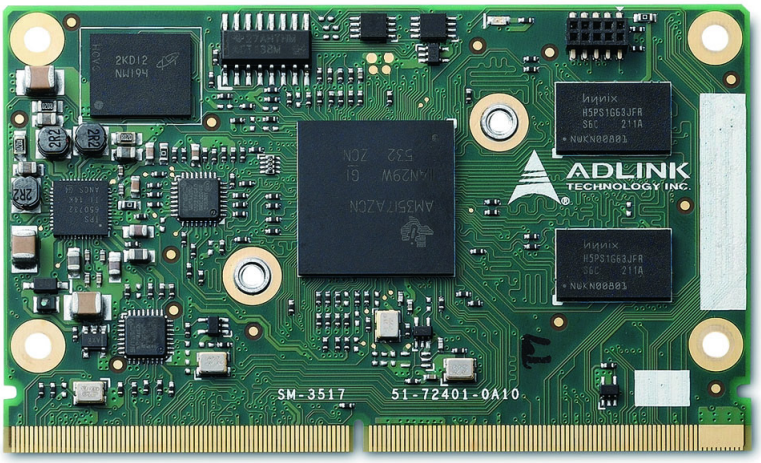
ADLINK TECHNOLOGY INC.

SMARC

LEC-3517
(Computer-on-Module)

Technical Reference

P/N 50-1Z152-1000



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Revision History

Revision	Reason for Change	Date
1000	Initial Release	Dec/13

ADLINK Technology, Incorporated
5215 Hellyer Avenue, #110
San Jose, CA 95138-1007
Tel. 408 360-0200
Fax 408 360-0222
www.adlinktech.com
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Audience

This manual provides reference only for computer design engineers, including but not limited to hardware and software designers and applications engineers. ADLINK Technology, Inc. assumes you are qualified to design and implement prototype computer equipment.

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1 Overview

This initial manual version presents a general overview of the LEC-3517 Computer-On-Module (COM). The next version of this manual shall include more detailed information including user interface descriptions, boot setup access and menu settings, memory map, interrupt channel assignments, and I/O address map. After reviewing this document you should understand the following features of the LEC-3517.

- Functional Block Diagram
- Major Component (IC) Locations and Descriptions
- Connector Location and Description
- Specifications
- SMARC Interface Signal Definitions

NOTE: Please refer to BSP readme documents in the Quick Drive for BSP installation instructions.

1.1 Block Diagram

Figure 1-1 represents the component functions of the module.

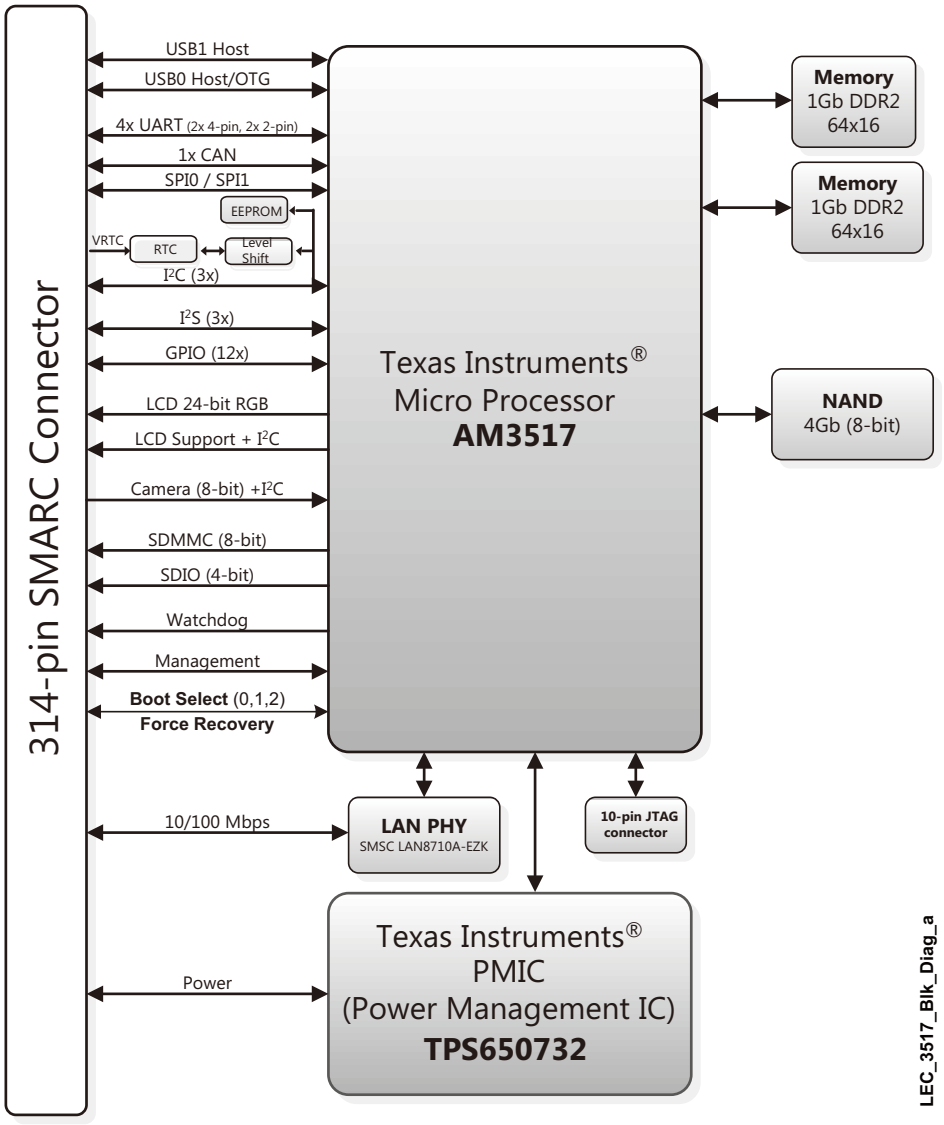


Figure 1-1: Functional Block Diagram

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1.2 Major Components (ICs)

Table 1-1 lists the major integrated circuits on the LEC-3517, including a brief description of each IC. Figure 1-2 shows the locations of the major ICs.

Table 1-1: Major Integrated Circuit Descriptions and Functions

Chip Type	Mfg.	Model	Description	Function
CPU (U5)	Texas Instruments	AM3517 ARM Cortex-A8	600MHz Microprocessor	Integrates Processor Core, Graphics and Memory Controller Hub, and I/O Hub
DDR2 SDRAM (U4, U7)	Hynix	H5PS1G63JFR-SGC	On-board DDR2, 1Gb, 64Mx16 System Memory	Provides high-speed data transfer
Ethernet Transceiver (U10)	SMSC	LAN8710AI-EXK-TR	Single-port, Fast Ethernet PHY Transceiver	Provides a standard IEEE 802.3 Ethernet interface for Ethernet transfer rates up to 100 Mb/s
PMIC (U65)	Texas Instruments	TP650732RSLR	Single-chip, power management solution	Provides power path management
NAND Flash (U68)	Micron	MT29F4G16ABBDA H4-IT	Rugged, Solid State Storage	Provides 4Gb, 8-bit data storage and transfer

Key:
U4, U7 - DDR2 SDRAM
U5 - CPU
U10 - Ethernet Transceiver
U65 - Power Management IC
U68 - NAND Flash Staorage

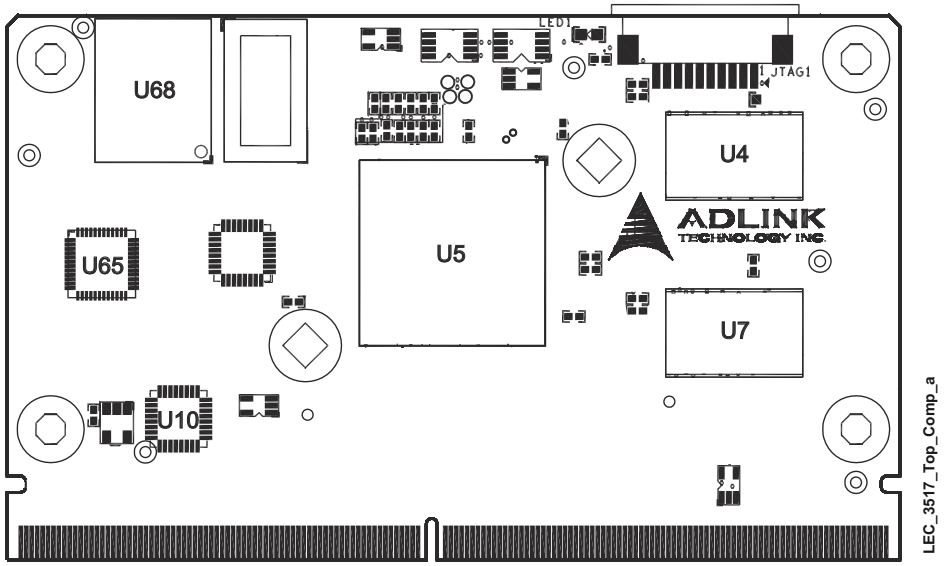


Figure 1-2: Component Locations (Top Side)

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1.3 Connectors

Table 1-2 describes the connectors shown in Figure 1-3.

Table 1-2: Module Connector Description

Connector#	Board Access	Description
J1 – SMARC P-S	Top/ Bottom	314-pin, MXM edge connector for Memory, Video, and I/O functions.
JTAG1	Top	10-pin connector for debugging
LED1	Top	Green LED for Power On

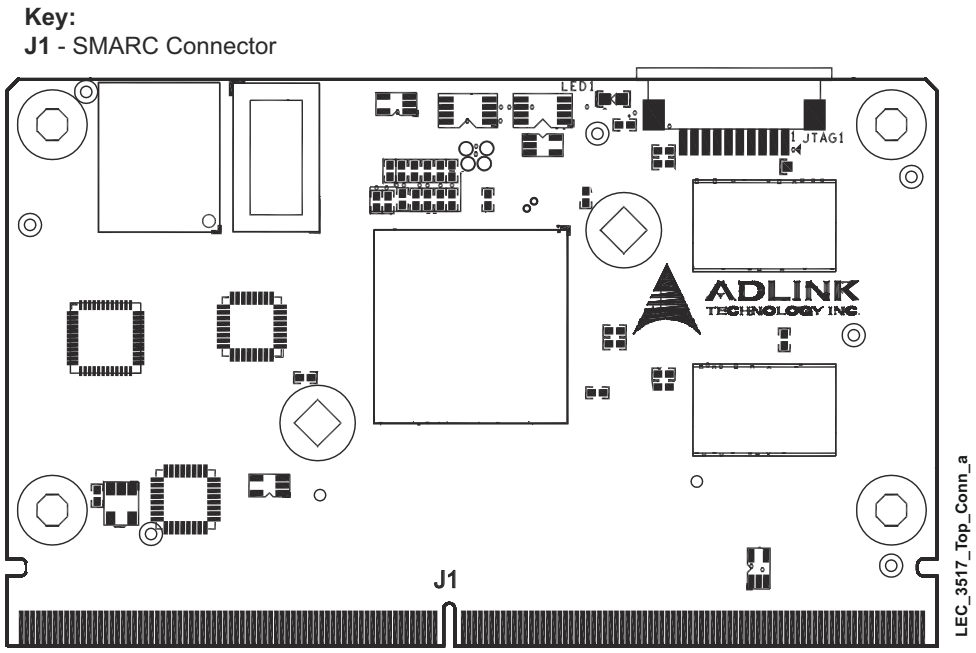


Figure 1-3: Connector Location (Top Side)

1.4 Specifications

Physical Specifications

Table 1-3 lists the physical dimensions of the module.

Table 1-3: Weight and Footprint Dimensions

Item	Dimension	
Weight	0.02 kg (0.05 lb)	Overall height is measured from the upper board surface to the top of the highest permanent component (JTAG1 connector) on the upper board surface. This measurement does not include the cooling solution, which can vary. The cooling solution will probably increase this dimension.
Height (overall)	3.05 mm (0.12 inches)	
Board thickness	1.27 mm (0.05 inches)	
Width	50.00 mm (1.97 inches)	
Length	82.00 mm (3.23 inches)	

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Mechanical Specifications

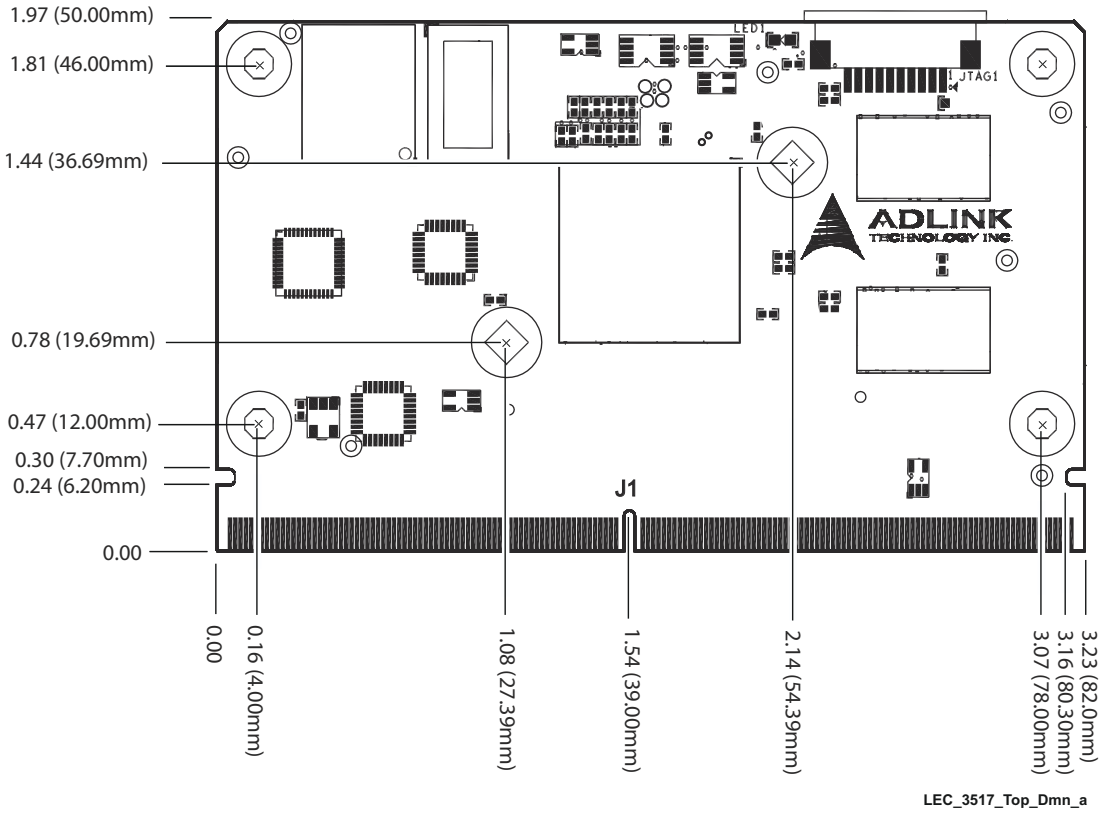


Figure 1-4: Mechanical Dimensions (Top Side)

All dimensions are given in inches and millimeters.

Power Specifications

Table 1-4 provides the power requirements for this module.

Table 1-4: Power Supply Requirements

Parameter	600Mhz Characteristics
Input Type	Regulated DC voltage
In-rush Voltage & Current	Not yet measured
Typical Idle Voltage & Current	Not yet measured
BIT* Voltage & Current	Not yet measured

Operating configurations:

- In-rush operating configuration - To be determined
- Idle operating configuration - To be determined
- *BIT = Burn-In-Test operating configuration - To be determined

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Environmental Specifications

Table 1-5 provides the most efficient operating and storage condition ranges required for this module.

Table 1-5: Environmental Requirements

Parameter	Conditions
Temperature	
Standard	–20° to +70° C (-4° to +158° F)
Extended (Optional)	–40° to +85° C (–40° to +185° F)
Storage	–55° to +85° C (–67° to +185° F)
Humidity	
Operating	5% to 90% relative humidity, non-condensing
Non-operating	5% to 95% relative humidity, non-condensing

Thermal/Cooling Requirements

The LEC-3517 is designed to operate at its maximum CPU speed and requires a thermal solution. ADLINK offers one optional thermal solution described in Table 1-6.

> The overall system design must keep the ICs within their operating temperature specifications.

Table 1-6: ADLINK Optional Cooling Solutions

Cooling Solution	Description
Passive Heatsink (without fan)	Qualified to maintain optimal performance up to +85°C. (See Quick Start Guide for P/N of heatsink.)

1.5 Interface Signals

Table 1-7 provides the pin signals for the SMARC P-S connector. Refer to the SMARC specification at http://www.sget.org/standards/smarc.html for definitions of the SMARC signals.

Table 1-7: SMARC P-S Connector Signal Descriptions

Pin #	Primary (Top Side)	Pin #	Secondary (Bottom Side)
		S1	PCAM_VSYNC
P1	Not connected	S2	PCAM_HSYNC
P2	GND	S3	GND
P3	CSI1_CK+/PCAM_D0	S4	PCAM_PXL_CK0
P4	CSI1_CK-/PCAM_D1	S5	I2C_CAM_CK
P5	Not connected	S6	CAM_MCK
P6	PCAM_MCK	S7	I2C_CAM_DAT
P7	CSI1_D0+/PCAM_D2	S8	Not connected
P8	CSI1_D0-/PCAM_D3	S9	Not connected
P9	GND	S10	GND
P10	CSI1_D1+/PCAM_D4	S11	Not connected
P11	CSI1_D1-/PCAM_D5	S12	Not connected
P12	GND	S13	GND
P13	CSI1_D2+/PCAM_D6	S14	Not connected
P14	CSI1_D2-/PCAM_D7	S15	Not connected
P15	GND	S16	GND
P16	Not connected	S17	Not connected
P17	Not connected	S18	Not connected
P18	GND	S19	Not connected

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Table 1-7: SMARC P-S Connector Signal Descriptions (Continued)

P19	Not connected	S20	Not connected
P20	Not connected	S21	Not connected
P21	GBE_LINK100# (Ethernet Speed LED)	S22	Not connected
P22	Not connected	S23	Not connected
P23	Not connected	S24	Not connected
P24	Not connected	S25	GND
P25	GBE_LINK_ACT# (LAN Link LED)	S26	SDMMC_D0
P26	GBE_MDI1-	S27	SDMMC_D1
P27	GBE_MDI1+	S28	SDMMC_D2
P28	GBE_CTREF	S29	SDMMC_D3
P29	GBE0_MDI0-	S30	SDMMC_D4
P30	GBE0_MDI0+	S31	SDMMC_D5
P31	SPI0_CS1#	S32	SDMMC_D6
P32	GND	S33	SDMMC_D7
P33	SDIO_WP	S34	GND
P34	SDIO_CMD	S35	SDMMC_CK
P35	SDIO_CD#	S36	SDMMC_CMD
P36	SDIO_CK	S37	SDMMC_RST#
P37	SDIO_PWR_EN	S38	Not connected
P38	GND	S39	I2S0_LRCK
P39	SDIO_D0	S40	I2S0_SDOUT
P40	SDIO_D1	S41	I2S0_SDIN
P41	SDIO_D2	S42	I2S0_CK
P42	SDIO_D3	S43	I2S1_LRCK
P43	SPI0_CS0#	S44	I2S1_SDOUT
P44	SPI0_CK	S45	I2S1_SDIN
P45	SPI0_DIN	S46	I2S1_CK
P46	SPI0_DO	S47	GND
P47	GND	S48	I2C_GP_CK
P48	Not connected	S49	I2C_GP_DAT
P49	Not connected	S50	I2S2_LRCK
P50	GND	S51	I2S2_SDOUT
P51	Not connected	S52	I2S2_SDIN
P52	Not connected	S53	I2S2_CK
P53	GND	S54	Not connected
P54	SPI1_CS0#	S55	Not connected
P55	SPI1_CS1#	S56	Not connected
P56	SPI1_CK	S57	PCAM_ON_CSI0#
P57	SPI1_DIN	S58	PCAM_ON_CSI1#
P58	SPI1_DO	S59	Not connected
P59	GND	S60	Not connected
P60	USB0+	S61	GND
P61	USB0-	S62	Not connected
P62	USB0_EN_OC#	S63	Not connected
P63	USB0_VBUS_DET	S64	GND
P64	USB0_OTG_ID	S65	Not connected
P65	USB1+	S66	Not connected
P66	USB1-	S67	GND
P67	USB1_EN_OC#	S68	Not connected
P68	GND	S69	Not connected

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Table 1-7: SMARC P-S Connector Signal Descriptions (Continued)

P69	Not connected	S70	GND
P70	Not connected	S71	Not connected
P71	USB2_EN_OC#	S72	Not connected
P72	Not connected	S73	GND
P73	Not connected	S74	Not connected
P74	Not connected	S75	Not connected
	Key		Key
P75	Not connected	S76	Not connected
P76	Not connected	S77	Not connected
P77	Not connected	S78	Not connected
P78	Not connected	S79	Not connected
P79	GND	S80	GND
P80	Not connected	S81	Not connected
P81	Not connected	S82	Not connected
P82	GND	S83	GND
P83	Not connected	S84	Not connected
P84	Not connected	S85	Not connected
P85	GND	S86	GND
P86	Not connected	S87	Not connected
P87	Not connected	S88	Not connected
P88	GND	S89	GND
P89	Not connected	S90	Not connected
P90	Not connected	P91	Not connected
P91	GND	S92	GND
P92	Not connected	S93	LCD_D0
P93	Not connected	S94	LCD_D1
P94	GND	S95	LCD_D2
P95	Not connected	S96	LCD_D3
P96	Not connected	S97	LCD_D4
P97	GND	S98	LCD_D5
P98	Not connected	S99	LCD_D6
P99	Not connected	S100	LCD_D7
P100	GND	S101	GND
P101	Not connected	S102	LCD_D8
P102	Not connected	S103	LCD_D9
P103	GND	S104	LCD_D10
P104	Not connected	S105	LCD_D11
P105	Not connected	S106	LCD_D12
P106	Not connected	S107	LCD_D13
P107	Not connected	S108	LCD_D14
P108	GPIO0 / CAM0_PWR#	S109	LCD_D15
P109	GPIO1 / CAM1_PWR#	S110	GND
P110	GPIO2 / CAM0_RST#	S111	LCD_D16
P111	GPIO3 / CAM1_RST#	S112	LCD_D17
P112	GPIO4 / HDA_RST#	S113	LCD_D18
P113	GPIO5 / _PWM_OUT	S114	LCD_D19
P114	GPIO6 / TACHIN	S115	LCD_D20
P115	GPIO7 / PCAM_FLD	S116	LCD_D21
P116	GPIO8 / CAN0_ERR#	S117	LCD_D22
P117	GPIO9 / CAN1_ERR#	S118	LCD_D23
P118	GPIO10	S119	GND

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Table 1-7: SMARC P-S Connector Signal Descriptions (Continued)

P119	GPIO11	S120	LCD_DE
P120	GND	P121	LCD_VS
P121	I2C_PM_CK	S122	LCD_HS
P122	I2C_PM_DAT	S123	LCD_PCK
P123	BOOT_SEL0#	S124	GND
P124	BOOT_SEL1#	S125	Not connected
P125	BOOT_SEL2#	S126	Not connected
P126	RESET_OUT#	S127	LCD_BKLT_EN
P127	RESET_IN#	S128	Not connected
P128	POWER_BTN#	S129	Not connected
P129	SER0_TX	S130	GND
P130	SER0_RX	S131	Not connected
P131	SER0_RTS#	S132	Not connected
P132	SER0_CTS#	S133	LCD_VDD_EN
P133	GND	S134	Not connected
P134	SER1_TX	S135	Not connected
P135	SER1_RX	S136	GND
P136	SER2_TX	S137	Not connected
P137	SER2_RX	S138	Not connected
P138	SER2_RTS#	S139	I2C_LCD_CK
P139	SER2_CTS#	S140	I2C_LCD_DAT
P140	SER3_TX	S141	LCD_BKLT_PWM
P141	SER3_RX	S142	Not connected
P142	GND	S143	GND
P143	CAN0_TX	S144	Not connected
P144	CAN0_RX	S145	WDT_TIME_OUT#
P145	Not connected	S146	Not Connected
P146	Not connected	S147	VDD_RTC
P147	VDD_IN	S148	LID#
P148	VDD_IN	S149	SLEEP#
P149	VDD_IN	S150	VIN_PWR_BAD#
P150	VDD_IN	S151	CHARGING#
P151	VDD_IN	S152	CHARGER_PRSNT#
P152	VDD_IN	S153	CHARGER_STBY#
P153	VDD_IN	S154	CARRIER_PWR_ON
P154	VDD_IN	S155	FORCE_RECOV#
P155	VDD_IN	S156	BATLOW#
P156	VDD_IN	S157	TEST#
		S158	VDD_IO_SEL#

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Debug (JTAG1)

Table 1-8 lists the pin signals of the JTAG1 header, which provides 10-pins, 2 rows, odd/even pin sequence (1, 2) with 0.039" (1.00mm) pitch.

Table 1-8: Camera 1 Pin Signals (CAM1)

Pin #	Signal
1	JTAG_PWR
2	JTAG_nTRST
3	JTAG_TMS
4	JTAG_TDO
5	JTAG_TDI
6	JTAG_TCK
7	JTAG_RTCK
8	GND
9	MFG_nMODEL
10	GND

NOTE: The shaded table cells denote ground.

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Appendix A Technical Support

ADLINK Technology, Inc. provides a number of methods for contacting Technical Support listed in Table A-1 below. Requests for support through Ask an Expert are given the highest priorities, and usually will be addressed within one working day.

- ADLINK Ask an Expert – This is a comprehensive support center designed to meet all your technical needs. This service is free and available 24 hours a day through the ADLINK web site at http://www.adlinktech.com/AAE/. This includes a searchable database of Frequently Asked Questions, which will help you with the common information requested by most customers. This is a good source of information to look at first for your technical solutions. However, you must register online if you wish to use the Ask a Question feature.

ADLINK strongly suggests that you register with the web site. By creating a profile on the ADLINK web site, you will have a portal page called “My ADLINK”, unique to you with access to exclusive services and account information.

- Personal Assistance – You may also request personal assistance by creating an Ask an Expert account and then going to the Ask a Question feature. Requests can be submitted 24 hours a day, 7 days a week. You will receive immediate confirmation that your request has been entered. Once you have submitted your request, you must log in to go to the My Question area where you can check status, update your request, and access other features.
- Download Service – This service is also free and available 24 hours a day at http://www.adlinktech.com. For certain downloads such as technical documents and software, you must register online before you can log in to this service.

Table A-1: Technical Support Contact Information

Method	Contact Information
Ask an Expert	http://www.adlinktech.com/AAE/
Web Site	http://www.adlinktech.com
Standard Mail	Contact us should you require any service or assistance. **ADLINK Technology, Inc.** Address: 9F, No.166 Jian Yi Road, Zhonghe District New Taipei City 235, Taiwan 新北市中和區建一路 166 號 9 樓 Tel: +886-2-8226-5877 Fax: +886-2-8226-5717 Email: service@adlinktech.com **Ampro ADLINK Technology, Inc.** Address: 5215 Hellyer Avenue, #110, San Jose, CA 95138, USA Tel: +1-408-360-0200 Toll Free: +1-800-966-5200 (USA only) Fax: +1-408-360-0222 Email: info@adlinktech.com **ADLINK Technology (China) Co., Ltd.** Address: 上海市浦东新区张江高科技园区芳春路 300 号 (201203) 300 Fang Chun Rd., Zhangjiang Hi-Tech Park, Pudong New Area, Shanghai, 201203 China Tel: +86-21-5132-8988 Fax: +86-21-5132-3588 Email: market@adlinktech.com

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Table A-1: Technical Support Contact Information (Continued)

ADLINK Technology Beijing
Address: 北京市海淀区上地东路 1 号盈创动力大厦 E 座 801 室(100085)
Rm. 801, Power Creative E, No. 1,
Shang Di East Rd., Beijing, 100085 China
Tel: +86-10-5885-8666
Fax: +86-10-5885-8626
Email: market@adlinktech.com

ADLINK Technology Shenzhen
Address: 深圳市南山区科技园南区高新南七道 数字技术园
A1 栋 2 楼 C 区 (518057)
2F, C Block, Bldg. A1, Cyber-Tech Zone, Gao Xin Ave. Sec. 7,
High-Tech Industrial Park S., Shenzhen, 518054 China
Tel: +86-755-2643-4858
Fax: +86-755-2664-6353
Email: market@adlinktech.com

LiPPERT ADLINK Technology GmbH
Address: Hans-Thoma-Strasse 11, D-68163, Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: emea@adlinktech.com

ADLINK Technology, Inc. (French Liaison Office)
Address: 15 rue Emile Baudot, 91300 Massy CEDEX, France
Tel: +33 (0) 1 60 12 35 66
Fax: +33 (0) 1 60 12 35 66
Email: france@adlinktech.com

ADLINK Technology Japan Corporation
Address: 〒101-0045 東京都千代田区神田鍛冶町 3-7-4
神田 374 ビル 4F
KANDA374 Bldg. 4F, 3-7-4 Kanda Kajicho,
Chiyoda-ku, Tokyo 101-0045, Japan
Tel: +81-3-4455-3722
Fax: +81-3-5209-6013
Email: japan@adlinktech.com

ADLINK Technology, Inc. (Korean Liaison Office)
Address: 서울시 서초구 서초동 1675-12 모인터빌딩 8 층
8F Mointer B/D,1675-12, Seocho-Dong, Seocho-Gu,
Seoul 137-070, Korea
Tel: +82-2-2057-0565
Fax: +82-2-2057-0563
Email: korea@adlinktech.com

ADLINK Technology Singapore Pte. Ltd.
Address: 84 Genting Lane #07-02A, Cityneon Design Centre,
Singapore 349584
Tel: +65-6844-2261
Fax: +65-6844-2263
Email: singapore@adlinktech.com

ADLINK Technology Singapore Pte. Ltd. (Indian Liaison Office)
Address: 1st Floor, #50-56 (Between 16th/17th Cross) Margosa Plaza,
Margosa Main Road, Malleswaram, Bangalore-560055, India
Tel: +91-80-65605817, +91-80-42246107
Fax: +91-80-23464606
Email: india@adlinktech.com

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Table A-1: Technical Support Contact Information (Continued)

	ADLINK Technology, Inc. (Israeli Liaison Office) Address: 6 Hasadna St., Kfar Saba 44424, Israel Tel: +972-9-7446541 Fax: +972-9-7446542 Email: israel@adlinktech.com

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