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Electronic
Research
&
Design

ERD TiAm Module

I/O EXPANSION
(50 way 1.27mm Female)

DRAM
(512MB (x 16))

eMMC
(2GB – Boot,
Filsesystem)

I/O Expansion
(Ethernet MAC, USB Host)
(30way 1.27mm Female)

JTAG
(20 pin CTI)

SERIAL DEBUG
(3 pin header)

AM3352 -600
AM3358-800
AM3358-1000

USB MICRO - Device
(Optional 5V supply)

MICRO SD-CARD
(Storage / Update)

POWER SUPPLY
(5.0V In, Li Battery support, 3.3V (200mA max) out.)

EEPROM(ID)
(MAC Address storage)

I/O EXPANSION
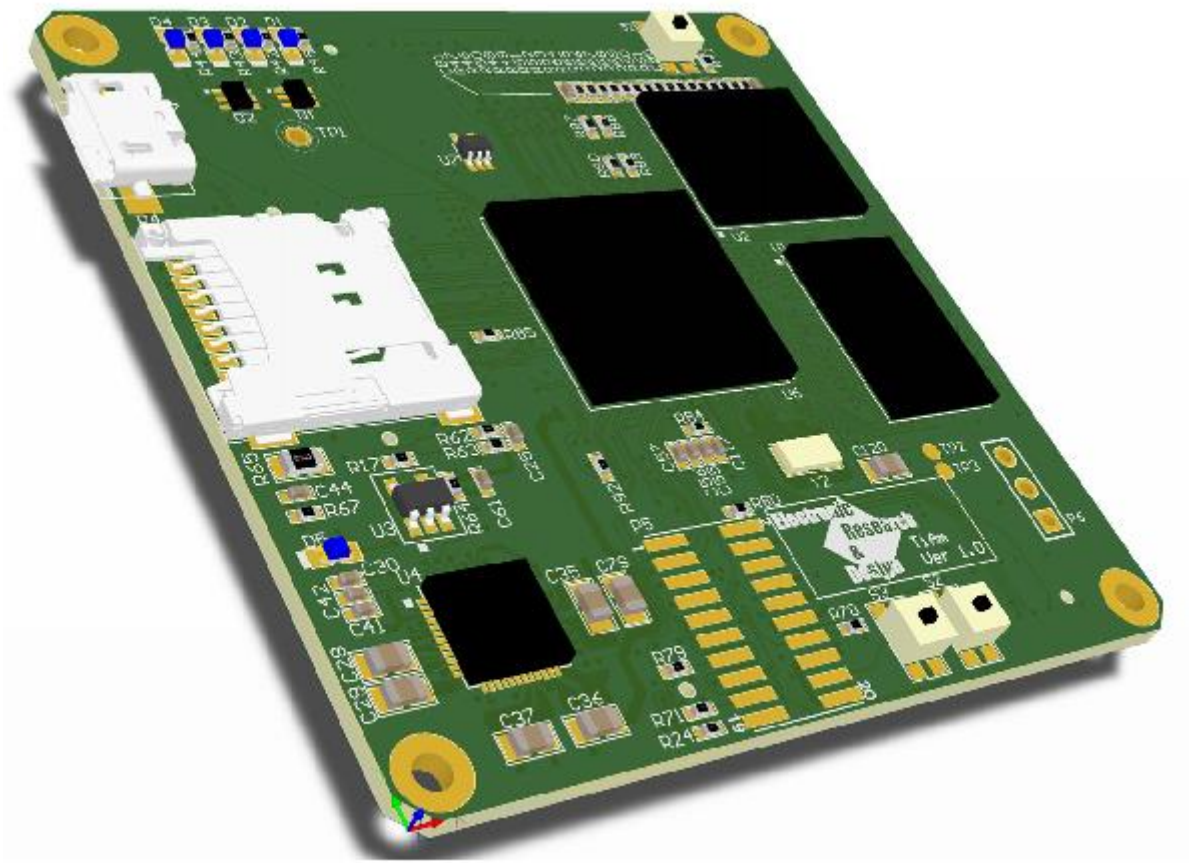(50 way 1.27mm Female)
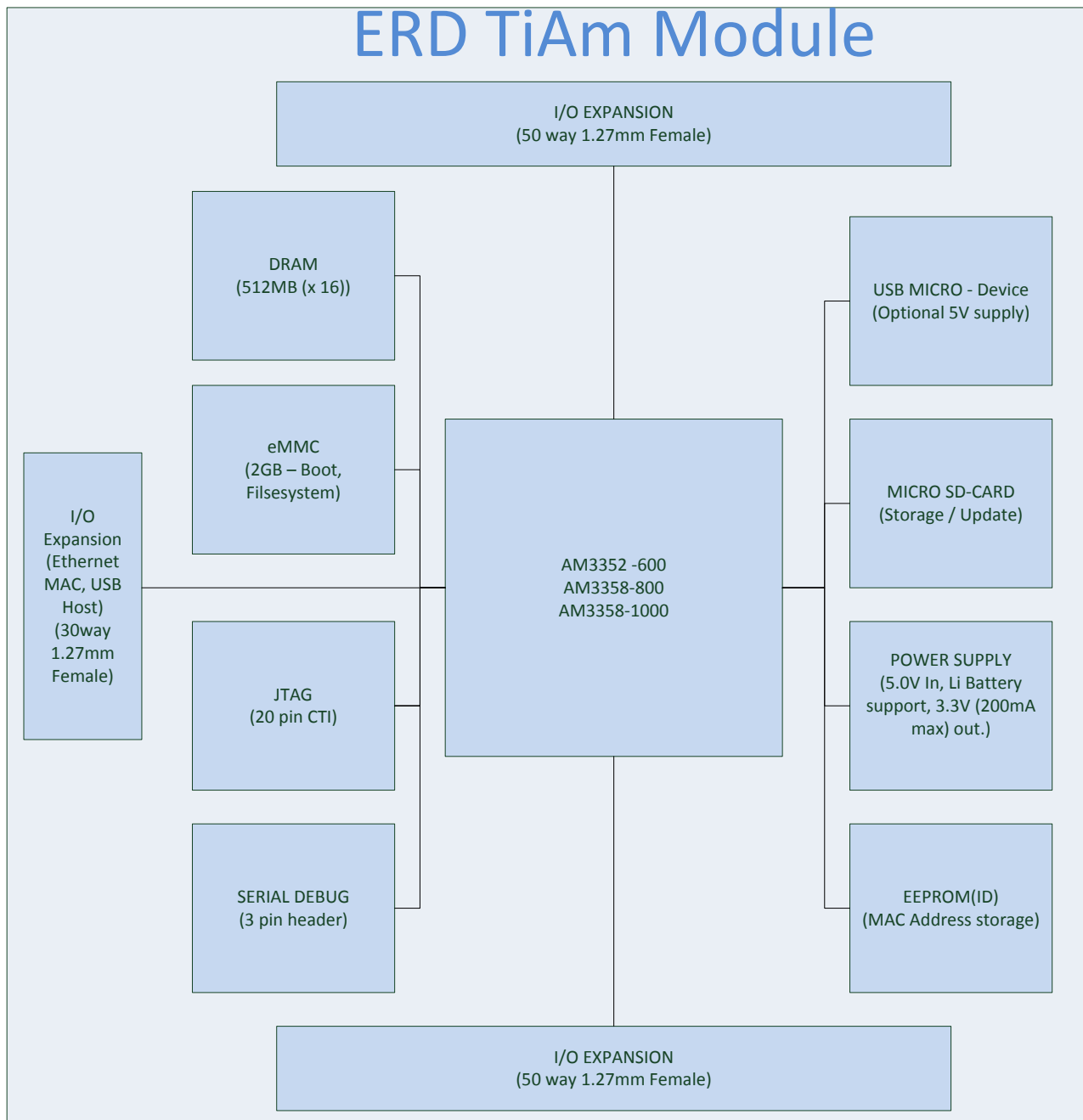
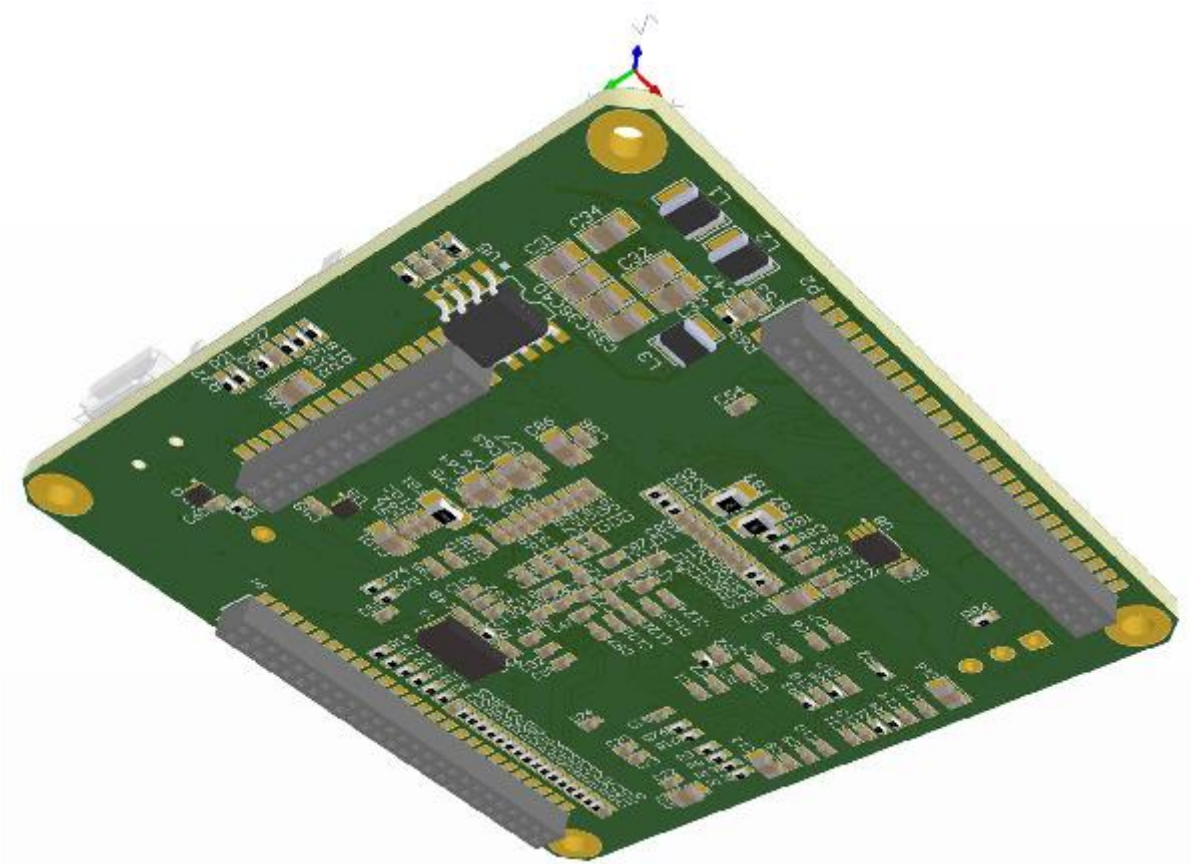**Block Diagram**

Figure 1- Top

Figure 2- Bottom

Features

- 55mm x 55mm, 1.6mm PCB
- 5V in (1A max) via USB or expansion connector.
- 3.3V out (200mA max) via expansion connector.
- 3 Processor choices :
  - AM3352 – 600MHz
  - AM3358 – 800MHz
  - AM3358 – 1GHz
- 512MB DDR3 DRAM(256MB DRAM for AM3352 – 600MHz)
- 2GB eMMC storage on-board (Used for boot, filesystem – no SD needed)
- JTAG - 20 pin CTI connector
- Serial debug header (Terminal output from Linux)
- USB Micro – Device port (High speed)
- Micro-SD card for storage
- EEPROM for parameter storage
- 3 Expansion connectors (1.27mm pitch)
  The I/O can be re-mapped on the processor for different functions – refer to the Data Sheet. The following shows the interface primary functions :
  - P1(50 way):
    - MMC interface (shared with on-board eMMC)
    - LCD interface (Can be used for HDMI interface – driver circuitry needed)
    - GPIO's
    - Timers, PWMs, Counters
  - P2 (50 way):
    - Power in (5V)
    - Battery interface (Li single cell supported)
    - 3.3V supply out (200mA max)
    - Power control
    - Reset
    - UARTS
    - I2C
    - SPI
    - Analog inputs
    - GPIO
    - Clock output
  - P3 (30 way):
    - Ethernet MII port
    - USB Host port
    - I2C
- Hardware configurable to run standard Beaglebone Software.

Connector pin definitions

1. Connector P1

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
1		3.3V I/O	3.3V out from module	3.3V		200mA max
2		3.3V I/O	3.3V out from module	3.3V		200mA max
3	R9	GPIO1_6	GPMC_AD6/MMC1_DAT6/GPIO1_6	3.3V	MMC1_DAT6	
4	T9	GPIO1_7	GPMC_AD7/MMC1_DAT7/GPIO1_7	3.3V	MMC1_DAT7	
5	R8	GPIO1_2	GPMC_AD2/MMC1_DAT2/GPIO1_2	3.3V	MMC1_DAT2	
6	T8	GPIO1_3	GPMC_AD3/MMC1_DAT3/GPIO1_3	3.3V	MMC1_DAT3	
7	R7	GPIO2_2	GPMC_ADVN_ALE/TIMER4/GPIO2_2	3.3V	TIMER4	
8	T7	GPIO2_3	GPMC_OEN_REN/TIMER7/EMU4/GPIO2_3	3.3V	TIMER7	
9	T6	GPIO2_5	GPMC_BE0N_CLE/TIMER5/GPIO2_5	3.3V	TIMER5	
10	U6	GPIO2_4	GPMC_WEN/TIMER6/GPIO2_4	3.3V	TIMER6	
11	R12	GPIO1_13	GPMC_AD13/LCD_DATA18/MMC1_DAT5/MMC2_DAT1/EQEP2B_IN /PR1_MII0_TXD1/PR1_PRU0_PRU_R30_15/GPIO1_13	3.3V	GPIO1_13	
12	T12	GPIO1_12	GPMC_AD12/LCD_DATA19/MMC1_DAT4/MMC2_DAT0/EQEP2A_IN /PR1_MII0_TXD2/PR1_PRU0_PRU_R30_14/GPIO1_12	3.3V	GPIO1_12	
13	T10	GPIO0_23	GPMC_AD9/LCD_DATA22/MMC1_DAT1/MMC2_DAT5/EHRPWM2B/ PR1_MII0_CRS//GPIO0_23	3.3V	EHRPWM2B	
14	T11	GPIO0_26	GPMC_AD10/LCD_DATA21/MMC1_DAT2/MMC2_DAT6 /EHRPWM2_TRIPZONE_INPUT/PR1_MII0_TXEN//GPIO0_26	3.3V	GPIO0_26	
15	U13	GPIO1_15	GPMC_AD15/LCD_DATA16/MMC1_DAT7/MMC2_DAT3 /EQEP2_STROBE/PR1_ECAP0_ECAP_CAPIN_APWM_O /PR1_PRU0_PRU_R31_15/GPIO1_15	3.3V	GPIO1_15	
16	V13	GPIO1_14	GPMC_AD14/LCD_DATA17/MMC1_DAT6/MMC2_DAT2 /EQEP2_INDEX/PR1_MII0_TXD0/PR1_PRU0_PRU_R31_14/GPIO1_14	3.3V	GPIO1_14	
17	U12	GPIO0_27	GPMC_AD11/LCD_DATA20/MMC1_DAT3/MMC2_DAT7 /EHRPWM2_SYNCI_O/PR1_MII0_TXD3//GPIO0_27	3.3V	GPIO0_27	
18	V12	GPIO2_1	GPMC_CLK/LCD_MEM_CLK/GPMC_WAIT1/MMC2_CLK/PRT1_MII1_TXEN /MCASP0_FSR/GPIO2_1	3.3V	GPIO2_1	
19	U10	GPIO0_22	GPMC_AD8/LCD_DATA23/MMC1_DAT0/MMC2_DAT4/EHRPWM2A /PR1_MII_MT0_CLK//GPIO0_22	3.3V	EHRPWM2A	
20	V9	GPIO1_31	GPMC_CSN2/GPMC_BE1N/MMC1_CMD/PR1_EDIO_DATA_IN7 /PR1_EDIO_DATA_OUT7/PR1_PRU1_PRU_R30_13/	3.3V	MMC1_CMD	

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
			PR1_PRU1_PRU_R31_13/GPIO1_31			
21	U9	GPIO1_30	GPMC_CSN1/GPMC_CLK/MMC1_CLK/PRT1EDIO_DATA_IN6/ PRT1_EDIO_DATA_OUT6/PR1_PRU1_PRU_R30_12/ PR1_PRU1_PRU_R31_12/GPIO1_30	3.3V	MMC1_CLK	
22	V8	GPIO1_5	GPMC_AD5/MMC1_DAT5/GPIO1_5	3.3V	MMC1_DAT5	
23	U8	GPIO1_4	GPMC_AD4/MMC1_DAT4/GPIO1_4	3.3V	MMC1_DAT4	
24	V7	GPIO1_1	GPMC_AD1/MMC1_DAT1/GPIO1_1	3.3V	MMC1_DAT1	
25	U7	GPIO1_0	GPMC_AD0/MMC1_DAT0/GPIO1_0	3.3V	MMC1_DAT0	
26	V6	GPIO1_29	GPMC_CSN0/GPIO1_29	3.3V	GPIO1_29	
27	U5	GPIO2_22	LCD_VSYNC/GPMC_A8//PR1_EDIO_DATA_IN2/PR1_EDIO_DATA_OUT2 /PR1_PRU1_PRU_R30_8/PR1_PRU1_PRU_R31_8/GPIO2_22	3.3V	LCD_VSYNC	
28	V5	GPIO2_24	LCD_PCLK/GPMC_A10//PR1_EDIO_DATA_IN4/PR1_EDIO_DATA_OUT4 /PR1_PRU1_PRU_R30_10/PR1_PRU1_PRU_R31_10/GPIO2_24	3.3V	LCD_PCLK	
29	R5	GPIO2_23	LCD_HSYNC/GPMC_A9//PR1_EDIO_DATA_IN3/PR1_EDIO_DATA_OUT3 /PR1_PRU1_PRU_R30_9/PR1_PRU1_PRU_R31_9/GPIO2_23	3.3V	LCD_HSYNC	
30	R6	GPIO2_25	LCD_AC_BIAS_EN/GPMC_A11//PR1_EDIO_DATA_IN5/PR1_EDIO_DATA_OUT5 /PR1_PRU1_PRU_R30_11/PR1_PRU1_PRU_R31_11/GPIO2_25	3.3V	LCD_DE	
31	V4	GPIO0_10	LCD_DATA14/GPMC_A18/EQEP1_INDEX/MCASP0_AXR1/UART5_RXD /PR1_MII_MR0_CLK/UART5_CTSN/GPIO0_10	3.3V	LCD_DATA14	
32	T5	GPIO0_11	LCD_DATA15/GPMC_A19/EQEP1_STROBE/MCASP0_AHCLKX /MCASP0_AXR3/PR1_MII0_RXDV/UART5_RTSN/GPIO0_11	3.3V	LCD_DATA15	
33	V3	GPI00_9	LCD_DATA13/GPMC_A17/EQEP1B_IN/MCASP0_FSR/MCASP0_AXR3 /PR1_MII0_RXER/UART4_RTSN/GPIO0_9	3.3V	LCD_DATA13	
34	U4	GPIO2_17	LCD_DATA11/GPMC_A15/EHRPWM1B/MCASP0_AHCLKR/MCASP0_AXR2 /PR1_MII0_RXD0/UART3_RTSN/GPIO2_17	3.3V	LCD_DATA11	
35	V2	GPIO0_8	LCD_DATA12/GPMC_A16/EQEP1A_IN/MCASP0_ACLKR/MCASP0_AXR2 /PR1_MII0_RXLINK/UART4_CTSN/GPIO0_8	3.3V	LCD_DATA12	
36	U3	GPIO2_16	LCD_DATA10/GPMC_A14/EHRPWM1A/MCASP0_AXR0//PR1_MII0_RXD1 /UART3_CTSN/GPIO2_16	3.3V	LCD_DATA10	
37	U1	GPIO2_14	LCD_DATA8/GPMC_A12/EHRPWM1_TRIPZONE_INPUT/MCASP0_ACLKX /UART5_TXD/PR1_MII0_RXD3/UART2_CTSN/GPIO2_14	3.3V	LCD_DATA8	
38	U2	GPIO2_15	LCD_DATA9/GPMC_A13/EHRPWM1_SYNCI_O/MCASP0_FSX/UART5_RXD /PR1_MII0_RXD2/UART2_RTSN/GPIO2_15	3.3V	LCD_DATA9	
39	T3	GPIO2_12	LCD_DATA6/GPMC_A6/PR1_EDIO_DATA_IN6/EQEP2_INDEX /PR1_EDIO_DATA_OUT6/PR1_PRU1_PRU_R30_6 /PR1_PRU1_PRU_R31_6/GPIO2_12	3.3V	LCD_DATA6	
40	T4	GPIO2_13	LCD_DATA7/GPMC_A7/PR1_EDIO_DATA_IN7/EQEP2_STROBE /PR1_EDIO_DATA_OUT7/PR1_PRU1_PRU_R30_7 /PR1_PRU1_PRU_R31_7/GPIO2_13	3.3V	LCD_DATA7	

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
41	T1	GPIO2_10	LCD_DATA4/GPMC_A4//EQEP2A_IN//PR1_PRU1_PRU_R30_4 /PR1_PRU1_PRU_R31_4/GPIO2_10	3.3V	LCD_DATA4	
42	T2	GPIO2_11	LCD_DATA5/GPMC_A5//EQEP2B_IN//PR1_PRU1_PRU_R30_5 /PR1_PRU1_PRU_R31_5/GPIO2_11	3.3V	LCD_DATA5	
43	R3	GPIO2_8	LCD_DATA2/GPMC_A2//EHRPWM2_TRIPZONE_INPUT /PR1_PRU1_PRU_R30_2/PR1_PRU1_PRU_R31_2/GPIO2_8	3.3V	LCD_DATA2	
44	R4	GPIO2_9	LCD_DATA3/GPMC_A3//EHRPWM2_SYNCI_O /PR1_PRU1_PRU_R30_3/PR1_PRU1_PRU_R31_3/GPIO2_9	3.3V	LCD_DATA3	
45	R1	GPIO2_6	LCD_DATA0/GPMC_A0//EHRPWM2A//PR1_PRU1_PRU_R30_0 /PR1_PRU1_PRU_R31_0/GPIO2_6	3.3V	LCD_DATA0	
46	R2	GPIO2_7	LCD_DATA1/GPMC_A1//EHRPWM2B//PR1_PRU1_PRU_R30_1 /PR1_PRU1_PRU_R31_1/GPIO2_7	3.3V	LCD_DATA1	
47	V17	GPIO1_27	GPMC_A11/GMII2_RXD0/RGMII2_RD0/RMII2_RXD0/GPMC_A27 /PR1_MII1_RXER/MCASP0_AXR1/GPIO1_27	3.3V	HDMICLK_DISn	
48	U16	GPIO1_25	GPMC_A9/GMII2_RXD2/RGMII2_RD2/MMC2_DAT7/GPMC_A25 /PR1_MII_MR1_CLK/MCASP0_FSX/GPIO1_25	3.3V	HDMI_INT	
49		DGND				Digital Ground
50		DGND				Digital Ground

2. Connector P2

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
1		BAT_SENSE	Single Cell Li-ion	4.2V		Battery Voltage Sense
2		VBAT	Single Cell Li-ion	4.2V		Battery Voltage Connection
3		BAT_TEMPSENSE	Single Cell Li-ion	10k		Battery Temperature sense
4		VBAT	Single Cell Li-ion	4.2V		Battery Voltage Connection
5		5V_IN	5.0V Input	5.0V		Up to 1A
6		5V_IN	5.0V Input	5.0V		Up to 1A
7		DGND				Digital Ground
8		DGND				Digital Ground
9		3.3V I/O	3.3V out from module	3.3V		200mA max
10		3.3V I/O	3.3V out from module	3.3V		200mA max
11		WP		3.3V		WP of EEPROM, pull to GND to enable writing
12	A15	GPIO0_19	EVENT_INTR0/TIMER4/CLKOUT1/SPI1_CS1/PR1PRU1R31_16 /EMU2/GPIO0_19		CLKOUT1	
13		SYS_5V				Output from Power Management IC
14		SYS_5V				Output from Power Management IC
15		PWR_BUT			PWR_BUT	Switch on/off
16		SYS_RESETn			SYS_RESETn	System reset signal(Active low)
17	T17	GPIO0_30	GPMC_WAIT0/GM112_CRS/GPMC_CSN4/RMII2_CRS_DV/MMC1_SDCD /PR1_MII1_RXDV/UART4_RXD/GPIO0_30	3.3V	UART4_RXD	
18	U18	GPIO1_28	GPMC_BE1N/GMII2_COL/GPMC_CSN6/MMC2_DAT3/GPMC_DIR /PR1_MII1_RXLINK/MCASP0_ACLKR/GPIO1_28	3.3V	GPIO1_28	
19	U17	GPIO0_31	GPMC_WPN/GMII2_RXERR/GPMC_CSN5/RMII2_RXERR/MMC2_SDCD /PR1_MDIO_MDCLK/UART4_TXD/GPIO0_31	3.3V	UART4_TXD	
20	U14	GPIO1_18	GPMC_A2/GMII2_TXD3/RGMII2_TD3/MMC2_DAT1/GPMC_A18 /PR1_MII1_TXD2/EHRPWM1A/GPIO1_18	3.3V	EHRPWM1A	
21	R13	GPIO1_16	GPMC_A0/GMII2_TXEN/RGMII2_TCTL/RMII2_TXEN/GPMC_A16 /PR1_MII_MT1_CLK/EHRPWM1_TRIPZONE_INPUT/GPIO1_16	3.3V	GPIO1_16	Coupled to GPIO2_0(T13) via 0R
22	T14	GPIO1_19	GPMC_A3/GMII2_TXD2/RGMII2_TD2/MMC2_DAT2/GPMC_A19	3.3V	EHRPWM1B	

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
			/PR1_MII1_TXD1/EHRPWM1B/GPIO1_19			
23	A16	GPIO0_5	SPI0_CS0/MMC2_SDWP/I2C1_SCL/EHRPWM0_SYNCI_O/PR1_UART0_TXD /PR1_EDIO_DATA_IN1/PR1_EDIO_DATA_OUT1/GPIO0_5	3.3V	I2C1_SCL	
24	B16	GPIO0_4	SPI0_D1/MMC1_SDWP/I2C1_SDA/EHRPWM0_TRIPZONE_INPUT /PR1_UART0_RXD/PR1_EDIO_DATA_IN0/PR1_EDIO_DATA_OUT0/GPIO0_4	3.3V	I2C1_SDA	
25	D17	GPIO0_13	UART1_RTSN/TIMER5/DCAN0_RX/I2C2_SCL/SPI1_CS1 /PR1_UART0_RTS_N/PR1_EDC_LATCH1_IN/GPIO0_13	3.3V	I2C2_SCL	
26	D18	GPIO0_12	UART1_CTSN/TIMER6/DCAN0_TX/I2C2_SDA/SPI1_CS0 /PR1_UART0_CTS_N/PR1_EDC_LATCH0_IN/GPIO0_12	3.3V	I2C2_SDA	
27	B17	GPIO0_3	SPI0_D0/UART2_TXD/I2C2_SCL/EHRPWM0B/PR1_UART0_RTS_N /PR1_EDIO_LATCH_IN/EMU3/GPIO0_3	3.3V	UART2_TXD	
28	A17	GPIO0_2	SPI0_SCLK/UART2_RXD/I2C2_SDA/EHRPWM0A/PR1_UART0_CTS_N /PR1_EDIO_SOF/EMU2/GPIO0_2	3.3V	UART2_RXD	
29	V14	GPIO1_17	GPMC_A1/GMII2_RXDV/RGMII2_RCTL/MMC2_DAT0/GPMC_A17 /PR1_MII1_TXD3/EHRPWM1_SYNCI_O/GPIO1_17	3.3V	GPIO1_17	
30	D15	GPIO0_15	UART1_TXD/MMC2_SDWP/DCAN1_RX/I2C1_SCL//PR1_UART0_TXD /PR1_PRU0_PRU_R31_16/GPIO0_15	3.3V	UART1_TXD	
31	A14	GPIO3_21	MCASP0_AHCLKX/EQEP0_STROBE/MCASP0_AXR3/MCASP1_AXR1/EMU4 /PR1_PRU0_PRU_R30_7/PR1_PRU0_PRU_R31_7/GPIO3_21	3.3V	GPIO3_21	
32	D16	GPIO0_14	UART1_RXD/MMC1_SDWP/DCAN1_TX/I2C1_SDA//PR1_UART0_RXD /PR1_PRU1_PRU_R31_16/GPIO0_14	3.3V	UART1_RXD	
33	C13	GPIO3_19	MCASP0_FSR/EQEP0B_IN/MCASP0_AXR3/MCASP1_FSX/EMU2 /PR1_PRU0_PRU_R30_5/PR1_PRU0_PRU_R31_5/GPIO3_19	3.3V	GPIO3_19	
34	C12	GPIO3_17	MCASP0_AHCLKR/EHRPWM0_SYNCI_O/MCASP0_AXR2/SPI1_CS0/ECAP2_ IN_PWM2_OUT/PR1_PRU0_PRU_R30_3/PR1_PRU0_PRU_R31_3/GPIO3_17	3.3V	SPI1_CS0	
35	B13	GPIO3_15	MCASP0_FSX/EHRPWM0B//SPI1_D0/MMC1_SDCD/PR1_PRU0_PRU_R30_ 1 /PR1_PRU0_PRU_R31_1/GPIO3_15	3.3V	SPI1_D0	
36	D12	GPIO3_16	MCASP0_AXR0/EHRPWM0_TRIPZONE_INPUT//SPI1_D1/MMC2_SDCD /PR1_PRU0_PRU_R30_2/PR1_PRU0_PRU_R31_2/GPIO3_16	3.3V	SPI1_D1	
37	A13	GPIO3_14	MCASP0_ACLKX/EHRPWM0A//SPI1_SCLK/MMC0_SDCD/PR1_PRU0_PRU_R30_0 /PR1_PRU0_PRU_R31_0/GPIO3_14	3.3V	SPI1_SCLK	
38		VDD_ADC		1.8V	VDD_ADC	Analogue Rail – (50mA Max)
39		AIN4		1.8V	AIN4	
40		AGND			AGND	Analogue ground
41		AIN6		1.8V	AIN6	
42		AIN5		1.8V	AIN5	

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
43		AIN2		1.8V	AIN2	
44		AIN3		1.8V	AIN3	
45		AIN0		1.8V	AIN0	
46		AIN1		1.8V	AIN1	
47	D14	GPIO0_20	EVENT_INTR1/TCLKIN/CLKOUT2/TIMER7/PR1PRU0_PRUR31_16 /EMU3/GPIO0_20		CLKOUT2	Coupled to GPIO3_20 via 0R
48	C18	GPIO0_7	ECAP0_IN_PWM0_OUT/UART3_TXD/SPI1_CS1/PR1_ECAP0_ECAP_ CAPIN_APWM_O/SPI1_SCLK/MMC0_SDWP/XDMA_EVENT_INTR2/GPIO0 _7		GPIO0_7	Coupled to GPIO3_18 via 0R
49		DGND				Digital Ground
50		DGND				Digital Ground

3. Connector P3

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
1		3.3V I/O	3.3V out from module	3.3V		200mA max
2		3.3V I/O	3.3V out from module	3.3V		200mA max
3	J15	GPIO3_2	GMII1_RXERR/RMII1_RXERR/SPI1_D1/I2C1_SCL/MCASP1_FSX /UART5_RTSN/UART2_TXD/GPIO3_2	3.3V	MII1_RXERR	
4	H16	GPIO3_0	GMII1_COL/RMII2_REFCLK/SPI1_SCLK/UART5_RXD/MCASP1_AXR2 /MMC2_DAT3/MCASP0_AXR2/GPIO3_0	3.3V	MII1_COL	
5	L16	GPIO2_19	GMII1_RXD2/UART3_TXD/RGMII1_RD2/MMC0_DAT4/MMC1_DAT3 /UART1_RIN/MCASP0_AXR1/GPIO2_19	3.3V	MII1_RXD2	
6	J18	GPIO0_16	GMII1_TXD3/DCAN0_TX/RGMII1_TD3/UART4_RXD/MCASP1_FSX /MMC2_DAT1/MCASP0_FSR/GPIO0_16	3.3V	MII1_TXD3	
7	J17	GPIO3_4	GMII1_RXDV/LCD_MEMORY_CLK/RGMII1_RCTL/UART5_TXD /MCASP1_ACLKX/MMC2_DAT0/MCASP0_ACLKR/GPIO3_4	3.3V	MII1_RXDV	
8	J16	GPIO3_3	GMII1_TXEN/RMII1_TXEN/RGMII1_TCTL/TIMER4/MCASP1_AXR0 /EQEP0_INDEX/MMC2_CMD/GPIO3_3	3.3V	MII1_TXEN	
9	H18	GPIO0_29	RMII1_REFCLK/XDMA_EVENT_INTR2/SPI1_CS0/UART5_TXD/MCASP1_AXR3 /MMC0_POW/MCASP1_AHCLKX/GPIO0_29	3.3V	MII1_REFCLK	
10	H17	GPIO3_1	GMII1_CRS/RMII1_CRS_DV/SPI1_D0/I2C1_SDA/MCASP1_ACLKX /UART5_CTSN/UART2_RXD/GPIO3_1	3.3V	MII1_CRS_DV	
11	L15	GPIO2_20	GMII1_RXD1/RMII1_RXD1/RGMII1_RD1/MCASP1_AXR3/MCASP1_FSR /EQEP0_STROBE/MMC2_CLK/GPIO2_20	3.3V	MII1_RXD1	
12	K17	GPIO0_28	GMII1_TXD0/RMII1_TXD0/RGMII1_TD0/MCASP1_AXR2/MCASP1_ACLKR /EQEP0B_IN/MMC1_CLK/GPIO0_28	3.3V	MII1_TXD0	
13	L17	GPIO2_18	GMII1_RXD3/UART3_RXD/RGMII1_RD3/MMC0_DAT5/MMC1_DAT2 /UART1_DTRN/MCASP0_AXR0/GPIO2_18	3.3V	MII1_RXD3	
14	K18	GPIO3_9	GMII1_TXCLK/UART2_RXD/RGMII1_TCLK/MMC0_DAT7/MMC1_DAT0 /UART1_DCDN/MCASP0_ACLKX/GPIO3_9	3.3V	MII1_TXCLK	
15	L18	GPIO3_10	GMII1_RXCLK/UART2_TXD/RGMII1_RCLK/MMC0_DAT6/MMC1_DAT1 /UART1_DSRN/MCASP0_FSX/GPIO3_10	3.3V	MII1_RXCLK	
16	K16	GPIO0_21	GMII1_TXD1/RMII1_TXD1/RGMII1_TD1/MCASP1_FSR/MCASP1_AXR1 /EQEP0A_IN/MMC1_CMD/GPIO0_21	3.3V	MII1_TXD1	
17	M16	GPIO2_21	GMII1_RXD0/RMII1_RXD0/RGMII1_RD0/MCASP1_AHCLKX/MCASP1_AHCLKR /MCASP1_ACLKR/MCASP0_AXR3/GPIO2_21	3.3V	MII1_RXD0	
18	K15	GPIO0_17	GMII1_TXD2/DCAN0_RX/RGMII1_TD2/UART4_TXD/MCASP1_AXR0 /MMC2_DAT2/MCASP0_AHCLKX/GPIO0_17	3.3V	MII1_TXD2	
19	M17	GPIO0_0	MDIO_DATA/TIMER6/UART5_RXD/UART3_CTSN/MMC0_SDCD /MMC1_CMD/MMC2_CMD/GPIO0_0	3.3V	MDIO_DATA	

Conn Pin	Proc Pin	Name	Alternative functions	Voltage	BBB Function	Notes
20	C17	GPIO3_5	I2C0_SDA/TIMER4/UART2_CTSN/ECAP2_IN_PWM2_OUT/GPIO3_5	3.3V	I2C0_SDA	
21	M18	GPIO0_1	MDIO_CLK/TIMER5/UART5_TXD/UART3_RTSN/MMC0_SDWP /MMC1_CLK/MMC2_CLK/GPIO0_1	3.3V	MDIO_CLK	
22	C16	GPIO3_6	I2C0_SCL/TIMER7/UART2_RTSN/ECAP1_IN_PWM1_OUT/GPIO3_6	3.3V	I2C0_SCL	
23	F15	GPIO3_13	USB1_DRVVBUS/GPIO3_13	3.3V	USB1_DRVVBUS	
24	P17	USB1_ID		3.3V	USB1_ID	
25	R17	USB1_D_P		3.3V	USB1_D_P	
26	T18	USB1_VBUS		3.3V	USB1_VBUS	
27	R18	USB1_D_N		3.3V	USB1_D_N	
28	T16	GPIO1_26	GPMC_A10/GMII2_RXD1/RGMII2_RD1/RMII2_RXD1/GPMC_A26 /PR1_MII1_CRS/MCASP0_AXR0/GPIO1_26	3.3V	USB1_OCn	
29		DGND				Digital Ground
30		DGND				Digital Ground

4. Board definitions

Label	
1.SD Boot Button	
7. LED 4	
8. LED 3	
9. LED 2	
10. LED1	
2.Terminal TxD	
3. Terminal RxD	
4. Terminal GND	
5. USR Button	
6. Reset Button	
11. Power LED	
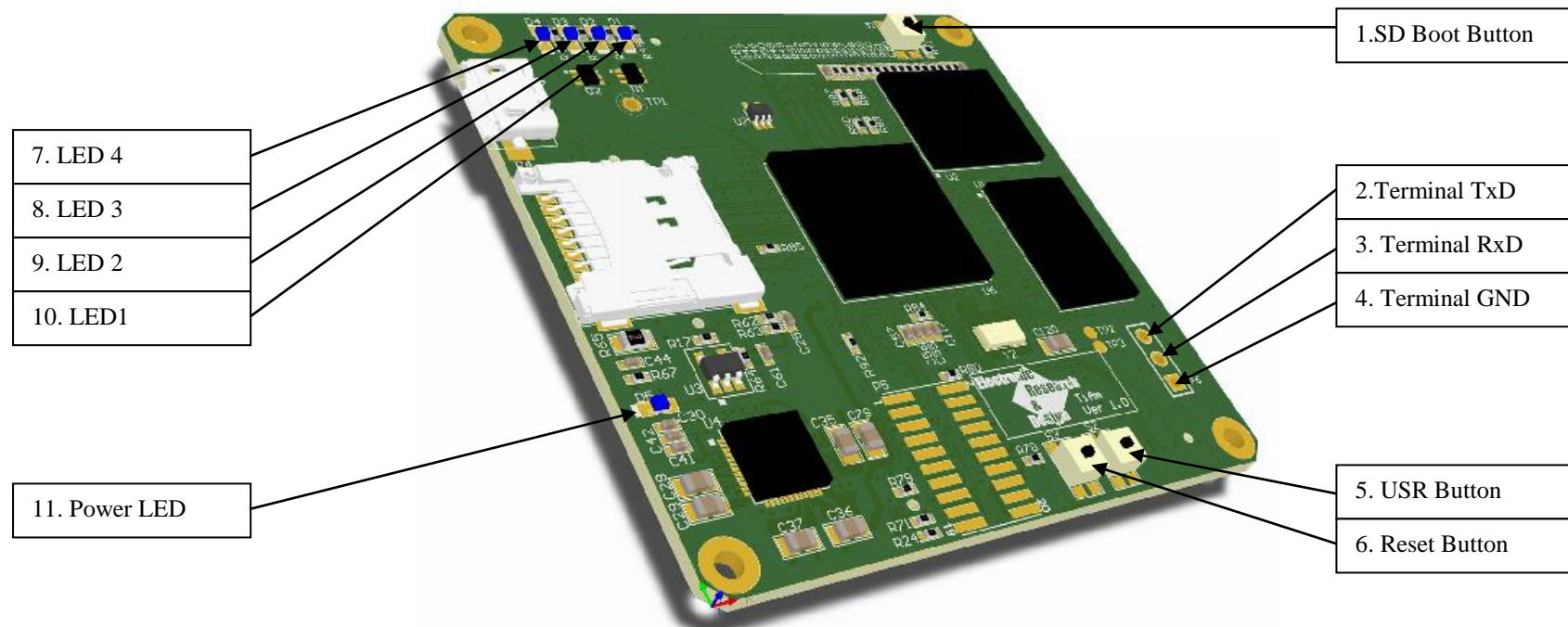
i.   SD Boot Button

Keep button in during power-up to force boot from SD.

ii.   Terminal TxD

Connect to **3.3V** level RxD on suitable serial cable.

iii.   Terminal RxD

Connect to **3.3V** level TxD on suitable serial cable.

iv.   Terminal GND

Connect to GROUND on suitable serial Cable.

v.   USR Button

Used by some distributions to shut down Linux.

vi.   Reset Button

Press button to force a hardware reset.

vii.   LED 4

Configured to light during eMMC accesses.

viii.   LED 3

Configured to light during CPU activity.

ix.   LED2

Configured to light during microSD card accesses.

x.   LED 1

Configured to blink in a heartbeat pattern.

xi.   Power LED

Indicates power supply active.

5. Software resources.

The ERD TiAm hardware is compatible to the BeagleBone Black except for not having the following on-board:
  i.   HDMI – A NXP interface IC () is needed to convert the LCD outputs to HDMI.
  ii. Host USB (Second port) connection and USB output power control.
  iii. Ethernet – A PHY () is necessary to connect to the MII signals from the processor to the Ethernet magnetics and connector.

All signals to achieve the above are available on the expansion connectors. An example baseboard is available on request with full schematics and PCB layout in Altium format.

To connect your ERD TiAm to a Windows host please download and install the following drivers from the official BeagleBone Black site :

For Windows 64 bit :
http://beagleboard.org/static/Drivers/Windows/BONE_D64.exe

For Windows 32 bit:
http://beagleboard.org/static/Drivers/Windows/BONE_DRV.exe

It should connect by default to a Linux host without any driver software.

You can then connect to your board via USB:
http://192.168.7.2/

This document will be available for download there.

The following is a list of resources to assist in customizing the platform to your requirements:

a. Host setup (Done on Ubuntu 14.04 LTS) for building the mainline Linux kernel

http://eewiki.net/display/linuxonarm/BeagleBone+Black

Get the latest versions and recipes from the above link!

To build the Kernel (in ~/bb-kernel):
./build_kernel.sh

To rebuild the Kernel (in ~/bb-kernel):
tools/rebuild.sh

After a kernel rebuild (with the board connected via USB) remember to export the kernel version (last line of build result)
sudo sh -c ''echo 'uname_r=${kernel_version}' > /media/user/rootfs/boot/uEnv.txt''
sudo cp -v ./bb-kernel/deploy/${kernel_version}.zImage /media/user/rootfs/boot/vmlinuz-${kernel_version}
sudo mkdir -p /media/user/rootfs/boot/dtbs/${kernel_version}/
sudo tar xfv ./bb-kernel/deploy/${kernel_version}-dtbs.tar.gz -C /media/user/rootfs/boot/dtbs/${kernel_version}/
sudo tar xfv ./bb-kernel/deploy/${kernel_version}-modules.tar.gz -C /media/user/rootfs/

b. Setup Host for gateway to internet from device via USB.
On the Host (USB Ether internet access):
sudo iptables --table nat --append POSTROUTING --out-interface eth0 -j MASQUERADE
sudo iptables --append FORWARD --in-interface eth1 -j ACCEPT
sudo su
sudo echo 1 > /proc/sys/net/ipv4/ip_forward
exit

sudo apt-get install iptables-persistent

(This should take the current rules and make them persistent (If you selected 'yes'....)

Edit :
sudo gedit /etc/sysctl.conf
Uncomment (remove #) from the line:
#net.ipv4.ip_forward=1

On Device - update :
sudo apt-get update

Now you can install software…

c. Install Eclipse and remote debugging for the device:
   Set up Eclipse :
   http://www.michaelhleonard.com/cross-compile-for-beaglebone-black/

   (Only difference is use of cross-compile tools installed in host setup above)

   On device (enable user root with password root):
   sudo passwd root
   root
   root

   Change the following :
   sudo nano /etc/ssh/sshd_config
   #PermitRootLogin without-password
   PermitRootLogin yes

   Then restart service :
   service ssh restart

Install gdbserver (device):
sudo apt-get install gdbserver

d. Pin configuration
Check pin configuration on device:
cat /sys/kernel/debug/pinctrl/44e10800.pinmux/pingroups

e. Custom pin configuration
On the Host:
cd bb-kernel/KERNEL/arch/arm/boot/dts/

Start in the text file "am335x-boneblack.dts"
gedit am335x-boneblack.dts

All the pre-defined peripheral/pin configurations are included from this file.

For the ERD TiAm please remove the line by commenting it out (/*..*/):
#include "am335x-boneblack-nxp-hdmi-no-audio.dtsi"
This is necessary as the TiAm board does not have HDMI on the core board. It can be added on the customer's base-board.