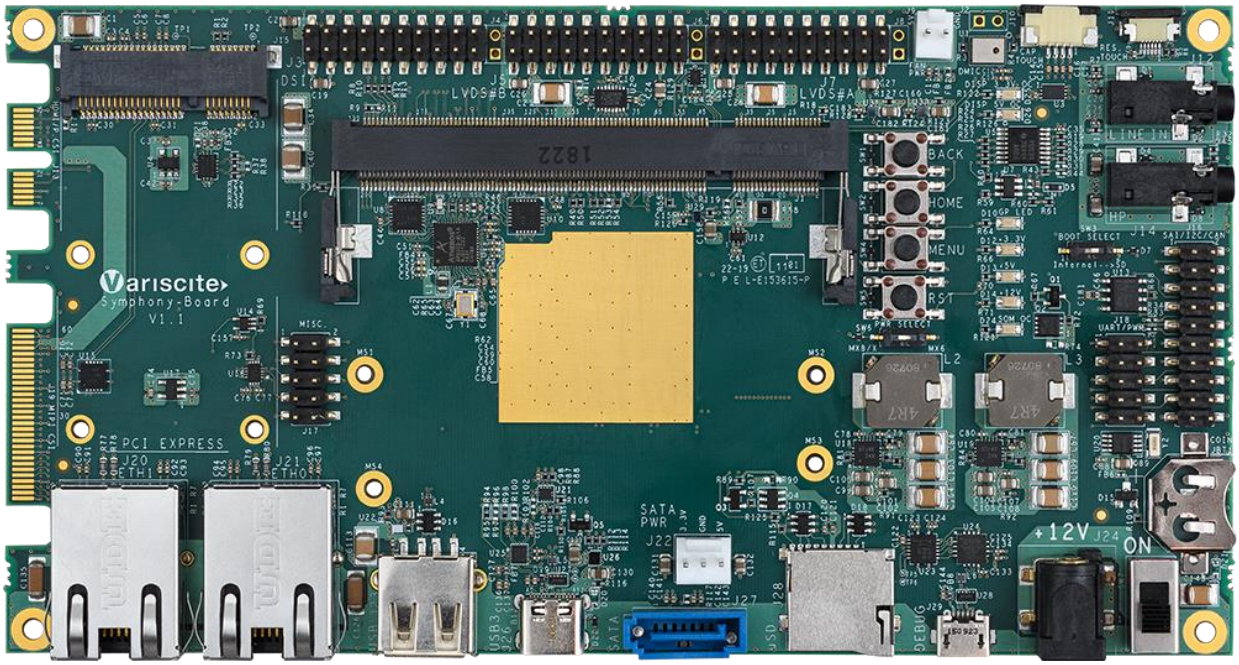
VARISCITE LTD

Symphony-Board Rev 1.x Datasheet

Carrier-board for:

VAR-SOM-MX6
VAR-SOM-MX8X
VAR-SOM-MX8M-NANO
VAR-SOM-MX93
VAR-SOM-MX8
VAR-SOM-MX8M-MINI
VAR-SOM-MX8M-PLUS
VAR-SOM-AM62



VARISCITE LTD.

Symphony-Board Datasheet

Variscite Ltd.
4, Hamelacha Street
Lod
P.O.B 1121
Airport City, 70100
ISRAEL

Tel: +972 (9) 9562910
Fax: +972 (9) 9589477

1. Document Revision History

Revision	Date	Notes
1.00	Jun 10, 2019	Initial
1.01	Jul 18, 2019	Updated block diagrams section 1.3 Updated table section 2.3.3.1
1.02	Sep 09, 2019	Updated section 2.3.1, Table 2-13
1.03	Mar 03, 2020	Added section 1.3.4 & 1.3.5
1.04	Oct 13, 2020	Added support for VAR-SOM-MX8M-PLUS - Added section 4.3.6 Updated according to latest revision v1.4x of Symphony-Board - Modified sections: 4.4, 4.5, 5.3.4, 5.3.6-5.3.10, 5.3.14
1.05	Jan 23, 2022	Table 2-17 Description changed
1.06	Apr 11, 2022	Added Symphony-Board v1.6 changes: Modified mechanical drawing section 4.4 Updated Ethernet related sections 5.3.4, 5.3.15 Updated RTC IC P/N sections 4.2, 5.4.3.5
1.07	Jan 23, 2023	Added support for: VAR-SOM-MX93 VAR-SOM-AM62 (See section 7)
1.08	Jan 30, 2023	Updated Symphony-Board revision section 7

2. Table of Contents

3. List of Tables

4. Overview

4.1. General Information

The Symphony-Board is a complete development board, utilizing all the System-on-Module's features. It is assembled with large variety of user and debug interfaces enabling it to serve as both a complete development kit or as a stand-alone end-product.

4.1.1. Supporting Variscite products

- VAR-SOM-MX6
- VAR-SOM-MX8
- VAR-SOM-MX8X
- VAR-SOM-MX8M-MINI
- VAR-SOM-MX8M-NANO
- VAR-SOM-MX8M-PLUS
- VAR-SOM-MX93
- VAR-SOM-AM62

- VAR-EXT-HDMI
- VAR-EXT-DP
- VCAM-5640PA
- VCAM-5640S-2ND

- 7" Capacitive touch LCD

4.1.2. Supporting O.S

- Linux
- Android

4.1.3. Additional information

Board schematics in PDF format as well as mechanical CAD data base is available to download at Variscite Web Site - www.variscite.com,

Valuable information including board schematics in Orcad format, Allegro layout files, pre-built software images, and more can be located on the Variscite FTP site. – ftp.variscite.com Please contact Variscite support for access details.

Additional SW support information can be found: http://variwiki.com/

For further information contact Variscite support at mailto:support@variscite.com.

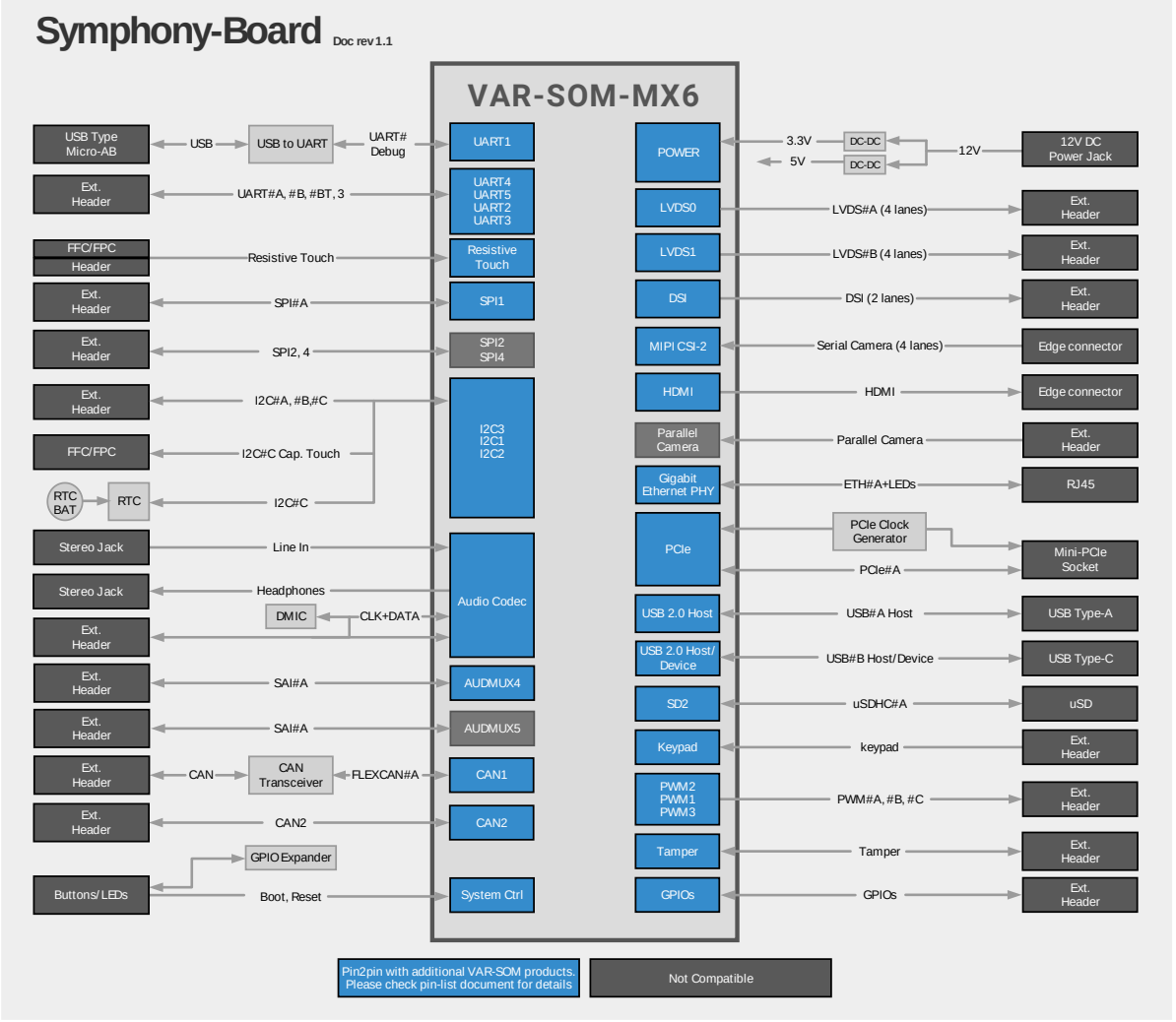
4.2. Symphony-Board Features Summary

- SO-DIMM200 socket, compatible with the:
  - VAR-SOM-MX6
  - VAR-SOM-MX8
  - VAR-SOM-MX8X
  - VAR-SOM-MX8M-MINI
  - VAR-SOM-MX8M-NANO
  - VAR-SOM-MX8M-PLUS
  - VAR-SOM-MX93
  - VAR-SOM-AM62
- Display
  - 2x 18-bit LVDS Interface supporting Variscite's 7" TFT capacitive touch LCD
  - HDMI 2.0a (Via Extension Card)
  - Display Port 1.3/ eDP 1.4 – (Via Extension Card)
- Touch panel interface
  - Capacitive - I2C based
  - Resistive – SPI based
- Ethernet
  - 2x 10/100/1000BaseT – RJ45
- PCIe
  - Mini PCIe
- SATA
  - uSATA connector
- USB
  - USB3.0/2.0 OTG Type C
  - USB2.0 Host Type A
- AUDIO
  - 3.5mm Headphones jack
  - 3.5mm Line in jack
  - Digital Microphone
- µSD-Card slot
- Camera
  - Serial interface – MIPI CSI x4 lanes (Via Extension Card)
  - Parallel interface – Parallel CSI 8-bit (Via Extension Card)
- CAN Bus
  - CAN Transceiver with CAN FD support via Header
- Debug

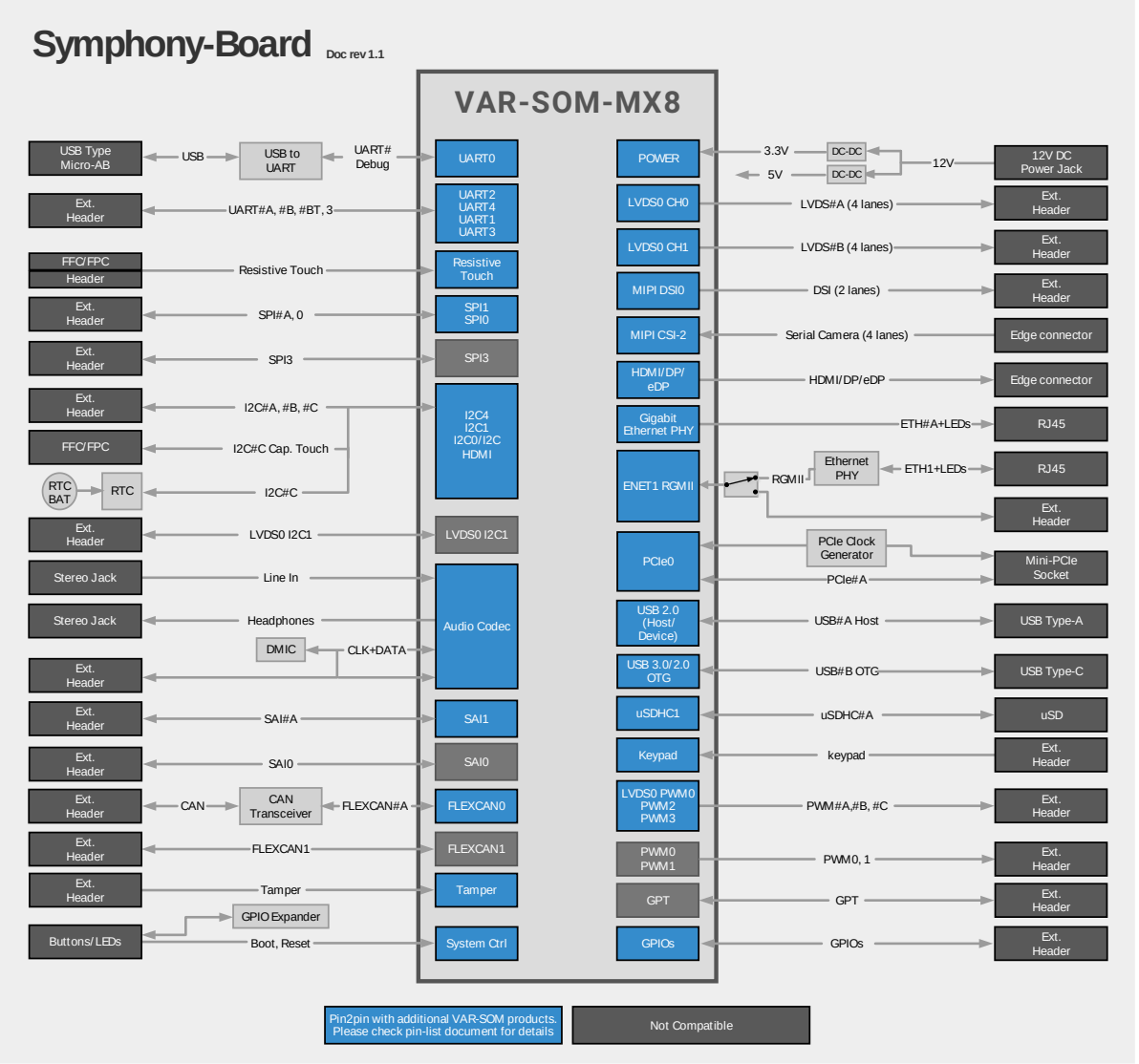
  - USB debug - Type Micro AB
- RTC
  - DS1337U+ Chip
- Additional
  - UART, PWM, SAI (Serial Audio Interface), SPI, I2C, GPIOs - Headers
  - General purpose LED, Buttons
- Power
  - 12V DC Input. - 2.0mm DC jack / 2 pin Terminal Block
  - 5V,3.3V DC Out – 2 pin Header SATA Power
  - 5V, DC Out – 2 pin Header FAN Power
  - RTC Backup battery - CR1225 Battery Holder

4.3. Block Diagram

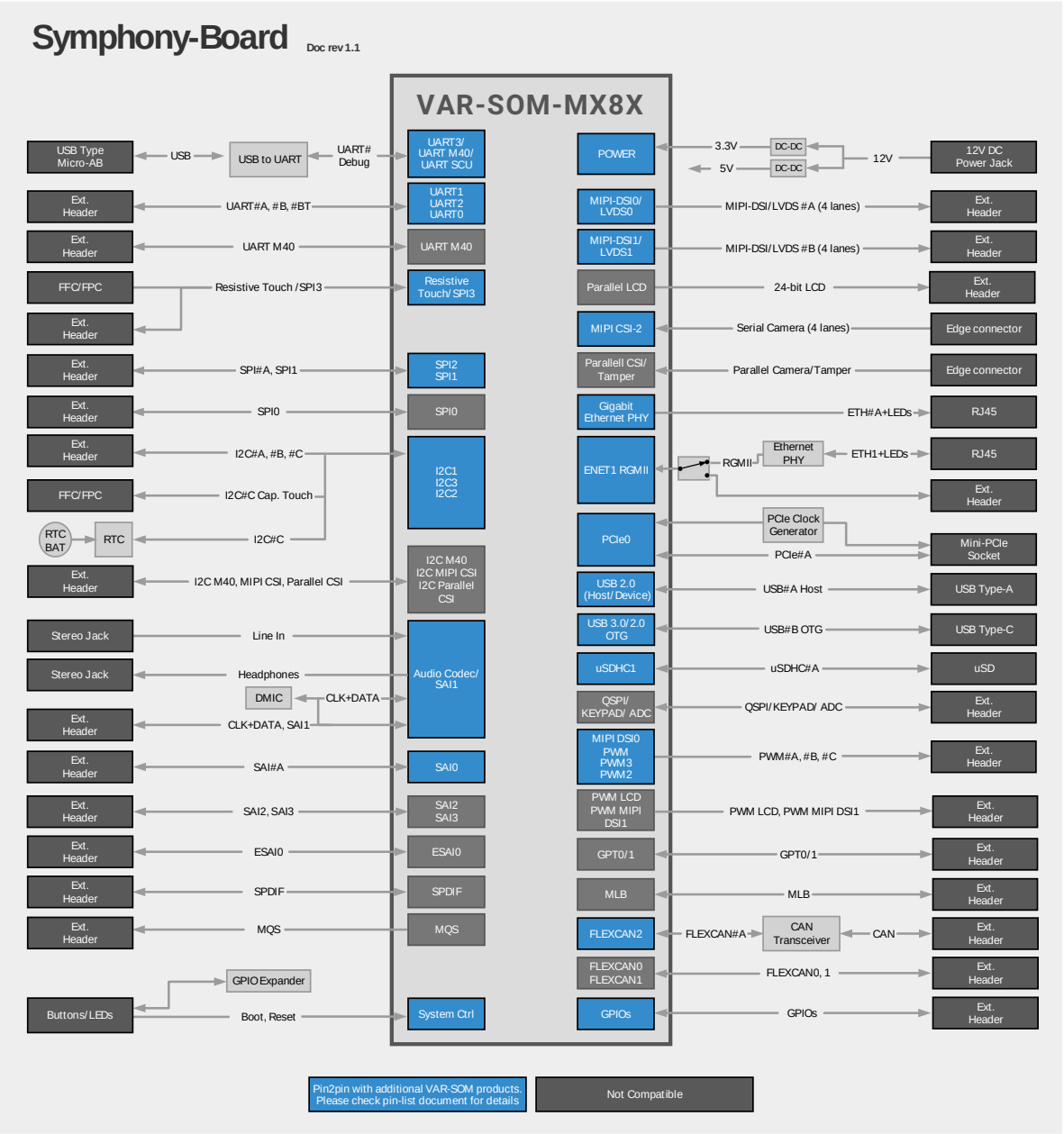
4.3.1. Symphony-Board (VAR-SOM-MX6 assembled)



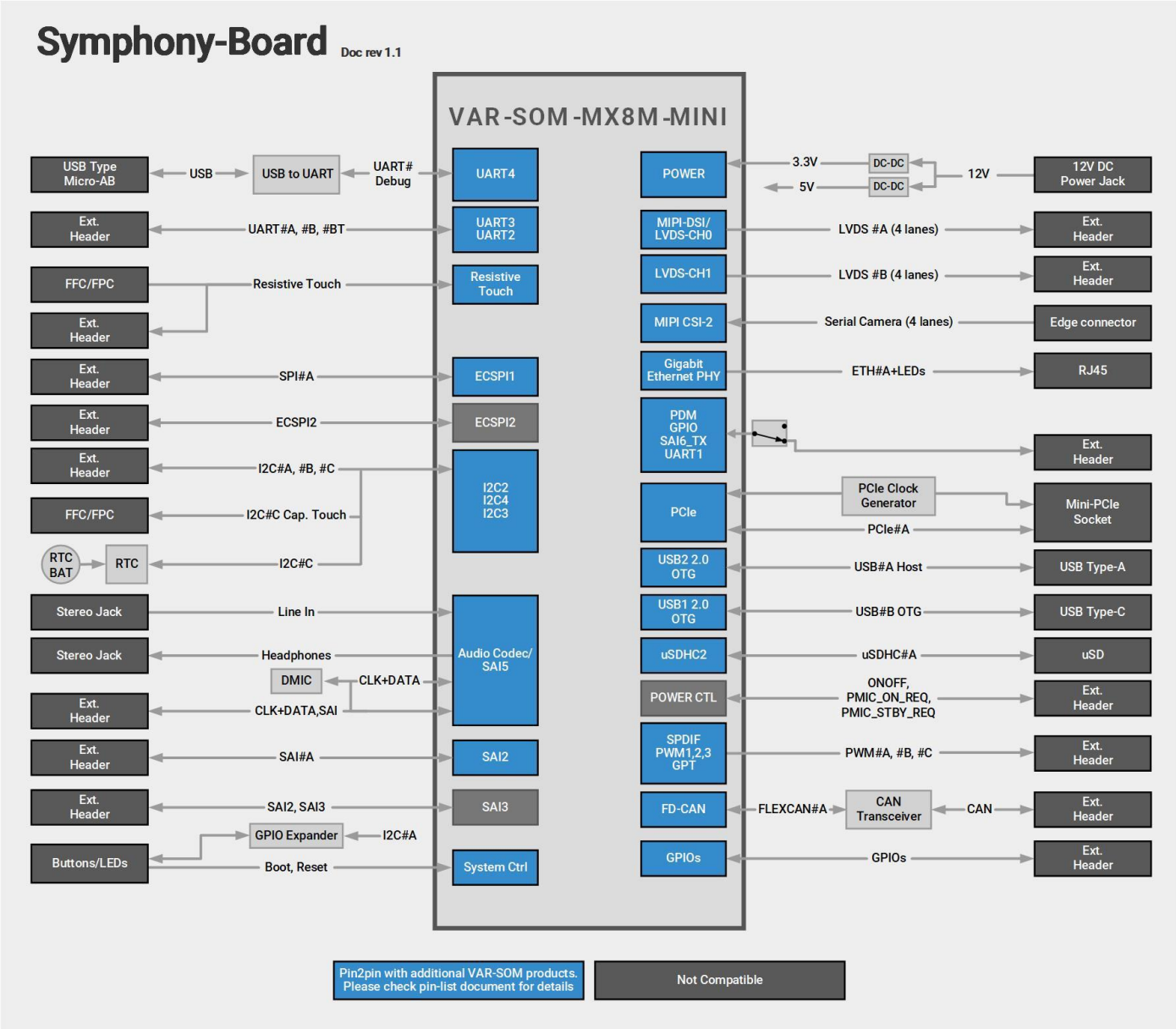
4.3.2. Symphony-Board (VAR-SOM-MX8 assembled)



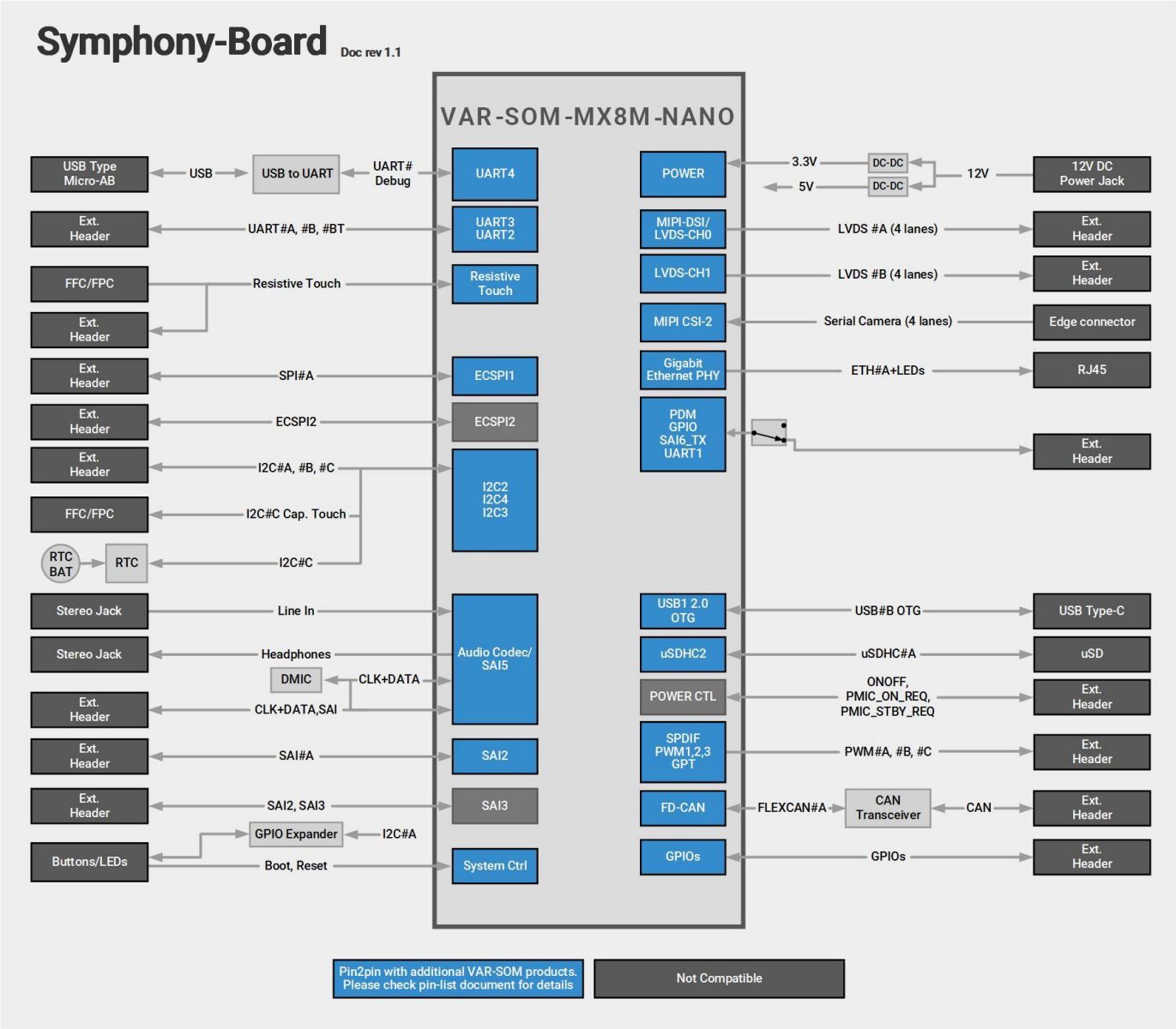
4.3.3. Symphony-Board (VAR-SOM-MX8X assembled)



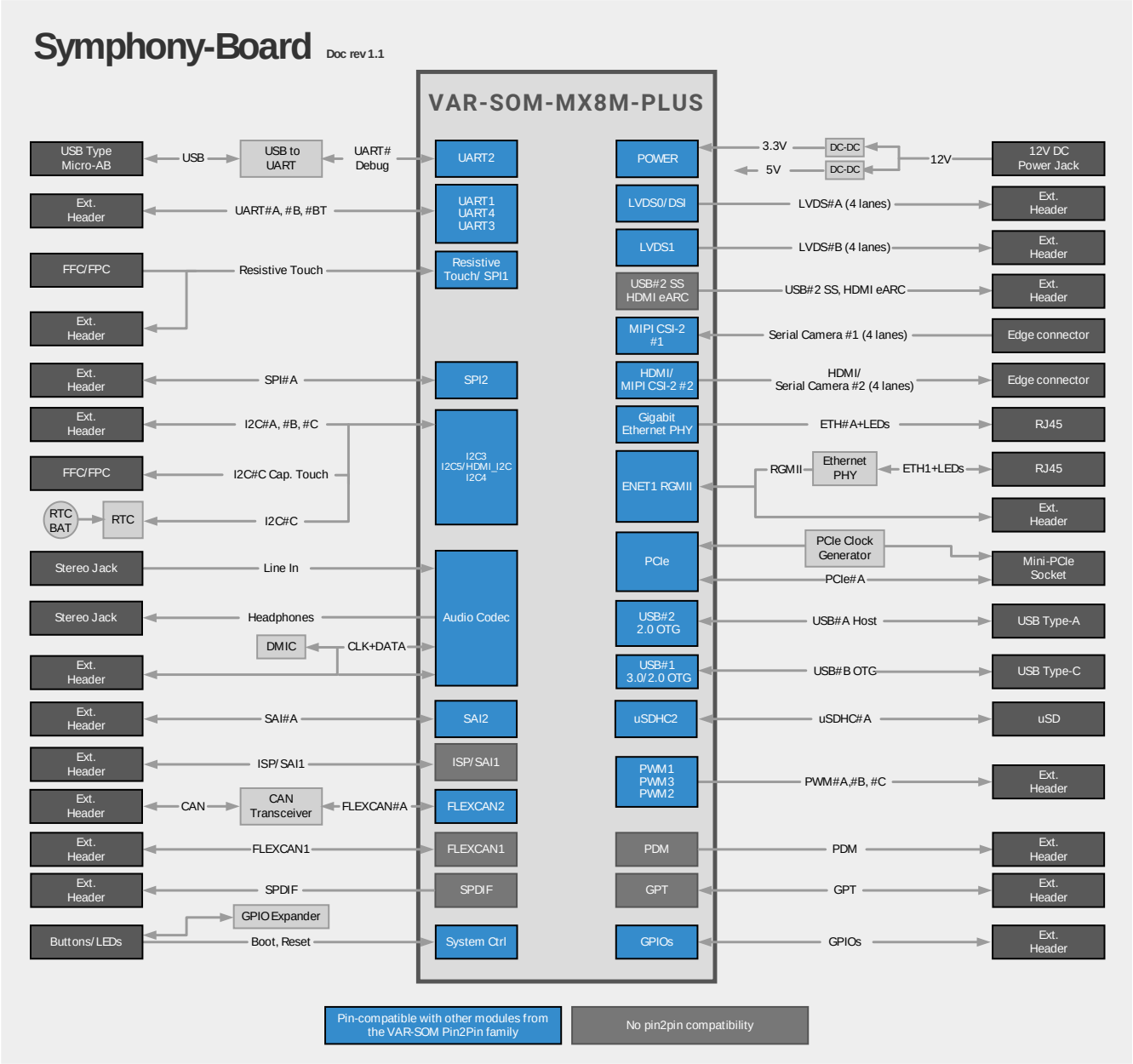
4.3.4. Symphony-Board (VAR-SOM-MX8M-MINI assembled)



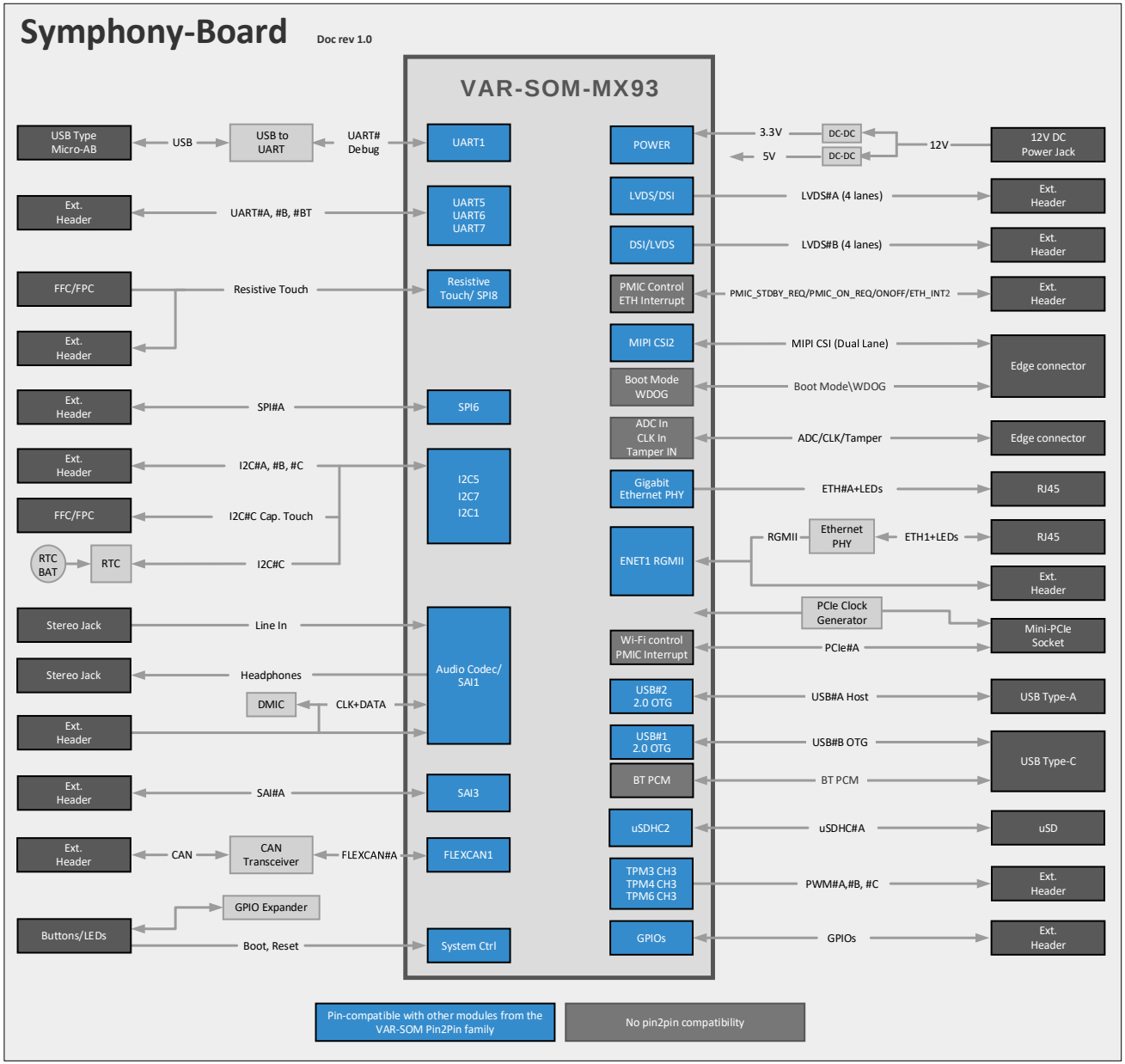
4.3.5. Symphony-Board (VAR-SOM-MX8M-NANO assembled)



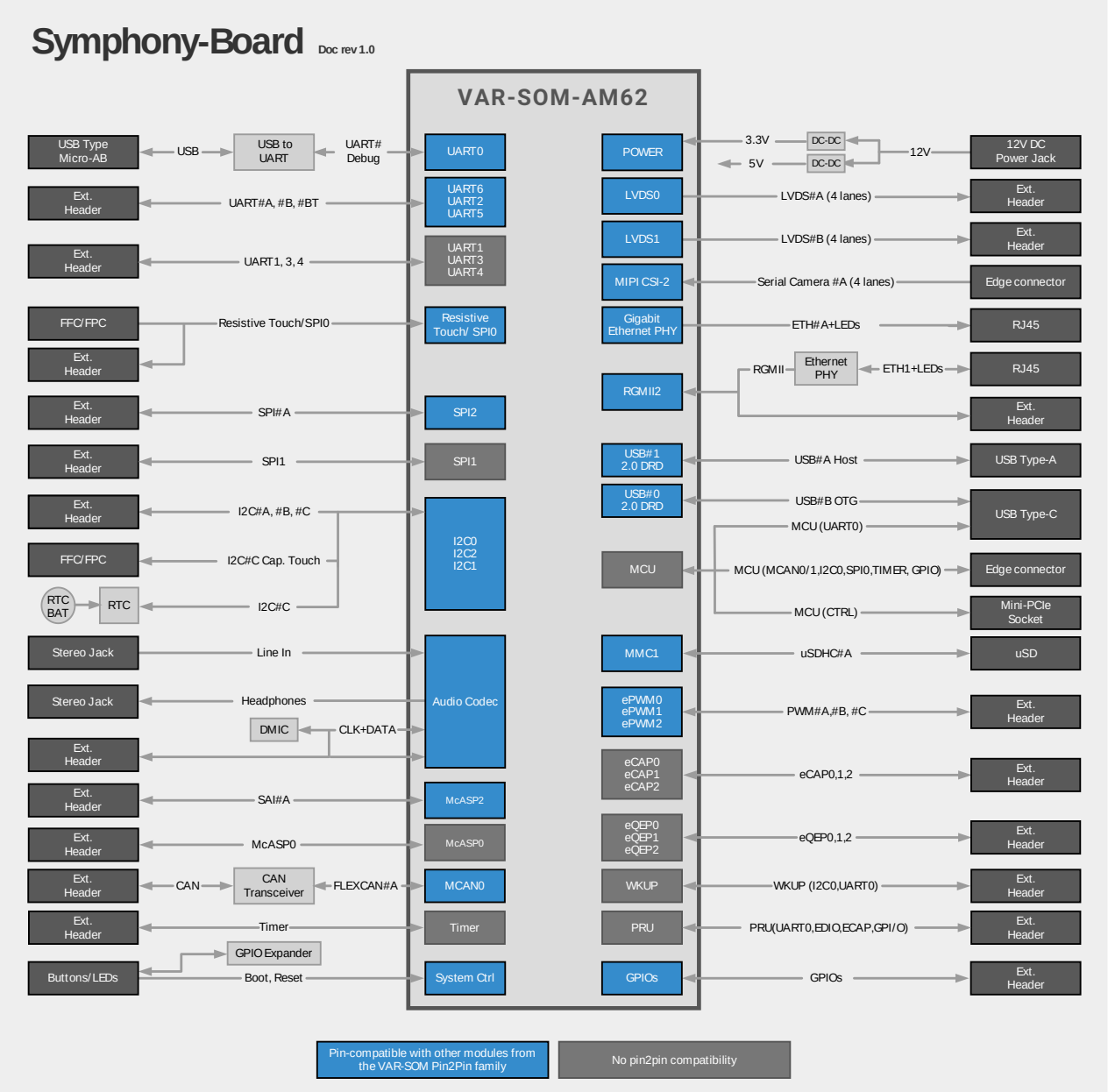
4.3.6. Symphony-Board (VAR-SOM-MX8M-PLUS assembled)



4.3.7. Symphony-Board (VAR-SOM-MX93 assembled)

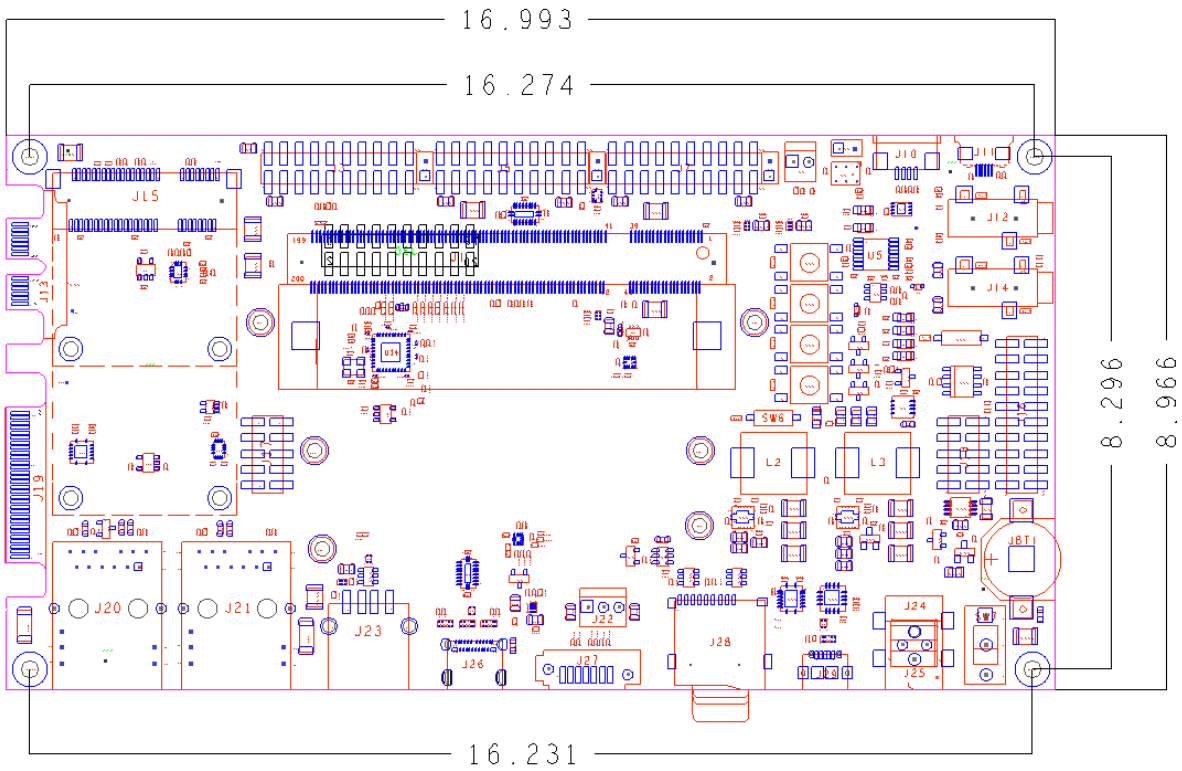


4.3.8. Symphony-Board (VAR-SOM-AM62 assembled)



4.4. Board Layout

The Symphony-Board's physical dimensions are 169.9 x 89.6 mm.



Detailed CAD files are available for download at www.variscite.com.

4.5. Symphony-Board Connectors

The below table lists all available connectors on the Symphony-Board,
Refer to chapter 2 for a more detailed description and Pin-out of each connector.

Table 1-1 Symphony-Board connectors

Reference	Function	Type
J1	SOM connection	SO-DIMM 200 Pin Connector
J2	DMIC	Header TH, 2x1, 2.54mm
J3	DSI	Header SMT, 10x2, 2.54mm
J4	I2C#A	Header TH, 2x1, 2.54mm
J5	LVDS#B (Clock & Data pairs 0-2)	Header SMT, 10x2, 2.54mm
J6	LVDS#B (Data pair 3)	Header TH, 2x1, 2.54mm
J7	LVDS#A (Clock & Data pairs 0-2)	Header SMT, 10x2, 2.54mm
J8	LVDS#A (Data pair 3)	Header TH, 2x1, 2.54mm
J9	FAN 12/5V	Header TH, 2x1, 2.54mm
J10	Resistive Touch I/F	FFC/FPC 4-pin
J11	Capacitive Touch Panel I/F	FFC/FPC 6-pin
J12	Line In	Audio Jack 3.5 mm
J13	HDMI	HSEC8-113-01-L-RA or HSEC8-113-01-L-DV-A-K
J14	Headphones	Audio Jack 3.5 mm
J15	Mini PCIe Conn	Mini PCIe Conn, 2x26 0.8mm
J16	SPI, SAI, I2C, CAN, GPIOs	Header SMT, 10x2, 2.54mm
J17	Miscellaneous Header	Header SMT, 5x2, 2.54mm
J18	PWM, UART	Header SMT, 5x2, 2.54mm
J19	MIPI-CSI 4 lanes	HSEC8-130-01-SM-DV-A
J20	10/100/1000Mbps ETH2 Port	RJ-45
J21	10/100/1000Mbps ETH1 Port	RJ-45
J22	SATA Power	Header 3 position, 2.54mm shrouded
J23	USB 2.0 Host	USB 2.0 Type A
J24	Power In	DC In Jack 2.0 mm
J25	Power In	2 Pin Terminal Block
J26	USB 3.0/2.0 OTG	USB Type C
J27	SATA 2.0	SATA Connector
J28	SD-MMC	Micro SD Card Connector
J29	USB Debug	USB Type micro-AB
J30	Extension Header	Header SMT, 10x2, 2.54mm
JBT1	RTC Battery Holder	CR1225 Battery Holder

5. Detailed Description

5.1. Overview

This chapter details the Symphony-Board features and external interfaces, some of which are driven directly by the following SOMs:

- VAR-SOM-MX6
- VAR-SOM-MX8
- VAR-SOM-MX8X
- VAR-SOM-MX8M-MINI
- VAR-SOM-MX8M-NANO
- VAR-SOM-MX8M-PLUS
- VAR-SOM-MX93
- VAR-SOM-AM62

Please refer to the SOM data sheet for more information.

Table 2-1 describes this chapter table header and acronyms used.

Table 2-1: Acronyms used on tables column header

Column		Meaning
Pin#	x	**Pin number on a connector**
Type		**Pin type & direction**
	I	INPUT
	O	OUTPUT
	DS	Differential Signal
	A	Analog
	P	Power
Signal		**Symphony-Board schematic signal name**
Description		**Pin functionality description**

5.2. Functionality of Symphony-Board Connectors

Various products can use the same connector pins to expose different interfaces, resulting in incompatibility or loss of intended functionality.

The reason is that not all products are compatible with the same set of interfaces.
We are making every effort to make as many interfaces available on each SOC as possible and utilize any available free pins to do so.

Please refer to the specific SOM datasheet for exact pin information.

5.3. Symphony-Board Interfaces

5.3.1. SOM

The Symphony-Board has a SO-DIMM200 pin connector that allows it to connect with all the pin-compatible SOMs listed above.
Please refer to the SOM module data sheet for a complete signal description and pin-out of J1.

5.4. Standard External Interfaces

5.4.1. USB & SATA

The Symphony-Board features a GPIO controlled switch which routes SOM pins to either a SATA connector or a USB Type C OTG connector.

If a SOM has the capability for USB3.0 interface, then the SOM pins will be connected to a USB Type C OTG connector, giving access to one USB3.0/2.0 OTG port. On the other hand, if the SOM has the capability for SATA interface, the SOM pins will be connected to a SATA connector, providing access to the SATA 2.0 interface.

In addition, for all SOMs that support second USB interface it is exported through USB Type A connector.

Note:

It is important to be aware that on System on Modules (SOMs) that do not have support for the USB3.0 and SATA interfaces, this connector may be used for other interfaces. For specific pin information, refer to the SOM datasheet.

5.4.1.1 USB3.0/2.0 Type-C OTG Connector Pin-out (J26)

Table 2-2: USB Type-C OTG Connector Pin-out (J26)

Pin #	Symphony-Board Signal	Type	Description
A1	GND	P	Ground return
A2	SS_TX1_P	DSO	SuperSpeed diff. pair #1, TX, positive
A3	SS_TX1_N	DSO	SuperSpeed diff. pair #1, TX, negative
A4	USB_SS3_VBUS	P	Bus power
A5	USB_SS3_CC1	IO	Configuration channel
A6	USB_C_OTG2_DP	DSIO	Non-SuperSpeed diff. pair, pos. 1, positive
A7	USB_C_OTG2_DN	DSIO	Non-SuperSpeed diff. pair, pos. 1, negative
A8	SBU1	IO	Sideband use (SBU)
A9	USB_SS3_VBUS	P	Bus power
A10	SS_RX2_N	DSI	SuperSpeed diff. pair #4, RX, negative
A11	SS_RX2_P	DSI	SuperSpeed diff. pair #4, RX, positive
A12	GND	P	Digital Ground
B1	GND	P	Digital Ground
B2	SS_TX2_P	DSO	SuperSpeed diff. pair #3, TX, positive
B3	SS_TX2_N	DSO	SuperSpeed diff. pair #3, TX, negative
B4	USB_SS3_VBUS	P	Bus power
B5	USB_SS3_CC2	IO	Configuration channel
B6	USB_C_OTG2_DP	DSIO	Non-SuperSpeed diff. pair, pos. 2, positive
B7	USB_C_OTG2_DN	DSIO	Non-SuperSpeed diff. pair, pos. 2, negative
B8	SBU2	IO	Sideband use (SBU)
B9	USB_SS3_VBUS	P	Bus power
B10	SS_RX1_N	DSI	SuperSpeed diff. pair #2, RX, negative
B11	SS_RX1_P	DSI	SuperSpeed diff. pair #2, RX, positive
B12	GND	P	Digital Ground
SH1	GND	P	SHIELD pin reference
SH2	GND	P	SHIELD pin reference
SH3	GND	P	SHIELD pin reference
SH4	GND	P	SHIELD pin reference

5.4.1.2 SATA 2.0 Connector Pin-out (J27)

Table 2-3: SATA 2.0 Connector Pin-out (J27)

Pin #	Symphony-Board Signal	Type	Description
1	GND	P	Digital ground
2	SATAC_TXP	DSIO	SATA Transmit Lane Diff. Positive
3	SATAC_TXN	DSIO	SATA Transmit Lane Diff. Negative
4	GND	P	Digital ground
5	SATAC_RXN	DSIO	SATA Receive Lane Diff. Negative
6	SATAC_RXP	DSIO	SATA Receive Lane Diff. Positive
7	GND	P	Digital ground
8	GND	P	Digital ground
9	GND	P	Digital ground

5.4.1.3 USB 2.0 HOST Connector Pin-out (J23)

Table 2-4: USB2.0 Host Connector Pin-out (J23)

Pin #	Symphony-Board Signal	Type	Description
1	USB#A_HOST_VBUS	P	+5V power supply. 500ma max
2	USB#A_HOST_DN_C	DSIO	USB Data Negative
3	USB#A_HOST_DP_C	DSIO	USB Data Positive
4	GND	P	Digital ground
5	GND	P	SHIELD pin reference
6	GND	P	SHIELD pin reference

5.4.2. uSD Card

uSD Card interface is driven by the USDHC interface of the of the SOM.

5.4.2.1 uSD card slot Connector Pin-out (J28)

Table 2-5: uSD Card Slot Connector Pin-out (J28)

Pin #	Symphony-Board Signal	Type	Description
1	USDHC#A_DAT2	IO	SD Parallel Data2
2	USDHC#A_DAT3	IO	SD Parallel Data3
3	USDHC#A_CMD	IO	SD Command
4	SW_3P3_SD1	P	SD card 3.3V supply
5	USDHC#A_CLK	I	SD Clock
6	GND	P	Digital Ground
7	USDHC#A_DAT0	IO	SD Parallel Data0
8	USDHC#A_DAT1	IO	SD Parallel Data1
9	USDHC#A_CD_B	O	SD Card Detect
10	GND	P	SHIELD pin reference
11	GND	P	SHIELD pin reference
12	GND	P	SHIELD pin reference
13	GND	P	SHIELD pin reference

5.4.3. Mini PCIe

The SOM PCI Express interface is exposed by the Symphony-Board through a standard Mini PCI Express connector supporting connection of mini PCI Express expansion card.

Note:

It is important to be aware that on System on Modules (SOMs) that do not have support for the PCIe interface, this connector may be used for other interfaces. For specific pin information, refer to the SOM datasheet.

5.4.3.1 Mini PCIe Connector Pin-out (J15)

Table 2-6: mini PCI Express Connector Pin-out (J15)

Pin #	Symphony-Board Signal	Type	Description
1	PCIE#A_WAKE_B	O	PCIe Wake (via T.P.)
2	BASE_PER_3V3	P	Base board 3.3V
3			
4	GND	P	Digital Ground
5			
6	BASE_PER_1V5	P	Base board 1.5V #1 Limited to 300mA
7			
8			
9	GND	P	Digital Ground
10			
11	PCIE#A_REFCLK100M_N_C	DSI	PCIe Clock Diff. Negative; 100MHz HCSL
12			
13	PCIE#A_REFCLK100M_P_C	DSI	PCIe Clock Diff. Positive; 100MHz HCSL
14			
15	GND	P	Digital Ground
16			
17			
18	GND	P	Digital Ground
19			
20	PCIE#A_DIS_B	I	PCIe Disable (via T.P.)
21	GND	P	Digital Ground
22	SAI#A_RXFS_ PCIE#A_RESET_B	O	PCIe Reset signal
23	PCIE_CRXM	DSI	PCIe Receive Lane Diff. Negative
24	BASE_PER_3V3	P	Base board 3.3V
25	PCIE_CRXP	DSI	PCIe Receive Lane Diff. Positive
26	GND	P	Digital Ground
27	GND	P	Digital Ground
28	BASE_PER_1V5	P	Base board 1.5V #1 Limited to 300mA
29	GND	P	Digital Ground
30	I2C#A_SCL	I	I2C #A Clock

Pin #	Symphony-Board Signal	Type	Description
31	PCIE_CTXM	DSO	PCIe Transmit Lane Diff. Negative
32	I2C#A_SDA	IO	I2C #A Data
33	PCIE_CTXP	DSO	PCIe Transmit Lane Diff. Positive
34	GND	P	Digital Ground
35	GND	P	Digital Ground
36			
37	GND	P	Digital Ground
38			
39	BASE_PER_3V3	P	Base board 3.3V
40	GND	P	Digital Ground
41	BASE_PER_3V3	P	Base board 3.3V
42			
43	GND	P	Digital Ground
44			
45			
46			
47			
48	BASE_PER_1V5	P	Base board 1.5V #1 Limited to 300mA
49			
50	GND	P	Digital Ground
51			
52	BASE_PER_3V3	P	Base board 3.3V

5.4.4. Ethernet

The Symphony-Board exports the SOM's Gigabit Ethernet interface, provided by its' on SOM PHY (Internal), to a standard RJ45 Ethernet jack connector with integrated magnetics.
Please refer to the SOM datasheet for more information.

The Symphony-Board has an additional on-board Ethernet PHY (External) routed to a second RJ45 Ethernet jack connector with integrated magnetics for exposing the 2nd Gigabit Ethernet interface available on part of the SOMs

5.4.4.1 Internal PHY 10/100/1000BaseT RJ45 Connector Pin-out (J21)

Table 2-7: Internal PHY 10/100/100BaseT RJ45 Connector Pin-out (J21)

Pin #	Symphony-Board Signal	Type	Description
L1	BASE_PER_3V3 (via R80)	I	Activity LED Anode
L2	ETH#A_LED_ACT	O	Activity LED Cathode
L4	ETH#A_LED_LINK_10_100_1000	O	Link 10/100/1000 LED Cathode
L5	BASE_PER_3V3 (via R79)	I	Link 10/100/1000 LED Anode
R1	TCT3	O	Primary transformer common pin
R2	ETH#A_MDI_C_M	DSIO	Bi-directional diff. pair C negative
R3	ETH#A_MDI_C_P	DSIO	Bi-directional diff. pair C positive
R4	ETH#A_MDI_B_P	DSIO	Bi-directional diff. pair B positive
R5	ETH#A_MDI_B_M	DSIO	Bi-directional diff. pair B negative
R6	TCT2	O	Primary transformer common pin
R7	TCT4	O	Primary transformer common pin
R8	ETH#A_MDI_D_P	DSIO	Bi-directional diff. pair D positive
R9	ETH#A_MDI_D_M	DSIO	Bi-directional diff. pair D negative
R10	ETH#A_MDI_A_M	DSIO	Bi-directional diff. pair A negative
R11	ETH#A_MDI_A_P	DSIO	Bi-directional diff. pair A positive
R12	TCT1		Primary transformer common pin
SH1	GND_EARTH	P	EARTH
SH2	GND_EARTH	P	EARTH

Note

For detailed LED behavior see LED status table in SOM data sheet.

5.4.4.2 External PHY 10/100/1000BaseT RJ45 Connector Pin-out (J20)

Table 2-8: External PHY 10/100/100BaseT RJ45 Connector Pin-out (J20)

Pin #	Symphony-Board Signal	Type	Description
L1	BASE_PER_3V3 (via R78)	I	Activity LED Anode
L2	ETH1_LED0	O	Activity LED Cathode
L4	ETH1_LED_LINK_B	IO	Link 10/100/100 LED Cathode
L5	BASE_PER_3V3 (via R77)	IO	Link 10/100/100 LED Anode
R1	TCT3	O	Primary transformer common pin
R2	ETH1_MDI_C_M	DSIO	Bi-directional diff. pair C negative
R3	ETH1_MDI_C_P	DSIO	Bi-directional diff. pair C positive
R4	ETH1_MDI_B_P	DSIO	Bi-directional diff. pair B positive
R5	ETH1_MDI_B_M	DSIO	Bi-directional diff. pair B negative
R6	TCT2	O	Primary transformer common pin
R7	TCT4	O	Primary transformer common pin
R8	ETH1_MDI_D_P	DSIO	Bi-directional diff. pair D positive
R9	ETH1_MDI_D_M	DSIO	Bi-directional diff. pair D negative
R10	ETH1_MDI_A_M	DSIO	Bi-directional diff. pair A negative
R11	ETH1_MDI_A_P	DSIO	Bi-directional diff. pair A positive
R12	TCT1		Primary transformer common pin
SH1	GND_EARTH	P	EARTH
SH2	GND_EARTH	P	EARTH

Table 2-9: RJ-45 Connector Led status (J20)

STATUS / LED	10M Link	10M Active	100M Link	100M Active	1000M Link	1000M Active
ETH1_LED_LINK_B	ON	ON	ON	ON	ON	ON
ETH1_LED0	ON	BLINK	ON	BLINK	ON	BLINK

5.4.5. Audio

The Symphony-Board features two 3.5mm jacks for analog audio interfaces.

- Headphone
- Line in

The analog audio interface signals are driven by the SOM Audio Codec. Please refer to the SOM data sheet for complete audio codec information.

Also, a digital microphone is implemented on the Symphony-Board, see schematics for U1. Digital microphone lines are also routed to optional Header making it possible to interface SOM CPU balls when a SOM without Audio Codec is plugged in.

5.4.5.1 Line In Jack Connector Pin-out (J12)

Table 2-10: Line in Jack Connector Pin-out (J12)

Pin #	Symphony-Board Signal	Type	Description
1	AGND	AP	Analog ground return for audio.
2	AC#_LLINEIN_C	AI	Line in Left input
3	AC#_RLINEIN_C	AI	Line in Right input

5.4.5.2 Headphone jack Connector Pin-out (J14)

Table 2-11: Headphone out Jack Connector Pin-out (J14)

Pin #	Symphony-Board Signal	Type	Description
1	AC#_HPOUTFB	AP	Analog ground return for audio.
2	AC#_HPLOUT_C	AO	Headphone out Left
3	AC#_HPROUT_C	AO	Headphone out Right

5.4.5.3 Digital Microphone Connector Pin-out (J2)

Table 2-12: Digital Microphone Connector Pin-out (J2)

Pin #	Symphony-Board Signal	Type	Description
1	AC#_DMIC_Clock	I	Digital Microphone Clock
2	AC#_DMIC_DATA	IO	Digital Microphone Data

5.4.6. Serial Camera

The Symphony-Board supports a MIPI CSI camera sensor input using an extension camera board connected to an edge connector in the Symphony-Board. Extension board for utilizing this interface can be purchased on variscite's website.

Note:

It is important to be aware that on System on Modules (SOMs) that do not have support for the MIPI CSI camera interface, this connector may be used for other interfaces. For specific pin information, refer to the SOM datasheet.

The Camera Board Mating connector: SAMTEC 60POS 0.8mm pitch, HSEC8-130-01-SM-DV-A

5.4.6.1 Serial Camera Connector Pin-out (J19)

Table 2-13: Serial Camera Connector Pin-out (J19)

Pin #	Symphony-Board Signal	Type	Description
1	BASE_PER_3V3	P	Base board 3.3V
2	GND	P	Digital Ground
3	BASE_PER_3V3	P	Base board 3.3V
4	CAM_I2C_SDA	IO	I2C Data
5	BASE_PER_1V8	P	Base board 1.8V
6	CAM_I2C_SCL	I	Camera I2C Clock
7	BASE_PER_1V8	P	Base board 1.8V
8	GND	P	Digital Ground
9	GND	P	Digital Ground
10	J1.77-MIPI_CSI_PWDN_1V8	O	Camera Power down signal
11			
12	J1.40-MIPI_CAM_RST_1V8	O	Camera Reset signal
13			
14	J1.117-MIPI_CAM_OPT_1V8	I	Camera Optional control signal
15	GND	P	Digital Ground
16	J1.70-MIPI_CAM_SYNC_1V8	I	Camera Sync signal
17			
18	GND	P	Digital Ground
19			
20	J1.75-MIPI_CAM_TRIGGER_1V8	I	Camera Trigger signal
21	GND	P	Digital Ground
22	GND	P	Digital Ground
23			
24	MIPI_CSI#A_DATA3_N	DSI	CSI Port Lane3; Negative
25			
26	MIPI_CSI#A_DATA3_P	DSI	CSI Port Lane3; Positive

Pin #	Symphony-Board Signal	Type	Description
27	GND	P	Digital Ground
28	GND	P	Digital Ground
29			
30	MIPI_CSI#A_DATA2_N	DSI	CSI Port Lane2; Negative
31			
32	MIPI_CSI#A_DATA2_P	DSI	CSI Port Lane2; Positive
33	GND	P	Digital Ground
34	GND	P	Digital Ground
35			
36	MIPI_CSI#A_DATA1_N	DSI	CSI Port Lane1; Negative
37			
38	MIPI_CSI#A_DATA1_P	DSI	CSI Port Lane1; Positive
39	GND	P	Digital Ground
40	GND	P	Digital Ground
41			
42	MIPI_CSI#A_CLK_N	DSI	CSI Port Clock; Negative
43	GND	P	Digital Ground
44	MIPI_CSI#A_CLK_P	DSI	CSI Port Clock; Positive
45			
46	GND	P	Digital Ground
47			
48	MIPI_CSI#A_DATA0_N	DSI	CSI Port Lane0; Negative
49			
50	MIPI_CSI#A_DATA0_P	DSI	CSI Port Lane0; Positive
51			
52	GND	P	Digital Ground
53	GND	P	Digital Ground
54	BASE_PER_1V8	P	Base board 1.8V
55			
56	BASE_PER_1V8	P	Base board 1.8V
57			
58	BASE_PER_3V3	P	Base board 3.3V
59	GND	P	Digital Ground
60	BASE_PER_3V3	P	Base board 3.3V

Note:

Camera control (reset, power down, sync, trigger, optional) and I2C interfaces run at 1.8V levels.

5.4.7. LVDS

The Symphony-Board exposes the Dual-Link LVDS interface available on the SOM.

The interface is exposed to two Variscite standard 20 pin Headers;
Fourth data bit of each interface is extended using additional 2 pin connector.

J7 used for connecting Variscite's standard 7" LVDS LCD screen.

Note:

It is important to be aware that on System on Modules (SOMs) that do not have support for the Dual-Link LVDS interface, this connector may be used for other interfaces. For specific pin information, refer to the SOM datasheet.

5.4.7.1 LVDS#A Connector Pin-out (J7)

Table 2-14: LVDS#A Connector Pin-out (J7)

Pin #	Symphony-Board Signal	Type	Description
1	VCC_DISP_3V3	P	Display power 3.3V
2	VCC_DISP_3V3	P	Display power 3.3V
3	GND	P	Digital Ground
4	GND	P	Digital Ground
5	LVDS#A_TX0_N	DSO	LVDS#A Data0 Diff. Negative
6	LVDS#A_TX0_P	DSO	LVDS#A Data0 Diff. Positive
7	GND	P	Digital Ground
8	LVDS#A_TX1_N	DSO	LVDS#A Data1 Diff. Negative
9	LVDS#A_TX1_P	DSO	LVDS#A Data1 Diff. Positive
10	GND	P	Digital Ground
11	LVDS#A_TX2_N	DSO	LVDS#A Data2 Diff. Negative
12	LVDS#A_TX2_P	DSO	LVDS#A Data2 Diff. Positive
13	GND	P	Digital Ground
14	LVDS#A_CLK_N	DSO	LVDS#A Clock Diff. Negative
15	LVDS#A_CLK_P	DSO	LVDS#A Clock Diff. Positive
16	GND	P	Digital Ground
17	VCC_DISP_5V	P	Display Backlight LED 5V power
18	VCC_DISP_5V	P	Display Backlight LED 5V power
19	PWM#A	IO	Backlight Brightness Control
20	GND	P	Digital Ground

5.4.7.2 LVDS#A Data3 Extension Connector Pin-out (J8)

Table 2-15: LVDS#A Data3 Connector Pin-out (J8)

Pin #	Symphony-Board Signal	Type	Description
1	LVDS#A_TX3_N	DSO	LVDS#A Data3 Diff. Negative
2	LVDS#A_TX3_P	DSO	LVDS#A Data3 Diff. Positive

5.4.7.3 LVDS#B Connector Pin-out (J5)

Table 2-16: LVDS#B Connector Pin-out (J5)

Pin #	Symphony-Board	Type	Description
1	VCC_DISP_3V3	P	Display power 3.3V
2	VCC_DISP_3V3	P	Display power 3.3V
3	GND	P	Digital Ground
4	GND	P	Digital Ground
5	LVDS#B_TX0_N	DSO	LVDS#B Data0 Diff. Negative
6	LVDS#B_TX0_P	DSO	LVDS#B Data0 Diff. Positive
7	GND	P	Digital Ground
8	LVDS#B_TX1_N	DSO	LVDS#B Data1 Diff. Negative
9	LVDS#B_TX1_P	DSO	LVDS#B Data1 Diff. Positive
10	GND	P	Digital Ground
11	LVDS#B_TX2_N	DSO	LVDS#B Data2 Diff. Negative
12	LVDS#B_TX2_P	DSO	LVDS#B Data2 Diff. Positive
13	GND	P	Digital Ground
14	LVDS#B_CLK_N	DSO	LVDS#B Clock Diff. Negative
15	LVDS#B_CLK_P	DSO	LVDS#B Clock Diff. Positive
16	GND	P	Digital Ground
17	VCC_DISP_5V	P	Display Backlight LED 5V power
18	VCC_DISP_5V	P	Display Backlight LED 5V power
19	PWM#A	IO	Backlight Brightness Control
20	GND	P	Digital Ground

5.4.7.4 LVDS#B Data3 Extension Connector Pin-out (J6)

Table 2-17: LVDS#B Data3 Connector Pin-out (J6)

Pin #	Symphony-Board Signal	Type	Description
1	LVDS#B_TX3_N	DSO	LVDS#B Data3 Diff. Negative
2	LVDS#B_TX3_P	DSO	LVDS#B Data3 Diff. Positive

5.4.8. DSI Display

The Symphony-Board exports a Dual channel DSI common to the various SOMs.

Note:

It is important to be aware that on System on Modules (SOMs) that do not have support for the Dual-Link LVDS interface, this connector may be used for other interfaces. For specific pin information, refer to the SOM datasheet.

5.4.8.1 DSI Display Connector Pin-out (J3)

Table 2-18: DSI Display Connector Pin-out (J3)

Pin #	Symphony-Board Signal	Type	Description
1	VCC_DISP_3V3	P	Display power 3.3V
2	BASE_PER_1V8	P	Base board power 1.8V
3	GND	P	Digital Ground
4	GND	P	Digital Ground
5	J1.141-DSI_D0M	DSO	DSI Data0 Diff. Negative
6	J1.143-DSI_D0P	DSO	DSI Data0 Diff. Positive
7	GND	P	Digital Ground
8	J1.145-DSI_D1M	DSO	DSI Data1 Diff. Negative
9	J1.147-DSI_D1P	DSO	DSI Data1 Diff. Positive
10	GND	P	Digital Ground
11	J1.57_EXT	O	Cold reset event WDOG_B for 6UL SOM
12	CB-USB#A_HOST_PWR	I	Symphony Board U22 control input
13	GND	P	Digital Ground
14	J1.142-DSI_CLK0M	DSO	DSI Clock Diff. Negative
15	J1.140-DSI_CLK0P	DSO	DSI Clock Diff. Positive
16	GND	P	Digital Ground
17	CB_WDOG_B	I	Symphony Board reset circuitry watch dog input
18	J1.82-USB#A_HOST_PWR	O	USB HOST PWR enable
19	PWM#A	IO	Backlight Brightness Control
20	GND	P	Digital Ground

5.4.9. HDMI, DP/eDP, Parallel camera, Serial camera

The Symphony-Board exposes various SOM interfaces through an edge connector.
Extension boards for utilizing these interfaces are can be purchased on variscite's website.

VAR-SOM-MX6/8/8M-PLUS – HDMI Interface via VAR-EXT-HDMI HDMI Extension Board
VAR-SOM-MX8 - eDP/DP Interface via VAR-EXT-DP DP Extension Board
VAR-SOM-MX8X - Parallel camera interface via VCAM-5640PA Parallel Camera Board
VAR-SOM-MX8M-PLUS - Serial camera interface #2 via VCAM-5640S-2ND Serial Camera board
2nd MIPI CSI instead of default HDMI Requires special SOM assembly.

The HDMI/DP extension boards Mating connector: SAMTEC 60POS 0.8mm pitch, HSEC8-113-01-L-RA

The Camera extension boards Mating connector: SAMTEC 60POS 0.8mm pitch, HSEC8-130-01-SM-DV-A

Note:

It is important to be aware that on System on Modules (SOMs) that do not have support for the above interfaces, this connector may be used for other interfaces. For specific pin information, refer to the SOM datasheet.

5.4.9.1 HDMI Connector Pin-out (J13)

Table 2-19: HDMI Connector Pin-out (J13)

Pin #	Symphony-Board Signal	Type	Description
1	J1.79	IO	General Purpose Input/Output
2	BASE_PER_3V3		Base Board 3.3V
3	J1.48	IO	General Purpose Input/Output
4	BASE_PER_3V3		Base board 3.3V
5	J1.84	IO	General Purpose Input/Output
6	VCC_5V		Base board 5V
7	J1.173	IO	General Purpose Input/Output
8	HDMI_DDC_SCL_DP_AUX_P	IO/ DO	Determined according to HDMI_DP_SEL (pin 12) state: Low: General I2C Clock or I2C Clock for HDMI DDC High: HDMI/DP/eDP x Auxiliary lane Diff. Positive
9	J1.154-HDMI_HPD	AI	HDMI Hot Plug Detect

Pin #	Symphony-Board Signal	Type	Description
10	HDMI_DDC_SDA_DP_AUX_N	IO/ DO	Determined according to HDMI_DP_SEL (pin 12) state: Low: General I2C Data or I2C Data for HDMI DDC High: HDMI/DP/eDP x Auxiliary lane Diff. Negative
11	J1.156-HDMI_DDCCEC	IO	HDMI Consumer Electronics Control; 1 Wire Serial; Bidirectional
12	HDMI_DP_SEL	I	See Pin 7,8 description
13	GND	P	Digital Ground
14	GND	P	Digital Ground
15	J1.152-HDMI_CLKP	DSO	HDMI TMDS Diff. Clock; Positive
16	J1.155-HDMI_D0P	DSO	HDMI TMDS Diff. Data 0; Positive
17	J1.150-HDMI_CLKM	DSO	HDMI TMDS Diff. Clock; Negative
18	J1.157-HDMI_D0M	DSO	HDMI TMDS Diff. Data 0; Negative
19	GND	P	Digital Ground
20	GND	P	Digital Ground
21	J1.151-HDMI_D2P	DSO	HDMI TMDS Diff. Data 2; Positive
22	J1.146-HDMI_D1P	DSO	HDMI TMDS Diff. Data 1; Positive
23	J1.153-HDMI_D2M	DSO	HDMI TMDS Diff. Data 2; Negative
24	J1.148-HDMI_D1M	DSO	HDMI TMDS Diff. Data 1; Negative
25	GND	P	Digital Ground
26	GND	P	Digital Ground

5.4.10. Capacitive Touch

The Symphony-Board provides a capacitive Touch interface exposed to a FFC/FPC connector for connecting to Variscite's standard 7" Capacitive touch LCD screen.

5.4.10.1 Capacitive Touch Panel Connector Pin-out (J11)

Table 2-20: Capacitive Touch Panel Connector Pin-out (J11)

Pin #	Symphony-Board Signal	Type	Description
1	CPT_RST	IO	Capacitive Touch Reset; Active Low;
2	I2C#C_SDA	IO	I2C #2 Clock
3	I2C#C_SCL	IO	I2C #2 Data
4	PWM#B_CPT_INT	IO	Capacitive Touch Interrupt, active low (on v1.2 and up of Carrier board)
5	BASE_PER_3V3	P	Base board 3.3V
6	GND	P	Digital Ground
7	GND	P	Digital Ground
8	GND	P	Digital Ground

Note:

In v1.1 of Symphony-Board PWM#C SOM pin J1.69 is routed to capacitive touch connector for touch interrupt.
For i.MX8X, GPIO function is not available on SOM pin J1.69. Therefore, J1.69 & J1.68 (PWM#B) signals are shorted on carrier board J18 header and J1.68 signal is defined in SW as capacitive touch interrupt. In v1.2 revisions and up of carrier board, J1.68 is used instead of J1.69 for capacitive touch interrupt.

5.4.11. Resistive Touch

The Symphony-Board provides a resistive interface exposed to an FFC/FPC connector for connecting to resistive touch LCD screen.

5.4.11.1 Resistive Touch Connector Pin-out (J10)

Table 2-21: Resistive Touch Connector Pin-out (J10)

Pin #	Symphony-Board Signal	Type	Description
1	TP#_TS_X-_CONN	AI	X negative side plate connection
2	TP#_TS_Y+_CONN	AI	Y positive side plate connection
3	TP#_TS_X+_CONN	AI	X positive side plate connection
4	TP#_TS_Y-_CONN	AI	Y negative side plate connection
5	GND	P	Digital Ground
6	GND	P	Digital Ground

5.4.12. USB - Debug

The Symphony-Board exposes the SOM debug UART through an on-board UART-to-USB Bridge exposed to a Micro USB connector.

5.4.12.1 USB Debug Connector Pin-out (J29)

Table 2-22: USB Debug Connector Pin-out (J29)

Pin #	Symphony-Board Signal	Type	Description
1	DEBUG_VBUS_C	P	5V power input
2	USB_DEBUG_DM_C	DSIO	USB Data Negative
3	USB_DEBUG_DP_C	DSIO	USB Data Positive
4	GND	I	USB Micro ID signal (Slave function)
5	GND	P	Digital Ground
6	GND	P	SHIELD pin reference
7	GND	P	SHIELD pin reference
10	GND	P	SHIELD pin reference
11	GND	P	SHIELD pin reference

5.4.13. SAI, I2C, SPI, CAN Connector

The Symphony-Board exports the SAI, I2C, SPI, CAN interfaces common to all SOMs through 20-Pin Header.

5.4.13.1 SAI, I2C, SPI, CAN Connector Pin-out (J16)

Table 2-23: SAI, I2C, SPI, CAN Connector Pin-out (J16)

Pin #	Symphony-Board Signal	Type	Description
1	SAI#A_RXFS_ PCIE#A_RESET_B	IO	SAI Receive Frame Sync (Used on carrier board as PCIE Reset GPIO)
2	SPI#A_SCK	O	SPI#A Clock signal
3	SAI#A_TXC	O	SAI Transmit clock
4	SPI#A_CS0	O	SPI#A chip select signal
5	SAI#A_RXD	I	SAI Receive Data
6	SPI#A_SDI	I	SPI#A data in signal
7	SAI#A_TXD	O	SAI Transmit Data
8	SPI#A_SDO	O	SPI#A data out signal
9	SAI#A_TXFS	O	SAI Transmit Frame Sync
10	I2C#B_SCL	O	I2C#B Clock signal
11	SAI#A_RXC_ USDHC1_RESET_B	IO	SAI Receive clock (Used on carrier board as SD Card Power enable)
12	I2C#B_SDA	IO	I2C#B Data signal
13	I2C#C_SCL	O	I2C#C Clock signal
14	I2C#A_SCL	O	I2C#A Clock signal

Pin #	Symphony-Board Signal	Type	Description
15	I2C#C_SDA	IO	I2C#C Data signal
16	I2C#A_SDA	IO	I2C#A Data signal
17	J1.72-USB3_INTB	IO	General Purpose Input/output (Used on carrier board as USB3 interrupt GPIO)
18	CANL0	DSIO	CAN Low Differential signal
19	GND	P	
20	CANH0	DSIO	CAN High Differential signal

5.4.14. PWM, UART Connector

The Symphony-Board exports the PWM, UART interfaces common to all SOMs through a 10-Pin Header.

5.4.14.1 PWM, UART Connector Pin-out (J18)

Table 2-24: PWM, UART Connector Pin-out (J18)

Pin #	Symphony-Board Signal	Type	Description
1	PWM#B_CPT_INT	O	PWM#B signal (Capacitive Touch Interrupt)
2	PWM#C	O	PWM#C signal
3	UART#A_TX	O	UART#A Transmit
4	UART#BT_TX	O	Bluetooth UART Transmit
5	UART#A_RX	I	UART#A Receive
6	UART#BT_RX	I	Bluetooth UART Receive
7	UART#B_TX	O	UART#B Transmit
8	UART#BT_CTS_B	I	BT UART CTS (used by on SOM Bluetooth)
9	UART#B_RX	I	UART#B Receive
10	UART#BT_RTS_B	O	BT UART RTS (used by on SOM Bluetooth)

Note:

In v1.1 of Symphony-Board J18.2 PWM#C SOM pin J1.69 is routed to capacitive touch connector for touch interrupt.
For i.MX8X, GPIO function is not available on SOM pin J1.69. Therefore, J1.69 & J1.68 (PWM#B) signals are shorted on carrier board J18 header and J1.68 signal is defined in SW as capacitive touch interrupt.
In v1.2 revisions and up of carrier board, J1.68 is used instead of J1.69 for capacitive touch interrupt.

5.4.15. Extension Connector

The Symphony-Board features an Ethernet PHY built-in, allowing access to the second Gigabit Ethernet interface on certain SOMs. If the second Gigabit Ethernet interface is not being used or if the SOM does not have one, the pins can be redirected through a resistor assembly to an extension header for use as GPIOs or any other alternate function.

Furthermore, the pins for resistive touch are also connected to the header to allow for interaction with the CPU balls in situations where a SOM without a resistive touch controller is being used.

5.4.15.1 Extension Connector Pin-out (J30)

Table 2-25: Extension Connector Pin-out (J30)

Pin #	Symphony-Board Signal	Type	Description
1	BASE_PER_3V3	P	Base Board 3.3V
2	BASE_PER_3V3	P	Base Board 3.3V
3	TP#_TS_Y-	AI/ IO	Resistive Touch Y negative side plate connection/ General Purpose Input/Output
4	J1.56_EXT	IO	General Purpose Input/Output
5	TP#_TS_Y+	AI/ IO	Resistive Touch Y positive side plate connection/ General Purpose Input/Output
6	J1.55_EXT	IO	General Purpose Input/Output
7	TP#_TS_X+	AI/ IO	Resistive Touch X positive side plate connection/ General Purpose Input/Output
8	J1.73_EXT	IO	General Purpose Input/Output
9	TP#_TS_X-	AI/ IO	Resistive Touch X negative side plate connection/ General Purpose Input/Output
10	J1.96_EXT	IO	General Purpose Input/Output
11	J1.71_EXT	IO	General Purpose Input/Output
12	J1.113_EXT	IO	General Purpose Input/Output
13	J1.81_EXT	IO	General Purpose Input/Output
14	J1.177_EXT	IO	General Purpose Input/Output
15	J1.122_EXT	IO	General Purpose Input/Output
16	J1.57_EXT	IO	General Purpose Input/Output
17	J1.120_EXT	IO	General Purpose Input/Output
18	J1.54_EXT	IO	General Purpose Input/Output
19	GND	P	General Purpose Input/Output
20	GND	P	General Purpose Input/Output

5.4.16. Miscellaneous Connector

The Symphony-Board exposes additional SOM pins, some of which, used for carrier board function to a 10-pin Header.
The pins can be used for alternate functions depending on SOM used with the Symphony-Board.

5.4.16.1 Miscellaneous Connector Pin-out (J17)

Table 2-26: Miscellaneous Connector Pin-out (J17)

Pin #	Symphony-Board Signal	Type	Description
1	J1.86-MIPI_CAM_BUF_CTL	IO	General Purpose Input/Output, (Used on carrier board for MIPI Camera control)
2	J1.40-MIPI_CAM_RST	IO	General Purpose Input/Output (Used on carrier board for MIPI Camera control)
3	J1.84	IO	General Purpose Input/Output
4	J1.70-MIPI_CAM_SYNC	IO	General Purpose Input/Output (Used on carrier board for MIPI Camera control)
5	J1.48	IO	General Purpose Input/Output
6	J1.75-MIPI_CAM_TRIGGER	IO	General Purpose Input/Output (Used on carrier board for MIPI Camera control)
7	J1.117-MIPI_CAM_OPT	IO	General Purpose Input/Output (Used on carrier board for MIPI Camera control)
8	J1.77-MIPI_CSI_PWDN	IO	General Purpose Input/Output (Used on carrier board for MIPI Camera control)
9	J1.173_R	IO	General Purpose Input/Output
10	J1.79	IO	General Purpose Input/Output

5.5. User Interfaces

5.5.1. Control Buttons

5.5.1.1 Power Switch (SW7)

The Power Switch SW7 Connect/Isolate the DC Power input to the Symphony-Board.

5.5.1.2 Power select Switch (SW6)

The Power select Switch SW6 Connects/Isolate the J1.33,35,37 SOM pins from SOM power rail in order to prevent short circuit when using VAR-SOM-MX6 SOM.

When using VAR-SOM-MX6 – Switch should be set to ON.

5.5.1.3 Boot Select (SW3)

The Boot select switch SW3 sets the SOM boot source & sequence. Refer to the SOM data sheet for detailed Boot description.

Table 2-27: Boot Select modes (SW3)

Position	Logic Level	Boot Source	
OFF	High or floating	VAR-SOM-MX6	NAND
		VAR-SOM-MX8	eMMC
		VAR-SOM-MX8X	eMMC
		VAR-SOM-MX8M-MINI	eMMC
		VAR-SOM-MX8M-NANO	eMMC
		VAR-SOM-MX8M-PLUS	eMMC
		VAR-SOM-MX93	eMMC
		VAR-SOM-AM62	eMMC
ON	Low	SD card	

Note:
Resistor options exist to support other boot sources for various SOMs.
Please refer to SOM datasheet and Symphony-Board schematics.

5.5.1.4 Reset Button (SW5)

A press on SW5 will perform a system reset of the SOM.

5.5.1.5 User Buttons (SW1, SW2, SW4)

SW1, SW2, and SW4 are User Buttons for general purpose controlled by the on board GPIO expander connected to the SOM via I2C interface.
In Linux release they can be configured in the device tree file as e.g. Back, Home, and Menu Buttons.

5.5.2. LED Indications

5.5.2.1 Power-On LEDs (D12, D13, D14)

Three LED indicators used:

- **D12** indicates that the Symphony-Board Carrier VCC_3V3 power is ON
- **D13** indicates that the Symphony-Board Carrier VCC_5V power is ON
- **D14** indicates that the Symphony-Board VCC_12V DC IN is ON.

5.5.2.2 Over current LEDs (D12, D25, D26)

The Symphony-Board has 3 on board load switches with current limit protection.
One switch is to prevent damage to VAR-SOM-MX6 SOM when SW6 is set in wrong position.
Two switches are to prevent damage to LCD when LVDS/DSI display cable in connected in wrong orientation.
Three LED indicators are connected to the 3 Load switches and indicate fault state.
After lit, Symphony-Board VCC_12V DC IN must be power cycled for load switches to turn on again.

- **D24** indicates over current on Symphony-Board J.31_33_35_PWR rail
- **D25** indicates over current on Symphony-Board BASE_PER_3V3 rail
- **D26** indicates over current on Symphony-Board VCC_5V rail

It is important to keep in mind that using these switches alone does not ensure complete protection. Therefore, it is recommended to thoroughly verify the SOM and LCD connections.

5.5.2.3 GP LEDs (D10)

LEDs D10 is a General-Purpose functionality LED controlled by the on board GPIO expander connected to the SOM via I2C interface.

5.5.3. Power

The Symphony-Board is powered by a +12V power supply, connected either through a 2.0 mm power plug or alternatively through a 2 pin Terminal block.

A 5V fan power output is available via shrouded 2 pin header.
Mating Housing Molex 22-01-3027; Connector Terminal Female Molex 08-50-0114;

5.5.3.1 DC-in Jack Pin-out (J24)

Table 2-28: DC-in Jack Pin-out (J24)

Pin #	Symphony-Board Signal	Type	Description
1	GND	P	Digital Ground
2	GND	P	Digital Ground
3	VCC_12V_PJ	P	Power supply 12V
4	VCC_12V_PJ	P	Power supply 12V

5.5.3.2 DC-in Terminal Block Pin-out (J25)

Table 2-29: DC-in 2 pins Terminal Block Pin-out (J25)

Pin #	Symphony-Board Signal	Type	Description
1	GND	P	Digital Ground
2	VCC_12V_PJ	P	Power supply 12V

5.5.3.3 DC-out FAN 5V Pin-out (J9)

Table 2-30: DC-out 5V FAN Header Pin-out (J9)

Pin #	Symphony-Board Signal	Type	Description
1	FAN_PWR	P	Power supply 5V out
2	GND	P	Ground Return

5.5.3.4 SATA Power DC-Out Pin-out (J22)

A 5V,3.3V power output is available via shrouded 3 pin header for SATA power.
Mating Housing Molex 22-01-3037; Connector Terminal Female Molex 08-50-0114;

Table 2-31: SATA Power DC-Out Connector Pin-out (J22)

Pin #	Symphony-Board Signal	Type	Description
1	BASE_PER_3V3	P	Base Board 3.3V
2	GND	P	Ground Return
3	VCC_5V	P	Base board 5V

5.5.3.5 RTC Backup Battery (JBT1)

The Symphony-Board features JBT1, a CR1225 battery holder for powering the
On board DS1337U+ RTC Module.

6. Electrical Environmental Specifications

6.1. Absolute Maximum Electrical Specifications

Table 3-1: DC Power Input absolute maximum electrical specifications

	Min	Max
Main Power Supply, DC-IN	-0.3V	20V

6.2. Operational Electrical Specifications

Table 3-2: DC Power Input Operational electrical specifications

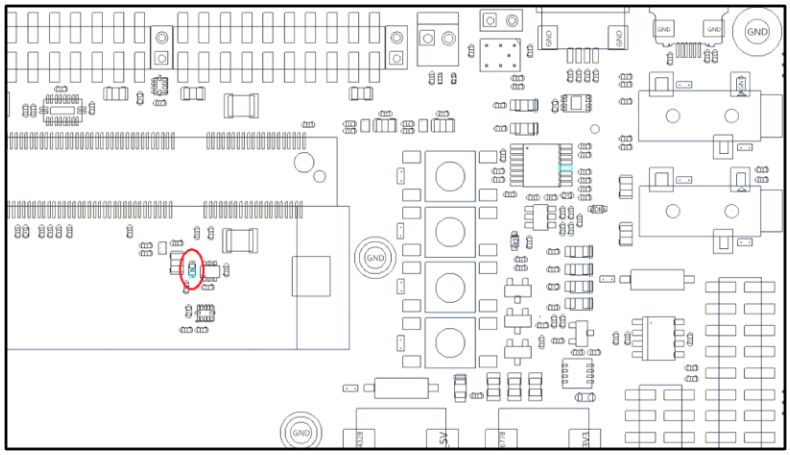
	Min	Max
Main Power Supply, DC-IN	8V	18V

7. VAR-SOM-AM62 Compatibility

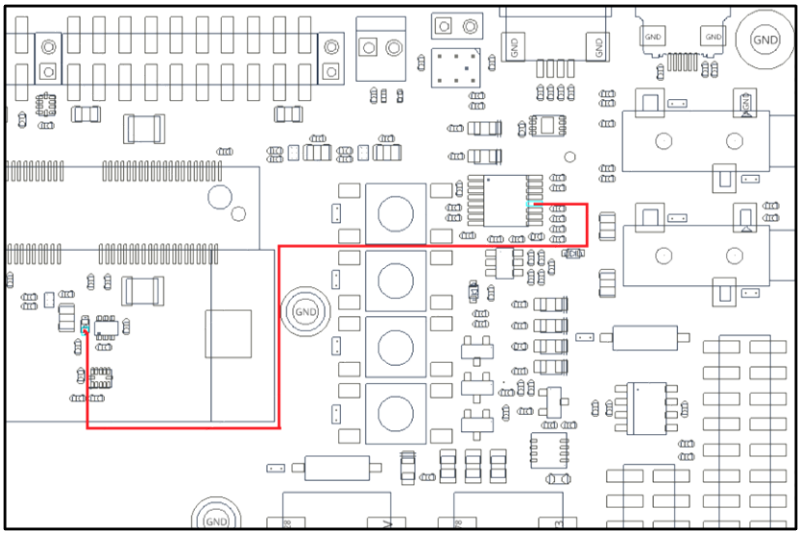
The introduction of the new VAR-SOM-AM62 product required a hardware change.
This SOM supports both 1.8V and 3.3V RGMII voltages, and it is shipped with 3.3V as the default setting.
As a result, the external PHY must also be powered by 3.3V on the Symphony-Board.
However, this is not possible as the MDIO lines are only enabled when the PHY voltage is set to 1.8V.
This is done to protect the MDIO lines of the VAR-SOM-MX8M-Mini and VAR-SOM-MX8M-Nano that expose these lines at 1.8V.
To address this issue, we recommend making changes to the Symphony-Board Rev 1.6/1.6A/1.6B

This modification is necessary only for Symphony-Boards Revisions 1.6/1.6A/1.6B in order to evaluate external PHY on VAR-SOM-AM62. No other products or functions require this change.

- Step 1: remove D30 diode.



- Step 2: Add a wire to connect Anode pin of D30 to Pin 12 of GPIO Expander U5



8. Environmental Specifications

Table 4-1: Environmental specifications

	Min	Max
Commercial operating temperature range	0^0C	+70^0C
MTBF	>10kHRS	
Relative humidity, Operational	10%	90%
Relative humidity, Storage	5%	95%

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10. Contact Information

Headquarters:
Variscite Ltd.

4, Hamelacha Street
Lod
P.O.B 1121
Airport City, 70100
ISRAEL

Tel: +972 (9) 9562910
Fax: +972 (9) 9589477

Sales: sales@variscite.com

Technical Support: support@variscite.com

Corporate Website: www.variscite.com