GEODE-JSP
Rugged Computer System
User Manual

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FOR TECHNICAL SUPPORT
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1. IMPORTANT SAFE HANDLING INFORMATION

WARNING!

ESD-Sensitive Electronic Equipment

Observe ESD-safe handling procedures when working with this product.

Always use this product in a properly grounded work area and wear appropriate ESD-preventive clothing and/or accessories.

Always store this product in ESD-protective packaging when not in use.

Safe Handling Precautions

The Geode Jasper contains a high density connector with many connections to sensitive electronic components. This creates many opportunities for accidental damage during handling, installation and connection to other equipment. The list here describes common causes of failure found on boards and systems returned to Diamond Systems for repair. This information is provided as a source of advice to help you prevent damaging your Diamond (or any vendor's) boards.

ESD damage – This type of damage is usually almost impossible to detect, because there is no visual sign of failure or damage. The symptom is that the board eventually simply stops working, because some component becomes defective. Usually the failure can be identified and the chip can be replaced. To prevent ESD damage, always follow proper ESD-prevention practices when handling computer boards.

Power supply wired backwards – Our power supplies and boards are not designed to withstand a reverse power supply connection. This will destroy each IC that is connected to the power supply (i.e. almost all ICs). In this case the board will most likely will be unrepairable and must be replaced. A chip destroyed by reverse power or by excessive power will often have a visible hole on the top or show some deformation on the top surface due to vaporization inside the package. **Check twice before applying power!**

2. DESCRIPTION

Geode Jasper is a rugged COM Express Compact/Basic type 6 carrier board system with MIL . The carrier is designed to support a variety of COM Express modules to provide both rapid product line expansion with a variety of processors and long life by enabling simple replacement of the COM when the designed-in one becomes obsolete.

The COM Express module mounts on the bottom side of the board, and the PCIe104 expansion sockets are on the top side. The board dimensions are 4.000" x 5.750", slightly larger than both COM Express compact/basic and PCIe104 modules. The larger size is necessitated due to the incompatibility between the mounting hole patterns of the two form factors plus the desire to provide increased PCB coastline for I/O connectors.
A thicker PCB (.090" / 2.3mm), latching I/O connectors, and full -40/+85C operating temperature provide increased ruggedness, enabling the board to work reliably in mobile and harsh environment applications.

2.1 System features

Sl No	Component	Feature	Qty
1	Power	12V DC supply or 9 to 36V DC supply(With Power Filter Board)	1
2	CPU	COM Express Module with Inter i7, 32GB/64GB RAM support	1
3	Display	HDMI Interface	1
4	Ethernet	2x 1Gbps	2
5	USB	USB2.0 & USB3.0	2x USB2.0, 2x USB3.0
6	Digital I/O	Extended I/O capability	4 GPI and 4 GPIO (3.3/5V Compatible)
7	Serial Port	RS232/RS422/RS485	4xRS232/RS422/RS485
8	Audio	IN, OUT, MIC	1 ports each
9	Utility	I2C, SPI & Power Signals	1
10	Expansion IO	Expansion IO signals	2 Ports

2.2 I/O Features and Connector Types

Feature	Description	Connector Type
Power	+12V DC / +9V to +36V input supply with MIL-STD-461 filtering	D38999/20WC4PN
RTC	3V power input for RTC functionality	1066
USB	2x USB 3.0/USB2.0	SJT00RT12-35S014
	2x USB2.0	D38999/20KE35BN
Ethernet	ETH-1 10/100/1000Mbps from COM module	D38999/20KE35BN
	ETH-2 10/100/1000Mbps via I210 Ethernet controller	
Display	1x HDMI 2.0a/b directly from the COM module	SJT00RT12-35DS014

DIO	4xGPI and 4xGPO form COM Module through expansion ports	D38999/20WF35SN
Mass Storage	2 PCIe minicard socket with USB and SATA Minicard2 supports Nano SIM interface	2 PCIe MiniCard 52 Position (J11 & J12)
	1 M.2 2242 / 2280 SATA/x1 PCIe	M.2 Socket (J15)
	1 Standard 7pin SATA connector	SATA Connector (J9)
Audio	HDA to Analog Audio converter	
PCIe104	4 PCIe x1 ports, 1x PCIe x16	156 Position Vertical Header (J1)
Utility	I2C, Reset Button, Power Button signals	D38999/20WF35SN
Antenna	Support for two SMA connectors on the enclosure	SMA connector on enclosure
Expansion IO	79-Pin expantion Ios support (Two qty of 2x10 pin and one 2x30 pin)	D38999/20WG35SN
Serial Ports	4 ports Software configurable RS-232/422/485 through SP336 transceivers or 2 RS232 only	D38999/20WF35SN

2.3 Operating System Support

Windows 10; Ubuntu Linux

2.4 Mechanical, Electrical, Environmental

Form factor	9.84”x7.05”x3.74”
Cooling	Conduction Cooling
Power input	+12V DC / 9 to +36V DSC with Filter Circuit
Operating Temp	-40°C to +85°C
Weight	5.8 lbs / 2.6Kg

3. KEY SUBSYSTEMS

3.1 COMe Carrier System

The Geode-JSP supports various COM Express modules which provide varying levels of performance and power consumption. Both COM Express Compact (95x95mm) and Basic (95x125mm) type 6 modules are supported. The availability of features is module dependent. Design emphasis is placed on minimizing the need for BIOS customization to enable the module to work with as many different modules as possible without any customization effort.

3.2 Power Supply Specifications

Geode Jasper supports two power supply options.

1. Usning on board power filder circuit on Rugged IO board
2. Using JMM-7525 external power filter board

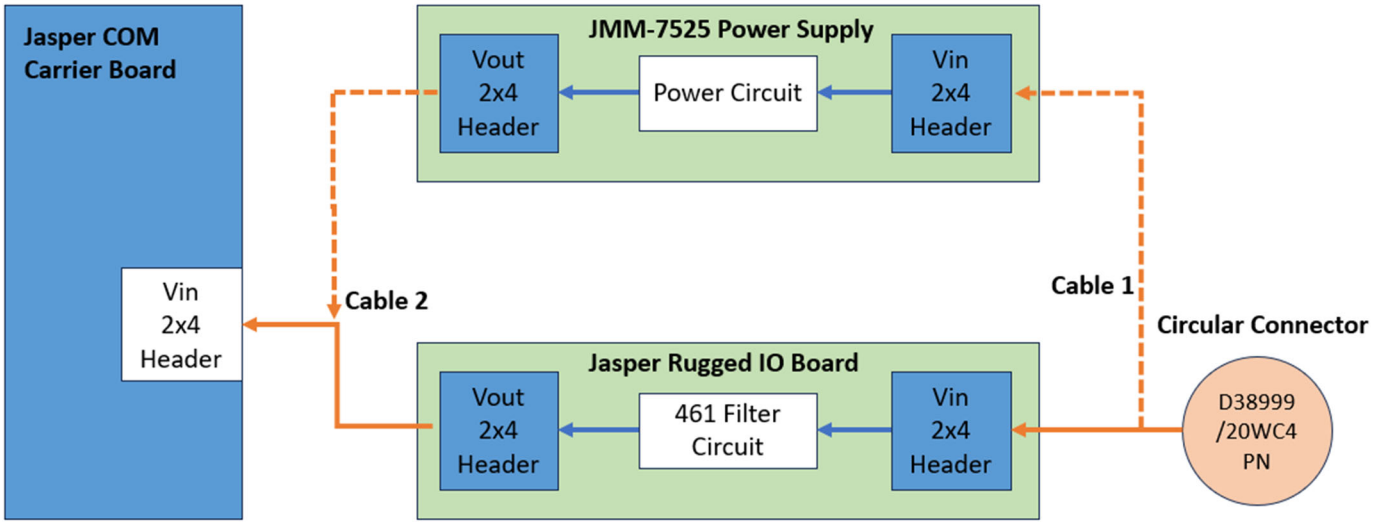
When on board power filter is used, the Geode Jasper can be powered from +12V DC typically.

On otherway, Geode Osbourne can be powered from +9V to +36V when external JMM-7525 power filter is used.

The maximum allowable reflected ripple, measured at the voltage input connector is 50mV p-p.

These power supplies are sized to support the highest capacity on-board memory and have enough reserve capacity to support the below add-on features.

Following figure shows varios power options.



3.3 Backup Battery

A 2032 coin horizontal battery holder is provided on Jasper Carrier board. The Geode Jasper can boot and function normally without a backup battery as well. RTC of Orin module backup voltage of 3V with 1.8V to 3.46V max is required.

3.4 Ethernet Ports

COM Express Carrier provides two 10/100/1000 Ethernet ports. One port comes directly from the COM module. The other port is derived from the Intel WGI210IT PCIe Ethernet controller. This controller is accessed via x1 PCIe lane from the COM. Each port has on-board magnetics. Both Ethernet ports are available at rugged circular connector J4 on the enclosure.

3.5 PCIe Link Routing

COM Express Carrier x1 PCIe port mapping is provided below. The carrier board routes the PCIe x16 lanes from the COM Express CD connector to the PCIe104 connector banks 2 and 3.

Lane 0 – Minicard Socket1
Lane 1 – Minicard Socket2
Lane 2 – PCIe104 Type1
Lane 3 – Intel I210 Ethernet Controller
Lane 4 – PCIe104 Type1
Lane 5 – PCIe104 Type1
Lane 6 – PCIe104 Type1
Lane 7 – M.2 2280/2242

PEG x16 – PCIe104 Type1

3.6 Display

The board offers one HDMI video output option. The HDMI port is directly from the COM Module and made available on the rugged I/O connector J5. All the common choke and ESD protection circuitry are buit in to the system.

3.7 Audio Interface

The HD audio from the COM module is converted to analog audio using Audio Codec. Line IN, Line OUT and Mic signals are terminated on rugged circular connector J3. The system uses internally a 2x10 pin cable assembly (DSC# 6982071) to get the Audio signals from COM carrier board to the rugged IO board.

3.8 Serial Ports

The system supports 4 serial ports using a USB to Quad UART controller (FT4232HL). The ports use SP336 transceivers (1 transceiver for 2 ports) to support RS-232, RS-422, and RS-485 protocols. The protocol is selected using GPIO pins on the FPGA in full feature (JSP BB03A) and Jumper options are given for protocol selection in Full feature without DAQ (JSP BB02D). On board jumpers are provided to enable 121-ohm line termination for RS-422 and RS-485 protocols.

The four serial ports are available on rugged circular connector J3 on the enclosure.

3.9 PCIe Minicard Socket

The system offers two full size (51mm length) or two half size Minicard sockets. Minicard interface support PCIex1 and SATA using a mux. Both minicard support USB2.0 interface.

On minicard connector1, PCIe lane 0 and SATA Port 2 are muxed using a high-speed mux IC. USB2.0 Port 6 is muxed with minicard connector 1 and PCIe104 and can be selected using jumper configuration available at JP3 on Jasper carrier board.

On Minicard connector2, PCIe lane 1 and SATA port 3 are muxed using high-speed mux IC. USB2.0 port 5 is also made available at the connector. Nano sim connector is supported on minicard connector 2.

Board provides 2nos onboard M2 4mm spacer on each minicard sockets to mount modules and for half minicard there are M2 2mm spacer which acts as nut for the Male to Female M2 4mm spacer provided as accessory.

3.10 USB

The Geode Jasper supports 2x USB2.0 ports routed to rugged I/O connector J4. Two numbers of USB3.2 are also routed to the rugged USB connector J7.

2 x USB2.0 ports are routed to one 2x5 headers and 3x USB 3.0/USB2.0 ports are routed to three nos of 2x5 headers.

USB2.0 port 6 is muxed between minicard socket 1 and PCIe104 and can be selected using jumper configuration at JP3.

USB port mapping is shown below:

USB3.0 Ports	
Port Number	Port Termination
Port 0	USB3.0 Header 1
Port 1	USB3.0 Header 2
Port 2	USB3.0 Header 3
Port 3	Not Used
USB2.0 Ports	
Port Number	Port Termination
Port 0	USB3.0 Header 1
Port 1	USB3.0 Header 2
Port 2	USB2.0 Header
Port 3	
Port 4	USB to Quad UART
Port 5	Minicard Socket2
Port 6	Minicard Socket1 / PCIe104
Port 7	USB3.0 Header 3

3.11 SATA M.2 Socket

The carrier board offers up to four SATA ports, derived from the COM express module.

M.2 2242/2280 socket supports SATA Port 0 / PCIe Lane 7 using a high-speed mux. SBC provides onboard M3 4mm spacer to mount M.2 2280 SATA SSD and M3 2mm spacer acts as nut for the Male to Female 4mm spacer provided to mount M.2 2242 SATA SSD.

Second SATA port (mapped as Port 1 from COM) is connected to an industry-standard vertical 7pin SATA connector that accepts cables with latching.

Third SATA (mapped as Port 2 from COM) and fourth (mapped as Port 2 from COM) SATA ports are made available on the first and second minicard sockets respectively using high speed mux. PCIe/SATA interface is supported depending on the type of minicard module inserted.

3.12 PCIe104 Expansion

The board offers expansion over 3 bank PCIe104 connector with 22mm stacking height.

Design supports up to four, x1 lane PCIe ports on one bank PCIe104 connector and x16 PEG port on the 2nd and 3rd bank. The PCIe ports availability depends on the COM express module used.

One of the USB2.0 (Port 6) is muxed with minicard2 can be selected using jumper configuration at JP3.

3.13 Digital I/O

The board contains a GPIO header with 4 GPI and 4 GPO available from the COM module. GPI3 (by default) is muxed with TPM IRQ.

It provides 500mA fused 3.3V supply.

The GPIO signals are available on rugged circular connector J4. The system uses internally a 2x10 pin cable assembly (DSC# 6982071) to get the GPIO signals from COM carrier board to the rugged IO board.

3.14 Utility signals

Power button, Reset and I2C signals are also made available on the circular connector J4.

3.15 Trusted Platform Module (TPM)

The board contains Infineon's SLB 9670XQ2.0 TPM module featuring a fully TCG TPM 1.2/2.0 standard compliant module with an SPI interface. TPM can be used as a root of trust for platform integrity, remote attestation and cryptographic services. This feature will be supported based on the customer requirement and not implemented by default.

3.16 Expansion IO

Geode Osbourne also provides another rugged circular connector J6 on the enclosure. This can be used for IO expansion in future.

3.17 Data Acquisition

The system provides an optional data acquisition subcircuit containing analog input, analog output, and digital I/O features. This circuit is controlled by an FPGA attached to the processor via the LPC bus. A pin header on the board provides access to JTAG signals for reprogramming the FPGA on the board and in the field.

Features of the DAQ subcircuit include: 16 single-ended / 8 differential analog inputs with 16-bit resolution, programmable input ranges, and 250KSPS maximum throughput; 4 analog outputs with 16-bit resolution and programmable output ranges; and 22 digital I/O lines with selectable 3.3V/5V logic levels, selectable pull-up/down resistors, programmable direction, buffered I/O, and capability for use as counter/timer and PWM circuits.

If this option is added, the signals are available on the rugged expansion IO connector J6.

4. KEY INTERFACES

The interfaces on Geode Osbourne are derived from the different subsystems. A summary of the interfaces provided on the system with its provider are tabulated below:

Sl No	Interface	Subsystem
1	HDMI	COMe Module
2	2x 1G Ethernet	One from COMe Module. One from WGI210IT 1G CTRLR+PHY
3	4xRS-232/RS422/RS485	Derived from SP336
4	2xUSB3.2	COMe Module
5	2xUSB2.0	COMe Module
6	4xGPI + 4xGPO	COMe Module
7	1x SATA M.2	COMe Module
8	2x MiniPCIe Socket	COMe Module
9	PCIe104 Expansion Ports	COMe Module+PCIe 104 Exp Board
10	AUDIO – IN, OUT, MIC IN	From ALC892-CG Audio CODEC
11	1x I2C	COMe Module
Power		
12	Power	Through external power filter (JMM-7515) or through onboard power filter on rugged IO board

5. SYSTEM ARCHITECTURE

Figure 1 provides an overview of the block diagrarm of the Geode Jasper system.

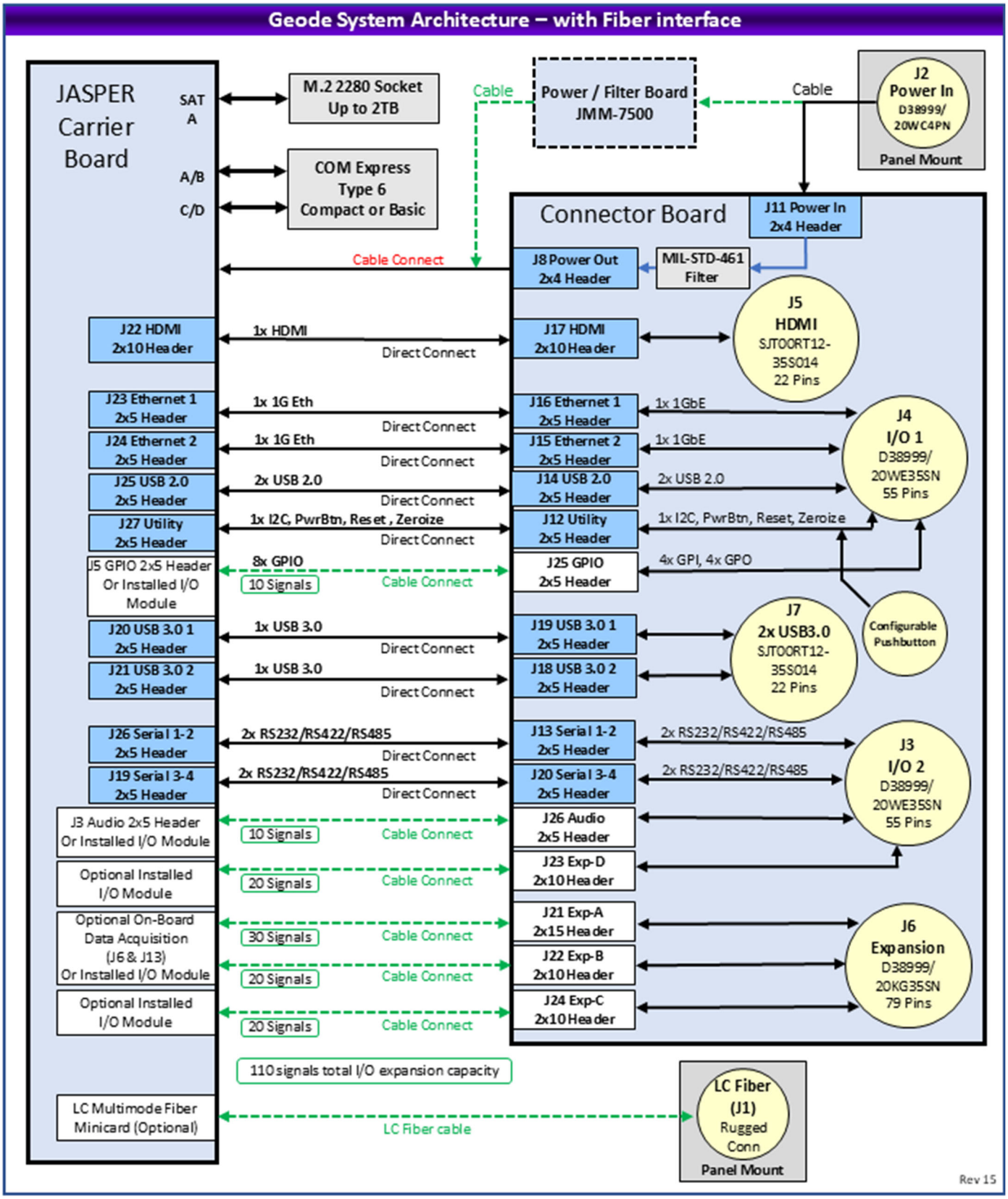


Figure 1: System Architecture of Geode Osbourne

6. GEODE OSBOURNE MECHANICAL DRAWING AND FEATURE LOCATIONS

The form factor of the system is 9.5”x8.5”x3.85”.

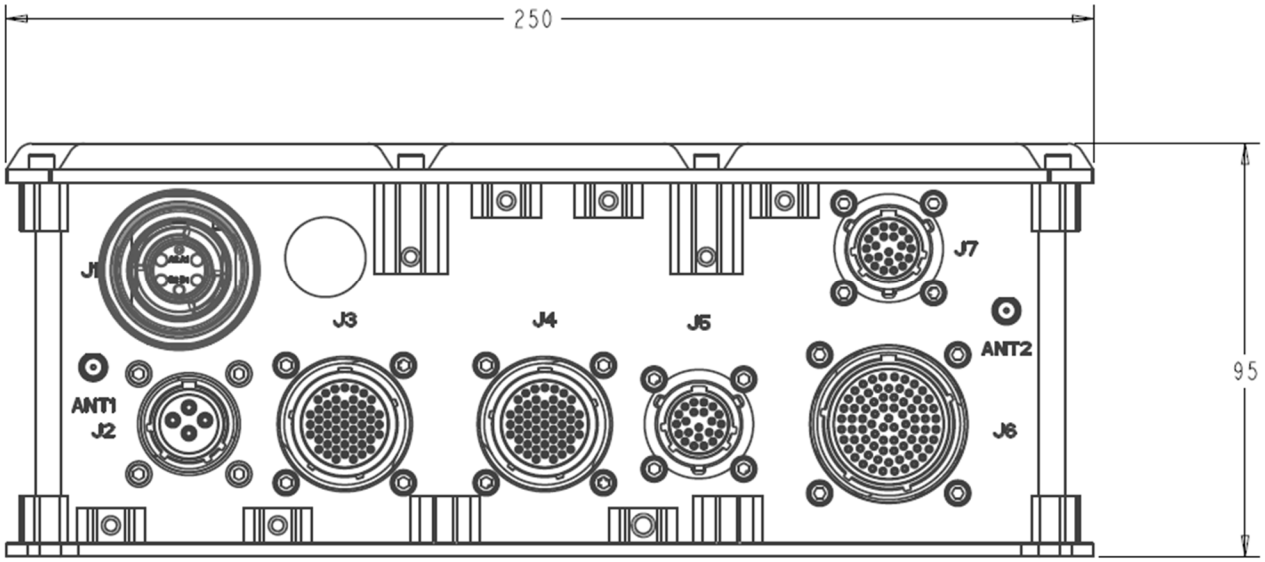


Figure 2: Mechanical outline, front view

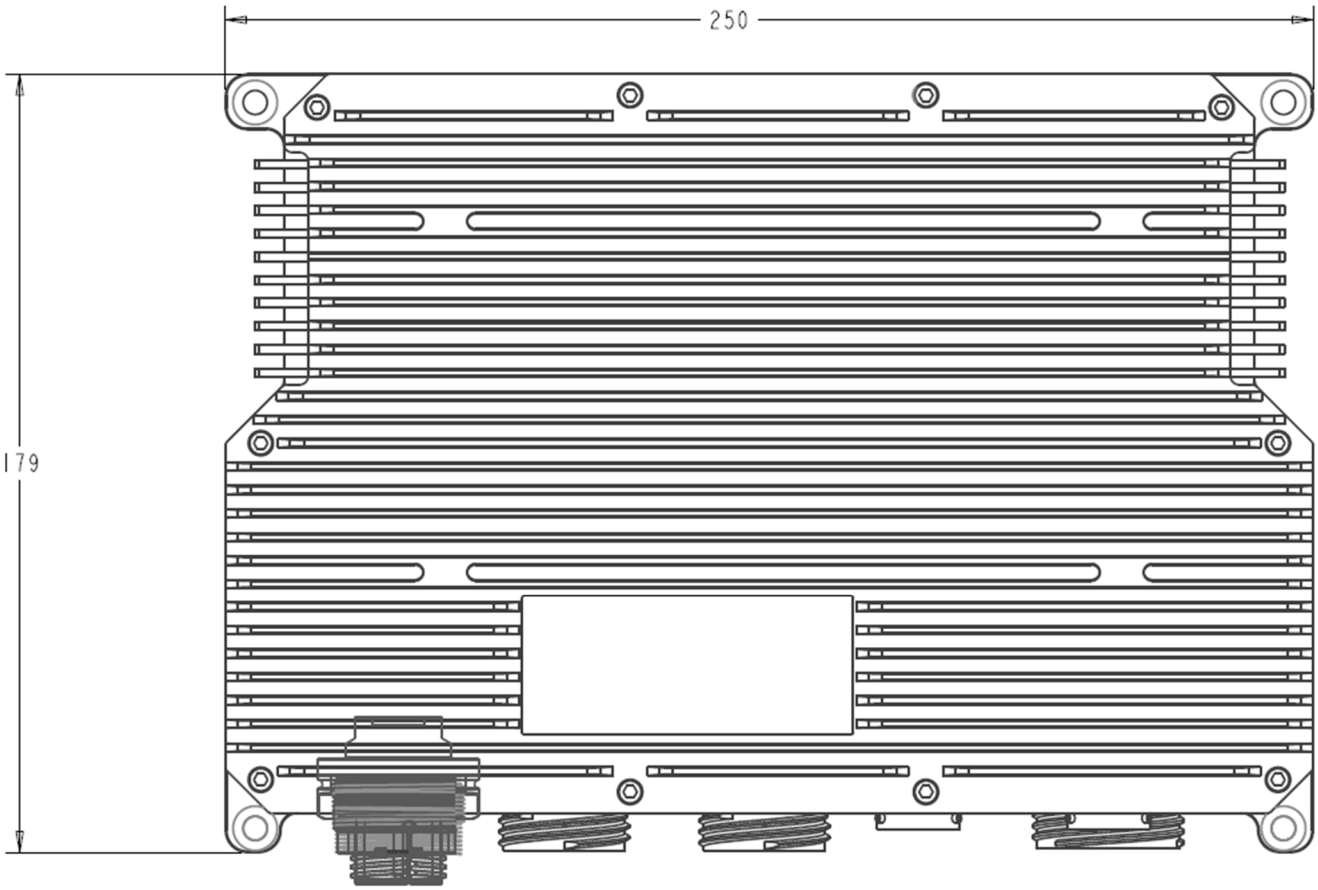
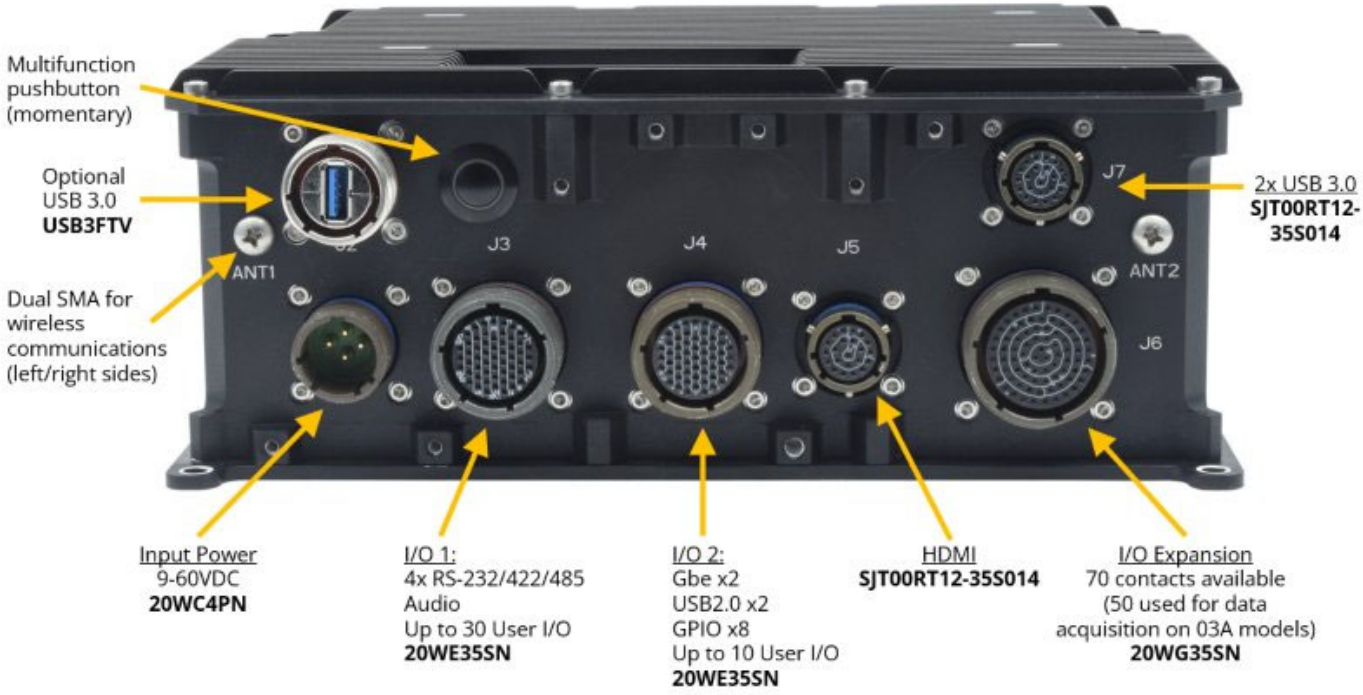


Figure 3: Mechanical outline, top view

7. I/O CONNECTORS

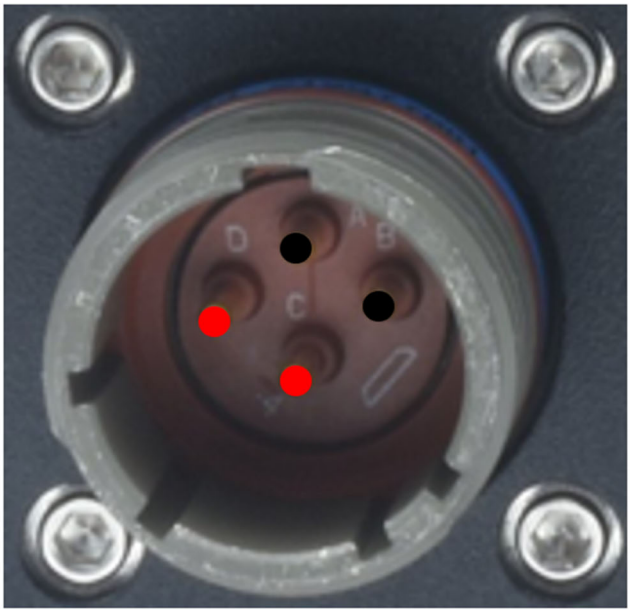
The following image shows the I/O connector features on Geode Jasper system.



7.1 J2 - Power Input (Power)

Geode Jasper provides D38999 series circular connector for power input. Connector pinout is as shown below:

Interface	Jasper Carrier Board Conn	Signal Description	IO Board Internal Connectors		IO Board External Connector (38999)	External Cable Assy Connector
Power In	J16-01	Common	J8-01	J11-01	J2-A	NA
Power In	J16-03	Common	J8-03	J11-03	J2-B	NA
Power In	J16-06	Vin	J8-06	J11-06	J2-C	NA
Power In	J16-08	Vin	J8-08	J11-08	J2-D	NA

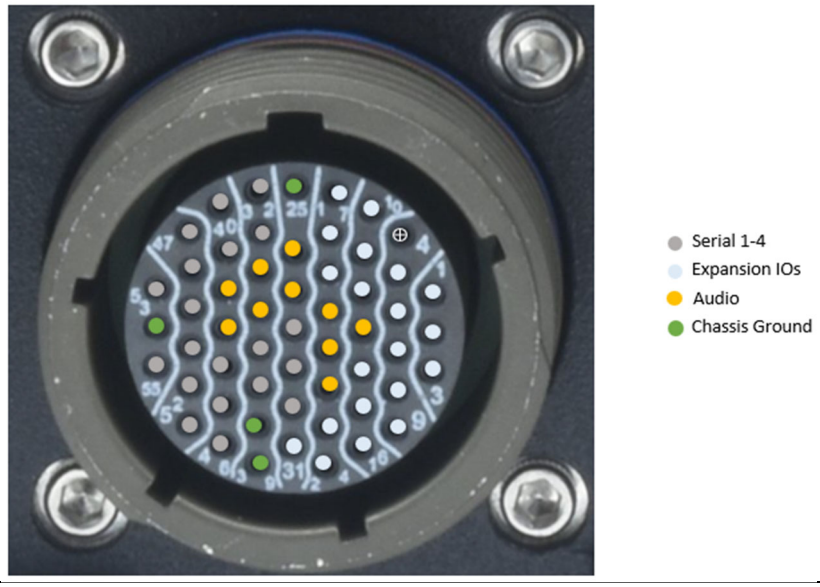
Geode system connector	Connector type	MIL D38999/20WC4PN	
	Description	Shell type	Straight Plug
		Material and finish	Olive Drab Cadmium Plated Nickel Base
		Shell Size	C
		Insert Arrangement	C4
		Contact type	Pin
		Keying position	Normal Keying
		Pins	4
Mating connector	Connector Part#	MIL D38999/26WC4SN	
Illustration Viewed from exterior			

7.2 J3 – IO Connector

Geode Jasper provides four serial ports, Audio In, Audio Out, MIC ports and Expansion IO signals on to D38999 series circular connector. Connector pinout is as shown below:

Interface	Jasper Carrier Board Conn	Signal Description	IO Board Internal Conn	IO Board External Connector (38999)	External Cable Assy Connector
Serial Port 1	J26-01	TX1/TX1_P/RX1_P	J13-01	J3-50	DB9_1-03
	J26-02	RTS1/TX1_N/RX1_N	J13-02	J3-55	DB9_1-07
	J26-03	RX1/RX1_P	J13-03	J3-49	DB9_1-02
	J26-04	CTS1/RX1_N	J13-04	J3-53	DB9_1-08
	J26-05	GND	J13-05	J3-48	DB9_1-05
	NC	GND_CHASSIS	Access pad	J3-54	NC
Serial Port 2	J26-07	TX2/TX2_P/RX2_P	J13-07	J3-41	DB9_2-03
	J26-08	RTS2/TX2_N/RX2_N	J13-08	J3-47	DB9_2-07
	J26-09	RX2/RX2_P	J13-09	J3-33	DB9_2-02
	J26-10	CTS2/RX2_N	J13-10	J3-40	DB9_2-08
	J26-06	GND	J13-06	J3-32	DB9_2-05
	NC	GND_CHASSIS	Access pad	J3-25	NC
Serial Port 3	J19-01	TX3/TX3_P/RX3_P	J20-01	J3-36	DB9_3-03
	J19-02	RTS3/TX3_N/RX3_N	J20-02	J3-28	DB9_3-07
	J19-03	RX3/RX3_P	J20-03	J3-37	DB9_3-02
	J19-04	CTS3/RX3_N	J20-04	J3-44	DB9_3-08
	J19-05	GND	J20-05	J3-29	DB9_3-05
	NC	GND_CHASSIS	Access pad	J3-38	NC
Serial Port 4	J19-07	TX4/TX4_P/RX4_P	J20-07	J3-46	DB9_4-03
	J19-08	RTS4/TX4_N/RX4_N	J20-08	J3-45	DB9_4-07
	J19-09	RX4/RX4_P	J20-09	J3-52	DB9_4-02
	J19-10	CTS4/RX4_N	J20-10	J3-51	DB9_4-08
	J19-06	GND	J20-06	J3-30	DB9_4-05
	NC	GND_CHASSIS	Access pad	J3-39	NC
Expansion Port D	NC	Expansion D Pin 1	J23-01	J3-31	DB25-01
	NC	Expansion D Pin 2	J23-02	J3-24	DB25-14
	NC	Expansion D Pin 3	J23-03	J3-23	DB25-02
	NC	Expansion D Pin 4	J23-04	J3-16	DB25-15
	NC	Expansion D Pin 5	J23-05	J3-15	DB25-03
	NC	Expansion D Pin 6	J23-06	J3-09	DB25-16
	NC	Expansion D Pin 7	J23-07	J3-14	DB25-04
	NC	Expansion D Pin 8	J23-08	J3-08	DB25-17
	NC	Expansion D Pin 9	J23-09	J3-07	DB25-05
	NC	Expansion D Pin 10	J23-10	J3-03	DB25-18
	NC	Expansion D Pin 11	J23-11	J3-06	DB25-06
	NC	Expansion D Pin 12	J23-12	J3-02	DB25-19
	NC	Expansion D Pin 13	J23-13	J3-05	DB25-07
	NC	Expansion D Pin 14	J23-14	J3-01	DB25-20
	NC	Expansion D Pin 15	J23-15	J3-12	DB25-08
	NC	Expansion D Pin 16	J23-16	J3-11	DB25-21

	NC	Expansion D Pin 17	J23-17	J3-19	DB25-09
	NC	Expansion D Pin 18	J23-18	J3-18	DB25-22
	NC	Expansion D Pin 19	J23-19	J3-10	DB25-10
	NC	Expansion D Pin 20	J23-20	J3-17	DB25-23
Audio Port/User IO	J3-01	LINE_OUT_L	J26-01	J3-42	Aud Jack-A
	J3-02	LINE_OUT_R	J26-02	J3-43	Aud Jack-B
	J3-03	AUD_GND	J26-03	J3-34	Aud Jack-C
	J3-04	AUD_GND	J26-04	J3-35	Aud Jack-C
	J3-05	LINE_IN_L	J26-05	J3-26	Aud Jack-A
	J3-06	LINE_IN_R	J26-06	J3-27	Aud Jack-B
	J3-07	AUD_GND	J26-07	J3-21	NC
	J3-08	AUD_GND	J26-08	J3-22	Aud Jack-C
	J3-09	AUD_GND	J26-09	J3-13	NC
	J3-10	MIC_IN	J26-10	J3-20	Aud Jack-A
Unused Pin	NC	NC	NA	J3-04	DB25-11

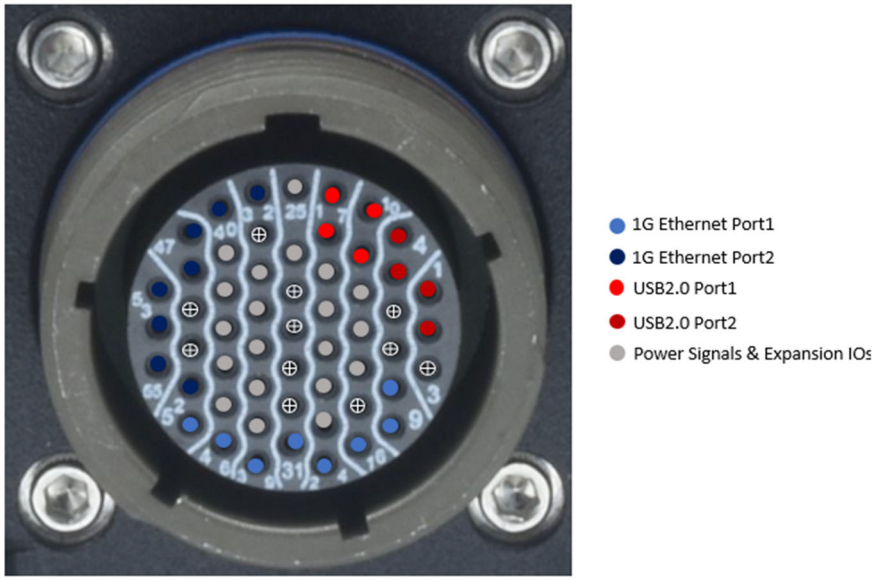
Geode system connector	Connector type	MIL D38999/20KE35BN	
	Description	Shell type	Straight Receptacle
		Material and finish	Olive Drab Cadmium Plated Nickel Base
		Shell Size	E
		Insert Arrangement	F35
		Contact type	Socket
		Keying position	Normal Keying
Mating connector	Connector type	MIL D38999/26WE35PN	
Illustration Viewed from exterior			

7.3 J4 – IO Connector

Geode Jasper provides two 1G Ethernet, two USB2.0, GPIO, I2C and power signals on to D38999 series circular connector. Connector pinout is as shown below:

Interface	Jasper Carrier Board Conn	Signal Description	IO Board Internal Conn	IO Board External Connector (38999)	External Cable Assy Connector
Ethernet Port 1	J23-03	GBE0_TR0_P	J16-03	J4-09	RJ45-01
	J23-04	GBE0_TR0_N	J16-04	J4-08	RJ45-02
	J23-05	GBE0_TR1_P	J16-05	J4-24	RJ45-03
	J23-06	GBE0_TR1_N	J16-06	J4-16	RJ45-04
	J23-07	GBE0_TR2_P	J16-07	J4-31	RJ45-05
	J23-08	GBE0_TR2_N	J16-08	J4-39	RJ45-06
	J23-09	GBE0_TR3_P	J16-09	J4-46	RJ45-07
	J23-10	GBE0_TR3_N	J16-10	J4-52	RJ45-08
Unused	J23-01	GND_CH_ETH1	J16-01	J4-03	NA
Ethernet Port 2	J24-03	GBE1_TR0_P	J15-03	J4-51	RJ45-01
	J24-04	GBE1_TR0_N	J15-04	J4-55	RJ45-02
	J24-05	GBE1_TR1_P	J15-05	J4-54	RJ45-03
	J24-06	GBE1_TR1_N	J15-06	J4-53	RJ45-04
	J24-07	GBE1_TR2_P	J15-07	J4-48	RJ45-05
	J24-08	GBE1_TR2_N	J15-08	J4-47	RJ45-06
	J24-09	GBE1_TR3_P	J15-09	J4-40	RJ45-07
	J24-10	GBE1_TR3_N	J15-10	J4-32	RJ45-08
Unused	J24-01	GND_CH_ETH2	J15-01	J4-49	NA
USB2.0 Port 1	J25-09	VBUS	J14-09	J4-11	USB2.0-01
	J25-07	D-	J14-07	J4-10	USB2.0-02
	J25-05	D+	J14-05	J4-17	USB2.0-03
	J25-03	GND	J14-03	J4-18	USB2.0-04
USB2.0 Port 2	J25-10	VBUS	J14-10	J4-02	USB2.0-01
	J25-08	D-	J14-08	J4-01	USB2.0-02
	J25-06	D+	J14-06	J4-04	USB2.0-03
	J25.04	GND	J14.04	J4-05	USB2.0-04
Power Signals	J27.01	M_2_MEM_ERS_GPIO	J12.01	J4-19	DB25-01
	J27.10	RSTBTN#_3P3	J12.10	J4-23	DB25-02
	J27-06	PWRBTN#	J12-06	J4-22	DB25-14
I2C Port	J27-02	I2C_CLK	J12-02	J4-20	DB25-03
	J27-04	I2C_DATA	J12-04	J4-21	DB25-16
	J27-08	GND	J12-08	J4-25	DB25-04
	J27-09	V_3P3_S_UTILITY	J12-09	J4-14	DB25-05
DIO/User IO	J5-01	Expansion E Pin 1	J25-01	J4-41	DB25-06
	J5-02	Expansion E Pin 2	J25-02	J4-42	DB25-19
	J5-03	Expansion E Pin 3	J25-03	J4-43	DB25-07
	J5-04	Expansion E Pin 4	J25-04	J4-44	DB25-20
	J5-05	Expansion E Pin 5	J25-05	J4-45	DB25-08
	J5-06	Expansion E Pin 6	J25-06	J4-34	DB25-21
	J5-07	Expansion E Pin 7	J25-07	J4-35	DB25-09

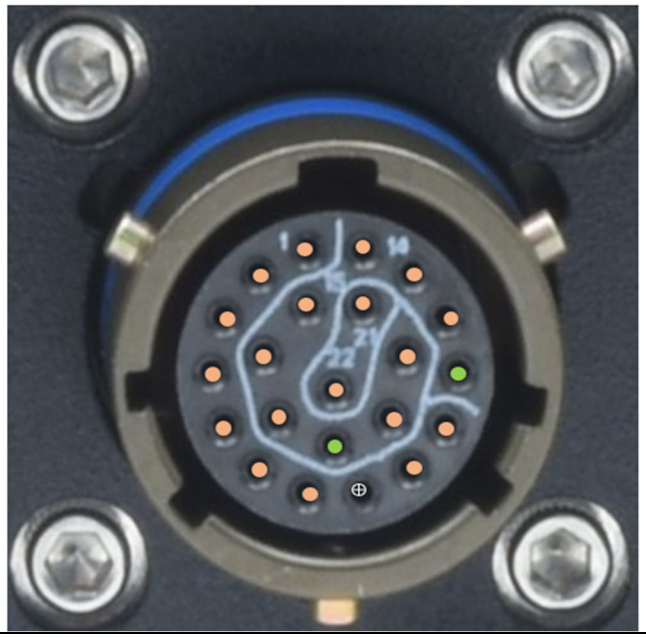
	J5-08	Expansion E Pin 8	J25-08	J4-36	DB25-22
	J5-09	Expansion E Pin 9	J25-09	J4-37	DB25-10
	J5-10	Expansion E Pin 10	J25-10	J4-38	DB25-23
	J27-03	GND	J12-03	J4-26	DB25-15
Ground	J27-05	GND	J12-05	J4-13	DB25-17
RTC Power	J27-07	V_3P0_RTC	J12-07	J4-12	DB25-18
	NC	NC	NC	J4-06	NC
	NC	NC	NC	J4-07	NC
	NC	NC	NC	J4-15	NC
	NC	NC	NC	J4-27	NC
Unused	NC	NC	NC	J4-28	NC
	NC	NC	NC	J4-29	NC
	NC	NC	NC	J4-30	NC
	NC	NC	NC	J4-33	NC
	NC	NC	NC	J4-50	NC

Geode system connector	Connector Part#	MIL D38999/20KE35BN	
	Description	Shell type	Straight Receptacle
		Material and finish	Olive Drab Cadmium Plated Nickel Base
		Shell Size	E
		Insert Arrangement	F35
		Contact type	Socket
		Keying position	Normal Keying
Mating connector	Connector Part#	MIL D38999/26WE35PN	
Illustration Viewed from exterior			

7.4 J5 – HDMI Connector

Geode Jasper provides HDMI interface signals which are terminated with SJT00RT12 series circular connector. Connector pinout is as shown below:

Interface	Jasper Carrier Board Conn	Signal Description	IO Board Internal Conn	IO Board External Connector (SJT)	External Cable Assy Connector (HDMI Male Plug)
HDMI Port	J22-01	HDMI_D2_P	J17-01	J5-01	HDMI-01
	J22-03	HDMI_D2_N	J17-03	J5-02	HDMI-03
	J22-04	HDMI_D1_P	J17-04	J5-03	HDMI-04
	J22-06	HDMI_D1_N	J17-06	J5-04	HDMI-06
	J22-07	HDMI_D0_P	J17-07	J5-05	HDMI-07
	J22-09	HDMI_D0_N	J17-09	J5-06	HDMI-09
	J22-19	HDMI_HPD_CON	J17-19	J5-07	HDMI-19
Unused	NC	NC	NC	J5-08	NC
HDMI Port	J22-10	HDMI_CLK_P	J17-10	J5-09	HDMI-10
	J22-12	HDMI_CLK_N	J17-12	J5-10	HDMI-12
	J22-20	GND_CHASSIS	J17-20	J5-11	NA
	J22-15	HDMI_DDC_CLK	J17-15	J5-12	HDMI-15
	J22-16	HDMI_DDC_DATA	J17-16	J5-13	HDMI-16
	J22-17	GND	J17-17	J5-14	HDMI-17
	J22-05	GND	J17-05	J5-15	HDMI-02
	J22-02	GND	J17-02	J5-16	HDMI-05
	J22-08	GND	J17-08	J5-17	HDMI-08
	J22-20	GND_CHASSIS	J17-20	J5-18	NA
	J22-11	GND	J17-11	J5-19	HDMI-11
	J22-13	CEC	J17-13	J5-20	HDMI-13
	J22-18	V_5P0_S	J17-18	J5-21	HDMI-18
	J22-17	GND	J17-17	J5-22	NA

Geode System connector	Connector Part#	MIL SJT00RT12-35S014
	Description	Shell type: Straight Receptacle Material and finish: Olive Drab Cadmium Plated Nickel Base Shell Size: 12 Insert Arrangement: 12-35 Contact type: Female Socket Keying position: Normal Keying Pins: 22
Mating connector	Connector Part#	MIL SJTG06RT12-35DP014
Illustration Viewed from exterior		

7.5 J6 - I/O Connector

The 1G Eth, 2x CAN, DIO, Audio, 4x Serial ports, 2x USB2.0 and Control Signals of the Geode System are terminated with a D38999 series circular connector. The connector pinouts are as shown below:

Interface	Jasper Carrier Board Conn	Signal Description	Internal Conn	External Connector (38999)	External Cable Assy Connector
Expansion Port A or analog I/O	J6-01	Expansion A Pin 1/ DAQ_AIN0	J21-01	J6-01	DB37-01
	J6-02	Expansion A Pin 2/ DAQ_AIN8	J21-02	J6-02	DB37-02
	J6-03	Expansion A Pin 3/ DAQ_AIN1	J21-03	J6-03	DB37-03
	J6-04	Expansion A Pin 4/ DAQ_AIN9	J21-04	J6-04	DB37-04
	J6-05	Expansion A Pin 5/ DAQ_AIN2	J21-05	J6-05	DB37-05
	J6-06	Expansion A Pin 6/ DAQ_AIN10	J21-06	J6-06	DB37-06
	J6-07	Expansion A Pin 7/ DAQ_AIN3	J21-07	J6-07	DB37-07
	J6-08	Expansion A Pin 8/ DAQ_AIN11	J21-08	J6-08	DB37-08
	J6-09	Expansion A Pin 9/ DAQ_AIN4	J21-09	J6-09	DB37-09
	J6-10	Expansion A Pin 10/ DAQ_AIN12	J21-10	J6-10	DB37-10
	J6-11	Expansion A Pin 11/ DAQ_AIN5	J21-11	J6-11	DB37-11
	J6-12	Expansion A Pin 12/ DAQ_AIN13	J21-12	J6-12	DB37-12
	J6-13	Expansion A Pin 13/ DAQ_AIN6	J21-13	J6-13	DB37-13
	J6-14	Expansion A Pin 14/ DAQ_AIN14	J21-14	J6-14	DB37-14
	J6-15	Expansion A Pin 15/ DAQ_AIN7	J21-15	J6-29	DB37-15
	J6-16	Expansion A Pin 16/ DAQ_AIN15	J21-16	J6-51	DB37-16
	J6-17	Expansion A Pin 17/ GNDA_DAQ	J21-17	J6-30	DB37-17
	J6-18	Expansion A Pin 18/ GNDA_DAQ	J21-18	J6-52	DB37-18
	J6-19	Expansion A Pin 19/ DAQ_AOUT0	J21-19	J6-31	DB37-19
	J6-20	Expansion A Pin 20/ DAQ_AOUT1	J21-20	J6-53	DB37-20
	J6-21	Expansion A Pin 21/ DAQ_AOUT2	J21-21	J6-32	DB37-21
	J6-22	Expansion A Pin 22/ DAQ_AOUT3	J21-22	J6-54	DB37-22

	J6-23	Expansion A Pin 23/ GNDA_DAQ	J21-23	J6-33	DB37-23
	J6-24	Expansion A Pin 24/ DAQ_DIO_PC0	J21-24	J6-55	DB37-24
	J6-25	Expansion A Pin 25/ DAQ_DIO_PC1	J21-25	J6-35	DB37-25
	J6-26	Expansion A Pin 26/ DAQ_DIO_PC2	J21-26	J6-56	DB37-26
	J6-27	Expansion A Pin 27/ DAQ_DIO_PC3	J21-27	J6-37	DB37-27
	J6-28	Expansion A Pin 28/ DAQ_DIO_PC4	J21-28	J6-57	DB37-28
	J6-29	Expansion A Pin 29/ V_3V3/V_5V0	J21-29	J6-38	DB37-29
	J6-30	Expansion A Pin 30/ GND_DIG	J21-30	J6-58	DB37-30
Expansion Port B or digital I/O	J13-01	Expansion B Pin 1/ V_3V3/V_5V0	J22-01	J6-21	DB25-01
	J13-02	Expansion B Pin 2/ DAQ_DIO_PA0	J22-02	J6-22	DB25-02
	J13-03	Expansion B Pin 3/ DAQ_DIO_PA1	J22-03	J6-23	DB25-03
	J13-04	Expansion B Pin 4/ DAQ_DIO_PA2	J22-04	J6-24	DB25-04
	J13-05	Expansion B Pin 5/ DAQ_DIO_PA3	J22-05	J6-25	DB25-05
	J13-06	Expansion B Pin 6/ DAQ_DIO_PA4	J22-06	J6-26	DB25-06
	J13-07	Expansion B Pin 7/ DAQ_DIO_PA5	J22-07	J6-27	DB25-07
	J13-08	Expansion B Pin 8/ DAQ_DIO_PA6	J22-08	J6-28	DB25-08
	J13-09	Expansion B Pin 9/ DAQ_DIO_PA7	J22-09	J6-49	DB25-09
	J13-10	Expansion B Pin 10/ DAQ_DIO_PB0	J22-10	J6-66	DB25-10
	J13-11	Expansion B Pin 11/ DAQ_DIO_PB1	J22-11	J6-48	DB25-11
	J13-12	Expansion B Pin 12/ DAQ_DIO_PB2	J22-12	J6-65	DB25-12
	J13-13	Expansion B Pin 13/ DAQ_DIO_PB3	J22-13	J6-47	DB25-13
	J13-14	Expansion B Pin 14/ DAQ_DIO_PB4	J22-14	J6-64	DB25-14
	J13-15	Expansion B Pin 15/ DAQ_DIO_PB5	J22-15	J6-45	DB25-15
	J13-16	Expansion B Pin 16/ DAQ_DIO_PB6	J22-16	J6-63	DB25-16
	J13-17	Expansion B Pin 17/ DAQ_DIO_PB7	J22-17	J6-78	DB25-17
	J13-18	Expansion B Pin 18/ DAQ_DIO_PC5	J22-18	J6-79	DB25-18

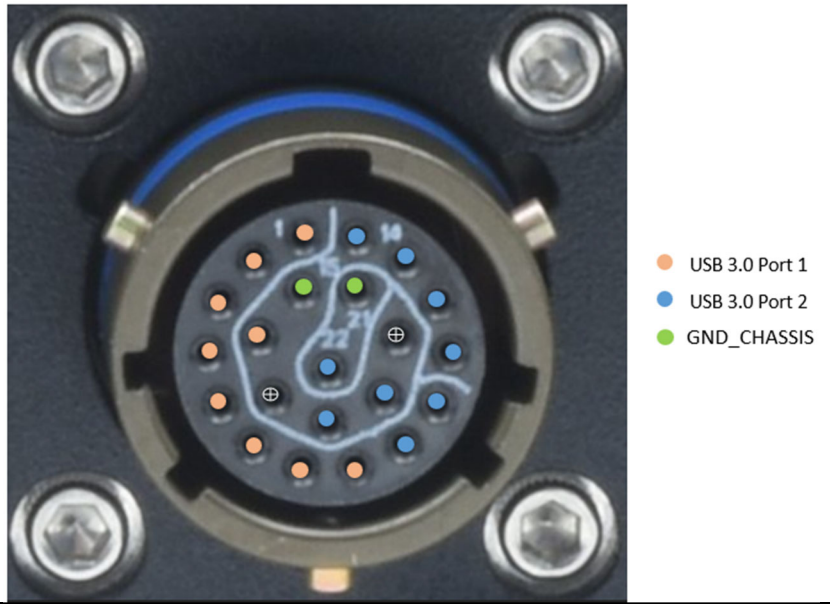
	J13-19	Expansion B Pin 19/ GND_DIG	J22-19	J6-76	DB25-19
	J13-20	Expansion B Pin 20/ GND_DIG	J22-20	J6-75	DB25-20
Expansion Port C	NC	Expansion C Pin 1	J24-01	J6-15	DB25-01
	NC	Expansion C Pin 2	J24-02	J6-16	DB25-02
	NC	Expansion C Pin 3	J24-03	J6-17	DB25-03
	NC	Expansion C Pin 4	J24-04	J6-18	DB25-04
	NC	Expansion C Pin 5	J24-05	J6-19	DB25-05
	NC	Expansion C Pin 6	J24-06	J6-20	DB25-06
	NC	Expansion C Pin 7	J24-07	J6-39	DB25-07
	NC	Expansion C Pin 8	J24-08	J6-59	DB25-08
	NC	Expansion C Pin 9	J24-09	J6-40	DB25-09
	NC	Expansion C Pin 10	J24-10	J6-60	DB25-10
	NC	Expansion C Pin 11	J24-11	J6-42	DB25-11
	NC	Expansion C Pin 12	J24-12	J6-61	DB25-12
	NC	Expansion C Pin 13	J24-13	J6-43	DB25-13
	NC	Expansion C Pin 14	J24-14	J6-44	DB25-14
	NC	Expansion C Pin 15	J24-15	J6-67	DB25-15
	NC	Expansion C Pin 16	J24-16	J6-68	DB25-16
	NC	Expansion C Pin 17	J24-17	J6-69	DB25-17
	NC	Expansion C Pin 18	J24-18	J6-70	DB25-18
	NC	Expansion C Pin 19	J24-19	J6-71	DB25-19
	NC	Expansion C Pin 20	J24-20	J6-72	DB25-20
Unused	NC	NC	NC	J6-34	NC
	NC	NC	NC	J6-36	NC
	NC	NC	NC	J6-41	NC
	NC	NC	NC	J6-46	NC
	NC	NC	NC	J6-50	NC
	NC	NC	NC	J6-62	NC
	NC	NC	NC	J6-73	NC
	NC	NC	NC	J6-74	NC
	NC	NC	NC	J6-77	NC

Geode system connector	Connector Part#	MIL D38999/20WF35SN
	Description	Shell type: Straight Receptacle Material and finish: Olive Drab Cadmium Plated Nickel Base Shell Size: F Insert Arrangement: F35 Contact type: Socket Keying position: Normal Keying
Mating connector	Connector Part#	MIL D38999/26WF35PN
Illustration Viewed from exterior		

7.6 J7 – USB3.2 Connector

Geode Jasper provides 2xUSB3.2 interface signals which are terminated with SJT00RT12 series circular connector. Connector pinout is as shown below:

Interface	Jasper Carrier Board Conn	Signal Description	IO Board Internal Conn	IO Board External Connector (SJT Pin)	External Cable Assy Connector
USB3.0 Port 0	J20-10	VBUS	J19-10	J7-01	USB3.0 Type A_1 - 01
	J20-08	D-	J19-08	J7-07	USB3.0 Type A_1 - 02
	J20-06	D+	J19-06	J7-08	USB3.0 Type A_1 - 03
	J20-04	GND	J19-04	J7-02	USB3.0 Type A_1 - 04
	J20-01	StdA_SSRX-	J19-01	J7-05	USB3.0 Type A_1 - 05
	J20-03	StdA_SSRX+	J19-03	J7-06	USB3.0 Type A_1 - 06
	J20-05	GND	J19-05	J7-16	USB3.0 Type A_1 - 07
	J20-07	StdA_SSTX–	J19-07	J7-03	USB3.0 Type A_1 - 08
	J20-09	StdA_SSTX+	J19-09	J7-04	USB3.0 Type A_1 - 09
	J20-02	GND_CHASSIS	J19-02	J7-15	NC
USB3.0 Port 1	J21-10	VBUS	J18-10	J7-14	USB3.0 Type A_2 - 01
	J21-08	D-	J18-08	J7-22	USB3.0 Type A_2 - 02
	J21-06	D+	J18-06	J7-18	USB3.0 Type A_2 - 03
	J21-04	GND	J18-04	J7-13	USB3.0 Type A_2 - 04
	J21-01	StdA_SSRX-	J18-01	J7-11	USB3.0 Type A_2 - 05
	J21-03	StdA_SSRX+	J18-03	J7-12	USB3.0 Type A_2 - 06
	J21-05	GND	J18-05	J7-19	USB3.0 Type A_2 - 07
	J21-07	StdA_SSTX–	J18-07	J7-09	USB3.0 Type A_2 - 08
	J21-09	StdA_SSTX+	J18-09	J7-10	USB3.0 Type A_2 - 09
	J21-02	GND_CHASSIS	J18-02	J7-21	NC
Unused	NC	NC	NC	J7-17	NC
	NC	NC	NC	J7-20	NC

Geode system connector	Connector Part#	MIL SJT00RT12-35S014	
	Description	Shell type	Straight Receptacle
		Material and finish	Olive Drab Cadmium Plated Nickel Base
		Shell Size	12
		Insert Arrangement	12-35
		Contact type	Female Socket
		Keying position	Normal Keying
		Pins	22
Mating connector	Connector Part#	MIL SJTG06RT12-35DP014	
Illustration Viewed from exterior			

8. JUMPER CONFIGURATION

8.1 Jumpers on Jasper SBC

The Jumper blocks on the Jasper SBC are used to configure various options. Most or all options should be set at the factory according to the customer requested configuration at time of order, so jumpers normally should not need to be altered, unless a configuration change is needed. Changing jumper settings requires opening up the system from the bottom side in order to access the Jasper SBC, which contains the jumper blocks and is mounted on the top cover facing down.

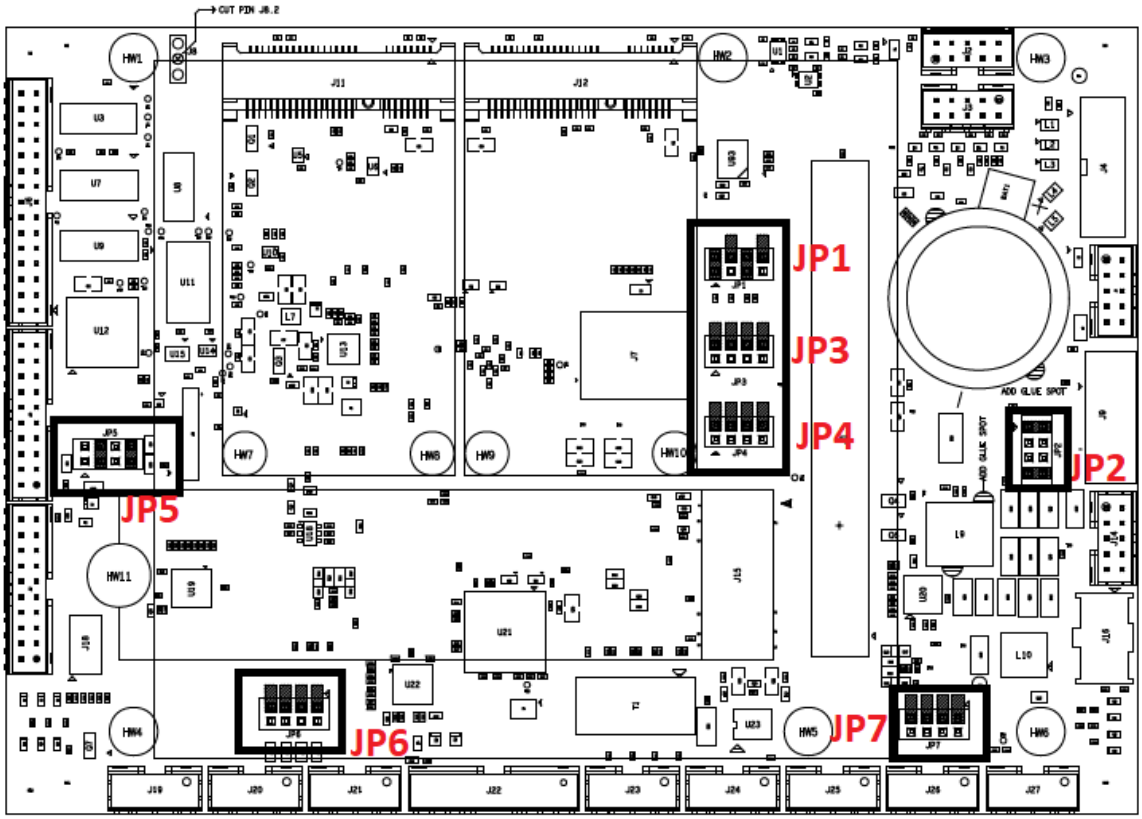


Figure 4: Jumper Blocks on Jasper Carrier Board

The following table describes the Jumper Blocks on the carrier board.

Name	Function
JP1	FPGA address selection
JP2	LVDS_BKLT and LVDS_VDD voltage level selection
JP3	USB TO MPCIE/PCIE/104, input voltage selection
JP4	Serial port mode selection
JP5	DIO Voltage and PU/PD selection
JP6	Serial Port 3 & 4 termination selection
JP7	Serial Port 1 & 2 termination selection

8.2 Jumper Block JP1

JP1 is used to set the base address of the FPGA on models with data acquisition (-03A). This jumper block is not present in models without data acquisition.

Position	Function	IN (Installed)	OUT (Not Installed)
A0	FPGA Address 0	Refer below table	
A1	FPGA Address 1	Refer below table	
A2	FPGA Address 2	Refer below table	
A3	FPGA Address 3	Refer below table	
***Default Mode**			

FPGA Base Addresses				
FPGA Address	**A0**	**A1**	**A2**	**A3**
0x100	IN	IN	IN	IN
0x120	IN	IN	IN	OUT
0x140	IN	IN	OUT	IN
0x180	IN	IN	OUT	OUT
0x200	IN	OUT	IN	IN
0x240*	***IN****	***OUT****	***IN****	***OUT****
0x280	IN	OUT	OUT	IN
0x2C0	IN	OUT	OUT	OUT
0x300	OUT	IN	IN	IN
0x340	OUT	IN	IN	OUT
0x380	OUT	IN	OUT	IN
0x3C0	OUT	IN	OUT	OUT
0x400	OUT	OUT	IN	IN
Reserved	OUT	OUT	IN	OUT
Reserved	OUT	OUT	OUT	IN
Reserved	OUT	OUT	OUT	OUT
	***Default Setting**			

Note: Base address must be selected based on options available on installed COM.

The following image shows the jumper configuration for FPGA address **0x240***

8.3 Jumper Block JP2 – LVDS Backlight

JP2 Jumpers are provided to select the voltage level of the LVDS display and backlight. This feature is not supported in Geode, so this jumper block is not applicable and should not be used.

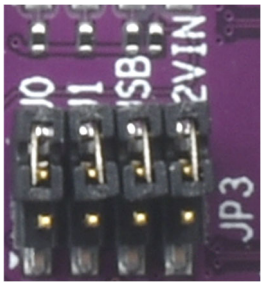
8.4 Jumper Block JP3

JP3 Jumpers Configuration are provided select expansion configuration pins for the FPGA, USB port assignment, and Power input option.
The two jumpers for the FPGA configuration are reserved for future feature enhancements and are not currently used.
The USB jumper selects whether USB port 6 is connected to the USB interface from COMe Type AB connector is multiplex to mPCIe and PCIe/104 connector. Board can be powered with 18V-36V wide input or 12V fixed supply.

Position	Function	IN	OUT
U0	FPGA Config 0	NA	***NA****
U1	FPGA Config 1	NA	***NA****
USB	USB SEL	Minicard	***PCIe104****
12VIN	Wide Input SEL	12V Fixed	***Wide Input****

***Default Setting**

The following image shows the all jumpers are in “OUT” mode. Which selects PCIe104 and Wide input voltage.



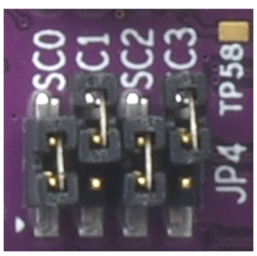
8.5 Jumper Block JP4 – Serial Port Protocol

JP2 Jumpers are provided to select the mode of serial ports 1, 2, 3 & 4. Ports are configured in pairs, since each pair shares the same transceiver IC. SC0 and SC1 jumpers are used to select mode for serial ports 1 & 2, and SC2 and SC3 jumpers are used to select mode for serial ports 3 & 4. The configuration is as shown below:

Position	Ports	RS232	RS485	RS422	Internal Loopback
SC0	1&2	***IN****	OUT	OUT	IN
SC1	1&2	***OUT****	IN	OUT	IN
SC2	3&4	***IN****	OUT	OUT	IN
SC3	3&4	***OUT****	IN	OUT	IN

***Default Setting**

The following image shows jumper configuration in RS232 mode.



8.6 Jumper Block JP5

JP2 Jumpers are provided to select the voltage level and Pullup/pull down configuration of the DIO. By default, the DIOs are 3.3 Volts and are pulled down. The configuration is as shown below:

Position	Function	IN	OUT
5V	DIO Voltage Level	5V	
3V3	DIO Voltage Level	3.3V*	
PU	DIO Pull up Enable	Enabled	Disabled
PD	DIO Pull down Enable	Enabled*	Disabled

***Default setting**

Note: Make sure 5V and 3V3 Jumper are not IN at same time.

Following image shows the jumper configuration to select 3.3V and PD enable.

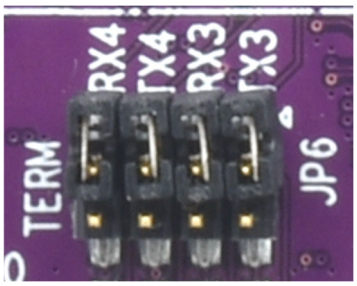
8.7 Jumper Block JP6

JP2 Jumpers are provided to enable and disable the 120 ohm termination of serial ports3-4. The configuration is as shown below:

Position	Function	IN	OUT
TX*3*	Serial Port3 TX Termination	Enabled	***Disabled****
RX*3*	Serial Port3 RX Termination	Enabled	***Disabled****
TX*4*	Serial Port4 TX Termination	Enabled	***Disabled****
RX*4*	Serial Port4 RX Termination	Enabled	***Disabled****

***Default setting**

The following image shows the jumper configuration to disable all four terminations by keeping all jumpers OUT.



8.8 Jumper Block JP7

JP2 Jumpers are provided to enable and disable the 120 ohm termination of serial ports1-2. The configuration is as shown below:

Position	Function	IN	OUT
TX1	Serial Port1 TX Termination	Enabled	***Disabled****
RX1	Serial Port1 RX Termination	Enabled	***Disabled****
TX2	Serial Port2 TX Termination	Enabled	***Disabled****
RX2	Serial Port3 RX Termination	Enabled	***Disabled****

***Default setting**

The following image shows the jumper configuration where all terminations are disabled by keeping all jumpers OUT.