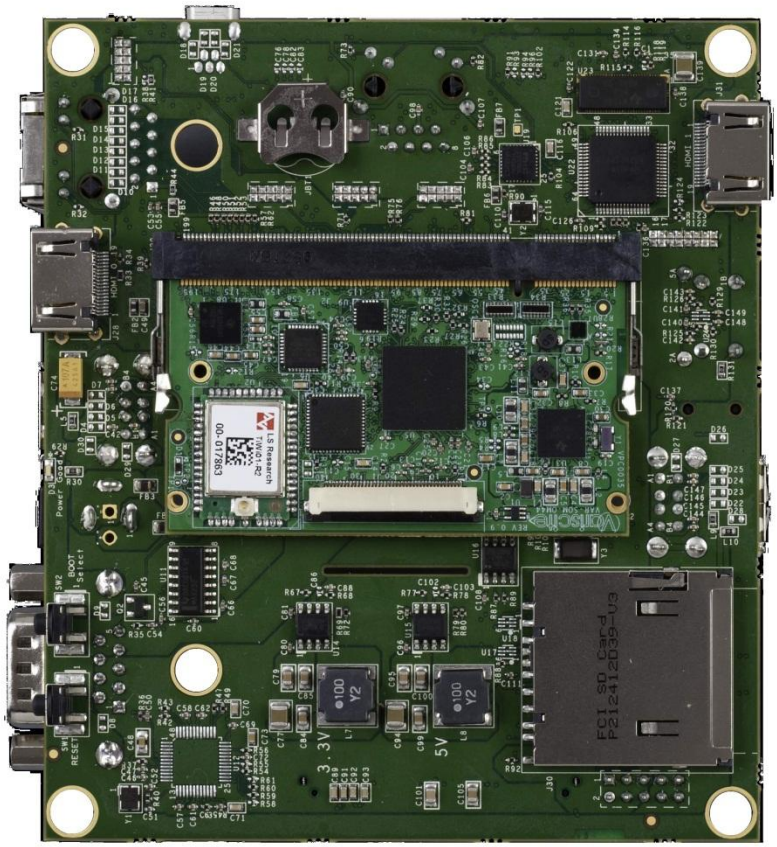
VARISCITE LTD

VAR-OM44CustomBoard REV 1.1 Datasheet

Carrier-board for VAR-SOM-OM44
V1.1



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Revision History

Revision	Date	Notes
0.1	27/07/2011	Preliminary
1.0	06/09/2011	Release
1.1	06/09/2012	Removing SATA interface Update J13 pin out Reference for VAR-EXT-CB401

Table of Contents

List of Tables

1 Overview

This chapter gives an overview of the VAR-OM44CustomBoard.

1.1 General Information

The VAR-OM44CustomBoard is a single board computer, utilizing all VAR-SOM-OM44 System-on-Modules features. For development and production, the VAR-OM44CustomBoard serves both as a complete development kit and as an end- product, assembled according to your specification for the most optimized price. The VAR-OM44CustomBoard is available in two main configurations:

- SBC
- DVK

1.1.1 SBC configuration

The SBC configuration forms a powerful, hand held size computing system with all standard peripherals interfaces as 4xUSB host ports, HDMI, Gigabit Ethernet, SD card and audio. All connectors are arranged in VAR-OM44CustomBoard rear/ front panel, easily fits to any required mechanics.

1.1.2 DVK configuration

The DVK configuration, assembled with large variety of debug & testing means as an OTG interface, 10/100BaseT Ethernet, Parallel LCD FFC/FPC connector, JTAG, serial interfaces and GPIO expansion connectors enables full VAR-SOM-OM44 testing ,evaluating ,and interfacing to custom hardware or a third part evaluation kit.

1.1.3 Supporting Variscite products

- VAR-SOM-OM44 System-On-Module
- VAR-EXT-CB401 Dual CSI-2 Camera & digital microphone connectors

1.1.4 Supporting O.S

- Linux BSP
- Android

1.1.5 Additional information

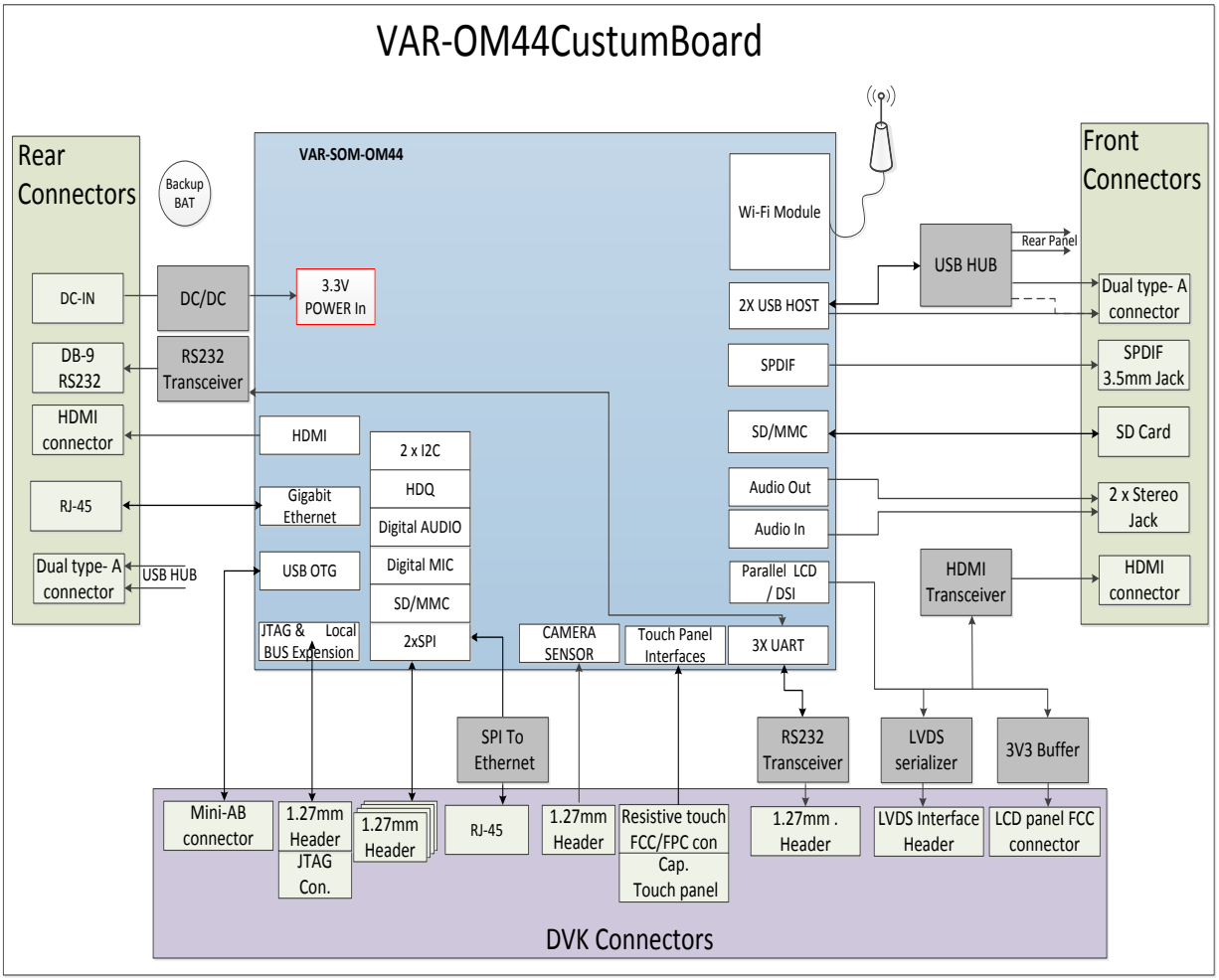
Board schematics as well as mechanical CAD data base is available to download at www.variscite.com ,

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

1.2 VAR-OM44CustomBoard features summary:

- SO-DIMM200 socket, compatible with VAR-SOM-OM44
- Dual Display
  - HDMI
  - LCD Parallel Interface connector compatible with U.R.T, 7" , TFT display module.
  - 24 bit LVDS transmitter (TI's FlatLink™ compatible)
- Touch panel interface
  - Resistive (4 wire) – 4 pin FFC/FPC connector
  - Capacitive (I2C based) – 10 pin 1.27mm Header.
- Ethernet
  - 10/100/1000BaseT – RJ45
  - 10/100BaseT – RJ45
- USB
  - USB2.0 OTG ,Mini AB type
  - 4 x USB2.0 Host Type A
- AUDIO
  - 3.5mm Headphones jack.
  - 3.5mm Line in jack.
  - S/PDIF Out
- SD-Card slot
- 2 x UART (RS232 levels)
  - DB-9 – Male (DTE)
  - IDC10 header
- JTAG
- Expansion connectors:
  - GPMC - Local Bus interface
  - SD/MMC interface
  - RAW image-sensor module interface
  - SPI
  - I2C
  - MSBSP/I2S
  - UART
  - Digital Microphone
  - GPIOs
  - 4 bit , general purpose, bidirectional 1.8V ←→ 3.3V level translation header
- Power
  - Power Terminal/ 2.5mm DC jack Options
  - 7.5V -14V DC Input.
  - RTC backup coin battery socket

1.3 Block Diagram



1.4 Board Layout

The VAR-OM44CustomBoard physical dimensions are 120x105 mm.

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

Top side - Detailed View

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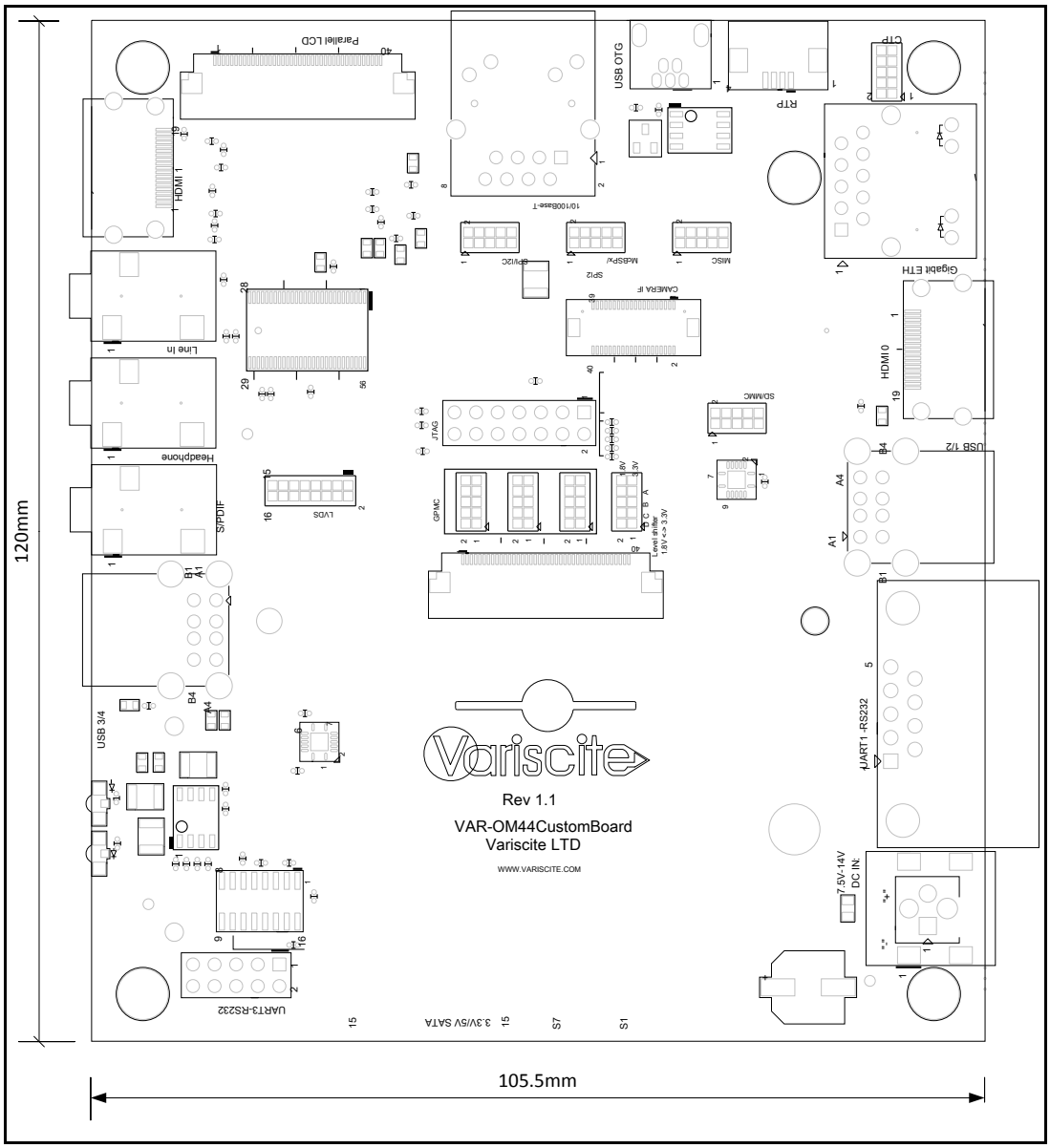

1.5 VAR-OM44CustomBoard connectors

The below Table listing the available connectors on the VAR- OM44CustomBoard , refer to chapter 2 for detailed description and pin out of each connector.

Reference	Function	Type
J1	UART1 (RS232)	D-Type -Male
J2	HDMI 0	HDMI
J3	Power In	2.5MM DC Jack * Assembly option with J4
J4	Power In	Terminal Block * Assembly option with J3
J5	USB Host , Ports 1/2	2 x USB TYPE A
J6	10/100/1000BaseT port	RJ-45
J7	Capacitive Touch Panel	Header , 2x5, 1.27mm
J8	Resistive Touch Panel	FFC/FPC ,4 wire ,1mm
J9	SD/MMC	Header , 2x5, 1.27mm
J10	MISC	Header , 2x5, 1.27mm
J11	USB OTG	USB Mini AB
J12	Camera Interface	Header , 2x20, 0.5mm
J13	General purpose , 4 x Bi directional 1.8V to 3.3V level shifter	Header , 2x5, 1.27mm
J14	McBSPx/SPI1	Header , 2x5, 1.27mm
J15	GPMC	Header , 2x5, 1.27mm
J16	VAR-SOM-OM44 GPMC & JTAG Connection	FFC/FPC , 40 pin
J17	10/100BaseT port	RJ-45
J18	GPMC	Header , 2x5, 1.27mm
J19	JTAG	Header , 2x7 ,2.54mm
J21	SPI/I2C	Header , 2x5, 1.27mm
J22	GPMC	Header , 2x5, 1.27mm
J23	24 Bit LVDS	Header , 2x7, 1.27mm
J24	24 bit , Parallel LCD	FFC/FPC , 40 pin
J25	UART3 (RS232)	Header , 2x5, 2.54mm
J26	USB Host , Ports 3/4	2 x USB TYPE A
J27	S/PDIF Out	Jack 3.5mm
J28	AUDIO In	Jack 3.5mm
J29	Headphone Jack	Jack 3.5mm
J31	VAR-Som-OM44 Socket	SODIMM , 200 pin 1.8V

Reference	Function	Type
J32	SD Slot	SD Card
JBT1	RTC battery holder	CR1225

Table 1-1 VAR-OM44CustomBoard connectors5

2 Detailed Description

2.1 Overview

This chapter details the VAR-OM44CustomBoard features and external interfaces, most are driven by the VAR-SOM-OM44. Please refer to the VAR-SOM-OM44 data sheet for more information regarding those interfaces.

The following list describes this chapter table's column header:

Pin#:
Pin Number of the specific connector

VAR-OM44CustomBoard Signal:
VAR-OM44CustomBoard schematic signal name

Type:
Pin Type & Direction:

- I – In
- O – Out
- DS – Differential Signal
- A – Analog
- P – Power Pin

Description:
Short Pin functionality description

2.2 VAR-SOM-OM44 Interfaces

2.2.1 SO-DIMM 200 (J31)

The VAR-OM44CustomBoard features a SO-DIMM200, 1.8V standard connector compatible with the VAR-SOM-OM44 System On a Module devices. Please refer to the VAR-SOM-OM44 module data sheet for a complete signal description.

2.2.2 40 pin SFF/FPC (J16)

The VAR-OM44CustomBoard features a 40 pin SFF/FPC connector in order to support VAR-SOM-OM44 GPMC/JTAG expansion connectivity. Please refer to the VAR-SOM-OM44 module data sheet for a complete signal description.

2.3 Standard External Interfaces

2.3.1 HOST USB (J5, J26)

The VAR-OM44CustomBoard supports four USB 2.0 Type A Host ports. The dual J5's USB host connector is driven by an on-board USB hub, while the dual J26 USB host connector is driven by both , an on-board HUB as well as by the VAR-SOM-OM44 USB HOST1 interface.

2.3.1.1 USB Host 0/1 Connector Pin-out (J5)

Pin #	VAR-OM44CustomBoard Signal	Type	Description
A1	VCC_USB1	O	5V power supply. 500ma max
A2	USB_HUB_DN1	IO	USB Data Negative
A3	USB_HUB_DP1	IO	USB Data Positive
A4	GND	P	
B1	VCC_USB2	O	5V power supply. 500ma max
B2	USB_HUB_DN2	IO	USB Data Negative
B3	USB_HUB_DP2	IO	USB Data Positive
B4	GND		

Table 2-1 USB Host1/2 Connector Connector Pin-out (J5)

2.3.1.2 USB Host 2, 3 Connector Pin-out (J26)

Pin #	VAR-OM44Custom Board Signal	Type	Description
A1	VCC_USB4	O	5V power supply. 500ma max
A2	USBH_DN1	IO	USB Data Negative (VAR-SOM-OM44)
A3	USBH_DP1	IO	USB Data Negative (VAR-SOM-OM44)
A4	GND	P	
B1	VCC_USB4	O	5V power supply. 500ma max
B2	USB_HUB_DN3	IO	USB Data Negative
B3	USB_HUB_DP3	IO	USB Data Positive
B4	GND		

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2.3.2 USB OTG Connector Pin-out (J11)

The VAR-OM44CustomBoard OTG, min iAB type connector is driven by the VAR-SOM-OM44 OTG interface.

Pin #	VAR-OM44CustomBoard Signal	Type	Description
1	USB_OTG_VBUS	IO	5V in/out (Client/host)
2	USB_OTG_DN	IO	USB Data Negative

3	USB_OTG_DP	IO	USB Data Positive
4	USB_OTG_ID	I	USB OTG ID signal ('1' - Device mode)
5	GND	P	

Table 2-2 USB OTG connector Pin-out (j11)

2.3.3 SD Card (J32)

SD Card interface is based on the VAR-SOM-OM44 SD/MMC2 interface. In order to support 3.3V IO interface, a bidirectional buffer is used.

2.3.3.1 SD card slot Connector Pin-out (J32)

Pin #	VAR-OM44CustomBoard Signal	Type	Description
1	MMC2_DAT3	IO	MMC Parallel Data, 3.3V
2	MMC2_CMD	IO	MMC command, 3.3V
3	GND	P	
4	VCC_SD	P	SD Card VCC 3.3v
5	MMC2_CKO	O	MMC Clock, 3.3V
6	GND	P	
7	MMC2_DAT0	IO	MMC Parallel Data, 3.3V
8	MMC2_DAT1	IO	MMC Parallel Data, 1.8V
9	MMC2_DAT2	IO	MMC Parallel Data, 1.8V
10	MMC2_CD	I	MMC Card Detect, 1.8V
11	GND	P	
12	SD_WP	I	MMC Write Protected , 1.8V

Table 2-3 SD Card slot Connector Pin-out (J32)

2.3.4 Ethernet (J6, J17)

The VAR-OM44CustomBoard features two Ethernet interfaces:

- 10/100/1000BaseT
- 10/100BaseT

Both are exposed by a standard RJ45 Ethernet jack with an integrated magnetics. The Giga Ethernet port is directly connected to VAR-SOM-OM44 on board gigabit Ethernet PHY while the fast Ethernet port is driven by on board ,SPI to fast Ethernet Bridge IC.

2.3.4.1 10/100/1000BaseT Connector Pin-out (J6)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	VCC 3V3	P	
2	GETH_TR0P	DIO	Bi-directional pair Positive
3	GETH_TR0N	DIO	Bi-directional pair Negative

4	GETH_TR1P	DIO	Bi-directional pair Positive
5	GETH_TR1N	DIO	Bi-directional pair Negative
6	GETH_TR2P	DIO	Bi-directional pair Positive
7	GETH_TR2N	DIO	Bi-directional pair Negative
8	GETH_TR3P	DIO	Bi-directional pair Positive
9	GETH_TR3N	DIO	Bi-directional pair Negative
10	GND	P	
11	SPEED_A	A	LED Anode
12	SPEED_K	A	LED Cathode
13	LINK_A	A	LED Anode
14	LINK_K	A	LED Cathode

Table 2-4 10/100/1000BaseT RJ45 Connector Pin-out (J6)

2.3.4.2 10/100BaseT Connector Pin-out (J17)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	ETH_TXP	DO	Tx Pair- Positive
2	ETH_TXN	DO	Tx Pair- Negative
3	ETH_RXP	DI	Rx Pair- Positive
4	VCCA_3V3	AP	
5	VCCA_3V3	AP	
6	ETH_RXN	DI	Rx Pair- Negative
7	NC		
8	DGND	P	
9	SPEED1_A	A	Speed LED Anode
10	SPEED1_K	A	Speed LED Cathode
11	LINK1_K	A	Link LED Anode
12	LINK1_A	A	Link LED Cathode

Table 2-5 10/100/100BaseT RJ45 Connector Pin-out (J17)

2.3.5 HDMI 0 (J2)

The VAR-3xCustumBoard features a HDMI connector to interface an external monitor. HDMI 0 connector is driven by native VAR-SOM-OM44 HDMI signals

2.3.5.1 HDMI Connector Pin-out (J2)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	DAT2+	DO	HDMI Data 2 positive
2	DAT2_S	P	GND
3	DAT2-	DO	HDMI Data 2 negative
4	DAT1+	DO	HDMI Data 1 positive

5	DAT1_S	P	GND
6	DAT1-	DO	HDMI Data 1 negative
7	DAT0+	DO	HDMI Data 0 positive
8	DAT0_S	P	GND
9	DAT0-	DO	HDMI Data 0 negative
10	CLK+	DO	HDMI Clock positive
11	CLK _S	P	GND
12	CLK 0-	DO	HDMI Clock negative
13	CEC	IO	
14	NC	NC	
15	SCL	IO	HDMI I2C Data
16	SDA	IO	HDMI I2C Clock
17	DDC/CEC GND	P	GND
18	+5V	P	5V Output

Table 2-6 HDMI Connector Pin-out (J2)

2.3.6 AUDIO

The VAR-OM44CustomBoard feature three 3.5mm jacks for audio interfaces, all are directly driven by VAR-SOM-OM44.

- Headphone Jack
- Line in
- S/PDIF out

2.3.6.1 Headphone jack Connector Pin-out (J29)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	GND	AP	
2	AUD_OUT_L	AI	Pre-amped audio signal
3	AUD_OUT_R	AI	Pre-amped audio signal

Table 2-7 Headphone Jack Connector Pin-out (J29)

2.3.6.2 Line In jack Connector Pin-out (J28)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	GND	AP	
2	AUD_IN_R	AI	Line in Right input
3	AUD_IN_L	AI	Line in Left input

Table 2-8 Line In Jack Connector Pin-out (J28)

2.3.6.3 S/PDIF Connector Pin-out (J27)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	GND	AP	
2	S/PDIF Signal	O	Digital S/PDIF signal
3	GND	AP	

Table 2-9 S/PDIF Jack Connector Pin-out (J27)

2.3.7 RS232 -DTE (J1)

The RS232 DTE interface is driven by VAR-SOM-OM44 UART1 interface and a RS232 transceiver. Together with an on-board standard, male D-Type9 connector, this serves as a DTE interface, for connecting a third party DCE (modem) device.

2.3.7.1 RS232 -DTE Connector Pin-out (J1)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1			
2	UART1_RX_C	I	UART#3/#1 Receive
3	UART1_TX_C	O	UART#3/#1 Transmit
4			
5	DGND	Power	
6			
7	UART1_RTS_C	O	UART#3/#1 RTS
8	UART1_CTS_C	I	UART#3 #1CTS
9			

Table 2-10 RS232 DTE Connector Pin-out (J1)

2.4 DVK External Interfaces

This section describes the additional available feature in VAR-SOM-OM44 DVK configuration.

2.4.1 Parallel LCD (J24)

A 24 bit LCD interface, driven by VAR-SOM-OM44 parallel LCD interface and exposed by a standard 40 pin FFC/FPC, 0.5mm pitch, connector. The Connector pin-out is compatible with U.R.T , 7" , TFT LCD module (UMSH-8272MD-1T). A 1.8V to 3.3V level translator is used in order to support the LCD module IO level specifications.

2.4.1.1 Parallel LCD Connector Pin-out (JJ24)

Pin #	VAR-OM44Custom Board Signal	Type	Description

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	VCC_5V	P	VLED ,5V
2	VCC_5V	P	VLED ,5V
3	BACKLIGHTEN_3V3	O	Backlight brightness control
4	DGND	P	GLED
5	DGND	P	GLED
6	VCC_3V3	P	VCC
7	VCC_3V3	P	VCC
8	MODE	O	MODE
9	DISPC2_DE_B	O	Data Enable
10	DISPC2_VSYNC_B	O	Vertical Sync
11	DISPC2_HSYNC_B	O	Horizontal Sync
12	DGND	P	
13	DISPC2_DATA7_B	O	Blue Bit 5
14	DISPC2_DATA6_B	O	Blue Bit 4
15	DISPC2_DATA5_B	O	Blue Bit 3
16	DGND	P	
17	DISPC2_DATA4_B	O	Blue Bit 2
18	DISPC2_DATA3_B	O	Blue Bit 1
19	DISPC2_DATA2_B	O	Blue Bit 0
20	DGND	P	
21	DISPC2_DATA15_B	O	Green Bit 5
22	DISPC2_DATA14_B	O	Green Bit 4
23	DISPC2_DATA13_B	O	Green Bit 3
24	DGND	P	
25	DISPC2_DATA12_B	O	Green Bit 2
26	DISPC2_DATA11_B	O	Green Bit 1
27	DISPC2_DATA10_B	O	Green Bit 0
28	DGND	P	
29	DISPC2_DATA23_B	O	Red Bit 5
30	DISPC2_DATA22_B	O	Red Bit 4
31	DISPC2_DATA21_B	O	Red Bit 3
32	DGND	P	
33	DISPC2_DATA20_B	O	Red Bit 2
34	DISPC2_DATA19_B	O	Red Bit 1
35	DISPC2_DATA18_B	O	Red Bit 0
36	DGND	P	
37	DISPC2_PCLK_B	O	Clock
38	DGND	P	
39	LR	O	Left /Right Select
40	DGND	O	Up/ Down Select

Table 2-11 LCD connector Connector Pin-out (J24)

2.4.2 LVDS Interface Connector (J23)

The VAR-OM44CustomBoard LVDS interface, compatible to a 24bit, four lane LVDS interface LCDs, is driven by an on-board TI SN75LVDS83B LVDS transmitter. LVDS data is sourced from VAR-SOM-OM44 parallel LCD interface.
The LVDS connector is a 1.27mm pitch 7x2 header.

2.4.3 LVDS signals (J23)

Pin #	Signal	Type	Description
1	RXIN0-	DO	LVDS Lane 0 , negative signal
2	RXIN2-	DO	LVDS Lane 2 , negative signal
3	RXIN0+	DO	LVDS Lane 0 , positive signal
4	RXIN2+	DO	LVDS Lane 2 , positive signal
5	DGND	P	
6	DGND	P	
7	RXIN1-	DO	LVDS Lane 1 , negative signal
8	CLKIN+	DO	LVDS Clock 0 , positive signal
9	RXIN1+	DO	LVDS Lane 1 , positive signal
10	CLKIN-	DO	LVDS clock , negative signal
11	VCC_5V	POWER	
12	DGND	POWER	
13	VCC_3V3	POWER	
14	RXIN3+	DO	LVDS Lane 3 , positive signal
15	BACKLIGHTEN_3V3	O	Backlight brightness control
16	RXIN3-	DO	LVDS Lane 3 , negative signal

Table 2-12 LVDS connector Connector Pin-out (J23)

2.4.4 Touch Panel connectors (J7/J8)

The VAR-OM44CustomBoard supports two touch panel interfaces:

- Resistive touch panels
- capacitive touch panels

The resistive touch panel connector, exposed by 4-wire FCC/FPC connector (Molex, 52207-0485), is driven by VAR-SOM-OM44 touch panel interface, capacitive touch panels, usually requires an I2C interface are supported by a 5x2 1.27mm Header, exposing VAR-SOM-OM44 I2C3 signals.

2.4.4.1 Resistive Touch Panel Connector Pin-out (J8)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	TS_X-	AI	Touch Screen X Minus
2	TS_Y+	AI	Touch Screen Y Plus
3	TS_X+	AI	Touch Screen X Plus

4	TS_Y-	AI	Touch Screen Y Minus

Table 2-13 Resistive touch panel Connector Pin-out (J8)

2.4.4.2 Capacitive Touch Panel Connector Pin-out (J7)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	VCC_3V3	P	
2	VCC_5V	P	
3	VIO	P	
4	CPT_INT	I	Capacitive touch panel interrupt
5	I2C3_SDA	IO	3.3V version of VAR-SOM-OM44 I2C3 interface.
6	NC		
7	I2C3_SCL	O	3.3V version of VAR-SOM-OM44 I2C3 interface.
8	NC		
9	DGND	P	
10	VCC_3V3	P	

Table 2-14 Capacitive touch panel Connector Pin-out (J7)

2.4.5 RS232 - Debug (J25)

RS232 Debug port is driven by VAR-SOM-OM44 UART3 interface and a RS232 transceiver. Exposed by 10pin IDC header, this port can be connected to a DTE device (i.e. PC) using a standard cable. Note that this port is usually serves as low level software debug port.

2.4.5.1 RS232 -Debug Connector Pin-out (J25)

Pin #	VAR-OM44Custom Board Signal	Type	Description
1	NC		
2	UART3_RX_C	I	UART#3 Receive
3	UART3_TX_C	O	UART#3 Transmit
4	NC		
5	GND	Power	
6	NC		
7	UART3_RTS_C	O	UART#3 RTS
8	UART3_CTS_C	I	UART#3 CTS
9	NC		
10	NC		

Table 2-15 RS232 – Debug Connector Pin-out (J25)

2.4.6 Camera (J12)

The VAR-OM44CustomBoard supports two CSI (Camera Serial interface channels) and one , 8 bit CPI (Camera parallel Interface) ,both are directly driven by VAR-SOM-OM44 .The camera expansion connectors is a Hirose Electric 0.5mm Header , DF17(3.0)-040DS-0.5V(57), suggest mating connectors is Hirose Electric , DF17(2.0)-040DP-0.5V(57).

2.4.6.1 Camera Connector Pin-out (J12)

Pin #	VAR-OM44Custom Board Signal	Parallel Camera Signal	VAR-SOM-OM44 PIN
1	VIO		
2	VCC_3V3		
3	CSI22_DX0	CAM2 _D3	141
4	CSI21_DX0		50
5	CSI22_DY0	CAM2 _D2	143
6	CSI21_DY0		52
7	CSI22_DX1	CAM2 _D1	135
8	CSI21_DX1		130
9	CSI22_DY1		137
10	CSI21_DY1		132
11	DGND		
12	DGND		
13	CSI22_DY2	CAM2 _WEN	136
14	CSI21_DX2		56
15	CSI22_DX2	CAM2 _FLD	138
16	CSI21_DY2		54
17	CSI21_DX3		53
18	CSI21_DX4	CAM2 _D5	129
19	CSI21_DY3	CAM2 _D6	55
20	CSI21_DY4		131
21	DGND		
22	DGND		
23	CAM_SHUTTER	CAM2 _HS	72
24	BACKLIGHTEN	CAM2 _D9	76
25	CAM_GLB_RESET	CAM2 _PCLK	59
26	HUB_REST	CAM2 _D7	78
27	KPD_ROW3_CAM4_D2 _GPIO_175	CAM2 _D4	85
28	CAM_STROBE	CAM2 _VS	80
29	KPD_ROW2_CAM2_D1 1_GPIO_3		87
30	VCC_5V		

Table 2-16 Camera Interface Connector Pin-out (J12)

2.4.7 SD/MMC4 (J9)

SD/MMC4 expansion connector pins are directly connected to the VAR-SOM-OM44 pins. Note that those signals are shared with on board Wi-Fi module and can't be used if the Wi-Fi module is enabled.

2.4.7.1 SD/MMC4 Connector Pin-out (J9)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 PIN
1	SDMMC4_CLK	164
2	VCC_3V3	
3	SDMMC4_CMD	166
4	VIO	
5	SDMMC4_DAT0	168
6	SDMMC4_DAT3	170
7	SDMMC4_DAT1	174
8	MMC4_GPIO	194
9	SDMMC4_DAT2	172
10	DGND	164

Table 2-17 SD/MMC4 Connector Pin-out (J9)

2.4.8 MISC (J10)

Miscellanies expansion connector exposes few VAR-SOM-OM44 interfaces:

- HDQ (one Wire)
- Digital Microphone
- UART2
- PWM (Backlight Enable)

All are directly connected to VAR-SOM-OM44 pins, refer to VAR-SOM-OM44 data sheet for more details.

2.4.8.1 MISC Connector Pin-out (J10)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 PIN
1	BACKLIGHTEN	158
2	HDQ_GPIO127	82
3	FREF_CLK1_OUT	49
4	DMIC_CLK	186
5	DMIC_DAT	188
6	UART2_TX	69
7	UART2_CTS	65
8	UART2_RTS	67
9	UART2_RX	71

10	DGND	1

Table 2-18 MISC Connector Pin-out (J10)

2.4.9 McBSPx/SPI1 (J14)

McBSPx/SPI1 expansion connector pins are directly connected to the VAR-SOM-OM44 pins. Refer to VAR-SOM-OM44 data sheet for more details.

2.4.9.1 McBSPx/SPI1 Connector Pin-out (J14)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 PIN
1	VCC_3V3	
2	MCBSP1_CLKX	27
3	MCBSP2_CLK	98
4	MCBSP1_DR	176
5	MCBSP2_DR	102
6	MCBSP1_DX	95
7	MCBSP2_DX	104
8	MCBSP1_FSX	93
9	MCBSP2_FSX	106
10	DGND	1

Table 2-19 McBSP/SPI Connector Pin-out (J14)

2.4.10 SPI1/I2Cx (J21)

SPI1/I2Cx expansion connector pins are directly connected to the VAR-SOM-OM44 pins, refer to VAR-SOM-OM44 data sheet for more details.

2.4.10.1 SPI1/I2Cx Connector Pin-out (J21)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 PIN
1	VIO	117
2	MCSPI1_SCLK	37
3	MCSPI1_CS0	34
4	MCSPI1_SIMO	39
5	I2C3_SCL	63
6	MCSPI1_SOMI	41
7	I2C4_SDA	99
8	I2C3_SDA	61
9	I2C4_SCL	101
10	DGND	1

Table 2-20 SPI1/I2Cx Connector Pin-out (J21)

2.4.11 GPMC

GPMC expansion connectors pins are directly connected to the VAR-SOM-OM44 pins, refer to VAR-SOM-OM44 data sheet for more details. In order to use those expansions a 40 pin flat cable should be used to connect between VAR-SOM-OM44 expansion connector and J16 on VAR-OM44CustomBoard.

2.4.11.1 GPMC 1 Connector Pin-out (J15)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 Expansion Connector PIN
1	VIO	117
2	VCC_3V3	
3	GPMC_NADV_ALE	37
4	GPMC_NCS1	35
5	GPMC_NOE_SDMMC2_CLK	38
6	GPMC_NCS0	34
7	GPMC_NWESDMMC2_CMD	39
8	GPMC_A22	33
9	GPMC_NBE0_CLE	40
10	GPMC_A21	32

Table 2-21 GPMC 1 Connector Pin-out (J15)

2.4.11.2 GPMC 2 pin-out (J18)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 Expansion Connector PIN
1	DGND	1
2	GPMC_CLK	25
3	GPMC_AD13	27
4	GPMC_AD11	23
5	GPMC_AD14	28
6	GPMC_AD10	22
7	GPMC_AD15	29
8	GPMC_AD9	21
9	GPMC_A20	31
10	GPMC_AD8	20

Table 2-22 GPMC 2 Connector Pin-out (J18)

2.4.11.3 GPMC 3 Connector Pin-out (J22)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 Expansion Connector PIN
1	DGND	1
2	GPMC_AD12	26
3	GPMC_AD4	15
4	GPMC_AD3	14
5	GPMC_AD5	16
6	GPMC_AD0	11
7	GPMC_AD6	18
8	GPMC_AD1	12
9	GPMC_AD7	19
10	GPMC_AD2	13

Table 2-23 GPMC 3 Connector Pin-out (J22)

2.4.12 JTAG (J19)

JTAG expansion connectors pins are directly connected to the VAR-SOM-OM44 pins, the connector is compatible to a standard 2x7 , 2.54mm JTAG cables . In order to use this expansion a 40 pin flat cable should be used to connect between VAR-SOM-OM44 expansion connector and J16 on VAR-OM44CustomBoard.

2.4.13 JTAG Connector Pin-out (J19)

Pin #	VAR-OM44Custom Board Signal	VAR-SOM-OM44 Expansion Connector PIN
1	JTAG_TMS	2
2	JTAG_NTRST	3
3	JTAG_TDI	1
4	DGND	9
5	VIO	10
6	NC	
7	JTAG_TDO	4
8	DGND	9
9	JTAG_RTCK	5
10	DGND	9
11	JTAG_TCK	8
12	DGND	9
13	JTAG_EMU0	6
14	JTAG_EMU1	7
15	JTAG_TMS	2

16	JTAG_NTRST	3
17	JTAG_TDI	1
18	DGND	9

Table 2-24 JTAG Connector Pin-out (J19)

2.4.14 Level Translator (J 13)

Level Translation expansion connector is a standalone utility. Featuring Ti's TXB0104, it enables 1.8V level IOs (used by the VAR-SOM-OM44 IO) shifting to a 3.3V levels IO commonly used. The device is a 60Mbps bidirectional level shifter , for more information refere to the TXB0104 data sheet.
http://focus.ti.com/general/docs/lit/getliterature.tsp?genericPartNumber=txb0104&fileType=pdf

2.4.15 Level Translator Connector Pin-out (J13)

Pin #	VAR-OM44Custom Board Signal	Description
1	GP1_3V3	3V3 level in/Out #1
2	GP1_1V8	1V8 level in/Out #1
3	GP2_3V3	3V3 level in/Out #2
4	GP2_1V8	1V8 level in/Out #2
5	GP4_3V3	3V3 level in/Out #3
6	GP4_1V8	1V8 level in/Out #3
7	GP3_3V3	3V3 level in/Out #4
8	GP3_1V8	1V8 level in/Out #4
9	VCC_3V3	POWERF
10	GND	GND

Table 2-25 Level Translator Connector Pin-out (J13)

2.5 User Interfaces

2.5.1 LED Indications

2.5.1.1 Power On LED (D5)

D5 is indicating that 5V power rail of the VAR-SOM-OM44 is on.

2.5.1.2 GP LED (D3, D4)

General purpose functionality LED, controlled by VAR-SOM-OM44 pins , using a 1.8V to 3.3V level shifter.
The VAR-OM44CustomBoard OTG connector is driven by the VAR-SOM-OM44 OTG interface.

LED Reference	VAR-OM44CustomBoard Signal	VAR-SOM-OM44 PIN
3	LED_0_3V3	180

4	LED_1_3V3	182

Table 2-26 GP LED

2.5.2 Control Buttons

2.5.2.1 Reset Button (SW1)

System hardware-reset

2.5.2.2 Boot Select (SW2)

Boot select switch sets the VAR-SOM-OM44 boot source & sequence. If VAR-SOM-OM44 external boot is required, it should be pressed during

Position	Logic Level	Boot Source	Boot Device Order
Released	'0'	Internal	MMC1 (micro SD Card), UART
Pressed	'1'	External	MMC2,UART

2-29 Boot select Switch modes

2.5.3 Power Input (J2/J5)

The VAR-OM44CustomBoard is powered using a, 7V-14V DC power supply, using one of the below connectors (Assembly option)

2.5.3.1 DC-IN Jack (J3)

Dc-In power jack is compatible with standard 2.5mm/5.5mm power plug.

Jack Part number:

KOBI CON, 163-0180-EX

2.5.3.2 Terminal Block (J4)

Pin #	Signal
1	GND
2	VCC IN

Table 2-27 Terminal Block Connector Pin-out (J4)

2.5.3.3 RTC Backup battery (JB1)

The VAR-OM44 features CR1225 battery holder powering VAR-SOM-OM44 RTC backup supply rail

3 Electrical Environmental Specifications

3.1 Absolute maximum electrical specifications

	Min	Max
Main Power supply, DC-IN	-0.3V	25V
External Interfaces	Unless other specified, refer to VAR-SOMOM44 data sheet.	

Table 3-1 Absolute maximum electrical specifications

3.2 Operational electrical specifications

	Min	Max
Main Power supply, DC-IN	7V	14V
External Interfaces	Unless other specified, refer to VAR-SOMOM44 data sheet.	

Table 3-2 Operational electrical specifications

4 Environmental specifications

	Min	Max
Commercial operating temperature range	0^0C	+70^0C
MTBF	10000hrs >	
Shock resistance	50G / 20 ms	
Relative humidity, Operational	10%	90%
Relative humidity, Storage	5%	95%
Vibration	20G / 0 - 600 Hz	

Table 4-1 Environmental specifications

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