SB-A510

Reference Guide

CompuLab

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Table 1   Document Revision Notes

Date	Description
November 2010	First release
May 2011	Fixed table 4, Jumper E8 description fixed.

Please check for a newer revision of this manual at CompuLab's web site – http://www.compulab.co.il/. Compare the revision notes of the updated manual from the web site to those of the printed or electronic version you have.

1 INTRODUCTION

1.1 About This Document

This document is part of a set of reference documents providing information necessary to operate and program CompuLab's SBC-A510.

1.2 Related Documents

For additional information not covered in this manual, please refer to the documents listed in Table 2.

Table 2   Related Documents

Document	Location
CM-A510 Product Developer Resources	http://www.compulab.co.il/

2   OVERVIEW

2.1   Highlights

- Single board computer implemented by the combination of a CM-A510 module and a SB-A510 baseboard. Micro-ATX form factor.
- Marvell Armada 510 SoC @1000MHz
- 1GB DDR3
- 512MB NAND flash
- VMeta video decode sub-system @500MHz with H.264, MPEG-4 and MPEG-2 support
- Integrated GPU with 2D/3D graphics acceleration and OpenGL-ES support
- WLAN / WiFi 802.11b/g/n interface
- 1920 x 1080 graphics controller with interfaces for LVDS, RGB, DVI and VGA monitors
- 2 x 1000 BaseT Ethernet ports
- SATA hard-drive interface
- 4 x USB2 high-speed host ports
- PCI Express and PCI extension interfaces
- MMC / SD / SDIO socket
- Sound codec with stereo output, line input and S/PDIF output support
- Touch-screen interface
- Serial ports, GPIO's
- 7V - 17V DC power supply, 3 - 8 watt
- RTC with lithium back-up battery

The SBC-A510 is a micro-ATX compliant, single board computer. It is implemented with a CM-A510 module providing most of the functions, and a SB-A510 carrier board providing standard connectors and additional peripherals. The rich feature set of the SBC-A510 is customizable according to the price / performance targets of the user's application.

The SBC-A510 features expansion connectors, opening it to a wide range of standard peripheral cards. Its wide input range switched power supply is compatible with the requirements of telecom and automotive applications.

2.2 Block Diagram

Figure 1   SB-A510 Block Diagram
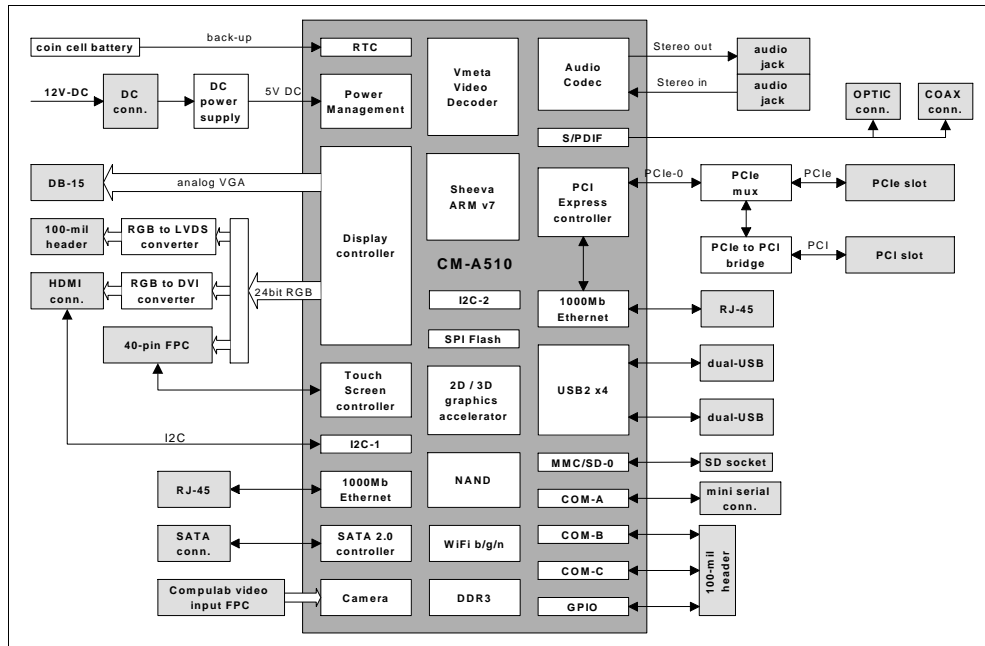
2.3   Features

SB-A510 does not have assembly options. The "CM Option" column specifies the P/N code of CM-A510 required to have the particular feature.

"+" means that the feature is always available, regardless of P/N code.

Table 3   SB-A510 Features

Feature	Specifications	CM-A510 Option
CPU SDRAM Flash Disk 2D / 3D graphics Video acceleration	See Feature List of the relevant CoM	
COM-A	Partial modem controls, RS-232, ultra mini serial conn.	+
COM-B	Rx/Tx only, 3.3V levels, 100-mil header	+
COM-C	Partial modem controls, 3.3V levels, 100-mil header	+
Gigabit Ethernet	One or two CM-A510 1000 BaseT Ethernet ports. RJ-45 connectors and activity LED's.	Ex
Hard disk	SATA-II interface, standard SATA connector	+
LCD Panel	TFT panel support. 40-pos FPC connector for direct interface to certain TFT panels	+
VGA	Analog VGA interface. DB-15 connector	+
DVI	DVI monitor support, HDMI connector	+
LVDS	4 pair LVDS panel interface, 100-mil header	+
USB 2.0 host	Two USB 2.0 host ports, 480 Mbps, type-A connectors	U2
USB 2.0 host	Additional two USB 2.0 high speed port, 480 Mbps, type-A connectors	U4
PCI Express	Mini PCI Express x1 slot	+
PCI	Single PCI slot, configurable 3.3V or 5V voltage level Note: only one extension slot is functional at a time: PCI or PCI Express	+
WiFi	WiFi interface, including on-board antenna connector, provided on CM-A510	W
MMC / SD / SDIO	MMC / SD / SDIO support (including SDHC up to 32GB). Standard full-size SD socket.	+
Camera	Direct camera sensor support. 40-pos FPC connector.	+
GPIO	12 lines, 100-mil header.	+
Touch Panel	TSC2046 touch-screen controller. Interface to LCD panel.	I
Sound I/O	I2S compliant audio codec, line input and speakers (stereo) jacks	A
RTC Battery	Real time clock on CM-A510, supplied by back-up lithium battery on SB-A510	+

Table 4   Electrical, Mechanical and Environmental Specifications

Supply Voltage	High efficiency switched power supply. Unregulated 7.5 to 17 volt input
Power consumption	3W to 8W in full activity, depending on CPU speed and selected features
Dimensions	170 mm (L) x 170 mm (W) x 35 mm (H)
Weight	200 gram
Operation temperature (case)	Commercial: 0o to 70o C Extended: -20o to 70o C Industrial: -40o to 85o C
Storage temperature	-40o to 85o C
Relative humidity	10% to 90% (operation) 05% to 95% (storage)
Shock	50G / 20 ms
Vibration	20G / 0 - 600 Hz
MTBF	> 100,000 hours

3   SYSTEM COMPONENTS

3.1   DC Power Supply

All SB-A510 power rails are generated from a 12V DC input (connector J2).

SB-A510 supports two power states:

- Full power mode – all SB-A510 power rails are enabled.
- Low power mode – only power rails required for sleep-mode support are enabled. All other voltage rails are disabled (gated).

SB-A510 power state is controlled by the CM-A510 "STBY_PWRDWN" signal, available on pin 37 of connector P1.

Table 5   Power mode selector signal table

STBY_PWRDWN	SB-A510 power mode
High	Full power mode
Low	Low power mode

The figure below describes the SB-A510 power scheme.

Figure 2   SB-A510 Power Scheme
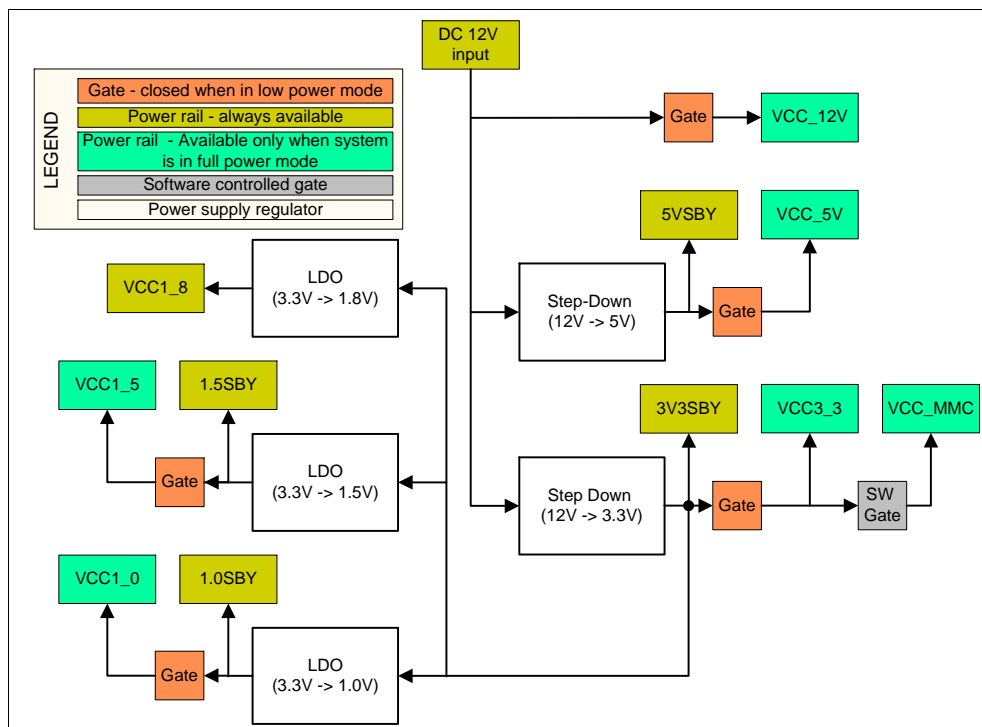
The "5VSBY" power rail supplies the CM-A510 module and certain SB-A510 peripherals. Other power rails are used only for SB-A510 peripherals.

3.2   DVI Transmitter

The SB-A510 is equipped with a DVI Transmitter that is based on the TFP410/SIL164 IC. DVI output signals are routed to the onboard HDMI Connector (J4). The DVI Transmitter is connected to the 24bit RGB interface of the CM-A510.

TFP410/SIL164 is fully DVI 1.0 compliant. The DVI Transmitter on the SB-A510 is configured for rising edge data sampling, single ended pixel clock and standard 3.3V CMOS input signal levels. The transmitter can be shut down by software (GPIO03 on I2C GPIO extender IC) and can also inform the system (through GPIO02 on I2C GPIO extender IC) whether a monitor is connected to the transmitter output.

In order to use the DVI interface, the CM-A510 display system has to be configured properly for RGB888 operation mode.

3.3   LVDS Transmitter

The SB-A510 is equipped with an LVDS Transmitter that is based on the DS90C365A IC. LVDS output signals are routed to a 100mil header (P20). The LVDS Transmitter is connected to the display interface of the CM-A510.

The DS90C365A is a National Semiconductor +3.3V Programmable 18-bit Flat Panel Display link-87.5MHz LVDS Transmitter. The transmitter is fully compatible with the TIA/EIA-644 LVDS standard and supports VGA, SVGA and XGA display modes.

The LVDS Transmitter is configured for rising edge data sampling. GPIO04 on the I2C GPIO extender, can be used to put the transmitter into shutdown mode.

In order to use the LVDS interface, the CM-A510 display system has to be configured properly for RGB888 operation mode.

3.4   PCI-E to PCI Bridge

SB-A510 PCI interface is implemented with a Pericom PI7C9X111 IC connected to the CM-A510 PCI-E link. The interface supports the following features:

- Compliant with PCI Local Bus Specification, Revision 3.0
- Compliant with PCI-to-PCI Bridge Architecture Specification, Revision 1.2
- Compliant with PCI Bus PM Interface Specification, Revision 1.1
- Transparent mode support
- Compliant with Advanced Configuration and Power Interface Specification (ACPI), Revision 2.0b

NOTE: In order to use the PCI interface, PI7C9X111 and PCI-E link must be set to the correct operating mode with jumpers E2, E3, and E4. Please refer to chapter 4.22 for additional details.

3.5 Back-Up Battery

SB-A510 is supplied with a 3V 200mAh Lithium Dioxide coin cell, which powers the CM-A510 RTC whenever the main power supply is not present.

NOTE: The E5 jumper must be installed for RTC back-up support. Please refer to chapter 4.22 for additional details.

4 INTERFACES AND CONNECTORS

4.1 CM-A510 Interface Connectors (P1, P2)

The CM-A510 CoM is interfaced through two 0.6mm pitch, 140pin connectors - P1 and P2.

Please refer to the "CM-A510 reference guide" for signal descriptions.

Table 6   P1 and P2 connector data

Manufacturer	P/N of SB-A510 Connector	P/N of CM-A510 Connector (Mating)
AMP	1-5353183-0	1-5353190-0 or CON140

4.2 DC Power Jack (J2)

Main power input connector of the SB-A510.

Table 7   12V DC input jack pinout

Pin	Signal Name
1	GND
2	GND
3	VIN12V
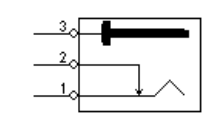
Table 8   J2 connector data

Manufacturer	Mfg. P/N
Astron	15-02037-R

Mating with power supply adapter 209C10020 supplied by CompuLab.

4.3 RS232 connector (P10)

The RS232 port of the CM-A510 is routed to the SB-A510 on-board RS232 ultra-mini connector (P10). All signals are at RS232 levels.

Table 9   P10 connector pinout

Pin	Signal Name	Pin	Signal Name
1	RS232_TXD	5	NC
2	RS232_RTS	6	NC
3	RS232_RXD	7	NC
4	RS232_CTS	8	GND
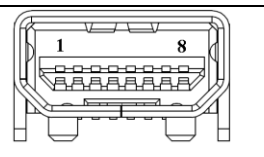
Table 10   P10 connector data

Manufacturer	Mfg. P/N	Mating connector
Wieson	G3169-500001	Wieson, P/N: 4306-5000

The connector is compatible with the CABDB9UMP cable supplied by CompuLab.

4.4   USB Host Connectors (P11, P15)

The four USB2.0 host ports provided by the CM-A510 are available through two dual type-A USB connectors (P11 & P15).

For USB ports 1, 2 and 3, the CM-A510 provides the "VBUS enable" signal and monitors the "VBUS good" signal generated on SB-A510. USB port 0 power is controlled by GPIO00, and monitored by GPIO01, on the I2C GPIO extender onboard the SB-A510.

NOTE: The actual number of USB2.0 ports available depends on the CM-A510 USB configuration option.

Table 11   P11 connector pinout (USB)

USB port 0 (Bottom)		USB port 1 (Middle)	
Pin	Signal Name	Pin	Signal Name
B1	VCC_USB0	B5	VCC_USB1
B2	USBN0	B6	USBN1
B3	USBP0	B7	USBP1
B4	GND	B8	GND

Table 12   P15 connector pinout (USB)

USB port 2 (Bottom)		USB port 1 (Middle)	
Pin	Signal Name	Pin	Signal Name
B1	VCC_USB2	B1	VCC_USB3
B2	USBN2	B2	USBN3
B3	USBP2	B3	USBP3
B4	GND	B4	GND

Table 13   P15/P11 connector data

Manufacturer	Mfg. P/N	Mating connector
YDS	45F-10202GDD2	Standard USB type A plug

4.5   Gigabit Ethernet Connectors (P11, P15)

The SB-A510 is equipped with two Gigabit Ethernet RJ45 connectors (P11 & P15). P11 is interfaced with the CM-A510 LAN0 port, and P15 with the LAN1 port.

Table 14   P11 connector pinout (Ethernet)

Pin	Signal Name	Pin	Signal Name
E1	LAN0_CT1	E10	LAN0_CT2
E2	LAN0_MDIP0	E11	VCC3_3
E3	LAN0_MDIN0	E12	LAN0_ACT
E4	LAN0_MDIP1	E13	LAN0_LINK
E5	LAN0_MDIN1	E14	VCC3_3
E6	LAN0_MDIP2	E15	GND
E7	LAN0_MDIN2	E16	GND
E8	LAN0_MDIP3	E17	GND
E9	LAN0_MDIN3	E18	GND

Table 15   P15 connector pinout (Ethernet)

Pin	Signal Name	Pin	Signal Name
E1	LAN1_CT1	E10	LAN1_CT2
E2	LAN1_MDIP0	E11	VCC3_3
E3	LAN1_MDIN0	E12	LAN1_ACT_T
E4	LAN1_MDIP1	E13	LAN1_LINK
E5	LAN1_MDIN1	E14	VCC3_3
E6	LAN1_MDIP2	E15	GND
E7	LAN1_MDIN2	E16	GND
E8	LAN1_MDIP3	E17	GND
E9	LAN1_MDIN3	E18	GND

Table 16   P15/P11 connector data

Manufacturer	Mfg. P/N	Mating connector
YDS	45F-10202GDD2	Standard Ethernet RJ45 plug

NOTE: The actual number of Gigabit Ethernet ports available depends on the CM-A510 Ethernet configuration option.

4.6   Analog VGA connector (P7)

The SB-A510 is equipped with an analog VGA output connector (P7). P7 is connected to the CM-A510 analog VGA output, and provides a standard VGA DB-15 interface for PC monitors.

The DSUB_I2C2_SCL and DSUB_I2C2_SDA signals are routed to the CM-A510 I2C port 2 signals and serve as a DDC host interface.

Table 17   P7 connector pinout

Pin	Signal Name	Pin	Signal Name
1	VGA_R	10	GND
2	VGA_G	11	NC
3	VGA_B	12	DSUB_I2C2_SDA
4	NC	13	VGA_HSYNC
5	GND	14	VGA_VSYNC
6	GND	15	DSUB_I2C2_SCL
7	GND	16	GND
8	GND	17	GND
9	VCC_5V		

Table 18   P7 connector data

Manufacturer	Mfg. P/N	Mating connector
Astron	HD6A-15-PFHN1T-R	Standard VGA monitor plug

4.7   DVI Connector (J4)

The SB-A510 is equipped with a standard HDMI socket (J4) providing a DVI interface. The on-board DVI transmitter IC drives the DVI signals through the HDMI socket. For additional details, please refer to section 3.2 of this document.

The DVI_DDCSCL and DVI_DDCDAT signals are routed to the CM-A510 I2C port 0 signals, and provide DVI DDC interface.

In order to use the DVI interface, the CM-A510 display system must be set to RGB 888 operation mode.

Table 19   J4 connector pinout

Pin	Signal Name	Pin	Signal Name
1	DVI_TXD2+	12	DVI_TXC-
2	GND	13	GND
3	DVI_TXD_2-	14	NC
4	DVI_TXD1+	15	DVI_DDCSCL
5	GND	16	DVI_DDCDAT
6	DVI_TXD1-	17	GND
7	DVI_TXD0+	18	DVI_5V
8	GND	19	HTPLG
9	DVI_TXD0-	20	GND
10	DVI_TXC+	21	GND
11	GND		

4.8 LCD FPC (P13)

The on-board LCD FPC connector (P13) allows easy integration with custom LCD panels. The CABFPC40 and CONLCD-GEN accessories (supplied by CompuLab) provide a generic 100-mil header connection. For additional details, please refer to section 7 of this document.

In order to use the P13 connector, set the CM-A510 display mode to RGB 888.

NOTE: The P13 connector does not provide power for the LCD backlight. An external power source is required.

Table 20   P13 connector pinout

Pin	Signal Name	Pin	Signal Name
1	TS_X-	21	VCC3_3
2	LCD_PWR_SRC	22	TS_Y+
3	GND	23	TS_Y-
4	LCDnRST	24	GND
5	LCD_D3_T	25	TS_X+
6	VCC3_3	26	LCD_D18_T
7	LCD_D4_T	27	VCC3_3
8	LCD_D5_T	28	LCD_D19_T
9	GND	29	LCD_D20_T
10	LCD_D6_T	30	GND
11	LCD_D7_T	31	LCD_D21_T
12	VCC3_3	32	LCD_D22_T
13	LCD_D15_T	33	GND
14	LCD_D14_T	34	LCD_D23_T
15	GND	35	LCD_DE_T
16	LCD_D13_T	36	VCC3_3
17	LCD_D12_T	37	LCD_HSYNC_T
18	VCC3_3	38	LCD_VSYNC_T
19	LCD_D11_T	39	GND
20	LCD_D10_T	40	LCD_PCLK_T2
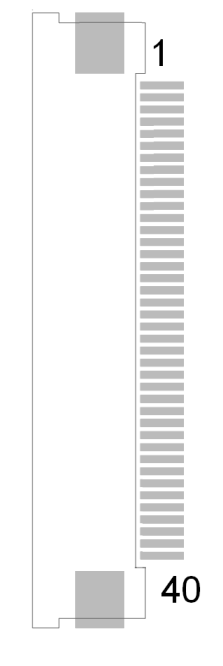
Table 21   P13 connector data

Manufacturer	Mfg. P/N	Mating connector
CVILux	CF20-401D0R0	FFC, 40 cont, 0.5mm

4.9 LVDS Header (P9)

LVDS output signals are routed from the LVDS Transmitter IC to the onboard 100mil header (P9). For additional details, please refer to section 3.3 of this document.

In order to use the LVDS interface, CM-A510 display system must be set to RGB 888 operation mode.

NOTE: The P9 connector does not provide power for the LVDS LCD panel and its backlight. An external power source is required.

Table 22   P9 connector pinout

Pin	Signal Name	Pin	Signal Name
1	LVDS_NE0	6	GND
2	LVDS_NE1	7	LVDS_NE2
3	LVDS_PE0	8	LVDS_NEC
4	LVDS_PE1	9	LVDS_PE2
5	GND	10	LVDS_PEC

4.10 Touch Screen Header (P12)

The touch screen (P12) header of the SB-A510 allows evaluating any resistive touch panel with the touch panel interface provided by the CM-A510. Please refer to the CM-A510 reference guide for additional details on the touch-screen interface.

NOTE: The P12 connector does not provide power to the touch panel.

Table 23   P12 connector pinout

Pin	Signal Name	Pin	Signal Name
1	GND	6	NC
2	TS_X-	7	TS_Y+
3	GND	8	TS_Y-
4	TS_X+	9	GND
5	NC	10	GND

4.11 Power Output Terminals (P17, P19)

The SB-A510 is equipped with two power output terminals. The power output terminals (P17 & P19) are provided for the S-ATA hard drive power supply.

Table 24   P17 connector pinout

Pin	Signal Name
1	VCC_12V
2	GND

Table 25   P19 connector pinout

Pin	Signal Name
1	VCC_5V
2	GND

4.12 S-ATA Connector (P18)

The SB-A510 is equipped with a standard S-ATA Connector (P18) that allows interfacing CM-A510 with standard and S-ATA disk drives.

Table 26   P18 connector pinout

Pin	Signal Name
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

Table 27   P13 connector data

Manufacturer	Mfg. P/N	Mating connector
AMP	1734058-1	Standard S-ATA Cable.

4.13   S/PDIF Connectors (P22, U6)

The CM-A510 S/PDIF interface can be accessed through the P22 Standard RCA connector (populated by default) or through the U6 optical transceiver (not populated by default) on the SB-A510.

Table 28   P22 connector pinout

Pin	Signal Name
1	GND
2	GND
3	SPDIF_BASE
4	GND

Table 29   P22 connector data

Manufacturer	Mfg. P/N	Mating connector
Hosiden	JPJ1225-01-040	Standard EIAJ-RC-5231 plug.

Table 30   U6 optical transmitter pinout

Pin	Signal Name
1	GND
2	VCC3_3
3	SPDIF_OUT_OPT
4	GND
5	GND

Table 31   U6 connector data

Manufacturer	Mfg. P/N	Mating connector
EVERLIGHT	PLT133/T	Standard plastic optic fiber cable

4.14   CompuLab Video Input FPC (P25)

The on-board CompuLab Video Input FPC connector (P25) allows direct integration with the CompuLab Video Input module. P25 is connected to the CM-A510 Camera interface.

Table 32   P25 connector pinout

Pin	Signal Name	Pin	Signal Name
1	I2C_GPIO11	21	CAM_D1/GPIO25
2	CAM_FLD (goes only to test point)	22	CAM_D2/GPIO26
3	CAM_I2C_SDA	23	GND
4	VCC_5V	24	NC
5	CAM_I2C_SCK	25	GND
6	CAM_SNR_CTL0/GPIO38	26	NC
7	CAM_VSYNC/GPIO34	27	GND
8	CAM_SNR_CTL1/GPIO39	28	CAM_CLK_T
9	CAM_HSYNC/GPIO33	29	GND
10	GND	30	CAM_MCLK/GPIO32
11	GND	31	GND
12	CAM_D7/GPIO31	32	I2C_GPIO12
13	VCC_5V	33	I2C_GPIO14
14	CAM_D6/GPIO30	34	I2C_GPIO15
15	VCC3_3	35	I2C_GPIO16
16	CAM_D5/GPIO29	36	I2C_GPIO17
17	VCC3_3	37	NC
18	CAM_D4/GPIO28	38	NC
19	CAM_D0/GPIO24	39	NC
20	CAM_D3/GPIO27	40	NC
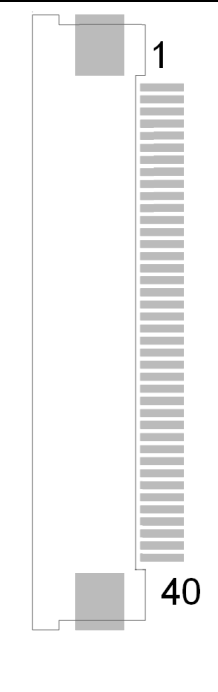
Table 33   P25 connector data

Manufacturer	Mfg. P/N	Mating connector
CVILux	CF20-401D0R0	FFC, 40 cont, 0.5mm

4.15   MMC/SD/SDIO Socket (P5)

The SB-A510 MMC/SD/SDIO interface is based on the SD-0 interface of the CM-A510. The MMC controller signals are routed to the standard MMC/SD socket (P5).

P5 power is supplied by the VCC_MMC voltage rail. VCC_MMC can be enabled/disabled by GPIO13 on the on-board I2C GPIO extender IC.

The write protect signal of the MMC/SD/SDIO socket, "MMC_WP", is routed to GPIO10 on the on-board I2C GPIO extender.

Table 34   P5 connector pinout

Pin	Signal Name	Pin	Signal Name
1	SD0_DATA3/GPIO45	9	SD0_DATA2/GPIO44
2	SD0_CMD/GPIO41	10	GND
3	GND	11	SD0_CD/GPIO16
4	VCC_MMC	12	MMC_WP
5	SD0_CLK/GPIO40	13	GND
6	GND	14	GND
7	SD0_DATA0/GPIO42	15	GND
8	SD0_DATA1/GPIO43		

4.16   Audio Jacks (J1, J3)

The SB-A510 features two 3.5mm jacks, one for stereo headphone output (J1) and the other (J3) for stereo audio input.
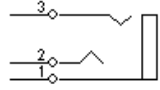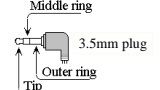
Table 35   J1 connector pinout

Pin	Signal Name	Mating plug pin	Jack pin-out	Mating plug
1	AUDIO_GND	Outer ring		
2	AUDIO_OUT_L	Tip		
3	AUDIO_OUT_R	Middle ring		

Table 36   J3 connector pinout
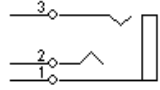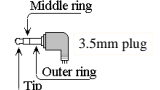
Pin	Signal Name	Mating plug pin	Jack pin-out	Mating plug
1	AUDIO_GND	Outer ring		
2	AUDIO_IN_L	Tip		
3	AUDIO_IN_R	Middle ring		

Table 37   J3 and J1 connector data

Manufacturer	Mfg. P/N	Mating connector
Kycon	ST-3500-3N	Standard 3.5mm stereo plug

4.17   MISC. Signals Headers (P14, P21)

Two 100mil headers (P14 & P21) provide access to miscellaneous CM-A510 interfaces.

Table 38   P14 connector pinout

Pin	Signal Name	Pin	Signal Name
1	UART2_TXD/GPIO14	13	CAM_MCLK/GPIO32
2	CAM_D5/GPIO29	14	GND
3	CAM_D0/GPIO24	15	CAM_D2/GPIO26
4	CAM_D6/GPIO30	16	CAM_VSYNC/GPIO34
5	UART1_RXD/GPIO62	17	CAM_HSYNC/GPIO33
6	CAM_D7/GPIO31	18	CAM_I2C_SCK
7	CAM_D1/GPIO25	19	CAM_D3/GPIO27
8	PMC_MISC0	20	CAM_CLK/GPIO35
9	UART2_RXD/GPIO15	21	CAM_SNR_CTL1/GPIO39
10	3V3SBY	22	CAM_I2C_SDA
11	VCC3_3	23	CAM_D4/GPIO28
12	UART1_TXD/GPIO63	24	CAM_SNR_CTL0/GPIO38

Table 39   P21 connector pinout

Pin	Signal Name	Pin	Signal Name
1	I2S1_LRCLK/I2C2_SDA/GPIO56	13	GND
2	3V3SBY	14	3V3SBY
3	VCC3_3	15	I2S1_SDO/SSP_RXD/GPIO55
4	MIC_BIAS	16	GND
5	I2C_GPIO11	17	I2C_GPIO14
6	I2C_GPIO16	18	GND
7	I2C_GPIO13	19	I2C_GPIO15
8	I2S1_SDI/SSP_TXD/GPIO52	20	SYSRST_OUTn
9	I2S1_BCLK/SSP_SFRM/GPIO53	21	GND
10	I2C_GPIO17	22	I2C_GPIO12
11	VCC3_3	23	I2S1_MCLK/SSP_SCLK/GPIO54
12	MIC_IN	24	GND

4.18   JTAG Header (P16)

The JTAG 100mil header (P16) outputs the JTAG signals from the CM-A510. The header implements a standard ARM JTAG header pinout (AKA ARM-20). The JTAG signals are referenced to 3V3SBY voltage levels.

Table 40   P16 connector pinout

Pin	Signal Name	Pin	Signal Name
1	3V3SBY	11	JTAG_RTCK
2	3V3SBY	12	GND
3	JTAG_nTRST	13	JTAG_TDO
4	GND	14	GND
5	JTAG_TDI	15	SYSRST_INn
6	GND	16	GND
7	JTAG_TMS_CPU	17	NC
8	GND	18	GND
9	JTAG_CLK	19	NC
10	GND	20	GND

4.19   Boot Source Button (SW1)

The SB-A510 features a user-accessible boot source button (SW1). Pressing this button during power-up or reset will cause the CM-A510 to boot with the alternate boot option (S-ATA hard drive).

NOTE: Jumper E6 may override button SW1. Please refer to chapter 4.22 for additional information

4.20   Reset Button (SW2)

The SB-A510 features a user-accessible reset button (SW2). Pressing the reset button issues a cold reset to the CM-A510.

4.21   Suspend/Resume Button (SW3)

To be added in a future revision of this document.

4.22   Jumpers

The SB-A510 jumpers configure SB-A510 sub-systems and CM-A510 operation modes. The table below summarizes all jumpers and their possible configurations.

Table 41   Jumpers description

Jumper	Shorted Pins	SB-A510 sub-System	Description
E2	1 & 2	PCI-E mux	PCI-E link connected to mini PCI-E slot (P4)
	2 & 3		PCI-E link connected to PCI slot (P3)
E3	1 & 2	PCI-E mux	PCI Slot (P3) is forced to operate in 66MHz Mode.
	None		PCI Slot (P3) operation mode is set automatically (33/66 MHz)
E4	1 & 2	PCI Power	VIO_PCI (PCI slot I/O Voltage) is VCC3_3
	2 & 3		VIO_PCI (PCI slot I/O Voltage) is VCC_5V (default)
E5	1 & 2	Backup battery	RTC battery is connected to CM-A510 (timekeeping is on)
	None		RTC battery is disconnected from CM-A510 (storage)
E6	1 & 2	CM-A510 boot option	Always use alternate boot option (S-ATA hard drive).
	None		SW1 determines boot option.
E8	1 & 2	CM-A510 SPI-Flash protection	CM-A510 SPI flash is write protected
	None		CM-A510 SPI flash is not write protected

4.23   LEDs

The table below describes SB-A510 LEDs.

Table 42   LED description

LED	Color	System	LED activity
DS1	Green	PCI-E mux	PCI-E link detected at mini PCI-E slot (P4)
DS2	Green	PCI-E mux	PCI-E link detected at PCI slot (P3)
DS3	Green	Power	VCC_12V rail is "ON"
DS4	Green	Power	VCC_5V rail is "ON"
DS5	Green	Power	5VSBY rail is "ON"
DS15	Green	PCI-E	PCI-E WLAN led, indicates WLAN activity in mini-PCI-Express Wireless adapter cards mated with slot P4.
DS17	Green	Power	VCC3_3 rail is "ON"
DS18	Green	Power	3V3SBY rail is "ON"
DS19	Green	SD power	VCC_MMC rail is "ON"

5 MECHANICAL DRAWINGS
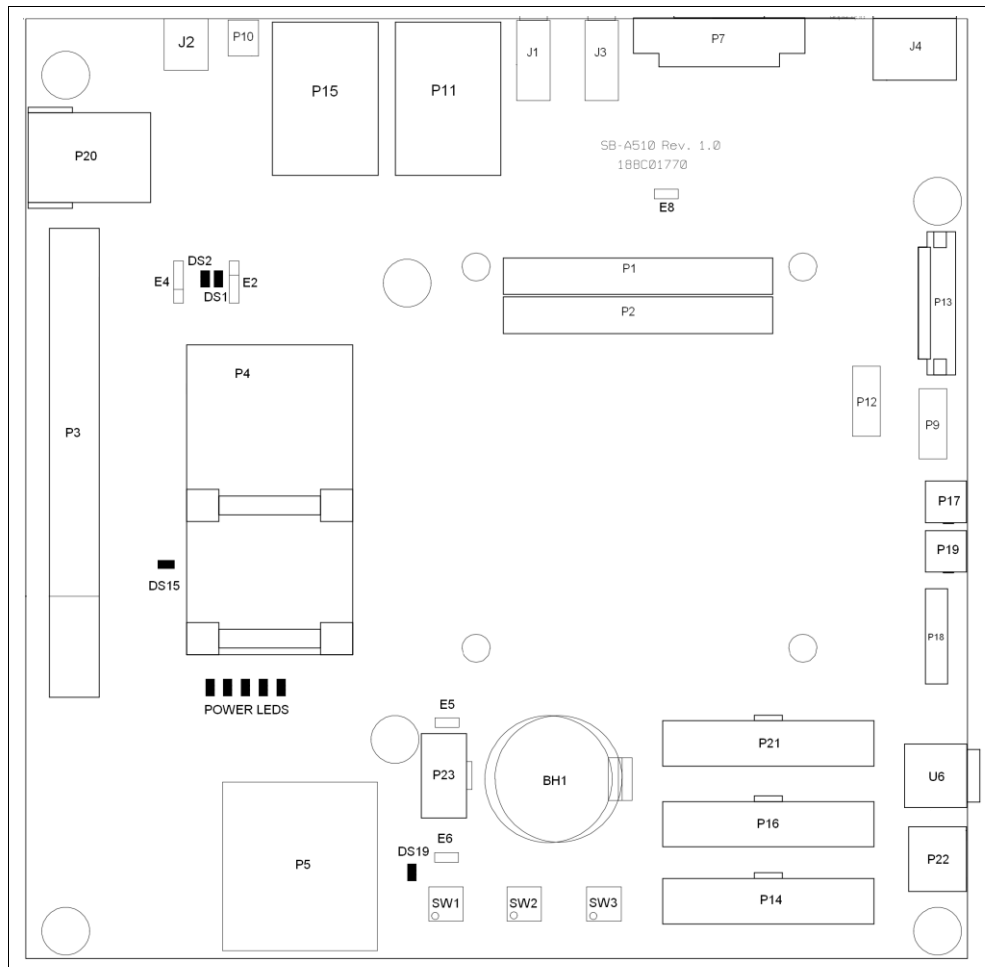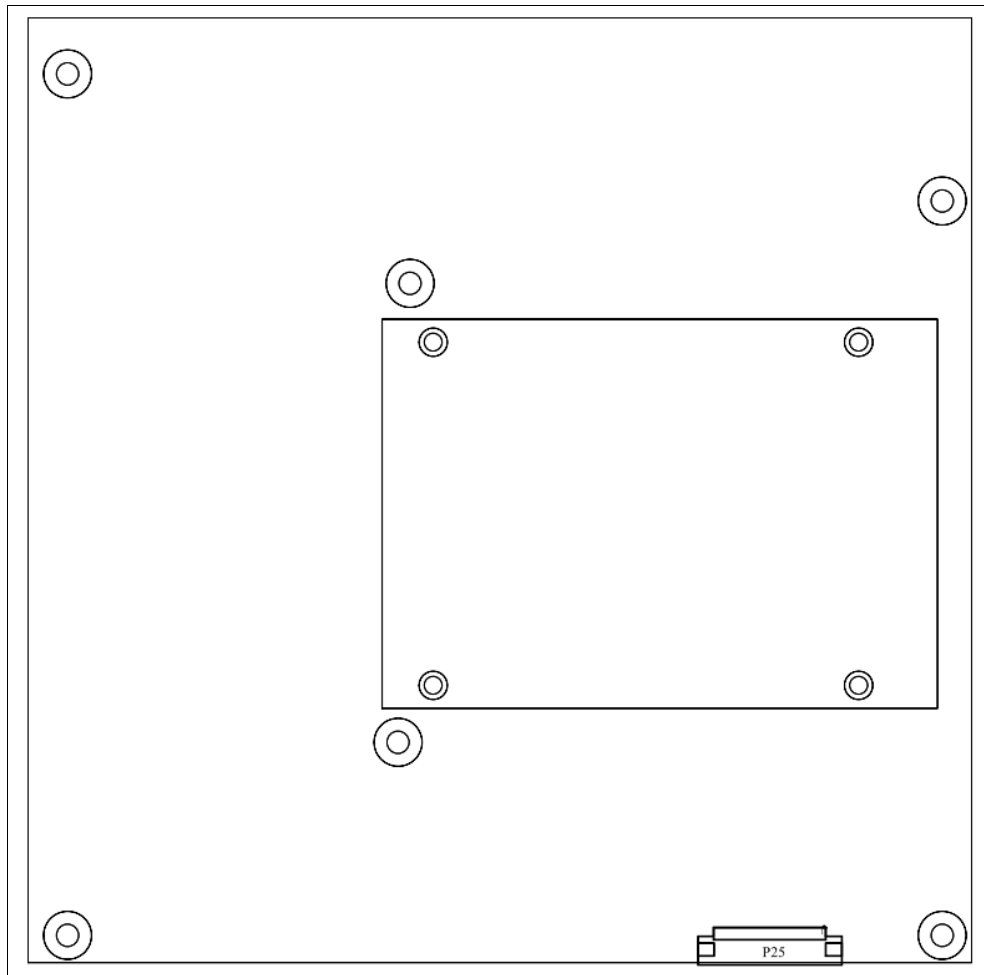
Figure 3 SB-A510 top

Figure 4   SB-A510 bottom (X-Ray view - as seen from top side)

Mechanical drawings are available in DXF format from CompuLab's website, following [Developer] >> [SB-A510] >> [SB-A510 – schematics, dimension, layout] links.

6 OPERATIONAL CHARACTERISTICS

6.1 Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit
Main power supply voltage	6	12	20	V

NOTE: Stresses beyond Absolute Maximum Ratings may cause permanent damage to the device.

6.2 Recommended Operating Conditions

Parameter	Condition	Min	Typ	Max	Unit
Main power supply voltage	12 Volt is **not** used by PCI or P19	7.5	12	17	V
Main power supply voltage	12 Volt is used by PCI or P19	See Note	12	See Note	V

NOTE: The allowed main power supply voltage range is determined by the allowed range of the PCI device using 12V through connector P3, the device drawing it's power from P19 and the range of SB-A510 when no devices use 12V on SB-A510.

6.3 DC Electrical Characteristics

DC electrical characteristics of SB-A510 are derived from the characteristics of the CM-A510. Please refer to the "CM-A510 reference guide".

6.4 Power Consumption

To be added in a future revision of this document.

6.5   Operating Temperature Ranges

The information in this section refers to the SB-A510 board only. For temperature ranges of off-board components such as the LCD panels or hard drives, please refer to the component's datasheet.

The SB-A510 is available with three options of operating temperature range:

Table 43   Operating Temperature Ranges

Range	Temp.	Description
Commercial	0º to 70º C	Sample boards from each batch are tested for the lower and upper temperature limits. Individual cards are not tested.
Extended	-20º to 70º C	Every board undergoes a short test for the lower limit (-20º C) qualification.
Industrial	-40º to 85º C	Every board is extensively tested for both lower and upper limits and at several midpoints.

7 ACCESSORIES

Table 44 Accessories

CompuLab P/N	Part Name	Description
199D10170	CABDB9UMP	Cable, DB9-F to Ultra Mini Plug (USB like), L=2m (RS-232) Used to connect the RS232 interface of the SB-A510 to a PC. Connects directly to P12 on the SB-A510.
410X60400	CABFPC40	FPC cable, 0.5mm, 40-pos. Used with CONLCD-GEN and CompuLab Video Input module
503R101301	CONLCD-GEN	General purpose LCD interface module. Used in combination with CABFPC40 to provide a generic LCD interface. Connects to P13 on the SB-A510.