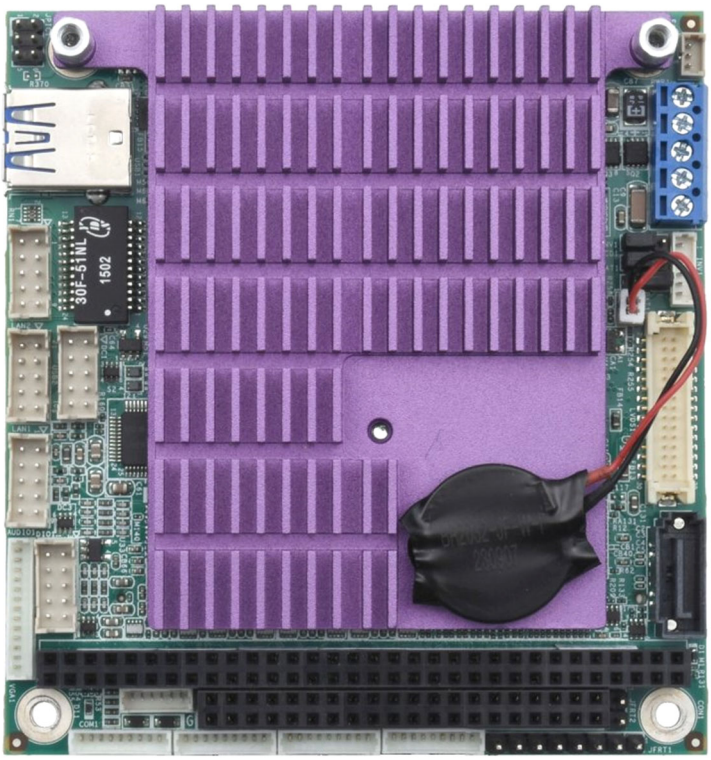
SAMSON

PC/104 Single-Board Computer with E3825/E3845 Processor

User Manual

Rev 2.0



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Technical Support Request Form
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VERSION 2.0 – 03/08/2025

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 Osbourne carrier board contains a high number of I/O connectors with connections to sensitive electronic components. This creates many opportunities for accidental damage during handling, installation, and connection to other equipment.

This section provides critical, best practice suggestions to avoid damage to your products. It includes descriptions of many common causes of damage – all of which can void your warranty.

Please follow these guidelines to be aware of common causes of damage and take the necessary precautions to prevent damage to your Diamond Systems' (or any vendor's) embedded computer boards.

Damage from incorrect handling or storage

- Physical and electronic damage can occur from mishandling. The following are frequent scenarios.
- An electrostatic discharge (ESD) causes a board to malfunction or stop working entirely. If ESD occurs, typically there is no visual sign of damage. While it is often difficult to identify faulty component(s), if the fault is identified there is a good chance that the board can be repaired.
- A screwdriver slips during installation, causing a gouge in the PCB surface and cutting signal traces or damaging components.
- A board is dropped, causing damage to the circuitry near the point of impact. Most of our boards are designed with at least 25 mils clearance between the board edge and any component pad, and ground / power planes are at least 20 mils from the edge. These design rules can minimize but cannot always prevent damage from impact.
- A short occurs when a metal screwdriver tip slips, or a screw drops onto a board while it is powered on. This can cause overvoltage or power supply problems described below.
- A storage rack with slots to hold boards can damage components near the board edge. Many boards have components that are close to the board edge, which are subject to damage in racks.
- Connector pins are bent by improperly dis-assembling attached boards or ribbon cables from a pin header, or from physical impact or improper storage. Typically, bent pins can be repaired one at a time with needle-nose pliers. Severely bent or frequently repaired pins may require the replacement of the connector.

Best Practices to avoid damage during handling or storage

- To prevent ESD damage, always follow proper ESD-prevention practices when handling any electronic components.
- To prevent physical damage from impact, handle all boards with care and work in a safe, spacious environment.

- To prevent short circuit damage from a metallic tool or dropped screw, perform assembly operations ONLY when the system is powered off.
- To prevent damage to fragile components and connector pins in storage, always store boards in individual ESD-safe sleeves in sturdy bins with dividers between boards. Do NOT use racks with slots, or stack boards in a pile or in close proximity.
- To prevent damage to connector pins during assembly or dis-assembly, use caution to align connectors and especially when force is needed to disassemble components and wires. Do not 'rock' connectors back and forth or pull any component at the wrong angle.

Damage due to incorrect voltage or connections

Power supply wired backwards

Diamond Systems power supplies and boards are not designed to withstand a reverse power supply connection. Reverse power will destroy nearly every IC that is connected to the power supply. Reverse power damage is rarely repairable. Check twice before applying power!

Board not installed properly in PC/104 stack

If a PC/104 board is accidentally shifted by 1 row or 1 column (of pins) it is possible for power and ground signals on the bus to contact the wrong pins. For example, this can damage components attached to the data bus because it puts the ±12V power supply lines directly on data bus lines.

Overvoltage on analog input

If a voltage applied to an analog input exceeds the design specification of the board, the input multiplexor and/or parts behind it can be damaged. Most of our boards will withstand an erroneous connection of up to ±35V on the analog inputs, even when the board is powered off, but not all boards, and not in 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 of our boards, a short circuit to ground on an analog output will not cause trouble.

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. On most of our boards the acceptable range of voltages connected to digital I/O signals is 0-5V, and they can withstand about 0.5V beyond that (-0.5 to 5.5V) before being damaged. However, logic signals at 12V and even 24V are common, and if one of these is connected to a 5V logic chip, the chip will be damaged, and damage may extend past that chip to others in the circuit.

Best Practices to avoid damage due to incorrect voltage or connections

- Ensure all power supply connections are correct and not reversed!
- Ensure all pins are aligned properly before and after assembling boards and components!
- Ensure proper voltage is supplied to all analog inputs!
- Ensure all analog voltage outputs do not connect to another signal output or power supply output!
- Ensure all voltages for digital I/O lines are proper and with range, and that higher voltage signals (24V or 12V) are not supplied to lower voltage circuits (12V or 5V)!

IMPORTANT! Always check twice before Powering Up!

Contents

Notices

Technical Support

Please use the Technical Support Request form to request assistance with a product you have already purchased.

Product and Sales Inquiry

Please use the Sales Inquiry form to request assistance with selecting a product for your application, or to obtain further information about products and service.

Limited Warranty

Diamond Systems Corporation provides a Limited Warranty for all items in this guide that it manufactures and sells, pursuant to terms provided in the Diamond Systems Corporation Limited Warranty. No other warranty, express or implied, is included. Please download the warranty for additional information.

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Document Version

Please ensure that you have downloaded the latest version of this document from the Diamond Systems Support documentation library.

Version	Date	Changes
1.0	01/15/2025	Ver 1.0 – Initial publication.
2.0	03/04/2025	Ver 2.0 – Added new and revised images and illustrations, added installation instructions, revised connectors section, revised text for introduction and jumper configuration.

1. Introduction

Samson provides a low-cost medium-performance solution for customers seeking to develop PC104-based embedded computers as well as extend the lifetime of their existing PC104-based platforms. The long-life Bay Trail Atom processor with 4GB RAM provides ample performance to support Windows and Linux operating systems.

Samson features a fanless design, ensuring efficient operation without the need for active cooling. It supports the Intel® Atom™ E3800 family of processors, offering powerful performance for embedded applications. Dual Gigabit Ethernet ports provide high-speed network connectivity, while the board also includes LVDS and Analog RGB ports, enabling versatile display options. It supports dual independent displays for enhanced visual performance.

Samson's wide temperature -40 to +85C performance allows it to be used with confidence in almost any embedded application, including stationary indoor applications as well as harsh environmental situations.

A wide array of modern I/O allows Samson to interface to the most commonly used embedded computer peripherals. The PC104 connector enables use of existing PC104 boards to simplify I/O expansion for new products and avoid costly redesign for existing systems.

This product may be considered as a possible replacement for customers with applications designed around Diamond's Rhodeus (RDS800-LC or RDS800-XT) product.

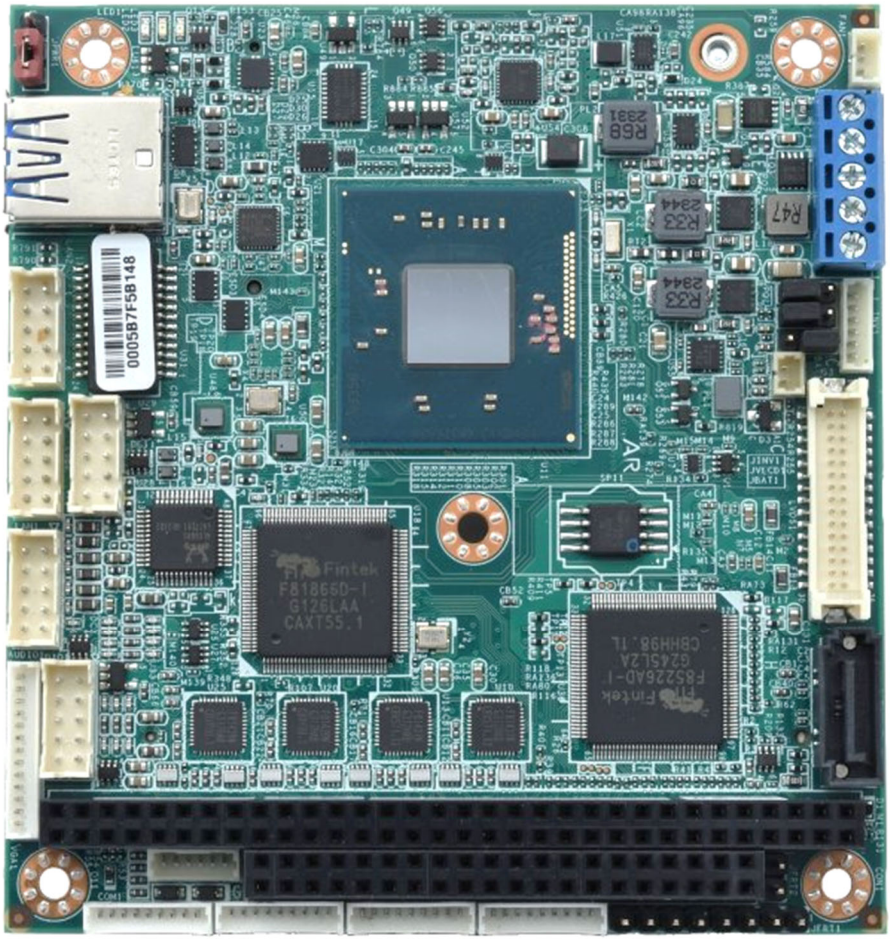


Figure 1-1: SAMSON PC/104 SBC – Top View

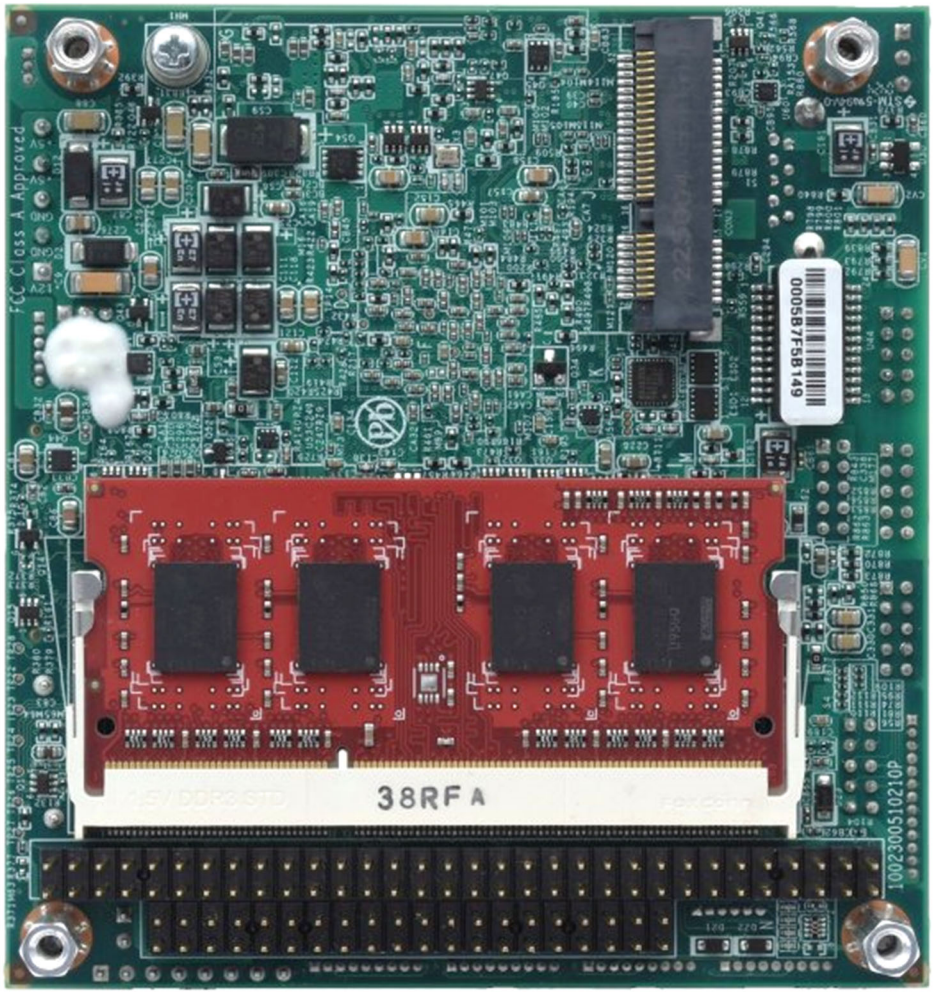


Figure 1-2: Samson PC/104 SBC – Bottom View with SODIMM RAM

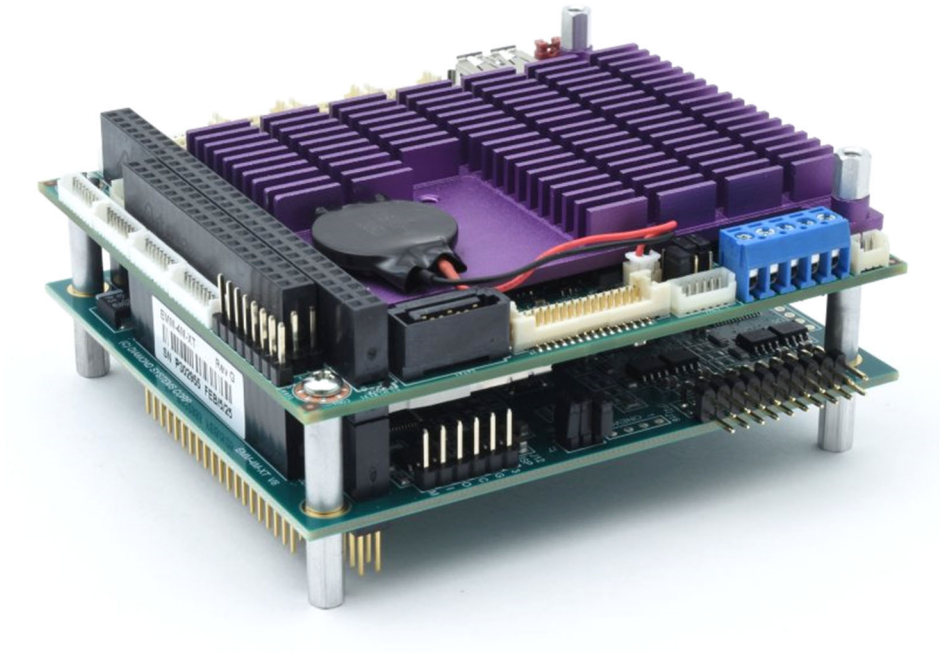


Figure 1-3: Samson with PC/104 I/O module installed underneath

1.1. Samson Ordering Guide

The table below lists the available models of Samson SBC. Contact Diamond Systems sales for assistance.

As the board can work with multiple COMs. New COMs are tested and added regularly. 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.

Model	Features
SAM-E3825-4G-XT	Samson PC104 SBC with E3825 dual-core processor and 4GB SODIMM RAM installed, -40 to +85C
SAM-E3845-4G-XT	Samson PC104 SBC with E3845 processor and 4GB SODIMM RAM installed, -40 to +85C
CK-SAM-01	Cable Kit, includes the following: 1 x SATA cable 1 x Audio cable 4 x COM port cables 1 x KB & MS cable 1 x USB cable 1 x VGA cable 2 x LAN cables 1x GPIO cable 1x Utility Cable

2. Features and Specifications Table

The following are the features and specifications for the Osbourne OSB-BB01 carrier board.

Feature	Specification
CPU	▪ Soldered onboard Intel® Atom™ processor E3825 dual-core 1.33GHz / E3845 quad-core 1.91GHz
Memory	▪ 1 x DDR3L SO-DIMM socket populated with 4GB 1333 MT/s SDRAM (8GB Max)
BIOS	▪ Insyde BIOS
Watchdog Timer	▪ 1 ~ 255 levels reset
I/O Chipset	▪ Fintek F81866
USB 3.0	▪ 1
USB 2.0	▪ 2
Serial	▪ 2x RS-232 ▪ 2 x RS-232/422/485 selectable
KB/MS	▪ 6-pin wafer connector for PS/2 keyboard and mouse via Y-cable
Expansion Bus	▪ PC/104 interface & Mini-card socket
Storage	▪ 1 x Serial ATA port with 300MB/s HDD transfer rate ▪ 1 x mSATA socket (Socket shared and BIOS selectable with Mini PCIe card)
Ethernet Chipset	▪ 2 x RTL8111H PCIe GbE controllers
Digital I/O	▪ 8-bit programmable
Audio	▪ Realtek ALC888S HD Audio CODEC, Mic-in/ Line-in/Line-out
Graphics Chipset	▪ Integrated Intel® HD Graphics
Graphics Interface	▪ Analog RGB supports resolution up to 2048 x 1536 ▪ LCD: Dual Channel 24-bit LVDS

Operating System Support
Linux Kernel version 4.4.38; Ubuntu 20.04
Windows 10, 64-Bit

Mechanical, Electrical and Environmental Properties	
Power Requirement	+5V (Additional +12V might be required for LCD panel)
Power Consumption	1.81A@5V with E3825 (Typical) 2.24A@5V with E3845 (Typical)
Operating Temp.	-40 ~ 85ºC (-40 ~ 185ºF)
Operating Humidity	10%~95% @ 85C (non-condensing)
Dimension (L x W)	90 x 96 mm (3.55” x 3.775”)

3. Block Diagram and Mechanical Drawings

Key functional blocks of the Samson PC/104 Single-Board Computer.

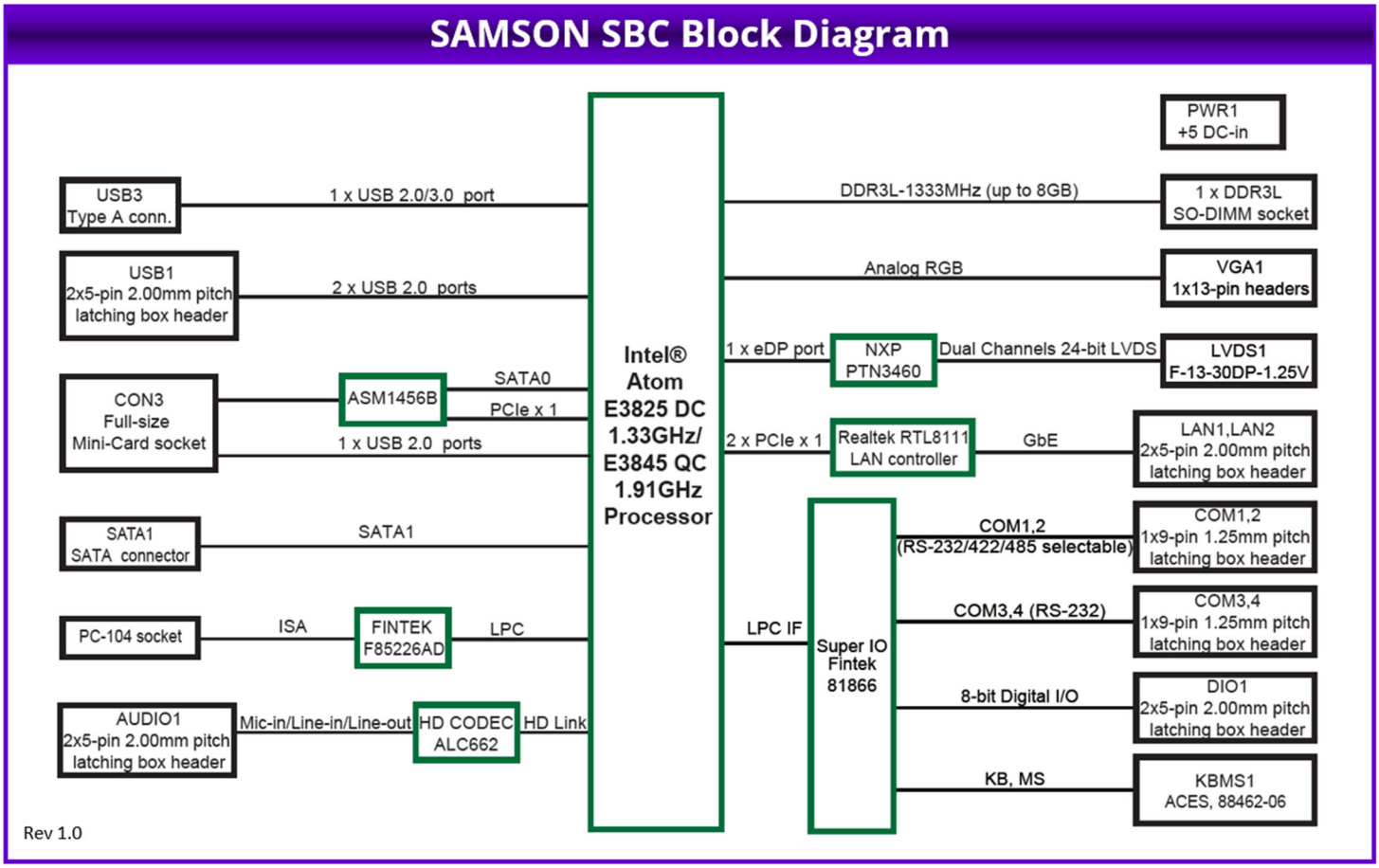


Figure 3-1: Samson PC/104 CPU Module Block Diagram

4. Board Dimensions

The illustrations below provide primary and secondary side dimensions of the Samson SBC. Dimensions are in "inches."

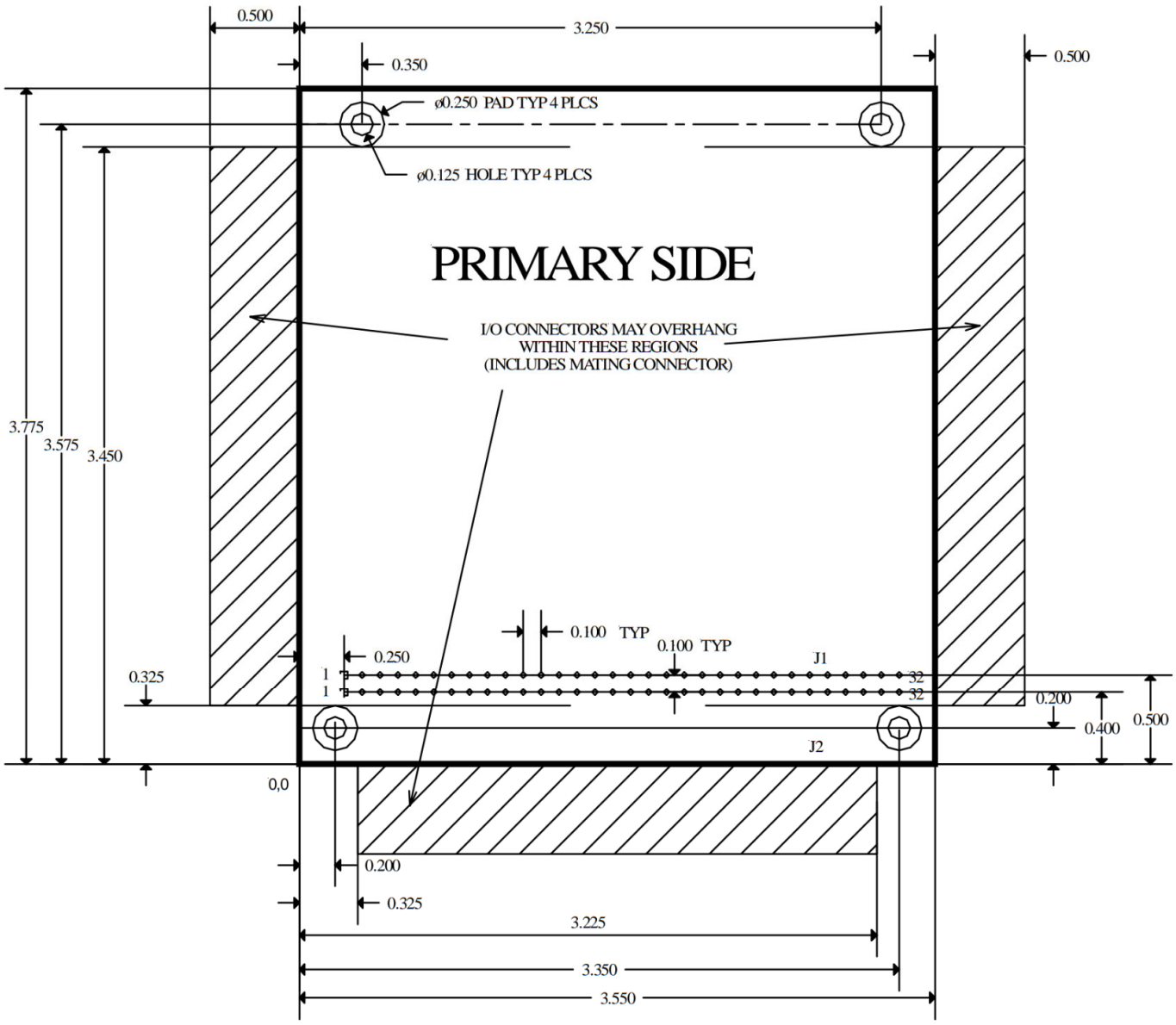


Figure 4-1: Samson PC/104 board dimensions – primary side

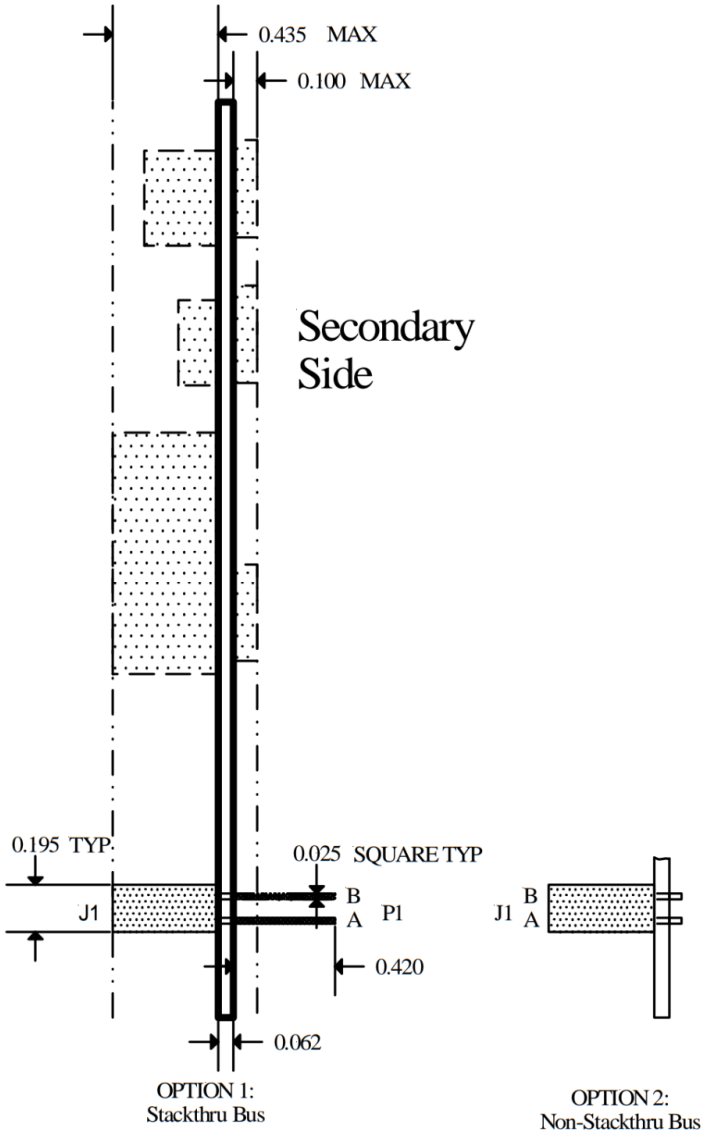


Figure 4-2: Samson PC/104 board dimensions – secondary side

5. Jumper and Connector Locations

The following images display the location of connectors and jumper blocks on both sides of the carrier board.

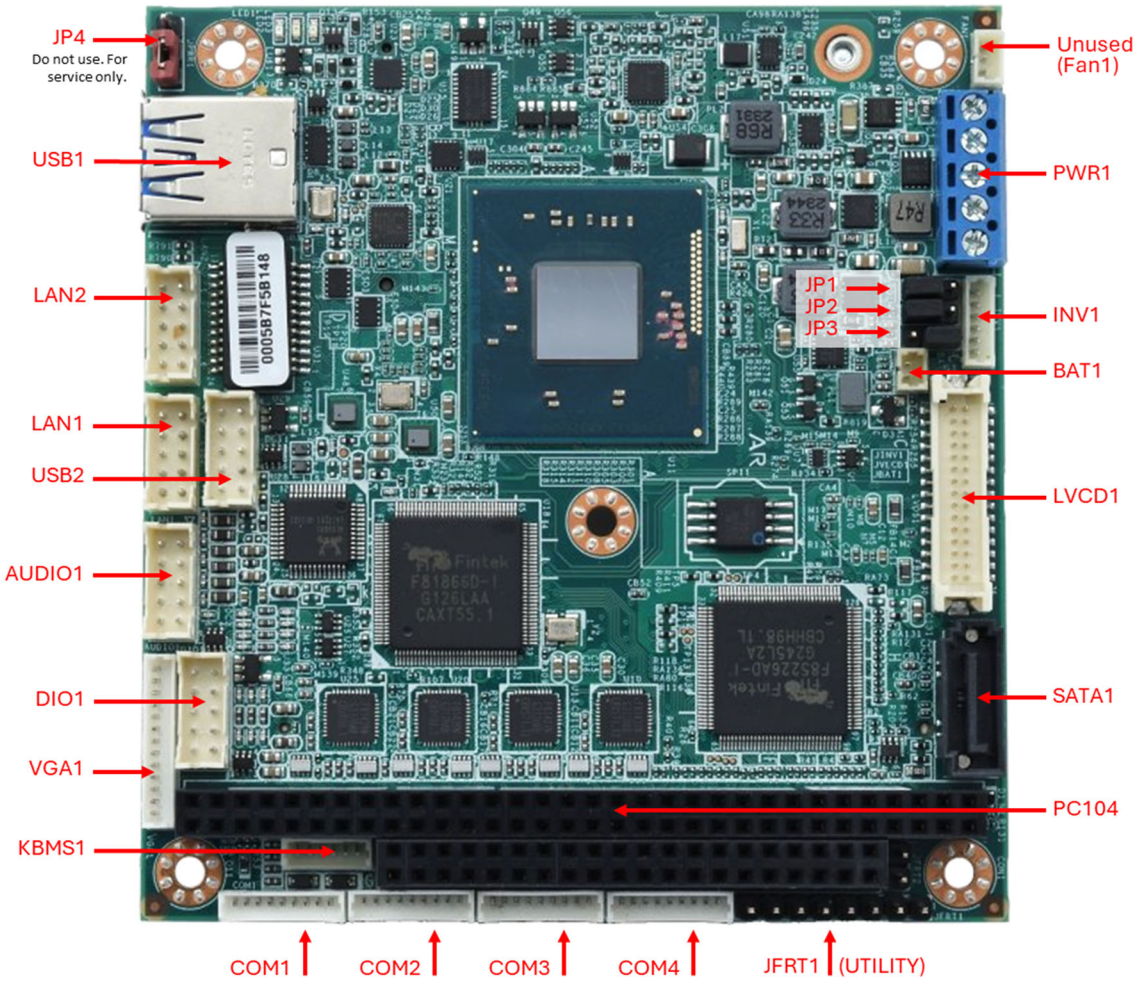


Figure 5-1: Top view (heat sink omitted)

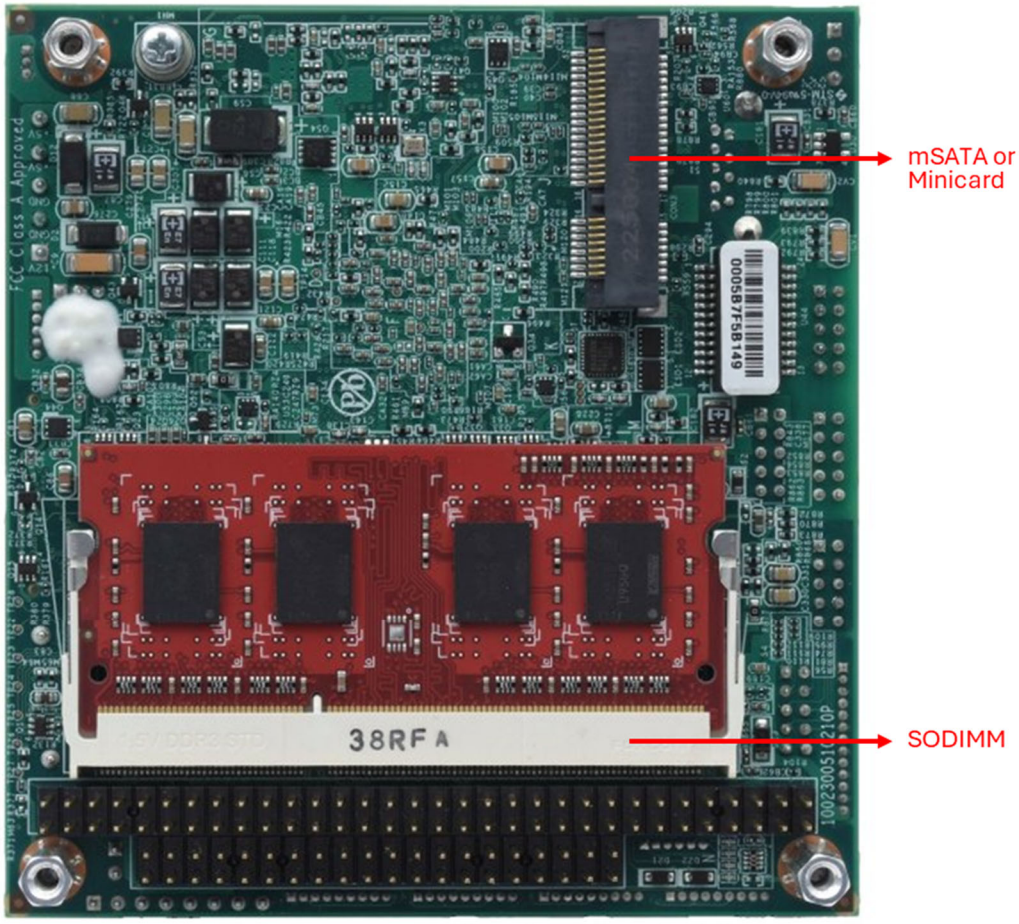


Figure 5-2: Bottom view showing mSATA/Minicard and SODIMM sockets

6. Jumper Configuration

The board included three jumper blocks to alter the hardware configuration. These are configured as follows:

Jumper	Description	Connector
JP1	Set LCD inverter voltage	2.00mm pitch, 1x3-pin header jumper
JP2	Set LCD panel voltage	2.00mm pitch, 1x3-pin header jumper
JP3	The voltage selection of LCD panel	2.00mm pitch, 1x3-pin header jumper
JP4	(**Do not use**. For service / testing only.)	

6.1. JINV1

Use the **JP1** jumper to set the LCD **inverter** voltage as needed for your LCD panel. This jumper sets the voltage for pin 1 of the **INV1** connector. Configure the voltage as follows:

- Pins 1-2: +12V
- Pins 2-3: +5V (default setting)

6.2. JLVCD1

Use the **JP2** jumper to set the LCD **panel** voltage as needed for your LCD panel. This jumper determines the voltage for pins 1 and 2 of the **LVCD1** connector. Configure the voltage as follows:

- Pins 1-2: +5V
- Pins 2-3: +3.3V (default setting)

6.3. JBAT1

Use the **JP3** jumper to “keep” or “clear” the CMOS memory.

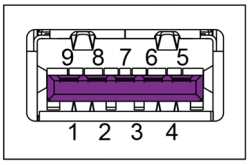
To reset (clear) the CMOS set the jumper to pins 2-3 for a few seconds. After the CMOS is clear, move the jumper back to pins 1-2.

- Pins 1-2: Keeps CMOS (default setting)
- Pins 2-3: Clear CMOS

7. Connector Pinout Specifications

7.1. USB1

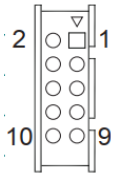
The **USB1** connector is a USB 3.0/2.0 Type A connector, designed to support both USB 3.0 and 2.0 devices. The pin assignments follow the industry-standard specifications, ensuring compatibility with a wide range of USB peripherals. Industry-standard Type A cables can be used with this connector.

Description: USB Type A right-angle 3.0/2.0 Connector	

7.2. LAN1 & LAN2

The Ethernet connectors use a 2.00mm pitch 2x5-pin wafer connector. The pin assignments are as follows:

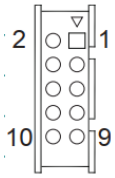
TX_MDI0-	**2**	**1**	TX_MDI0+
MDI2+	**4**	**3**	RX_MDI1+
RX_MDI1-	**6**	**5**	MDI2-
MDI3-	**8**	**7**	MDI3+
N/C	**10**	**9**	N/C

Connector: JST part no. B10B-PHDSS Connector Type: 2.00mm pitch 2x5-pin wafer connector Mating connector: JST part no. PHDR-10VS Mating Cable: DSC no. **6989032**	

7.3. USB2

The board supports 2 USB2.0 ports with a 2x5 connector. The pin assignments are as follows:

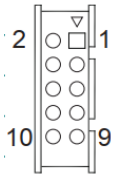
+5V-	**2**	**1**	+5V
USBP1-	**4**	**3**	USBP0-
USBP1+	**6**	**5**	USBP0+
GND	**8**	**7**	GND
N/C	**10**	**9**	GND

Connector: JST part no. B10B-PHDSS Connector Type: 2.00mm pitch 2x5-pin wafer connector Mating connector: JST part no. PHDR-10VS Mating Cable: DSC no. **6989033**	

7.4. AUDIO1

The AUDIO1 connector is a 2.00mm pitch 2x5-pin connector. The pin assignments are as follows:

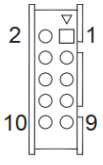
Line In R	**2**	**1**	Line In L
Gnd3	**4**	**3**	Gnd1
N/C	**6**	**5**	Mic
Gnd4	**8**	**7**	Gnd2
Line Out R	**10**	**9**	Line Out L

Connector: JST part no. B10B-PHDSS Connector Type: 2.00mm pitch 2x5-pin wafer connector Mating connector: JST part no. PHDR-10VS Mating Cable: DSC no. **6989030**	

7.5. DIO1

The Digital I/O lines operate with 5V logic levels and are individually configurable for input or output. These DIO lines are controlled with a C language programming library available for free download. The library provides functions for direction configuration, input, and output operations.

DIO 0	**1**	**2**	DIO 1
DIO 2	**3**	**4**	DIO 3
DIO 4	**5**	**6**	DIO 5
DIO 6	**7**	**8**	DIO 7
5V	**9**	**10**	GND

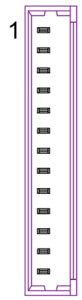
Connector: JST part no. B10B-PHDSS Connector Type: 2.00mm pitch 2x5-pin wafer connector Mating connector: JST part no. PHDR-10VS Mating Cable: DSC no. **6989036**	

7.6. VGA1

VGA availability is dependent on the installed COM. The pin assignments are as follows:

1	VSync
2	HSync
3	GND
4	SCL
5	SDA
6	GND
7	BLUE
8	GND
9	GREEN
10	GND
11	RED
12	GND
13	VCC

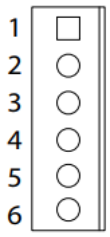
Connector PN: ACES 86801-13 or Amphenol 10114829-11113LF
Connector Type: 1x13-pin 1.25mm 4-wall connector
Mating part no.: Amphenol 10114826-00013LF
Mating Cable: DSC no. **6989035**



7.7. KBMS1

The connector for keyboard and mouse uses a 1x6-pin 1.25mm 4-wall connector. The pin assignments are as follows:

1	KB_DATA
2	KB_CLK
3	GND
4	PS2_VCC
5	MS_DATA
6	MS_CLK

Connector PN: Cvilux CI4406P1V00-LF or AdamTech 125SH-A-06-TS Connector Type: 1x6-pin 1.25mm 4-wall connector Mating connector: AdamTech 125CH-A-06 Mating Cable: DSC no. **6989034**	

7.8. COM1 to COM4

The board supports four COM ports on 4 connectors.

- Serial ports 1 and 2 support RS-232, RS-422, and RS-485 protocols. The connector pinout for each protocol is shown below.
- Serial ports 3 and 4 support RS-232 only. The connector pinout for RS-232 protocol is shown below.

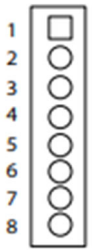
	Serial Ports 3 & 4	N/A	N/A
	Serial Ports 1 & 2		
PIN	**RS-232**	**RS-422**	**RS-485**
1	DCD#	TX-	D-
2	DSR#		
3	RX	TX+	D+
4	RTS#		
5	TX	RX+	
6	CTS#		
7	DTR#	RX-	
8	RI#		
9	GND	GND	GND

Connector PN: ACES 86801-09 or AdamTech 125SH-A-09-TS Connector Type: 1x9-pin1.25mm 4-wall connector Mating connector: AdamTech 125CH-A-09 Mating Cable: DSC no. **6989031**	

7.9. JFRT1 (Utility)

The connector for reset, power LED, HDD LED, and speaker uses a 2.54mm pitch 1x8-pin header. The pin assignments are as follows:

1	Reset
2	Gnd
3	Power LED+
4	Gnd
5	HD LED+
6	HDD LED-
7	Speaker+
8	Speaker-

Connector type: Industry standard 1x8 .1" single-row vertical pin header Mating Cable: DSC no. **6989037**	

7.10. SATA1

The Serial ATA (SATA) connector supports high-speed data transfer rates of up to 300MB/s. This connector type is designed for fast and reliable data transfer, ideal for hard drives and SSDs, conforming to the SATA interface standard for modern storage solutions. The pin assignments are as follows:

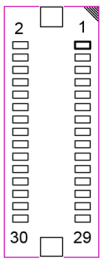
1	Ground
2	Transmit +
3	Transmit -
4	Ground
5	Receive -
6	Receive +
7	Ground

Connector Type: Industry-standard SATA 7-pin vertical connector Mating Cable: Generic; DSC cable no. **6989102** may be used	

7.11. LVDS1

The LCD panel connector is a DF-13-30DP-1.25V type connector. This connector is specifically designed for LCD panel connections, providing a reliable interface with a 1.25mm pitch to support the required signal and power connections for the display. The pin assignments are as follows:

VDD 5V/3.3V	**1**	**2**	VDD 5V/3.3V
TX1CLK+	**3**	**4**	TX2CLK+
TX1CLK-	**5**	**6**	TX2CLK-
GND	**7**	**8**	GND
TX1_D0+	**9**	**10**	TX2_D0+
TX1_D0-	**11**	**12**	TX2_D0-
GND	**13**	**14**	GND
TX1D1+	**15**	**16**	TX2_D1+
TX1D1-	**17**	**18**	TX2_D1-
GND	**19**	**20**	GND
TX1D2+	**21**	**22**	TX2D2+
TX1D2-	**23**	**24**	TX2D2-
GND	**25**	**26**	GND
TX1D3+	**27**	**28**	TX2D3+
TX1D3-	**29**	**30**	TX2D3-

Connector PN: Hirose DF13-30DP-1.25V	

7.12. BAT1

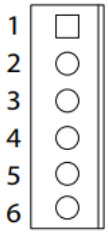
The Battery Connector is a 2-pin connector. The pin assignments are as follows. Replaement batteries may have alternate wiring polarities. Note the color coding of the wires in the photo. If the battery is replaced, make sure the + (red) and – (black) wires are in the same positions as in the photo.

1	Power +
2	GND

7.13. INV1

The LCD Inverter Connector uses a 1x6-pin CVILUX 1.25mm CI4406P1V00-LF 4-wall connector. The pin assignments are as follows:

1	INV_VCC
2	INV_VCC
3	BKLT_EN
4	BKLT_CTRL
5	GND
6	GND

Connector PN: CVILUX 1.25mm CI4406P1V00-LF Connector Type: 1x6-pin 4-wall connector	

7.14. PWR1

The input power is provided by a 5-position screw terminal block.

Although two terminals are provided for both 5V input and Ground, the individual terminal rating exceeds the power requirements for Samson, so just a single +5V wire and a single Ground wire is sufficient.

1	VCC 12V	Backlight power input, not required for SBC operation
2	GND	Common connection for all input voltages
3	GND	Common connection for all input voltages
4	VCC 5V	Main power input for SBC operation
5	VCC 5V	Main power input for SBC operation

7.15. FAN1

FAN1 is not used. For reference only. 1.25mm pitch 1x3-pin wafer connector. Pin1 GND. Pin2 5V. Pin3 N/C.

The heat sink on Samson is sufficient for operation up to 85C in a free air environment. If a PC104 board is installed on the top side however, the upper temperature limit may be reduced.

7.16. PCIe Minicard / mSATA – CON3

(On the bottom of the board.) The bord contains a dual-use PCIe Minicard / mSATA 52-Pin full-size socket. The pin assignments conform to the industry standard. A single mounting standoff is provided for a full-size card. Half-size cards can be used with an extender, which may be included with the half-size module or is easily obtainable.

Connector PN: Connector Type: 52-pin Minicard Socket	

7.17. PC104 Bus

The PC/104 bus is essentially identical to the ISA Bus except for the physical design. It specifies two pin and socket connectors for the bus signals. A 64-pin header J1 incorporates the 62-pin 8-bit bus connector signals, and a 40-pin header J2 incorporates the 36-pin 16-bit bus connector signals. The additional pins on the PC/104 connectors are used as ground or key pins. The female sockets on the top of the board enable stacking another PC/104 board on top of the board, while the male pins on the bottom enable the board to plug into another board below it.

In the pinout figures below, the tops correspond to the left edge of the connector when the board is viewed from the primary side (side with the CPU chip and the female end of the PC/104 connector) and the board is oriented so that the PC/104 connectors are along the bottom edge of the board.

View from Top of Board

J2: PC/104 16-bit bus connector

Ground	**D0**	**C0**	Ground
MEMCS16-	**D1**	**C1**	SBHE-
IOCS16-	**D2**	**C2**	LA23
IRQ10	**D3**	**C3**	LA22
IRQ11	**D4**	**C4**	LA21
IRQ12	**D5**	**C5**	LA20
IRQ15	**D6**	**C6**	LA19
IRQ14	**D7**	**C7**	LA18
DACK0-	**D8**	**C8**	LA17
DRQ0	**D9**	**C9**	MEMR-
DACK5-	**D10**	**C10**	MEMW-
DRQ5	**D11**	**C11**	SD8
DACK6-	**D12**	**C12**	SD9
DRQ6	**D13**	**C13**	SD10
DACK7-	**D14**	**C14**	SD11
DRQ7	**D15**	**C15**	SD12
+5V	**D16**	**C16**	SD13
MASTER-	**D17**	**C17**	SD14
Ground	**D18**	**C18**	SD15
Ground	**D19**	**C19**	Key (pin cut)

J1: PC/104 8-bit bus connector

IOCHCHK-	**A1**	**B1**	Ground
SD7	**A2**	**B2**	RESET
SD6	**A3**	**B3**	+5V
SD5	**A4**	**B4**	IRQ9
SD4	**A5**	**B5**	-5V
SD3	**A6**	**B6**	DRQ2
SD2	**A7**	**B7**	-12V
SD1	**A8**	**B8**	0WS-
SD0	**A9**	**B9**	+12V
IOCHRDY	**A10**	**B10**	Key (pin cut)
AEN	**A11**	**B11**	SMEMW-
SA19	**A12**	**B12**	SMEMR-
SA18	**A13**	**B13**	IOW-
SA17	**A14**	**B14**	IOR-
SA16	**A15**	**B15**	DACK3-
SA15	**A16**	**B16**	DRQ3
SA14	**A17**	**B17**	DACK1-
SA13	**A18**	**B18**	DRQ1
SA12	**A19**	**B19**	Refresh-
SA11	**A20**	**B20**	SYSCLK
SA10	**A21**	**B21**	IRQ7
SA9	**A22**	**B22**	IRQ6
SA8	**A23**	**B23**	IRQ5
SA7	**A24**	**B24**	IRQ4
SA6	**A25**	**B25**	IRQ3
SA5	**A26**	**B26**	DACK2-
SA4	**A27**	**B27**	TC
SA3	**A28**	**B28**	BALE
SA2	**A29**	**B29**	+5V
SA1	**A30**	**B30**	OSC
SA0	**A31**	**B31**	Ground
Ground	**A32**	**B32**	Ground

8. PC/104 I/O Board Installation

Samson supports a PC/104 (ISA bus) I/O expansion board in either 8-bit or 16-bit configuration.

Each PC/104 board has its own address range. The lowest address of this range is called the base address. Most PC/104 boards will have information on how to select the base address. No two boards may overlap their address ranges, otherwise the system will not operate correctly.

Many PC/104 boards also use interrupts, or IRQs. If so, these may also be configurable. The PC/104 standard allows for multiple boards to share the same interrupt level. Information on interrupt level selection and interrupt sharing will be found in the board's user manual.

8.1. Installation

PC/104 I/O boards can be installed either above or below the Samson board. The following photos depicts the clearance available in either (above or below) configuration.

The preferred installation position is below the board, so that the heat sink has free exposure to air for convection cooling. If a PC/104 board is installed on top of Samson, it will block the heat sink, reducing its effectiveness. The maximum operating temperature may be reduced in this scenario.

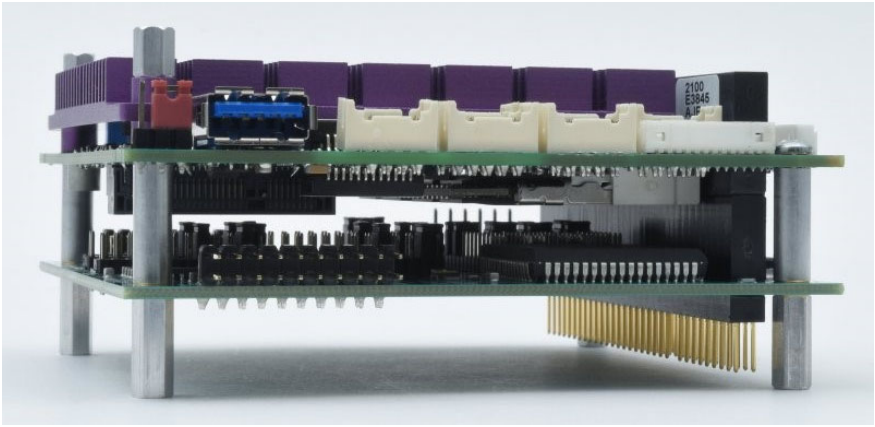


Figure 8-1: Samson with PC/104 board mounted below (preferred position)

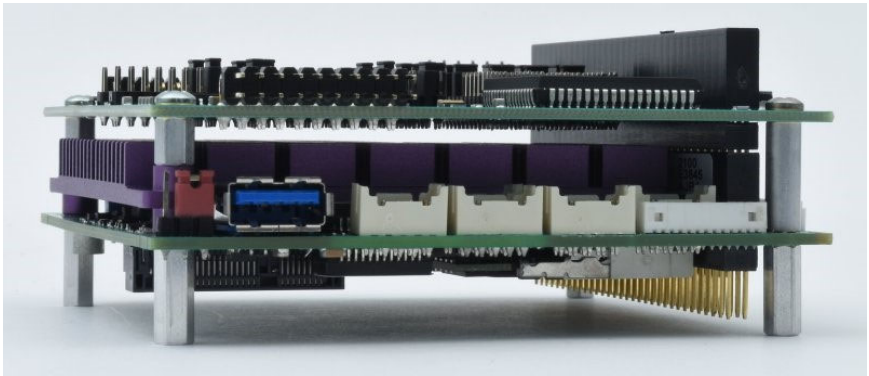


Figure 8-2: Samson with PC/104 board mounted above (may reduce upper temperature limit)

Installation Steps

1. Check that the PC/104 connectors are compatible. The PC/104 standard specifies two key pins on the connectors, numbered B10 and C19. On the top socket side, these pins should be plugged, and on the bottom side, they should be cut away. This helps to prevent misalignment during installation.

   Not all vendors adhere to both the plugged sockets and cut pins. In the case that you are installing a board without cut pins onto a board with plugged sockets, you can either pull out the plugs on the top side or cut the interfering pins on the bottom side. These pins have no function on the PC/104 bus, so they can be cut without any adverse impact on performance.

2. Install PC/104 spacers (4-40 0.6” length or M2.5/M3 15.24mm length) in the 4 corners to maintain the proper distance and parallel positioning. Spacers should always be used in all 4 corners for reliability and to avoid damage. Align the two boards, then press down carefully to connect them. Push straight down until the boards are fully seated.

Removal Steps

1. To remove a PC/104 board, grab the two boards to be separated so that the thumb of each hand is on one of the boards at the PC/104 connector side. Rock the two boards back and forth carefully along the axis of the PC/104 connectors, using a very limited range of motion (about 5-10 degrees maximum rotation).

   Rock back and forth multiple times while gently pulling the boards apart. After 10-15 rocking motions, the boards should eventually come apart.

   Be **very careful** to pull the boards apart evenly across the length of the connectors to avoid bending the PC/104 pins. If the pins become bent by accident, needle-nose pliers can generally be used to straighten them out again.