GEODE-OSB Rugged system with Nvidia Jetson AGX Orin supporting up to 8 GMSL cameras

DIAMOND SYSTEMS

NVIDIA.

Original design; see new shorter design 3D images

Original design; see new shorter design 3D images

FEATURES

Core Features

Available with AGX Orin (32GB), AGX Orin 64GB, and AGX Orin 64GB Industrial modules

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

Rugged design featuring sealed construction and MIL-grade I/O connectors

Reliable high-speed connectors support 10GbE, USB3, and HDMI interfaces

I/O Features

1x 1Gb Ethernet + 1x 10Gb copper Ethernet

2x USB 3.2 ports with USB 2.0 fallback

2 additional USB 2.0 ports

2 RS-232 + 2 RS-232/422/485 ports

2x CAN, 8x GPIO 3.3V

60 pins User I/O on dedicated expansion connector; supports user-specified Minicard and M.2 I/O modules

Support for up to 8 GMSL cameras using sealed Fakra connectors

Mechanical / Environmental

Input voltage: 9-36VDC (isolated), 7-20VDC (non-isolated)

Optional MIL-grade 80W power supply with 9-36VDC input range and MIL-STD-461/704/1275 compliance

-40 to +80C operation

MIL-STD-810H shock and vibration tested and verified

Dimensions: 241mm W x 215mm D x 98mm H / 9.5" W x 8.5" D x 3.9" H

New shorter case design with camera connectors on sides

New case design showing connector caps (included with system)

The GEODE-Osbourne computer system platform offers easy customization and quick delivery, due to its novel architecture that includes pre-integrated expansion connectors for easy addition of I/O. Geode is based on Diamond's **Osbourne carrier board** for Nvidia Jetson AGX Orin. The system can support all three Orin modules: AGX Orin 32GB, AGX Orin 64GB, and Orin Industrial 64GB.

The I/O connector scheme consists of a mix of standard 38999 connectors plus dedicated SJT style connectors to support both low-speed and high-speed signals cost-effectively. In the high-speed category, Geode Osbourne supports 10Gb copper Ethernet, two USB 3.2 ports, and an HDMI port. Low-speed I/O consists of a 1Gb Ethernet port, 2 USB 2.0 ports, 2 RS-232 and 2 RS-232/422/485 serial ports, 2 CAN ports, 8 GPIO 3.3V, and Audio.

Since no two rugged computer systems are exactly alike, GEODE supports up to 60 additional I/O signals and two SMA antenna connectors for I/O expansion. This enables the installation of minicard and M.2 I/O modules without requiring any change to the enclosure or cabling. The elimination of custom design and manufacturing efforts dramatically reduces up-front costs and delivery times. The resulting use of common
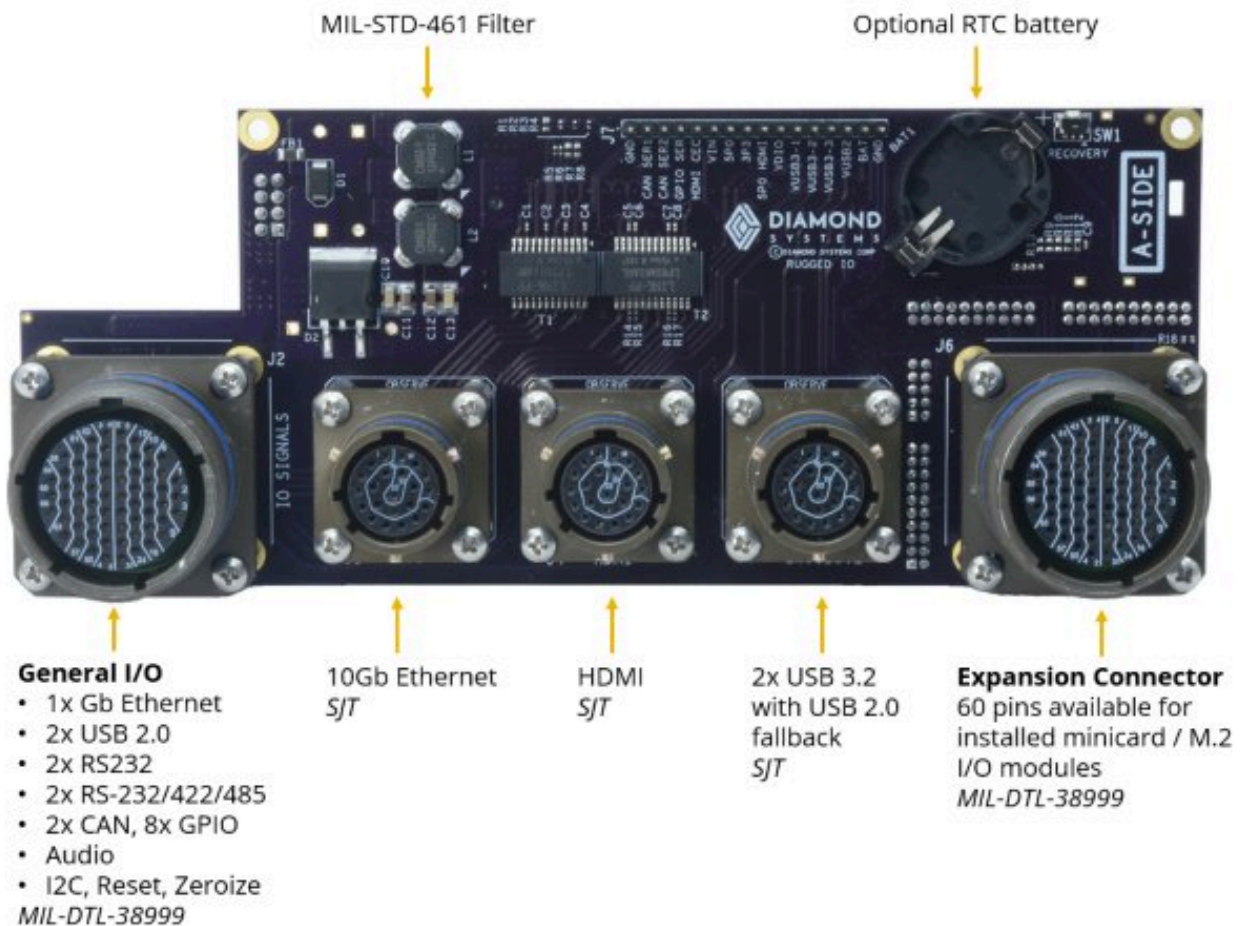
components across multiple product configurations helps keep production costs down and facilitates the production of small quantities for pilot or small-run programs.

A GMSL camera adapter board can be installed into the system to facilitate the connection of up to 8 GMSL cameras to the system. And a rugged, isolated, wide-range-input power supply featuring MIL-STD-461, -704, and -1275 compliance can be installed as an option. The power supply and Jetson module are mounted directly to the bottom and top enclosure lids, respectively, to improve heat dissipation and keep the interior cooler for more reliable long-term operation.
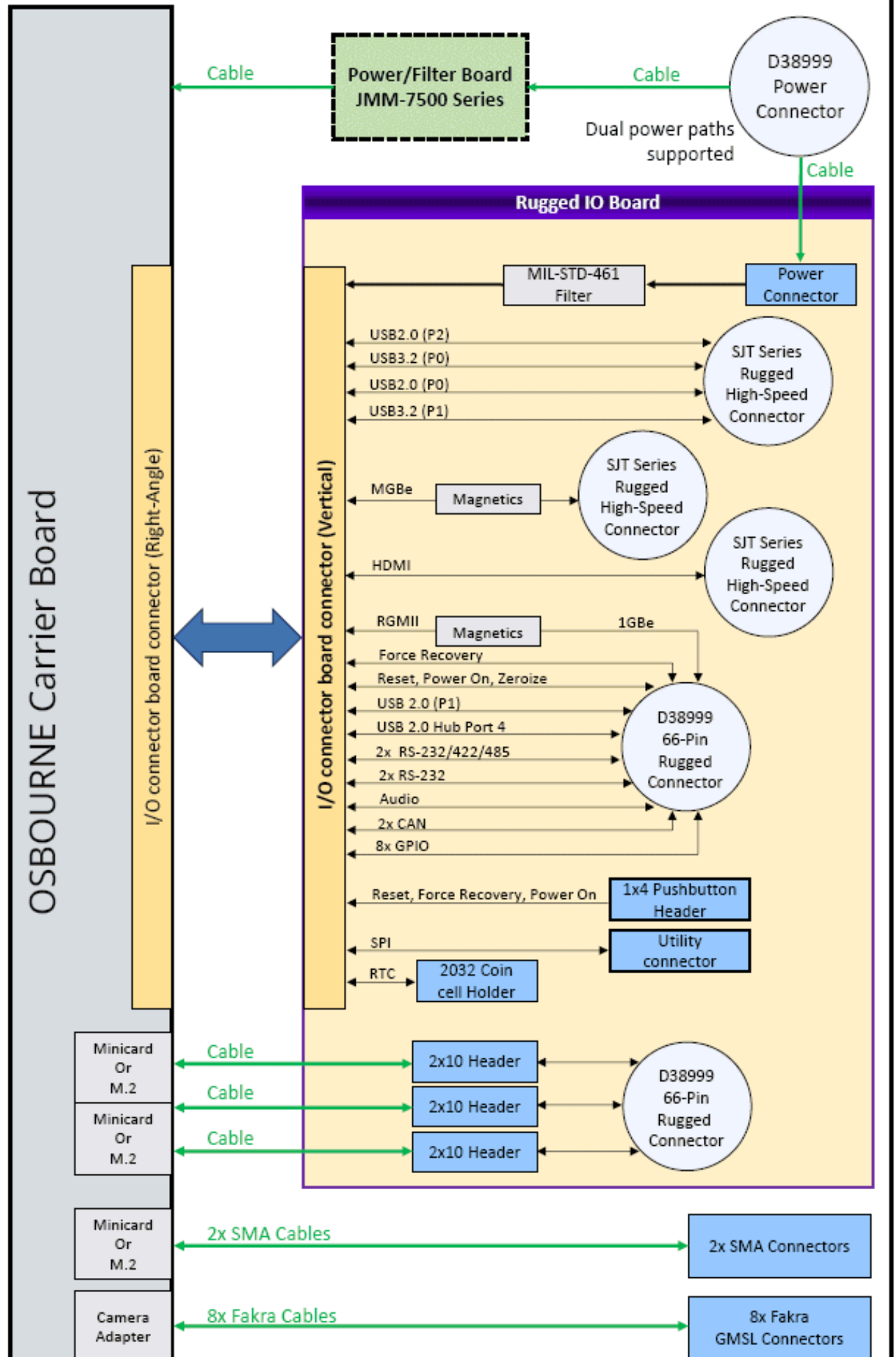
Geode consists of a 3-part aluminum CNC enclosure that eliminates T joints to improve sealing. All joints and connector cutouts utilize sealing gaskets to support an IP67 rating. The Geode series was designed to meet MIL-STD-810H shock and vibration specifications.

◆ Panel I/O Board

Geode-Osbourne's internal architecture utilizes a direct-mount panel I/O board to eliminate most internal cables. The board contains a mix of standard 38999 and high-speed connectors to support the full range of I/O provided by the Jetson AGX Orin module and the carrier board electronics. It also includes a MIL-STD-461 filter for economical configurations where a full rugged MIL-grade power supply is not desired.

General I/O
- 1x Gb Ethernet
- 2x USB 2.0
- 2x RS232
- 2x RS-232/422/485
- 2x CAN, 8x GPIO
- Audio
- I2C, Reset, Zeroize

MIL-DTL-38999

10Gb Ethernet
SJT

HDMI
SJT

2x USB 3.2 with USB 2.0 fallback
SJT

Expansion Connector
60 pins available for installed minicard / M.2 I/O modules
MIL-DTL-38999

Geode Osbourne System Block Diagram

OSBOURNE Carrier Board

I/O connector board connector (Right-Angle)

I/O connector board connector (Vertical)

Cable — Power/Filter Board JMM-7500 Series — Cable — D38999 Power Connector

Dual power paths supported

Cable

Rugged IO Board

MIL-STD-461 Filter — Power Connector

USB2.0 (P2)
USB3.2 (P0)
USB2.0 (P0)
USB3.2 (P1)

SJT Series Rugged High-Speed Connector

MGBe — Magnetics — SJT Series Rugged High-Speed Connector

HDMI — SJT Series Rugged High-Speed Connector

RGMII — Magnetics — 1GBe
Force Recovery
Reset, Power On, Zeroize
USB 2.0 (P1)
USB 2.0 Hub Port 4
2x RS-232/422/485
2x RS-232
Audio
2x CAN
8x GPIO

D38999 66-Pin Rugged Connector

Reset, Force Recovery, Power On — 1x4 Pushbutton Header

SPI — Utility connector

RTC — 2032 Coin cell Holder

Minicard Or M.2 — Cable — 2x10 Header
Minicard Or M.2 — Cable — 2x10 Header
Minicard Or M.2 — Cable — 2x10 Header

D38999 66-Pin Rugged Connector

Minicard Or M.2 — 2x SMA Cables — 2x SMA Connectors
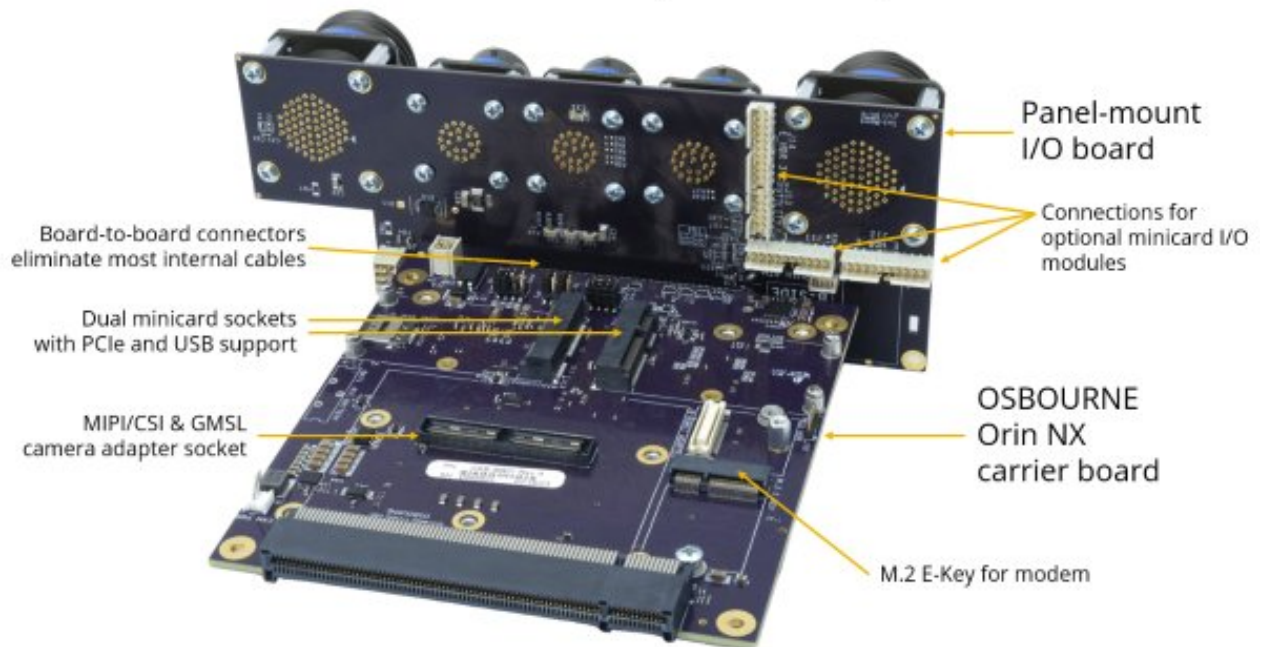
Camera Adapter — 8x Fakra Cables — 8x Fakra GMSL Connectors

Rev 1.1

◆ I/O Expansion

The Osbourne carrier board includes 2 minicard sockets and an M.2 E-Key socket for installing I/O and connectivity expansion modules. The Panel I/O board provides 3 connectors to bring out the I/O from installed expansion modules without requiring enclosure redesign. It has capacity for up to 60 I/O signals. Two SMA connectors are also provided on the front face of the enclosure for installed communications modules.

GEODE-Osbourne I/O Expansion Capabilities

Panel-mount I/O board

Connections for optional minicard I/O modules

Board-to-board connectors eliminate most internal cables

Dual minicard sockets with PCIe and USB support

MIPI/CSI & GMSL camera adapter socket

OSBOURNE Orin NX carrier board

M.2 E-Key for modem