

SB-iGT

Reference Guide

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Table 1 Document Revision Notes

Date	Description
February 2013	<ul style="list-style-type: none">• First release

Please check for a newer revision of this manual at the CompuLab website – <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 necessary to operate and program the CompuLab SB-iGT.

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-iGT Reference Guide	http://www.compulab.co.il/

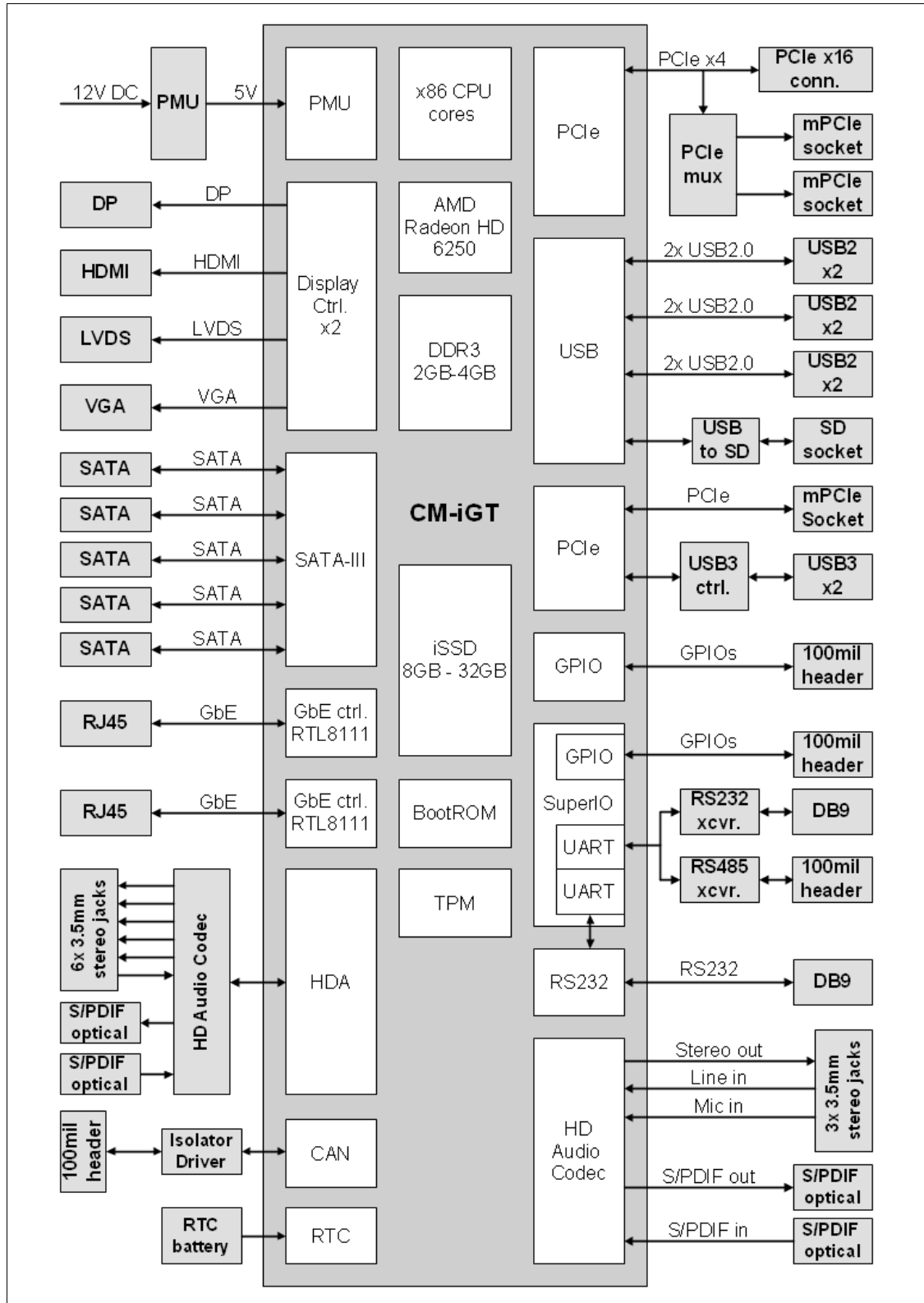
2 OVERVIEW

2.1 Highlights

- Mini-ATX PC implemented with the **CM-iGT** computer-on-module and the SB-iGT carrier board
- Up to 4GB DDR3
- Up to 32GB on-board SSD storage
- AMD Radeon HD 6250 GPU
- Universal Video Decoder, 1080p Blu-Ray playback support
- Graphics controller with dual-head support. Up to 1920x1200 at 60 Hz resolution
- HDMI, DisplayPort, LVDS and VGA interfaces
- GbE x2, USB3 x2, USB2 x6, SATA x5, PCIe, RS232, RS485, CAN
- Linux, Windows Embedded 7
- Single 10V – 17V DC power supply

2.2 Block Diagram

Figure 1 SB-iGT Block Diagram



2.3 Features

- The "SB Option" column specifies the P/N code of SB-iGT carrier board required to have the particular feature. The "CM Option" column specifies the P/N code of CM-iGT required to have the particular feature. SBC-iGT feature-set is the combination of features provided by the attached CM-iGT and the features implemented on the SB-iGT. To have the particular feature, both the CM and SB options of that feature must be implemented.
- "+" means that the feature is always available, regardless of P/N code.

Table 3 SB-iGT Features {ToDo – Igor }

Feature	Specifications	SB Option	CM Option
CPU RAM Graphics Storage	See the Feature List section in CM-iGT module		
Display	Two configurable display interfaces support simultaneous operation with the following outputs: <ul style="list-style-type: none"> • DisplayPort, up to 1920x1200 at 60Hz, DisplayPort connector • HDMI 1.4, stereo-3D support, up to 1920x1200 at 60Hz, HDMI connector • VGA, up to , DB-15 connector 	+	+
Network	Up to two 1000 BaseT Ethernet ports implemented with CM-iGT. RJ-45 connectors, activity LEDs.	+	E
USB	Six USB2.0 high-speed host ports, 480 Mbit/s. Type-A connectors.	+	+
	Two USB 3.0 host ports, 5 Gbit/s. Implemented with a TUSB7320 USB3 host controller. Type-A connector.	U	+
SATA	5 SATA interfaces, on 7-pin vertical SATA connectors.	+	+
Serial Ports	COM1 - RS-232, rx/tx & flow control, RS-232 levels, up to 460 Kbps, DB9 connector.	+	S
	COM2 - RS-232 / RS485, Rx/Tx only, mini serial connector / 100mil header.	+	S
Sound I/O	Analog and digital audio implemented with the CM-iGT audio codec: <ul style="list-style-type: none"> • Stereo output, line-in, microphone input; 3.5mm jacks • S/PFIF input / output, optical connectors 	+	A
	Analog and digital audio implemented with the SB-iGT audio codec: <ul style="list-style-type: none"> • 5x stereo outputs, line-in; 3.5mm jacks • S/PFIF input / output, optical connectors 	+	+
PCIe	PCIe x4 interface, PCI Express ×16 connector * Preclude usage of additional mini-PCIe sockets	P	+
	Mini-PCIe socket	+	+
	Two additional mini-PCIe sockets * Preclude usage of the PCI Express ×16 connector	P	+
CAN	CAN bus interface with isolator and driver , on 100-mil header	+	Y
SD	Micro-SD socket	+	+
GPIO	Up to 21 GPIOs, implemented with the CM-GT chip-set, 100-mil header	+	+
	Up to 8 GPIOs, implemented with the CM-iGT SuperIO, 100-mil header	+	S
TPM	Trusted Platform Manager ver 1.2 of TCG by Atmel AT97SC3204	+	J
RTC	Real time clock operated from on-board rechargeable lithium battery.	+	+

Table 4 Electrical, Mechanical, and Environmental Specifications

Feature	Specifications
Supply Voltage	Unregulated 10V to 17V. High efficiency switched power supply. Sleep mode support.
Power Consumption	TBD
Dimensions	190 mm x 170 mm Height ranges from 10 mm to 37 mm, depending on the connectors assembled. The specified height includes the CM-iGT module
Operation Temp. (case)	Commercial: 0°C to 70°C
	Extended: -20°C to 70°C
	Industrial: -40°C to 85°C
Storage Temp.	-40°C to 85°C
Relative Humidity	10% to 90% (operation) 05% to 95% (storage)
Shock	50 G / 20ms
Vibration	20 G / 0 - 600 Hz
MTBF	> 100,000 hours

3 SYSTEM COMPONENTS

3.1 USB3 Controller

SB-iGT implements the USB3 interface with the TI TUSB7320 USB3 Host controller.

3.2 Audio Codec

SB-iGT implements on-board 7.1 audio with the Realtek ALC886-GR audio codec. This codec is interfaced with the system via channel #1 (AZ_SI1_GPIO168) HDA output.

The codec has four configurable HP/line outputs, two configurable MIC/LINE inputs, one S/PDIF output and one S/PDIF input.

3.3 PCIe Mux

Two of the SB-iGT PCIe lanes routed to PCIex16 connector J2 are muxed with mini-PCIe interfaces routed to P46 and P45. The multiplexing selection is done in BIOS menu.

3.4 PCIe CLK Buffer x 4

SB-iGT multiplies PCIe CLK provided by CM-iGT with a clock buffer.

3.5 SD Card Controller

SB-iGT implements an SDIO interface with a SMSC USB2-to-SD USB2240 controller.

3.6 LED Indicators

SB-iGT features the following LED indicators:

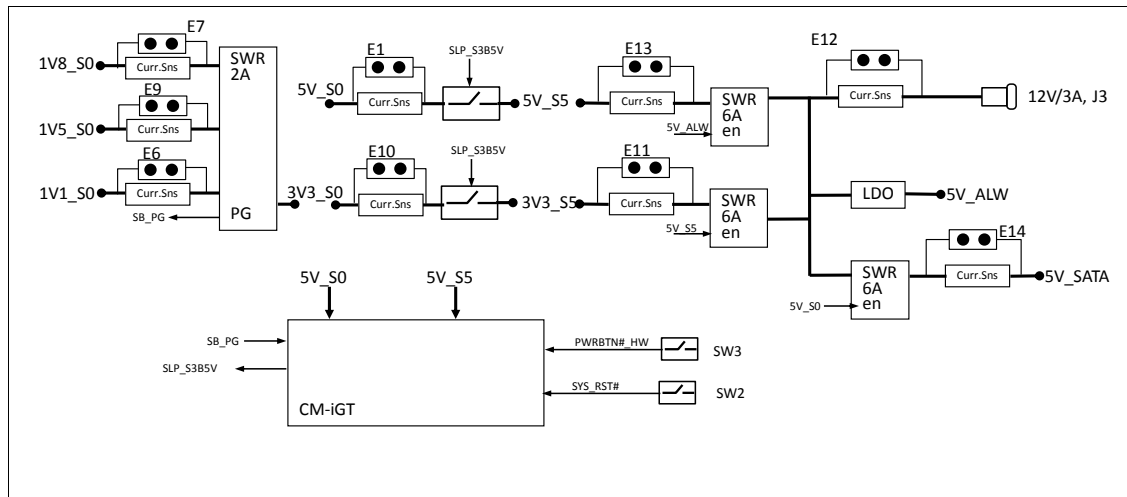
Table 5 LED Indicators

LED	Description	Color
DS1	BIOS source: ON – from SB-iGT, off – from CM-iGT	Yellow
DS2	miniPCIe P46 activity	Green
DS3	miniPCIe P45 activity	Green
DS4	Reserved	Green
DS5	miniPCIe P47 activity	Green
DS6	System 5V_S0 Power rails is ON	Green
DS7	Hard Disk Active	White
DS8	System 5V_S5 Power rails is ON	Orange

3.7 DC Power Supply

SB-iGT can be powered with an unregulated 10V-17V DC power source.

Figure 2 Power Supply Path



The system power up sequence is described below:

1. 5V_S5 is UP (on the base - orange LED DS8) and stable on the CM-iGT inputs.
2. CM-iGT enables all of the internal standby circuits, then the automatic power-on switches its state to ON and indicates readiness by drawing the SLP_S3B5V signal to LOW (green LEDs DS6 on the base). The signal SLP_S3B5V enables the 5V_S0, 5V_SATA and 3V3_S0 power rails.
3. The 1V8_S0, 1V5_S0 and 1V1_S0 are enabled by 3V3_S0 power rail.

Power down /standby sequence:

1. The SLP_S3B5V signal disables all the _S0 and 5V_SATA power rails.
2. 5V_S5 remains ON.

For turning ON (S5, S4, S3->S0), power button SW3 should be pressed. The CM-iGT requires only 5V_S5 and 5V_S0 power rails.

Jumpers E14, E11, E12, E13, E6, E7 and E9 can be used for current consumption measurements. For normal operation, assemble the jumpers. For measuring current consumption, remove the jumper associated with the measured supply and then measure the voltage drop on the current sense resistor. The value of each current sense resistor is 18 mohm +-1%.

USB power supply is limited to 2 A total and 1 A per port. The USB2 power supplies are enabled in Sleep/Hibernate (for implementing system wakeup by keyboard or mouse), while USB3 power supplies are disabled in the Sleep/Hibernate.

3.8 RTC Battery and BIOS Reset

SB-iGT is equipped with an RTC BIOS rechargeable battery. For BIOS reset, install jumper E8 for 5sec.

4 INTERFACES AND CONNECTORS

4.1 CM-iGT Interface Connectors

The CM-iGT CoM is interfaced through two 0.6mm pitch, 140-pin connectors – P9 and P10. For signal description, please refer to the CM-iGT Reference Guide.

4.2 COM1 Connector (P6B)

The COM1 connector (P6B) is a standard DB9 connector compatible with RS-232 levels.

Table 6 COM1 Connector (P6B)

Pin	Signal Name	Pin	Signal Name
1	COM1-DCD	6	COM1-DSR
2	COM1-RXD	7	COM1-RTS
3	COM1-TXD	8	COM1-CTS
4	COM1-DTR	9	COM1-RI
5	GND		

4.3 COM2 Connectors (P26)

COM2 port is routed to the on-board RS232 ultra-mini connector. All signals are at RS232 levels.

Table 7 P26 connectors pin-out

Pin	Signal Name	Pin	Signal Name
1	COM2_TXD	5	NC
2	NC	6	NC
3	COM2_RXD	7	NC
4	NC	8	GND

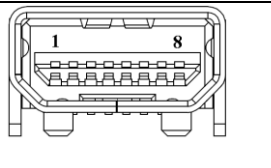


Table 8 P26 connector data

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 RS485 Connector (P29)

P29 is a 100-mil header that provides RS485 interface implemented with a RS485 transceiver connected to the COM2 port.

Table 9 P29 connector pin-out

Pin	Signal Name	Pin	Signal Name
1	GND	6	GND
2	GND	7	COM2_RS485_RXP
3	COM2_RS485_TXN	8	COM2_RS485_RXN
4	COM2_RS485_TXP	9	GND
5	GND	10	GND

4.5 USB2 Host Connectors (P7B, P8B, P17)

USB connectors (P7B, P8B, P17) are standard dual USB Type-A stacked connector. P7B is used for USB2-7 and USB2-8 interfaces. P8B is used for USB2-4 and USB2-12 interfaces. P17 is used for USB1-1 (bottom) and USB2-0 (top) interfaces.

4.6 USB3 Host Connector (P4)

The USB3 connector P4 is a standard dual USB3 Type-A stacked connector. P4 routes the USB3 interfaces from the on the board USB3 host controller.

4.7 GPIO, Misc Header (P14, P15)

The GPIO/Misc connectors (P14, P15) are 2x20 100-mil headers.

Table 10 GPIO, Misc Header (P14)

Pin	Name	Pin	Name
01	INTRUDER_ALERT#	21	FNTH2_GPIO58
02	GND	22	3V3_S0
03	GND	23	1V5_S0
04	TMR0_GPIO197	24	AZ_SI2_GPIO169
05	TIN1_GPIO172	25	NC
06	TMR1_GPIO198	26	GND
07	TIN2_GPIO173	27	5V_S5
08	GND	28	AZ_SI3_GPIO170
09	1V8_S0	29	CAN_TX
10	PCI_CLK3	30	GND
11	FN2PWM_GPIO54	31	CAN_RX
12	+V5	32	AZ_BITCLK
13	FNPWM_GPIO52	33	Reserved
14	SLP_S3B5V	34	AZ_RST#
15	FNTH_GPIO56	35	Reserved
16	IRRX0_GEVENT16#	36	AZ_SDOUT
17	FNTH1_GPIO57	37	GND
18	1V1_S0	38	AZ_SYNC
19	GND	39	GND
20	IRTX0_GEVENT17#	40	3V3_S5

Table 11 GPIO, Misc Header (P15)

Pin	Name	Pin	Name
01	FCH_GPIOD149	21	SDATA0
02	GND	22	3V3_S0
03	GND	23	SCLK0
04	FCH_GPIO11	24	NC
05	SIO_GPIO16	25	SPKR
06	FCH_GPIO182	26	GND
07	SIO_GPIO17	27	5V_S5
08	GND	28	PWRBTN#_HW
09	SIO_GPIO30	29	FCH_GPIO201_S5
10	NC	30	GND
11	SIO_GPIO31	31	FCH_GPIO202_S5
12	5V_S0	32	SB_PG
13	SIO_GPIO32	33	FCH_GPIO204_S5
14	SIO_GPIO34	34	FCH_GPIOD147
15	SIO_GPIO33	35	FCH_GPIO205_S5

16	SIO_GPIO35	36	SERIRQ_GPIO48
17	SMBALERT#	37	GND
18	FCH_GPIO14	38	FCH_GPIOD146
19	GND	39	SYS_RST#
20	FCH_GPIOD145	40	FCH_PCIE_RST#

4.8 SATA Connectors (P20, P33, P30, P23, P27)

The SATA connectors (P20, P33, P30, P23 and P27) are standard Serial ATA signal (7pin) + power (15pin) connectors.

4.9 Micro-SD Connector (P48)

The micro-SD interface is implemented with the SMSC USB2SD USB2240 controller.

4.10 Audio Interfaces

SB-iGT implements audio codec on-board and also routes the audio lines from CM-iGT to the on-board connectors. The schematic below describes the audio sub-system:

Figure 3 Audio Interface Block Diagram

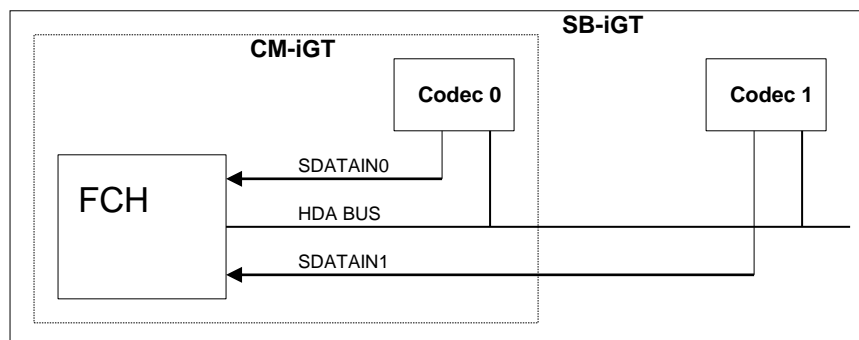


Table 12 Codec 0 connectors

Connector	Connector type	Function
P1	3.5mm jack with jack detection	line input
P2	3.5mm jack with jack detection	microphone input
P3	3.5mm jack with jack detection	line output
U11	Optical SPDIF transmitter	SPDIF output
U14	Optical SPDIF receiver	SPDIF input

Table 13 Codec 1 connectors

Connector	Connector type	Function
P35, P36, P37, P38	3.5mm jack with jack detection	configurable head phone / line output
P39, P40	3.5mm jack with jack detection	configurable microphone / line in input
U24	Optical SPDIF transmitter	SPDIF output
U25	Optical SPDIF receiver	SPDIF input

4.11 VGA Connector (P6A)

The VGA connector (P6A) is a standard HDB-15 connector used for direct connection to VGA displays.

4.12 DisplayPort and HDMI Connectors (P5-A, P5-B)

Standard DisplayPort and HDMI monitors can be connected through the standard connectors implemented with P5-A (HDMI) and P5-B (DisplayPort).

4.13 PCIe Slot x16 (J2)

The PCIe slot J2 is a standard PCIe x16 connector. Please note that the CM-iGT provides only 1x4 PCIe lanes to this connector.

4.14 Mini-PCIe Connectors (P45, P46 and P47)

Two of the SB-iGT PCIe lanes routed to PCIe connector J2 are muxed with mini-PCIe interfaces routed to P46 and P45. The multiplexing selection can be done in the BIOS menu.

Mini-PCIe connector P47 features a dedicated PCIe lane.

4.15 CAN-BUS Connector and Header (P12, P13)

The CAN-BUS transceiver U7 and isolator U37 are implemented on the SB-GT. The transceiver can be powered by an external CAN-device (no jumpers on E4 and E5) or from the on-board 5V_S5 and GND rails (E4 and E5 are populated). The CAN-BUS signals are routed to the RJ-45 connector P13 and the 1x6 pin 100-mil header P12.

Table 14 CAN BUS Signals (P12 & P13)

P12	P13	Name	Description
4	1	CAN_H	Differential TX/RX lane of CAN-BUS
3	2	CAN_L	
6	3,7	CAN_GND	GND from CAN device
2	8	CAN_VCC	VCC from CAN device
1		5V_S5	
6		GND	

4.16 Gigabit Ethernet (P7A & P8A)

Two Gigabit Ethernet interfaces are provided through standard RJ-45 connectors P7A and P8A.

4.17 Power Connector (J3)

Table 15 J3: DC Jack, External - 5.5mm, Inner pin – 2.5mm

Pin	Name	Description
1	PWR_IN	Inner pin
2	GND	Outer ring

5 MECHANICAL DRAWINGS

5.1 Connector Locations

Figure 4 SB-iGT – Top View

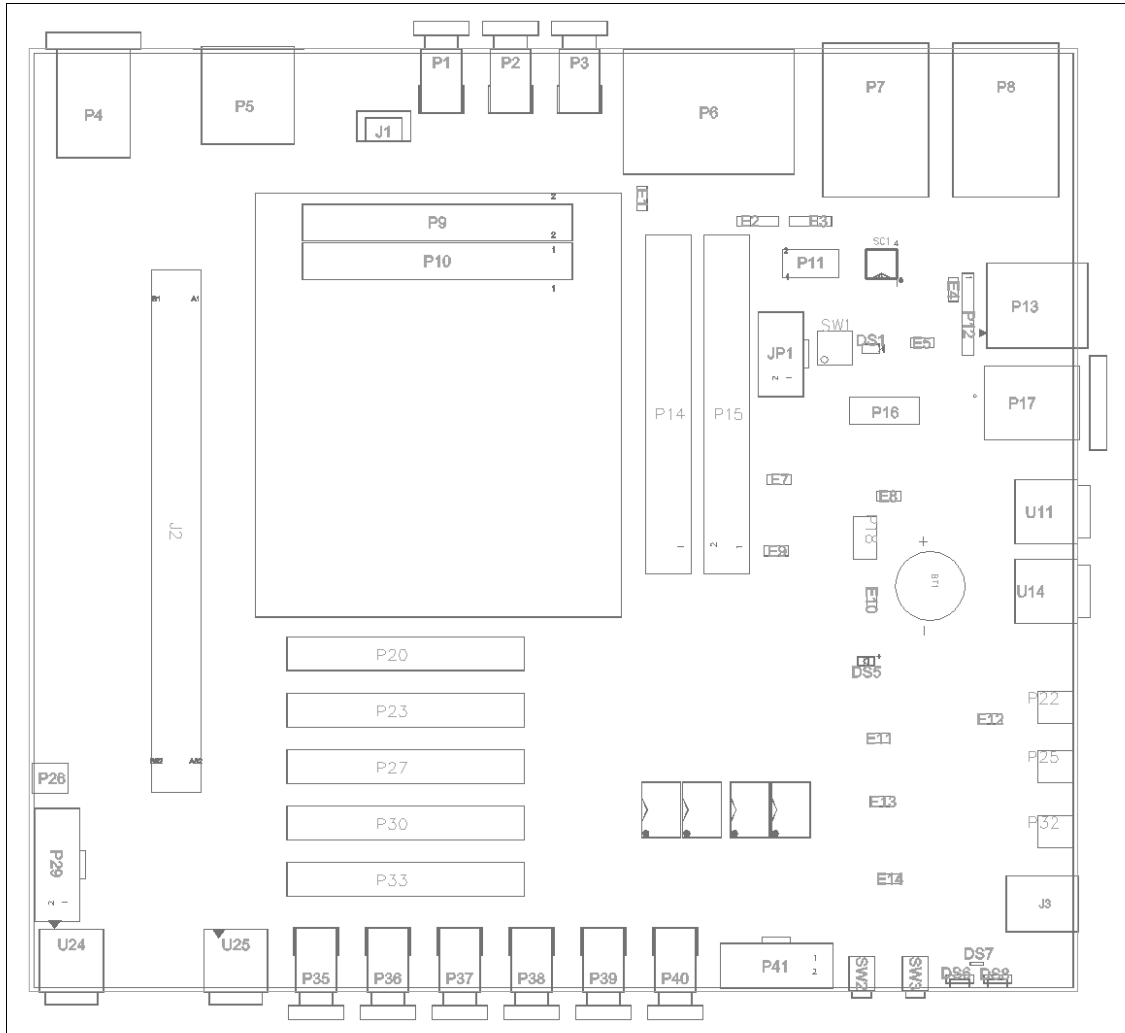
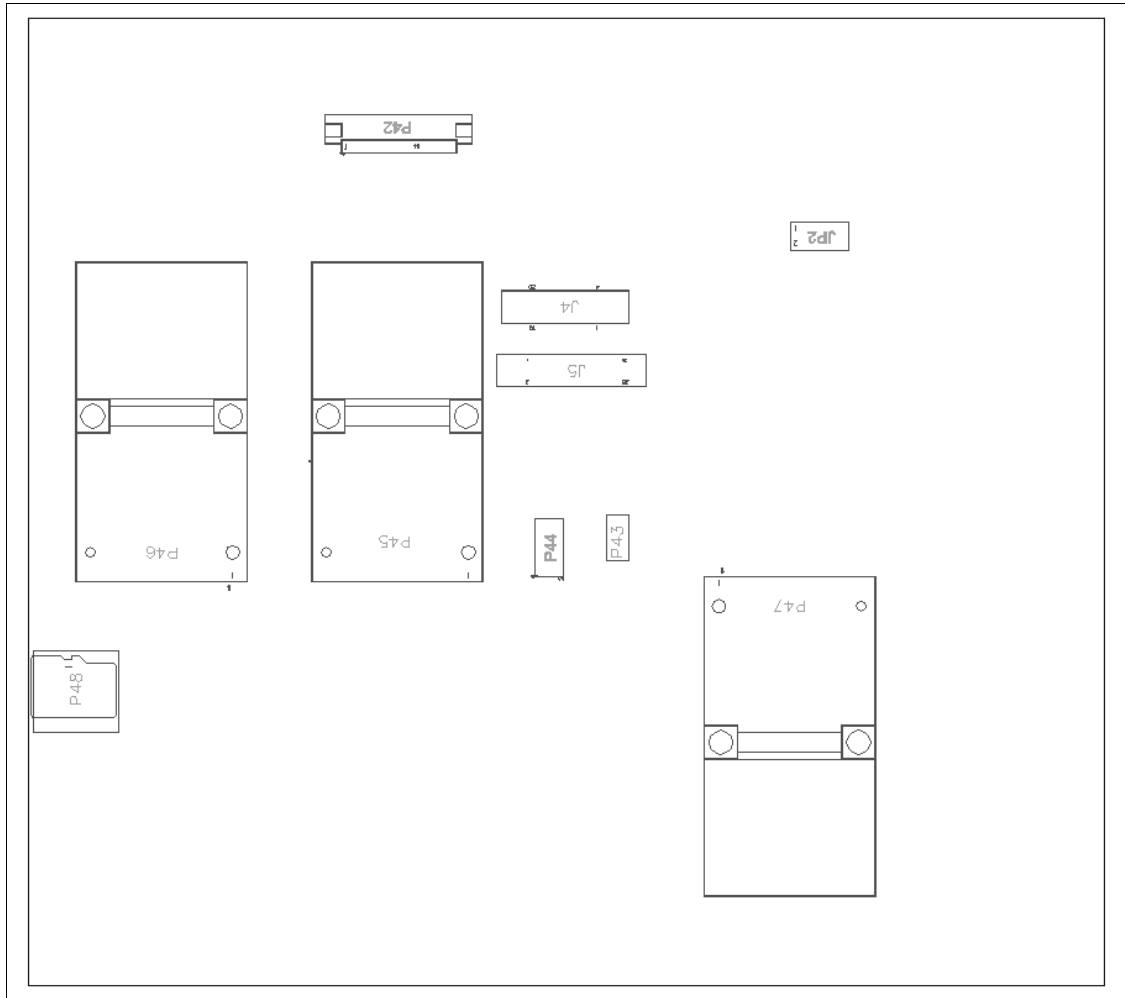


Figure 5 SB-iGT – Bottom View (X-Ray view - as seen from top side)


5.2 Default Jumper Settings

Table 16 Jumpers

#	Header	Default	Description	States	Jumper
1	E2	2-3	Reserved	Reserved	2-3
				Reserved	1-2
2	E3	1-2	Reserved	Reserved	1-2
				Reserved	2-3
3	JP1	5-6	Boot selection	SB-iGT	1-2
				Reserved	3-4
				CM-iGT	5-6
4	JP2	7-8	Reserved		1-2
					3-4
					5-6
					7-8

For proper operation, the “reserved” jumpers must in default positions. For BIOS recovery JP1 should be in 1-2 before booting and returned to position 5-6 before running recovery tool.

6 OPERATIONAL CHARACTERISTICS

6.1 Power Output Specifications

To be added in a future revision of this document.

6.2 Operating Temperature Ranges

SB-iGT is available with three options of operating temperature range, as in the following table.

Table 17 Operating Temperature Ranges

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