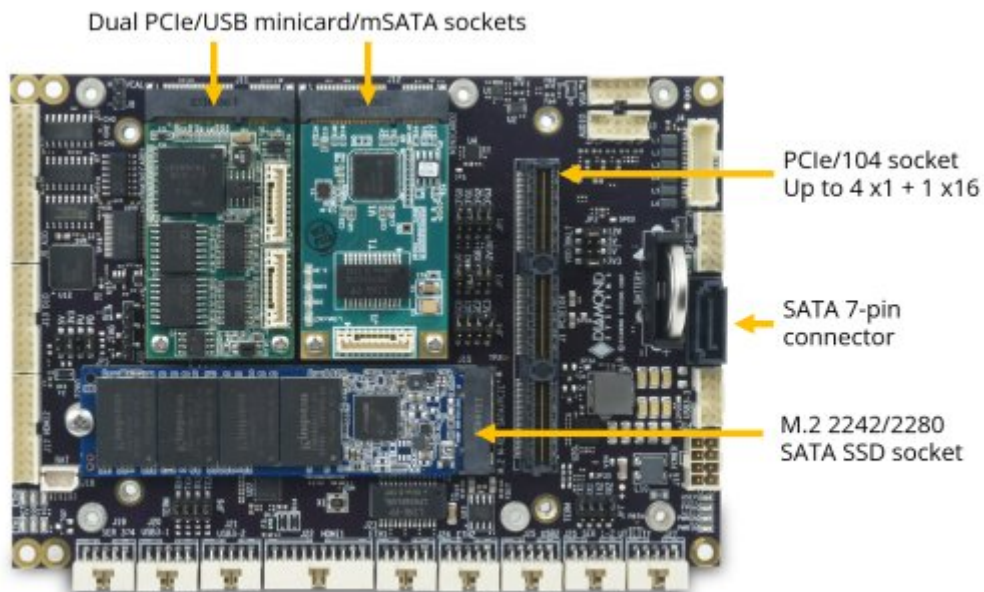
The optional filtered 80-watt power supply is thermally coupled to the bottom surface of the enclosure using a conduction cooling mounting plate with thermal pads on both sides.
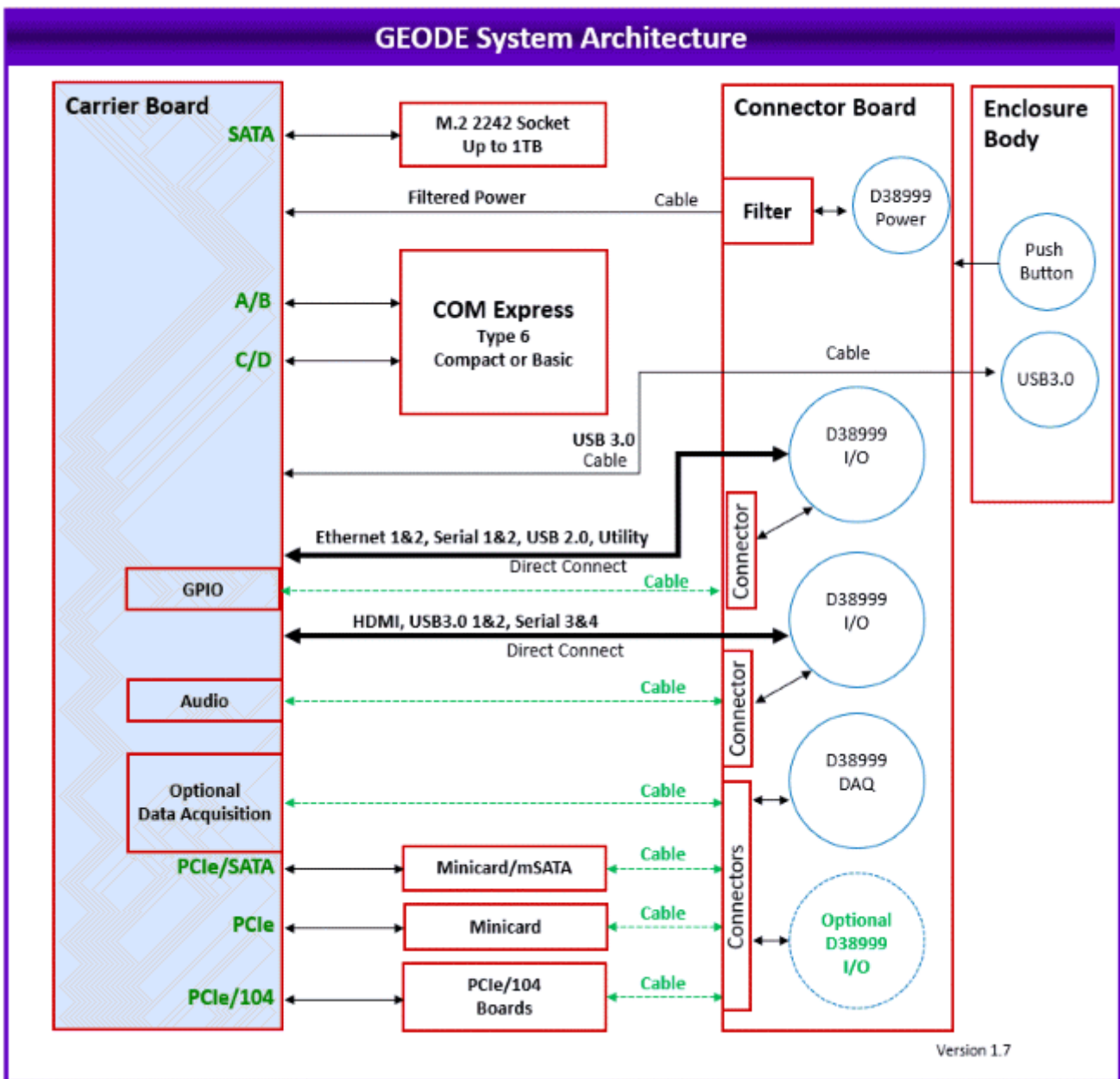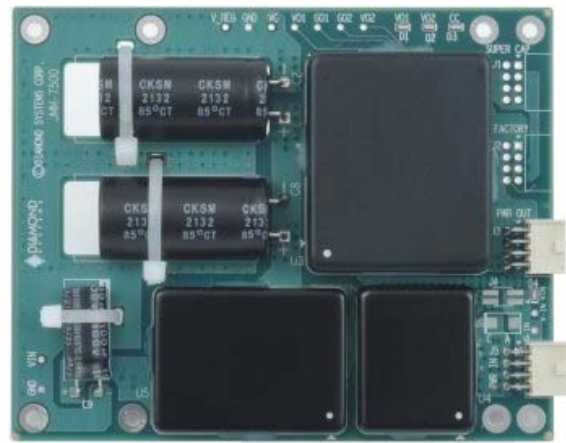
The entire system is housed in a rugged 3-part enclosure that eliminates all T joints and includes seals at all joints to ensure IP67 compliance.

GEODE is based on Diamond's **JASPER** COM Express carrier board featuring a high level of I/O as well as multiple sockets for I/O expansion. The optional integrated data acquisition circuit provides high-accuracy analog I/O with autocalibration and programming library support. Dual minicard sockets and a PCIe/104 socket with PCIe x1 and x16 links (depending on the installed COM) enable feature upgrade with the widest range of I/O modules, from low-cost minicards up to high-performance graphics and 10Gb Ethernet, all without modifying the case or cables.

Dual PCIe/USB minicard/mSATA sockets

PCIe/104 socket
Up to 4 x1 + 1 x16

SATA 7-pin connector

M.2 2242/2280 SATA SSD socket

A MIL-grade rugged power supply with MIL-STD-461, -704, and -1275 compatibility and wide input range is available with both isolated and non-isolated output configurations. As a cost and weight reduction alternative, a MIL-STD-461 filter circuit can be built right into the connector board, eliminating the separate power supply. Both the processor and power supply are direct-coupled to the enclosure for efficient conduction cooling.

GEODE System Architecture

Carrier Board

SATA ← → M.2 2242 Socket Up to 1TB

Filtered Power — Cable — Filter ← → D38999 Power

A/B ← → COM Express Type 6 Compact or Basic

C/D ← →

Cable — USB3.0

USB 3.0 Cable

D38999 I/O

Ethernet 1&2, Serial 1&2, USB 2.0, Utility
Direct Connect

GPIO — Cable — Connector — D38999 I/O

HDMI, USB3.0 1&2, Serial 3&4
Direct Connect

Audio — Cable — Connector

Optional Data Acquisition — Cable — D38999 DAQ

PCIe/SATA ← → Minicard/mSATA — Cable

PCIe ← → Minicard — Cable — Connectors — Optional D38999 I/O

PCIe/104 ← → PCIe/104 Boards — Cable

Connector Board **Enclosure Body**

Push Button

Version 1.7

◆ **Mass Storage and I/O Expansion**

Mass storage is provided by an M.2 2242/2280 size solid-state disk module with capacity up to 2TB. Additional storage can be provided with an add-on drive using the built-in SATA connector.

I/O expansion is readily accomplished with the use of PCIe / USB minicards as well as PCIe/104

I/O modules. The PCIe/104 socket supports up to 4 x1 links and 1 x16 link, depending on the installed COM. A Core i7 or lower performance COM will typically support 3-4 PCIe x1 links. A Xeon or higher COM will typically support the x1 links as well as the x16 link.

Slide Id Jasper callouts not found

◆ Direct-Coupled Connector Board Eliminates Cables

Internal cables are a leading cost, leadtime, and size driver for rugged systems, as well as usually the most failure-prone element in the design. With Geode, most I/O connectors are mounted on a circuit board that plugs directly into the main computer board and eliminates most internal cables. This design reduces cost, reduces failure, reduces size, increases ruggedness, and simplifies assembly. Attachment points are provided for optional dust caps for all connectors. The rightmost connector is on a breakaway portion of the circuit board and can be removed to support smaller systems that have lesser I/O requirements.

Outward face with MIL-DTL-38999 connectors

Inner face with Board to board connectors and I/O expansion cable connectors

One front panel I/O connector is reserved for cable connection to allow flexibility and support high speed interfaces such as USB 3.0, high speed graphics, and 10G Ethernet. The default system configuration provides USB 3.0 in this position.

◆ How to Order

Geode Systems are configured to order based on customer I/O requirements. Depending on your I/O needs and current stock levels, a Geode system can be configured and shipped in as little as one week. **Contact Diamond Systems Sales** to discuss your system requirements and obtain a quote.

sales@diamondsystems.com

The Jasper standard enclosure and panel board can satisfy a preponderance of typical rugged system requirements. The design can also be customized for special situations, for example to change the size or type of the I/O connectors or to install SMA connectors for antenna attachment.