JASPER

COM Express Type 6 Carrier Board and SBC

User Manual

Revision 1.32
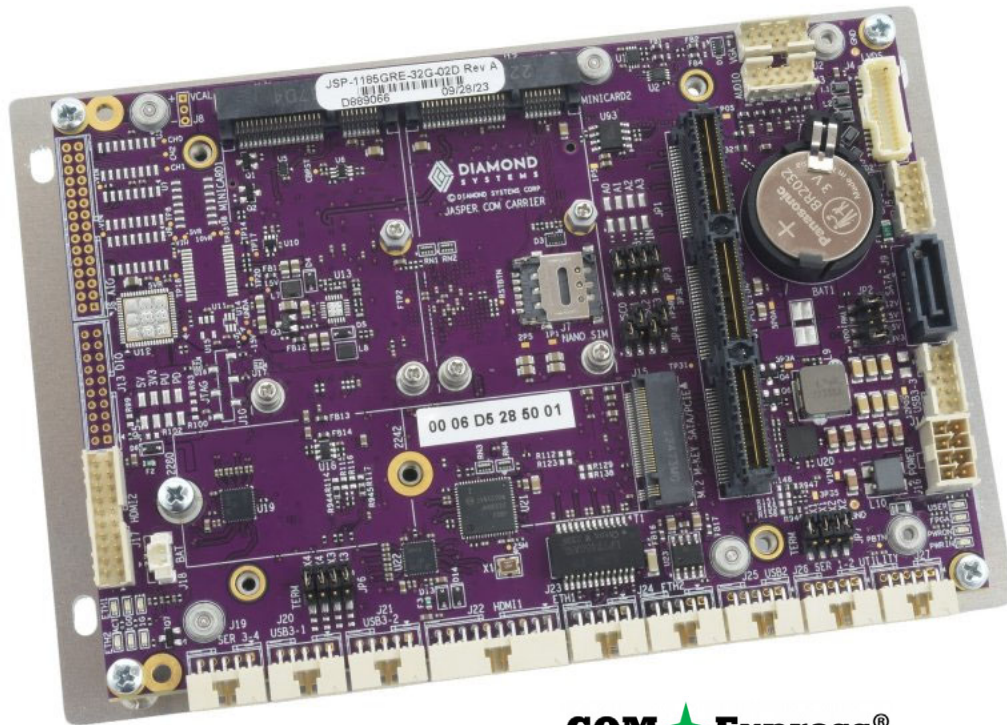
Contents

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

Diamond Systems boards are designed with complex circuitry and electronic components that are ESD-sensitive. This increases the likelihood of the boards incurring accidental damage during handling, installation, and connection to other equipment.

It is highly recommended that the following precautionary measures and best practices be observed in sequential order:

Wear an anti-static Wristband/Strap or/and an antistatic Lab Coat or/and Rubber-soled shoes.

Spread anti-static mats over the table or work surface or/and anti-static mats on the floor.

Unpack components and remove them from their anti-static bags only when they are ready to be used.

Avoid ungrounded surfaces such as plastic, carpets, floors, or tables, in the work area.

Handle boards by the edges and their metal mounting brackets. Avoid touching components on the boards and the edge connectors that connect to expansion slots.

The following information describes common causes of failure found on boards and components returned to Diamond Systems for repair. It is provided as a guideline to avoid accidental damage.

ESD Damage: This type of damage is typically impossible to detect because there is no visual sign of failure or damage. In this type of damage, the board eventually stops functioning because of some defective components. 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.

Damage During Handling or Storage: Physical damage on boards also occur due to mishandling. A common observation is that of a screwdriver slipping on the board during installation, causing a gouge on the PCB surface, cutting signal traces or damaging components.

Another common observation is damaged board corners, indicating the board was dropped. This may or may not cause damage to the circuitry, depending on components located near the edges. Most Diamond System boards are designed with a minimum 25 mils clearance between the board edge and component pad. The ground/power planes are located a minimum of 20 mils from the edge to avoid possible shorting from this type of damage. However, these design rules do not prevent damage in all situations.

Sometimes boards are stored in racks with slots that grip the edge of the board. This is a common practice for board manufacturers. Though Diamond Systems boards are resilient to damages, the components located close to the board edges can be damaged or even knocked off the board if the board lies tilted in the rack.

Diamond Systems recommends that all its boards be stored only in individual ESD-safe packaging units. If multiple boards are stored together, they should be contained in bins with dividers placed between the boards. Do not pile boards on top of each other or cram too many boards within a small location. This can cause damage to connector pins or fragile components.

Bent Connector Pins: This type of problem can be resolved by re-bending the pins to their original shape using needle-nose pliers.

The most common cause of a bent connector pin is when the board is pulled off a stack by tugging it at angles from one end of the connector to the other, in an effort to release it off the stack. Tugging the board off the stack in this manner can bend the pin(s) significantly.

A similar situation can occur when pulling a ribbon cable off a pin header. If the pins are bent too severely, bending them back can cause them to weaken or break. In this case, the connector must be replaced.

Power Damages: There are various causes of power-specific damages that can occur while handling the board. Some common causes such as –a metal screwdriver tip slipping, or a screw dropping onto the board while it is powered-up, causes a short between a power pin and a signal pin on a component.

These faults can cause over-voltage/power supply problems besides other causes described below.

To avoid such damages, assembly operations must be performed when the system is powered off.

Power Supply Wired Backwards: Diamond Systems power supplies and boards are not designed to withstand a reverse power supply connection. This will destroy almost all ICs connected to the power supply. In this case, the board will likely be irreparable and must be replaced. A chip destroyed by reverse or excessive power will often have a visible hole or show some deformation on the surface due to vaporization inside the package.

Overvoltage on Analog Input: If a voltage applied to an analog input exceeds the power specification of the board, the input multiplexer and/or parts behind it can be damaged. Most Diamond Systems boards will withstand an erroneous connection of up to 36V on the analog inputs, even when the board is powered off, but not on all boards, and not under all conditions.

Overvoltage on Analog Output: If an Analog output is accidentally connected to another output signal or a power supply voltage, the output can be damaged. On most Diamond boards, a short circuit to ground on an analog output will deter any damage to the board.

Overvoltage on Digital I/O Line: If a Digital I/O signal is connected to a voltage above the maximum specified voltage, the digital circuitry can be damaged. The acceptable voltage range, on most Diamond Systems boards connected to digital I/O signals is 0-5V, with overvoltage protection up to 5.5V (-0.5 to 5.5V). Overvoltage beyond this limit can damage the circuitry.

Other considerations are Logic Signals, which are typically generated between 12V to 24V.

If a Digital I/O Line of 12V to 24V is connected to a 5V logic chip, the chip will be damaged, and the damage could extend to other chips in the circuit.

IMPORTANT!   Always check twice before Powering Up!

2 INTRODUCTION

2.1 Jasper Product Overview

This Product is a COM Express Compact/Basic type 6 carrier board with PCIe104. 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", matching the 3.5-inch form factor in size and mounting hole pattern. 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.

A special feature of Jasper is that most I/O connectors are located along the front edge. This makes it possible to design and build I/O boards that mate directly to Jasper without the use of cables, to reduce size and increase ruggedness for rugged systems applications.

Jasper Carrier Board Feature List

Feature	Description	Connector Type
Power	15V-36V wide input or 12V fixed supply (Selected using Jumper configuration at JP3)	8 Position Vertical Connector Header (J16)
RTC	3V power input for RTC functionality	On board battery 2032 holder Or 2 Position Vertical Connector Header (J18)
Ethernet	ETH-1 10/100/1000Mbps from COM module	10 Position RA Connector Header (J23)
	ETH-2 10/100/1000Mbps via I210 Ethernet controller	10 Position RA Connector Header (J24)
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	10 Position Vertical Connector Header (J3)
USB	2x USB 2.0	10 Position RA Connector Header (J25)
	3x USB3.0 / USB2.0	10 Position Connector Header (J20, J21, J14)
Serial Ports	4 ports Software configurable RS-232/422/485 through SP336 transceivers or 2 RS232 only	10 Position RA Connector Header (J19, J26)
Display	2x HDMI	20 Position Connector Header (J17, J22)
	1x VGA (Based on the COMe module)	10 Position RA Connector Header (J2)
	1x Dual Channel 24-bit LVDS port with 3.3V / 5V power option	30 Position RA Connector Header (J4)
LCD Backlight	LCD backlight power and control signals with 5V / 12V power option	Surface Mount 6 Position Connector Receptacle (J29)

Analog/Digital IO	16 Single ended/ 8 Differential ended Ain 4 Aout	30 Position Vertical Connector Header (J6) 20 Position Vertical Connector Header (J13)
	22 Programmable direction digital I/O, 3.3V/5V logic compatible	
PCIe104	4 PCIe x1 ports, 1x PCIe x16	156 Position Vertical Header (J1)
GPIO	4 GPI, 4 GPO	10 Position Right Angle Connector Header (J5)
Others (Utility)	I2C, Reset Button, Power Button	10 Position Vertical Connector Header (J27)

Operating System Support

Windows 10; Ubuntu; Linux	
Form-Factor	4.000" x 5.750"
Cooling Mechanism	Conduction cooling with bottom side heat spreader (target heat spreader height 13mm as per COM express specification)
Power Input Range	15V-36V wide range input or Fixed 12V +/-10% supply
Operating Temperature Range	-40°C to +85°C ambient (final system capability depends on the COM installed)

2.2   Baseboard Variants

Feature	Baseline JSP-BB01D	Full-Feature JSP-BB02D	Full Feature w/ DAQ JSP-BB03A
Gigabit Ethernet	1	2	2
Minicard socket	2	2	2
M.2 socket	1	1	1
SATA connector	1	1	1
HDMI	2	2	2
VGA*	1	1	1
LVDS	1	1	1
USB 3.0	3	3	3
USB 2.0	2	2	2
Serial	2x RS-232	4x RS-232/422/485 (Jumper for protocol selection)	4x RS-232/422/485 (SW control for protocol selection)
PCIe104	No	Yes	Yes
Audio	No	1	1
Analog/Digital IO	No	No	16 SI/8 DE Ain 4 Aout 22 DIO
Others	4 GPI, 4 GPO I2C Reset & Power Button	4 GPI, 4 GPO I2C,1x RS232 Reset & Power Button	4 GPI, 4 GPO I2C, 1x RS232 Reset & Power Button

*Based on the COMe Module

2.3 Jasper Ordering Guide

The table below lists the available standard configurations for the carrier board. As the board can work with multiple COMs, new COMs are tested and added regularly, so check the Diamond website for currently available SBC processor options. In general, when a new COM is added, OS support will also be available for the current versions of Windows and Ubuntu Linux.

JSP-BB01D	Jasper COM Carrier, low-cost model, 12V or 15-36VDC In
JSP-BB02D	Jasper COM Carrier, PCIe/104 expansion, Digital I/O, 12V or 15-36VDC In
JSP-BB03A	Jasper COM Carrier, PCIe/104 and Data Acquisition, 12V or 15-36VDC In
JSP-1185G7E-64G-02D	JSP-BB02D with Intel 11th Gen Core i7, 64GB RAM, Heat Spreader
JSP-1185G7E-64G-03A	JSP-BB03A with Intel 11th Gen Core i7, 64GB RAM, Heat Spreader
JSP-1185GRE-32G-02D	JSP-BB02D with Intel 11th Gen Core i7-1185GRE, 32GB RAM Soldered, Heat Spreader
SDK-JSP-1185G7E-LNX64	Linux 64-bit Software Development Kit for Jasper SBC with 11th Gen Core i7 (Inclusive of OS, Instruction for flashing, USB2.0 8GB Flash drive, M.2 2242 SATA 64GB wide temperature flash disk)
SDK-JSP-1185G7E-WE1064	Windows 10 64-bit Software Development Kit for Jasper SBC with 11th Gen Core i7 (Inclusive of OS, Instruction for flashing, USB2.0 8GB Flash drive, M.2 2242 SATA 64GB wide temperature flash disk)
SDK-JSP-1185GRE-LNX64	Linux 64-bit Software Development Kit for Jasper SBC with 1185GRE processor (Inclusive of OS, Instruction for flashing, USB2.0 8GB Flash drive, M.2 2242 SATA 64GB wide temperature flash disk)
SDK-JSP-1185GRE-WE1064	Windows 10 64-bit Software Development Kit for Jasper SBC with 1185GRE processor (Inclusive of OS, Instruction for flashing, USB2.0 8GB Flash drive, M.2 2242 SATA 64GB wide temperature flash disk)
DK-JSP-1185G7E-LNX64	Development Kit: Jasper 11th Gen Core i7 SBC with DIO, 64GB RAM, Linux 64-bit OS
DK-JSP-1185G7E-WE1064	Development Kit, Jasper SBC, 1185G7E CPU, Windows 10 64-Bit OS
CK-JSP-01	CK-JSP-01 cable kit

2.4   Product Photos
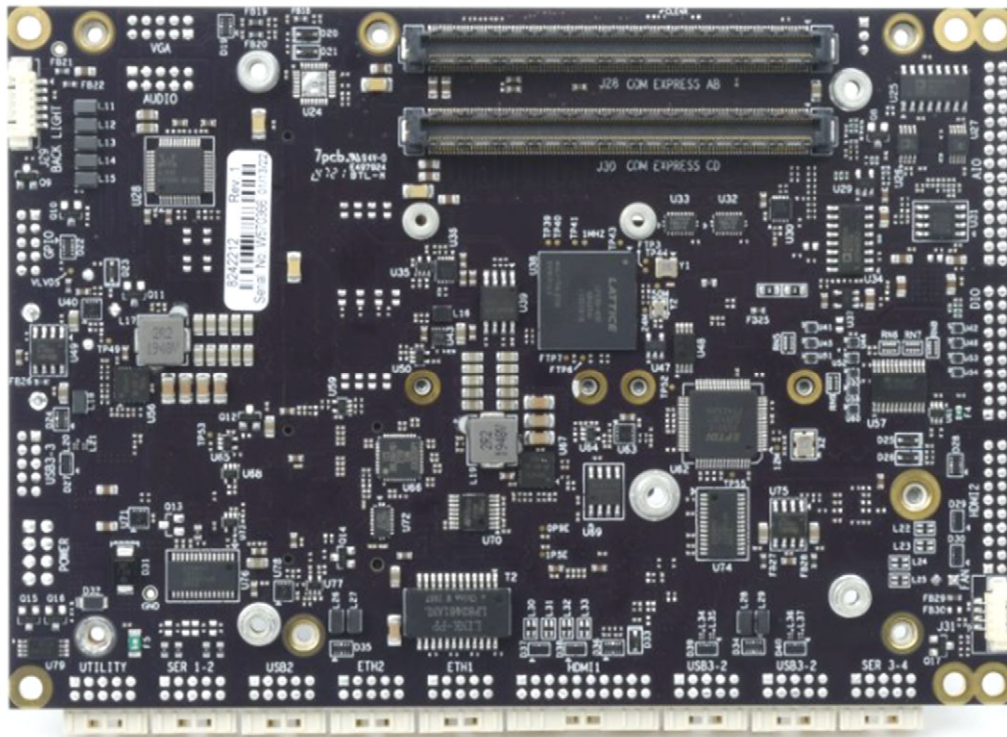
Figure 1: COM module installation side
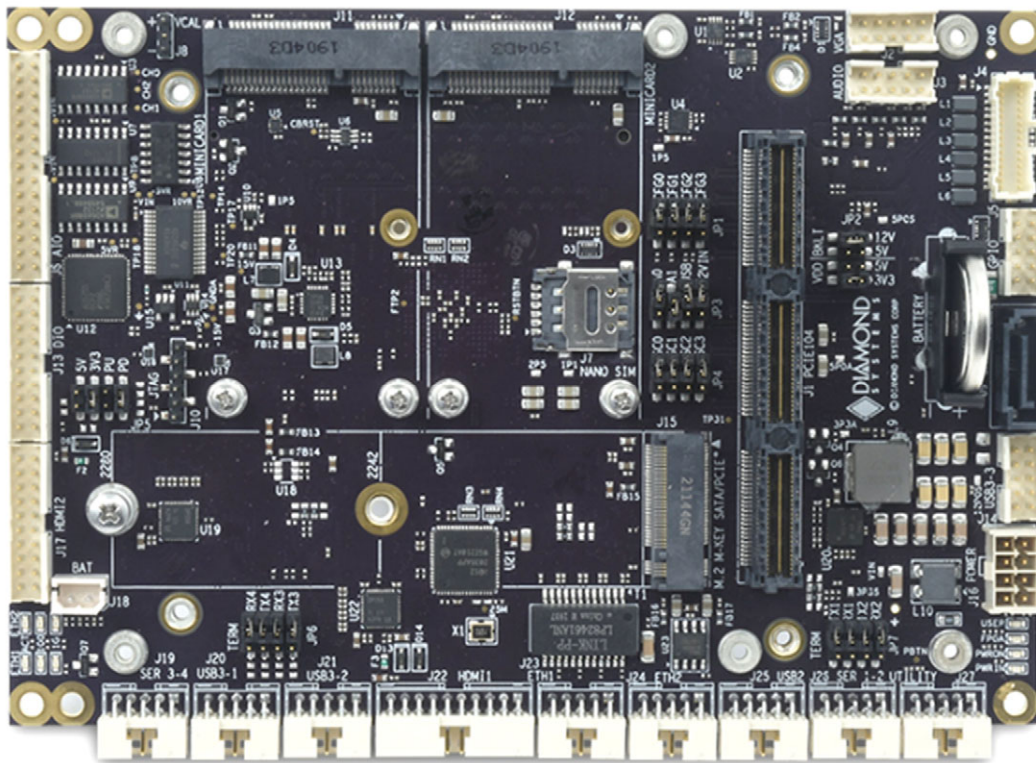
Figure 2: I/O expansion side

JASPER carrier board

COM Express module *

COM Express heat spreader

JASPER mounting plate
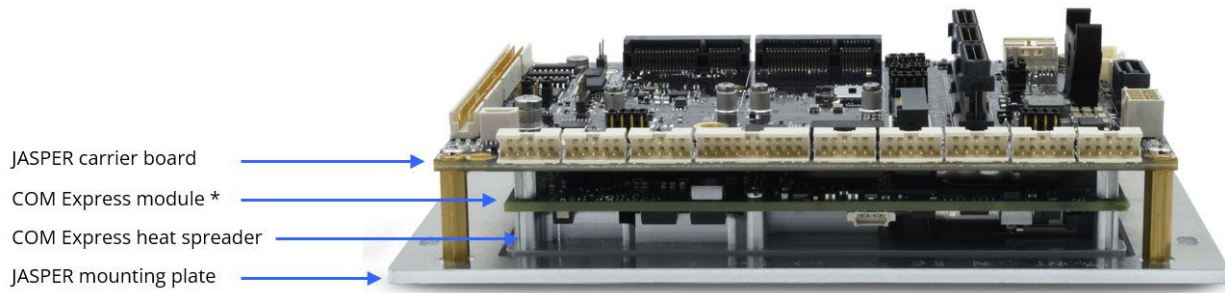
* The COM Express module may be either a Basic size 95x125mm
or a Compact size 95x95mm, depending on the model of Jasper.

Figure 3: Side view showing COM Express module and heat spreader.
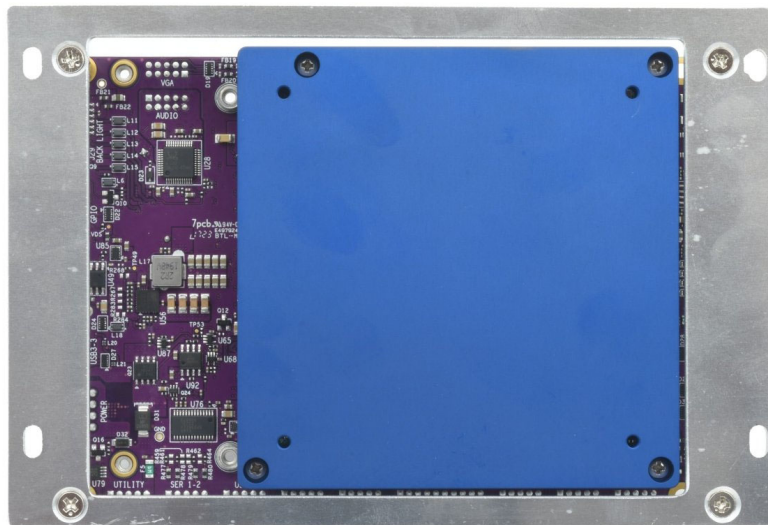
Figure 4: Bottom view showing Compact size COM heat spreader nested in mounting plate.

3 BLOCK DIAGRAMS

3.1 Carrier Board Block Diagram

The following Block Diagram illustrates the key functional block of the JASPER COM Express Carrier board. The diagram shows all available features. Exact implemented features depend on the installed COM.
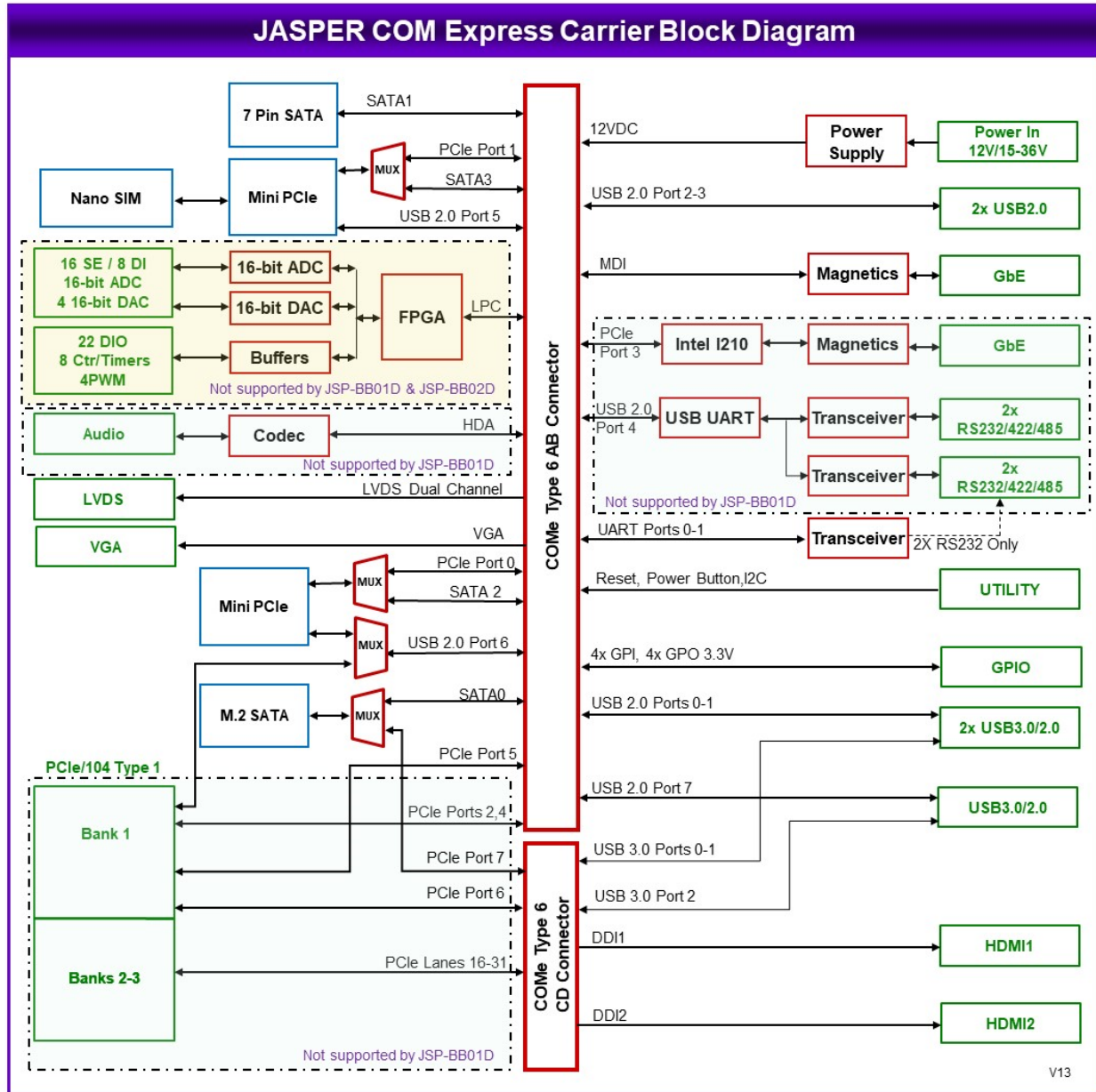
Figure 5: JASPER COM Express Carrier Board Block Diagram

3.2 Jasper with Winsystems COMET6-1100 COM Module
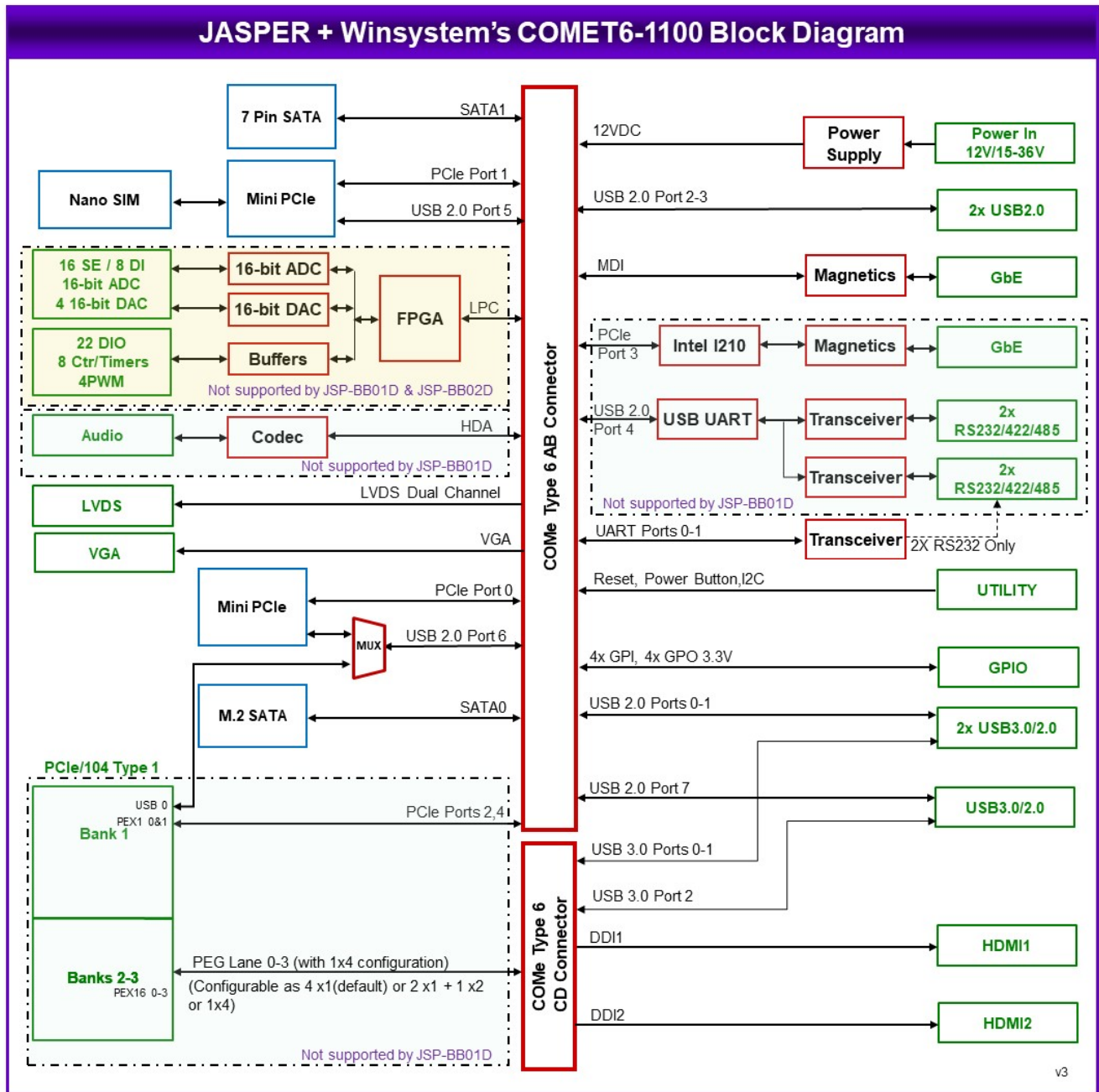
Figure 6: Jasper with Winsystems COMET6-1100 COM Module

3.3 Jasper with Arbor EmETXe-i92U1 COM Module
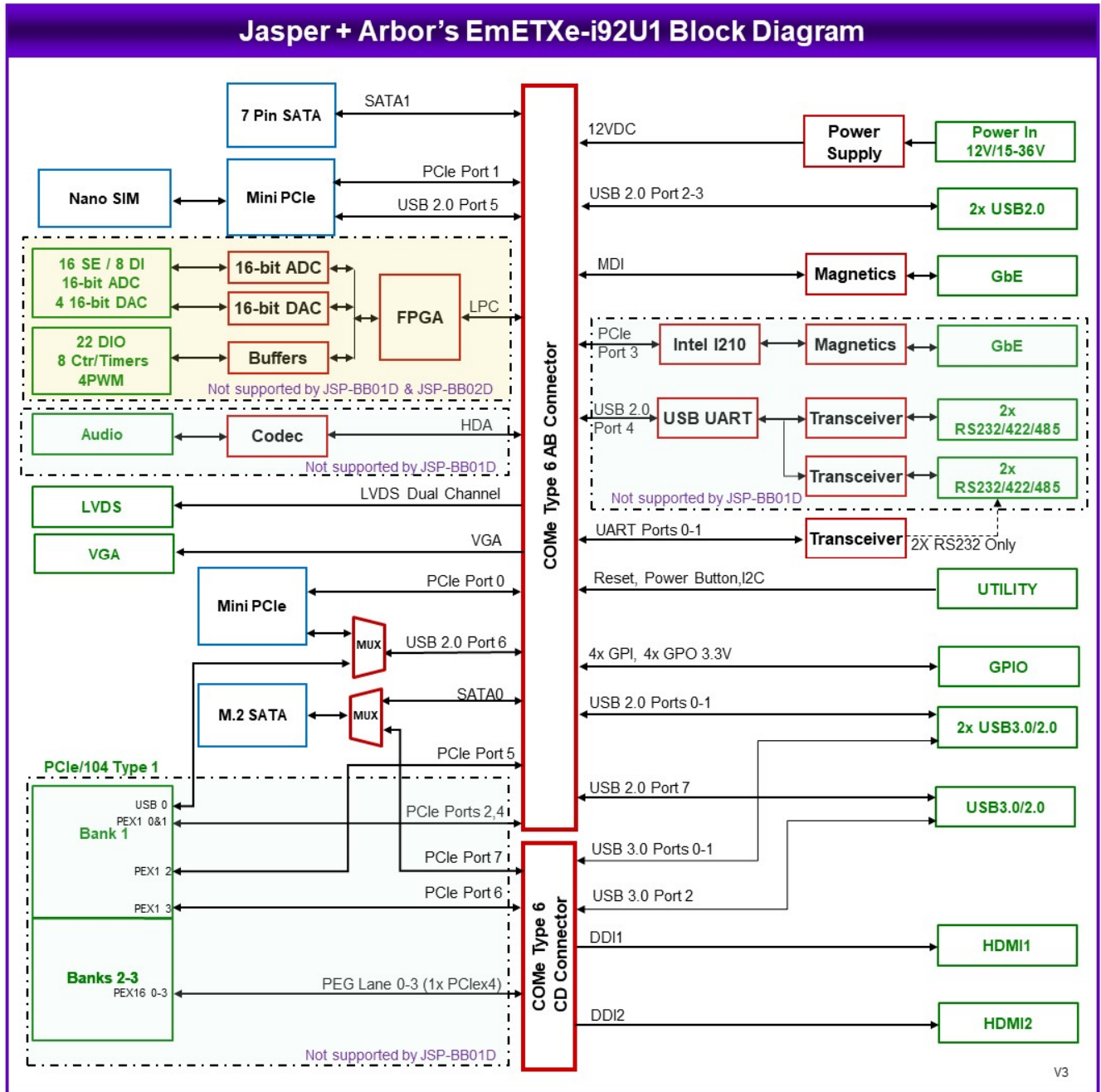
Figure 7: Jasper with Arbor EmETXe-i92U1 COM Module

4 FUNCTIONAL OVERVIEW

The following section provides functional details of the key subsystems implemented on Jasper.

4.1 COM Express Carrier Board

Jasper supports COM Express Compact (95x95mm) / Basic (95x125mm) type 6 modules. 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.

4.2 Power Supply Specifications

The board is powered from a wide input voltage range of 15V-36V wide range input or Fixed 12V +/-5% supply. This is done using jumper setting available on JP3.

All required supply voltages for the board are derived from the 15V-36V wide range input or Fixed 12V +/-5% DC input. These power supplies are sized to meet or exceed the below ratings to support add-on features.

12V	5V	3.3V	Feature
3.6	0.5		COM Express Module
		1.5	M.2
	1		USB2.0Ports
		2.6	PCIe minicard socket
	2.7		USB 3.0 Ports
1	2	1.5	PCIe104
	0.1	0.1	Utility Connector
1.1	1	1	LVDS/LCD

4.3 Ethernet Ports

Jaspersupports 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 connected through x1 PCIe lane from the COM module. Each port has on-board magnetics. Both Ethernet ports are terminated at two DSC standard 2x5 pin headers.

On-board LEDs are provided for Link, Activity, and Speed on each port. The LEDs are located along the left bottom edge of the board.

4.4 PCIe Link Routing

Jasper's PCIe x1 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

4.5 SATA M.2 Socket

Jasper 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 3 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.

4.6 USB

Jasper supports 2 USB2.0 ports and 3 USB 3.0/USB 2.0 ports from the COM. 2x 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	USB2.0 Header
Port 4	USB to Quad UART
Port 5	Minicard Socket2
Port 6	Minicard Socket1 / PCIe104
Port 7	USB3.0 Header 3

4.7 Audio

The HD audio from the COM module is converted to analog audio using an Audio Codec. Line IN, Line OUT and Mic signals are terminated on a 2x5 pin header.

4.8 LVDS LCD

Jasper supports a 24-bit dual channel LVDS display with a 2x15 vertical latching connector. A separate backlight supply connector provides LCD backlight supply and PWM control. Backlight supply will be derived from the main power input.

4.9 HDMI

Jasper offers two HDMI 2.0 video outputs. HDMI ports are made available on two 2x10 2mm pitch pin header. SN65DP159RSBT IC is used for DP++ to HDMI level translation.

4.10 Serial Ports

Jasper supports 4 serial ports using a USB to Quad UART controller (FT4232HL) in Full feature variant (JSP BB02D and JSP BB03A) and 2 RS232 ports on Low-cost baseboard variants (JSP BB01D). The four serial ports are available on two 2x5 pin headers. 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.

In Low-cost version (JSP BB01D) two RS232 (only) ports are made available at one of the 2x5 pin header.

4.11 Data Acquisition

Jasper 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 that managed the data acquisition circuit. This pin header is for factory use only and should not be accessed by the user.

Pin #	Signal
1	VCC
2	Ground
3	TCK
4	TDO
5	TDI
6	TMS

Features of the DAQ circuit 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. The circuit occupies a contiguous area on both sides of the PCB so that this area can be replaced with a different circuit in the future.

4.12 Backup Battery

An onboard 2032 coin cell battery holder is provided to maintain the system real-time clock. A 1x2 connector is provided to enable the use of an external battery for rugged applications.

This is used on a battery backed internal RTC circuit in COM Module that keeps system time and date as well as certain system setup parameters. The board can boot and function properly without a backup battery installed.

4.13 Trusted Platform Module

The board contains circuitry to support TPM 1.2/2.0 standard compliant functionality. Most COMs used on Jasper have TPM already included, so the carrier board TPM circuit is not installed by default. It can be added as a backup solution in cases where the installed COM does not have integrated TPM.

4.14 Utility

The board offers a 2x5 utility connector, Power Button, Reset button and I2C interface.

It provides 500mA fused 3.3V supply.

Power Button is an active low input signal (momentary pulse triggering less than a second) used to wake up the system from sleep state or soft shutdown.

Also, in generic, long press of power button more than 4 seconds will override system to soft shutdown (S5 state). This time interval depends on the COM Module's design aspects.

I/O level of this signal is defined to be 3.3V as per the COM specification.

System Reset is an active low request for Module to reset and reboot. The logic level of this signal is 3.3V as per the COM specification.

4.15 GPIO Header

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

General purpose input and outputs pins are defined to be in push-pull CMOS configuration with 3.3V levels as in COM specification.

These are directed to / from COM module to the J5 GPIO connector on Jasper with no pullup or pull-down resistors mounted on carrier board.

It provides 500mA fused 3.3V supply.

4.16 Minicard Socket

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

Jasper 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.

4.17 PCIe104 Expansion

The board offers I/O expansion with a full-size 3-bank PCIe104 connector with 22mm stacking height. This taller height is intended to allow for installed minicards and cabling below the PCIe/104 board.

The PCIe/104 connector supports up to four PCIe x1 ports on the first bank of the PCIe104 connector (referred to as the OneBank connector) and x16 PEG port on the 2nd and 3rd bank. The PCIe ports availability depends on the COM express module installed.

One of the USB2.0 (Port 6) is muxed with minicard 2 can be selected using jumper configuration at JP3.

LED Indicators

Jasper provides the following LED indicators. All LEDs are located near a board edge or their respective features. All LEDs are labeled in silkscreen with their function.

Function	LED color and operation	PCB label
Power input	Input power applied	PWR IN
Power Good	Green LED for Power Good indication	PWR ON
Done LED	FPGA is configured successfully	DONE
User LED	Blue, controlled by processor FPGA	USER
Ethernet:	Green LED for Link, activity, and speed for each port	LINK, ACT, SPEED

JSP BB01D: This variant has LED indications on Power input (PWR IN), Power good (PWR ON) and ethernet (LINK, ACT, SPEED).

JSP BB02D: This variant has LED indications on Power input (PWR IN), Power good (PWR ON) and ethernet (LINK, ACT, SPEED).

JSP BB03A: This variant has LED indications on Power input (PWR IN), Power good (PWR ON), Done LED (DONE), User LED (USER) and ethernet (LINK, ACT, SPEED).

LED Block-1	
1st LED (Left most)	PWRIN
2nd LED (Left middle most)	PWRON
3rd LED (Right middle most)	FPGA
4th LED (Right most)	USER
LED Block-2	
1st Row 1st LED	ETH1 ACT
1st Row 2nd LED	ETH2 ACT
2nd Row 1st LED	ETH1 100
2nd Row 2nd LED	ETH2 100
3rd Row 1st LED	ETH1 1G
3rd Row 2nd LED	ETH2 1G

5 MECHANICAL DRAWINGS

The illustrations below provide dimensions of the key connectors and features of Jasper.
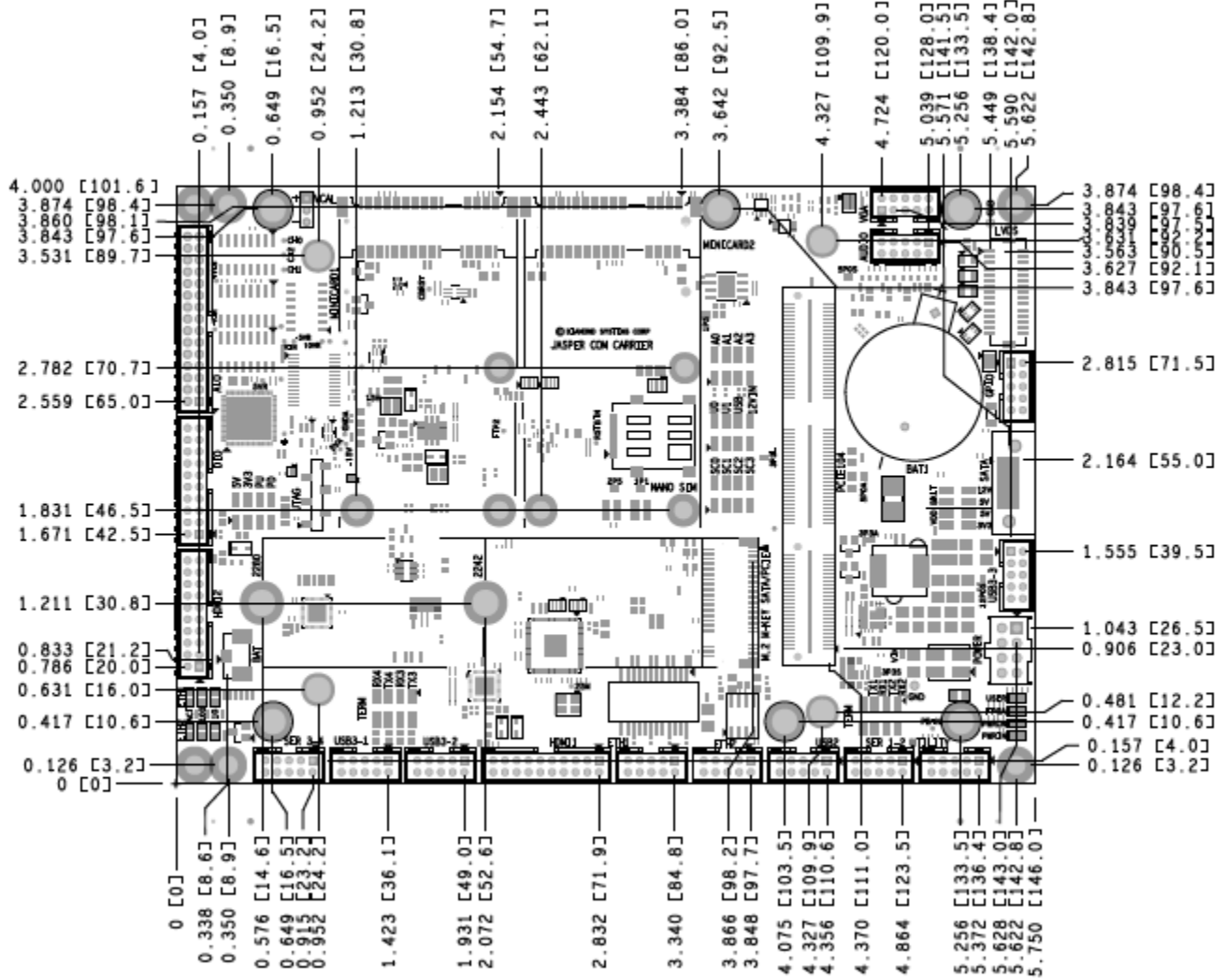
Figure 8: Mechanical Top View
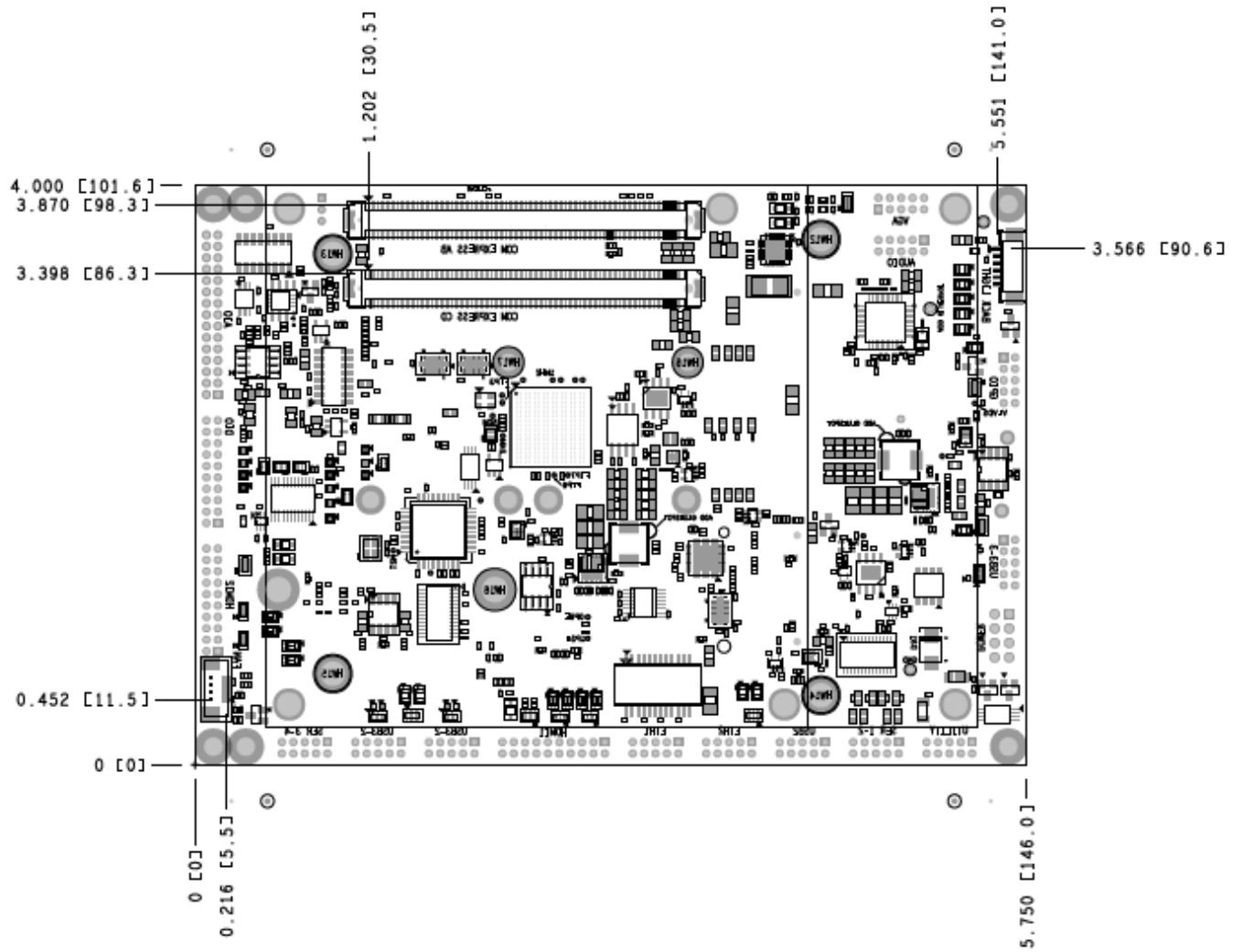
Figure 9: Mechanical Bottom View

Tallest Component above Jasper : 15.57mm

Jasper PCB Thickness : 2.36mm

Jasper & COM Module B2B : 8mm

COM Module with Heat Spreader : 13mm

Mount Plate thickness: 3mm
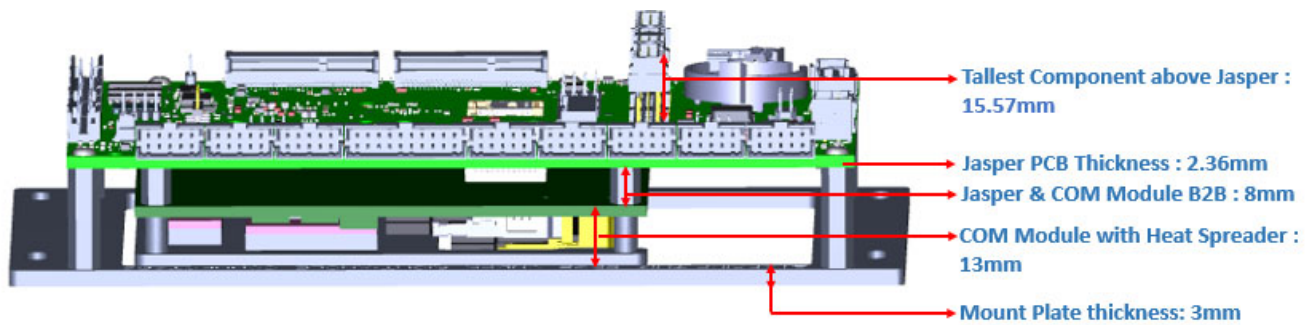
Figure 10: Jasper Stacking Height Details

6 CONNECTOR AND JUMPER LOCATIONS
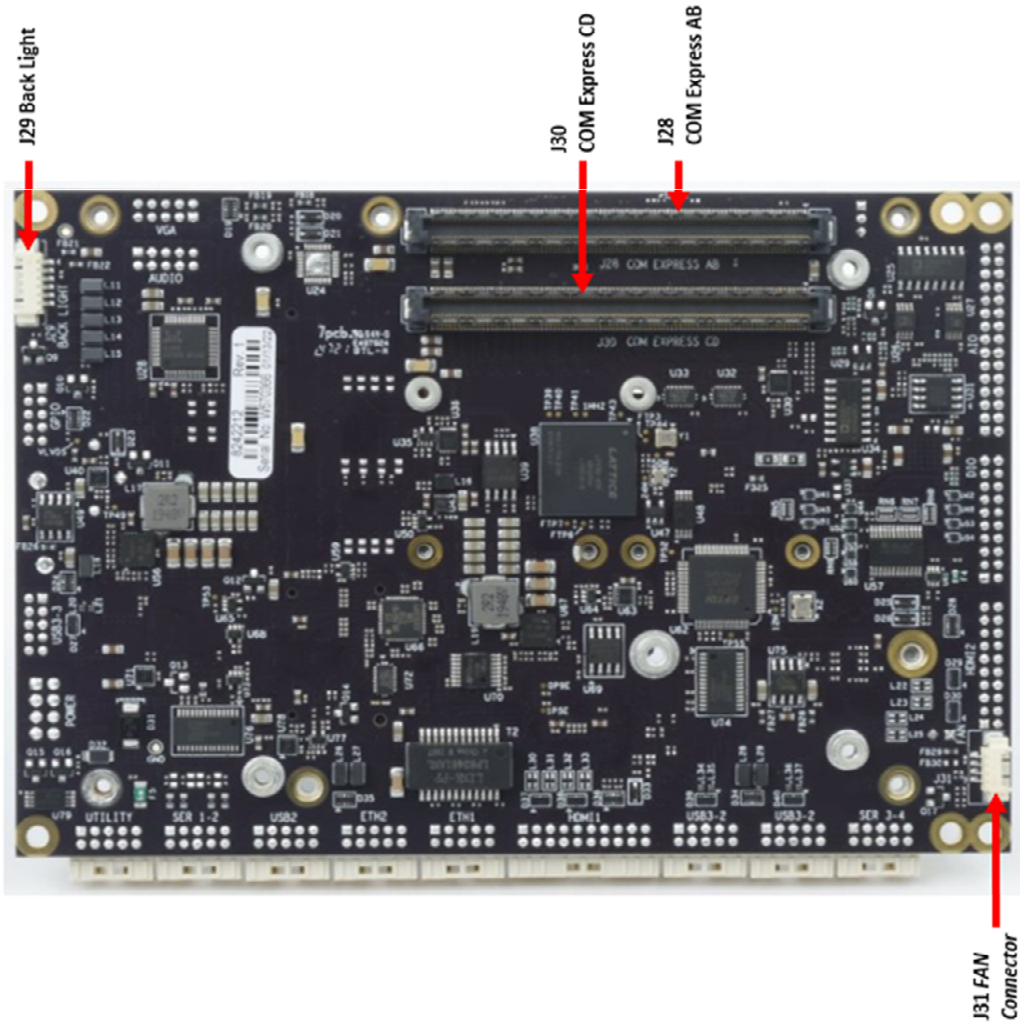
Figure 11: COM module installation side
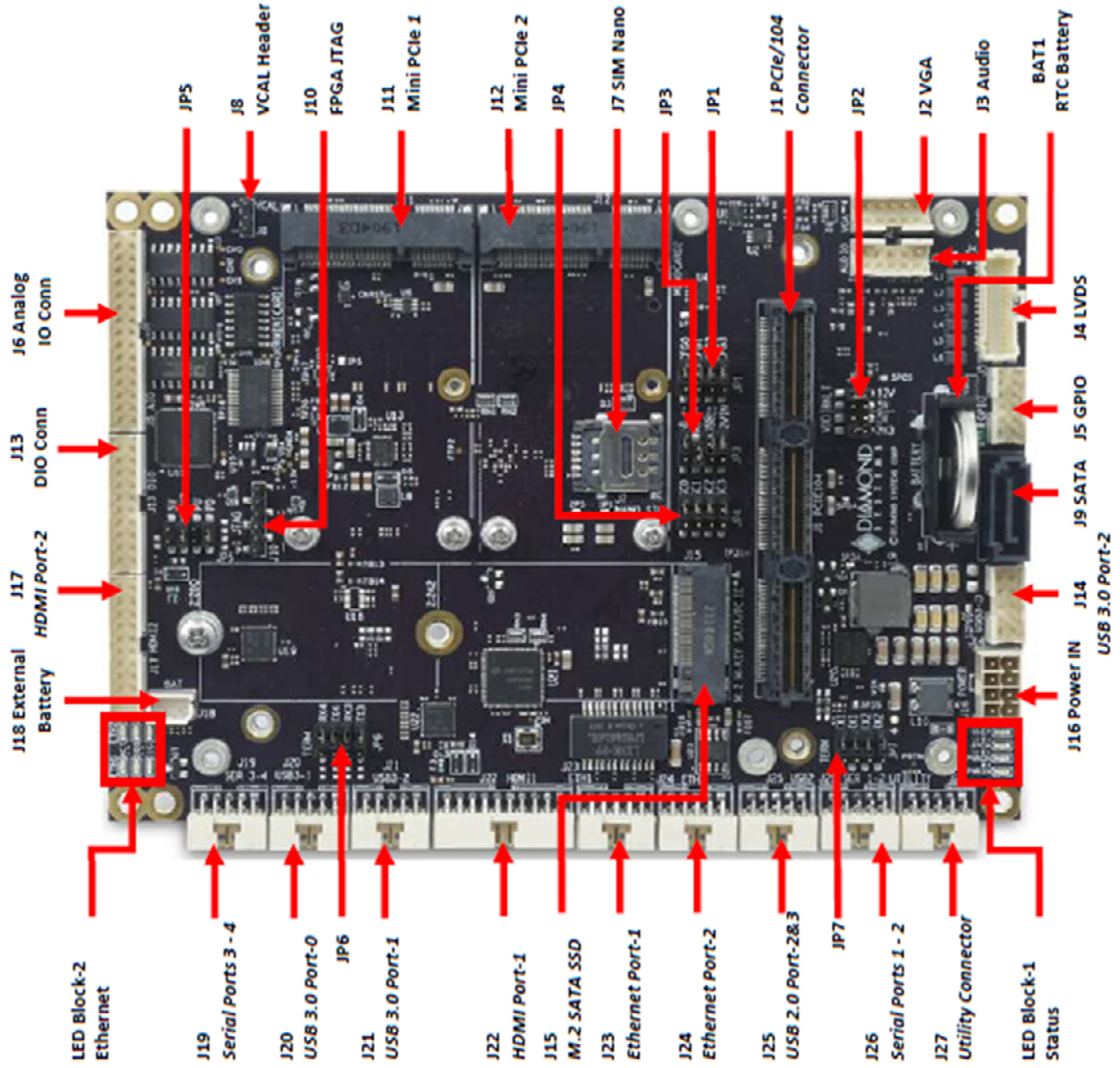
Figure 12: I/O expansion side

6.1 Jumper Selection

The Jumper blocks on the Jasper board can be configured to enable/disable or alter the default signal routing settings on the circuit, using Jumper shunts.

The following table describes the Jumper Blocks on the baseboard.

Jumper	Description
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
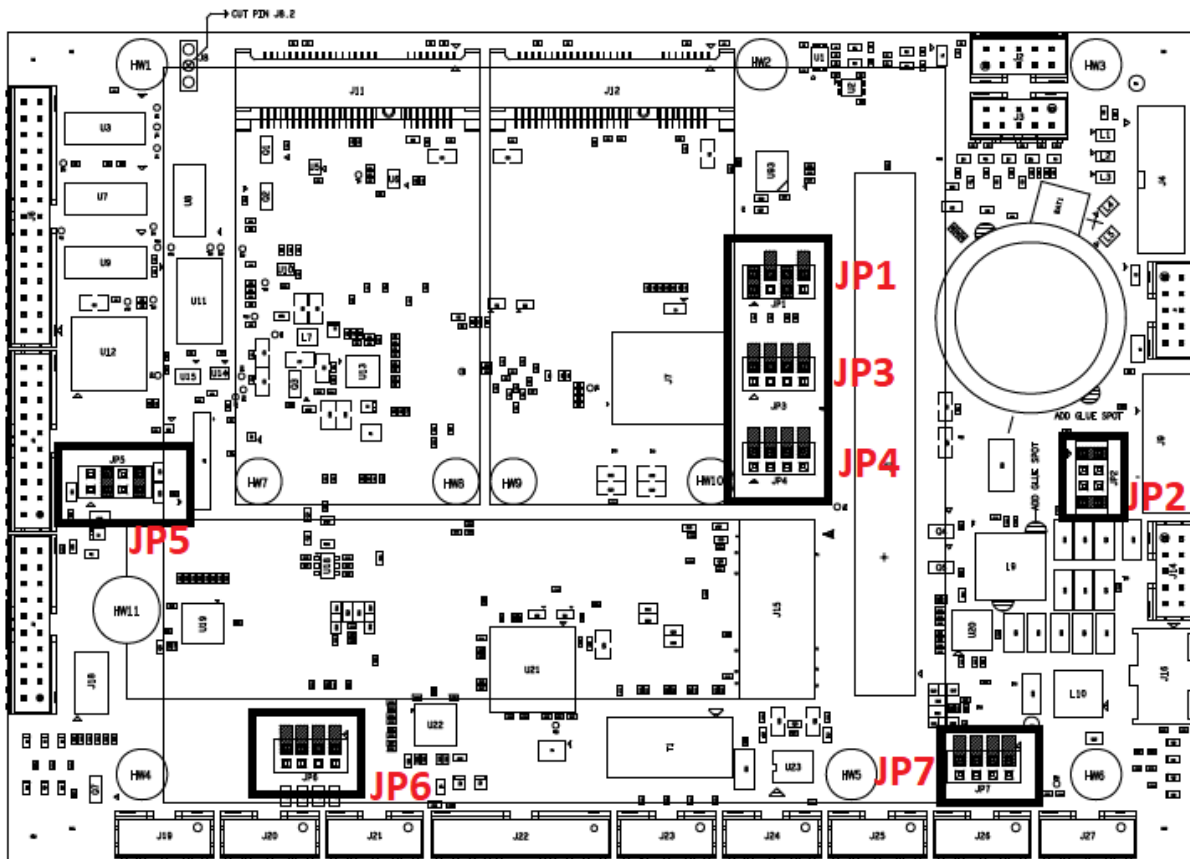
Figure 13: Default Jumper Locations

6.1.1 Jumper Block JP1

This jumper block sets the base address of the FPGA in model JSP-BB03A with data acquisition. 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 Addresses				
FPGA Address	**A0**	**A1**	**A2**	**A3**
FPGA Address - 0X100	IN	IN	IN	IN
FPGA Address - 0X120	IN	IN	IN	OUT
FPGA Address - 0X140	IN	IN	OUT	IN
FPGA Address - 0X180	IN	IN	OUT	OUT
FPGA Address - 0X200	IN	OUT	IN	IN
FPGA Address - 0X240	*IN**	*OUT**	*IN**	*OUT**
FPGA Address - 0X280	IN	OUT	OUT	IN
FPGA Address - 0X2C0	IN	OUT	OUT	OUT
FPGA Address - 0X300	OUT	IN	IN	IN
FPGA Address - 0X340	OUT	IN	IN	OUT
FPGA Address - 0X380	OUT	IN	OUT	IN
FPGA Address - 0X3C0	OUT	IN	OUT	OUT
FPGA Address - 0X400	OUT	OUT	IN	IN
FPGA Address - Reserved	OUT	OUT	IN	OUT
FPGA Address - Reserved	OUT	OUT	OUT	IN
FPGA Address - Reserved	OUT	OUT	OUT	OUT
Default setting				

Note: 1. Base address must be selected based on addresses available on the COM module used with Jasper. Check the COM user manual for available addresses.

6.1.2 Jumper Block JP2

JP2 Jumpers are provided to select the voltage level of the LVDS display and backlight.

Position	Function	IN (Installed)	OUT (Not Installed)
12V	LCD Backlight Voltage	*12V**	-
5V	LCD Backlight Voltage	5V	-
5V	LCD VDD Voltage	5V	-
3V3	LCD VDD Voltage	*3.3V**	-
Default Mode			

6.1.3 Jumper Block JP3

JP3 Jumpers are provided to select the configuration pins of the FPGA, USB interface and Power IN option. USB interface from COMe Type AB connector is multiplex to mPCIe and PCIe/104 connector. Board can be powered with 15V-36V wide input or 12V fixed supply.

Position	Function	IN (Installed)	OUT (Not Installed)
U0	FPGA Config 0	TBD	*TBD**
U1	FPGA Config 1	TBD	*TBD**
USB	USB SEL	Minicard	*PCIe104**
12VIN	Wide Input SEL	12V Fixed	*Wide Input** *(15-36V)*
Default Mode			

6.1.4 Jumper Block JP4

JP4 Jumpers are provided to select the mode of serial ports 1, 2, 3 & 4. 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.

Position	Port	RS232	RS485	RS422	Internal Loop
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					

Applicable only for JSP-BB02D model. JP4 Jumper is software overridden by FGPA for JSP-BB03A model.

6.1.5 Jumper Block JP5

JP5 Jumpers are provided to select the voltage level and Pullup/pull down configuration of the DIO on models with data acquisition. By default, the DIOs are 3.3V and pulled down.

Position	Function	IN (Installed)	OUT (Not Installed)
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			

6.1.6 Jumper Block JP6

JP6 Jumpers Configuration are provided enable and disable the termination of serial ports3-4. This feature is not available in model JSP-BB01D.

Position	Function	IN (Installed)	OUT (Not Installed)
TX3	Serial Port3 TX Termination	Enabled	**Disabled***
RX3	Serial Port3 RX Termination	Enabled	**Disabled***
TX4	Serial Port4 TX Termination	Enabled	**Disabled***
RX4	Serial Port4 RX Termination	Enabled	**Disabled***
Default setting			

6.1.7 Jumper Block JP7

JP7 Jumpers Configuration are provided enable and disable the termination of serial ports1-2. This jumper block is not available in model JSP-BB01D. On that model, the serial ports are fixed in RS-232 configuration.

Position	Function	IN (Installed)	OUT (Not Installed)
TX1	Serial Port1 TX Termination	Enabled	**Disabled***
RX1	Serial Port1 RX Termination	Enabled	**Disabled***
TX2	Serial Port2 TX Termination	Enabled	**Disabled***
RX2	Serial Port2 RX Termination	Enabled	**Disabled***
Default setting			

7 CONNECTOR PINOUTS

7.1 Power In (J16)

A 2x4 latching pin header is used for power input.

GND	**1**	**5**	VIN
GND	**2**	**6**	VIN
GND	**3**	**7**	VIN
GND	**4**	**8**	VIN

VIN = 12V or 15V to 36V

Connector PN: IPL1-104-01-L-D-K

Connector Type: 2.54mm pitch 2x4 box header TH vertical

Mating Cable PN: 6980512

7.2 Battery (J18)

An external battery may be connected to support real-time clock and BIOS custom settings.

1	Battery V+
2	Ground

Connector PN: 053398-0271

Connector Type: 2 position 1.25 mm pitch vertical SMD header

Mating Cable PN: DSC no. 4713001 (CR2032 Battery with Wire Leads)

DSC no. 6980529 (Battery cable with free wires)

7.3 Fan Connector (J31)

An external fan can be connected as a thermal solution for effective heat dissipation where conduction cooling is not possible.

1	Fan PWM
2	Fan Tach
3	Fan PWR (5V/12V)
4	GND

Connector PN: Molex 0532610471

Connector Type: 4 pin Right Angle Surface Mount shrouded pin header

Recommended Fan PN: ASB0305HP-00CP4

7.4 Ethernet (J23 & J24)

There are two identical on-board connectors for 10/100/1000 BASE T Ethernet.

	1	2	
Chassis Gnd	1	2	NC
DA+	3	4	DA-
DB+	5	6	DB-
DC+	7	8	DC-
DD+	9	10	DD-
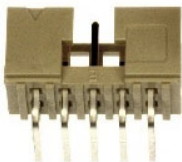
Connector PN: 98464-G61-10ULF

Connector Type: latching 2x5 2mm pitch RA shrouded pin header.

Mating Cable PN: 6980604

7.5 Audio (J3)

This connector provides the audio signals.

LineOut-L	1	2	LineOut-R
GND_Audio	3	4	GND_Audio
LineIn-L	5	6	LineIn-R
GND_Audio	7	8	GND_Audio
NC	9	10	MIC_IN

Connector PN: 98414-G06-10LF

Connector Type: latching 2x5 2mm pitch vertical shrouded pin header.

Mating Cable PN: 6980608

7.6 USB 2.0 Ports (J25)

The Carrier board supports 2 USB2.0 ports on a 2x5 connector. The pinout for the connector is as shown below:

NC	1	2	Shield
USB1 Pwr-	3	4	USB0 Pwr-
USB1 Data+	5	6	USB0 Data+
USB1 Data-	7	8	USB0 Data-
USB1 Pwr+	9	10	USB0 Pwr+
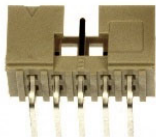
Connector PN: 98464-G61-10ULF

Connector Type: latching 2x5 2mm pitch RA shrouded pin header

Mating Cable PN: 6980602

7.7 USB 3.0 Ports (J14, J20, J21)

The Carrier board supports 3 USB3.0 ports on identical on-board 2x5 connectors. The connector supports backward compatibility to USB2.0. Pinout of the same is shown below:

USB_SSRX0-	**1**	**2**	Shield
USB_SSRX0+	**3**	**4**	USB Pwr-
USB Pwr-	**5**	**6**	USB2 D+
USB_SSTX0-	**7**	**8**	USB2 D-
USB_SSTX0+	**9**	**10**	USB Pwr+
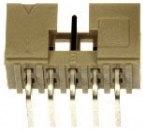
Connector PN (J20, J21): 98464-G61-10ULF

Connector Type: latching 2x5 2mm pitch RA shrouded pin header on the front edge of the board.

Mating Cable PN: 6980603
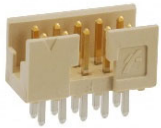
Connector PN (J14): 98414-G06-10LF

Connector Type: latching 2x5 2mm pitch vertical shrouded pin header on the right edge of board.

Mating Cable PN: 6980603

7.8   LVDS (J4)

The LCD panel power is jumper-selectable for 3.3V (default) or 5V.

VDD 5V/3.3V	**1**	**2**	VDD 5V/3.3V
VDD 5V/3.3V	**3**	**4**	VDD 5V/3.3V
CLK+ Odd	**5**	**6**	CLK+ Even
CLK- Odd	**7**	**8**	CLK-Even
Ground	**9**	**10**	Ground
D0+ Odd	**11**	**12**	D0+ Even
D0- Odd	**13**	**14**	D0- Even
D1+ Odd	**15**	**16**	D1+ Even
D1- Odd	**17**	**18**	D1- Even
D2+ Odd	**19**	**20**	D2+ Even
D2- Odd	**21**	**22**	D2- Even
D3+ Odd	**23**	**24**	D3+ Even
D3- Odd	**25**	**26**	D3- Even
Ground	**27**	**28**	Ground
DDC CLK	**29**	**30**	DDC DATA
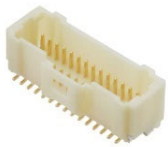
Connector PN: 5011903027

Connector Type: 1mm pitch vertical shrouded pin header
Mating Cable: Custom depending on the target display

7.9   LCD Backlight (J29)

The brightness control for the LCD backlight has a weak pull-down resistor to ensure maximum brightness when it is not connected externally. This signal may be controlled by a PWM pin on the COM module. A jumper selects the source of the brightness signal to this pin.

1	Power +5V/+12V, jumper selectable
2	Power (same as pin 1)
3	Ground
4	Ground
5	Enable (GPIO output), 0 = off, open circuit = on
6	Brightness, 0-3.3VDC variable; 0V = max, 3.3V = min

Connector PN: JS-1147H-06

Connector Type: 1x6 1.25mm pitch SMD RA header
Mating Cable: Custom depending on the target display.

7.10 HDMI (J17 & J22)

The board supports 2 HDMI ports. HDMI signals come through a level translator IC from COM module over DDI lanes.

Data 2+	**1**	**2**	Ground
Data 2-	**3**	**4**	Data 1+
Ground	**5**	**6**	Data 1-
Data 0+	**7**	**8**	Ground
Data 0-	**9**	**10**	Clock+
Ground	11	12	Clock-
CEC	13	14	Reserved
DDC Clock	15	16	DDC Data
Ground	17	18	+5V
Hot Plug Detect	19	20	Chassis ground
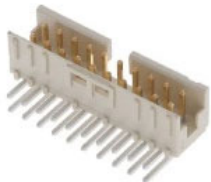
Connector PN (J22): 98464-G61-20ULF

Connector Type: latching 2x10 2mm pitch RA shrouded pin header on the front edge of board

Mating Cable PN: 6980605
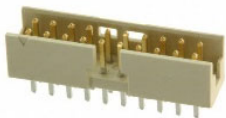
Connector PN (J17): 98414-F06-20ULF

Connector Type: latching 2x10 2mm pitch vertical shrouded pin header on the left edge of board.

Mating Cable PN: 6980605

7.11 VGA (J2)

VGA availability is dependent on the installed COM.

VGA_RED	1	2	GND
VGA_GREEN	3	4	NC
VGA_BLUE	5	6	GND
VGA_HSYNC	7	8	VGA_DDC_DATA
VGA_VSYNC	9	10	VGA_DDC_CLK
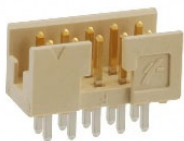
Connector PN: FCI 98414-G06-10LF

Connector Type: latching 2x5 2mm pitch vertical shrouded pin header

Mating Cable PN: 6981084

7.12 Serial ports (J19 & J26)

The COM express carrier board supports 4 serial ports available at 2 headers in full feature variant and only 2 RS232 ports at one of the connectors in low-cost variant.

Each connector supports 2 serial ports. Pinouts are as follows depending on the mode of the transceiver (RS232/ RS422/ RS485).

RS-232:

	1	2	
TX1	1	2	RTS1
RX1	3	4	CTS1
GND	5	6	GND
TX2	7	8	RTS2
RX2	9	10	CTS2

RS-422:

	1	2	
TX1+	1	2	TX1-
RX1+	3	4	RX1-
GND	5	6	GND
TX2+	7	8	TX2-
RX2+	9	10	RX2-

RS-485:

	1	2	
TX1/RX1+	1	2	TX1/RX1-
NC	3	4	NC
GND	5	6	GND
TX2/RX2+	7	8	TX2/RX2-
NC	9	10	NC
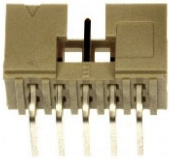
Connector PN: 98464-G61-10ULF

Connector Type: latching 2x5 2mm pitch right angle shrouded pin header

Mating Cable PN: 6980601

7.13 M.2 Socket (J15)

M.2 2280/2242 supports SATA / PCIe using a high-speed mux. All TX/RX signals are with respect to the host. TX on the socket drives RX on the installed module, and RX on the socket is driven by TX on the installed module. The mounting standoffs of the module installation site is not connected to ground.

Gnd	1	2	+3.3V
Gnd	3	4	+3.3V
	5	6	MEM_ERS_2
	7	8	MEM_ERS_1
	9	10	
	11	12	+3.3V
	13	14	+3.3V
	15	16	+3.3V
	17	18	+3.3V
	19	20	
Gnd	21	22	
	23	24	
	25	26	
Gnd	27	28	
	29	30	
	31	32	
Gnd	33	34	
	35	36	
	37	38	
Gnd	39	40	
SATA_RX+/ PCIe RX-	41	42	
SATA_RX-/PCIe RX+	43	44	
Gnd	45	46	
SATA_TX-/PCIe TX-	47	48	
SATA_TX+/PCIe TX+	49	50	PERST#
Gnd	51	52	PCIe CLKREQ#
PCIe REFCLK-	53	54	PCIe WAKE#
PCIe REFCLK+	55	56	
Gnd	57	58	
	KEY		
	67	68	
	69	70	+3.3V
Gnd	71	72	+3.3V
Gnd	73	74	+3.3V
Gnd	75		
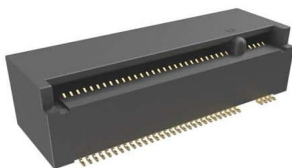
Connector PN: 10128798-005RLF

Connector Type: 75 Position Female Connector M.2 (NGFF) Mini Card

7.14 SATA (J9)

The SATA connector is an industry-standard vertical connector. This connector does not support the Pin 7 Vcc option for an installed SATA DOM.

1	Ground
2	Transmit +
3	Transmit -
4	Ground
5	Receive -
6	Receive +
7	Ground

Connector PN: 0678005025
Connector Type: 7 Position SATA Header, Shrouded Connector

Mating Cable PN: 6989101

7.15 Analog I/O (J6)

The VIO pins on the analog and digital I/O connectors are tied together on the board and provide access to jumper-selectable 3.3V / 5V system voltage rail through a polyswitch resettable fuse. The fuse is rated for ~100mA maximum sustained current.

Signal	Pin	Pin	Signal
Ain 0	29	30	Ain 8
Ain 1	27	28	Ain 9
Ain 2	25	26	Ain 10
Ain 3	23	24	Ain 11
Ain 4	21	22	Ain 12
Ain 5	19	20	Ain 13
Ain 6	17	18	Ain 14
Ain 7	15	16	Ain 15
Analog Ground	13	14	Analog Ground
Aout 0	11	12	Aout 1
Aout 2	9	10	Aout 3
Analog Ground	7	8	DIO C0
DIO C1	5	6	DIO C2
DIO C3	3	4	DIO C4
VIO (fused)	1	2	Digital Ground

Connector PN: 98414-G06-30LF
Connector Type: latching 2x15 2mm pitch vertical shrouded pin header
Mating Cable PN: 6980612

7.16 Digital I/O (J13)

VIO (fused)	1	2	DIO A0
DIO A1	3	4	DIO A2
DIO A3	5	6	DIO A4
DIO A5	7	8	DIO A6
DIO A7	9	10	DIO B0
DIO B1	11	12	DIO B2
DIO B3	13	14	DIO B4
DIO B5	15	16	DIO B6
DIO B7	17	18	DIO C5
Ground	19	20	Ground
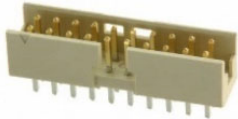
Connector PN: 98414-F06-20ULF
Connector Type: latching 2x10 2mm pitch vertical shrouded pin header
Mating Cable PN: 6980611

7.17 Utility (J27)

The utility connector provides access to power button, reset signal, I2C and RTC power. It provides fused 3.3V power that can be used for powering customer auxiliary circuitry.

M_2_MEM_ERS_GPIO	**1**	**2**	I2C Clock
Ground	**3**	**4**	I2C Data
Ground	**5**	**6**	Power Button
V_3P3_RTC	**7**	**8**	Ground
3.3V Fused 0.5A	**9**	**10**	Reset
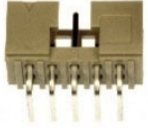
Connector PN: 98464-G61-10ULF
Connector Type: latching 2x5 2mm pitch right angle shrouded pin header
Mating Cable PN: 6980609

7.18 GPIO Connector (J5)

The GPIO connector provides access to 4 GPO and 4 GPI along with fused 3.3V power that can be used for powering customer auxiliary circuitry. GPI3 is muxed with the TPM IRQ and is available as general purpose input to the COM module by default.

GPI0	**1**	**2**	GPO0
GPI1	**3**	**4**	GPO1
GPI2	**5**	**6**	GPO2
GPI3	**7**	**8**	GPO3
3.3V Fused 0.5A	**9**	**10**	GND
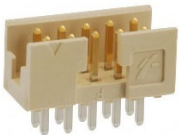
Connector PN: 98414-G06-10LF
Connector Type: latching 2x5 2mm pitch vertical shrouded pin header
Mating Cable PN: 6980609

7.19 PCIe Mini Card (J11 & J12)

Minicard supports SATA / PCIe using a high-speed mux. All TX/RX signals are with respect to the host. TX on the socket drives RX on the installed module, and RX on the socket is driven by TX on the installed module. The mounting standoffs of the module installation site are not connected to ground.

PCIe WAKE#	1	2	+3.3V
	3	4	Gnd
	5	6	+1.5V
PCIe CLKREQ#	7	8	
Gnd	9	10	
PCIe CLK-	11	12	
PCIe 1 Clk+	13	14	
Gnd	15	16	
	KEY		
	17	18	Gnd
	19	20	
Gnd	21	22	PCIe Reset-
PCIe RX-/SATA RX+	23	24	+3.3V
PCIe RX+/SATA RX-	25	26	Gnd
Gnd	27	28	+1.5V
Gnd	29	30	SMB Clk
PCIe TX-/SATA TX-	31	32	SMB Data
PCIe TX+/SATA TX+	33	34	Gnd
Gnd	35	36	USB D-
Gnd	37	38	USB D+
+3.3V	39	40	Gnd
+3.3V	41	42	
Ground	43	44	
	45	46	
	47	48	+1.5V
	49	50	Gnd
	51	52	+3.3V

Connector PN: 1759547-1
Connector Type: 52 Position Female Connector PCI Express Mini Card

7.20 PCIe104 Connector (J1)

This connector is implemented to facilitate I/O expansion modules to be plugged onto the carrier board. 4 PCIe x1 lanes are connected to the first bank PCIe104 connector. A x16 PCIe lane is connected from the COM CD connector to the second and third banks of PCIe104 connector. These signals are only functional when supported by the installed COM.

USB-OC#	1		2	PCIe Reset#
+3.3V	3		4	+3.3V
	5		6	USB_0+
	7		8	USB_0-
Ground	9		10	Ground
PCIe1 Tx+	11		12	PCIe0 Tx+
PCIe1 Tx-	13		14	PCIe0 Tx-
Ground	15		16	Ground
PCIe2 Tx+	17		18	PCIe3 Tx+
PCIe2 Tx-	19		20	PCIe3 Tx-
Ground	21	+5V TAB	22	Ground
PCIe1 Rx+	23		24	PCIe0 Rx+
PCIe1 Rx-	25		26	PCIe0 Rx-
Ground	27		28	Ground
PCIe2 Rx+	29		30	PCIe3 Rx+
PCIe2 Rx-	31		32	PCIe3 Rx-
Ground	33		34	Ground
PCIe1 Clk+	35		36	PCIe0 Clk+
PCIe1 Clk-	37		38	PCIe0 Clk-
+5VSB	39		40	+5VSB
PCIe2 Clk+	41		42	PCIe3 Clk+
PCIe2 Clk-	43		44	PCIe3 Clk-
Ground(Dir)	45		46	PWRGOOD
SMB Data	47		48	PEx_CLK+
SMB Clk	49		50	PEx_CLK-
SMB Alert#	51		52	PSON#

	53		54	
Ground	55		56	Ground
PEx16 Tx8+	57		58	PEx16 Tx0+
PEx16 Tx8-	59		60	PEx16 Tx0-
Ground	61		62	Ground
PEx16 Tx9+	63		64	PEx16 Tx1+
PEx16 Tx9-	65		66	PEx16 Tx1-
Ground	67		68	Ground
PEx16 Tx10+	69	+5V TAB	70	PEx16 Tx2+
PEx16 Tx10-	71		72	PEx16 Tx2-
Ground	73		74	Ground
PEx16 Tx11+	75		76	PEx16 Tx3+
PEx16 Tx11-	77		78	PEx16 Tx3-
Ground	79		80	Ground
PEx16 Tx12+	81		82	PEx16 Tx4+
PEx16 Tx12-	83		84	PEx16 Tx4-
Ground	85		86	Ground
PEx16 Tx13+	87		88	PEx16 Tx5+
PEx16 Tx13-	89		90	PEx16 Tx5-
Ground	91		92	Ground
PEx16 Tx14+	93		94	PEx16 Tx6+
PEx16 Tx14-	95		96	PEx16 Tx6-

Ground	97		98	Ground
PEx16 Tx15+	99		100	PEx16 Tx7+
PEx16 Tx15-	101		102	PEx16 Tx7-
Ground	103		104	Ground
	105		106	
Ground	107		108	Ground
PEx16 Rx8+	109		110	PEx16 Rx0+
PEx16 Rx8-	111		112	PEx16 Rx0-
Ground	113		114	Ground
PEx16 Rx9+	115		116	PEx16 Rx1+
PEx16 Rx9-	117		118	PEx16 Rx1-
Ground	119		120	Ground
PEx16 Rx10+	121		122	PEx16 Rx2+
PEx16 Rx10-	123		124	PEx16 Rx2-
Ground	125	+5V TAB	126	Ground
PEx16 Rx11+	127		128	PEx16 Rx3+
PEx16 Rx11-	129		130	PEx16 Rx3-
Ground	131		132	Ground
PEx16 Rx12+	133		134	PEx16 Rx4+
PEx16 Rx12-	135		136	PEx16 Rx4-
Ground	137		138	Ground
PEx16 Rx13+	139		140	PEx16 Rx5+
PEx16 Rx13-	141		142	PEx16 Rx5-
Ground	143		144	Ground
PEx16 Rx14+	145		146	PEx16 Rx6+
PEx16 Rx14-	147		148	PEx16 Rx6-
Ground	149		150	Ground
PEx16 Rx15+	151		152	PEx16 Rx7+
PEx16 Rx15-	153		154	PEx16 Rx7-
Ground	155		156	Ground
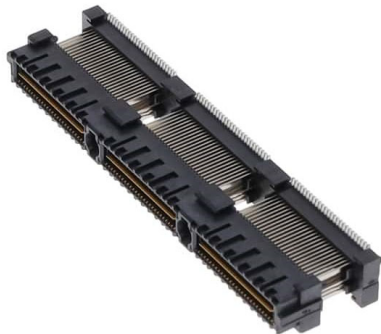
Connector PN: ASP-142781-03
Connector Type: 156 Position Connector Header, Outer Shroud Contacts

7.21 COM Express type 6 Compact / Basic connector Pinout (J28 & J30)

This is a 2-connector set. The first connector consists of rows A and B, while the second connector consists of rows C and D.

	A	B	
GND	A1	B1	GND
GBE0_MDI3-	A2	B2	GBE0_ACT#
GBE0_MDI3+	A3	B3	LPC_FRAME#
GBE0_LINK100#	A4	B4	LPC_AD0
GBE0_LINK1000#	A5	B5	LPC_AD1
GBE0_MDI2-	A6	B6	LPC_AD2
GBE0_MDI2+	A7	B7	LPC_AD3
GBE0_LINK#	A8	B8	
GBE0_MDI1-	A9	B9	
GBE0_MDI1+	A10	B10	LPC_CLK
GND	A11	B11	GND
GBE0_MDI0-	A12	B12	PWRBTN#
GBE0_MDI0+	A13	B13	SMB_CK
GBE0_CTREF	A14	B14	SMB_DAT
SUS_S3#	A15	B15	SMB_ALRERT#
SATA0_TX+	A16	B16	SATA1_TX+
SATA0_TX-	A17	B17	SATA1_TX-
	A18	B18	
SATA0_RX+	A19	B19	SATA1_RX+
SATA0_RX-	A20	B20	SATA1_RX-
GND	A21	B21	GND
SATA2_TX+	A22	B22	SATA3_TX+
SATA2_TX-	A23	B23	SATA3_TX-
	A24	B24	PWR_OK
SATA2_RX+	A25	B25	SATA3_RX+
SATA2_RX-	A26	B26	SATA3_RX-
	A27	B27	WDT
	A28	B28	
AC_SYNC	A29	B29	
AC_RST#	A30	B30	AC/HDA_SDIN0
GND	A31	B31	GND
AC_BITCLK	A32	B32	SPKR
AC_SDOUT	A33	B33	I2C_CK
BIOS_DIS0#	A34	B34	I2C_DAT
	A35	B35	
USB6-	A36	B36	USB7-
USB6+	A37	B37	USB7+
USB_6_7_OC#	A38	B38	
USB4-	A39	B39	USB5-
USB4+	A40	B40	USB5+
GND	A41	B41	GND
USB2-	A42	B42	USB3-
USB2+	A43	B43	USB3+
USB_2_3_OC#	A44	B44	USB_0_1_OC#
USB0-	A45	B45	USB1-
USB0+	A46	B46	USB1+
VCC_RTC	A47	B47	
	A48	B48	
	A49	B49	SYS_RESET#
LPC_SERIRQ	A50	B50	CB_RESET#
GND	A51	B51	GND
PCIE_TX5+	A52	B52	PCIE_RX5+
PCIE_TX5-	A53	B53	PCIE_RX5-
GPI0	A54	B54	GPO1
PCIE_TX4+	A55	B55	PCIE_RX4+

PCIE_TX4-	A56	B56	PCIE_RX4-
GND	A57	B57	GPO2
PCIE_TX3+	A58	B58	PCIE_RX3+
PCIE_TX3-	A59	B59	PCIE_RX3-
GND	A60	B60	GND
PCIE_TX2+	A61	B61	PCIE_RX2+
PCIE_TX2-	A62	B62	PCIE_RX2-
GPI1	A63	B63	GPO3
PCIE_TX1+	A64	B64	PCIE_RX1+
PCIE_TX1-	A65	B65	PCIE_RX1-
GND	A66	B66	WAKE0#
GPI2	A67	B67	
PCIE_TX0+	A68	B68	PCIE_RX0+
PCIE_TX0-	A69	B69	PCIE_RX0-
GND	A70	B70	GND
LVDS_A0+	A71	B71	LVDS_B0+
LVDS_A0-	A72	B72	LVDS_B0-
LVDS_A1+	A73	B73	LVDS_B1+
LVDS_A1-	A74	B74	LVDS_B1-
LVDS_A2+	A75	B75	LVDS_B2+
LVDS_A2-	A76	B76	LVDS_B2-
LVDS_VDD_EN	A77	B77	LVDS_B3+
LVDS_A3+	A78	B78	LVDS_B3-
LVDS_A3-	A79	B79	LVDS_BKLT_EN
GND	A80	B80	GND
LVDS_A_CLK+	A81	B81	LVDS_B_CLK+
LVDS_A_CLK-	A82	B82	LVDS_B_CLK-
LVDS_I2C _CK	A83	B83	LVDS_BKLT_CTRL
LVDS_I2C_DAT	A84	B84	VCC_5V_SBY
GPI3	A85	B85	VCC_5V_SBY
	A86	B86	VCC_5V_SBY
	A87	B87	VCC_5V_SBY
PCIE0_CK_REF+	A88	B88	BIOS_DIS1#
PCIE0_CK_REF-	A89	B89	VGA_RED
GND	A90	B90	GND
SPI_POWER	A91	B91	VGA_GRN
SPI_MSIO	A92	B92	VGA_BLU
GPO0	A93	B93	VGA_HSYNC
SPI_CLK	A94	B94	VGA_VSYNC
SPI_MOSI	A95	B95	VGA_I2C_CK
TPM_PP (N/C)	A96	B96	VGA_I2C_DAT
	A97	B97	SPI_CS#
SER0_TX	A98	B98	
SER0_RX	A99	B99	
GND	A100	B100	GND
SER1_TX	A101	B101	FAN_PWMOUT
SER1_RX	A102	B102	FAN_TACHIN
	A103	B103	
VCC_12V	A104	B104	VCC_12V
VCC_12V	A105	B105	VCC_12V
VCC_12V	A106	B106	VCC_12V
VCC_12V	A107	B107	VCC_12V
VCC_12V	A108	B108	VCC_12V
VCC_12V	A109	B109	VCC_12V
GND	A110	B110	GND

GND	C1	D1	GND

	C	D	
GND	C2	D2	GND
USB_SSRX0-	C3	D3	USB_SSTX0-
USB_SSRX0+	C4	D4	USB_SSTX0+
GND	C5	D5	GND
USB_SSRX1-	C6	D6	USB_SSTX1-
USB_SSRX1+	C7	D7	USB_SSTX1+
GND	C8	D8	GND
USB_SSRX2-	C9	D9	USB_SSTX2-
USB_SSRX2+	C10	D10	USB_SSTX2+
GND	C11	D11	GND
	C12	D12	
	C13	D13	
GND	C14	D14	GND
	C15	D15	DDI1_CTRLCLK_AUX+
	C16	D16	DDI1_CTRLDATA_AUX-
	C17	D17	
	C18	DUS	
PCIE_RX6+	C19	D19	PCIE_TX6+
PCIE_RX6-	C20	D20	PCIE_TX6-
GND	C21	D21	GND
PCIE_RX7+	C22	D22	PCIE_TX7+
PCIE_RX7-	C23	D23	PCIE_TX7-
DDI1_HPD	C24	D24	
	C25	D25	
	C26	D26	DDI1_PAIR0+
	C27	D27	DDI1_PAIR0-
	C28	D28	
	C29	D29	DDI1_PAIR1+
	C30	D30	DDI1_PAIR1-
GND	C31	D31	GND
DDI2_CTRLCLK_AUX+	C32	D32	DDI1_PAIR2+
DDI2_CTRLDATA_AUX-	C33	D33	DDI1_PAIR2-
DDI2_DDC_AUX_SEL	C34	D34	DDI1_DDC_AUX_SEL
	C35	D35	
	C36	D36	DDI1_PAIR3+
	C37	D37	DDI1_PAIR3-
	C38	D38	
	C39	D39	DDI2_PAIR0+
	C40	D40	DDI2_PAIR0-
GND	C41	D41	GND
	C42	D42	DDI2_PAIR1+
	C43	D43	DDI2_PAIR1-
	C44	D44	DDI2_HPD
	C45	D45	
	C46	D46	DDI2_PAIR2+
	C47	D47	DDI2_PAIR2-
	C48	D48	
	C49	D49	DDI2_PAIR3+
	C50	D50	DDI2_PAIR3-
GND	C51	D51	GND
PEG_RX0+	C52	D52	PEG_TX0+
PEG_RX0-	C53	D53	PEG_TX0-
	C54	D54	
PEG_RX1+	C55	D55	PEG_TX1+
PEG_RX1-	C56	D56	PEG_TX1-
	C57	D57	TYPE2#
PEG_RX2+	C58	D58	PEG_TX2+
PEG_RX2-	C59	D59	PEG_TX2-
GND	C60	D60	GND
PEG_RX3+	C61	D61	PEG_TX3+

PEG_RX3-	C62	D62	PEG_TX3-
	C63	D63	
	C64	D64	
PEG_RX4+	C65	D65	PEG_TX4+
PEG_RX4-	C66	D66	PEG_TX4-
	C67	D67	GND
PEG_RX5+	C68	D68	PEG_TX5+
PEG_RX5-	C69	D69	PEG_TX5-
GND	C70	D70	GND
PEG_RX6+	C71	D71	PEG_TX6+
PEG_RX6-	C72	D72	PEG_TX6-
GND	C73	D73	GND
PEG_RX7+	C74	D74	PEG_TX7+
PEG_RX7-	C75	D75	PEG_TX7-
GND	C76	D76	GND
	C77	D77	
PEG_RX8+	C78	D78	PEG_TX8+
PEG_RX8-	C79	D79	PEG_TX8-
GND	C80	D80	GND
PEG_RX9+	C81	D81	PEG_TX9+
PEG_RX9-	C82	D82	PEG_TX9-
	C83	D83	
GND	C84	D84	GND
PEG_RX10+	C85	D85	PEG_TX10+
PEG_RX10-	C86	D86	PEG_TX10-
GND	C87	D87	GND
PEG_RX11+	C88	D88	PEG_TX11+
PEG_RX11-	C89	D89	PEG_TX11-
GND	C90	D90	GND
PEG_RX12+	C91	D91	PEG_TX12+
PEG_RX12-	C92	D92	PEG_TX12-
GND	C93	D93	GND
PEG_RX13+	C94	D94	PEG_TX13+
PEG_RX13-	C95	D95	PEG_TX13-
GND	C96	D96	GND
	C97	D97	
PEG_RX14+	C98	D98	PEG_TX14+
PEG_RX14-	C99	D99	PEG_TX14-
GND	C100	D100	GND
PEG_RX15+	C101	D101	PEG_TX15+
PEG_RX15-	C102	D102	PEG_TX15-
GND	C103	D103	GND
VCC_12V	C104	D104	VCC_12V
VCC_12V	C105	D105	VCC_12V
VCC_12V	C106	D106	VCC_12V
VCC_12V	C107	D107	VCC_12V
VCC_12V	C108	D108	VCC_12V
VCC_12V	C109	D109	VCC_12V
GND	C110	D110	GND

Connector PN: QT002206-4131-3H

8 I/O CONNECTOR LIST & MATING CABLES

The following table provides a summary of the I/O connectors on the board.

Function	Manufacturer	Part no.	Description	DSC Mating Cable
Power in	Samtec	IPL1-104-01-L-D-K	2x4 latching box header TH vertical .1" pitch, long PCB pins	6980512
USB 2.0	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980602
USB 3.0 qty 2	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980603
USB 3.0 qty 1	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6980603
Ethernet qty 2	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980604
Serial Ports qty 2	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980601
LVDS	Molex	5011903027	2x15 1mm pitch vertical SMT shrouded header	Custom
HDMI qty 1	Amphenol	98464-G61-20ULF	2x10 2mm pitch latching RA TH header	6980605
HDMI qty 1	Amphenol	98414-F06-20ULF	2x10 2mm pitch latching vertical TH header	6980605
Backlight	Molex	JS-1147H-06	1x6 1.25mm pitch SMD RA header	Custom
External battery	Molex	0533980271	2 position 1.25mm pitch vertical SMD header	4713001 or 6980529
Analog I/O	Amphenol	98414-G06-30LF	30 Pos 1.5mm Pitch SMT vertical Latching	6980612
Digital I/O	Amphenol	98414-F06-20ULF	20 Pos 1.25mm Pitch SMT vertical Latching	6980611
Audio	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6980608
VGA	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6981084
Utility	Amphenol	98464-G61-10ULF	2x5 2mm pitch latching RA TH header	6980609
GPIO	Amphenol	98414-G06-10LF	2x5 2mm pitch latching vertical TH header	6980609
FAN	Molex	0532610471	1x4 1.25mm pitch SMD vertical header	NA
PCIe104	Samtec	ASP-142781-03	156 Pos Top Mount	NA
M.2	Amphenol	10128798-005RLF	Connector Female 67position 0.020 pitch	NA
SATA	Molex	0678005025	Connector header 7 position vertical TH	6989101
PCIe Minicard	TE	1759547-1	52-pin Minicard, full size, with PCB mount threaded spacers	NA
COM Express Compact	Foxconn	QT002206-4131-3H	220 Position Connector Plug, SMT, Outer Shroud Contacts Surface Mount Gold	NA

* Representative part; other manufacturers / part numbers are also acceptable; confirm selection with DSC

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9   JASPER VS COM MODULE INTERFACE COMPARISON LIST

Interfaces as in COM Specification	Available on Carrier Board	Available on SBC Assembly	
	Models JSP-BBxxx	Winsystems COMET6-110	Arbor EmETXe-i92U1
PCIe Port0 on AB	Minicard 1 SATA & PCIe Muxed	Yes	Yes
PCIe Port1 on AB	Minicard 2 SATA & PCIe Muxed	Yes	Yes
PCIe Port2 on AB	PCIe104 Bank 1 Lane_0	Yes	Yes
PCIe Port3 on AB	I210 Ethernet controller	Yes	Yes
PCIe Port4 on AB	PCIe104 Bank 1 Lane_1	Yes	Yes
PCIe Port5 on AB	PCIe104 Bank 1 Lane_2	No	Yes
PCIe Port6 on CD	PCIe104 Bank 1 Lane_3	No	Yes
PCIe Port7 on CD	M.2 2242/2280 SATA & PCIe supported	No PCIe; SATA only	Yes, PCIe and SATA
PEG x16 on CD	PCIe104 Bank 2 & 3	No (Only 4 Lanes available; Configurable as 4 x1(default) or 2 x1 + 1 x2 or 1x4)	No (Only 4 Lanes available; fixed configuration 1x PCIex4)

LVDS on AB	LVDS	Yes (Optional)	Yes
DDI0 on CD	HDMI 1	Yes	Yes
DDI1 on CD	HDMI 2	Yes	Yes
DDI2 on CD	Not Supported	NA	NA
VGA	VGA	Yes (Optional)	Yes

USB2.0 Port0	USB3.0 Header-1	Yes	Yes
USB2.0 Port1	USB3.0 Header-2	Yes	Yes
USB2.0 Port2	USB2.0 Header-1	Yes	Yes
USB2.0 Port3	USB2.0 Header-1	Yes	Yes
USB2.0 Port4	USB to UART	Yes	Yes
USB2.0 Port5	Minicard 2	Yes	Yes
USB2.0 Port6	Minicard 1 / PCIe104 Bank 1 Port_0	Yes	Yes
USB2.0 Port7	USB3.0 Header-3	Yes	Yes

USB3.0 Port0	USB3.0 Header-1	Yes	Yes
USB3.0 Port1	USB3.0 Header-2	Yes	Yes
USB3.0 Port2	USB3.0 Header- 3	Yes	Yes
USB3.0 Port3	Not Supported	NA	NA

*Continued in next page

SATA Port0	M.2 2242/2280 SATA & PCIe Muxed	Yes	Yes
SATA Port1	7 Pin SATA	Yes	Yes
SATA Port2	Minicard 1 SATA & PCIe Muxed	No	No
SATA Port3	Minicard 2 SATA & PCIe Muxed	No	No

HD Audio	Audio	Yes	Yes
LPC	Data acquisition circuit Model JSP-BB03A only	Yes	Yes
GbE Lan	GbE	Yes (2.5G)	Yes (1G)
UART 0	1x RS-232	Yes	Yes
UART 1	1x RS-232	Yes	Yes
4x GPI & 4x GPO	4x GPI, 4x GPO	Yes	Yes

10 MOUNTING PLATE

Jasper includes an aluminum mounting plate that enables convenient installation into an enclosure. The board assembly is mounted on the plate using M3 19mm long standoffs. Slots in the corners allow flexibility in the installed position. This is useful for installations where the front row of I/O connectors is directly mated to an I/O board.

The plate contains a cutout in the center to fit the standard heat spreader provided by the COM vendor. The COM Express standard defines a standard height for all heat spreaders, enabling the Jasper mounting plate to be used with any compliant COM heat spreader. The mounting pate is 0.9mm taller than the standard heat spreader height to allow for installing a 1mm thick thermal pad between the heat spreader and the enclosure surface for improved thermal conductivity. All standard models of Jasper include thermal pads for use in this manner.