

# ESM-A50M

AMD eOntario COM Express Type 6 Module with AMD A50M Chipset

## Quick Installation Guide

1<sup>st</sup> Ed –12 March 2012

### Notice

This guide is designed for experienced users to perform quick setup of the system. For detailed information, please always refer to the electronic user's manual.

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Part No. E2017254900R

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# 1. Getting Started

## 1.1 Safety Precautions

### Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

### Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

## 1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x ESM-A50M AMD COM Express Type 6 CPU module with AMD A50M chipset.
- 1 x Quick Installation Guide
- 1 x DVD-ROM contains the followings:
  - User's Manual
  - Chipset and Ethernet drivers



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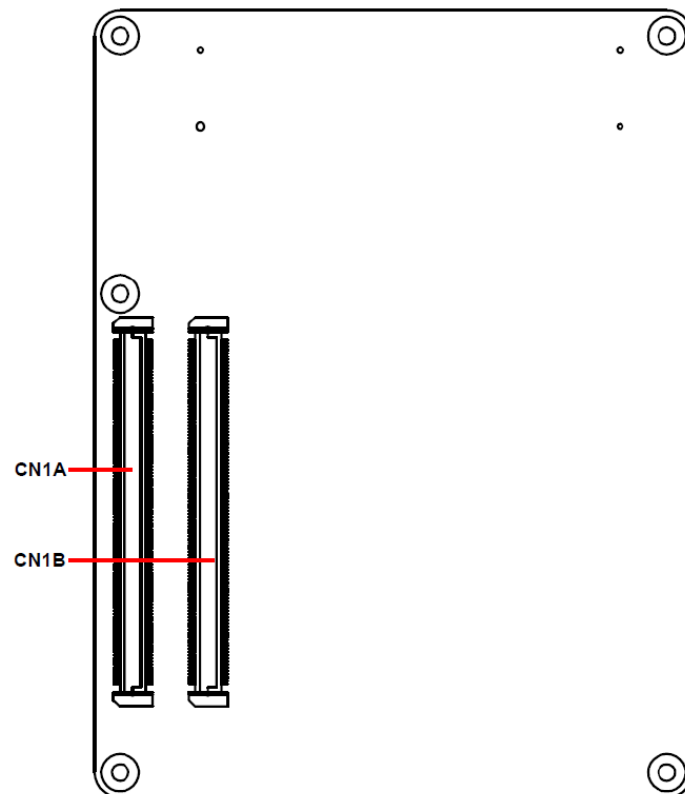
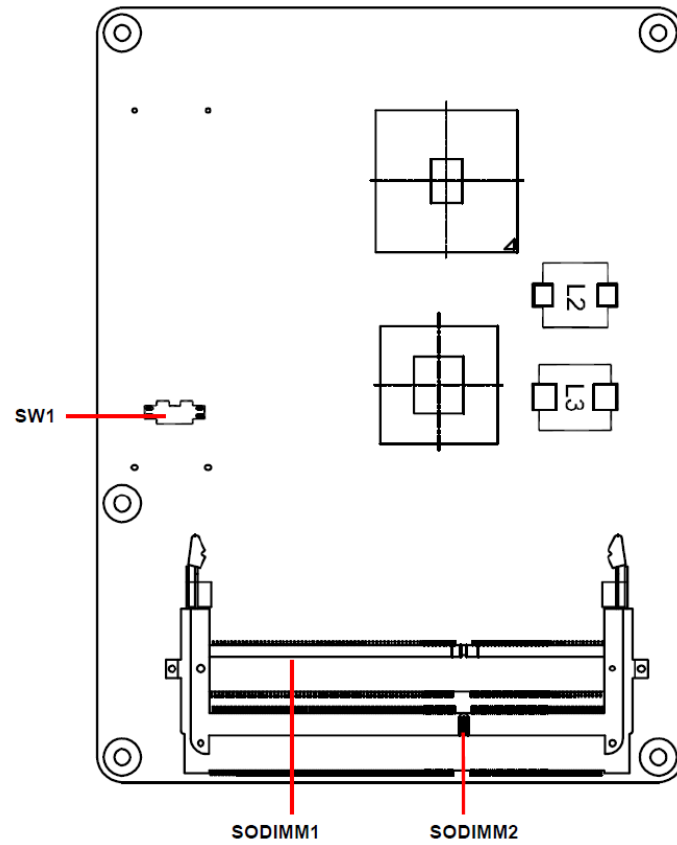
If any of the above items is damaged or missing, contact your retailer.

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# 2. Hardware Configuration

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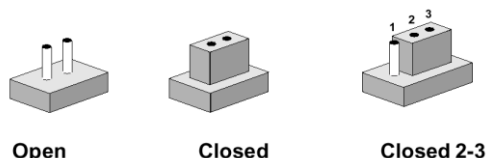
## 2.1 Product Overview



## 2.2 Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



The jumper settings are schematically depicted in this manual as follows:



A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

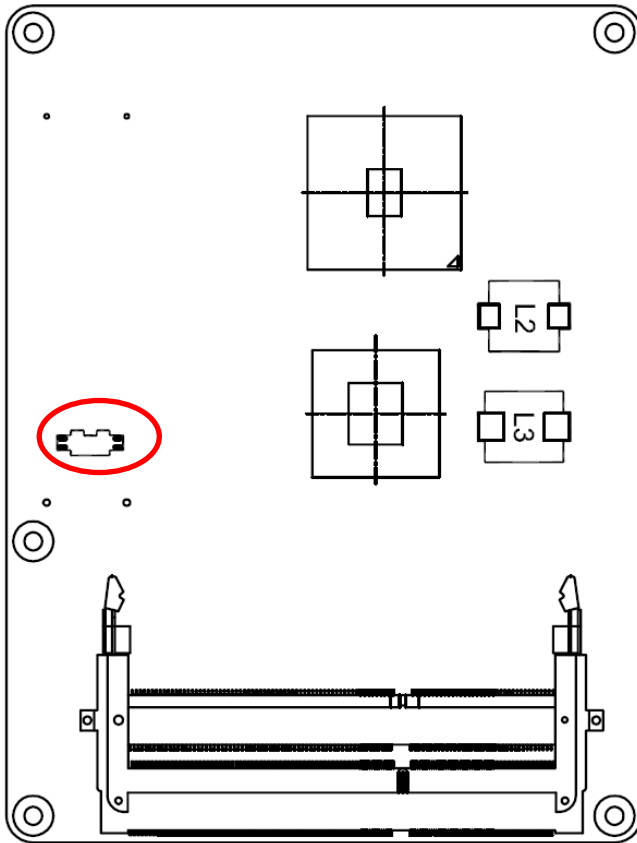
The following tables list the function of each of the board’s jumpers and connectors.

### Connectors

Label	Function	Note
CN1A	COM Express connector 1	
CN1B	COM Express connector 2	
SODIMM1	204-pin DDR3 SDRAM DIMM socket	
SODIMM2	204-pin DDR3 SDRAM DIMM socket	
SW1	AT/ATX mode selector	

## 2.3 Setting Jumpers & Connectors

### 2.3.1 AT/ATX mode selector (SW1)

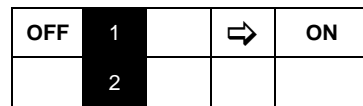


\*Default

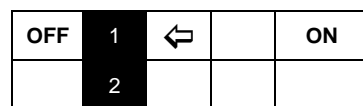
AT/ATX mode



AT mode



ATX mode\*

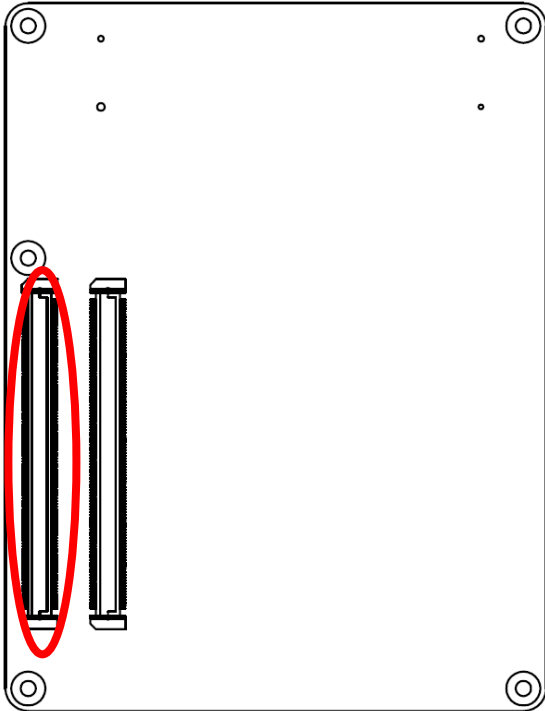


#### 2.3.1.1 Signal Description –AT/ATX mode selection

AT/ATX mode	Description
<p>AT mode</p>	This Mode supports AT power supply, no need to press Power button to enable power on/off
<p>ATX mode</p>	This Mode supports ATX power supply. Press the ATX power button to enable power on/off

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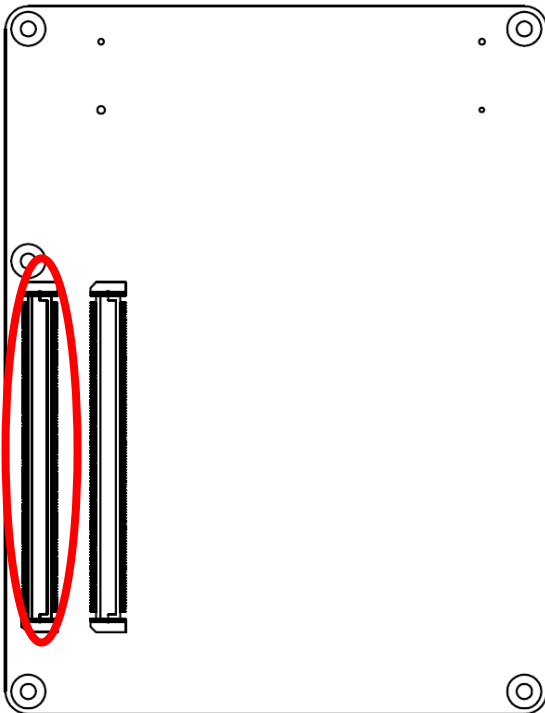
### 2.3.2 COM Express Connector 1 (CN1A)



Signal	PIN	PIN	Signal
GND	A1	B1	GND
GBE0_MDI3-	A2	B2	GBE0_ACT#
GBE0_MDI3+	A3	B3	LPC_FRAME#
GBE0_LINK100#	A4	B4	LPC_AD0
GBE0_LINK1000#	A5	B5	LPC_AD1
GBE0_MDI2-	A6	B6	LPC_AD2
GBE0_MDI2+	A7	B7	LPC_AD3
GBE0_LINK#	A8	B8	LPC_DRQ0#
GBE0_MDI1-	A9	B9	LPC_DRQ1#
GBE0_MDI1+	A10	B10	CLK_LPC_33M
GND	A11	B11	GND
GBE0_MDI0-	A12	B12	PWRBTN#
GBE0_MDI0+	A13	B13	SMB_CLK
GBE0_1.5V	A14	B14	SMB_DATA
SLP_S3#	A15	B15	LINKALERT#
SATAP0_TXP	A16	B16	SATAP1_TXP
SATAP0_TXN	A17	B17	SATAP1_TXN
SUS_S4#	A18	B18	PM_SUS_SATA#
SATAP0_RXP	A19	B19	SATAP1_RXP
SATAP0_RXN	A20	B20	SATAP1_RXN
GND	A21	B21	GND
SATAP2_TXP	A22	B22	SATAP3_TXP
SATAP2_TXN	A23	B23	SATAP3_TXN
SUS_S5#	A24	B24	POWER_OK
SATAP2_RXP	A25	B25	SATAP3_PXP
SATAP2_RXN	A26	B26	SATAP3_PXN
PM_BATLOW#	A27	B27	WDT
SATA_LED#	A28	B28	AC/HDA_SDIN2
AC/HDA_SYNC	A29	B29	AC/HDA_SDIN1
AC/HDA_RST#	A30	B30	AC/HDA_SDIN0

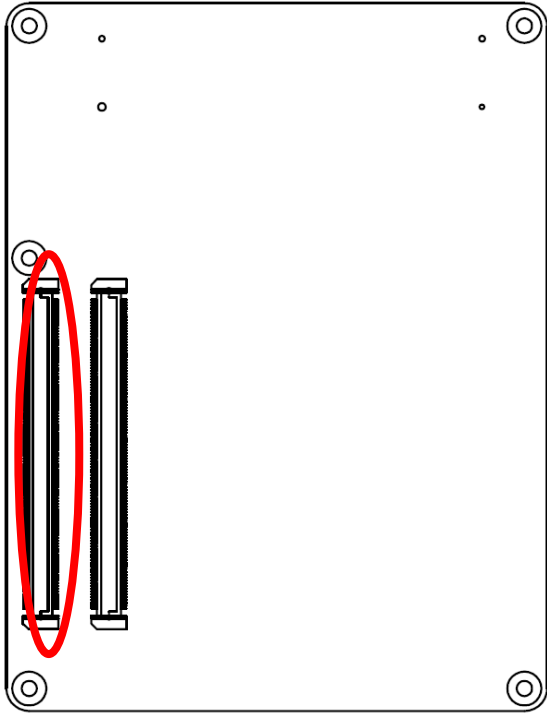


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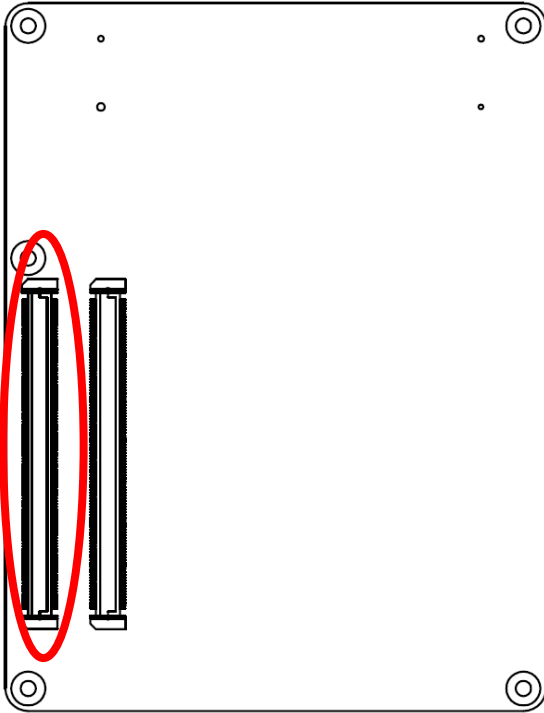
Signal	PIN	PIN	Signal
GND	A31	B31	GND
AC/HDA_BIT_CLK	A32	B32	AC/HDA_SPKR
AC/HDA_SDOUT	A33	B33	I2C_CLK
BIOS_DIS0#	A34	B34	I2C_DAT
THRMTRIP#	A35	B35	THRM#
USB_PN6	A36	B36	USB_PN7
USB_PP6	A37	B37	USB_PP7
USB_OC67#	A38	B38	USB_OC45#
USB_PN4	A39	B39	USB_PN5
USB_PP4	A40	B40	USB_PP5
GND	A41	B41	GND
USB_PN2	A42	B42	USB_PN3
USB_PP2	A43	B43	USB_PP3
USB_OC23#	A44	B44	USB_OC01#
USB_PN0	A45	B45	USB_PN1
USB_PP0	A46	B46	USB_PP1
RTC_VCC	A47	B47	EXCD1_PERST#
EXCD0_PERST#	A48	B48	EXCD1_CPPE#
EXCD0_CPPE#	A49	B49	SYSRST#
LPC_SERIRQ	A50	B50	CB_PLTRST#
GND	A51	B51	GND
PCIE5_TX+	A52	B52	PCIE5_RX+
PCIE5_TX-	A53	B53	PCIE5_RX-
GPI0	A54	B54	GPO1
PCIE4_TX+	A55	B55	PCIE4_RX+
PCIE4_TX-	A56	B56	PCIE4_RX-
GND	A57	B57	GPO2
PCIE3_TX+	A58	B58	PCIE3_RX+
PCIE3_TX-	A59	B59	PCIE3_RX-
GND	A60	B60	GND

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Signal	PIN	PIN	Signal
PCIE2_TX+	A61	B61	PCIE2_RX+
PCIE2_TX-	A62	B62	PCIE2_RX-
GPI1	A63	B63	GPO3
PCIE1_TX+	A64	B64	PCIE1_RX+
PCIE1_TX-	A65	B65	PCIE1_RX-
GND	A66	B66	WAKE0#
GPI2	A67	B67	WAKE1#
PCIE0_TX+	A68	B68	PCIE0_RX+
PCIE0_TX-	A69	B69	PCIE0_RX-
GND	A70	B70	GND
LVDSA_DATA0	A71	B71	LVDSB_DATA0
LVDSA_DATA#0	A72	B72	LVDSB_DATA#0
LVDSA_DATA1	A73	B73	LVDSB_DATA1
LVDSA_DATA#1	A74	B74	LVDSB_DATA#1
LVDSA_DATA2	A75	B75	LVDSB_DATA2
LVDSA_DATA#2	A76	B76	LVDSB_DATA#2
LVDS_VDD_EN	A77	B77	LVDSB_DATA3
LVDSA_DATA3	A78	B78	LVDSB_DATA#3
LVDSA_DATA#3	A79	B79	LVDS_BKLT_EN
GND	A80	B80	GND
LVDSA_CLK	A81	B81	LVDSB_CLK
LVDSA_CLK#	A82	B82	LVDSB_CLK#
LVDS_DDC_CLK	A83	B83	LVDS_BKLT_CTRL
LVDS_DDC_DATA	A84	B84	5VSB
GPI3	A85	B85	5VSB
NC	A86	B86	5VSB
NC	A87	B87	5VSB
PCIE_CLK_REF+	A88	B88	BIOS_DIS1
PCIE_CLK_REF-	A89	B89	VGA_RED
GND	A90	B90	GND

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Signal	PIN	PIN	Signal
+3.3V_SPI	A91	B91	VGA_GREEN
SPI_MISO	A92	B92	VGA_BLUE
GPO0	A93	B93	VGA_HSYNC
SPI_CLK	A94	B94	VGA_VSYNC
SPI_MOSI	A95	B95	VGA_DDC_CLK
PP_TPM	A96	B96	VGA_DDC_DATA
TYPE 10#	A97	B97	SPI_CS#
SER0_TX	A98	B98	NC
SER0_RX	A99	B99	NC
GND	A100	B100	GND
SER1_TX	A101	B101	FAN_PWMOUT
SER1_RX	A102	B102	FAN_TACHIN
LID#	A103	B103	SLEEP#
+12V	A104	B104	+12V
+12V	A105	B105	+12V
+12V	A106	B106	+12V
+12V	A107	B107	+12V
+12V	A108	B108	+12V
+12V	A109	B109	+12V
GND	A110	B110	GND

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### 2.3.2.1 Signal Description – COM Express Connector 1 (CN1A)

#### 2.3.2.1.1 Audio Signals

Signal	Signal Description
AC/HDA_SYNC	HD Audio Sync
AC/HDA_RST#	HD Audio Reset
AC/HDA_SDIN[0:2]	Audio CODEC Serial Data
AC/HDA_BITCLK	HD Audio Clock
AC/HDA_SDOUT	HD Audio Data

#### 2.3.2.1.2 Gigabit Ethernet Signals

Signal	Signal Description																				
GBE0_MD[0:3] +/-	Gigabit Ethernet Controller 0: Media Dependent Interface Differential Pairs 0,1,2,3. The MDI can operate in 1000, 100 and 10 Mbit / sec modes. Some pairs are unused in some modes, per the following:																				
	<table border="1"> <thead> <tr> <th></th> <th>1000B-T</th> <th>100B-T</th> <th>10B-T</th> </tr> </thead> <tbody> <tr> <td>MDI[0] +/-</td> <td>B1_DA+ /</td> <td>TX+ / -</td> <td>TX+ / -</td> </tr> <tr> <td>MDI[1] + /</td> <td>B1_DB+ /</td> <td>RX+ / -</td> <td>RX+ / -</td> </tr> <tr> <td>MDI[2] + /</td> <td>B1_DC+ /</td> <td>X</td> <td>X</td> </tr> <tr> <td>MDI[3] + /</td> <td>B1_DD+ /</td> <td>X</td> <td>X</td> </tr> </tbody> </table>		1000B-T	100B-T	10B-T	MDI[0] +/-	B1_DA+ /	TX+ / -	TX+ / -	MDI[1] + /	B1_DB+ /	RX+ / -	RX+ / -	MDI[2] + /	B1_DC+ /	X	X	MDI[3] + /	B1_DD+ /	X	X
		1000B-T	100B-T	10B-T																	
	MDI[0] +/-	B1_DA+ /	TX+ / -	TX+ / -																	
	MDI[1] + /	B1_DB+ /	RX+ / -	RX+ / -																	
MDI[2] + /	B1_DC+ /	X	X																		
MDI[3] + /	B1_DD+ /	X	X																		
GBE0_ACT#	Gigabit Ethernet Controller 0 activity indicator, active low.																				
GBE0_Link#	Gigabit Ethernet Controller 0 link indicator, active low.																				
GBE0_Link100#	Gigabit Ethernet Controller 0 100 Mbit / sec link indicator, active low.																				
GBE0_Lin1000#	Gigabit Ethernet Controller 0 1000 Mbit / sec link indicator, active low.																				

#### 2.3.2.1.3 GPIO Signals

Signal	Signal Description
GPI[0:4]	General purpose input pins.
GPO[0:4]	General purpose output pins. Upon a hardware reset, these outputs will be low.

2.3.2.1.4 Flat Panel LVDS Signals

Signal	Signal Description
BIASON	Controls panel contrast voltage.
DIGON	Controls panel digital power.
ENBKL#	Controls backlight power enable.
I <sup>2</sup> C_DAT, I <sup>2</sup> C_CLK	I <sup>2</sup> C interface for panel parameter EEPROM. This EEPROM is mounted on the LVDS receiver. The data in the EEPROM allows the EXT module to automatically set the proper timing parameters for a specific LCD panel.

2.3.2.1.5 LPC Signals

Signal	Signal Description
LPC_FRAME#	LPC frame indicates the start of an LPC cycle
LPC_AD[0:3]	LPC multiplexed address, command and data bus
LPC_DRQ[0:1]#	LPC serial DMA request
LPC_CLK	LPC clock output - 33MHz nominal
LPC_SERIRQ	LPC serial interrupt

2.3.2.1.6 Miscellaneous Signals

Signal	Signal Description
I <sup>2</sup> C_CK	General purpose I <sup>2</sup> C port clock output
I <sup>2</sup> C_DAT	General purpose I <sup>2</sup> C port data I/O line
SPKR	Output for audio enunciator - the "speaker" in PC-AT systems
BIOS_DISABLE#	Module BIOS disable input. Pull low to disable module BIOS. Used to allow off-module BIOS implementations.
KB_RST#	Input to module from (optional) external keyboard controller that can force a reset. Pulled high on the module. This is a legacy artifact of the PC-AT.
KB_A20GATE	Input to module from (optional) external keyboard controller that can be used to control the CPU A20 gate line. The A20GATE restricts the memory access to the bottom megabyte and is a legacy artifact of the PC-AT. Pulled low on the module.

2.3.2.1.7 PCI Express Signals

Signal	Signal Description
PCIE_TX[0:4] +/-	PCI Express Differential Transmit Pair 0-4
PCIE_RX[0:4] +/-	PCI Express Differential Receive Pair 0-4
PCIE0_CK_REF+/-	Reference clock output for PCI Express lanes 0-7 and for PCI Express Graphics lanes 0-15

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### 2.3.2.1.8 Power Signals

Signal	Signal Description
VCC_5V_SBY	Standby power input: +5.0V nominal. See Electrical Specifications for allowable input range. If VCC5_SBY is used, all available VCC_5V_SBY pins on the connector(s) must be used. Only used for standby and suspend functions. May be left unconnected if these functions are not used in the system design.
VCC_RTC	Real-time clock circuit-power input. Nominally +3.0V. See Electrical Specifications section for details.

### 2.3.2.1.9 Power & System Management Signals

Signal	Signal Description
SUS_S3#	Indicates system is in Suspend to RAM state. Active low output.
SUS_S4#	Indicates system is in Suspend to Disk state. Active low output.
SUS_S5#	Indicates system is in Soft Off state. Also known as "PS_ON" and can be used to control an ATX power supply.
BATLOW#	Indicates that external battery is low
PWRBTN#	Power button to bring system out of S5 (soft off), active on rising edge.
SMB_CK	System Management Bus bidirectional clock line. Power sourced through 5V standby rail and main power rails.
SMB_DTA	System Management Bus bidirectional data line. Power sourced through 5V standby rail and main power rails.
SMB_ALERT#	System Management Bus Alert - input can be used to generate an SMI# (System Management Interrupt) or to wake the system. Power sourced through 5V standby rail and main power rails.
SUS_STAT#	Indicates imminent suspend operation; used to notify LPC devices
PWR_OK	Power OK from main power supply
THRMTRIP#	Active low output indicating that the CPU has entered thermal shutdown.
THRM#	Input from off-module temp sensor indicating and over-temp situation.
SYS_RESET#	Reset button input. Active low input. System is held in hardware reset while this input is low, and comes out of reset upon release.
RSMRST#	Resume reset input, active low. Resets power plane logic. May be left open on carrier board if not used.
WAKE0#	PCI Express wake up signal
WAKE1#	General purpose wake up signal

2.3.2.2.0 SATA Signals

Signal	Signal Description
SATA[0:3]_TX +/-	Serial ATA Channel 0-3 transmit differential pair.
SATA[0:3]_RX +/-	Serial ATA Channel 0-3 receive differential pair.
ATA_ACT#	ATA (parallel and serial) activity indicator, active low.

2.3.2.2.1 VGA Signals

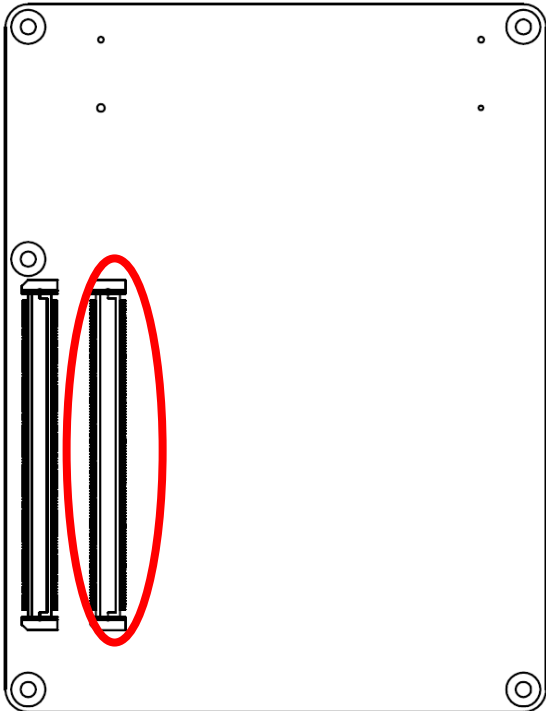
Signal	Signal Description
VGA_RED	Red for monitor. Analog DAC output, designed to drive a 37.5-Ohm equivalent load.
VGA_GRN	Green for monitor. Analog DAC output, designed to drive a 37.5-Ohm equivalent load.
VGA_BLU	Blue for monitor. Analog DAC output, designed to drive a 37.5-Ohm equivalent load.
VGA_HSYNC	Horizontal sync output to VGA monitor
VGA_VSYNC	Vertical sync output to VGA monitor
VGA_I <sup>2</sup> C_CLK	DDC clock line (I2C port dedicated to identify VGA monitor capabilities)
VGA_I <sup>2</sup> C_DAT	DDC data line.

2.3.2.2.2 USB Signals

Signal	Signal Description
USB[0:7] +/-	USB differential pairs, channels 0 through 7
USB_0_1_OC#	USB over-current sense, USB channels 0 and 1
USB_2_3_OC#	USB over-current sense, USB channels 2 and 3
USB_4_5_OC#	USB over-current sense, USB channels 4 and 5
USB_6_7_OC#	USB over-current sense, USB channels 6 and 7

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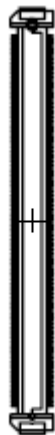
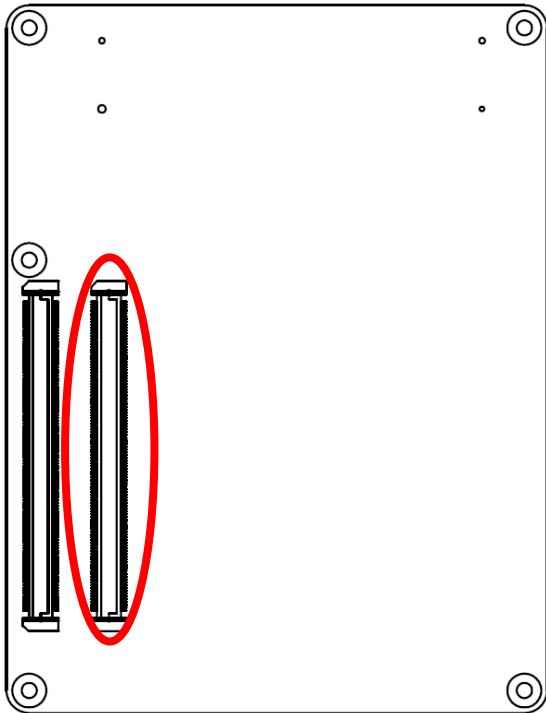
## 2.3.3 COM Express Connector 1 (CN1B)



Signal	PIN	PIN	Signal
GND	C1	D1	GND
GND	C2	D2	GND
NC	C3	D3	NC
NC	C4	D4	NC
GND	C5	D5	GND
NC	C6	D6	NC
NC	C7	D7	NC
GND	C8	D8	GND
NC	C9	D9	NC
NC	C10	D10	NC
GND	C11	D11	GND
NC	C12	D12	NC
NC	C13	D13	NC
GND	C14	D14	GND
NC	C15	D15	DDI1_CTRLCLK_AUX+
NC	C16	D16	DDI1_CTRLCLK_AUX-
NC	C17	D17	NC
NC	C18	D18	NC
PCIE_RX6+	C19	D19	PCIE_TX6+
PCIE_RX6-	C20	D20	PCIE_TX6-
GND	C21	D21	GND
NC	C22	D22	NC
NC	C23	D23	NC
DDI1_HPD	C24	D24	NC
NC	C25	D25	NC
NC	C26	D26	DDI1_PAIR0+
NC	C27	D27	DDI1_PAIR0-
NC	C28	D28	NC
NC	C29	D29	DDI1_PAIR1+
NC	C30	D30	DDI1_PAIR1-

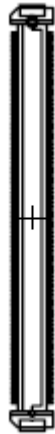
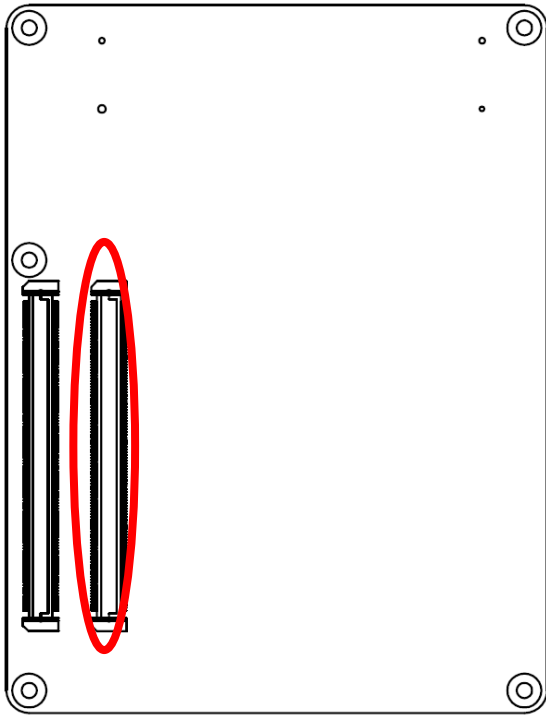


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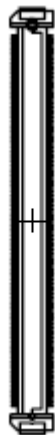
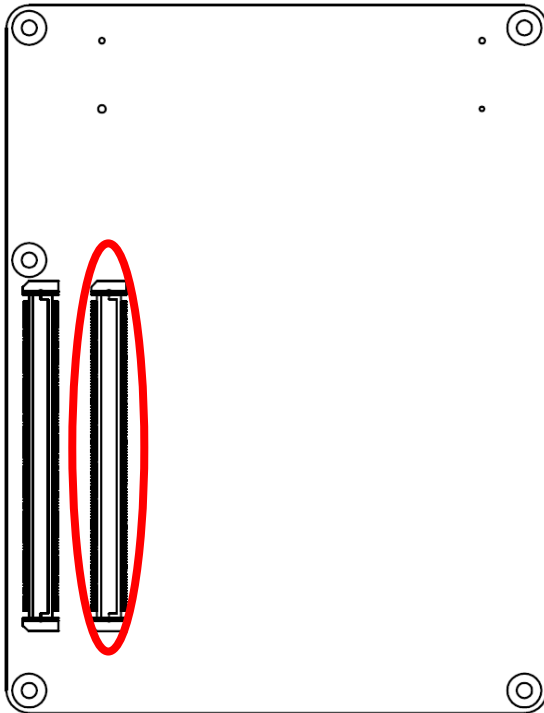
Signal	PIN	PIN	Signal
GND	C31	D31	GND
NC	C32	D32	DDI1_PAIR2+
NC	C33	D33	DDI1_PAIR2-
NC	C34	D34	DDI1_DDC_AUX_SEL
NC	C35	D35	NC
NC	C36	D36	DDI1_PAIR3+
NC	C37	D37	DDI1_PAIR3-
NC	C38	D38	NC
NC	C39	D39	NC
NC	C40	D40	NC
GND	C41	D41	GND
NC	C42	D42	NC
NC	C43	D43	NC
NC	C44	D44	NC
NC	C45	D45	NC
NC	C46	D46	NC
NC	C47	D47	NC
NC	C48	D48	NC
NC	C49	D49	NC
NC	C50	D50	NC
GND	C51	D51	GND
NC	C52	D52	NC
NC	C53	D53	NC
TYPE0#	C54	D54	NC
NC	C55	D55	NC
NC	C56	D56	NC
TYPE1#	C57	D57	TYPE2#
NC	C58	D58	NC
NC	C59	D59	NC
GND	C60	D60	GND

# ESM-A50M



Signal	PIN	PIN	Signal
NC	C61	D61	NC
NC	C62	D62	NC
NC	C63	D63	NC
NC	C64	D64	NC
NC	C65	D65	NC
NC	C66	D66	NC
NC	C67	D67	GND
NC	C68	D68	NC
NC	C69	D69	NC
GND	C70	D70	GND
NC	C71	D71	NC
NC	C72	D72	NC
GND	C73	D73	GND
NC	C74	D74	NC
NC	C75	D75	NC
GND	C76	D76	GND
NC	C77	D77	NC
NC	C78	D78	NC
NC	C79	D79	NC
GND	C80	D80	GND
NC	C81	D81	NC
NC	C82	D82	NC
NC	C83	D83	NC
GND	C84	D84	GND
NC	C85	D85	NC
NC	C86	D86	NC
GND	C87	D87	GND
NC	C88	D88	NC
NC	C89	D89	NC
GND	C90	D90	GND

## Quick Installation Guide



Signal	PIN	PIN	Signal
NC	C91	D91	NC
NC	C92	D92	NC
GND	C93	D93	GND
NC	C94	D94	NC
NC	C95	D95	NC
GND	C96	D96	GND
NC	C97	D97	NC
NC	C98	D98	NC
NC	C99	D99	NC
GND	C100	D100	GND
NC	C101	D101	NC
NC	C102	D102	NC
GND	C103	D103	GND
+12V	C104	D104	+12V
+12V	C105	D105	+12V
+12V	C106	D106	+12V
+12V	C107	D107	+12V
+12V	C108	D108	+12V
+12V	C109	D109	+12V
GND	C110	D110	GND

## ESM-A50M

### 2.3.3.1 Signal Description – COM Express Connector 1 (CN1B)

#### Key changes in Type 6 are:

- PCI interface is no longer supported and the pins are used instead for digital display interfaces (DDI) and two additional PCI Express lanes
- IDE (PATA) parallel interface is no longer supported and the pins are used instead for additional transmit and receive pairs for four USB 3.0 ports. (USB 3.0 is not supported on the ETXexpress-AI module.)
- Three dedicated DDI ports have been added. Ports 1, 2, and 3 can be configured individually for Display Port (DP), HDMI, or DVI and port 1 can also be used for SDVO.
- SDVO is no longer supported on the PEG port. Instead SDVO is multiplexed on DDI port 1.

