

# Reference Manual

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## **VL-COMm-26**

Intel® Atom E6x0T-based  
Computer on Module with  
SATA, Ethernet, USB, Serial,  
Video, HD Audio, PCI Express,  
CAN, and microSD



**VERSA**LOGIC  
CORPORATION



[WWW.VERSALOGIC.COM](http://WWW.VERSALOGIC.COM)

12100 SW Tualatin Road  
Tualatin, OR 97062-7341  
(503) 747-2261  
Fax (971) 224-4708

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VersaLogic reserves the right to revise this product and associated documentation at any time without obligation to notify anyone of such changes.

## Product Revision Notes

*Revision 1.00* – Commercial release.

## Technical Support

The VL-COMm-26 support page, at <http://www.versalogic.com/private/comm26support.asp>, contains additional information and resources for this product including:

- Reference Manual (PDF format)
- Datasheets and manufacturers' links for chips used in this product
- Photograph of the circuit board
- BIOS information and upgrades

This is a private page for VL-COMm-26 users that can be accessed only by entering this address directly. It cannot be reached from the public VersaLogic website.

The VersaTech KnowledgeBase is an invaluable resource for resolving technical issues with your VersaLogic product.

[VersaTech KnowledgeBase](#)

## Related Products

[Falcon \(VL-EPU-2610\)](#). VersaLogic base board with VL-COMm-26 CPU board.

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## Description

### FEATURES AND CONSTRUCTION

The VL-COMm-26 is a feature-packed Computer-on-Module (COM) board. It is intended for systems, such as unmanned vehicles, where size, weight, and power consumption are critical design elements. Its features include:

- Intel® Atom™ E680T (1.6 GHz), E640T (1.0 GHz), or E620T (0.6 GHz custom order) processor
- Intel® EG20T Platform Controller Hub (PCH)
- COMe Type 10 Connector including:
  - One LVDS interface
  - Two SATA II ports, 3 Gb/s
  - Six USB 2.0 ports
  - One USB Client port
  - Three PCIe 1.0 lanes
  - One Intel High Definition Audio (HDA) compatible port
  - Speaker out
  - Two RS-232/422 serial ports
  - One 10BaseT/100BaseTX/1000BaseT Ethernet interface
  - One SDIO interface
  - One I<sup>2</sup>C interface
  - One SMBus interface
  - One LPC interface
- 1 GB or 2 GB soldered-on DDR2 80 MT/s RAM
- Integrated Intel® GMA600 2D/3D graphics engine
- AUX Connector including:
  - One CAN port
  - Two RS-232/422 serial ports
- One MicroSD socket
- Full ACPI support
- Heat plate or heatsink thermal solutions
- Optional mounting plate
- RoHS compliant
- Extended temperature operation
- Customization available

The VL-COMm-26 is compatible with popular operating systems including Windows 7/XP/XPe, Linux, VxWorks, and QNX (see the [VersaLogic OS Compatibility Chart](#)).

VL-COMm-26 boards are subjected to 100% functional testing and are backed by a limited two-year warranty. Careful parts sourcing and US-based technical support ensure the highest possible quality, reliability, service, and product longevity for this exceptional COM board.

## Technical Specifications

Specifications are typical at +25°C with +12V supply unless otherwise noted.

### Board Size:

55 mm x 84 mm – COM Express Mini standard

### Storage Temperature:

-40° to +85°C

### Operating Temperature:

-40° to +85°C. Derate -1.1°C per 305m (1,000 ft.) above 2,300m (7,500 ft.)

### Airflow Requirements:

Heat plate models: zero airflow to 85°C based on customer supplied heat removal system. User must keep the heat plate below 90°C, measured topside center point of heat plate

Heatsink models: -40° to +60°C with zero airflow, +60° to + 85°C with 300 LFM

**Power Requirements:** *(at +25°C and +12V supply running Windows 7 with LVDS display, SATA, GbE, COM, and USB keyboard/mouse. Typical power computed as the mean value of Idle and Maximum power specifications. Maximum power measured with 95% CPU utilization.)*

0.6 GHz Models: 7.2W idle, 7.6W max (custom SKU)

1.0 GHz Models: 7.3W idle, 8.7W max

1.6 GHz Models: 7.3W idle, 9.5W max

### System Reset:

All voltage rails monitored. Watchdog timer with programmable timeout (1 µs to 10 min.)

### DRAM:

Soldered-on 1 GB DDR2, 800 MT/s

### Video Interface:

Single-channel LVDS interface. 18/24-bit. Up to 1280 x 768 (60 Hz)

SDVO Display Port interface. 1920 x 1024 (50 Hz), 1280 x 1024 (85 Hz) max

### SATA Interface:

Two SATA II ports, 3 Gb/s

### Flash Storage:

One microSD socket supports up to 32 GB. SDIO interface supports SD, SDIO, and MMC

One SDIO port to AUX connector

### Ethernet Interface:

One IEEE802.3 compliant Gigabit Ethernet MAC, 10BaseT/100BaseTX/1000BaseT

### UART Interface:

UART0 – Full RS-232, interoperable with 16C550, 115 Kbps max. on AUX connector

UART1 – 2-wire RS-232 on AUX connector

UART2-3 – 2-wire RS-232 on COMe Type 10 connector

### USB:

Six USB 2.0 ports

One USB client port

All ports on on COMe Type 10 connector

### CAN:

2-wire CAN port on AUX connector

### SDIO:

Port 0 routed to on-board microSD card connector;

Port 1 routed to COMe Type 10 connector

### GPIO:

Four independent lines

### Audio:

Intel High-Definition Audio CODEC

Stereo HD audio line in/out

### BIOS:

AMI Aptio UEFI BIOS with OEM enhancements, field programmable

### Weight:

0.088 lb (0.040 kg) – CPU

0.171 lb (0.078 kg) – CPU with heat plate

0.279 lb (0.127 kg) – CPU with heat plate and heat sink

Specifications are subject to change without notification.



# Block Diagram

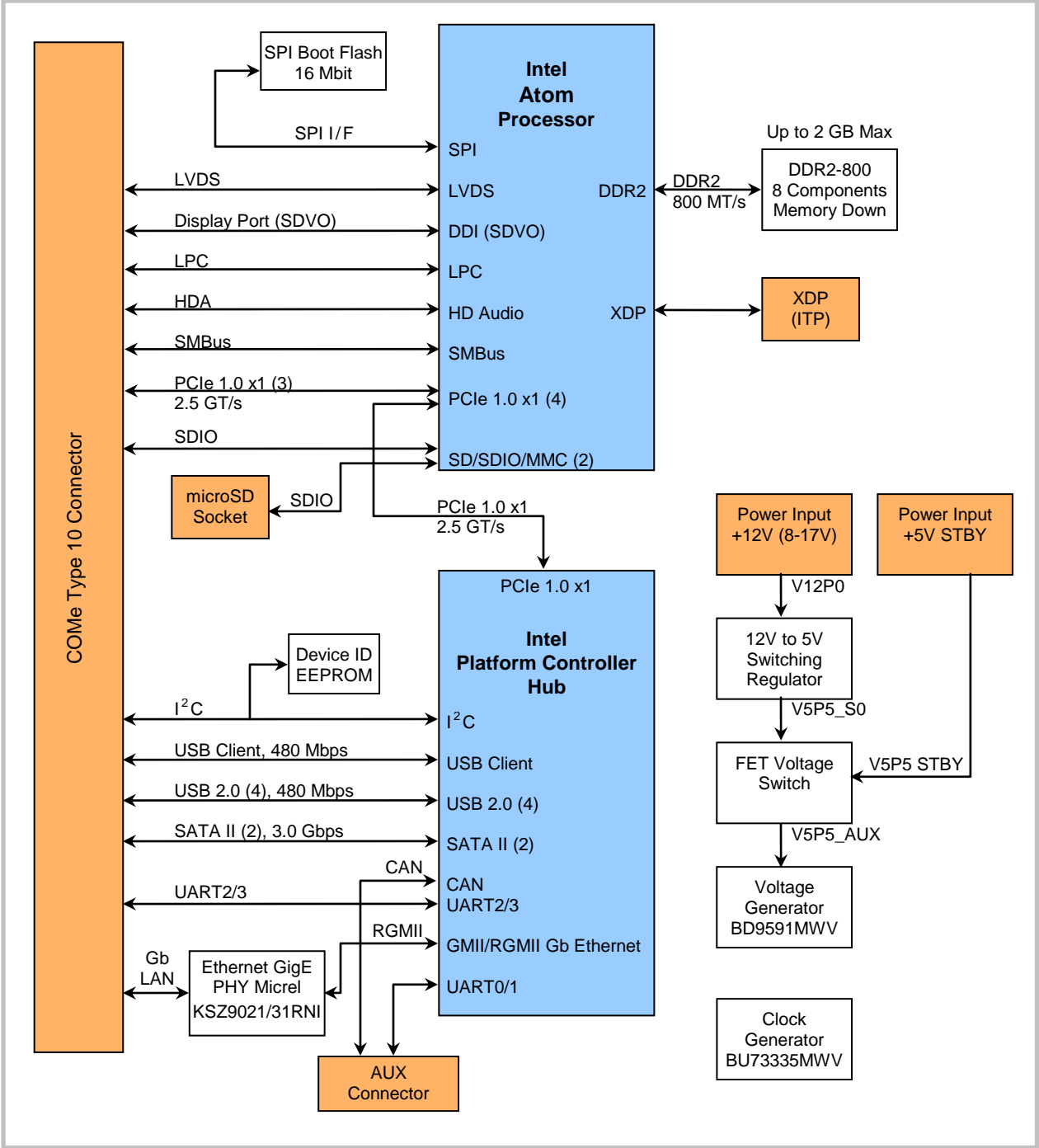


Figure 1. System Block Diagram

## RoHS Compliance

The VL-COMm-26 is RoHS-compliant.

### ABOUT ROHS

In 2003, the European Union issued Directive 2002/95/EC regarding the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment.

The RoHS directive requires producers of electrical and electronic equipment to reduce to acceptable levels the presence of six environmentally sensitive substances: lead, mercury, cadmium, hexavalent chromium, and the presence of polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) flame retardants, in certain electrical and electronic products sold in the European Union (EU) beginning July 1, 2006.

VersaLogic Corp. is committed to supporting customers with high-quality products and services meeting the European Union's RoHS directive.

## Warnings

### ELECTROSTATIC DISCHARGE

**Warning!** Electrostatic discharge (ESD) can damage circuit boards, disk drives, and other components. The circuit board must only be handled at an ESD workstation. If an approved station is not available, some measure of protection can be provided by wearing a grounded antistatic wrist strap. Keep all plastic away from the board, and do not slide the board over any surface.

After removing the board from its protective wrapper, place the board on a grounded, static-free surface, component side up. Use an antistatic foam pad if available.

The board should also be protected inside a closed metallic antistatic envelope during shipment or storage.

**Note:** The exterior coating on some metallic antistatic bags is sufficiently conductive to cause excessive battery drain if the bag comes in contact with the bottom side of the VL-COMm-26.

### HANDLING CARE

**Warning!** Care must be taken when handling the board not to touch the exposed circuitry with your fingers. Though it will not damage the circuitry, it is possible that small amounts of oil or perspiration on the skin could have enough conductivity to cause the contents of CMOS RAM to become corrupted through careless handling, resulting in CMOS resetting to factory defaults.

## Thermal Considerations

### CPU DIE TEMPERATURE

The CPU die temperature is affected by numerous conditions, such as CPU utilization, CPU speed, ambient air temperature, air flow, thermal effects of adjacent circuit boards, external heat sources, and many others.

The thermal management for the Intel Atom E6xx series of processors consists of a sensor located in the core processor area. The processor contains multiple techniques to help better manage thermal attributes of the processor. It implements thermal-based clock throttling and thermal-based speed step transitions. There is one thermal sensor on the processor and this is used for triggering Intel's thermal monitor. The temperature at which the thermal sensor triggers the thermal monitor is set during the fabrication of the processor. Triggering of this sensor is visible to software by means of the thermal interrupt LVT entry in the local APIC. (See the [Intel Atom E6xx Datasheet](#) for complete information.)

Two thermal configurations are available:

- Heat plate mounted via the four corner mounting holes.
- Low-profile heatsink mounted via the four corner mounting holes. The heatsink covers the entire module, including the heat plate.

## Technical Support

If you are unable to solve a problem after reading this manual, please visit the VL-COMm-26 product support web page below. The support page provides links to component datasheets, device drivers, and BIOS and PLD code updates.

[VL-COMm-26 Support Page](#)

The VersaTech KnowledgeBase contains a wealth of technical information about VersaLogic products, along with product advisories. Click the link below to see all KnowledgeBase articles related to the VL-COMm-26.

[VersaTech KnowledgeBase](#)

If you have further questions, contact VersaLogic Technical Support at (503) 747-2261. VersaLogic support engineers are also available via e-mail at [Support@VersaLogic.com](mailto:Support@VersaLogic.com).

**REPAIR SERVICE**

If your product requires service, you must obtain a Returned Material Authorization (RMA) number by calling (503) 747-2261.

Please provide the following information:

- Your name, the name of your company, your phone number, and e-mail address
- The name of a technician or engineer that can be contacted if any questions arise
- Quantity of items being returned
- The model and serial number (barcode) of each item
- A detailed description of the problem
- Steps you have taken to resolve or recreate the problem
- The return shipping address

**Warranty Repair** All parts and labor charges are covered, including return shipping charges for UPS Ground delivery to United States addresses.

**Non-warranty Repair** All approved non-warranty repairs are subject to diagnosis and labor charges, parts charges, and return shipping fees. Please specify the shipping method you prefer and provide a purchase order number for invoicing the repair.

**Note:** Please mark the RMA number clearly on the outside of the box before returning.

## Basic Setup

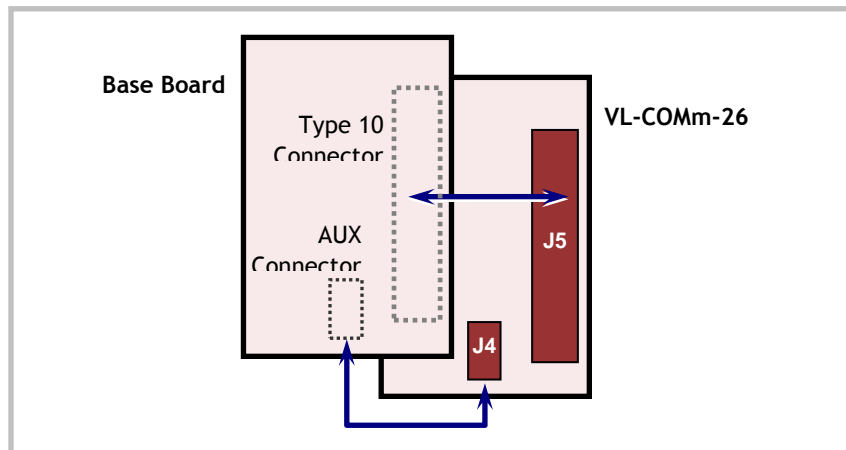
When setting up the VL-COMm-26 in a development environment, it should be handled at an ESD workstation or while wearing a grounded antistatic wrist strap.

Before you begin, unpack the VL-COMm-26 and accessories. Verify that you received all the items you ordered. Inspect the system visually for any damage that may have occurred in shipping. Contact [Support@VersaLogic.com](mailto:Support@VersaLogic.com) immediately if any items are damaged or missing.

Gather all the peripheral devices you plan to attach to the VL-COMm-26, including the base board and all interface and power cables.

### HARDWARE ASSEMBLY

Attach the VL-COMm-26 to the base board as shown in the figure below.

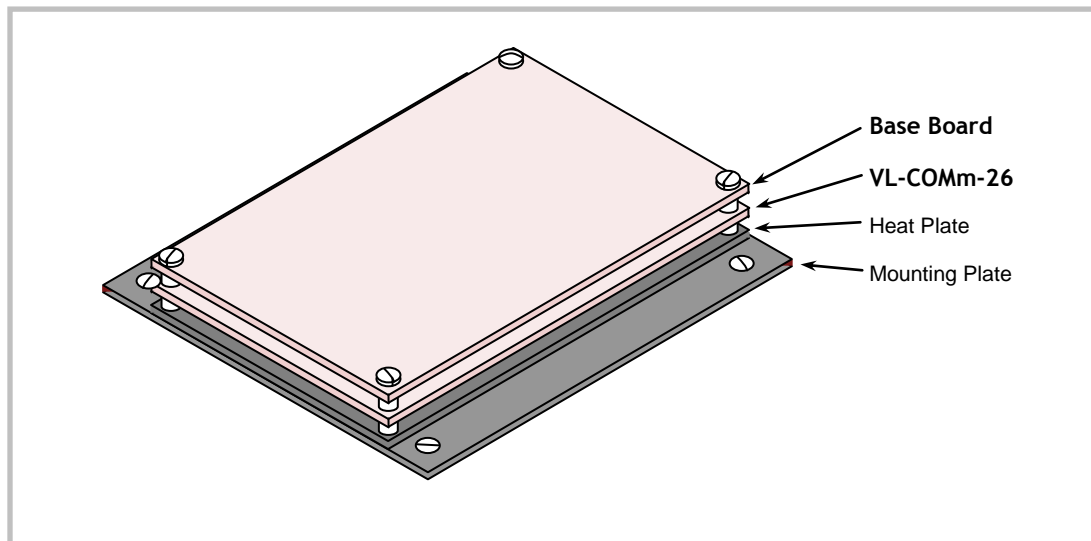


**Figure 2. Attaching the VL-COMm-26 to the Base Board**

The VL-COMm-26 uses a COM Express Type 10 connector and auxiliary connector to attach to a base board. The hardware used to attach the VL-COMm-26 to the base board will depend on the assembly configuration. There are two basic assembly methods: heat plate down (in relation to the enclosure) or heatsink up. An optional mounting plate, VL-HDW-405, can be used with either method. These assembly methods are described below.

#### Heat Plate Down

Use this assembly method if your VL-COMm-26 is equipped with a heat plate only (no heatsink). The figure below shows the assembly including the mounting plate.



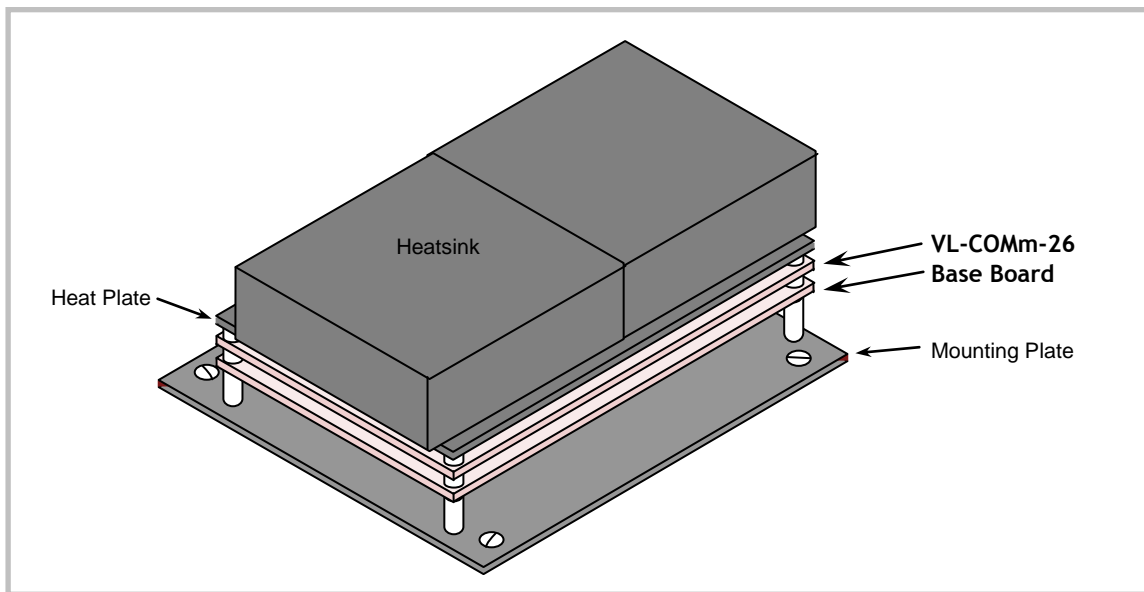
**Figure 3. Hardware Assembly with Heat Plate Down**

The recommended method is to attach the VL-COMm-26 heat plate to the mounting plate (VL-HDW-405), and attach the mounting plate to the enclosure.

A thermal interface compound must be applied to the heat plate to thermally bond it to the mounting plate or other surface to which the VL-COMm-26 is mounted. Spread the compound thinly and evenly across the entire heat plate surface before mounting. The compound is supplied in the VL-CKR-FALC-N/L cable kit or sold separately as part number VL-HDW-401.

### Heatsink Up

Use this assembly method if your VL-COMm-26 is equipped with a heat plate and heatsink. The figure below shows the assembly including the mounting plate.



**Figure 4. Hardware Assembly with Heatsink Up**

The recommended method is to attach the base board to the mounting plate (VL-HDW-405), and attach the mounting plate to the enclosure.

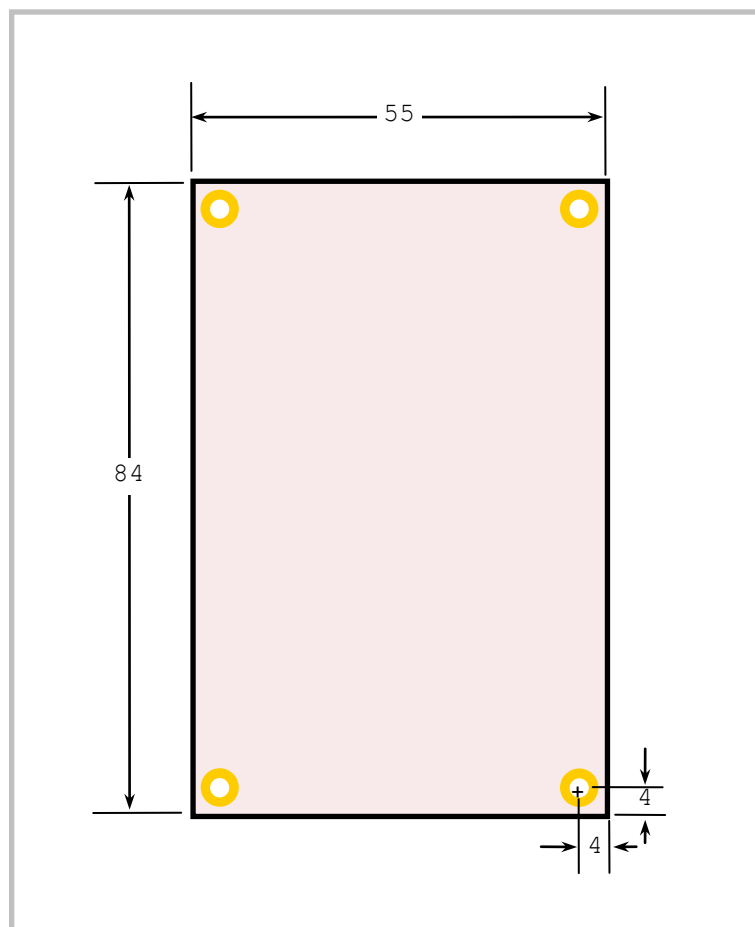
## Operating System Installation

The standard PC architecture used on the VL-COMm-26 makes the installation and use of most of the standard x86-based operating systems very simple. The operating systems listed on the [VersaLogic OS Compatibility Chart](#) use the standard installation procedures provided by the maker of the OS. Special optimized hardware drivers for a particular OS, or a link to the drivers, are available at the [VL-COMm-26 Product Support web page](#).

## Dimensions and Mounting

### VL-COMM-26 DIMENSIONS

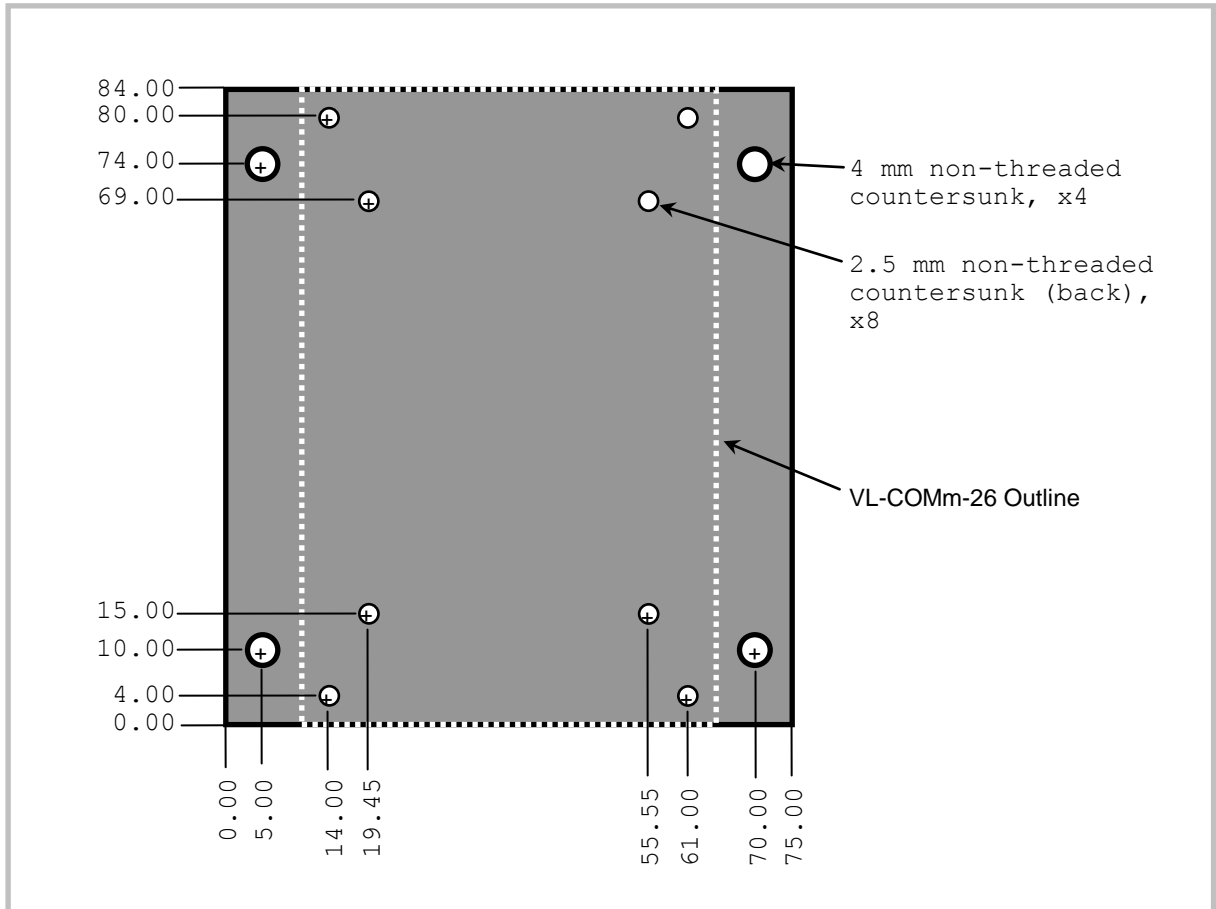
The VL-COMM-26 complies with COM Express Mini form factor standards. Dimensions are given below to help with pre-production planning and layout.



**Figure 5. VL-COMM-26 Dimensions and Mounting Holes**  
(Not to scale. All dimensions in millimeters.)



## VL-HDW-405 MOUNTING PLATE DIMENSIONS



**Figure 6. Mounting Plate Dimensions**  
*(Not to scale. All dimensions in millimeters.)*

## External Connectors

### VL-COMM-26 CONNECTOR LOCATIONS – TOP

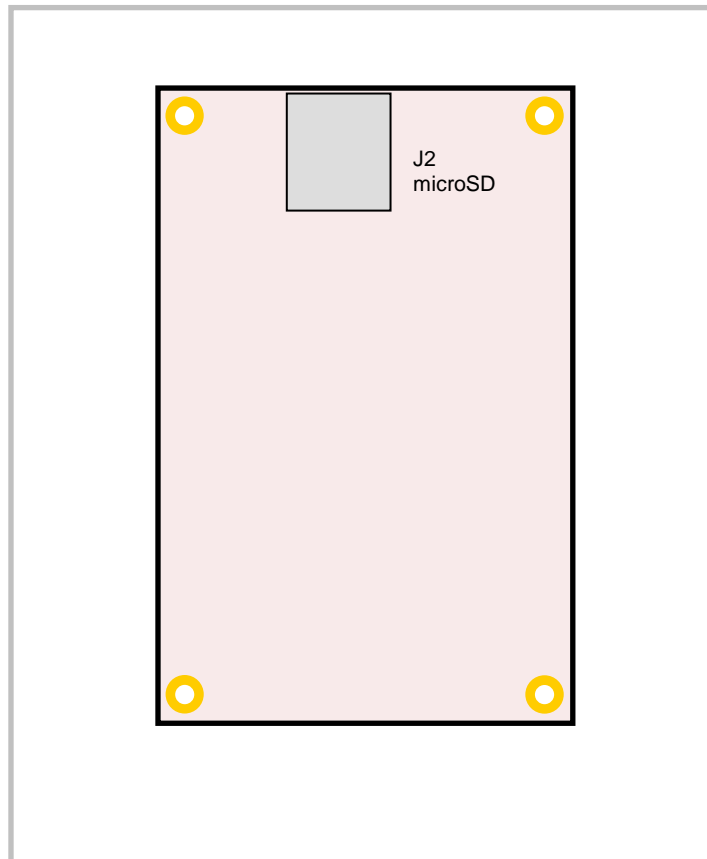


Figure 7. Connector Locations (Top)

## VL-COMM-26 CONNECTOR LOCATIONS – BOTTOM

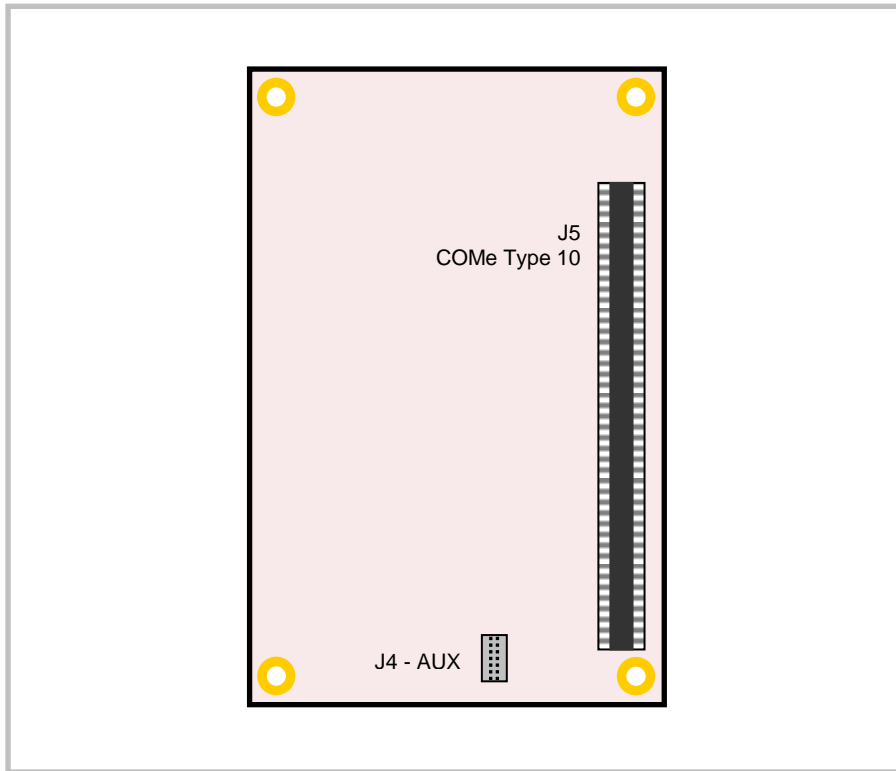


Figure 8. Connector Locations (Bottom)

## VL-COMM-26 CONNECTOR FUNCTIONS AND INTERFACE CABLES

Table 1 provides information about the function, mating connectors, and transition cables for VL-COMM-26 connectors. Page numbers indicate where a detailed pinout or further information is available.

Table 1: Connector Functions and Interface Cables

Connector <sup>1</sup>	Function	Mating Connector/Component	Transition Cable	Cable Description	Page
J2	microSD	VL-F41-xxxx microSD Flash Drive	—	—	18
J4	AUX connector: Serial, SDIO, CAN, GPIO	Samtec FTE-107-03-G-DV-A	—	—	18
J5	COMe Type 10	Tyco 3-1827253-6	—	—	16

1. Connectors J1 and J3 are not installed.

## Power Supply

Main power is applied to the VL-COMm-26 through the COM Express Type 10 connector at location J5. All 12V pins on the Type 10 connector should be connected to the input payload power supply.

### POWER REQUIREMENTS

The VL-COMm-26 requires a single +8-17V DC supply of 2A (24W) or better. A +5V standby power rail may be supplied to support standby functions and a +3V battery input for applications that require the RTC to keep time in the absence of the main and standby power supplies. The exact power requirements for the VL-COMm-26 depend on several factors, including memory configuration, CPU speed, peripheral connections, and attached devices, etc. For example, driving long RS-232 lines at high speed can increase power demand.

## CPU

The Intel Atom Processor E6x0T series with Intel Platform Controller Hub EG20T features integrated 3D graphics, video encode and decode, and memory and display controllers in one package.

## System RAM

The VL-COMm-26 has soldered-on DDR2 SDRAM with the following characteristics:

- Storage Capacity      1 GB or 2 GB
- Voltage                    +1.8V
- Speed                      800 MT/s DDR2

## Clearing Non-volatile RAM (NVRAM)

When clearing the NVRAM:

1. Power off the VL-COMm-26.
2. Short J4 pin 14 to GND and J5 pin A85 to GND.
3. Power on the COMm-26, and remove power after the Boot menu appears.
4. Remove the shorts from the pins.
5. Power on the VL-COMm-26.

## Real-Time Clock (RTC)

The VL-COMm-26 features a real-time clock/calendar (RTC) circuit. The VL-COMm-26 supplies RTC voltage in S5, S3 and S0 states, but requires an external battery connection to pin A47 of the J5 Type 10 connector to maintain its functionality and its RAM when the VL-COMm-26 is not powered. The RTC can be set using the BIOS Setup.

## Watchdog Timer

The VL-COMm-26 has a watchdog timer that contains a selectable prescaler approximately 1  $\mu$ s to 10 minutes. See the [Intel Atom E6x0T Datasheet](#) for configuration information.

## COM Express Type 10 Connector

The COM Express Type 10 connector at location J5 has 220 pins. The feature set includes three PCI Express lanes, six USB ports, one USB client port, two SATA ports, LVDS, SDVO, HDA, two RS-232 serial ports, watchdog timer, and speaker. Modules implementing Pin-out Type 10 shall use the pin-out shown in this table.

**Table 2: J5 COM Express Connector Pinout**

Pin	Row A Signal	Function	Row B Signal	Function
1	GND(FIXED)	Ground	GND(FIXED)	Ground
2	GBE0_MDI3-	Ethernet 3 –	GBE0_ACT#	Ethernet Activity LED
3	GBE0_MDI3+	Ethernet 3 +	LPC_FRAME#	LPC Frame
4	NC	Not connected	LPC_AD0	LPC 0 address/data
5	NC	Not connected	LPC_AD1	LPC 1
6	GBE0_MDI2-	Ethernet 2 –	LPC_AD2	LPC 2
7	GBE0_MDI2+	Ethernet 2 +	LPC_AD3	LPC 3
8	GBE0_LINK#	Ethernet Link LED	NC	Not connected
9	GBE0_MDI1-	Ethernet 1 –	NC	Not connected
10	GBE0_MDI1+	Ethernet 1 +	LPC_CLK	LPC Clock
11	GND(FIXED)	Ground	GND(FIXED)	Ground
12	GBE0_MDI0-	Ethernet 0 –	PWRBTN#	Power Button
13	GBE0_MDI0+	Ethernet 0	SMB_CK	SMB Clock
14	GBE0_CTREF	Ethernet Magnetics center Tap Voltage	SMB_DAT	SMB Data
15	SUS_S3#	Suspend State 3	SMB_ALERT#	SMB Alert
16	SATA0_TX+	SATA 0 Transmit +	SATA1_TX+	SATA 1 Transmit +
17	SATA0_TX-	SATA 0 Transmit –	SATA1_TX-	SATA 1 Transmit –
18	SUS_S4#	Suspend State 4	SUS_STAT#	Suspend State
19	SATA0_RX+	SATA 0 Receive +	SATA1_RX+	SATA 1 Receive +
20	SATA0_RX-	SATA 0 Receive –	SATA1_RX-	SATA 1 Receive –
21	GND(FIXED)	Ground	GND(FIXED)	Ground
22	RSVD	Reserved	RSVD	Reserved
23	RSVD	Reserved	RSVD	Reserved
24	SUS_S5#	Suspend State 5	PWR_OK	Power OK
25	RSVD	Reserved	RSVD	Reserved
26	RSVD	Reserved	RSVD	Reserved
27	BATLOW#	Battery Low	WDT	GPIO 4
28	NC	Not connected	AC/HDA_SDIN2	HDA Serial Data In 2
29	AC/HDA_SYNC	HDA Frame Sync	AC/HDA_SDIN1	HDA Serial Data In 1
30	AC/HDA_RST#	HDA Reset	AC/HDA_SDIN0	HDA Serial Data In 0
31	GND(FIXED)	Ground	GND(FIXED)	Ground
32	AC/HDA_BITCLK	HDA Bit Clock	SPKR	Speaker
33	AC/HDA_SDOUT	HDA Serial Data Out	I2C_CK	I2C Clock
34	BIOS_DIS0#	BIOS disable	I2C_DAT	I2C Data
35	THRMTTRIP#	Not used	THRM#	Off-Module over temp condition
36	NC	Not connected	USB7-	USB 7 Data –
37	NC	Not connected	USB7+	USB 7 Data +
38	USB_6_7_OC#	USB 6-7 Over current	USB_4_5_OC#	USB 4-5 Over Current

Pin	Row A Signal	Function	Row B Signal	Function
39	USB4-	USB 4 Data –	USB5-	USB 5 Data –
40	USB4+	USB 4 Data +	USB5+	USB 5 Data +
41	GND(FIXED)	Ground	GND(FIXED)	Ground
42	USB2-	USB 2 Data –	USB3-	USB 3 Data –
43	USB2+	USB 2 Data +	USB3+	USB 3 Data +
44	USB_2_3_OC#	USB 2-3 Over Current	USB_0_1_OC#	USB 0-1 Over Current
45	USB0-	USB 0 Data –	USB1-	USB 1 Data –
46	USB0+	USB 0 Data +	USB1+	USB 1 Data +
47	VCC_RTC	VCC RTC	EXCD1_PERST#	Reserved
48	EXCD0_PERST#	Reserved	EXCD1_CPPE#	Reserved
49	EXCD0_CPPE#	Reserved	SYS_RESET#	System Reset Input
50	LPC_SERIRQ	LPC Serial IRQ	CB_RESET#	Reset output
51	GND(FIXED)	Ground	GND(FIXED)	Ground
52	RSVD	Reserved	RSVD	Reserved
53	RSVD	Reserved	RSVD	Reserved
54	GPIO	SDIO Data 0	GPO1	SDIO Command Line
55	RSVD	Reserved	RSVD	Reserved
56	RSVD	Reserved	RSVD	Reserved
57	GND	Ground	GPO2	SDIO Write Protect
58	NC	Not connected	NC	Not connected
59	NC	Not connected	NC	Not connected
60	GND(FIXED)	Ground	GND(FIXED)	Ground
61	PCIE_TX2+	PCIe 2 Transmit +	PCIE_RX2+	PCIe 2 Receive +
62	PCIE_TX2-	PCIe 2 Transmit –	PCIE_RX2-	PCIe 2 Receive –
63	GPI1	SDIO Data 1	GPO3	SDIO Card Detect
64	PCIE_TX1+	PCIe 1 Transmit +	PCIE_RX1+	PCIe 1 Receive +
65	PCIE_TX1-	PCIe 1 Transmit –	PCIE_RX1-	PCIe 1 Receive –
66	GND	Ground	WAKE0#	Wake 0
67	GPI2	SDIO Data 2	WAKE1#	Wake 1
68	PCIE_TX0+	PCIe 0 Transmit +	PCIE_RX0+	PCIe 0 Receive +
69	PCIE_TX0-	PCIe 0 Transmit –	PCIE_RX0-	PCIe 0 Receive –
70	GND(FIXED)	Ground	GND(FIXED)	Ground
71	LVDS_A0+	LVDS Data 0 +	DDIO_PAIR0+	SDVO Red +
72	LVDS_A0-	LVDS Data 0 –	DDIO_PAIR0-	SDVO Red –
73	LVDS_A1+	LVDS Data 1 +	DDIO_PAIR1+	SDVO Green +
74	LVDS_A1-	LVDS Data 10 –	DDIO_PAIR1-	SDVO Green –
75	LVDS_A2+	LVDS Data 2 +	DDIO_PAIR2+	SDVO Blue +
76	LVDS_A2-	LVDS Data 2 –	DDIO_PAIR2-	SDVO Blue –
77	LVDS_VDD_EN	LVDS VDD Enable	DDIO_PAIR4+	SDVO Interrupt +
78	LVDS_A3+	LVDS Data 3 +	DDIO_PAIR4-	SDVO Interrupt –
79	LVDS_A3-	LVDS Data 3 –	LVDS_BKLT_EN	LVDS Backlight Enable
80	GND(FIXED)	Ground	GND(FIXED)	Ground
81	LVDS_A_CK+	LVDS Clock +	DDIO_PAIR3+	SDVO Clock +
82	LVDS_A_CK-	LVDS Clock –	DDIO_PAIR3-	SDVO Clock –
83	LVDS_I2C_CK	LVDS I2C Clock	LVDS_BKLT_CTRL	Not Used
84	LVDS_I2C_DAT	LVDS I2C Data	VCC_5V_SBY	+5V Standby
85	GPI3	SDIO Data 3	VCC_5V_SBY	+5V Standby
86	RSVD	Reserved	VCC_5V_SBY	+5V Standby
87	RSVD	Reserved	VCC_5V_SBY	+5V Standby
88	PCIE_CLK_REF+	PCIe Clock +	BIOS_DIS1#	Not Used
89	PCIE_CLK_REF-	PCIe Clock –	NC	Not connected
90	GND(FIXED)	Ground	GND(FIXED)	Ground
91	NC	Not connected	DDIO_PAIR5+	SDVO TV Clock +
92	NC	Not connected	DDIO_PAIR5-	SDVO TV Clock –
93	GPO0	SDIO Clock	DDIO_PAIR6+	SDVO Stall +

Pin	Row A Signal	Function	Row B Signal	Function
94	NC	Not connected	DDIO_PAIR6-	SDVO Stall –
95	NC	Not connected	DDIO_DDC_AUX_SEL	SDVO DDC Aux Select
96	NC	Not connected	RSVD	Reserved
97	TYPE10#	Indicates Type 10 Module	NC	Not connected
98	SER0_TX	UART2 Transmit	DDIO_CTRLCLK_AUX+	SDVO Control Clock
99	SER0_RX	UART2 Receive	DDIO_CTRLDATA_AUX-	SDVO Control Data
100	GND(FIXED)	Ground	GND(FIXED)	Ground
101	SER1_TX	UART3 Transmit	NC	Not connected
102	SER1_RX	UART3 Receive	FAN_TACHIN	Not Used
103	LID#	Not Used	SLEEP#	PCH GPIO 1
104	VCC_12V	+12 Volts	VCC_12V	+12 Volts
105	VCC_12V	+12 Volts	VCC_12V	+12 Volts
106	VCC_12V	+12 Volts	VCC_12V	+12 Volts
107	VCC_12V	+12 Volts	VCC_12V	+12 Volts
108	VCC_12V	+12 Volts	VCC_12V	+12 Volts
109	VCC_12V	+12 Volts	VCC_12V	+12 Volts
110	GND(FIXED)	Ground	GND(FIXED)	Ground

## microSD Interface

The VL-COMm-26 provides one microSD socket at location J2. The VersaLogic VL-F41 series of microSD cards provide solid-state storage of 2 GB, 4 GB, or 8 GB. The microSD sockets will accommodate cards with up to 32 GB of storage capacity.

## AUX Connector

The auxiliary connector at location J4 provides one 4-wire RS-232 interface, one 2-wire RS-232 interface, one two-wire CAN interface, and two GPIO interfaces.

**Table 3: User I/O Connector Pinout**

J4 Pin	Signal Name	Function
1	UART0_IOH_TX	UART0 Transmit
2	UART0_IOH_CTS	UART0 CTS
3	UART0_IOH_RTS	UART0 RTS
4	UART0_IOH_RX	UART0 Receive
5	GND	Ground
6	GND	Ground
7	UART1_IOH_TX	UART1 Transmit
8	UART1_IOH_RX	UART1 Receive
9	IOH_CAN_TX	CAN Transmit
10	IOH_CAN_RX	CAN Receive
11	SDIO0_PORT_EN	SDIO Port Enable
12	IOH_GPIO3	GPIO3
13	IOH_GPIO4	GPIO4
14	IOH_GPIO5_MFG_CODE	Manufacturing Code



## LVDS Interface

The Atom E6x0T processor supports one LVDS channel. The LVDS channel can support clock frequency ranges up to a maximum pixel clock rate up to 80MHz, and provides 18 or 24 bits of RGB data plus 3 bits of timing control. The maximum LVDS resolution is 1024x768@60Hz. The processor utilizes multiplexed GPIO\_SUS[4:0] in LVDS\_CTL\_MODE to support LVDS Backlight Control.

The LVDS interface is routed to the J5 connector.

## SATA Ports

Two SATA ports are provided which support SATA 1.5 Gbps Revision 1.0 and 3 Gbps Revision 2.0 speeds. The SATA ports are both routed to the J5 connector.

The SATA controller operates in AHCI mode. Older operating systems may require a driver, as IDE compatibility mode is not supported.

## USB Host Ports

The PCH provides six USB 2.0 ports that support high-speed, 480 Mbps transfers, full speed, and low speeds. All USB host ports are routed to the J5 connector.

**Table 4: USB Host Port Configuration**

PCH Port	Connection
0	COMe Type 10 Conn (USB0)
1	COMe Type 10 Conn (USB5)
2	COMe Type 10 Conn (USB4)
3	COMe Type 10 Conn (USB1)
4	COMe Type 10 Conn (USB3)
5	COMe Type 10 Conn (USB2)

## USB Client Port

The PCH provides one USB 2.0 client port. The USB client port is routed to the J5 connector.

**Table 5: USB Client Port Configuration**

PCH Port	Connection
0	COMe Type 10 Conn (USB7)

## PCIe Lanes

The VL-COMm-26 supports PCIe Gen1. Gen1 has a data rate of 2.5 GT/s and a bandwidth of 250 MB/s. PCIe uses 8b/10b encoding. The processor allows for polarity inversion of the PCIe signals.

The Atom E6x0T supports 4 x1 PCIe ports. One of these is connected to the PCH while the other three are routed to the J5 connector for peripherals on the base board.

## High Definition Audio

The audio interface on the VL-COMm-26 is implemented using an Integrated Device Technology, Inc. 92HD87B1X5 audio codec. This interface is Intel High Definition Audio (HDA) compatible. Drivers are available for most Windows-based and Linux operating systems. To obtain the most current versions, consult the VL-COMm-26 support page.

## Serial Ports

The PCH provides four UARTs interoperable with the industry standard 16550 UART. They are native PCI devices, requiring OS driver support. Three of these provide RS-232 2-wire serial ports and the fourth is used to provide an RS-232 4-wire serial port.

**Note:** The UART clock operates at 48 MHz, and OS drivers may need to be configured accordingly.

**Table 6: PCH UART Port Configuration**

PCH Port	Connection
UART0	AUX Connector (4-wire)
UART1	AUX Connector (2-wire)
UART2	COMe Type 10 Conn (2-wire)
UART3	COMe Type 10 Conn (2-wire)

## Ethernet Interface

The PCH incorporates a Gigabit Ethernet MAC that conforms to IEEE802.3. It supports three types of interfaces – MII, GMII, and RGMII to transfer data between the MAC and PHY device.

- The supported features include:
- Compliant with IEEE 802.3
- Wake-on-LAN event detection
- Jumbo Frame up to 10,318 byte

The Micrel KSZ9021RN Gigabit Ethernet Phy provides a single 10/100/1000Mbps Ethernet Transceiver. The KSZ9021RN features:

- Supports auto detection
- Compliant with IEEE 802.3 (802.3, 802.3u, and 802.3ab)
- Support half/full duplex operation
- Crossover Detection and Auto-Correction
- Polarity Correction

The KSZ9021RN component is used on the COMm-26 to provide a Gigabit Ethernet port connection to the J5 connector.

## SDIO Interface

The PCH provides two SDIO ports which support the following specifications:

- SD memory card: SD Memory Card Specification Part 1 Physical Layer Specification Ver2.0
- SDIO card: SDIO Card Specification Ver1.10
- MMC: MMC System Specification Ver4.1

The SDIO ports support the following transfer modes:

- SD memory card/SDIO card
- SD bus transfer mode (1-bit/4-bit/high-speed)
- MMC transfer mode (1-bit/4-bit/8-bit/high-speed)

Port 0 is routed to an on-board microSD card connector, and the second is routed to the COMe type 10 connector.

**Table 7: PCH SDIO Port Configuration**

PCH Port	Connection
0	microSD Socket*
1	COMe Type 10 Conn

\* The on-board microSD port supports up to 32 GB density.

## I<sup>2</sup>C Interface

The PCH supports one I<sup>2</sup>C bus which is routed directly to the J5 connector. An Atmel AT24C32D EEPROM is also implemented on the I<sup>2</sup>C bus for to provide 4Kbytes of storage for COMe device information.

The contents of this EEPROM will follow the PICMG Eep Embedded EEPROM Specification Revision 1.0. Default programmed values are in () below. Refer to the Eep specification for more detail.

This specification defines:

- Module Header
  - EepDeviceType (Extended)
  - EepDeviceSize (4KBytes)
  - WriteLength (32)
  - VendorId (VLC)
  - DeviceId (0x00)
  - DeviceFlav (0x00)
  - RevId (0x00)
  - MType (0x0A)
  - SpecRevision (2.0)
- SMBIOS Information Block
  - InsideCRC (InsideCRC)
  - MinBlockSize (Not Used)<sup>1</sup>
  - BlockFillChar (Not Used)<sup>1</sup>

- Manufacturer (VERSALOGIC CORPORATION)
- Product (COMm-26Ex) <sup>2</sup>
- Version (0.20)<sup>2</sup>
- SerialNumber (123456)<sup>1, 2</sup>
- AssetTag (Not Used)<sup>1</sup>
- FeatureFlag (Removable, Replaceable)
- Location (Not Used)<sup>1</sup>
- LocationHandle (Not Used)<sup>1</sup>
- BoardType (ProcessorModule)
- Handles (Not Used)<sup>1</sup>
- LFPData Block (Not Used)<sup>1</sup>
- Vendor Block 01
  - InsideCRC (InsideCRC)
  - MinBlockSize (Not Used)<sup>1</sup>
  - BlockFillChar (Not Used)<sup>1</sup>
  - VendorId (VLC)
  - VendorSpecificBlockId (0x00)
  - FileName (MACaddr.txt)
    - MAC Address<sup>2</sup>
- Vendor Block 11
  - InsideCRC (InsideCRC)
  - MinBlockSize (Not Used)<sup>1</sup>
  - BlockFillChar (Not Used)<sup>1</sup>
  - VendorId (VLC)
  - VendorSpecificBlockId (0x01)
  - FileName (Manufacturing\_info.txt)
    - Manufactured Date<sup>2</sup>
    - Last Functional Test Date<sup>2</sup>
    - BIOS programmed at Functional Test<sup>2</sup>

**NOTES:**

1. Eeep specification optional field
2. This field is customized for each board

The device address for this EEPROM is set to 0xA0 (8-bit address).

## SMBus Interface

The SMBus runs at clock frequencies up to 1 MHz. An LM95245 thermal sensor for the CPU resides on the SMBus. The SMBus is also routed to the J5 connector.

## LPC Interface

The LPC runs at 33 MHz and is connected directly to the J5 connector to allow for additional peripheral devices via the base board.

The LPC interface supports accessing Intel® Trusted Platform Module (Intel® TPM) 1.2 devices by LPC Intel® TPM START encoding. A physical presence detect signal is routed to the COMe type 10 connector to allow the carrier to indicate a physical presence to the TPM on the COMe.

## **CAN Bus**

The PCH provides one 2-wire CAN port. The CAN port is routed to the J4 connector.



## Mounting Configurations

The following illustrations show the mounting options for the VL-COMm-26.

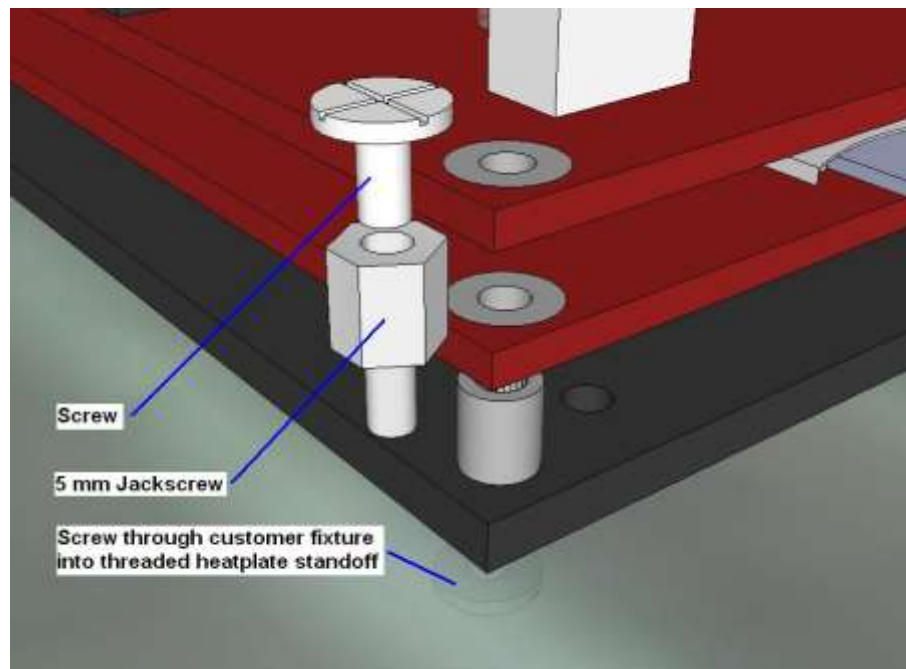


Figure 9. Bolt-through Heat Plate

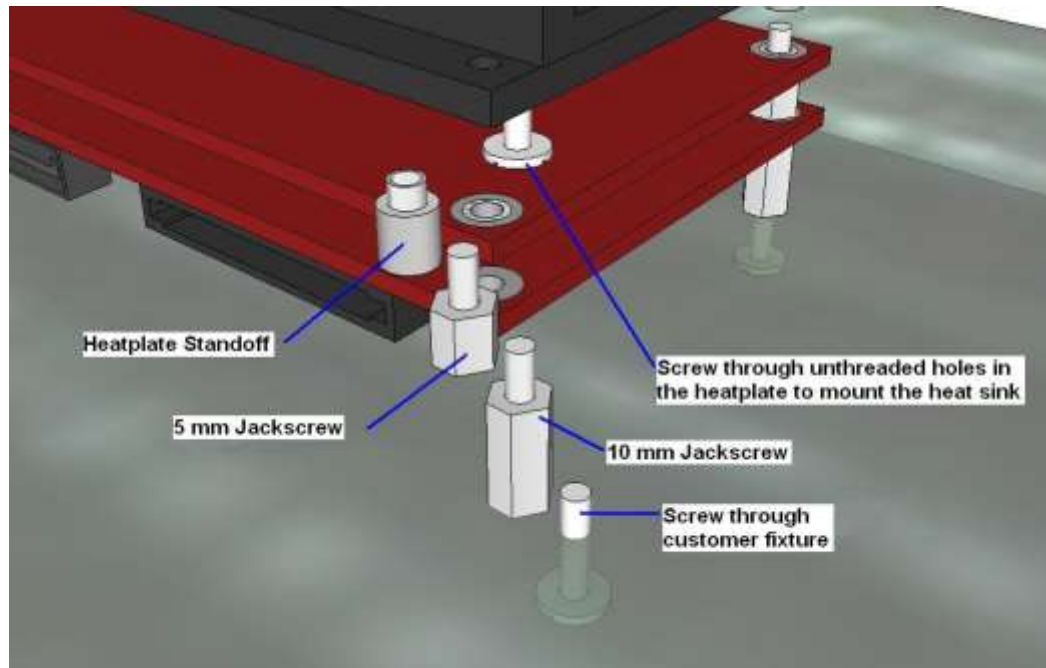


Figure 10. Bolt-through Heatsink

## Mounting Plate Configurations

The following illustrations show options for installing the VL-COMm-26 with the VL-HDW-405 mounting plate.

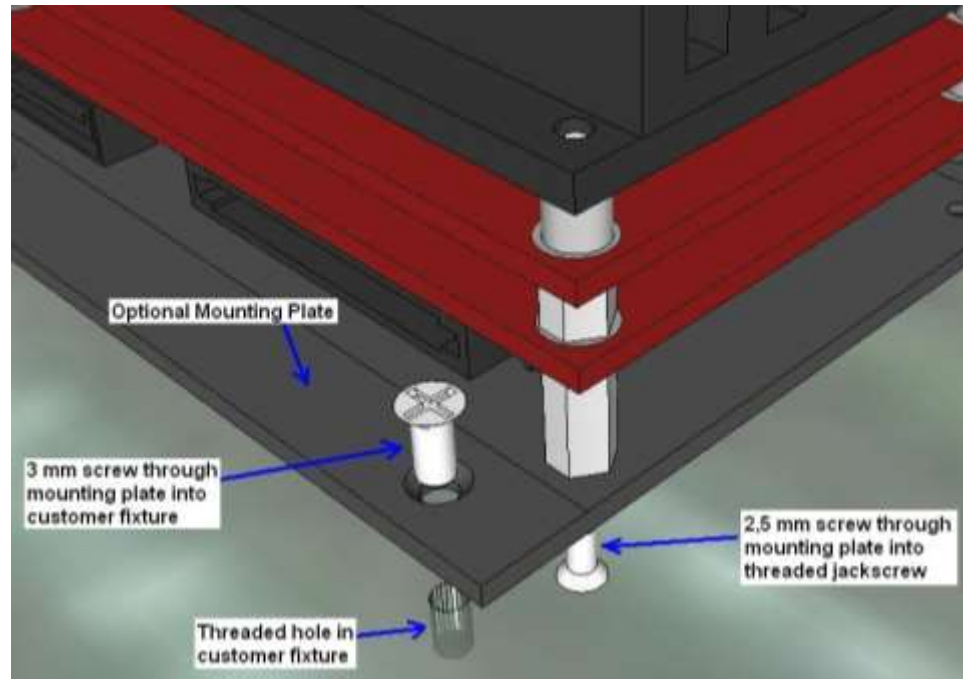


Figure 11. Mounting Plate Option 1



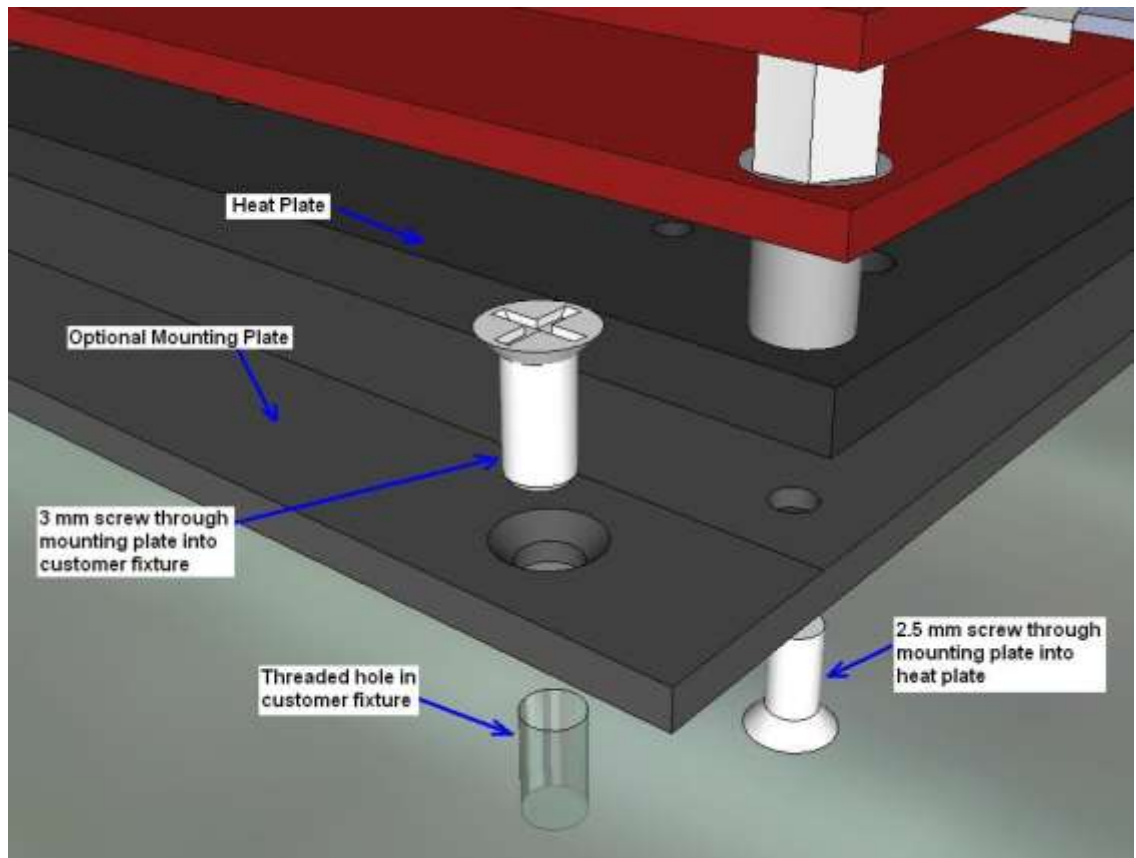


Figure 12. Mounting Plate Option 2