InvenSense ARM Reference Board
Application Note

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1. Revision History

Date	Revision	Description
05/26/2010	1.0	Initial release
06/23/2010	1.1	Updated BOM, added mechanical drawings for select components, added firmware revision note.
08/11/2010	1.2	Updated firmware revision in Section 10.

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2. Purpose

This document describes the hardware and circuitry of the RB_ARMAT91_XXAXX_A reference board (also known as InvenSense ARM board).

3. Usage

This reference board provides a bridge function between InvenSense evaluation boards and a PC. It connects to a PC via USB and to InvenSense evaluation boards via SPI or I^2C. The figure below shows the ARM board connecting an IMU-3000 evaluation board to a Windows PC. (Note that the ARM board is used as a general-purpose bridge and can also be used with other InvenSense EVBs, including the ITG-3xxx and MPU-3xxx family of devices.) The ARM processor on the reference board is not meant to be reprogrammed by the user. It contains all code necessary to be used in conjunction InvenSense evaluation boards. Note that separate demonstration software may accompany the individual evaluation boards with which this device connects.

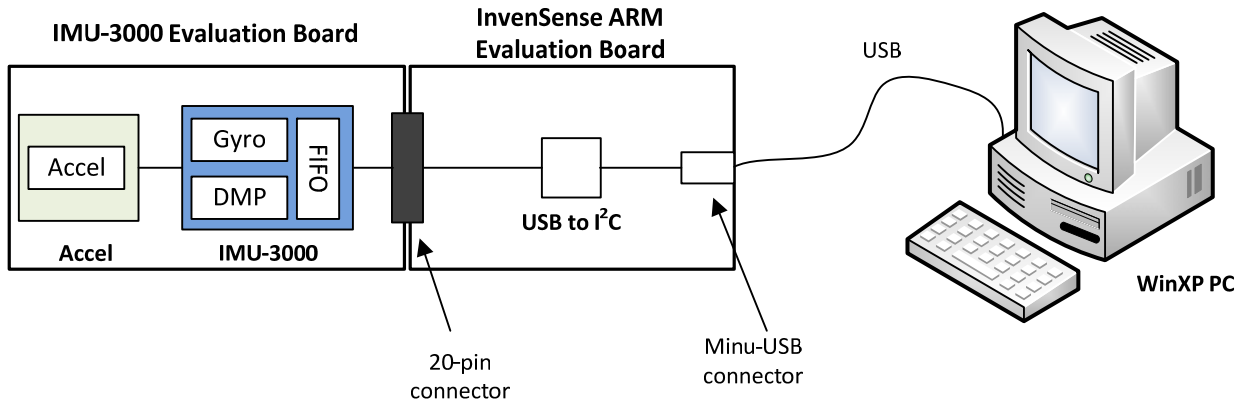

Figure 1. Example of ARM Board Used as Bridge between PC and IMU-3000 Evaluation Board. Note that the ARM board is used as a general-purpose bridge and can also be used with other InvenSense EVBs, including the ITG-3xxx and MPU-3xxx family of devices.

4. Other Documents

Since the ARM board is meant to bridge between InvenSense evaluation boards and a PC, this document should be used in conjunction with the documents related to the particular board that is being used with the ARM Board.

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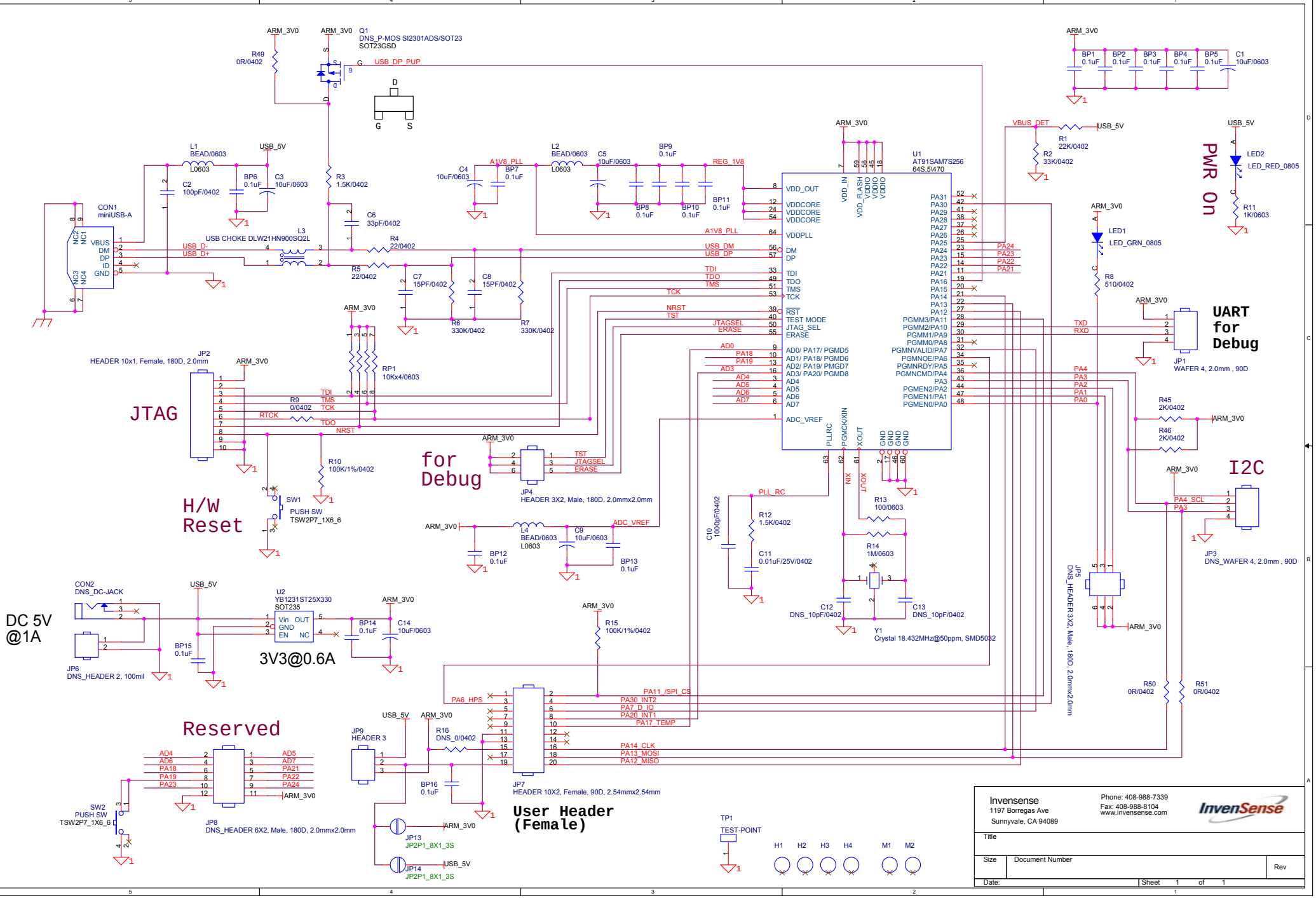
JTAG
H/W Reset
for Debug
UART for Debug
I2C
PWR On
DC 5V @1A
3V3@0.6A
Reserved
User Header (Female)
U1 AT91SAM7S256 64S.5\470
Q1 DNS_P-MOS SI2301ADS/SOT23 SOT23GSD
CON1 miniUSB-A
CON2 DNS_DC-JACK
JP1 WAFER 4, 2.0mm , 90D
JP2 HEADER 10x1, Female, 180D, 2.0mm
JP3 DNS_WAFER 4, 2.0mm , 90D
JP4 HEADER 3X2, Male, 180D, 2.0mmx2.0mm
JP5 DNS_HEADER 3X2, Male, 180D, 2.0mmx2.0mm
JP6 DNS_HEADER 2, 100mil
JP7 HEADER 10X2, Female, 90D, 2.54mmx2.54mm
JP8 DNS_HEADER 6X2, Male, 180D, 2.0mmx2.0mm
JP9 HEADER 3
JP13 JP2P1_8X1_3S
JP14 JP2P1_8X1_3S
SW1 PUSH SW TSW2P7_1X6_6
SW2 PUSH SW TSW2P7_1X6_6
U2 YB1231ST25X330 SOT235
L1 BEAD/0603 L0603
L2 BEAD/0603 L0603
L3 USB CHOKE DLW21HN900SQ2L
L4 BEAD/0603 L0603
Y1 Crystal 18.432MHz@50ppm, SMD5032
LED1 LED_GRN_0805
LED2 LED_RED_0805
TP1 TEST-POINT
ARM_3V0
USB_5V
USB_DP_PUP
USB_D+
USB_D-
VBUS_DET
TDI
TMS
TCK
TDO
NRST
TST
JTAGSEL
ERASE
RTCK
PLL_RC
ADC_VREF
TXD
RXD
PA4_SCL
PA3
PA6_HPS
PA11_/SPI_CS
PA30_INT2
PA7_D_IO
PA20_INT1
PA17_TEMP
PA14_CLK
PA13_MOSI
PA12_MISO
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6. Board Photo

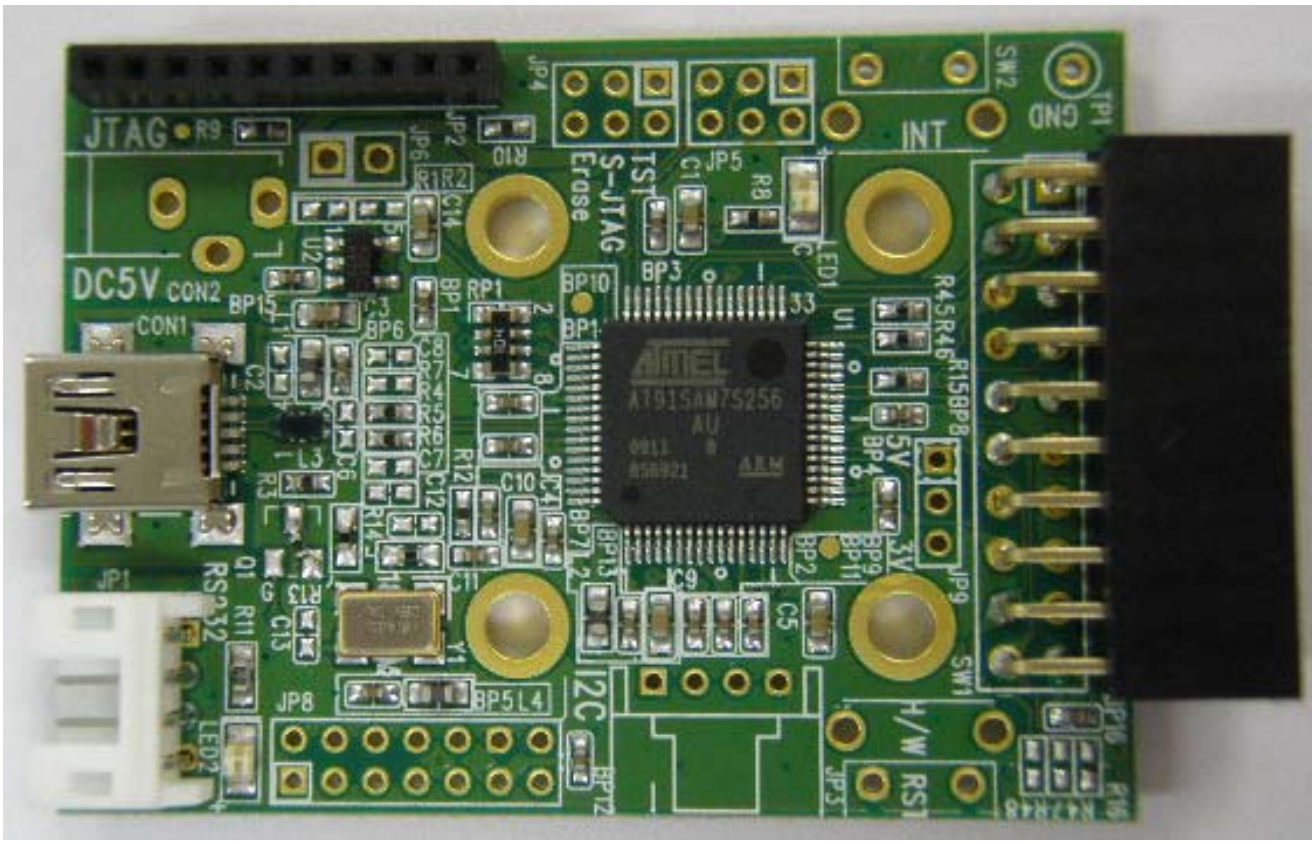

Figure 3. Component-layer board photo

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7. Component Layer Silk Screen

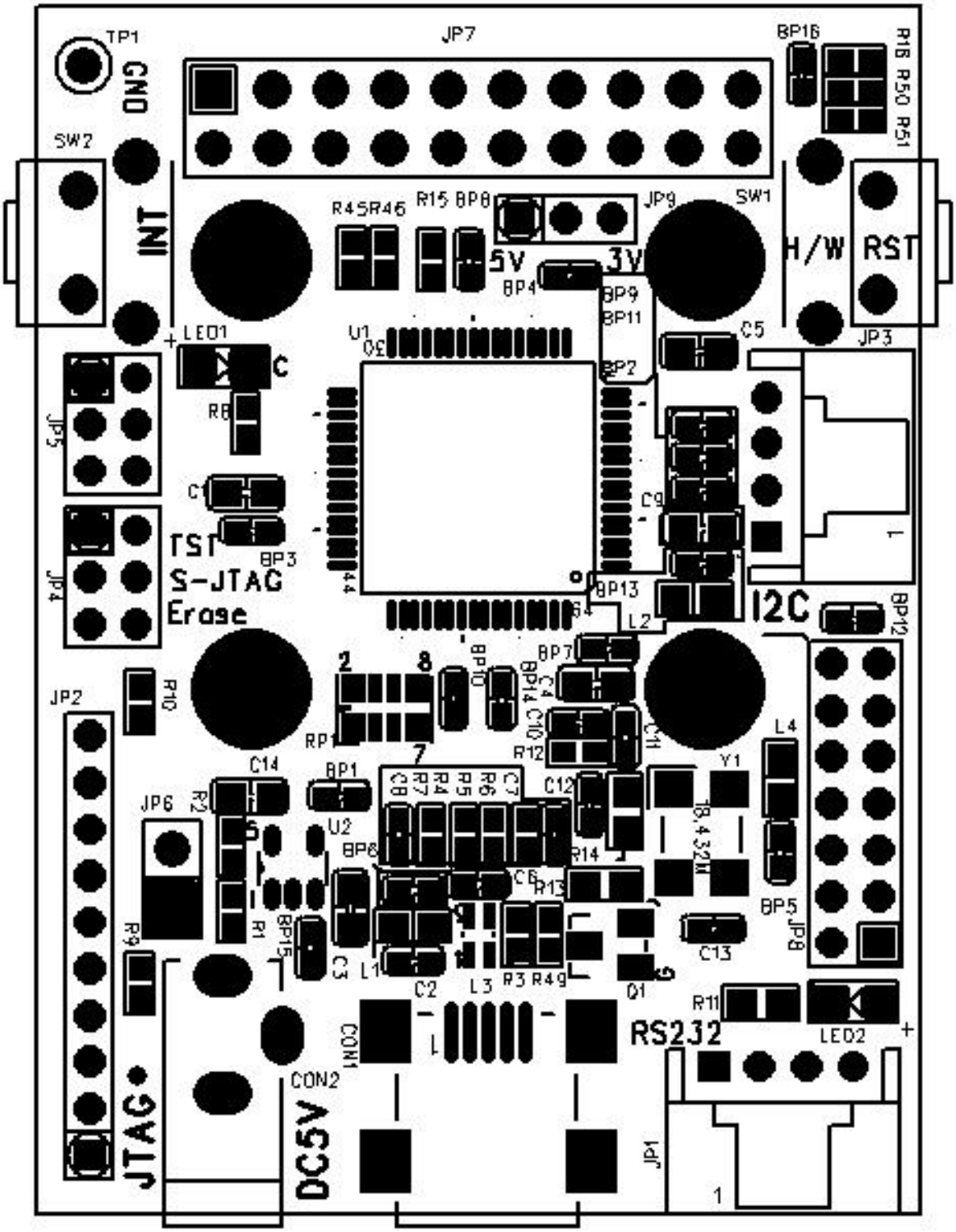

Figure 4. Component-layer silk screen

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8. Table 1. Bill of Materials (Parts Stuffing List)

Item	Quantity	Reference	Part	PCB Footprint
1	16	BP1,BP2,BP3,BP4,BP5,BP6,BP7,BP8,BP9, BP10,BP11,BP12,BP13,BP14,BP15,BP16	0.1uF	C0402
2	1	CON1	miniUSB-A	USB\MINI
3	1	CON2 (DO NOT STUFF)	DC Jack	
4	6	C1,C3,C4,C5,C9,C14	10uF/0603	C0603
5	1	C2	100pF/0402	C0402
6	1	C6	33pF/0402	C0402
7	2	C7,C8	15PF/0402	C0402
8	1	C10	1000pF/0402	C0402
9	1	C11	0.01uF/25V/0402	C0402
10	1	C12 (DO NOT STUFF)	10pF/0402	
11	1	C13 (DO NOT STUFF)	10pF/0402	
12	1	JP1	WAFER 4, 80mil, ANGLE	J79\4SA90
13	1	JP2	HEADER 10, 80mil, Angle, Female	J79\10S
14	1	JP3 (DO NOT STUFF)	HEADER 4, 80mil	
15	1	JP4	HEADER 3X2, 80mil	J79\6D
16	1	JP5 (DO NOT STUFF)	HEADER 3x2, 2mmx2mm, Male	
17	1	JP6 (DO NOT STUFF)	HEADER 2, 100mil	
18	1	JP7	HEADER 10X2, 100mil, Female	J100\20DF
19	1	JP8 (DO NOT STUFF)	HEADER 6X2, 2mmx2mm, Male	
20	1	JP9	HEADER 3	J79\3S
21	1	LED1	LED_GRN_0805	LED0805AC
22	1	LED2	LED_RED_0805	LED0805AC
23	3	L1,L2,L4	BEAD/0603	L0603
24	1	L3	CHOKE CM3216W900H	CH4P1_25X2_05S
25	1	Q1 (DO NOT STUFF)	P-FET SI2301ADS/SOT23	
26	1	RP1	10Kx4/RP4A0603	RN8P06SN
27	1	R1	22K/0402	R0402
28	1	R2	33K/0402	R0402
29	2	R3,R12	1.5K/0402	R0402
30	2	R4,R5	33/0402	R0402
31	2	R6,R7	330K/0402	R0402
32	1	R8	510/0402	R0402
33	4	R9, R49, R50, R51	0/0402	R0402
34	1	R16 (DO NOT STUFF)	0/0402	
35	2	R10,R15	100K/1%/0402	R0402
36	1	R11	1K/0603	R0603
37	1	R13	100/0603	R0603
38	1	R14	1M/0603	R0603
39	2	R45,R46	2K/0402	R0402
40	1	SW1 (DO NOT STUFF)	PUSH SW	TSW2P7_1X6_6
41	1	SW2 (DO NOT STUFF)	PUSH SW	TSW2P7_1X6_6
42	1	U1	ARM AT91SAM7S64	64S.5\470
43	1	U2	3V3 LDO YB1231ST25X330	SOT235
44	1	Y1	Crystal 18.432MHz@50ppm, SMD5032	SX-5032
45	1	Blank Printed Circuit Board	Gerber_ARM_EVB.rar	
46	1	Firmware for ARM	V1.1.1 Firmware for ARM MCU	

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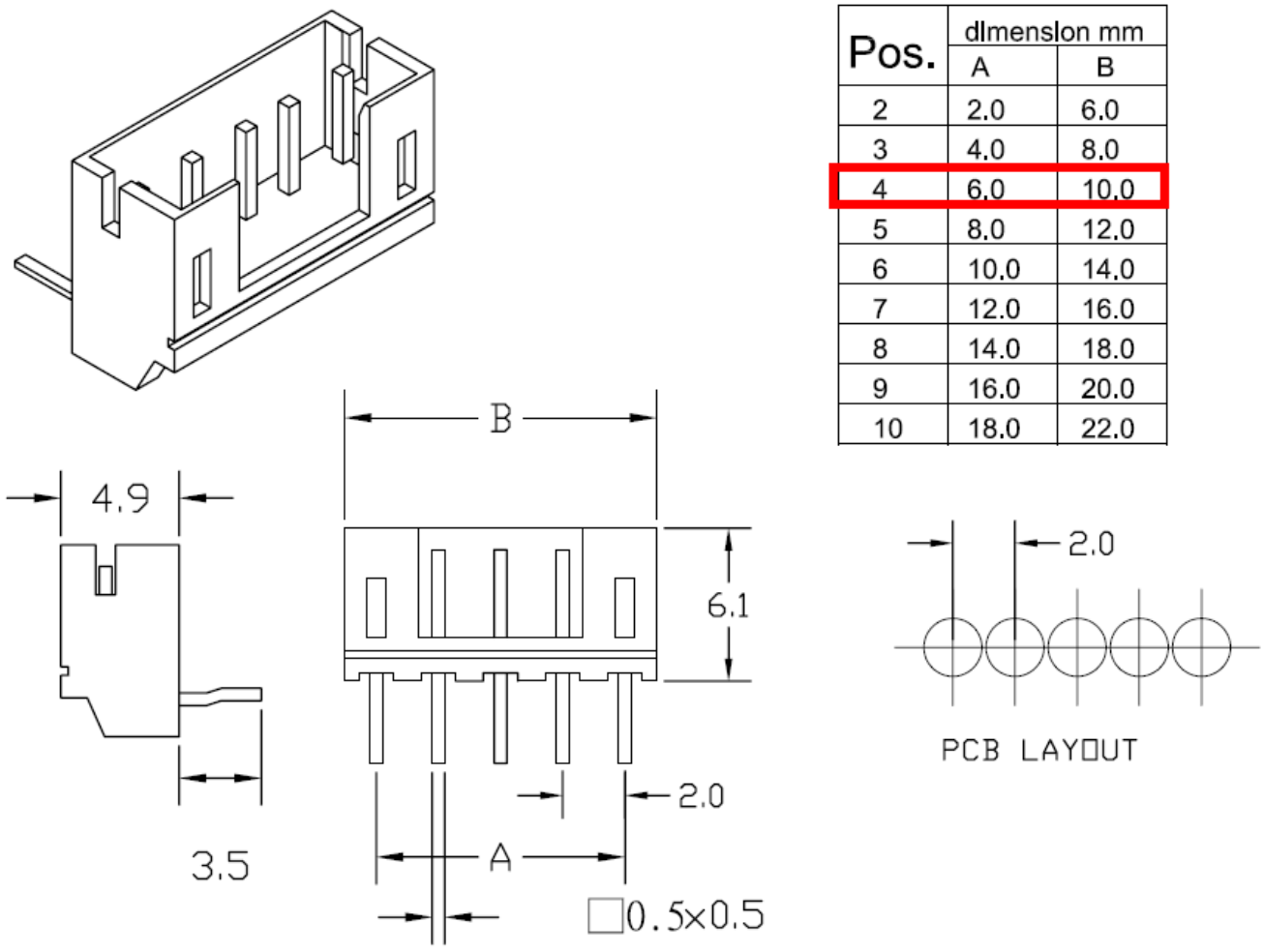
9. Mechanical Drawings for Selected BOM Items



Pos.	dimension mm	
	A	B
2	2.0	6.0
3	4.0	8.0
4	6.0	10.0
5	8.0	12.0
6	10.0	14.0
7	12.0	16.0
8	14.0	18.0
9	16.0	20.0
10	18.0	22.0

Figure 5. BOM Item #12, JP1 Drawing

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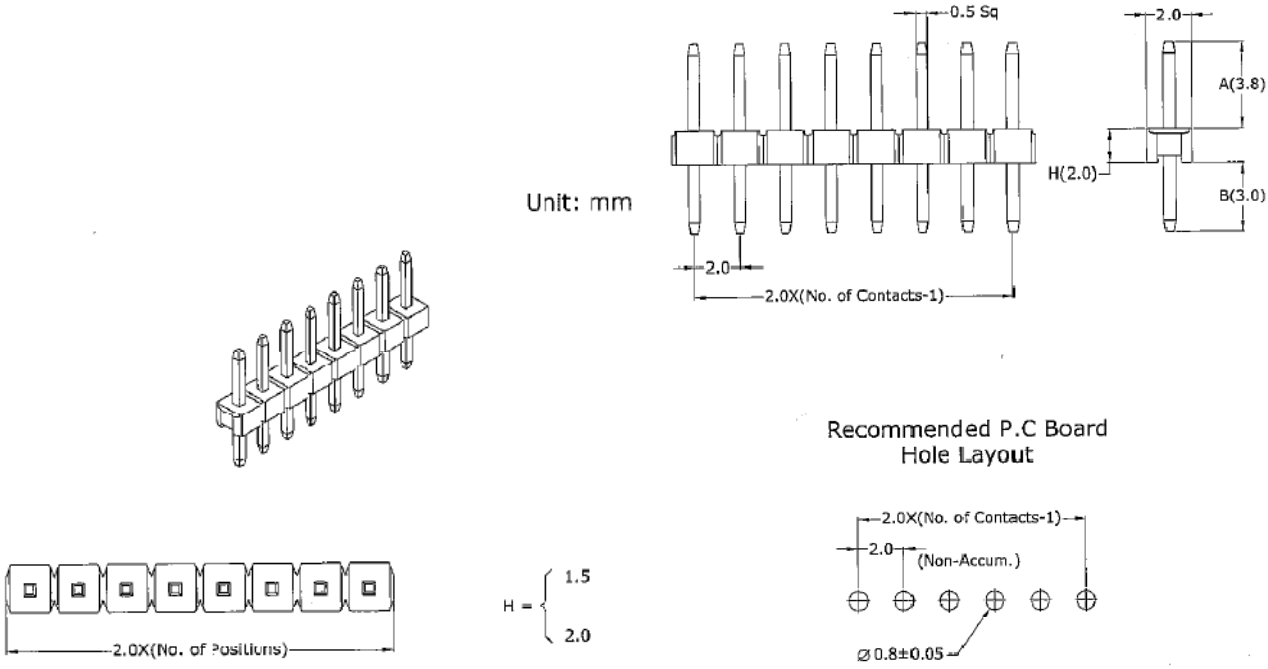

Figure 6. BOM Item #20, JP9 Drawing (3-Pin Header)

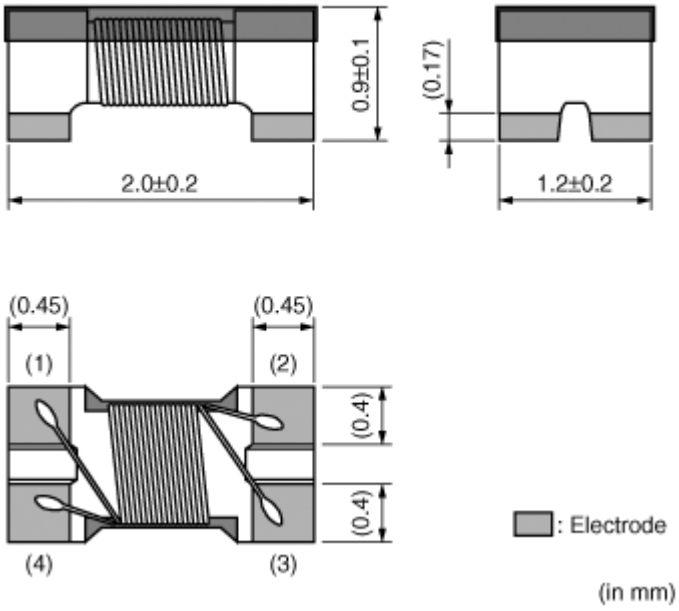

Figure 7. BOM Item #24, L3 Drawing

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10. Programming the ARM AT91 MCU

The firmware for the InvenSense ARM Board must be factory programmed using the JTAG port JP2 with Atmel's programming tool and software. The current firmware revision is V1.1.2EVB. For upgrading boards that have an older firmware revision, the ARM MCU may only be programmed by InvenSense or its designated representatives.

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