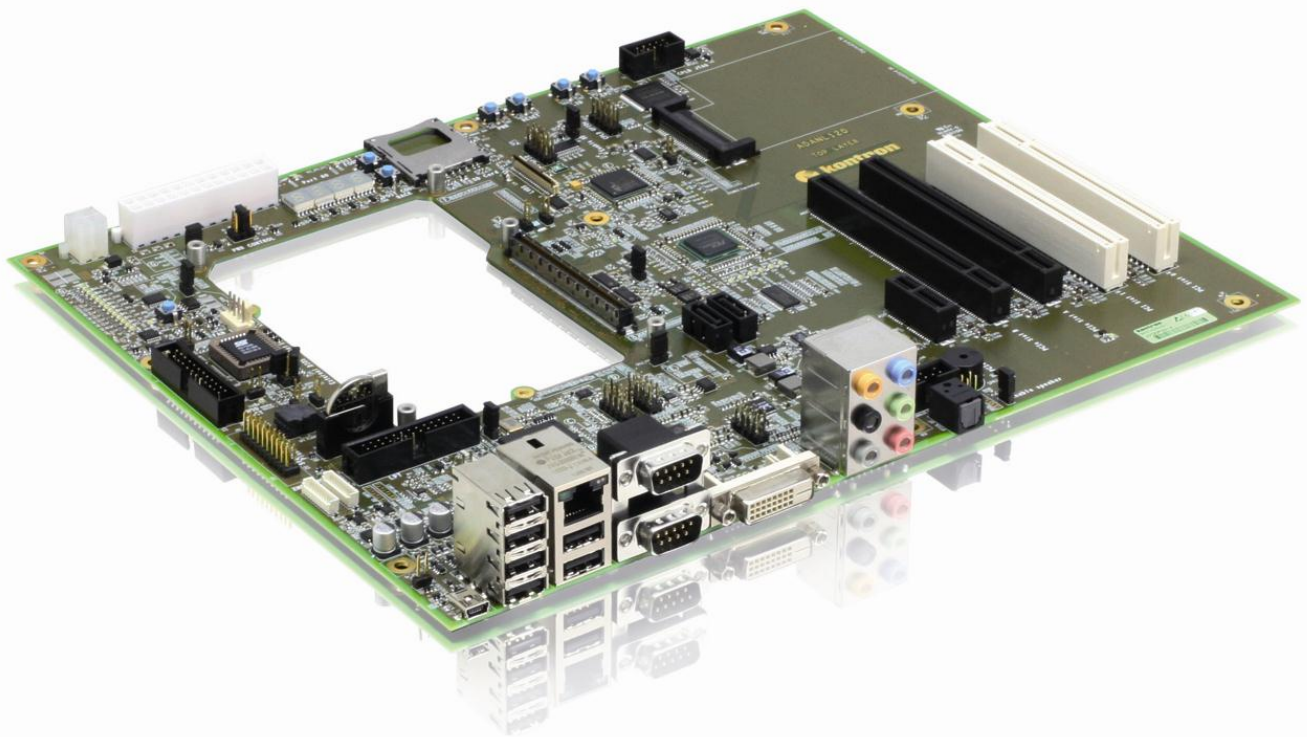


» Kontron User's Guide «



COM Express® Eval Type 10

Document Revision 141

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1 User Information

1.1 About This Document

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The warranty does not apply to defects resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, operation outside of the product's environmental specifications or improper installation or maintenance.

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Please consult our Web site at <http://www.kontron.com/support> for the latest product documentation, utilities, drivers and support contacts. Consult our customer section <http://emdcustomersection.kontron.com> for the latest BIOS downloads, Product Change Notifications and additional tools and software. In any case you can always contact your board supplier for technical support.

2 Introduction

The COM Express® COM.0 Rev. 2.0 Evaluation carrier board for Type 1 and Type 10 modules is designed to allow embedded application developers to get up and running quickly on the COM Express® mini platform, giving them a head start on the total system design. Simply select a Type 1 or Type 10 COM Express® CPU module, then Plug & Go. The Kontron COM Express® Eval Type 10 is an evaluation backplane for COM Express® Computer-on-Modules following the PICMG COM.0 specification Rev 1.0 or Rev 2.0 with pin-out Type 1 or Type 10.

Ordering Information

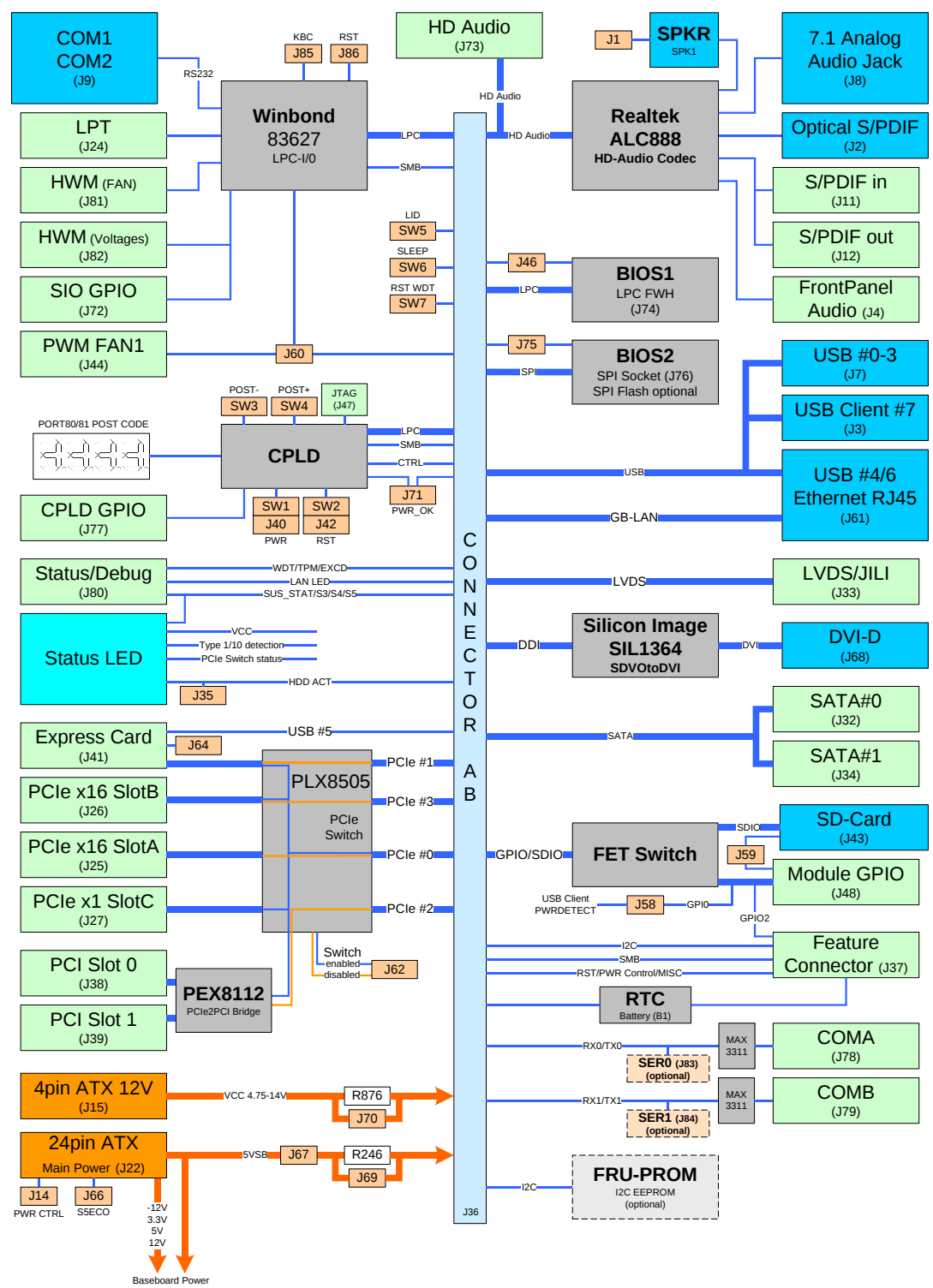
Article	Part-No.	Description
nanoETXexpress Evaluation Board	34101-0000-00-0 EOL ->	nanoETXexpress Evaluation Board COM.0 Rev1.0 Type1 Note: Product is EOL and no longer available. Please contact your local sales or support if documentation for this baseboard is needed.
COM Express® Eval Type 10	34101-0000-00-1	Evaluation Board COM.0 Rev2.0 Type10/Type1

3 Specification

3.1 Functional Specification

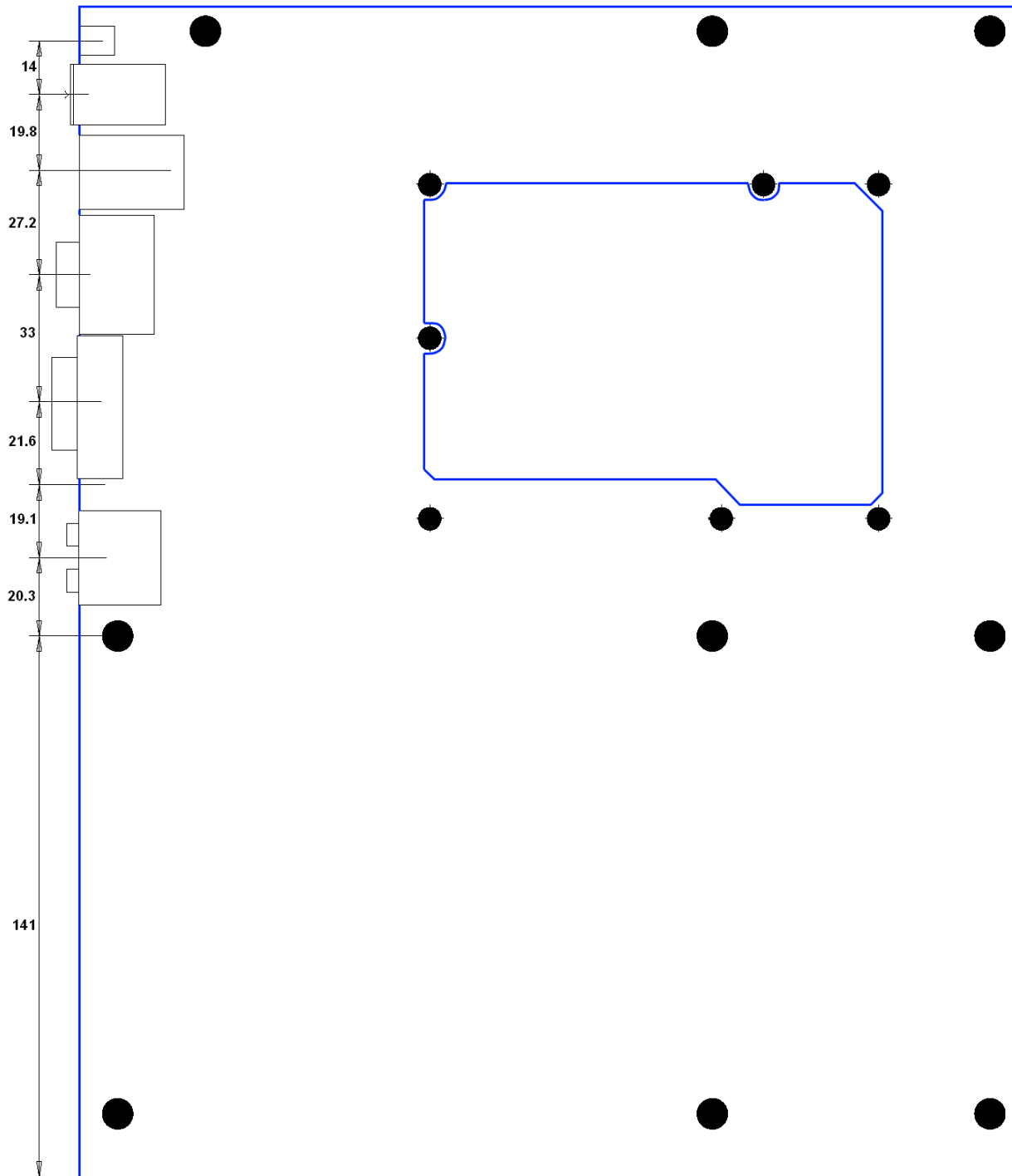
- » COM Express® COM.0 Rev 2.0 baseboard compatible to Type 10 and Type 1 pin-out based modules
- » ATX EPS (20pin + 4pin) power connector
- » PLX8112 PCIe2PCI Bridge
- » PLX8505 PCIe Switch
- » 2 x PCI
- » 2 x PCIexpress x16 (electrically x1)
- » 1 x PCIexpress x1
- » 1 x Express Card
- » 2 x SATA
- » LVDS (40pin JILI FFC40 connector)
- » 1 x DVI-D (SIL1364 SDV0toDVI)
- » 1x Ethernet RJ45
- » 6 x USB 2.0/1.1
- » 1 x USB Client
- » LPC Firmware Hub and SPI Flash support for external BIOS
- » Kontron feature connector
- » Front panel connectors (HDD Act., Reset and Power Switch)
- » Status LED
- » SD-Card Socket
- » GPIO pin header for module GPIO and Winbond LPC-I/O GPIO
- » 4 digit Port 80/81 POST code display with POST code control
- » LID and SLEEP support
- » Power Control functions (Power Button override, module single supply, power consumption measurements)
- » Realtek ALC888/ALC886 HDAudio Codec
 - 7.1 Analog Audio Jack
 - Optical S/PDIF output
 - Digital S/PDIF input/output
 - Front Panel HD Audio connector
- » Winbond 83627HFJ LPC-I/O
 - LPT pin-header
 - COM1/COM2 DSUB9 rear panel connector
 - PWM FAN and Hardware Monitor connectors (FAN/Voltage)

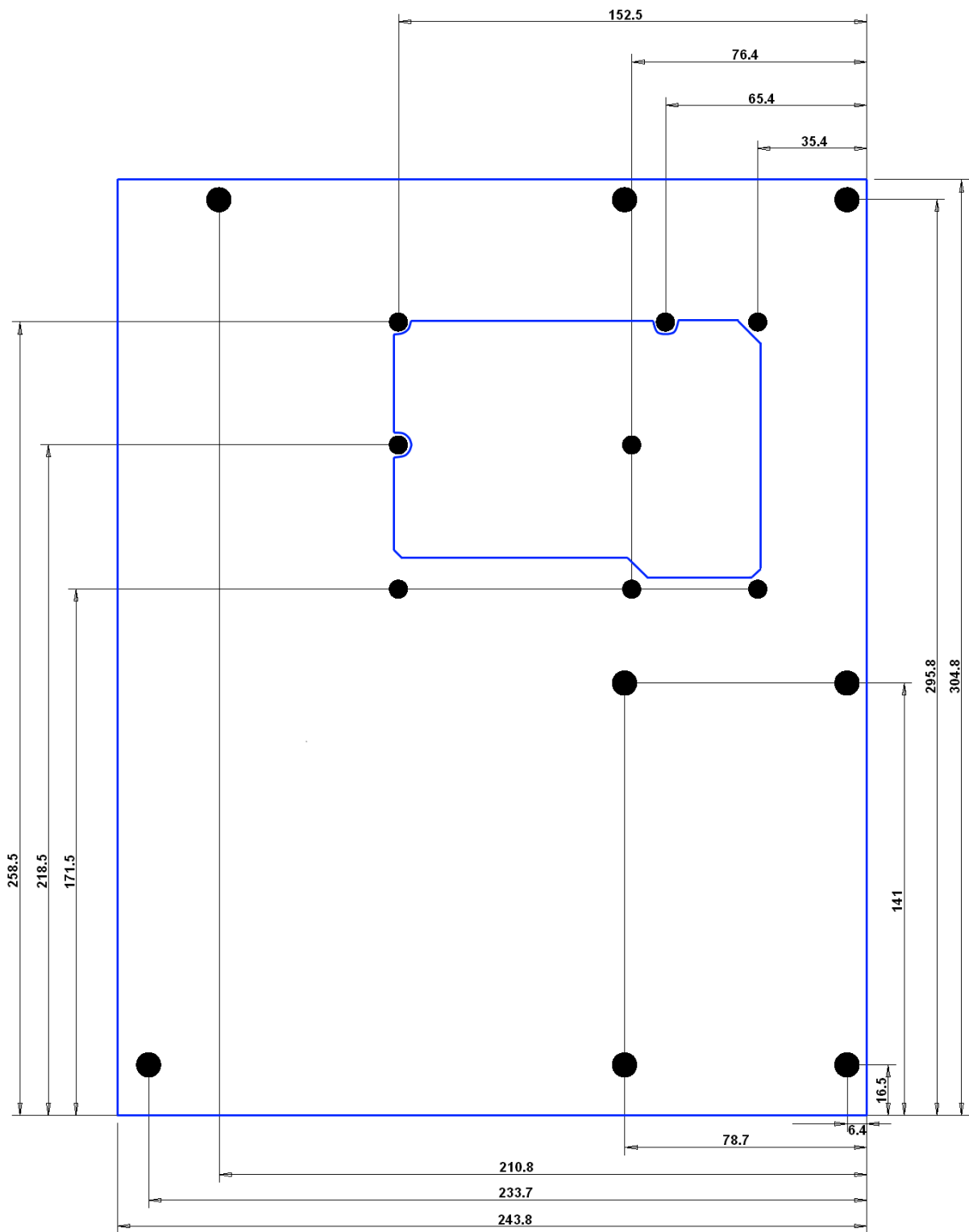
3.2 Block Diagram



3.3 Mechanical Specification

- » Size: 243.8mm x 304.8mm
- » max height on top: 34.7mm (Connector J8)
- » PCB thickness: 1.4mm $\pm 10\%$





3.4 Electrical Specification

Supply Voltage

- » ATX Main Power 24pin
- » ATX_12V P4 connector (wide range input depends on module specification)

Power Supply Rise time

- » The input voltages shall rise from $\leq 10\%$ of nominal to within the regulation ranges within 0.1ms to 20ms.
- » There must be a smooth and continuous ramp of each DC input voltage from 10% to 90% of its final set-point following the ATX specification

Supply Voltage Ripple

- » Maximum 100 mV peak to peak 0-20MHz

3.5 Environmental Specification

Ambient temperature

- » Operating: 0 to +60 °C
- » Non-operating: -30 to +85 °C

Humidity

- » Operating: 10% to 90% (non condensing)
- » Non operating: 5% to 95% (non condensing)

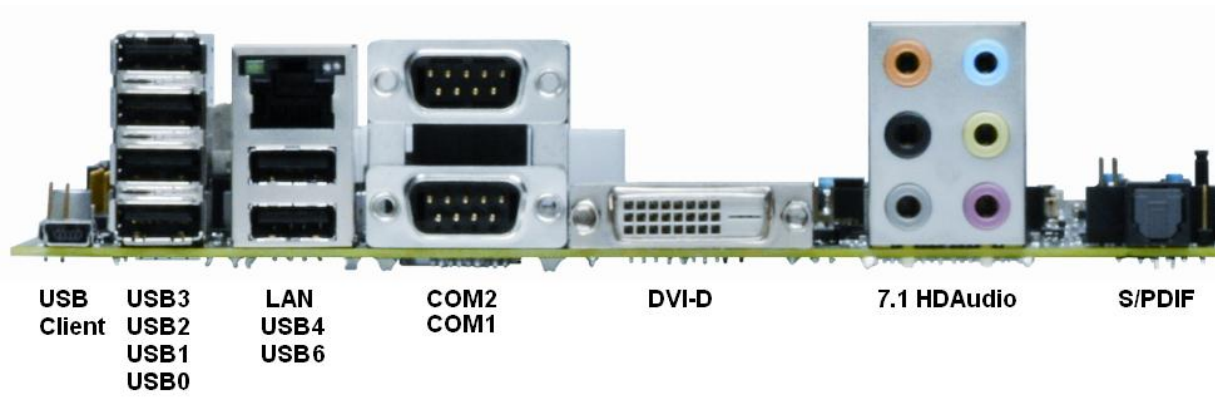
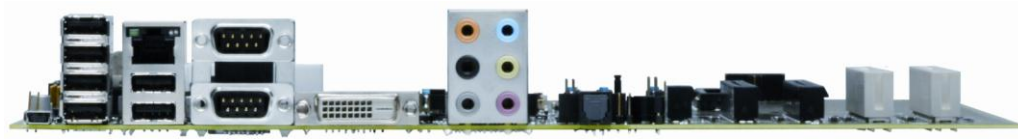
3.6 MTBF

The following MTBF (Mean Time Between Failures) values were calculated using a combination of manufacturer's test data, if the data was available, and a Bellcore calculation for the remaining parts. The Bellcore calculation used is "Method 1 Case 1". In that particular method the components are assumed to be operating at a 50 % stress level in a 40° C ambient environment and the system is assumed to have not been burned in. Manufacturer's data has been used wherever possible. The manufacturer's data, when used, is specified at 50° C, so in that sense the following results are slightly conservative. The MTBF values shown below are for a 40° C in an office or telecommunications environment. Higher temperatures and other environmental stresses (extreme altitude, vibration, salt water exposure, etc.) lower MTBF values.

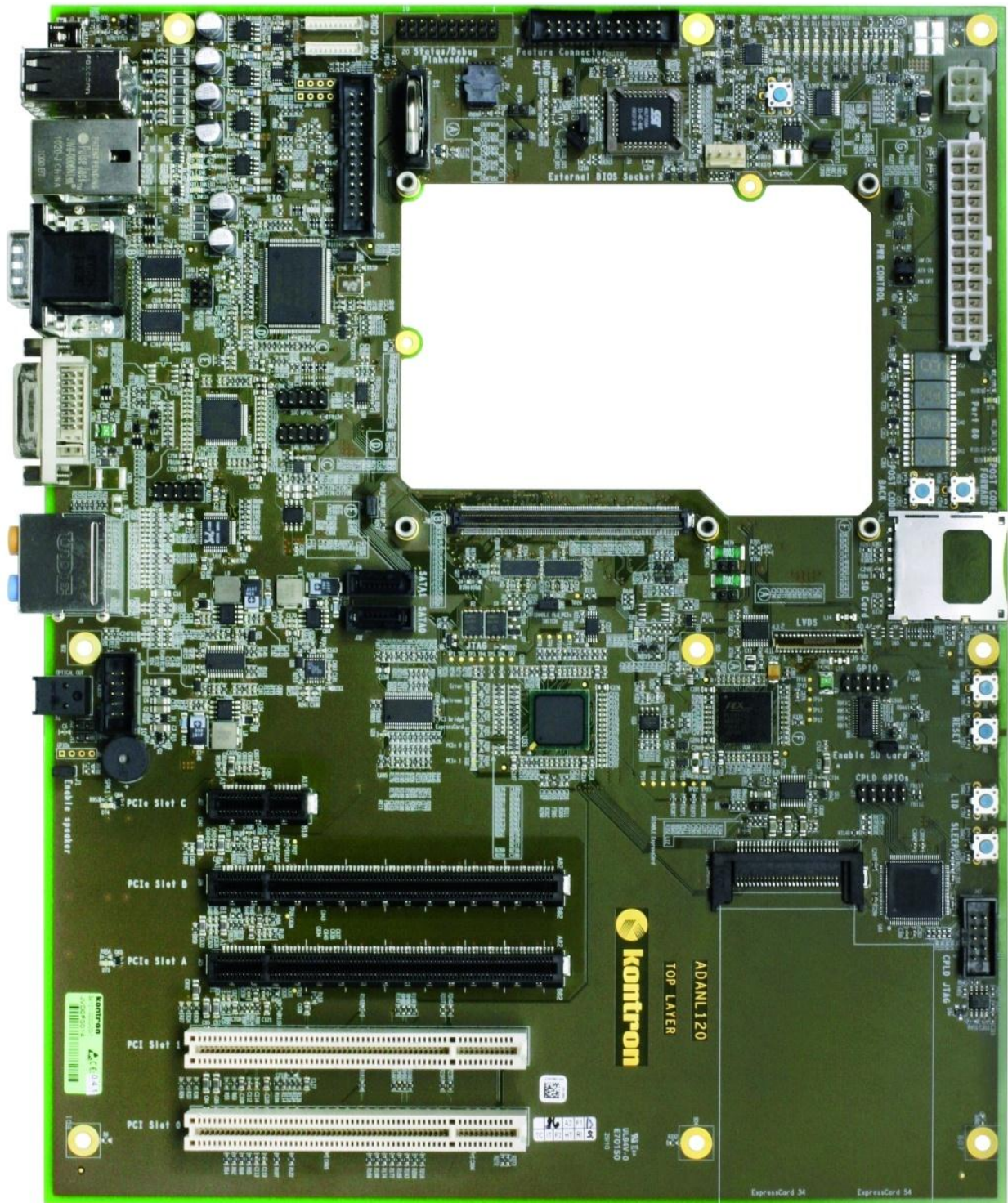
- » System MTBF: **tbd** hours

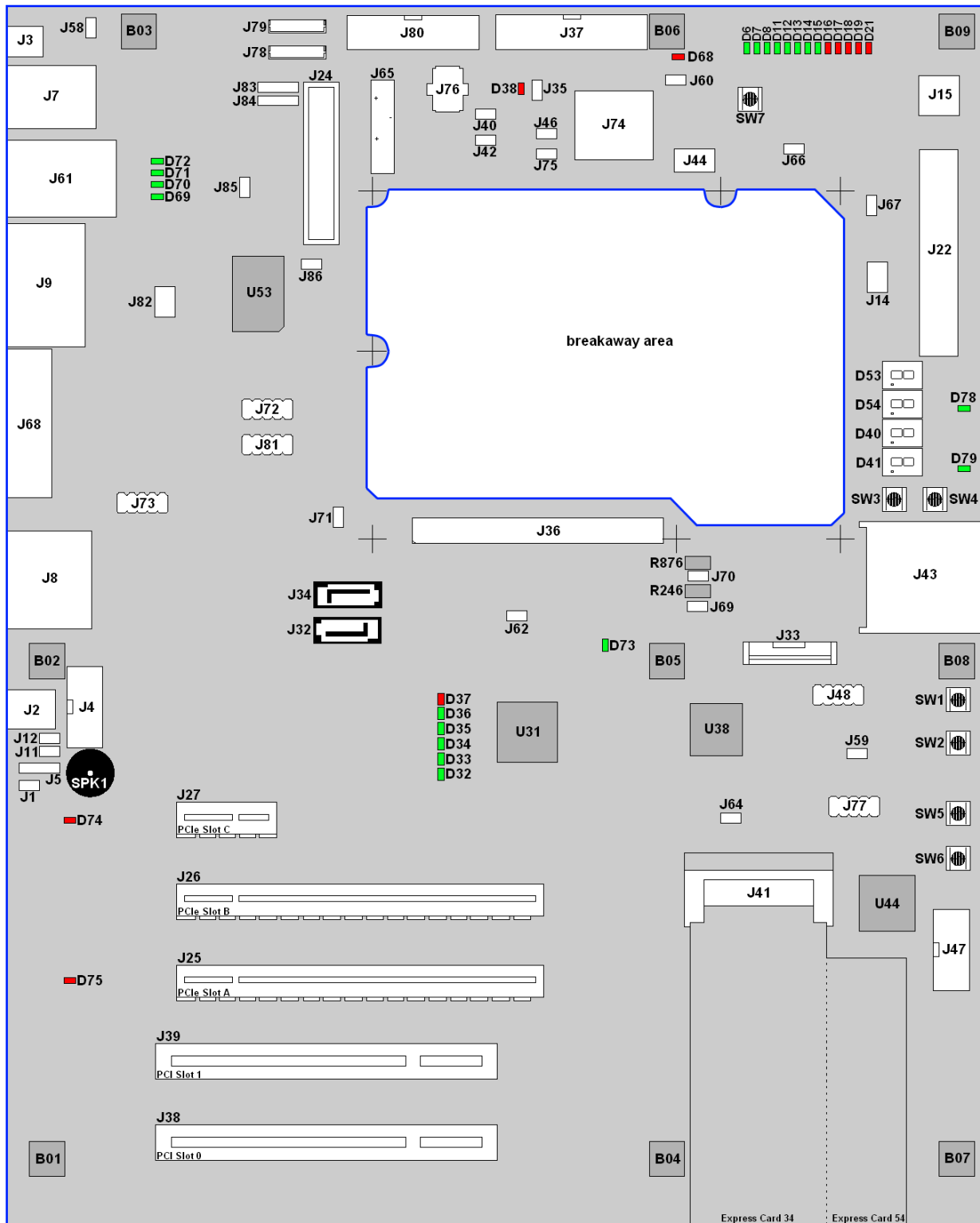
4 Connector Layout

4.1 Rear Panel



4.2 Connector Locations





4.3 Component overview

Connector	Short Description
B01-B09	Baseboard mounting holes
D6	Status LED: VCC 3.3V
D7	Status LED: VCC 5V
D8	Status LED: VCC 5V SBY
D11	Status LED: VCC 12V Module
D12	Status LED: VCC 12V
D13	Status LED: VCC 3.3V SBY
D14	Status LED: VCC 1.0V
D15	Status LED: VCC 1.5V
D16	Status LED: SUS_STAT#
D17	Status LED: SUS_S3#
D18	Status LED: SUS_S4#
D19	Status LED: SUS_S5#
D21	Status LED: THRMTRIP
D32	Status LED: PCIe Switch Lane 4 good (PCIe Slot C)
D33	Status LED: PCIe Switch Lane 3 good (PCIe Slot B)
D34	Status LED: PCIe Switch Lane 2 good (Express Card)
D35	Status LED: PCIe Switch Lane 1 good (PCIe2PCI Bridge)
D36	Status LED: PCIe Switch Lane 0 good (Uplink)
D37	Status LED: PCIe Switch Error
D38	Status LED: HDD activity
D40/41	PORT80 POST code display
D53/54	PORT81 POST code display
D68	Status LED: WDT active
D69	Status LED: GBLAN Activity
D70	Status LED: GBLAN Link
D71	Status LED: GBLAN Link 100
D72	Status LED: GBLAN Link 1000
D73	Status LED: Type10 detection
D74	Status LED: PCIe Switch disabled (PCIe Slot C inactive)
D75	Status LED: PCIe Switch enabled (PCIe Slot A inactive)
D78	Status LED: VCC 1.8V
D79	Status LED: VCC 3.3V for Silicon Image SIL1364
J1	Enable/Disable onboard speaker
J2	Optical S/PDIF out
J3	USB Client connector
J4	Front Panel HDAudio connector
J5	HD Audio GPIO / Digital Microphone
J7	USB #0-3
J8	7.1 Analog Audio Jack
J9	SIO COM1/COM2
J11	S/PDIF input
J12	S/PDIF output
J14	ATX_PS_ON Override
J15	ATX_12V 4pin P4 Power Connector

J22	ATX 24pin Main Power Connector
J24	LPT
J25	PCIexpress Slot A (x16, electrically x1)
J26	PCIexpress Slot B (x16, electrically x1)
J27	PCIexpress Slot C (x1)
J32	SATA0
J33	LVDS FFC40
J34	SATA1
J35	HDD Activity
J36	COM Express® AB connector for Type1/Type10 Computer-on-Modules
J37	Kontron Feature Connector
J38	PCI Slot0
J39	PCI Slot 1
J40	Power Button Front Panel connector
J41	Express Card
J42	ResetButton Front Panel connector
J43	SD-Card socket
J44	PWM FAN1 (SIO or Module)
J46	Enable external BIOS0 from LPC FWH
J47	CPLD JTAG
J48	Module GPIO
J58	Enable/Disable USB Client Power Detect to GPIO
J59	SDCard/GPIO selection
J60	Enable SIO PWM FAN/Module PWM FAN to FAN1 connector
J61	USB #4 / USB #6 and Ethernet RJ45
J62	Enable/Disable PLX8505 PCIexpress switch
J64	Disable/Enable Express Card
J65	RTC Battery
J66	Disable/Enable S5ECO
J67	Enable/Disable 5V Standby to module
J68	DVI-D (SDVO2DVI)
J69	Module 5VSB measurement point
J70	Module VCC measurement point
J71	Enable/Disable CPLD PWR_OK
J72	SIO GPIO
J73	HDAudio Connector for external codecs
J74	LPC FirmwareHub for external BIOS
J75	Enable external BIOS1 from SPI Flash
J76	SPI Flash for external BIOS
J77	CPLD GPIO
J78	RS232 COMA from module (RX/TX only)
J79	RS232 COMB from module (RX/TX only)
J80	Status/Debug pin-header
J81	SIO HWM: FAN
J82	SIO HWM: Voltages
J83	SER0 from module (RX/TX only)
J84	SER1 from module (RX/TX only)
J85	Enable/Disable SIO KBC
J86	Enable/Disable Winbond LPC-I/O
J92	LID

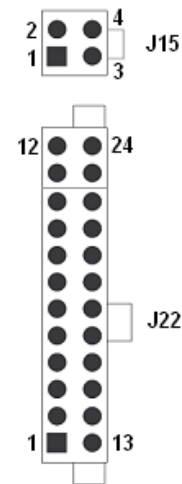
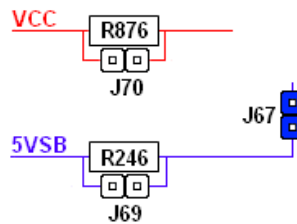
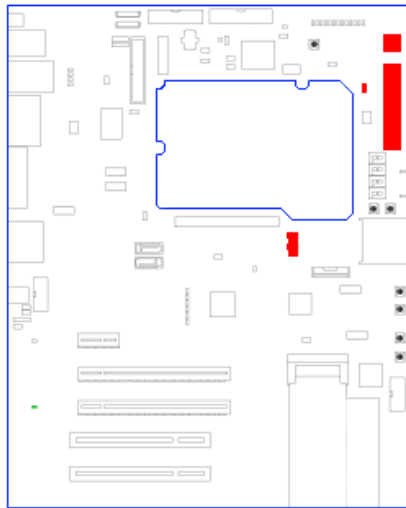
SPK1	Speaker
SW1	Power button
SW2	Reset button
SW3	POST Code back
SW4	POST Code foward
SW6	SLEEP
SW7	Reset WDT Latch
U31	PEX8505 PCIe Switch
U38	PLX8112 PCIe2PCI Bridge
U44	Altera CPLD
U53	Winbond 83627 LPC-I/O

5 Connectors and Features

5.1 Power supply

5.1.1 ATX connector

The COM Express® Eval Type 10 power supply follows the ATX 2.x specification and the baseboard should be supplied by connecting an ATX PSU with 24pin ATX and 4pin ATX_12V supply cable in correct orientation. The 4pin ATX_12V connector mainly supplies power to the module over OR resistor R876 and allows powering the module directly in specified wide range power input. The module additionally is supplied with 5V standby voltage over OR resistor R246. Standby voltage can easily be disconnected by opening jumper J67 to drive the module in single supply mode. Use connector J70 and J69 for current measurements.



Pin	ATX Main Power	Pin	ATX Main Power
1 (Orange)	+3.3V	13 (Orange/Brown)	+3.3V / +3.3V sense
2 (Orange)	+3.3V	14 (Blue)	-12V
3 (Black)	GND	15 (Black)	GND
4 (Red)	+5V	16 (Green)	Power on
5 (Black)	GND	17 (Black)	GND
6 (Red)	+5V	18 (Black)	GND
7 (Black)	GND	19 (Black)	GND
8 (Grey)	PWR_OK	20	No connection
9 (Purple)	+5VSB	21 (Red)	+5V
10 (Yellow)	+12V	22 (Red)	+5V
11 (Yellow)	+12V	23 (Red)	+5V
12 (Orange)	+3.3V	24 (Black)	GND

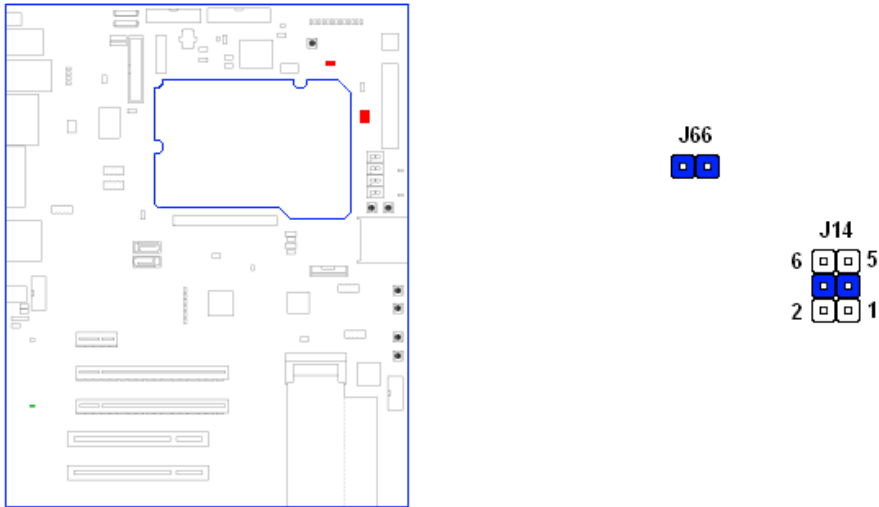
Pin	ATX_12V	Pin	ATX_12V
1 (Black)	GND	3 (Yellow)	Module VCC (12V nominal)
2 (Black)	GND	4 (Yellow)	Module VCC (12V nominal)

5.1.2 PS_ON override & S5 Eco

With PS_ON override jumper J14 it is possible to switch off the ATX power supply manually. Jumper J66 should be opened to test module S5Eco or single supply mode.

In S5Eco mode all baseboard components (including status LED) are disconnected from standby voltages in S5 state. 5VSB supply to the module can be disconnected separately with jumper J67.

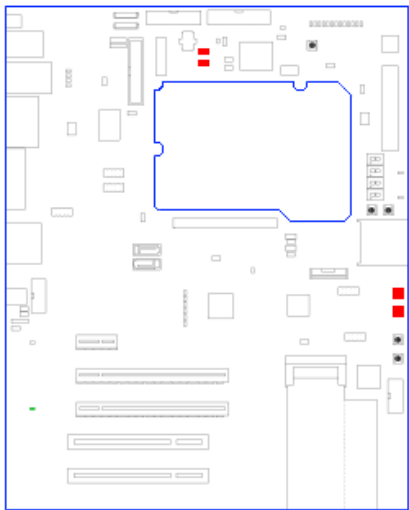
Note: If S5Eco mode is enabled only power button SW1 is supported to power-on the system.



J14 Jumper position	Function
1-2	Power Supply OFF
3-4 (default)	Power Supply controlled by PS_ON signal
5-6	Power Supply always ON

5.1.3 Reset and Power button

The COM Express® Eval Type 10 provides an onboard Reset Button (SW1) and Power Button (SW2). To connect a front panel button from your chassis use J40 (Power) or J42 (Reset).



J40 

J42 

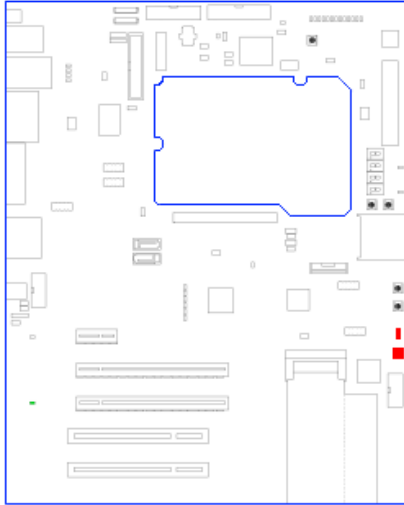
 SW1

 SW2

Connector	Function
J40	Power Button
SW1	
J42	Reset Button
SW2	

5.1.4 LID and Sleep

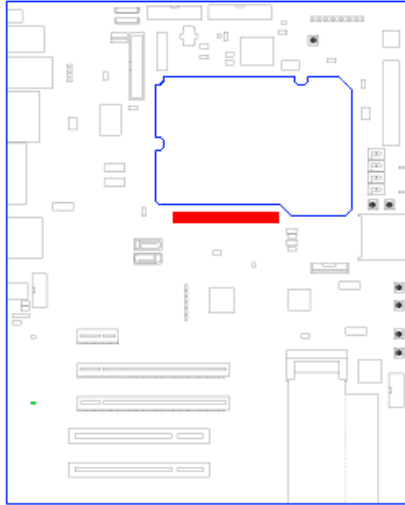
The specification update for PICMG COM.0 modules to revision 2.0 implements new signals for LID and Sleep. The low active signals can be simulated by switch 5 and 6 similar to notebook functionality of closing the lid or pressing the sleep button.



Connector	Function
J92	LID
SW6	Sleep

5.2 COM Express® connector

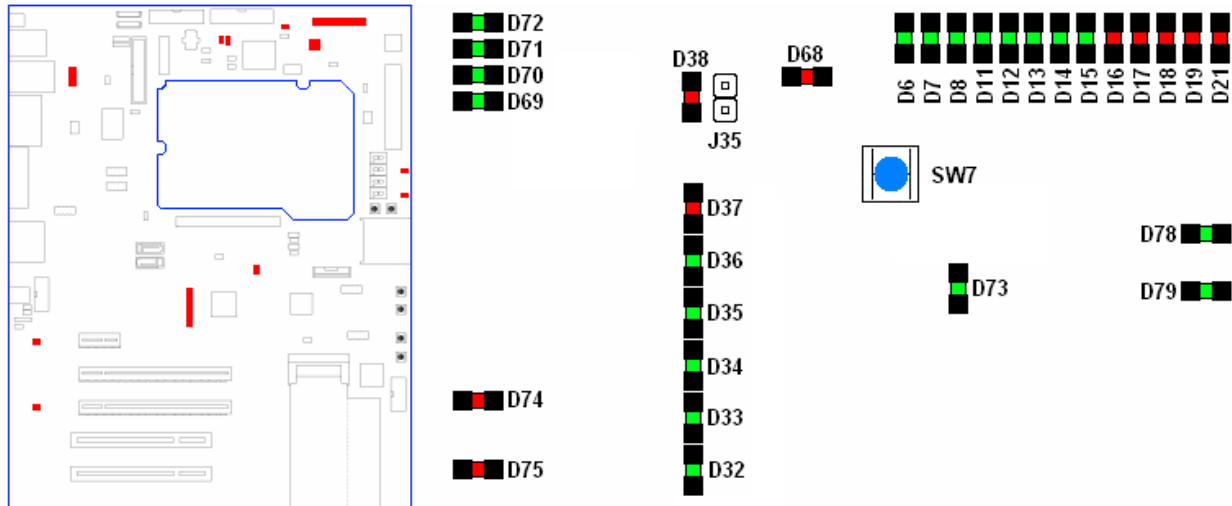
The COM Express® Eval Type 10 is an evaluation backplane for Type 1 or Type 10 based Computer-on-Modules. Both types are module pin-outs based on one connectors with 2 rows (Row A and B) with 220 pins overall. Please refer to your module documentation for detailed pin-out descriptions.



Note: The Type 1 or Type 10 pin-out is compatible to Type 2. It's possible to drive Computer-on-Modules based on pin-out Type 2 on this evaluation baseboard without functionality of second COM Express® connector CD (PEG, IDE, PCI).

5.3 Status LED

The onboard main status and voltage LED D6-D21 indicates the current power state of the module and if all voltages are working correctly. Some additional status LED shows active or inactive slots and signals. See table below for detailed information.

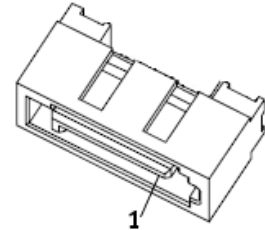
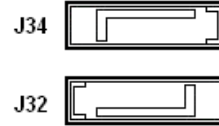
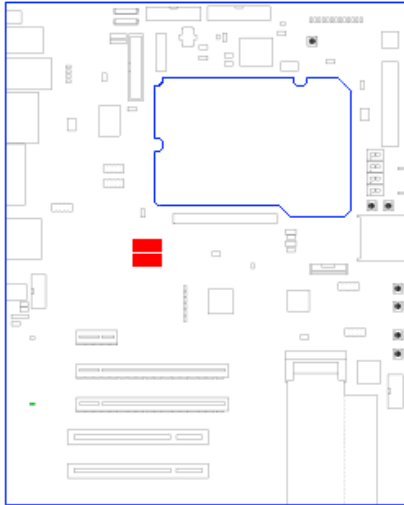


A front panel HDD LED can be connected HDD Activity connector J35. D68 indicates an active watchdog trigger WDT. The output is buffered and the switch SW7 resets the Latch.

LED	Description	LED	Description
D6	VCC 3.3V	D34	PLX PCIe Switch Lane 2 good (Express Card)
D7	VCC 5V	D35	PLX PCIe Switch Lane 1 good (PCIe2PCI Bridge)
D8	VCC 5V SBY	D36	PLX PCIe Switch Lane 0 good (Uplink)
D11	VCC 12V Module	D37	PLX PCIe Switch Error
D12	VCC 12V	D38	HDD activity
D13	VCC 3.3V SBY	D68	latched WDT
D14	VCC 1.0V	D69	GBLAN Activity
D15	VCC 1.5V	D70	GBLAN Link 10
D16	SUS_STAT#	D71	GBLAN Link 100
D17	SUS_S3#	D72	GBLAN Link 1000
D18	SUS_S4#	D73	Type10 detection
D19	SUS_S5#	D74	PLX PCIe Switch disabled (PCIe Slot C inactive)
D21	THRMTRIP	D75	PLX PCIe Switch enabled (PCIe Slot A inactive)
D32	PLX PCIe Switch Lane 4 good (PCIe Slot C)	D78	VCC 1.8V
D33	PLX PCIe Switch Lane 3 good (PCIe Slot B)	D79	VCC 3.3V for Silicon Image SIL1364

5.4 Serial ATA

The COM Express® Type 10 pin-out specification according to COM.0 specification revision 2.0 defines 2 SATA ports. The COM Express® Eval Type 10 provides two 7-pin SATA data connectors as standard 1.27mm Pitch Serial ATA High Speed Header with Locking Latch.



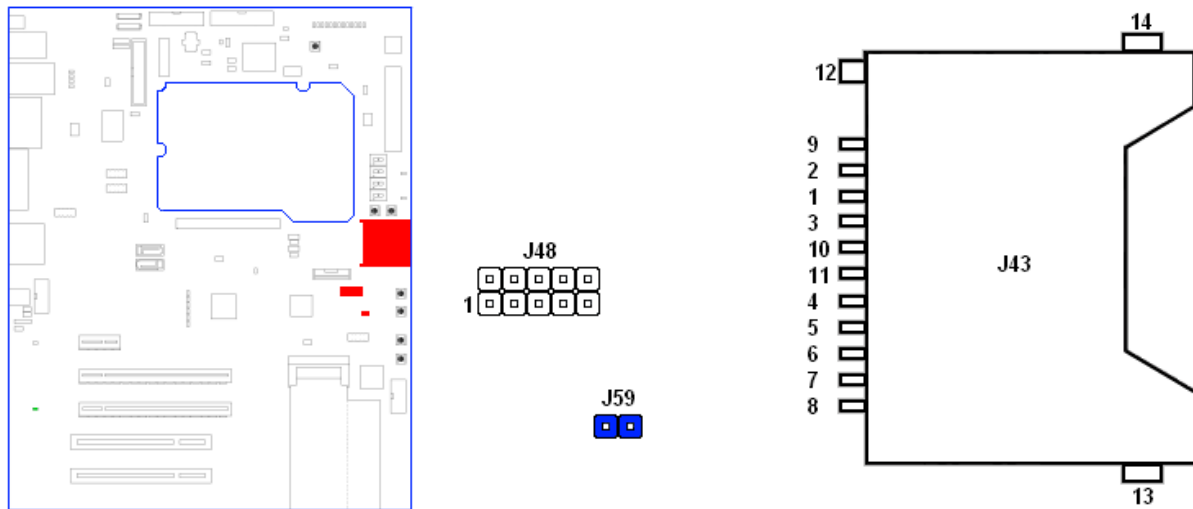
SATA Pin	Signal
1	Ground
2	Transmit +
3	Transmit -
4	Ground
5	Receive -
6	Receive +
7	Ground

Connector	SATA Port
J32	SATA #0
J34	SATA #1

5.5 SD-Card / Module GPIO

The SD-Card standard is a standard for removable memory storages designed and licensed by the SD Card Association (<http://sdcard.org>). The card form factor, electrical interface and protocol are all part of the SD Card specification. COM Express® Type 1 and Type 10 pin-out based modules may provide a SDIO interface shared with GPIO signals. Therefore on COM Express® Eval Type 10 a SD-Card connector is available. Please check the documentation of your module if SDIO is supported and how to enable.

Close configuration jumper J59 (default) to enable SD-Card Slot J43 or open J59 to enable GPIO pin-header J48.



SD-Card J43 PIN	Description	SD-Card J43 PIN	Description
1	DAT3/CD - Data Line 3/Card Detection	8	DAT1 - Data Line 1
2	CMD - Command/Response	9	DAT2 - Data Line 2
3	VSS 1 - Supply Voltage - GND	10	Card Detect
4	VDD - Supply Voltage - 3.3V	11	Write Protect
5	CLK - Clock	12	COM (GND)
6	VSS2 - Supply Voltage - GND	13	Shield Ground 0
7	DAT0 - Data Line 0	14	Shield Ground 1

GPIO J48 PIN	Description	GPIO J48 Pin	Description
1	VCC 3.3V	2	GP00 / SD_CLK
3	GPIO / SD_DATA0	4	GP01 / SD_CMD
5	GPI1 / SD_DATA1	6	GP02 / SD_WP
7	GPI2 / SD_DATA2	8	GP03 / SD_CD#
9	GPI3 / SD_DATA3	10	GND

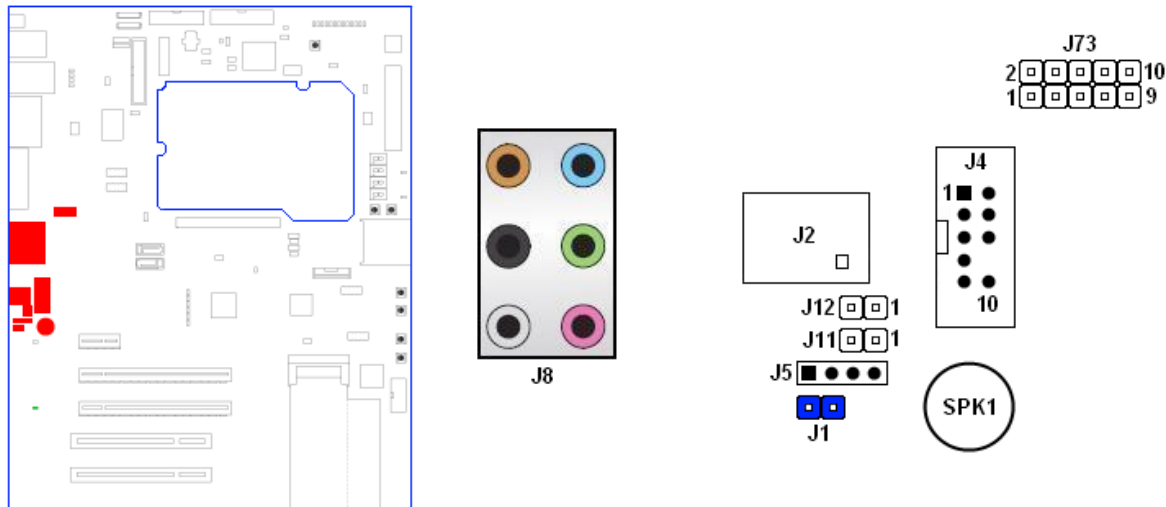
Note1: A SD-Card is detected if Card Detect is at low level. The write protection is active (read only) if SD_WP is at high level.

Note2: The switching circuitry which selects GPIO or SDIO interface may influence the signal quality of SDIO which results in detection or boot issues with some fast SD/SDHC cards. Therefore it's recommended to reduce SDIO interface speed to 24MHz in module's BIOS if supported

5.6 High Definition Audio

The COM Express® Eval Type 10 provides HDAudio via Realtek ALC888/ALC886 High Definition Audio Codec supporting analog, optical and digital audio connections.

The onboard buzzer SPK1 can be disabled by opening jumper J1 (default closed). Optical S/PDIF for Toslink connection is available on rear panel connector J2.



Audio Connector J8 - Speaker Configuration

The Audio Connector J8 on COM Express® Eval Type 10 is a full featured analog audio jack for speaker configuration up to 8-channel.

J8	2-channel	4-channel	6-channel	8-channel
Orange	-	-	Center/Subwoofer	Center/Subwoofer
Black	-	Rear Speaker	Side Speaker	Rear Speaker Out
Gray	-	-	-	Side Speaker Out
Blue	Line In	Line In	Line In	Line In
Green	Line Out	Front Speaker	Front Speaker	Front Speaker
Pink	Mic In	Mic In	Mic In	Mic In

Note1: In addition to the default speaker settings, the analog audio Jacks can be reconfigured to perform different functions via the Realtek HDAudio Driver Software which is available on Kontron website. Only microphones still must be connected to the default pink jack.

Note2: Audio is only supported with HD Audio compatible COM Express® Modules.

Front Panel Audio Connector J4

The front panel audio connector J4 allows connecting a chassis front panel audio with analog microphone input and stereo speaker output.

Pin	Description
1	MIC2-L
2	GND
3	MIC2-R (MIC Power)
4	PRESENCE#
5	LINE2-R (LineOut-R)
6	MIC2-JD
7	SENSE
8	Key Pin
9	Line2-L (LineOut-L)
10	LINE2-JD

Digital Audio Connectors J5/J11/J12

Digital audio inputs and outputs are available on connector J11 (S/PDIF input), J12 (S/PDIF output) and microphone connection on J5.

Pin	J5 (HDA GPIO / Dig. MIC)	J11 (S/PDIF in)	J12 (S/PDIF out)
1	HDA_GPIO0 / DMIC-CLK	SPDIF_II	SPDIF_OUT
2	HDA_GPIO1 / DMIC-DATA	GND	GND
3	PWR_3.3V	-	-
4	GND	-	-

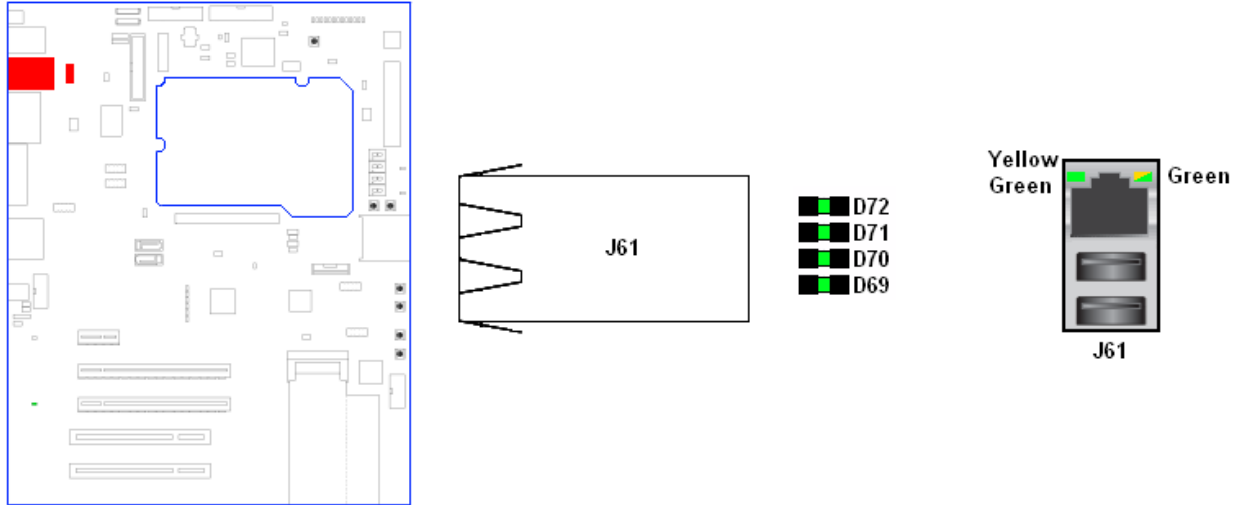
Codec connector J73

Connector J73 allows access to HD Audio interface to connect external HDAudio codec additional to the onboard Realtek ALC888/ALC886.

Pin	Description	Pin	Description
1	HDA_BITCLK	2	GND
3	GND	4	HDA_SDIN1
5	HDA_SDINO_R (default n.c.)	6	HDA_SDIN2
7	GND	8	HDA_SYNC
9	HDA_SDOUT	10	HDA_RST#

5.7 Ethernet

The COM Express® Eval Type 10 provides a RJ45/Dual USB Combo with a single RJ45 in combination with 2 USB ports (USB 4/6). Ethernet Connector J61 with integrated magnetics and LED is configured to support modules with Gigabit Ethernet controller only. Modules with 10/100 MBit Ethernet controller are not supported.



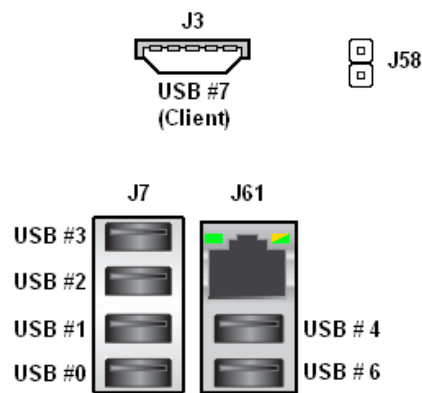
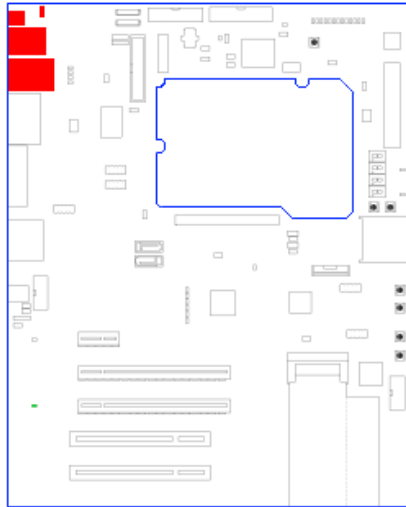
J61 LED function

Function	J61 Left LED	J61 Right LED	Status LED
Activity	Green	-	D69
Link10	-	Off	D70
Link100	-	Yellow	D71
Link1000	-	Green	D72

5.8 USB

The COM Express® module's USB ports 0 to 3 are available on rear panel connector J7. USB port 5 is used on Express Card connector. The COM Express® Eval Type 10 provides USB port 4 and 6 on RJ45/USB Combo connector J61.

Additionally USB7 is available on USB mini-A connector J3 as non-powered connector for USB client functionality. Check the documentation of your module if USB client on Port #7 is supported and J3 can be used. J58 allows connecting USB Client Power to GPIO to use it as detection input for custom USB Client driver software.

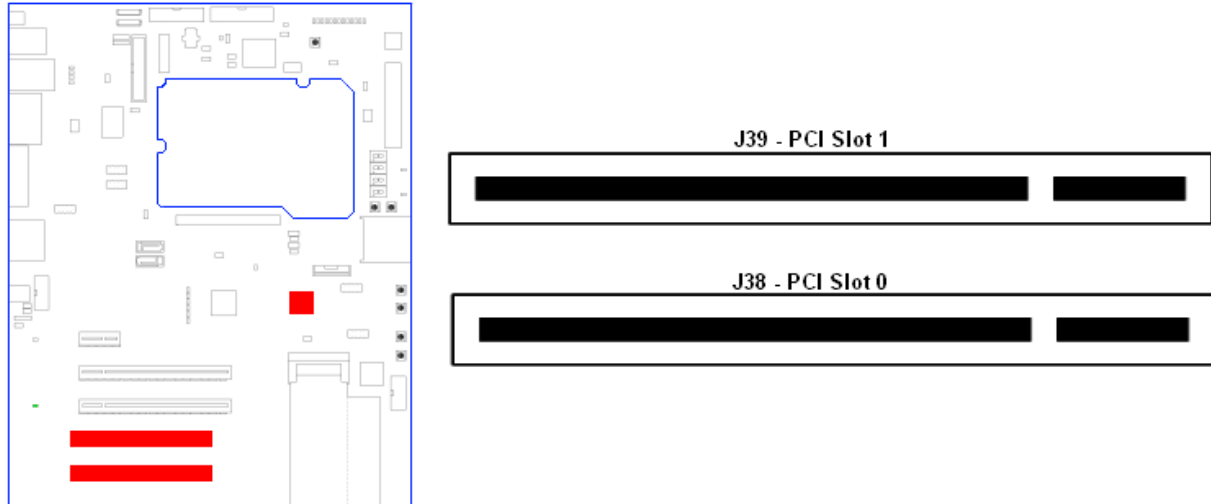


USB Client connector J3 - Pin	J3 Function
1	USB Client Power detect
2	USB7-
3	USB7+
4	n.c.
5	GND
6-9	Shield GND

5.9 PCI

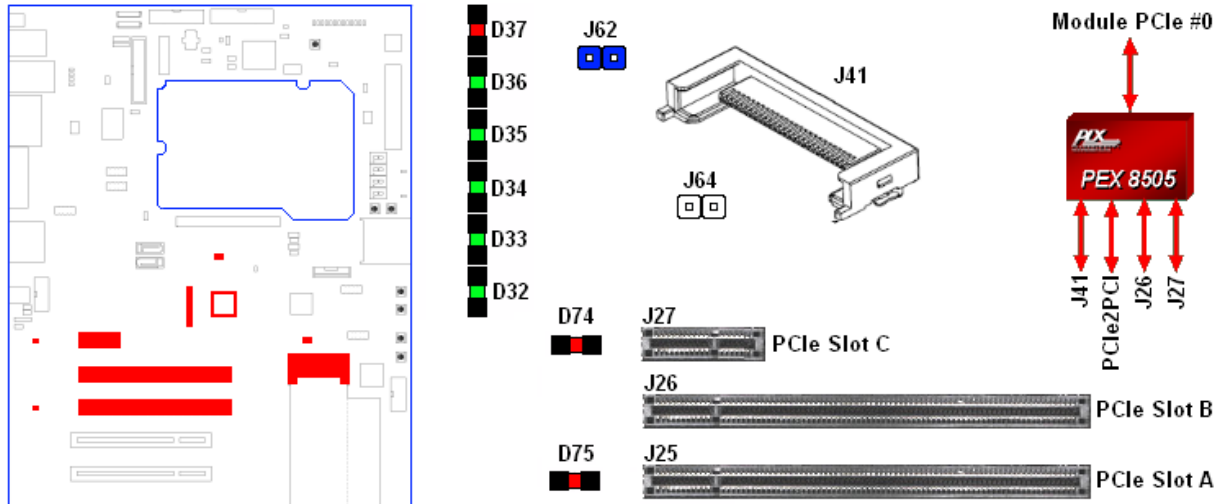
The mini size COM Express® form factor for Type 1 and Type 10 pin-out based modules does not specify an interface for PCI. Therefore on COM Express® Eval Type 10 a PLX8112 PCIexpress to PCI switch (U38) is used to provide two PCI Slots following the PCI 2.x specification.

Both PCI slots are enabled when the PCIexpress switch is active. If the PCIe switch is disabled a module with at least 3 PCIexpress lanes is required to enable J38/J39.



5.10 PCIeexpress and Express Card

The COM Express® Eval Type 10 provides one PCIeexpress x1 port, two PCIeexpress x16 ports (electrically x1) and one Express Card Slot in different configuration. To allow usage of multiple PCIeexpress connectors and PCI the PEX8505 PCIeexpress switch (U31) is connected to module's PCIeexpress Lane #0.



PCIe switch enabled

If PEX8505 PCIe switch is enabled (J62 closed, default) the following routing is active

Computer-on-Module	PCIe switch PEX8505	Connector
PCIe Lane #0	PCIe Lane #0: Uplink	-
-	PCIe Lane #1	Express Card J41
-	PCIe Lane #2	PCIe2PCI Bridge
-	PCIe Lane #3	PCIe Slot B J26
-	PCIe Lane #4	PCIe Slot C J27

The PCIeexpress Slot A (J25) is disabled in this configuration and marked by red LED D75.

Note: Module PCI Express lanes #1 -#3 are not connected if PCIe switch is enabled

PCIe switch disabled

If PEX8505 PCIe switch is disabled (J62 open) the following routing is active

Computer-on-Module	Connector
PCIe Lane #0	PCIe Slot A J25
PCIe Lane #1	Express Card J41
PCIe Lane #2	PCIe2PCI Bridge
PCIe Lane #3	PCIe Slot B J26

The PCIeexpress Slot C (J27) is disabled in this configuration and marked by red LED D74.

PCIexpress status LED

The PCIexpress status LED D32-D37 shows active devices on available PCIexpress ports and if the PCIe switch is working correctly

LED	Description
D32	PCIe Switch Lane 4 good (PCIe Slot C)
D33	PCIe Switch Lane 3 good (PCIe Slot B)
D34	PCIe Switch Lane 2 good (Express Card)
D35	PCIe Switch Lane 1 good (PCIe2PCI Bridge)
D36	PCIe Switch Lane 0 good (Uplink)
D37	PCIe Switch Error
D74	PCIe Switch disabled (PCIe Slot C inactive)
D75	PCIe Switch enabled (PCIe Slot A inactive)

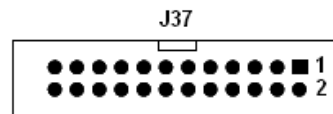
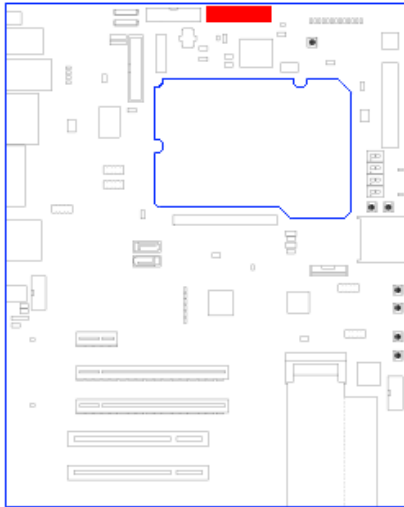
Express Card

The Express Card Slot J41 in combination with USB #5 allows 1.3A on 3.3V, 275mA on AuxPower and 650mA on 1.5V continuous Card Power with pin-out in table below. Close configuration jumper J64 to disable the Express Card slot

Pin	J41 Signal	Pin	J41 Signal
1	GND	14	3.3VS_1
2	USB_D-	15	3.3VS_0
3	USB_D+	16	CLKREQ#
4	CPUSB#	17	CPPE#
5	NC	18	REFCLK-
6	NC	19	REFCLK+
7	SMB_CLK	20	GND
8	SMB_DATA	21	PERNO
9	1.5V_2	22	PERP0
10	1.5V_1	23	GND_1

5.11 Kontron Feature connector

The Kontron Feature connector provides additional interfaces such as I2C, SMBus or Power Control Signals. See the table below for detailed pin-out description

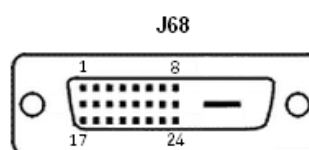
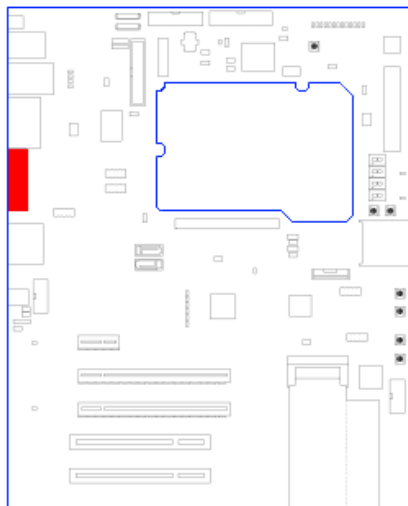


Pin	Signal	Level	Signal Description
1	PWR_+5V	5V power	+5V UL-protected with inductor (600R@100MHz, 1A)
2	GPO2	3.3V-O	General-purpose power management event output
3	#BATLOW	3.3V-I	Battery low input. May be driven low by external circuitry to signal that the system battery is low, or may be used to signal some other external power management event.
4	GPI2	3.3V-I	General-purpose power management event input
5	#SYS_RESET	3.3V-I	This input may be driven low by external circuitry in order to reset the power management logic
6	WDT	3.3V-O	Indicating that a Watchdog Timeout Event has occurred (non buffered module output)
7	LPC_SERIRQ	3.3V-I	Serial interrupt request. This pin is used to support the serial interrupt protocol.
8	-	-	Not connected
9	I2C_DAT	3.3V-I/O	Data line of I2C-Bus
10	#SMB_ALERT	3.3V-I	System Management Bus Alert input. May be driven low by SMB devices in order to signal an event on the SM Bus
11	I2C_CLK	3.3V-O	Clock line of I2C-Bus
12	SMB_DAT	3.3V-I/O	Clock and data line of SM-Bus.
13	SMB_CLK	3.3V-O	
14	-	-	Not connected
15	#WAKE1	3.3V-I	Low driven general purpose wake-up signal
16	VCC_RTC	3V-I	3V backup cell input. Should be connected to a 3V backup cell for RTC operation and storage register non-volatility in the absence of system power. (VBATT = 2.4 – 3.3V)
17	#THRM	3.3V-I	Input from off-module temperature sensor indicating an over temperature situation
18	GND	GND	Ground
19	PWR_OK	3.3V-I	High active input indicating that power from the power supply is ready. It can also be used as low active reset input signal.
20	GND	GND	Ground
21	#PWRBTN	3.3V-I	Power Button Input. This input is used to support the ACPI Power Button function.

22	GND	GND	Ground
23	#ATA_ACT	3.3V-0	Low active output signal, which indicates activity on IDE interfaces.
24	#CB_RESET	3.3V-0	Low active Reset output from module to carrier board

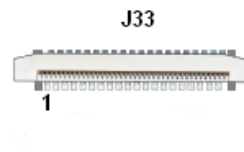
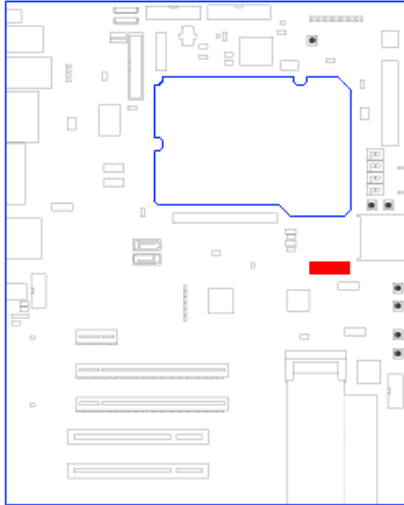
5.12 DVI-D

On COM Express® Eval Type 10 the DVI output is available through a Silicon Image SiL1364/A SDVO to single link DVI Panellink Transmitter. Check your module documentation if SDVO is available on DDI interface defined for Type 10 pin-out based modules.



5.13 LVDS

The 40-pin JILI LVDS panel connector J33 allows connecting a flat panel directly to the module's dual channel LVDS output. Check your module documentation for available BIOS configurations for this flat panel output.

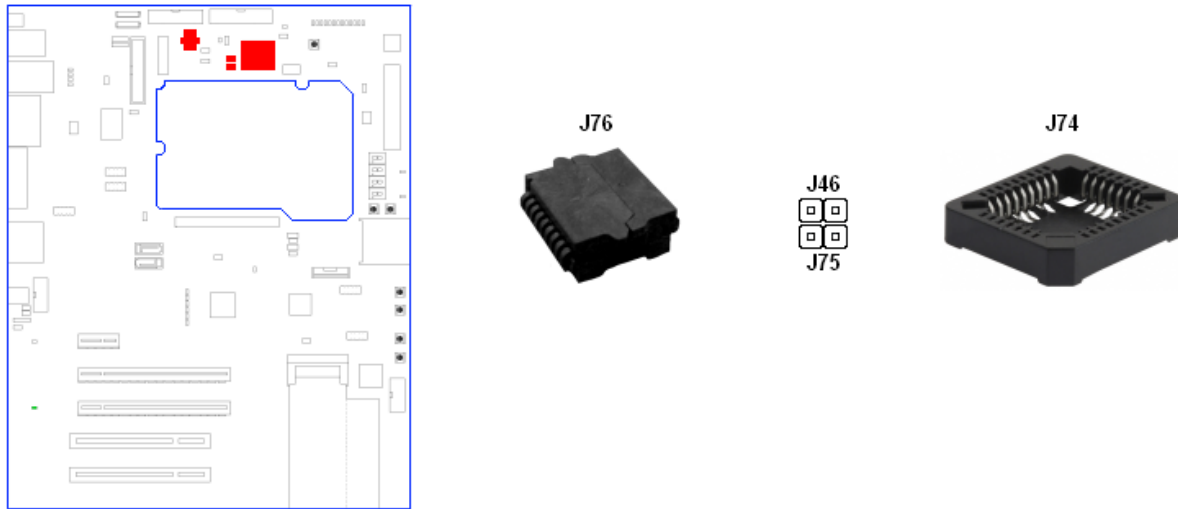


Pin	LVDS Signal	Pin	LVDS Signal
1	NC	21	LCDD013
2	LCDD00	22	DETECT# (GND)
3	LCDD01	23	LCDD014
4	ENAVDD	24	LCDD015
5	LCDD02	25	GND
6	LCDD03	26	LCDD016
7	NC	27	LCDD017
8	LCDD04	28	GND
9	LCDD05	29	LCDD018
10	GND	30	LCDD019
11	LCDD06	31	+5V
12	LCDD07	32	+5V
13	GND	33	+5V
14	LCDD08	34	+5V
15	LCDD09	35	BLON#
16	JILI_DAT	36	GND
17	LCDD010	37	GND
18	LCDD011	38	+12V
19	JILI_CLK	39	+12V
20	LCDD012	40	+12V

5.14 External BIOS

The COM Express® Eval Type 10 supports external boot. By closing Jumper J46 the module's onboard BIOS is disabled and the system will boot from an external Firmware Hub in U43 PLCC socket J74.

For modules supporting SPI boot the COM Express® Eval Type 10 provides a SPI socket J76 for an optional available SPI Flash. SPI is part of COM.0 Specification Rev 2.0 and external SPI boot can be enabled by closing Jumper J75. Please check the documentation of your module if SPI is supported and which SPI Flash size is required.



Booting from external BIOS:

- » Close Jumper J46 to boot from the baseboard's LPC Firmware
- » Close Jumper J75 to boot from the baseboard's SPI Flash

Flashing the external BIOS:

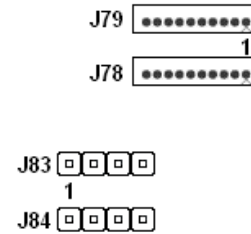
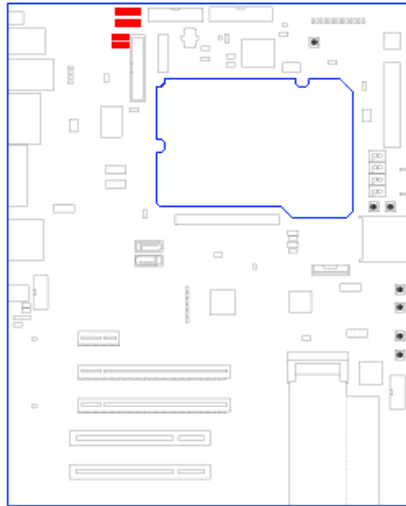
- » Prepare a bootable USB flash drive and save BIOS and flash utility in the root folder
Please check Application Note KEMAP046 available at Kontron's customer section for more details
- » Open J46/J75 to boot from the module's BIOS
- » Power on the system and boot from our USB flash drive
- » Close J46 to enable the LPC FWH or close J75 to enable the SPI Flash
- » Execute the BIOS update command (e.g. afudos.exe bios.rom /P /B /N /C /X)
- » Reboot your system if flash procedure has finished
- » Your system should now start from external BIOS

Note: Please check module documentation if external boot from LPC FWH and/or SPI Flash is supported

Warning: Do not close both jumpers at the same time

5.15 Serial Interface

The PICMG COM.0 specification revision 2.0 defines two optional 2-pin serial interfaces on COM Express® connector pins A98/A99 and A101/A102 formerly used for 12V VCC input. Both new interfaces are available directly on optional pin-header J83 and J84.

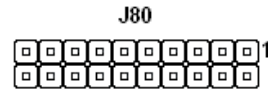
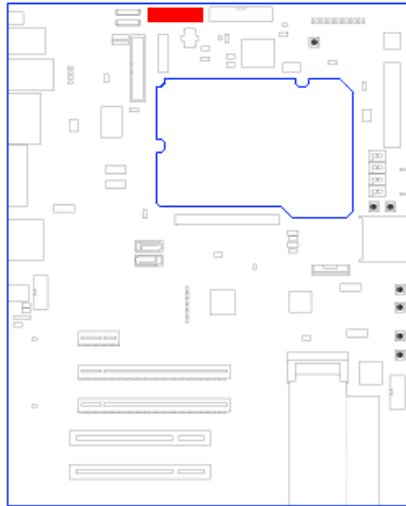


J78 and J79 allow both interfaces to be used as 2-pin RS232 interfaces COMA and COMB with Kontron Adapter cable [KAB-DSUB9-3](#). Please check the documentation of your module if this interface is supported and how to configure.

Pin	J78 (COMA)	J79 (COMB)	J83 (SER0, A98/99)	J84 (SER1, A101/102)
1	n.c.	n.c.	+5V	+5V
2	n.c.	n.c.	SER0_TX	SER1_TX
3	RX0	RX1	SER0_RX	SER1_RX
4	n.c.	n.c.	GND	GND
5	TX0	TX1	-	-
6	n.c.	n.c.	-	-
7	n.c.	n.c.	-	-
8	n.c.	n.c.	-	-
9	GND	GND	-	-
10	+5V	+5V	-	-

5.16 Status & Debug Connector

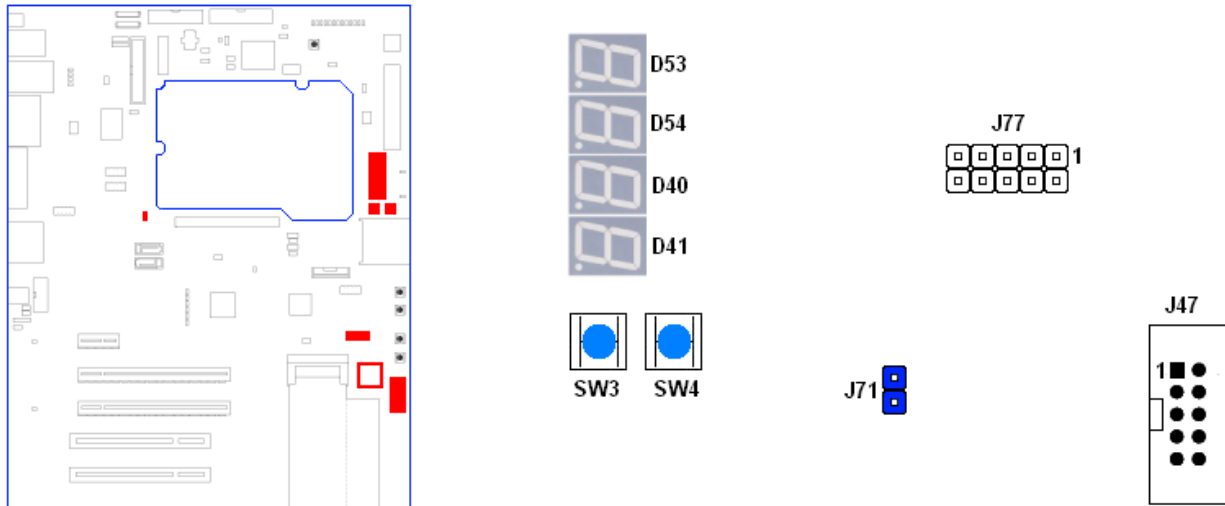
For debugging and measurements some important status signals are available on pin-header J80 for direct access.



Pin	Description	Pin	Description
1	+3.3V SBY	2	GND
3	TPM_PP	4	SUS_STAT#
5	WDT_LATCHED	6	SUS_S3#
7	RST_WDT_L#	8	SUS_S4#
9	SPKR	10	SUS_S5#
11	EXCD0_CPPE#	12	GBE0_ACT#
13	EXCD0_PERST#	14	GBE0_LINK100#
15	EXCD1_CPPE#	16	GBE0_LINK1000#
17	EXCD1_PERST#	18	GBE0_LINK#
19	+3.3V	20	GND

5.17 CPLD & POST-Code Display

Power Management control, 4 digits LPC/PCI Port 80/81 Post Code and additional GPIOs are implemented in onboard Altera CPLD (U44).



Port 80/81 POST Code display

The 7-segment display D53/D54 for Port 81 and D40/41 for Port 80 shows BIOS status codes during boot-up process. Last 8 check codes are stored automatically and can be controlled by switch SW3 (Post Code step backward) and switch SW4 (Post code step forward). Pressing SW3 and SW4 simultaneously returns to newest POST code.

The POST Code display also shows current Suspend state:

- » S3 -> POST code "___ 3"
- » S4 -> POST code "___ 4"
- » S5 -> POST code "___ 5"

Power Good J71

The Power Good output generated by the CPLD must be high level to allow the module to start. Some modules may provide direct power-on support if VCC gets connected and PWR_OK (COM Express pin B24) is open or at high level. To test this functionality configuration jumper J71 can be opened to disconnect Power Good.

J77 - CPLD I/O Port

The I/O Port J77 provides 8 I/O ports directly from the CPLD without any functionality in default configuration.

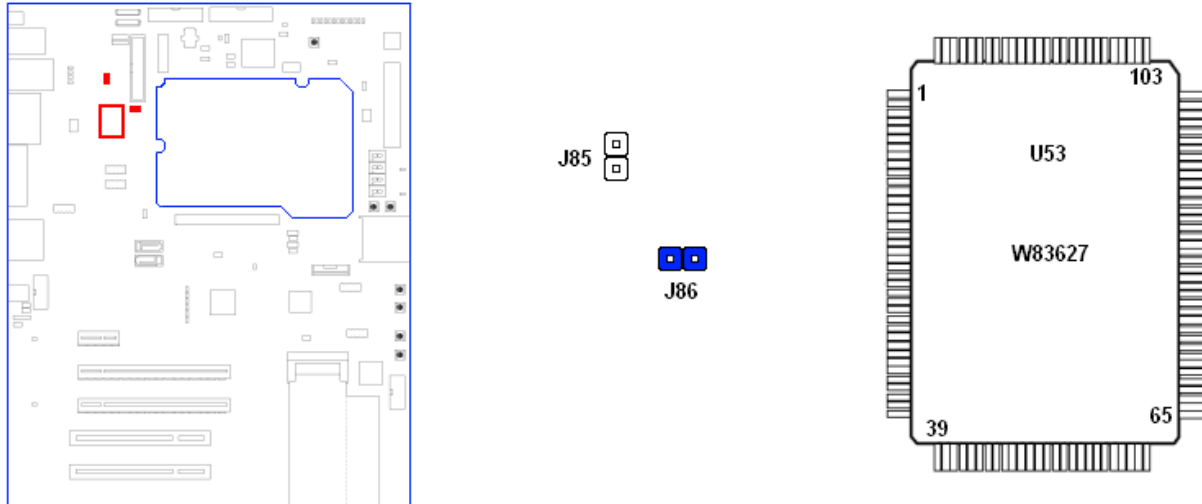
J7 pin	Function	J7 pin	Function
1	VCC 3.3V SBY	2	GND
3	CPLD_IO_PIN64	4	CPLD_IO_PIN66
5	CPLD_IO_PIN67	6	CPLD_IO_PIN68
7	CPLD_IO_PIN69	8	CPLD_IO_PIN70
9	CPLD_IO_PIN71	10	CPLD_IO_PIN72

J47 - CPLD JTAG Connector

J7 pin	Function	J7 pin	Function
1	TCK (PD 1K0)	2	GND
3	TDO (PU 1K0 3.3VSBY)	4	3.3V SBY
5	TMS (PU 1K0 3.3VSBY)	6	n.c.
7	n.c.	8	n.c.
9	TDI (PU 1K0 3.3VSBY)	10	GND

5.18 Winbond 83627 Super-I/O

A Winbond 83627HFJ Super-I/O controller (U53) is connected to module's LPC bus to offer legacy interfaces like RS232 and parallel ports additionally to temperature, FAN and voltage monitoring features. The default SIO LPC address is 2Eh.

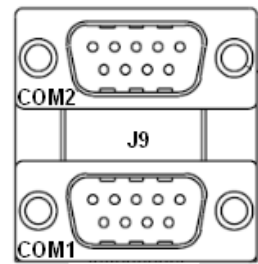
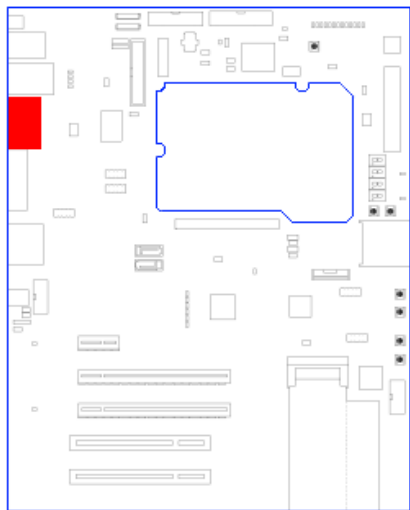


The configuration jumpers J85 enables the SIO keyboard controller when closed. Open J86 to hold the Super-I/O in reset to simulate a legacy free backplane.

Note: A LPC Super-I/O controller requires BIOS support. Please check the documentation of your module if the Winbond 83627 is supported.

5.18.1 RS232

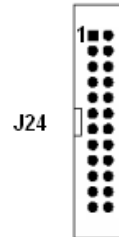
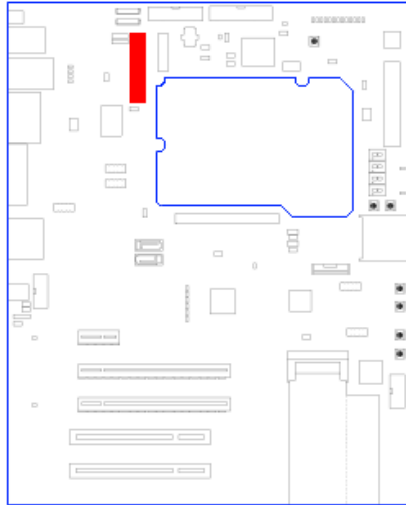
With Winbond 83627 LPC-I/O two serial ports are supported. Both COM ports can be configured in module BIOS setup if Super-I/O support is implemented.



Pin	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

5.18.2 LPT

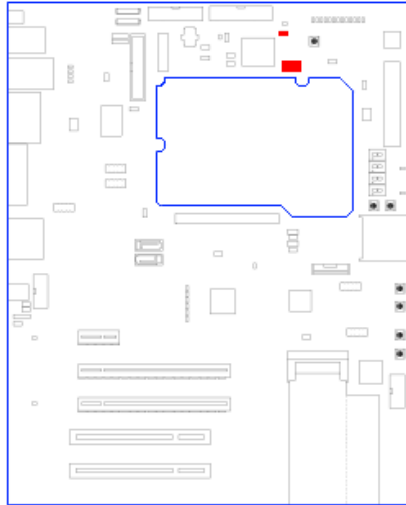
The Winbond 83627 LPC-I/O supports one parallel port available on baseboard's pin header J24. Use the optional available [KAB-DSUB25-1](#) cable adapter to access the LPT port and check to module BIOS to configure the port resources.



Pin	Signal	Pin	Signal
1	#STB	2	#AFD
3	PD0	4	#ERROR
5	PD1	6	#INIT
7	PD2	8	#SLCTIN
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	#ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	n.c.

5.18.3 FAN

The COM Express® Eval Type 10 provides one 4-pin PWM FAN connector directly controlled by the LPC-I/O PWM output 1. If configuration jumper J60 is open (default) the PWM FAN J44 is controlled by the module FAN output specified in COM.0 revision 2.0 specification if supported by the module.



J60

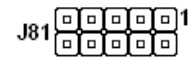
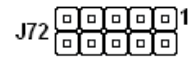
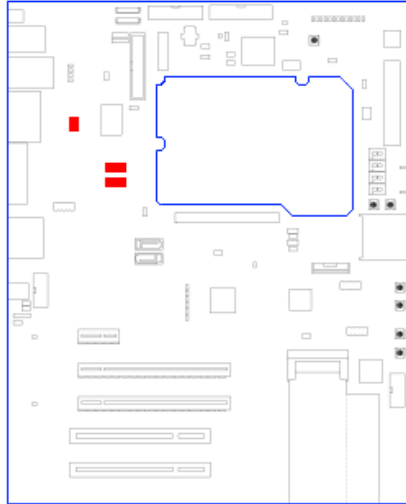



J44

Pin	J50 on COM Express® Eval Type 10
1	GND
2	+12V
3	Sense
4	Control (PWM)

5.18.4 SIO Debug connectors

For debugging Winbond 83627 LPC-I/O GPIOs and FAN/Voltage interfaces are available via pin-header.



Pin	J72 - GPIO	J81 - FAN	J82 - Voltage
1	+5V	+3.3V	SIO HWM IN - VCOREA
2	GND	GND	SIO HWM IN - 12V
3	SIO GP10 / JOAYABTN0	Module FAN_PWMOUT#	SIO HWM IN - VCOREB
4	SIO GP11 / JOYBBTN0	Module FAN_TACHIN	SIO HWM IN - -5V
5	SIO GP12 / JOYAX	SIO HWM OUT - FANPWM1	SIO HWM IN - 3.3V
6	SIO GP13 / JOYBX	SIO HWM IN - FANIO1	GND
7	SIO GP14 / JOYBY	SIO HWM OUT - FANPWM2	-
8	SIO GP15 / JOYAY	SIO HWM IN - FANIO2	-
9	SIO GP16 / JOYBBTN1 SIO GP20 / MDRX	SIO HWM OUT - FANPWM3	-
10	SIO GP17 / JOYABTN1 SIO IRQIN / MDTX0	SIO HWM IN - FANIO3	-

Note: Check the module's BIOS how to enable the baseboard hardware monitor for monitoring voltages and fan revolutions via JIDA32/K-Station or in BIOS HWM setup page.

SIO GPIOs are not accessible via JIDA interface.

5.19 FRU-PROM (I2C EEPROM)

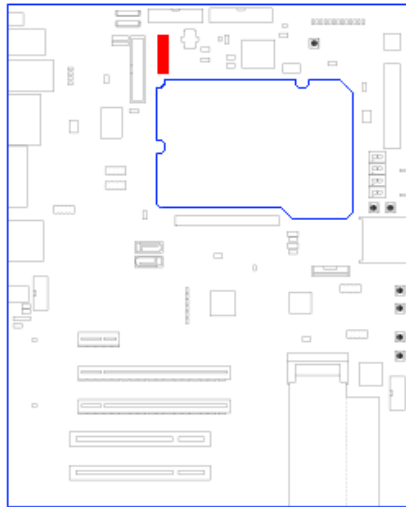
Following the new COM Express® specification the COM Express® Eval Type 10 provides an I2C EEPROM. The FRU-PROM (Field Replacable Unit; U76) at I2C address 07h can be used to store user specific data or baseboard configuration settings.

5.20 SM Bus Devices

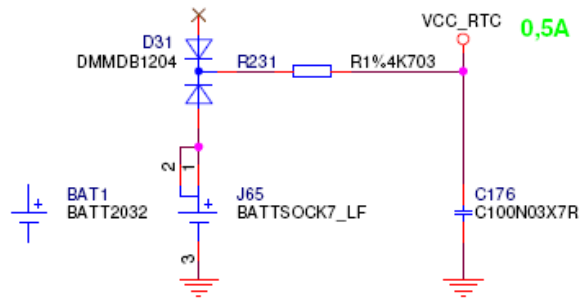
The COM Express® Evaluation Board Type 10 uses 2 chips that are connected to the SM Bus of the module at the following addresses:

Chip	SM Bus Address
Clock Buffer IDT ICS9DB801C	0x6e/0xdc
PCIe switch PLX PEX 8505AA	0x3f/0x7e

6 Battery Information



RTC Battery



English:

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Deutsch:

VORSICHT: Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

French:

ATTENTION: Risque d'explosion avec l'échange inadéquat de la batterie. Remplacement seulement par le même ou un type équivalent recommandé par le producteur. L'évacuation des batteries usagées conformément à des indications du fabricant.

Danish:

ADVARSEL: Lithiumbatteri – Eksplosionsfare ved fejlagtig Håndtering. Udskifting må kun ske med batteri af samme fabrikant og type. Lever det brugte batteri tilbage til leverandøren.

Finnish:

VAROITUS: Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan alitevalmistajan suosittelemaan tyyppiln. Havita kaytetty paristo valmistajan ohjeiden mukaisesti.

Spanish:

Precaución: Peligro de explosión si la batería se sustituye incorrectamente. Sustituya solamente por el mismo o tipo equivalente recomendado por el fabricante. Disponga las baterías usadas según las instrucciones del fabricante.

Note: The battery of this product is not considered to be accessible by the end user. Therefore the safety instructions are only given in English, German, French, Danish, Finish and Spanish language.

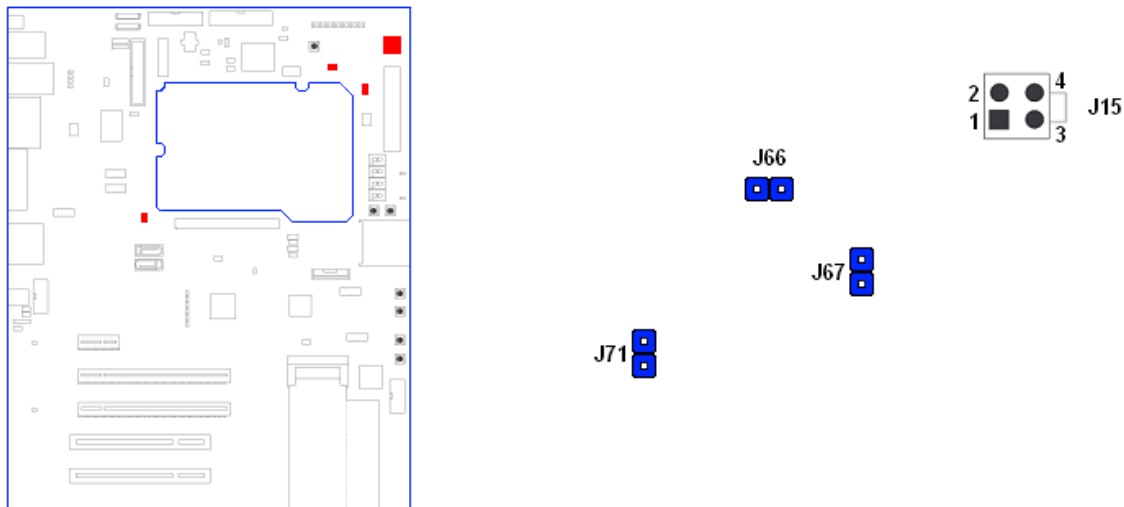
If the battery of this product however is accessible by the end user, it is in the responsibility of the Kontron customer to give the corresponding safety instructions in the required language(s).

7 Module Single Supply and Wide Range

The Computer-on-Module power is supplied directly from ATX_12V connector J15. Kontron modules are capable of working in a wide range voltage input and therefore it's possible to connect module VCC on J15 parallel to ATX supply J22 for the baseboard.

Please check the documentation of your product if a wide range voltage input is supported. Kontron Computer-on-Modules usually supports:

- » COM Express® modules in mini size form factor:
4.75V to 14V
- » COM Express® modules in compact and basic size form factor
8.5V to 18V



Additionally Kontron modules support single supply operation without standby voltage. To enable module single supply mode open jumper:

- » J66 to enable Baseboard's S5Eco mode
- » J67 to disconnect 5VSB from the module
- » J71 to disconnect Power Good (PWR_OK)

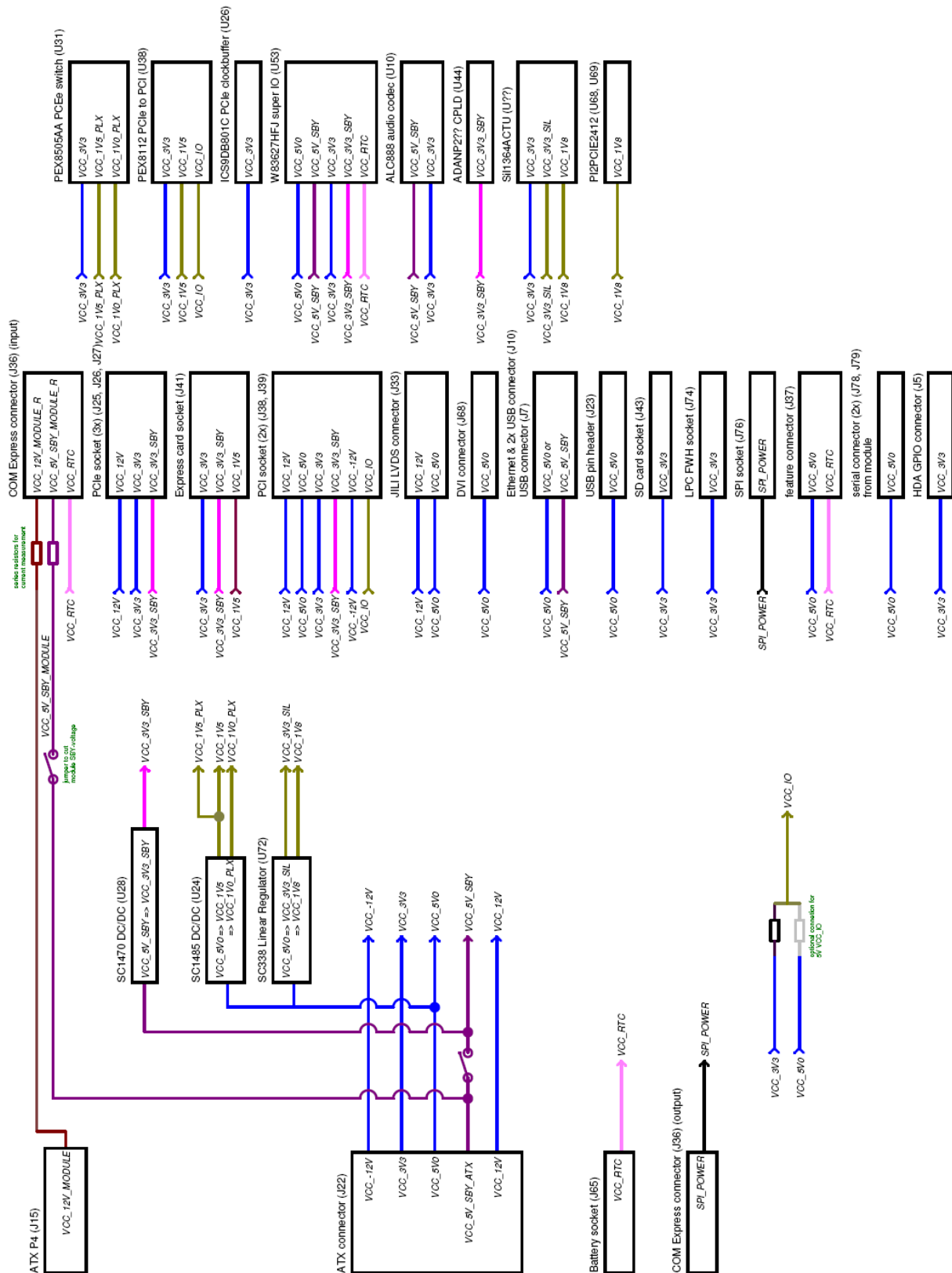
8 Compatibility Matrix

The COM Express® Eval Type 10 supports Computer-on-Modules following PICMG COM.0 Revision 1.0 pin-out Type 1 or COM.0 revision 2.0 pin-out Type 10.

See table below which features are supported by Kontron's COM Express® mini form factor modules:

Con	Feature	COMe-mSP1	COMe-mTT10	COMe-mCT10
J15	ATX 12V Power	4.75V - 14V	4.75V - 14V	4,75-14V
J25	PCIexpress Slot A	if PCIe Switch is disabled	if PCIe Switch is disabled	if PCIe Switch is disabled
J26	PCIexpress Slot B	if PCIe Switch is enabled	if PCIe Switch is enabled	if PCIe Switch is enabled
J27	PCIexpress Slot C	if PCIe Switch is disabled	if PCIe Switch is disabled	if PCIe Switch is disabled
J41	ExpressCard	YES, but USB#5 is USB 2.0 only	YES	YES
J38	PCI Slot0	if PCIe Switch is enabled	YES	if PCIe Switch is disabled
J39	PCI Slot 1	if PCIe Switch is enabled	YES	if PCIe Switch is enabled
J41	Express Card	if PCIe Switch is enabled	YES	if PCIe Switch is disabled
J34	SATA1	on variants without onboard LAN	YES	YES
J61	USB #4 / USB #6 Ethernet RJ45	USB 2.0 only	No USB #6	YES
J44	PWM FAN (SIO/Module)	SIO YES / Module NO	SIO YES / Module optional	SIO YES / Module YES
J68	DVI-D (SDVO2DVI)	Optional	YES	NO
J74	LPC FWH for external BIOS	YES	NO	NO
J76	SPI Flash for external BIOS	NO	YES	YES
J78	RS232 COMA from module	NO	YES	Optional
J79	RS232 COMB from module	NO	YES	Optional
J83	SER0 from module	NO	YES	Optional
J84	SER1 from module	NO	YES	Optional
J92	LID	NO	Optional	YES
SW6	SLEEP	NO	Optional	YES

9 Power Distribution



10 Security Advice

To protect the external power lines to peripheral devices the customer has to take care about:

- The wires to the external device have the right diameter to withstand the max. available current
- The housing of the external device fulfils the fire protection requirements of IEC/EN 60950.

11 Document Revision History

Revision	Date	Edited by	Changes
0.10_prelim	08.10.08	PRO	Initial Release for nanoETXexpress Eval Board COM.0 revision 1.0 Type 1
110	11.10.2010	PRO	Updated to redesign variant 34101-0000-00-1 nanoETXexpress Eval Board COM.0 revision 2.0 Type 1/Type 10
120	04.11.2010	PRO	Added speed limitation for SDIO Updated supported features by nETXe-SP
130	04.11.2010	PRO	Updated Product name
140	13.07.2011	UMA	Updated ® and ™, changed LID button to LID jumper, changed “ALC888” to “ALC888/ALC886”, added SM Bus addresses
141	07.03.2011	UMA	Renaming from ETXexpress® to COM Express® an ultra to mini, removed typo at KAB-DSUB9-3

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