CS_VERSA_EVM_AM1808_VGA/ CS_VERSA_EVM_OMAPL138_VGA/ CS_VERSA_EVM_1808_LCD3/ CS_VERSA_EVM_OMAPL138_LCD3 User Manual

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Revision History

Date	Revision	Remarks
09/12/11	0.1	First version created
10/01/2012	1.0	Modified before release

Table of Contents

1. Introduction

This document gives details of Calixto Systems Evaluation boards (EVMs) for Calixto AM1808/OMAPL-138 VERSA System On Modules (VERSA SOMs). These EVMs are based on TI's Sitara™ AM1808 and Integra™ OMAPL-138 processors. Calixto EVMs are constructed using System On Module and Carrier Board approach. They are intended for customers to evaluate Calixto SOMs. Unless explicitly specified the details are applicable for both AM1808 and OMAPL138 EVMs.
This document does not provide details of TI silicon, memory maps etc. For details like this, customers are advised to look Technical Reference Manuals (TRMs) of the processors at TI product web pages.

2. EVM Box Contents

The Calixto VERSA EVM box will contain:

- Any one of the EVM as selected by customer:
  - CS_VERSA_EVM_AM1808_VGA
  - CS_VERSA_EVM_OMAPL138_VGA
  - CS_VERSA_EVM_AM1808_LCD3
  - CS_VERSA_EVM_OMAPL138_LCD3
- CD containing Documentations, Carrier board schematics, Binary and source code for Uboot and Linux BSP 2.6.33 or later. Most of these information are also available at www.calixtosystems.org
- USB cable
- 5 V Power adapter (if ordered)

3. EVM Interface Summary

- Carrier Board with VGA or LCD interface. Carrier board will also contain 200 PIN SODIMM connector.
- One of **CS-VERSA-SOM-AM1808** or **CS-VERSA-SOM-OMAPL138** System On Module (SOM) as per customer selection. This SOM will be inserted to SODIMM connector of the Carrier board.
- 10/100BaseT - RJ45 Ethernet connector.
- USB2.0 OTG Mini AB type connector.
- USB1.1 Host Type A connector.
- Video Graphics Array (VGA) connector or 3.5 Inch LCD board as applicable.
- Two 3.5mm jack for AUDIO IN and AUDIO OUT.
- One micro-SD-Card slot.
- RS232 interface through DB9 connector (3 UART interface)
- 5V DC Input connector.
- Boot Selection switch.
- SATA Right angled SMD connector
- Two 50 pin expansion slot exposing interfaces like
  - SPI, I2C, VPIF, EMIFA, UART, McASP and GPIOs

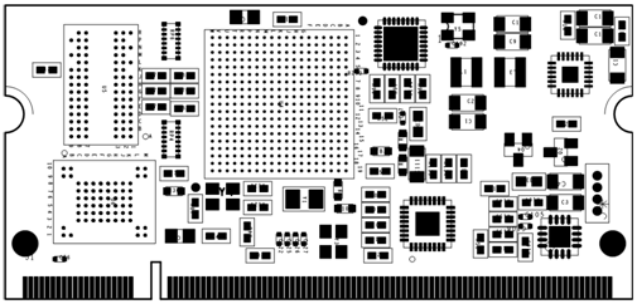
4. System On Module (SOM)s

Calixto Systems VERSA System on Module (SOM) for OMAPL138/OMAPL132/AM1808/AM1802 simplifies embedded hardware design by incorporating all complex processor circuitry in a small form factor board. The 200 PIN SODIMM Connector used in the design provides versatile connectivity options without adding much cost to the design.

Operating from Single 3.3V DC power supply, the board contains Processor, SPI Flash, DDR2 RAM, NAND Flash, 10/100 Ethernet PHY and SATA PHY: which are most common requirement for any embedded hardware design.

The standard 200 PIN SODIMM connector brings out most of the processor signals and helps the end user to design simple double sided board to meet the product requirements.

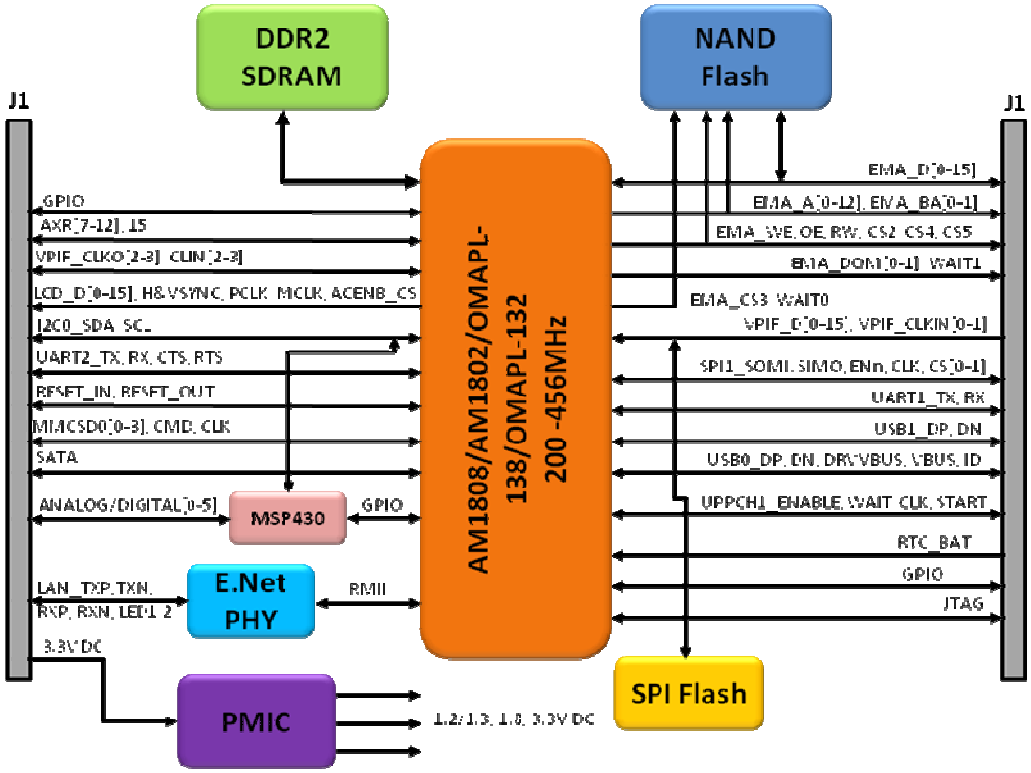
4.1 The figure given below gives PCB layout and assembled VERSA SOM



4.2 Table below shows the configuration of CS VERSA SOMs

	CS-VERSA_SOM-OMAPL138	CS-VERSA-SOM-OMAPL132	CS-VERSA-SOM-AM1808	CS-VERSA-SOM-AM1802
Processor	TI OMAP L138	TI OMAP L132	TI Sitara AM1808	TI Sitara AM1802
Processor Speed	375MHz (ARM/DSP)	200 MHz(ARM/DSP)	456MHz ARM	300MHz ARM
DDR2 SDRAM	128MB	128 MB	128MB	128MB
Nand Flash	128MB(Optional)	128 MB (Optional)	128MB(Optional)	128MB(Optional)
Serial Flash	2MB(Optional)	2MB (Optional)	2MB(Optional)	1MB(Optional)
Ethernet (MAC + PHY)	Yes	Yes	Yes	Yes
UART Serial Interface	3	3	3	3
USB OTG	1	1	1	1
USB HOST	1	No	1	No
SATA	Optional	No	Optional	No
MSP430 A/D I/Os	6 (Optional)	6(Optional)	6(Optional)	6 (Optional)
Other Interfaces	LCD, VPIF, SPI, I2C, MMC/SD, EMIFA, GPIO, PWM, JTAG, McASP, PRU, McBSP	SPI, I2C, MMC/SD, EMIFA, GPIO, PWM, JTAG, McASP, McBSP	LCD, VPIF, SPI, I2C, MMC/SD, EMIFA, GPIO, PWM, JTAG, McASP, PRU, McBSP	SPI, I2C, MMC/SD, EMIFA, GPIO, PWM, JTAG, McASP, McBSP
Input Power	3.3V DC	3.3V DC	3.3V DC	3.3V DC
Dimension	67mm x 34mm	67mm x 34mm	67mm x 34mm	67mm x 34mm

4.3 Calixto VERSA System on Module high level block diagram:



5. VERSA Carrier Board (CB)s

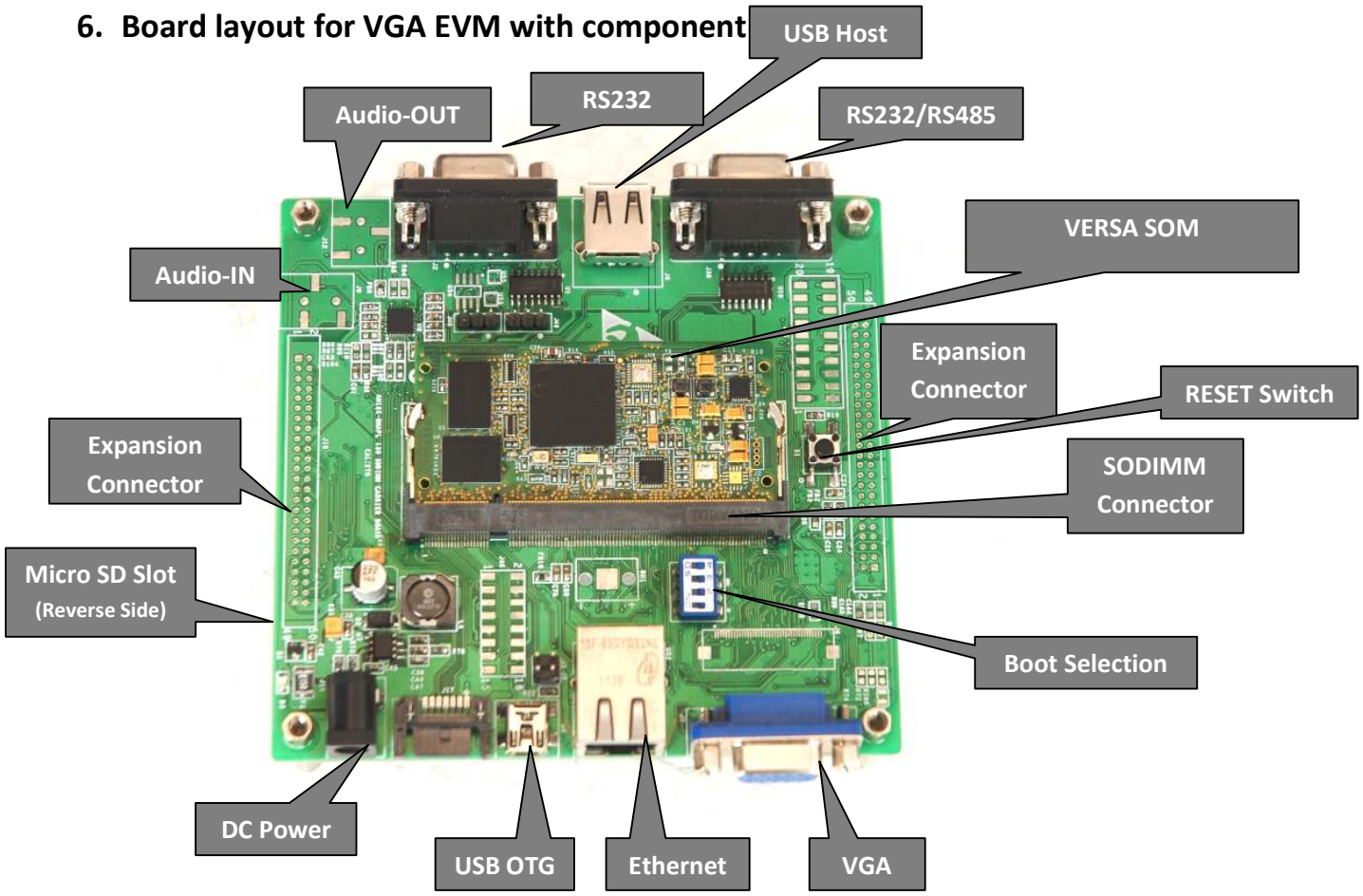
Carrier board is Capable of extending Calixto's CS-VERSA-SOM-OMAPL13x or CS-VERSA-SOM-AM180x with System On Dual In Memory Module (SODIMM) interfaces through standard connectors, to connect with real world devices.

This Carrier board can be used by customers for Initial prototyping, Software development or use them straight in the product. There are two versions of the Carrier board, one with VGA interface and other with LCD and Touch screen interface.

Also extended the processors SPI, I2C, VPIF, EMIFA, UART, McASP, PRU, PWM and GPIOs through two expansion connectors, so that a custom board can be interfaced with Carrier board to expand the functionality.

	CS-VERSA-CB-VGA	**CS-VERSA-CB-LCD**
Supported SOMs	CS-VERSA-SOM-OMAPL138 CS-VERSA-SOM-OMAPL132 CS-VERSA-SOM-AM1808 CS-VERSA-SOM-AM1810 CS-VERSA-SOM-AM1802	CS-VERSA-SOM-OMAPL138 CS-VERSA-SOM-OMAPL132 CS-VERSA-SOM-AM1808 CS-VERSA-SOM-AM1810 CS-VERSA-SOM-AM1802
Display Interface	Standard VGA DB15	3.5 inch LCD Interface with Resistive Touch
Ethernet 10/100	RJ45	RJ45
USB Host Connector	Type A	Type A
USB OTG Connector	Type AB	Type AB
Audio IN/OUT	3.5mm Jack	3.5mm Jack
micro-SD Card Connector	Yes	Yes
RS232 Serial	Standard DB9	Standard DB9
RS422/485 Serial	Optional	Optional
RTC Battery	Optional	Optional
Dimension	115mm * 110mm	115mm * 110mm
Input Power	5V DC @1A	5V DC @1A

6. Board layout for VGA EVM with component



7. Board Layout for 3.5 Inch LCD EVM

This EVM contains 3.5 LCD add on board with touch screen and user buttons.

8. External Connector Details

Following are the important interface connectors exposed from EVM. (Please refer the Carrier board schematics for more details on signals).

8.1 Ethernet

Standard 10/100Base-T RJ45 Ethernet jack (U52) with LED indicators is provided. The Ethernet magnetic is on the board to provide needed isolation. Ethernet interface of the board is realized using MAC of the application processor and external PHY connected to the MII of processor.

8.2 USB

The USB 2.0 OTG (J6) is exposed through mini AB type connector and USB 1.1 Host (J6) is available over Type A connector.

8.3 UART

There are three UARTs available on the EVM. Two RS232 level UART (J2,J38) available through DB9 connector and TTL level UART on the Expansion Slot (J10).

8.4 micro-SD Card Interface

Standard SD Card connector (P7) is located beneath the board. SD Card makes use of MMC/SD0 interface of the processor.

8.5 Audio

There are separate connectors for Audio IN and OUT. The Audio IN is J12 and Audio OUT is J9 and uses Standard 3.5mm connectors. Audio IN is connected to LINE1 (LINE1RP and LINE1LP) and Audio OUT is connected to HPOUT (HPROUT and HPLOUT) of Texas Instruments AIC3104 CODEC.

8.6 VGA

On VGA EVMs Analog VGA is exposed through standard DB15 (J7).

8.7 SATA

One SMD SATA connection is available at J17.

8.8 JTAG

One 16 PIN JATAG connector at J46.

8.9 Expansion Slots

Connector slots J10 and J11 are two 50 pin 2.5mm connector slots supporting processor signals such as EMIFA, UART1, VPIF, I2C, SPI, PWM and GPIOs. Also provided are 5.0V DC and 3.3V DC supplies for powering external circuits (Please do not load more than 250mA from each supply).

8.10Input Power

EVM operates from 5V DC input (J14).

8.11Boot Selection

Processor boot selection is supported by the switch array (SW1). Following table gives the boot options supported.

	SW1-1	SW1-2	SW1-3	SW1-4
Nand Boot	OFF	ON	ON	ON
UART2 Boot	ON	OFF	ON	OFF
Emulation *	ON	ON	ON	ON

*Emulation boot selection should be used for debugging OMAP-L138 (ARM and DSP) using JTAG and Code Composer Studio (CCS).

9. Expansion connector PIN assignments

9.1 Expansion Connector1 (J11)

This is a 50 pin 2.5mm pitch berg connector. Table shows pin specifications

PIN NUMBER	SIGNAL	PIN	SIGNAL
1	MICIN	2	GND
3	EMA_A16	4	EMA_A15
5	EMA_A14	6	EMA_A13
7	AXR1	8	VPIF_CLKO3
9	RESETOUT	10	AXR7
11	AXR8	12	AXR10
13	GND	14	AXR9
15	AXR15	16	AXR12
17	GND	18	AXR11
19	GPIO6_12	20	AXR13
21	VPIF_D10	22	VPIF_D8
23	VPIF_D12	24	VPIF_D9
25	AXR0	26	AXR14
27	AXR6	28	VPIF_D15
29	AXR4	30	AXR5
31	UPPCH1_WAIT	32	UPPCH1_ENABLE
33	UPPCH1_START	34	UPPCH1_CLK
35	SPI1_SOMI	36	SPI1_ENn
37	SPI1_CLK	38	SPI1_SIMO
39	GND	40	SPI1_CS1
41	GPIO6_13	42	VPIF_D11
43	VPIF_D14	44	VPIF_D13
45	AXR2	46	AXR3
47	VPIF_CLKIN0	48	VPIF_CLKIN1
49	VCC_5VOD	50	VCC_5VOD

9.2 Expansion Connector 2 (J10)

This is a 50 pin 2.5mm pitch berg connector. Table shows pin specifications

PIN NUMBER	SIGNAL	PIN NUMBER	SIGNAL
1	GND	2	EMA_D4
3	EMA_D6	4	EMA_D5
5	EMA_D7	6	EMA_D2
7	EMA_D3	8	EMA_D1
9	EMA_D0	10	EMA_RW
11	EMA_BA0	12	EMA_CS4
13	EMA_WE	14	EMA_DQM0
15	EMA_DQM1	16	EMA_A1
17	EMA_A6	18	EMA_A2
19	EMA_A8	20	EMA_A9
21	EMA_A7	22	EMA_A5
23	EMA_A4	24	EMA_A0
25	EMA_A3	26	EMA_OE
27	EMA_CS5	28	EMA_CS2
29	EMA_BA1	30	EMA_WAIT1
31	EMA_D15	32	EMA_D14
33	EMA_D9	34	EMA_D13
35	EMA_D11	36	EMA_D12
37	GND	38	GND
39	EMA_A12	40	GPIO0_9
41	GPIO0_8	42	GND
43	EMA_A10	44	EMA_D8
45	EMA_D10	46	EMA_A11
47	I2C0_SCL	48	I2C0_SDA
49	VCC_3V3D	50	VCC_3V3D

9.3 DB9 connector for UART0 signals (J38)

PIN NUMBER	SIGNAL
1	NC
2	TXD
3	RXD
4	NC
5	GND
6	NC
7	CTS
8	RTS
9	GND

9.4 DB9 Female Connector (J2) for UART 2(RS-232mode) and UART 1(RS232/RS485 mode)

PIN NUMBER	SIGNAL
1	RS 422-TX-/RX-
2	UART2-TXD
3	UART2-RXD
4	NC
5	GND
6	NC
7	UART1-RXD
8	UART1-TXD
9	RS422-TX+/RX+

9.5 Right angled SATA connector (J17)

PIN NUMBER	SIGNAL
1	GND
2	SATA TXP
3	SATA TXN
4	GND
5	SATA RXN
6	SATA RXP
7	GND

9.6 JTAG (J46)

PIN NUMBER	SIGNAL
1	TMS
2	TRSTn
3	TDI
4	GND
5	VCC 3V3D
6	NC
7	TDO
8	GND
9	RTCK
10	GND
11	TCK
12	GND
13	EMU0
14	GND
15	NC
16	NC

10. Electrical and Environmental Specification

Parameter	Min	Max
Input Power Supply -DC	5V	5V
Operating Temperature	0^0 C	$+70^0$ C
Relative humidity - Operational	10%	90%

11. Legal Notice

Customer Support: Calixto Systems are excited to offer our customers an easy "out of box" experience by providing board support package, software demos, user manuals and other electro mechanical documentation to get our evaluation modules up and running. We also provide further electronic (email, wiki and discussion forum) support for evaluation of our System on Dual In Memory Modules (SODIMMs) using corresponding Calixto EVMs.

Customer product development support is not part of standard support offer from Calixto systems. If customers are interested, Calixto can offer product development services around Calixto SODIMMs. This includes application board (carrier board) development, Board Support package (BSP) development and application software development.

Usage Restriction: Calixto products are excellent starting point for customer's applications development. But, selection and usage of Calixto systems products for a particular application is responsibility of customers. In order to minimize risks associated with customer applications, the customer must use adequate design and operating safeguards to minimize inherent or procedural hazards.

Calixto systems products are not intended for use in life support systems and appliances, nuclear systems or systems where malfunction can reasonably be expected to result in personal injury, death or severe property or environmental damage. Any use of products by the customer for such purposes are at the customer's own risk.

Off the shelf products from Calixto systems are commercial temperature grade. If customers are looking for Industrial or Extended temperature products, please order them specifically.

12. Warranty and Return Policy

Warranty Period: Calixto Systems guarantees hardware products against defects in workmanship and. material for a period of twelve (12) months from the date of shipment.

Warranty Coverage: Calixto systems at its sole discretion, to either repair or replace the defective hardware product at no charge. Shipment costs in both directions are the responsibility of the customer. The warranty is void if the hardware product has been altered or damaged by accident, misuse or abuse. The warranty is void if the damage is due to the shipping of the Products and other external causes like problems with electrical power, usage not in accordance with product instruction, and problems caused by use of parts and components not supplied by Calixto systems.

This warranty does not cover any items that are in one or more of the following categories:

a. Software and/or device drivers,

b. External devices,
c. Accessories or parts added to products after the products shipped from Calixto Systems.
d. All Warranty terms are subject to change without prior notice.

Product Repair:

- Calixto systems shall repair the defective products covered under this warranty that are returned to Calixto systems.
- Calixto systems shall own all parts removed from repaired products.
- Calixto systems will use parts made by various manufacturers in performing the repair. This can be different from the components used in the original products.
- The repaired products shall be warranted subjected to the original warranty only (If the original warranty period left was three months, the repaired product warranty will be only for three months)
- Customers shall agree that an independent third party assigned by Calixto Systems may repair the products covered under this limited warranty.

RMA (Return Merchandise Authorization)

- Customer shall enclose the completed "Calixto Systems RMA Service Form" with the returned packages.
- Customers shall provide all the relevant information of the defect in the “Calixto Systems RMA Service Form”. This will reduce delay in defect identification and repair.
- Customers shall take responsibility to ensure that the packages of defective Products are durable enough to be resistant against further damage and deterioration during shipment. In case of damages occurred during the transportation, the repair is treated as “Out of Warranty”.