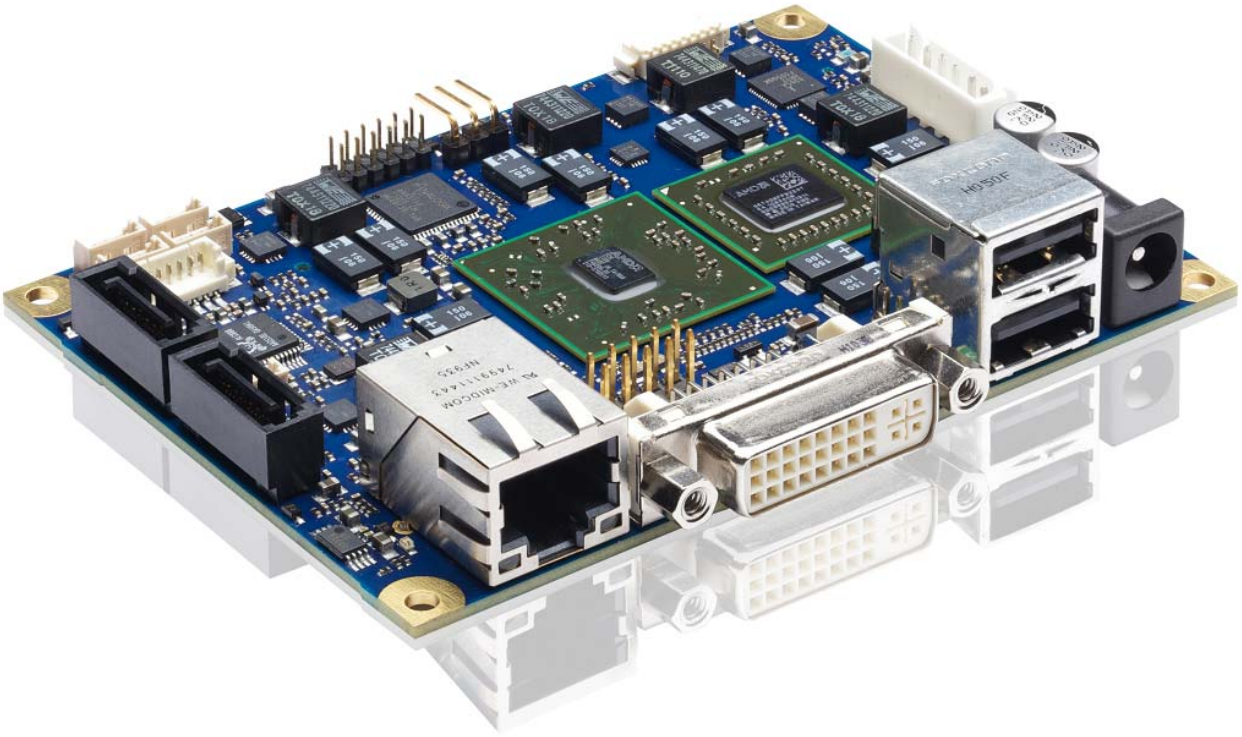
kontron

» Kontron User's Guide «



KTA55/pITX

KTD-S0031-G

Pico™

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1 User Information

1.1 About This Document

This document provides information about products from KONTRON Technology A/S and/or its subsidiaries. No warranty of suitability, purpose or fitness is implied. While every attempt has been made to ensure that the information in this document is accurate the information contained within is supplied “as-is” - no liability is taken for any inaccuracies. Manual is subject to change without prior notice.

KONTRON assumes no responsibility for the circuits, descriptions and tables indicated as far as patents or other rights of third parties are concerned.

1.2 Copyright Notice

1.3 Trademarks

Brand and product names are trademarks or registered trademarks of their respective owners.

1.4 Standards

KONTRON Technology A/S is certified to ISO 9000 standards.

1.5 Warranty

This product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period KONTRON Technology A/S will at its discretion decide to repair or replace defective products.
Within the warranty period the repair of products is free of charge as long as warranty conditions are observed.
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.
KONTRON Technology A/S will not be responsible for any defects or damages to third party products that are caused by a faulty KONTRON Technology A/S product.

1.6 Life Support Policy

KONTRON Technology's products are not for use as critical components in life support devices or systems without express written approval of the general manager of KONTRON Technology A/S.
As used herein:
Life support devices or systems are devices or systems which
a) are intended for surgical implant into body or
b) support or sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labelling, can be reasonably expected to result in significant injury to the user.
A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

1.7 Technical Support

Please consult our web site at **http://www.kontron.com/support** for the latest product documentation, utilities, drivers and support contacts or use the special e-mail address **sbc-support@kontron.com** for a technical problem. In any case you can always contact your board supplier for technical support.
Before contacting support please be prepared to provide as much information as possible:
Board identification:

- Type
- Part number (find PN on label)
- Serial number (find SN on label)

Board configuration:

- DRAM type and size
- BIOS revision (find in the BIOS Setup)
- BIOS settings different than default settings (refer to the BIOS Setup section)

System environment:

- O/S type and version
- Driver origin and version
- Attached hardware (drives, USB devices, LCD panels ...)

2 Introduction

2.1 *p*ITX Embedded Line Family

Each *p*ITX is a member of the 2.5" SBC family of KONTRON Technology A/S based on the Pico-ITX™ specification (only mechanical outer dimensions) from the Small Form Factor Special Interest Group (SFF-SIG).
*p*ITX embedded line modules are characterized by the same front-line pinouts and interfaces for reset logic and simple power supply, 2 x USB, Gigabit LAN, S-ATA, Audio, GPIOs, DVI and LVDS interface. These embedded line family features allow to use of the same chassis over the whole product line and maximize design reuse.
The *p*ITX embedded line modules allow the use of standard laptop memories.
These homogeneous features facilitate easy upgrades within the *p*ITX embedded line product family. Connection of LCD panels is simplified when using the onboard standard JILI30 interface.

3 Specifications

3.1 Functional Specifications

Processor: AMD® T40N (Embedded G-Series, 1.0 GHz)

- 64 bit dual core CPU
- AMD® Virtualization™ technology (AMD®-V™)
- 32 kB data and 32 kB instruction L1 cache
- 512 kB L2 cache for each core
- One 64 bit DDR3-800 or DDR3-1066 DDR-SDRAM (SODIMM form factor) up to 4 GB
- AMD® Radeon™ HD 6250 graphic controller with dual independent display support
- 4-lane Unified Media Interface (UMI) to connect the Hudson-E1 Controller Hub
- Four PCI Express® ports (x1 lanes), only two ports used

Chipset: AMD® Hudson-E1 Controller Hub

- Four PCI Express® ports (x1, x2 or x4), unused
- 33 MHz PCI host interface, used as GPIOs
- Sixteen USB channels (OHCI/EHCI) (only six channels available)
- Six S-ATA ports (only two ports available)
- Integrated High Definition audio with four streams (HD audio), (only one stream used)
- One Gigabit LAN controller, unused
- Configurable GPIO ports (multiplexed with other functions)
- One LPC host controller
- Hardware monitoring with Integrated Micro Controller (IMC)
- ACPI 3.0 compatible power management

Onchip Video Graphics Array (VGA)

- Supports a DVI-I monitor interface (max. 165 MHz pixel clock)
- The Low Voltage Differential Signaling (LVDS) flatpanel interface supports dual clock panels with 18/24 bit color depth and resolutions up to 1920x1200 pixel
- Highly optimized 128 bit 2D accelerator
- 3D accelerator with full DirectX® 11, Open CL™ 1.1 and Open GL 2.1/3.2 support
- Full hardware acceleration of following video decode standards: H.264, MPEG2, MPEG4 and VC-1

Onchip Serial-ATA (S-ATA)

- Complies with S-ATA III specification (compatible to S-ATA I and S-ATA II)
- Supports three modes: Legacy IDE, Native IDE and AHCI/RAID
- RAID0, RAID1, RAID5 and RAID10 support

Onchip Universal Serial Bus (USB)

- Six ports are capable to handle USB 1.1 (OHCI) and USB 2.0 (EHCI)

Onchip High Definition Audio

- Up to 24 bit sample resolution with 192 kHz sample rate
- Use the onboard HD audio codec ALC888 (Realtek)
- Supports LINE OUT, LINE IN, MICROPHONE IN and S/PDIF output
- Unified Audio Architecture (UAA) compatible

Onchip Digital I/O

- Eight bidirectional I/O lines, +3.3V signal level

Onchip Temperature Monitoring

- One CPU and one chipset temperature sensor

Secure Digital I/O / Multimedia Card (PCI Express®): JMicron JMB389A

- Fully compliant with SDIO revision 2.0 and MMC revision 4.2
- Supports Extended Capacity SD Memory Cards (SDXC), more than 32 GB and up to 2 TB
- Supports xD-Picture Cards™ including Type M+, Type M and Type H

Gigabit LAN (PCI Express®): Intel® 82574L

- Full duplex operation at 10/100/1000 Mbps
- Fully compliant with IEEE 802.3, IEEE 802.3u and IEEE 802.3ab

Trusted Platform Module (LPC): Infineon SLB9635TT

- Chipset LPC bus supports TPM 1.2 devices

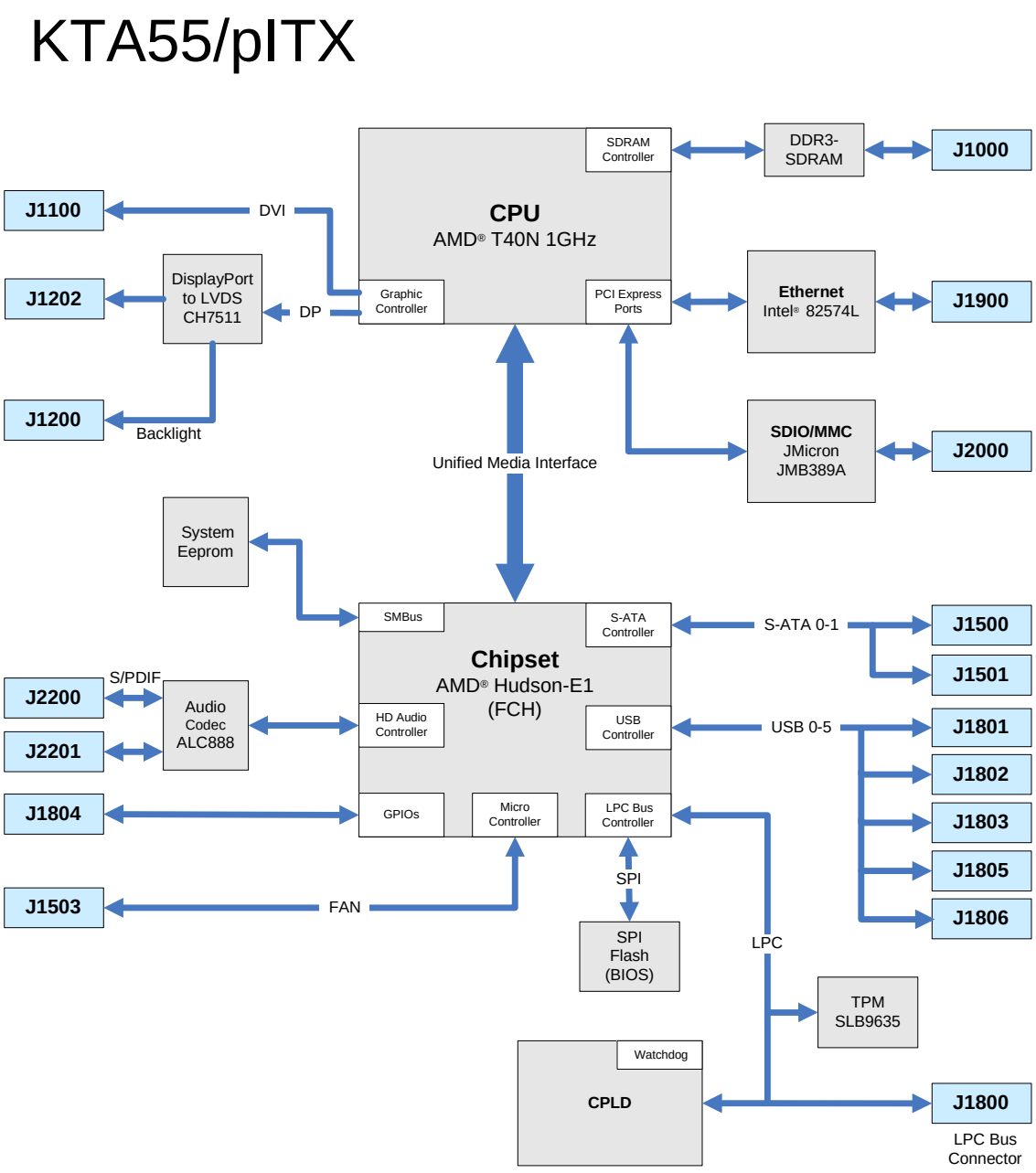
Watchdog Timer (CPLD)

- Seven discrete time-out values from 1 second to 10 minutes

BIOS: AMI®, 4 MB Flash BIOS

Real-Time Clock (RTC) with CMOS RAM and battery

3.2 Block Diagram



3.3 Mechanical Specifications

Dimensions

- Pico-ITX™ form factor 100 x 72 mm ±0.2 mm (complete with all connectors 100 x 80 mm)
- Height approx. 46 mm (including heat-sink with fan)

3.4 Electrical Specifications

Supply Voltage

- +5V DC ±5%

Supply Voltage Ripple

- Maximum 100mV peak to peak 0 – 20 MHz

Supply Current (DOS prompt)

Power consumption tests were executed during the DOS prompt with 4 GB DDR3 SDRAM, DVI monitor, USB keyboard and S-ATA SSD (Solid State Drive, external powered) as boot device (default BIOS settings).

Full Load		Soft Off S5	
[A]	[W]	[A]	[W]
2.85	14.25	0.075	0.375

Supply Current (Windows® 7, 64 bit)

The power consumption tests were executed during Windows® 7 by using a tool to stress the CPU (100% load) and extensive 3D graphic. The boards were ran with 4 GB DDR3 SDRAM, DVI monitor, USB keyboard & mouse and S-ATA (Solid State Drive, external powered) as boot device (default BIOS settings).

Full Load		Idle		Standby S3	
[A]	[W]	[A]	[W]	[A]	[W]
3.15	15.75	1.45	7.25	0.11	0.55

3.5 Real-Time Clock Battery

- Voltage range: +2.4V - +3.6V (typ. +3.0V)
- Typical current: 5µA @ +3.0V

Lithium battery precautions

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instructions.	**VORSICHT!** Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch den selben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.
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.	**PRECAUCION!** 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.
ADVARSEL! Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.	**ADVARSEL!** Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.
VARNING! Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.	**VAROITUS!** Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan lalteval-mistajan suosittelemaan tyyppiln. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

3.6 Environmental Specifications

Temperature

Operating (with original KONTRON heat-spreader plate and heat-sink):

- Ambient temperature: 0 to +60°C [1)]

Non operating:

- Ambient temperature: -10 to +85°C

Note: *1) It is the customer's responsibility to provide sufficient airflow around each of the components to keep them within the allowed temperature range.*

Humidity

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

3.7 MTBF

The following MTBF (Mean Time Between Failure) 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.) cause lower MTBF values.

- System MTBF (hours): 252839

Note: ***Fans usually shipped with KONTRON Technology A/S products have 50.000-hour typical operating life. The above esti- mation assumes no fan but a passive heat sinking arrangement. Estimated RTC battery life (as opposed to battery failures) is not included in the MTBF calculation. The RTC battery lifetime has to be considered separately. Battery life depends on both temperature and operating conditions. When the KONTRON unit has external power; the only battery drain is from leakage paths.***

4 Getting Started

Getting started with the KTA55/pITX is simple. Take the following steps:

- Plug a suitable DDR3-SDRAM memory module into the RAM socket.
- Connect a DVI monitor to the DVI connector.
- Plug a keyboard and/or mouse to the USB connector(s).
- Attach a harddisk to the S-ATA connector.
- Make sure all your connections have been made correctly. Connect the power supply to the KTA55/pITX power supply connector.
- Turn on the board by shortening the power button pins with a push button on power front panel header (J2401) or use the autostart jumper (J2403). In case the display does not turn on please consult chapter "15.1 Wrong BIOS Settings".
- Enter the BIOS by pressing the Del key during boot-up. Make all changes in the BIOS Setup. See the BIOS Setup chapter of this manual for details.

5 System Memory

The KTA55/pITX uses only 204 pin Small Outline Dual Inline Memory Modules (SODIMMs). One socket is available for +1.5V unbuffered DDR3-800 or DDR3-1066 SDRAM of up to 4 GB.

The total amount of memory available on the SDRAM module is used for main memory and graphic memory on KTA55/pITX. Unified Memory Architecture (UMA) manages the sharing of the system memory between graphic controller and processor. Therefore the full memory size is not available for software applications.

Attention: KONTRON Technology A/S cannot guarantee the correct functionality of the KTA55/pITX when a module faster then DDR3-1066 is used.

NEW SKU 04/2016*	SKU Name**	OLD SKU before 04/2016
1060-2502	DDR3-1066 SODIMM 1GB	1054-3773
1060-2508	DDR3-1066 SODIMM 2GB	1054-3777
1060-2512	DDR3-1333 SODIMM 2GB	1054-3781
1060-2518	DDR3-1333 SODIMM 2GB	1055-8136
1060-2514	DDR3-1333 SODIMM 4GB	1054-3782
1060-2506	DDR3-1600 SODIMM 1GB	1054-3776
1060-2482	DDR3-1600 SODIMM 2GB	1051-5403
1060-2484	DDR3-1600 SODIMM 4GB	1051-9057

*SKU changes were caused by administrative issues only, no hardware changes.

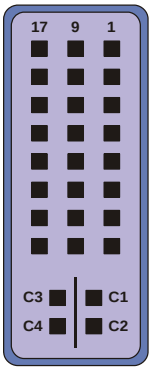
**Named are always the min. requirements, the shipped memory can fulfill a higher performance level

6 Graphics Interface

The graphics accelerator supports a DVI interface up to 165 MHz combined with a DisplayPort/LVDS controller with dual clock, color depths of 18/24 bit and resolutions up to 1920x1200 pixel.

6.1 DVI-I Connector

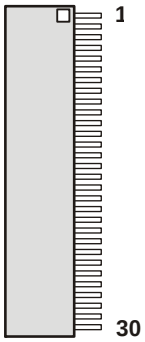
The DVI interface is available through the standard 29 pin DVI-I connector J1100.

Header	Pin	Signal Name	Function
	1	**TMDS2-**	TMDS data 2 (negative)
	2	**TMDS2+**	TMDS data 2 (positive)
	3	**GND**	Ground
	4	**N.C.**	Not connected
	5	**N.C.**	Not connected
	6	**DDC_CLK**	DDC clock
	7	**DDC_DATA**	DDC data
	8	**VSYNC**	Vertical sync (analog)
	9	**TMDS1-**	TMDS data 1 (negative)
	10	**TMDS1+**	TMDS data 1 (positive)
	11	**GND**	Ground
	12	**N.C.**	Not connected
	13	**N.C.**	Not connected
	14	**VCC** [1)]	Power +5V
	15	**GND**	Ground
	16	**TMDS_HPD**	Hot plug detect
	17	**TMDSO-**	TMDS data 0 (negative)
	18	**TMDSO+**	TMDS data 0 (positive)
	19	**GND**	Ground
	20	**N.C.**	Not connected
	21	**N.C.**	Not connected
	22	**GND**	Ground
	23	**TMDS_CLK+**	TMDS clock (positive)
	24	**TMDS_CLK-**	TMDS clock (negative)
	C1	**RED**	Red video signal (analog)
	C2	**GREEN**	Green video signal (analog)
	C3	**BLUE**	Blue video signal (analog)
	C4	**HSYNC**	Horizontal sync (analog)
	C5	**GND**	Ground (analog)

Note: *1) To protect the external power lines of peripheral devices make sure that*
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

6.2 Flat Panel Connector (JILI30)

The LVDS interface for the flat panel is available through the J1202 connector (30 pins) on the bottom side of the board. This connector represents the JILI interface. The implementation of this subsystem complies with the JILI specification of KONTRON Technology A/S. A variety of cables for different display types are available from KONTRON. Please refer to the actual ***Display Cable Guide*** on the same product web site.

Header	Pin	Signal Name	Function
	1	**FTX0-**	First channel data output 0 (negative)
	2	**FTX0+**	First channel data output 0 (positive)
	3	**FTX1-**	First channel data output 1 (negative)
	4	**FTX1+**	First channel data output 1 (positive)
	5	**FTX2-**	First channel data output 2 (negative)
	6	**FTX2+**	First channel data output 2 (positive)
	7	**GND**	Ground
	8	**FTXC-**	First channel clock output (negative)
	9	**FTXC+**	First channel clock output (positive)
	10	**FTX3-**	First channel data output 3 (negative)
	11	**FTX3+**	First channel data output 3 (positive)
	12	**STX0-**	Second channel data output 0 (negative)
	13	**STX0+**	Second channel data output 0 (positive)
	14	**GND**	Ground
	15	**STX1-**	Second channel data output 1 (negative)
	16	**STX1+**	Second channel data output 1 (positive)
	17	**GND**	Ground
	18	**STX2-**	Second channel data output 2 (negative)
	19	**STX2+**	Second channel data output 2 (positive)
	20	**STXC-**	Second channel clock output (negative)
	21	**STXC+**	Second channel clock output (positive)
	22	**STX3-**	Second channel data output 3 (negative)
	23	**STX3+**	Second channel data output 3 (positive)
	24	**GND**	Ground
	25	**SDA**	I2C data line
	26	**DATAENA**	Panel power output
	27	**SCL**	I2C clock line
	28 - 30	**VCC** [1)]	Power +3.3V or +5V

Note: 1) To protect the external power lines of peripheral devices make sure that
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

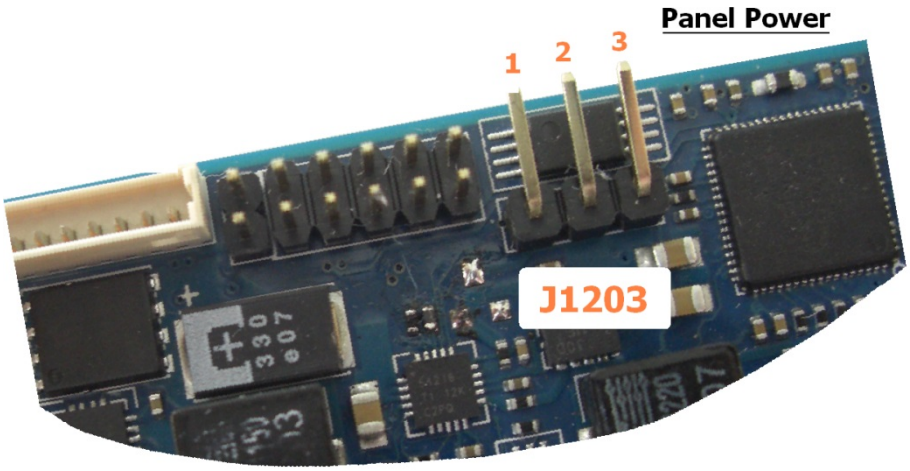
Warning: Check jumper J1203 (Panel Power) for correct settings for your panel – not doing so might cause permanent damage to your panel.

6.3 Connecting a Flat Panel

To determine whether your flat panel is supported check the ***Display Cable Guide*** on the KONTRON web site. If you use one of those adapters supplied by KONTRON configuration is easy:

- Check whether you have the correct adapter and cable for the panel you plan to use. Inspect the cable for damages. Disconnect the power from your system.
- Check jumper J1203 for correct panel voltage (**Pos. 1-2 = +3.3V 2-3 = +5V**).
- Connect an external power supply for the correct backlight voltage (exception: +5V).
- Connect the cable to the flat panel connector J1202 on the KTA55/pITX and connect the other end to your display.
- Connect a DVI monitor to the DVI-I connector. Hint: the default boot display setting in the BIOS Setup is DVI.
- Supply power to your system. Enter the BIOS Setup and choose the option '*LVDS*' at menu '*Advanced/Display Configuration/Digital Display Port 0*' and in addition set the desired display resolution at '*LVDS Flat Panel Type*'.
- If you still do not see improvement consider contacting the dealer for technical support.

6.4 Flat Panel Jumper



6.5 Available Video Modes

The following list shows the video modes supported by the graphics controller with maximum frame buffer size. When configured for saller frame buffers and/or using a flat panel on the JILI30 interface not all of the video modes listed below may be available.

Video Mode	Type	Characters/Pixels	Colors
00h/01h	Text	40 x 25	16
02h/03h	Text	80 x 25	16
04h/05h	Graphic	320 x 200	4
06h	Graphic	640 x 200	2
07h	Text	80 x 25	2
0Dh	Graphic	320 x 200	16
0Eh	Graphic	640 x 200	16
0Fh	Graphic	640 x 350	2
10h	Graphic	640 x 350	4
11h	Graphic	640 x 480	2
12h	Graphic	640 x 480	16
13h	Graphic	320 x 200	256

6.6 Extended VESA Modes

VESA Mode	Type	Pixels	Colors
100h	Graphic	640 x 400	256
101h	Graphic	640 x 480	256
103h	Graphic	800 x 600	256
105h	Graphic	1024 x 768	256
107h	Graphic	1280 x 1024	256
10Dh	Graphic	320 x 200	32k
10Eh	Graphic	320 x 200	64k
110h	Graphic	640 x 480	32k
111h	Graphic	640 x 480	64k
113h	Graphic	800 x 600	32k
114h	Graphic	800 x 600	64k
116h	Graphic	1024 x 768	32k
117h	Graphic	1024 x 768	64k
119h	Graphic	1280 x 1024	32k
11Ah	Graphic	1280 x 1024	64k

6.7 Backlight Connector

An external voltage source must be used to supply the backlight with i.e. +12V DC (+5V DC is always available). The external voltage can be sourced to the backlight connector through the power connector J2901. This connector can also be used to power the board with +5V DC instead of the round power jacket (see chapter 'Power Supply').

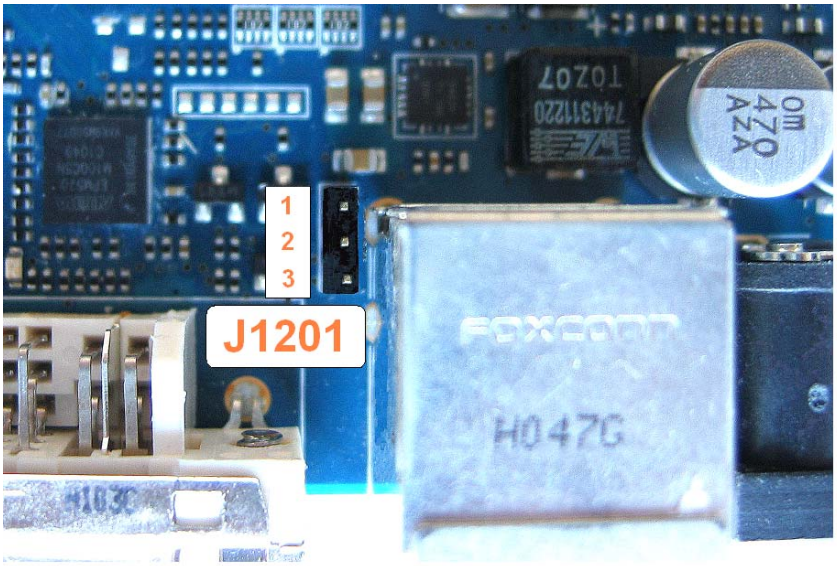
Note: ***The backlight voltage that is sourced through connector J2901 can be chosen freely.***

6.7.1 External Voltage

Parameter	Min.	Typ.	Max.	Units
Input voltage		+12.0	+30.0	V
Continuous input current			1.0	A

6.7.2 Backlight Voltage Jumper

Check the jumper J1201 for the correct backlight voltage (**Pos. 1-2 = +5V 2-3 = external voltage**).



6.7.3 Connector

The backlight control signals and supply voltage is available through the connector J1200 (7 pins).

Header	Pin	Signal Name	Function
	1	**N.C.**	Not connected
	2	**BKLTADJ**	Brightness control (0V - +5V)
	3	**GND**	Ground
	4	**VDD** 1)	Backlight voltage
	5	**VDD** 1)	Backlight voltage
	6	**GND**	Ground
	7	**BKLTON**	Backlight on/off

Note: *1) To protect the external power lines of peripheral devices make sure that*
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

6.8 Simultaneous Mode

For simultaneous digital and analog connection from the DVI-I connector a Y-cable is needed. It is important that the DDC lines are routed to the DVI monitor otherwise only the analog CRT output is available.

Y-Cable

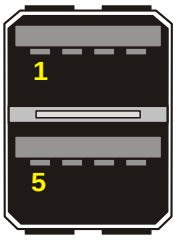
Note: *Without the right DDC connection you have no output on the DVI monitor.*

7 USB Interface

The USB interface comes with six USB ports which follow the OHCI/EHCI specification and are USB 2.0 compliant. You can expand the amount of USB connections by adding external hubs. Two ports are available on a standard connector and more ports on four extension connectors.

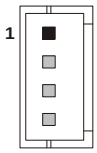
7.1 Standard Connector

Two USB ports are available through the standard USB connector J1801 (8 pins).

Header	Pin	Signal Name	Function
	1	**VCC** [1)]	Power +5V
	2	**USB0-**	USB port 0 (negative)
	3	**USB0+**	USB port 0 (positive)
	4	**GND**	Ground
	5	**VCC** [1)]	Power +5V
	6	**USB1-**	USB port 1 (negative)
	7	**USB1+**	USB port 1 (positive)
	8	**GND**	Ground

7.2 Extension Connectors

The other USB ports are available through the extension connectors J1802/J1803 and J1805/J1806 (4 pins). To have the signals available on the standard USB interface connectors an adapter cable is required. An USB interface cable is available from KONTRON (KAB-USB-2, part number 96054-0000-00-2).

Header	Pin	Signal Name	Function
	1	**GND**	Ground
	2	**USBn+**	USB port n (positive)
	3	**USBn-**	USB port n (negative)
	4	**VCC** [1)]	Power +5V

Note: *1) To protect the external power lines of peripheral devices make sure that*
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

7.3 Limitations

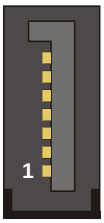
The contacts for USB devices are protected. They are suitable to supply connected USB devices with a maximum input current of 500mA. Do not supply external USB devices with higher power dissipation through these pins.

8 Serial-ATA Interface (S-ATA)

The KTA55/pITX has realized two S-ATA III ports. Serial-ATA connections boost the transfer rate theoretically up to 600 MB/sec. In addition it changes the parallel interface requiring 40 separate wires to a serial interface requiring only 6 wires.

8.1 Connector

The S-ATA interface is available through the standard L-type connectors J1500 and J1501 (7 pins). A S-ATA interface cable is deliverable from KONTRON (KAB-SATA-1, part number 96079-0000-00-1).

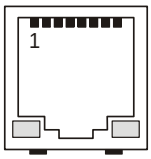
Header	Pin	Signal Name	Function
	1	**GND**	Ground
	2	**TX+**	Transmit (positive)
	3	**TX-**	Transmit (negative)
	4	**GND**	Ground
	5	**RX-**	Receive (negative)
	6	**RX+**	Receive (positive)
	7	**GND**	Ground

9 LAN Controller

The KTA55/pITX uses an Intel® 82574L Gigabit PCI Express® LAN controller. The controller support 10/100/1000 Base-T interfaces. The device auto-negotiates the use of a 10, 100 or 1000 Mbps connection. Additionally it is possible to enable the LAN PXE Boot in the BIOS Setup to allow the system to boot up via a network connection from a PXE server.

9.1 Connector

The LAN interface is available through the standard RJ45 connector J1900 (8 pins).

Header	Pin	Signal Name	Function
	1	**TXD+ / BI_D1+**	10/100 transmit / 1000 pair 1 (positive)
	2	**TXD- / BI_D1-**	10/100 transmit / 1000 pair 1 (negative)
	3	**RXD+ / BI_D2+**	10/100 receive / 1000 pair 2 (positive)
	4	**BI_D3+**	1000 pair 3 (positive)
	5	**BI_D3-**	1000 pair 3 (negative)
	6	**RXD- / BI_D2-**	10/100 receive / 1000 pair 2 (negative)
	7	**BI_D4+**	1000 pair 4 (positive)
	8	**BI_D4-**	1000 pair 4 (negative)

10 Audio Interface

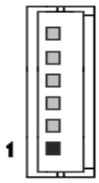
The chipset supports a HD audio codec with 24 bit resolution and 192 kHz sample rate. The interface includes LINE OUT, LINE IN, MICROPHONE IN and a digital S/PDIF output. The HD audio controller is a bus mastering PCI device which is physically connected to one or more codecs via the HD audio link. It contains four input/output DMA engines. For signal levels see the High Definition audio specification (Intel®).

10.1 Hardware Features

Parameter	Values	Units
Output resolution (LINE OUT, S/PDIF)	16/20/24	bit
Output sample rate (LINE OUT, S/PDIF)	44.1/48/96/192	kHz
Output signal-to-noise ratio (LINE OUT)	97	dB
Output current (S/PDIF)	12 @ 75Ω	mA
Input resolution (LINE IN)	16/20	bit
Input sample rate (LINE IN)	44.1/48/96	kHz
Input signal-to-noise ratio (LINE IN)	90	dB

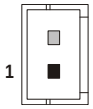
10.2 Analog Connector

The analog audio interface is available through the connector J2201 (6 pins). A prototype adapter cable (open ended) is deliverable from KONTRON (KAB-SOUND-CMP-2, part number 96063-0000-00-1).

Header	Pin	Signal Name	Function
	1	**LINE_IN_L**	Line input left
	2	**MIC_IN**	Microphone input
	3	**LINE_IN_R**	Line input right
	4	**LINE_OUT_L**	Line output left
	5	**GND**	Ground
	6	**LINE_OUT_R**	Line output right

10.3 Digital Connector (S/PDIF)

The digital audio output is available through the connector J2200 (2 pins).

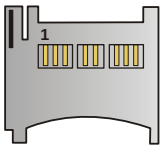
Header	Pin	Signal Name	Function
	1	**SPDIF_OUT**	S/PDIF output
	2	**GND**	Ground

11 Secure Digital I/O and Multimedia Card

The SDIO/MMC interface provides one microSD card socket (only memory cards available). The controller supports SDIO revision 2.0 and MMC revision 4.2. In addition the controller supports Extended Capacity SD Memory Cards (SDXC) up to 2 TByte. The data bus width accounts one or four bits, the SDIO transfer rate can be up to 50 MHz.

11.1 microSD Card Connector

The microSD card socket is named J2000 (8 pins).

Header	Pin	Signal Name	Function
	1	**DAT2**	Data bit 2
	2	**CD / DAT3**	Card detect / Data bit 3
	3	**CMD**	Command line
	4	**VCC** [1)]	Power +3.3V (programmable)
	5	**CLK**	Clock
	6	**GND**	Ground
	7	**DAT0**	Data bit 0
	8	**DAT1**	Data bit 1

Note: 1) To protect the external power lines of peripheral devices make sure that
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

12 Digital I/O Interface

The KTA55/pITX features eight bidirectional I/O lines.

12.1 Electrical Specifications

Digital Inputs

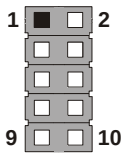
Parameter	Min.	Typ.	Max.	Units
Input LOW voltage			+1.5	V
Input HIGH voltage	+1.5		+3.45	V
Input rate (direct access)			1.6	MHz

Digital Outputs

Parameter	Min.	Typ.	Max.	Units
Output LOW voltage			+0.4	V
Output HIGH voltage	+2.4		+3.3	V
Output LOW/HIGH current			8	mA
Switching rate (direct access)			1.6	MHz

12.2 Connector

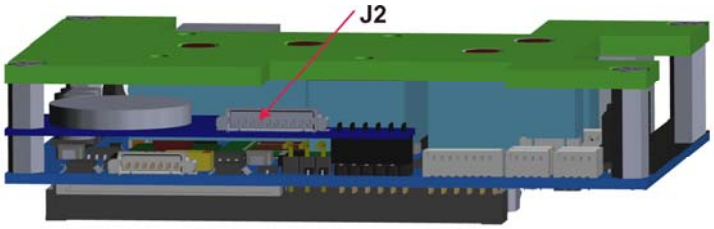
The digital I/O interface is available through the connector J1804 (10 pins).

Header	Pin	Signal Name	Function
	1	**VCC** [1)]	Power +3.3V
	2	**GPIO4**	Bidirectional I/O 4
	3	**GPIO0**	Bidirectional I/O 0
	4	**GPIO5**	Bidirectional I/O 5
	5	**GPIO1**	Bidirectional I/O 1
	6	**GPIO6**	Bidirectional I/O 6
	7	**GPIO2**	Bidirectional I/O 2
	8	**GPIO7**	Bidirectional I/O 7
	9	**GPIO3**	Bidirectional I/O 3
	10	**GND**	Ground

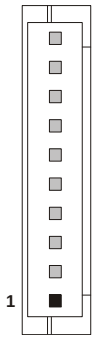
Note: *1) To protect the external power lines of peripheral devices make sure that*
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

12.3 Connector Redirection

When the board is shipped the digital I/O pins are routed to a 10 pin Molex connector on the RTC battery module.



The digital I/O interface is available through the Molex connector J2 (10 pins). An interface cable (open ended) is deliverable from KONTRON (KAB-GPIO-PROTO-10, part number 62038).

Header	Pin	Signal Name	Function
	1	**VCC** [1)]	Power +3.3V
	2	**GPIO4**	Bidirectional I/O 4
	3	**GPIO0**	Bidirectional I/O 0
	4	**GPIO5**	Bidirectional I/O 5
	5	**GPIO1**	Bidirectional I/O 1
	6	**GPIO6**	Bidirectional I/O 6
	7	**GPIO2**	Bidirectional I/O 2
	8	**GPIO7**	Bidirectional I/O 7
	9	**GPIO3**	Bidirectional I/O 3
	10	**GND**	Ground

Note: *1) To protect the external power lines of peripheral devices make sure that*
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

13 LPC Bus

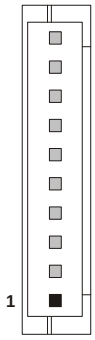
The LPC bus (Low Pin Count) is used to connect low bandwith devices to the compagnion chip. This bus is replacing the 16 bit-wide, 8.33 MHz ISA bus with a 4 bit-wide bus operating at 4 times the clock speed (33 MHz PCI bus clock frequency).
You can use the LPC bus to expand the board functionality (e.g. Lattice LPC bus controller (LPC peripheral), ROM emulator or LPC to SPI bridge).

CAUTION!

Do not use signal voltages above 3.3V. LPC bus signals are unprotected against overvoltage.

13.1 Connector

The LPC bus interface is available through the connector J1800 (10 pins).

Header	Pin	Signal Name	Function
	1	**VCC** [1)]	Power +3.3V
	2	**/RESET**	Reset
	3	**LCLK**	Clock
	4	**/LFRAME**	Start or stop transfer
	5	**LAD0**	Address or data 0
	6	**LAD1**	Address or data 1
	7	**LAD2**	Address or data 2
	8	**LAD3**	Address or data 3
	9	**SERIRQ**	Serial interrupt
	10	**GND**	Ground

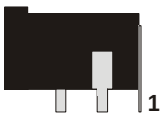
Note: *1) To protect the external power lines of peripheral devices make sure that*
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

14 Power Supply

The KTA55/pITX SBC has a power input voltage range from +4.75 to +5.25V DC. All other voltages are generated onboard (e.g. +3.3V system and +1.5V memory voltage).

14.1 Connector

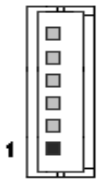
The power supply is injected through the connector J2900 (3 pins, DC power jacket 2.1mm).

Header	Pin	Signal Name	Function
	1	**VCC** 1)	Power supply +5V
	2	**GND**	Ground
	3	**GND**	Ground

Warning: ***Don't overload the onboard system voltage +3.3V (microSD card socket, LPC bus and Digital I/O connector). The maximum current should not exceed 250mA.***

14.2 External Power Connector (Alternative)

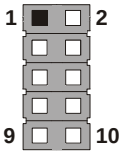
This connector can also be used to power the board with +5V DC instead of the round power jacket. The external voltage input is available through the connector J2901 (6 pins)

Header	Pin	Signal Name	Function
	1	**VCC** 1)	Board power supply +5V
	2	**VCC** 1)	Board power supply +5V
	3	**GND**	Ground
	4	**GND**	Ground
	5	**VCC** 1)	Board power supply +5V
	6	**VDD** 1)	External voltage (backlight)

Note: ***1) To protect the external power lines of peripheral devices make sure that***
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

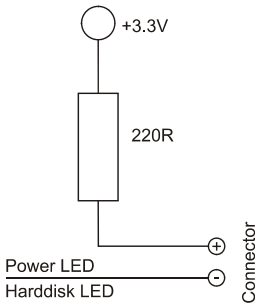
14.3 Power Front Panel Header

The power button and other power signals are available through the pin strip J2401 (10 pins). A button set (two buttons) is deliverable from KONTRON (BUTTON-SET, part number 60905-0000-00-0).

Header	Pin	Signal Name	Function
	1	**RST_BTN+**	Reset button (positive)
	2	**PWR_BTN+**	Power button (positive)
	3	**RST_BTN-**	Reset button (negative)
	4	**PWR_BTN-**	Power button (negative)
	5	**RECOVERY**	Recovery pin
	6	**RSVD**	Reserved
	7	**PWR_LED-**	Power LED (negative)
	8	**HDD_LED-**	Harddisk LED (negative)
	9	**PWR_LED+**	Power LED (positive)
	10	**HDD_LED+**	Harddisk LED (positive)

14.3.1 Power and Harddisk LED

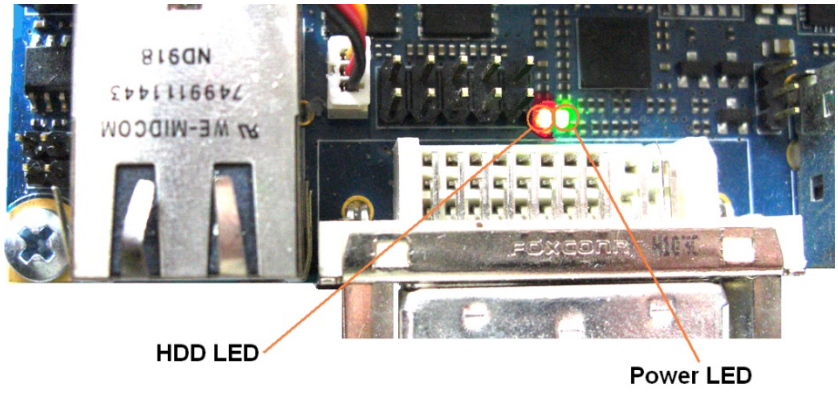
The following picture illustrates the onboard wiring.



14.4 Onboard Status LEDs

Two additional LEDs indicate the power and the harddisk status. The power LED can take the following states.

Power State	LED Display
S0	Continuous ON
S3	Blinking
S5	Continuous OFF

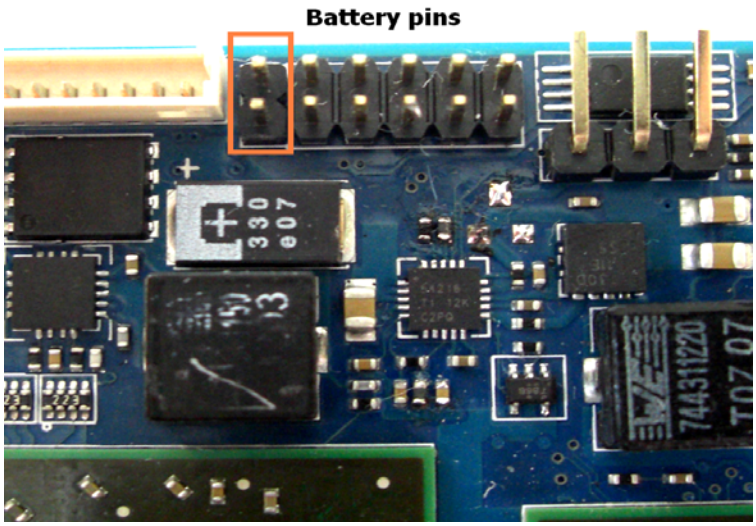


14.5 Battery Connector

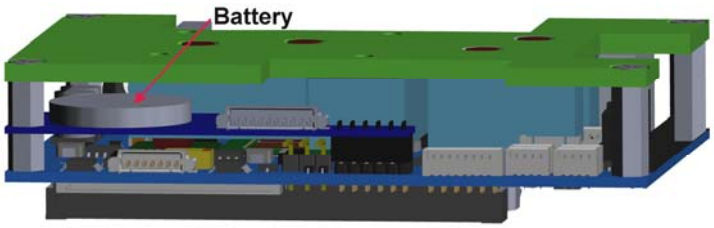
The battery interface is available through the pin strip J1400 (2 pins).

Header	Pin	Signal Name	Function
1 ■ □ 2	1	**VBAT** [1)]	Battery input voltage +3V
	2	**GND**	Ground

Note: 1) To protect the external power lines of peripheral devices make sure that
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.



When the board is shipped the RTC battery is mounted on the RTC battery module.



If you remove the battery module Kontron Technology A/S cannot guarantee an error-free operation

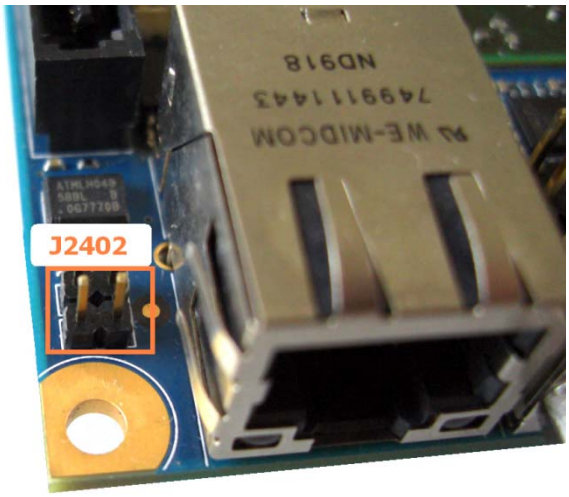
15 Crisis Management

If the board is not booting up there are two options to fix this.

15.1 Wrong BIOS Settings

Modifying parameters in the BIOS Setup implies the risk of leaving your system in a unbootable state. In case this happens one jumper exists to reset the settings to '*Fail-Safe*' values.
Take the following steps:

- Power down the system.
- Install a jumper on J2402.
- Power up the board and enter the BIOS Setup.
- Remove the jumper on J2402.
- Save settings with '*Save Changes and Exit*'. The board should be functional now.



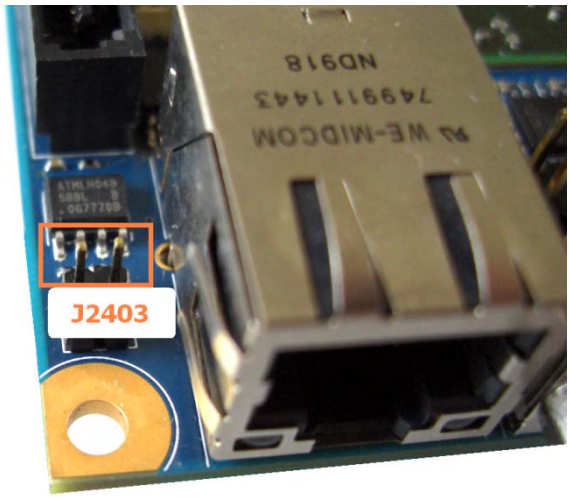
15.2 Restore Failed BIOS Update

Take the following steps:

- Power down the system.
- Copy the BIOS named '**AMIBOOT.ROM**' to a USB key formatted as super-floppy and connect the USB device.
- Put a jumper on pin 3 and 5 (pins side by side) to the Front Panel Header (J2401).
- Power up the board.
- The BIOS bootblock starts the recovery process and loads the new BIOS.
- After the programming the BIOS performs a reset. Before the reset is executed the jumper should be removed.

16 Autostart Function

When the KTA55/pITX should start directly when the power is applied (without a power button signal) the autostart jumper J2403 must be set.



17 Power and Thermal Management

17.1 Cooling Options

A heat-spreader plate is already mounted. External cooling must be provided to maintain the heat-spreader plate at proper operating temperatures. Under worst case conditions the cooling mechanism must maintain an ambient air temperature of 60°C or less.

The aluminum slugs and thermal pads on the underside of the heat-spreader plate implement thermal interfaces between the heat-spreader plate and the major heat generating components on the KTA55/pITX. The optimum cooling solution varies - depending on the application and environmental conditions.

Attention: ***After the heat-sink has been mounted it cannot be removed anymore because after the warming up of the board the thermal-foil between the both components will melt and bond the heat-sink to the heat-spreader plate.***

17.2 C-State Control

The AMD® Ontario platform has been implemented the control for dynamically starting and stopping system clocks and power. The mapping between ACPI defined C-States and AMD® specified C-State actions is not direct. The actions when entering a C-State can be configured by software. The states are passing through C0 (full on) to C6 one after another. The C-state ends when a break event occurs (e.g. an IRQ or SMI).

17.3 Fan Interface

If a fan is added use this interface to connect a fan to cool off the CPU. The connector only supports 5V fans. A three pin fan includes a pulse output (sense) which allows the control of fan speed.

17.3.1 Connector

The fan interface is available through connector J1503.

Header	Pin	Signal Name	Function
	1	**SENSE**	Speed monitoring
	2	**VCC** [1)]	Power +5V
	3	**GND**	Ground

Note: ***1) To protect the external power lines of peripheral devices make sure that***
- the wires have the right diameter to withstand the maximum available current.
- the enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

18 Setup Guide

The module is equipped with AMI® UEFI BIOS which is located in an onboard flash memory. You can update the BIOS using a flash utility.

18.1 Determining the BIOS Version

Whenever you contact technical support about BIOS issues providing a BIOS version <IP55R???> is especially helpful. To determine the AMI® BIOS version press the DEL key on your keyboard during boot-up and looks at main menu (additional information are available with submenu *Board Information*):

Bios Information
BIOS Version : IP55R???
Build Date : ??/??/????

18.2 Start AMI® BIOS Setup Utility

To start the AMI® BIOS Setup utility press <DEL> when the following string appears during boot-up.

Press <DEL> to run Setup

The main menu then appears.

The Setup screen is composed of several sections:

Setup Screen	Location	Function
Menu Bar	Top	Lists and selects all top level menus
Legend Bar	Right side bottom	Lists Setup navigation keys
Item Specific Help Window	Right side top	Help for selected item
Menu Window	Left center	Selection fields for current menu
General Help Window	Overlay (center)	Help for selected menu

Menu Bar
The menu bar at the top of the window lists different menus. Use the left/right arrow keys to make a selection.

Legend Bar

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu. The table below describes the legend keys and their alternates.

Key	Function
<F1>	General help window
<Esc>	Exit menu
← or → Arrow key	Select a menu
↑ or ↓ Arrow key	Select fields in current menu
<Home> or <End>	Move cursor to top or bottom of current window
<F3>	Load the default configuration values
<F4>	Save and exit
<Enter>	Execute command or select submenu

Selecting an Item

Use the ↑ or ↓ key to move the cursor to the field you want. Then use the + and – keys to select a value for that field.

Displaying Submenus

Use the ← or → key to move the cursor to the submenu you want. Then press <Enter>. A pointer (▸) marks all submenus.

Item Specific Help Window

The help window on the right side of each menu displays the help text for the selected item. It updates as you move the cursor to each field.

General Help Window

Pressing <F1> on a menu brings up the general help window that describes the legend keys and their alternates. Press <Esc> to exit the general help window.

18.3 Menu Bar

Feature	Description
Main	Define time and date and show service information
Advanced	Configuration of all onboard devices (e.g. CPU, S-ATA, LAN, USB, Display)
Boot	Define the boot sequence and special boot settings
Security	Change, set or disable administrator/user passwords
Exit	Exit Setup with/without saving or set default values

18.4 Main Menu

Feature	Option	Description
BIOS Version	N / A	Show the actual BIOS release
Build Date	N / A	Show the BIOS build date
Compliancy	N / A	Show the supported UEFI version
▸ Board Information	Submenu	Show additional service information
Time	HH:MM:SS	Set the system time
Date	MM/DD/YYYY	Set the system date

18.4.1 Board Information Submenu

Feature	Option	Description
Product Name	N / A	Show the KONTRON specific product name
Serial Number	N / A	Show the KONTRON specific serial number
Manufacturing Date	N / A	Show the KONTRON specific manufacturing date
Hardware Version	N / A	Show the KONTRON specific hardware version
Boot Counter	N / A	Display the boot counter
Processor Name	N / A	Show the processor identifier
Processor Speed	N / A	Show the actual CPU boot speed
Chipset Revision	N / A	Show the chipset (southbridge = Hudson E1) revision
CPLD Revision	N / A	Show the KONTRON specific CPLD revision
Total Memory	N / A	Display amount of system memory detected during boot-up

18.5 Advanced Menu

Feature	Option	Description
▸ CPU Configuration	Submenu	Configure special CPU features
▸ Onboard Device Configuration	Submenu	Configure most onboard devices (e.g. S-ATA, LAN, USB)
▸ Display Configuration	Submenu	Set the display features (including panel parameters)
▸ ACPI Configuration	Submenu	Set some ACPI defaults
▸ Miscellaneous	Submenu	Configure additional important settings
▸ Trusted Computing	Submenu	Configure the TPM (Trusted Platform Module)

18.5.1 CPU Configuration Submenu

Feature	Option	Description
Processor Name	N / A	Show the processor identifier
Processor Speed	N / A	Show the actual CPU boot speed
L1 Code Cache	N / A	Display the L1 code cache size
L1 Data Cache	N / A	Display the L1 data cache size
L2 Cache	N / A	Display the L2 cache size
Execute-Disable Bit Capability	Disabled **Enabled**	This option can help to prevent certain classes of buffer overflow errors (AMD® NX-bit or Intel® XD-bit)
Secure Virtual Machine Mode	Disabled **Enabled**	Enable or disable AMD® Virtualization™ technology. Useful e.g. for VMware™
Power Saving Mode C6	Disabled Enabled **Auto**	Enable or disable the reducing of power consumption with sleep state C6
CPB Mode	**Auto** Disabled	Activate if possible the 'Core Performance Boost'
Gate A20 Active	**Upon Request** Always	**Upon Request:** A20 can be disabled using BIOS services. **Always:** do not allow disabling A20. This option is useful when any RT code is executed above 1 MB
PSS Support	Disabled **Enabled**	Enable or disable the generation of ACPI _PPC, _PSS, and _PCT objects
PSTATE Adjustment	**PState 0** PState 1	Provide to adjust startup P-state level
PPC Adjustment	**PState 0** PState 1	Provide to adjust _PPC object. _PPC = number of performance states

18.5.2 Onboard Device Configuration Submenu

Feature	Option	Description
▸ Northbridge Configuration	Submenu	Set northbridge options (e.g. memory)
▸ Serial-ATA Configuration	Submenu	Configure the S-ATA devices
▸ SDIO Configuration	Submenu	Configure the SDIO ports
▸ Audio Configuration	Submenu	Configure the audio options
▸ LAN Configuration	Submenu	Configure the PCI Express® LAN controller
▸ USB Configuration	Submenu	Configure the USB support

18.5.2.1 Northbridge Configuration Submenu

Feature	Option	Description
Memory Type	N / A	Display the memory type
Total Memory	N / A	Display amount of system memory detected during boot-up
Memory Clock	**Auto** DDR800 DDR1066	This option allows to select a different memory clock
Memory Clear	**Disabled** Enabled	Memory clear functionality
I/O Memory Mapping Unit	**Disabled**, 32 MB 64 MB, 128 MB 256 MB, 512 MB 1 GB, 2 GB	The I/O Memory Mapping Unit (IOMMU) is supported on LINUX based systems to convert 32 bit I/O to 64 bit MMIO

18.5.2.2 Serial-ATA Configuration Submenu

Feature	Option	Description
Port 0 / Port 1 Model	N / A	Display the drive model on port 0 and/or port 1
Port 0 / Port 1 Type	N / A	Display the drive type on port 0 and/or port 1
Port 0 / Port 1 Size	N / A	Display the drive size on port 0 and/or port 1
Serial-ATA Controller	Disabled **Enabled**	Enable or disable the S-ATA controller
Serial-ATA Mode	AHCI **Native IDE** Legacy IDE RAID IDE->AHCI	Configure the S-ATA mode
RAID Mode	**RAID 5** RAID 0/1	Define the RAID mode

18.5.2.3 SDIO Configuration Submenu

Feature	Option	Description
SDIO Controller	Disabled **Enabled**	Enable or disable the SDIO controller
Access Mode	**Auto** DMA PIO	**Auto** selects the optimum access mode (sets PIO mode if DMA not possible)
Device Emulation Type	**Auto** Floppy Forced FDD Harddisk	Mass storage device emulation type

18.5.2.4 Audio Configuration Submenu

Feature	Option	Description
HD Audio Controller	Disabled **Enabled** Auto	Enable or disable the HD audio controller (Azalia)

18.5.2.5 LAN Configuration Submenu

Feature	Option	Description
MAC Address	N / A	Show the programmed MAC address
LAN Controller	Disabled **Enabled**	Enable or disable the onboard PCIe LAN controller
Network Stack	**Disabled** Enabled	Enable or disable the network stack
Legacy LAN PXE Boot	**Disabled** Enabled	Enable or disable the option ROM to allow LAN boot functionality

18.5.2.6 USB Configuration Submenu

Feature	Option	Description
USB Devices	N / A	Show detected USB devices
USB Controller Port 0	Disabled **Enabled**	Enable or disable the USB controller port 0
USB Controller Port 1	Disabled **Enabled**	Enable or disable the USB controller port 1
USB Controller Port 2	Disabled **Enabled**	Enable or disable the USB controller port 2
USB Controller Port 3	Disabled **Enabled**	Enable or disable the USB controller port 3
USB Controller Port 4	Disabled **Enabled**	Enable or disable the USB controller port 4
USB Controller Port 5	Disabled **Enabled**	Enable or disable the USB controller port 5
USB 2.0 Controller (Port 0 - 4)	Disabled **Enabled**	Enable or disable the USB 2.0 (EHCI) functionality Port 0 - 4
USB 2.0 Controller (Port 5)	Disabled **Enabled**	Enable or disable the USB 2.0 (EHCI) functionality for Port 5
Legacy USB Support	**Enabled** Disabled Auto	Enable legacy USB support. **AUTO** disable legacy support if no USB devices are connected
BIOS USB 2.0 Hand-Off	**Disabled** Enabled	This patch must be allied for operating systems before WIN XP which have problems gaining control over USB 2.0 ports. If enabled this provides a simple semaphore based mechanism for exchanging USB 2.0 (EHCI) ownership
Port 60h/64h Emulation	Disabled **Enabled**	Emulation support should be enabled for the complete USB keyboard legacy support for non-USB aware OSes
▸ USB Mass Storage Device Configuration	Submenu	Display the status of USB mass storage devices

18.5.2.6.1 USB Mass Storage Device Configuration Submenu

Feature	Option	Description
USB Transfer Timeout	1 Sec., 5 Sec. 10 Sec., **20 Sec.**	The timeout value for control, bulk and interrupt transfers
Device Reset Timeout	10 Sec., **20 Sec.** 30 Sec., 40 Sec.	USB mass storage device start unit command timeout
Device Power-Up Delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the host controller. **AUTO** uses default value: for a root port 100 ms, for a hub port the delay is taken from hub descriptor
Device Power-Up Delay	1 Sec. .. **5 Sec.** .. 40 Sec.	Define the device power-up delay
Device Emulation Type	**Auto** Floppy Forced FDD Harddisk DVD-ROM	Define the emulation type. Forced FDD can be used to force a HDD formatted drive to boot as FDD

18.5.3 Display Configuration Submenu

Feature	Option	Description
VGA BIOS Revision	N / A	Show the VGA BIOS revision
UMA Frame Buffer Size	32 MB, 64 MB, 128 MB **256 MB**, 512 MB 1 GB, 2 GB	Select the amount of system memory used by the onchip graphic controller
Digital Display Port 0	**Disabled** LVDS	Control the boot display
Digital Display Port 1	Disabled **DVI-D** DVI-I HDMI	Control the boot display
LVDS Flat Panel Type	**Panel 0** ... Panel 15	Select a predefined panel
Brightness Level	0 ... **128** ... 255	Backlight brightness

18.5.4 ACPI Configuration Submenu

Feature	Option	Description
Auto Configuration	**Disabled** Enabled	Enable or disable BIOS ACPI auto configuration
Hibernation Mode	Disabled **Enabled**	Enable or disable system ability to hibernate (S4 sleep state)
Sleep State	Disabled S1 (POS) **S3 (STR)**	Define the power down mode (POS = Power On Standby and STR = Suspend To RAM)
Lock Legacy Resources	**Disabled** Enabled	Enable or disable lock of legacy resources
S3 Video Repost	**Disabled** Enabled	Determine whether to invoke the VGA BIOS post on suspend event (resume)
USB Wakeup from S3/S4	Disabled **Enabled**	Enable or disable USB wake event
S5 Behaviour	**Disabled** Enabled	Allow board to enter S5
Watchdog Timeout	**Disabled** 1 Sec., 5 Sec. 10 Sec., 30 Sec. 1 Min., 5 Min. 10 Min., 30 Min.	Enable or disable the watchdog

18.5.5 Miscellaneous Submenu

Feature	Option	Description
▸ Cooling Monitor	Submenu	Display the CPU and chipset temperature resp. the fan speed
▸ Active Cooling Configuration	Submenu	Control the Integrated Micro Controller (IMC) in the south-bridge

18.5.5.1 Cooling Monitor Submenu

Feature	Option	Description
CPU Temperature	N / A	Show the CPU temperature
Chipset Temperature	N / A	Show the chipset/southbridge temperature (Hudson E1)
Fan Speed	N / A	Show the fan speed

18.5.5.2 Active Cooling Configuration Submenu

Feature	Option	Description
Active Cooling	Disabled **Enabled**	Enable or disable active cooling respectively the fan
Fan Speed Mode	Linear Mode **Step Mode**	Select the fan speed mode
Fan Frequency	**28.64 kHz** 25.78 kHz 23.44 kHz 21.48 kHz 19.83 kHz 18.41 kHz 100 Hz, 87 Hz 58 Hz, 44 Hz 35 Hz, 29 Hz 22 Hz, 14 Hz, 11 Hz	Select the fan frequency
PWM Step Rate	0 ... **1** ... 100	Define the Pulse Width Modulation (PWM) step rate
Temperature Sensor	**CPU Internal** Chipset Internal	Select the temperature sensor for fan control
Temperature Averaging	Disabled **Enabled**	Enable or disable temperature averaging
Temperature Hysteresis	0°C ... **5°C** ... 16°C	Define the temperature hysteresis for fan on/off
▸ Enhanced Fan Control	Submenu	Define the temperature and PWM values for fan ramping

18.5.5.2.1 Enhanced Fan Control Submenu

Feature	Option	Description
Temp 0 Threshold	0°C ... **70°C** ... 100°C	Define temperature 0 threshold
PWM 0 Percentage	0% ... **100%**	Define PWM 0 percentage
Temp 1 Threshold	0°C ... **60°C** ... 100°C	Define temperature 1 threshold
PWM 1 Percentage	0% ... **50%** ... 100%	Define PWM 1 percentage
Temp 2 Threshold	0°C ... **50°C** ... 100°C	Define temperature 2 threshold
PWM 2 Percentage	0% ... **30%** ... 100%	Define PWM 2 percentage
Temp 3 Threshold	0°C ... **40°C** ... 100°C	Define temperature 3 threshold
PWM 3 Percentage	**0%** ... 100%	Define PWM 3 percentage
Temp 4 Threshold	**0°C** ... 100°C	Define temperature 4 threshold
PWM 4 Percentage	**0%** ... 100%	Define PWM 4 percentage
Temp 5 Threshold	**0°C** ... 100°C	Define temperature 5 threshold
PWM 5 Percentage	**0%** ... 100%	Define PWM 5 percentage
Temp 6 Threshold	**0°C** ... 100°C	Define temperature 6 threshold
PWM 6 Percentage	**0%** ... 100%	Define PWM 6 percentage
Temp 7 Threshold	**0°C** ... 100°C	Define temperature 7 threshold
PWM 7 Percentage	**0%** ... 100%	Define PWM 7 percentage
Critical Trip Point	0°C ... **85°C** ... 100°C	At this point the operating system will shut off the board

18.6 Trusted Computing Menu

Feature	Option	Description
TPM Support	**Disabled** Enabled	Enable or disable TPM support
TPM State	**Disabled** Enabled	Set the TPM state
Pending Operation	**None** Enable Take Ownership Disable Take Ownership TPM Clear	Schedule a TPM operation
Current Status Information	N / A	Show the current status
TPM Enabled Status	N / A	Show the TPM 'Enabled' status
TPM Active Status	N / A	Show the TPM 'Active' status
TPM Owner Status	N / A	Show the TPM 'Owner' status

18.7 Boot Menu

Feature	Option	Description

CSM16 Module Version	N / A	Compatibility Support Module 16 (CSM16) version
▸ Enhanced Boot Settings	Submenu	Define some special boot settings

18.7.1 Enhanced Boot Settings Submenu

Feature	Option	Description
Dark Boot	**Disabled** Enabled	If disabled the BIOS generates the normal messages otherwise an OEM logo can be displayed
Fast Boot	**Disabled** Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option
Skip VGA	**Disabled** Enabled	If enabled BIOS will skip the EFI VGA driver
Skip USB	**Disabled** Enabled	If enabled USB devices will not be available until after OS boot
Setup Prompt Timeout	1 Sec. ... 65535 Sec.	Number of seconds to wait for setup activation key
Bootup NumLock State	**On** Off	Off doesn't enable the keyboard Num-Lock automatically
Option ROM Messages	**Force BIOS** Keep Current	Set display mode for Option ROM
Interrupt 19h Capture	**Disabled** Enabled	If enabled 'Addon ROMs' can be trapped interrupt 19h (boot IRQ)

18.8 Security Menu

Feature	Option	Description
Administrator Password	N / A	Press 'Enter' to change the administrator password
User Password	N / A	Press 'Enter' to change the user password

18.9 Exit Menu

Feature	Option	Description
Save Changes and Exit	Yes No	Save selections and exits Setup. The next time the system boots the BIOS configures the system according to the Setup selection stored in CMOS
Discard Changes and Exit	Yes No	Exit Setup without storing in CMOS any new selections you may have made
Save Changes and Reset	Yes No	Reset the system after saving the changes
Discard Changes and Reset	Yes No	Reset system setup without saving any changes
Save Changes	Yes No	Save changes done so far to any of the setup options
Discard Changes	Yes No	Discard changes done so far to any of the setup options
Restore Defaults	Yes No	Restore or load default values for all the setup options
Save as User Defaults	Yes No	Save the changes done so far as user defaults
Restore User Defaults	Yes No	Restore the user defaults to all the setup options

Appendix A: System Resources

A.1 Interrupt Request (IRQ) Lines

Please ensure that the chosen interrupt is not already in use by PCI devices. This table is only valid in legacy mode (e.g. DOS) - most operating systems are using the APIC assignment.

Legacy mode

IRQ #	Used for	Available	Comment
0	Timer 0	No	
1	Keyboard	No	
2	8259 Slave (Cascade)	No	
3		Yes	
4	PCI IRQ	for PCI	
5		Yes	
6		Yes	
7	PCI IRQ	for PCI	
8	Real Time Clock (RTC)	No	
9	ACPI Power Management	No	
10	PCI IRQ	for PCI	
11	PCI IRQ	for PCI	
12		Yes	
13	Floating Point Unit (FPU)	No	
14	S-ATA (Legacy IDE)	Yes	Note (1)
15	S-ATA (Legacy IDE)	Yes	Note (1)

APIC mode

IRQ #	Used for	Available	Comment
0	Timer 0	No	
1	Keyboard	No	
2	8259 Slave (Cascade)	No	
3		Yes	
4		Yes	
5		Yes	
6		Yes	
7		Yes	
8	Real Time Clock (RTC)	No	
9	ACPI Power Management	No	
10		Yes	
11		Yes	
12		Yes	
13	Floating Point Unit (FPU)	No	
14	S-ATA (Legacy IDE)	Yes	Note (1)
15	S-ATA (Legacy IDE)	Yes	Note (1)
16	PCI IRQ	for PCI	
17	PCI IRQ	for PCI	
18	PCI IRQ	for PCI	
19	PCI IRQ	for PCI	
20		Yes	
21		Yes	
22		Yes	
23		Yes	

Note: 1) Default mode is 'Native IDE'.

A.2 Memory Area

The first 640 kB of DRAM are used as main memory. DOS can address 1 MB of memory directly. Memory area above 1 MB (high memory, extended memory) is accessed under DOS via special drivers such as HIMEM.SYS. Other operating systems (Linux or Windows® versions) allow you to address the full memory area directly.

Memory Range	Used for	Available	Comment
C0000h - CFFFFh	VGA BIOS	No	
D0000h - FFFFFh	System BIOS	No	

A.3 I/O Address Map

The I/O port addresses of the KTA55/pITX are functionally identical to a standard PC/AT. All addresses not mentioned in this table should be available. We recommend that you do not use I/O addresses below 0100h with additional hardware for compatibility reasons even though they are available.

I/O Address	Used for	Available	Comment
0170h - 0177h	S-ATA Controller (Legacy Mode)	Yes	Chipset Note (2)
01F0h - 01F7h	S-ATA Controller (Legacy Mode)	Yes	Chipset Note (2)
0376h	S-ATA Controller (Legacy Mode)	Yes	Chipset Note (2)
03B0h - 03DFh	Graphic Controller	No	Chipset
03F6h	S-ATA Controller (Legacy Mode)	Yes	Chipset Note (2)
0470h	Software IRQ Register	No	Chipset
04D0h - 04D1h	PIC Extension	No	Chipset
0600h - 06FFh	TPM Controller	No	Chipset Note (1)
0800h - 0827h	Power Management	No	Chipset
0A80h - 0A81h	System Extension	No	CPLD
0B00h - 0B3Fh	SMBus™	No	Chipset
0C00h - 0C01h	PIC Extension	No	Chipset
0CD0h - 0CDFh	System Extension	No	Chipset
0CF8h - 0CFFh	PCI Configuration	No	Chipset
E000h - E01Fh	LAN Controller	No	Onboard PCI Express® device Note (1)
F000h - F0FFh	Graphic Controller	No	Chipset
F100h - F14Fh	S-ATA Controller 2	No	Chipset Note (1)
F150h - F19Fh	S-ATA Controller 1	No	Chipset Note (1)
FE00h	Power Management	No	Chipset

Note: *1) If the Used for device is disabled in the BIOS Setup the corresponding I/O address is free.*
2) Default mode is 'Native IDE'.

A.4 PCI Devices

All devices follow the PCI Express® base specification revision 1.0 and 2.0. Please see the specifications for more details.

PCI Device	Comment
AMD® Host Bridge	Chipset
ATI® Graphics Controller	Chipset
ATI® Audio Controller	Chipset
AMD® PCI Express Bridge	Chipset
AMD® PCI Express Bridge	Chipset
ATI® S-ATA Controller	Chipset
ATI® USB 1.1 Controller	Chipset
ATI® USB 2.0 Controller	Chipset
ATI® USB 1.1 Controller	Chipset
ATI® USB 2.0 Controller	Chipset
ATI® SMBus Controller	Chipset
ATI® S-ATA Controller	Chipset
ATI® Audio (Azalia) Controller	Chipset
ATI® LPC Bus Controller	Chipset
ATI® PCI Bridge	Chipset
ATI® USB 1.1 Controller	Chipset
ATI® USB 1.1 Controller	Chipset
ATI® USB 2.0 Controller	Chipset
AMD® Link Controller	Chipset
AMD® Memory Controller	Chipset
AMD® SDRAM Controller	Chipset
AMD® Northbridge Configuration	Chipset
AMD® Power Management	Chipset
AMD® Bridge	Chipset
AMD® Northbridge Configuration	Chipset
AMD® Bridge	Chipset
JMicron Card Reader (MMC)	Onboard PCI Express® device
JMicron Card Reader (SD/SDHC)	Onboard PCI Express® device
JMicron Card Reader (MS)	Onboard PCI Express® device
JMicron Card Reader (XD)	Onboard PCI Express® device
Intel® LAN Controller	Onboard PCI Express® device

A.5 System Management Bus (SMBus™)

The KTA55/pITX uses three onboard System Management Buses (SMBus™). These buses are not available on a peripheral connector and therefore cannot be used for external SMBus™ devices.

SMBus 0

SMBus™ Address	Device	Comment
A0h / A1h	SPD Eeprom (DDR3-SDRAM)	Read only

SMBus 1

SMBus™ Address	Device	Comment
42h / 43h	Chrontel DisplayPort/LVDS Controller	

SMBus 2

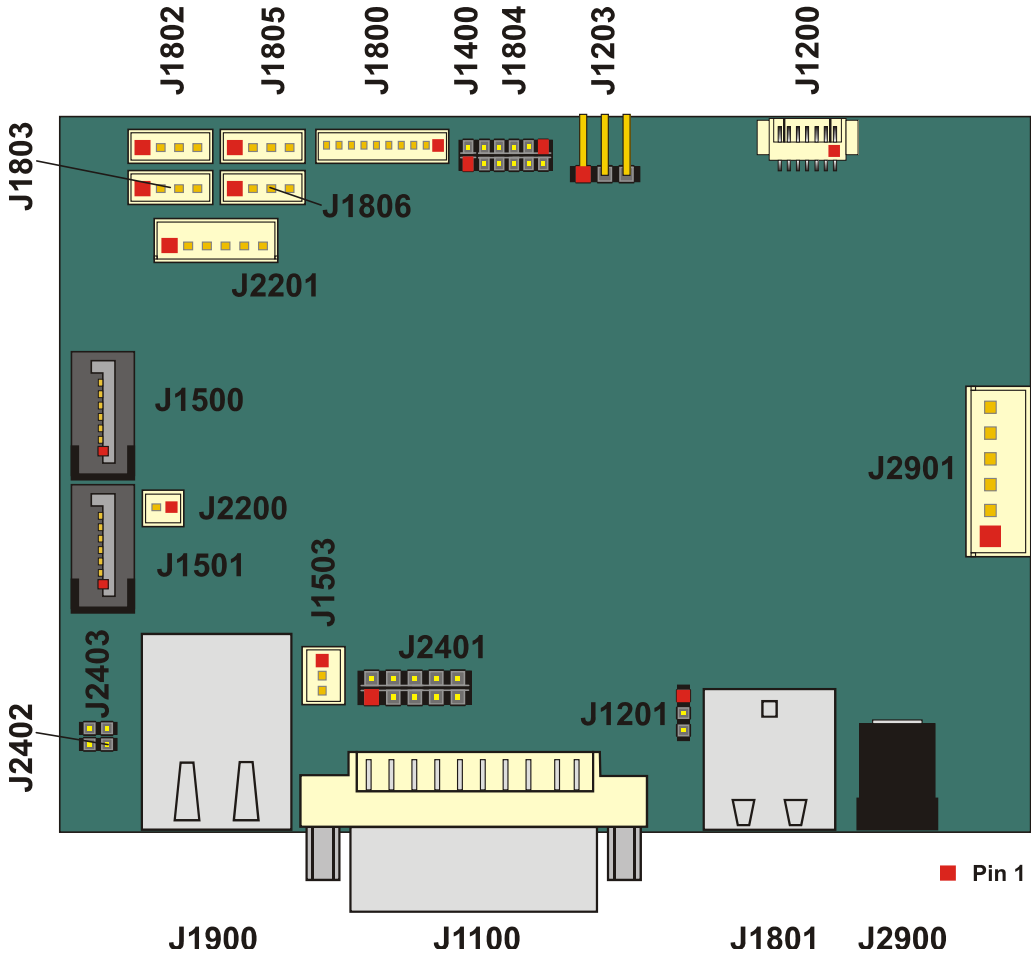
SMBus™ Address	Device	Comment
tbd.	Intel i82574 LAN Controller	

Warning: ***There are more devices connected to the SMBus™ than listed in this table but access to these devices in not permitted. Don't access any other device addresses except those listed above.***

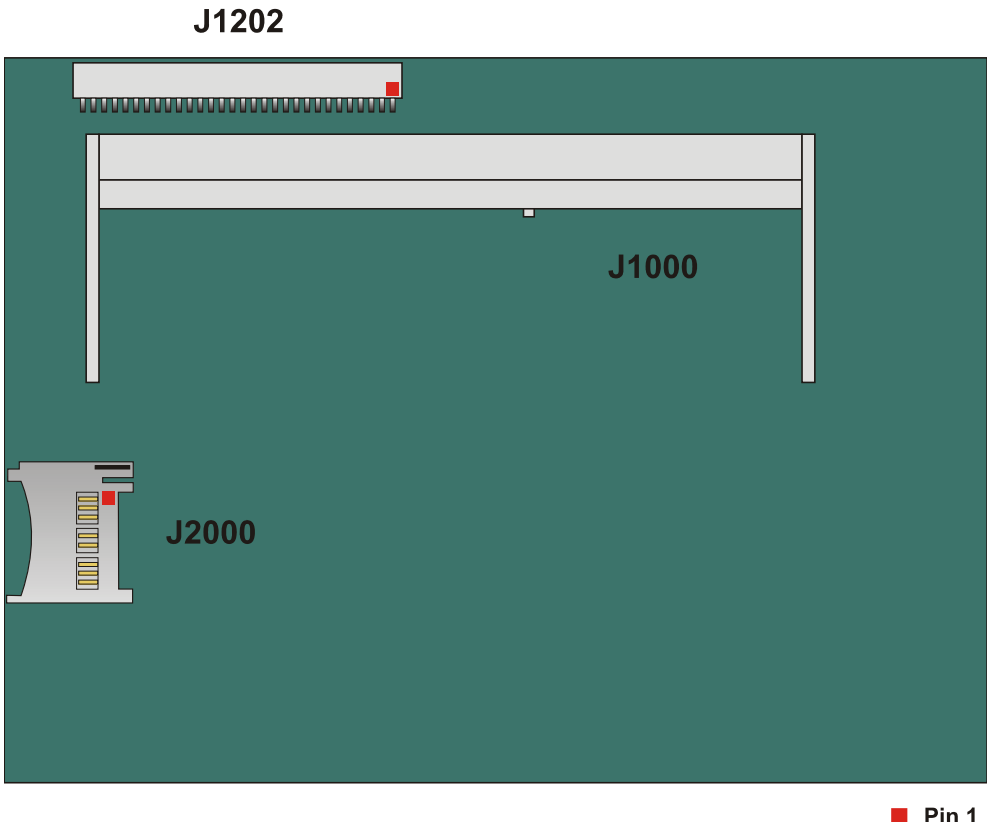
Appendix B: Connector Layout

B.1 Connector Locations

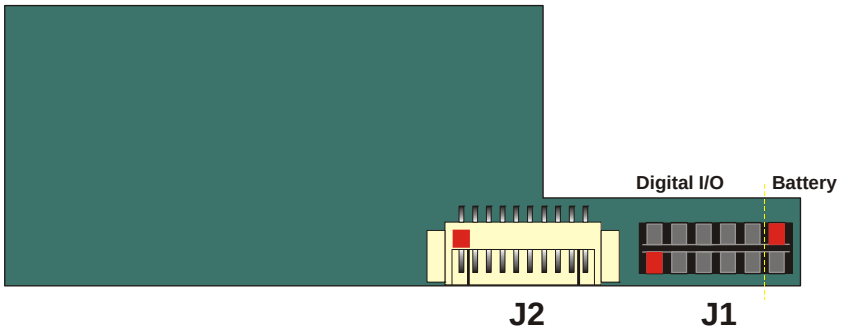
B.1.1 Top Side



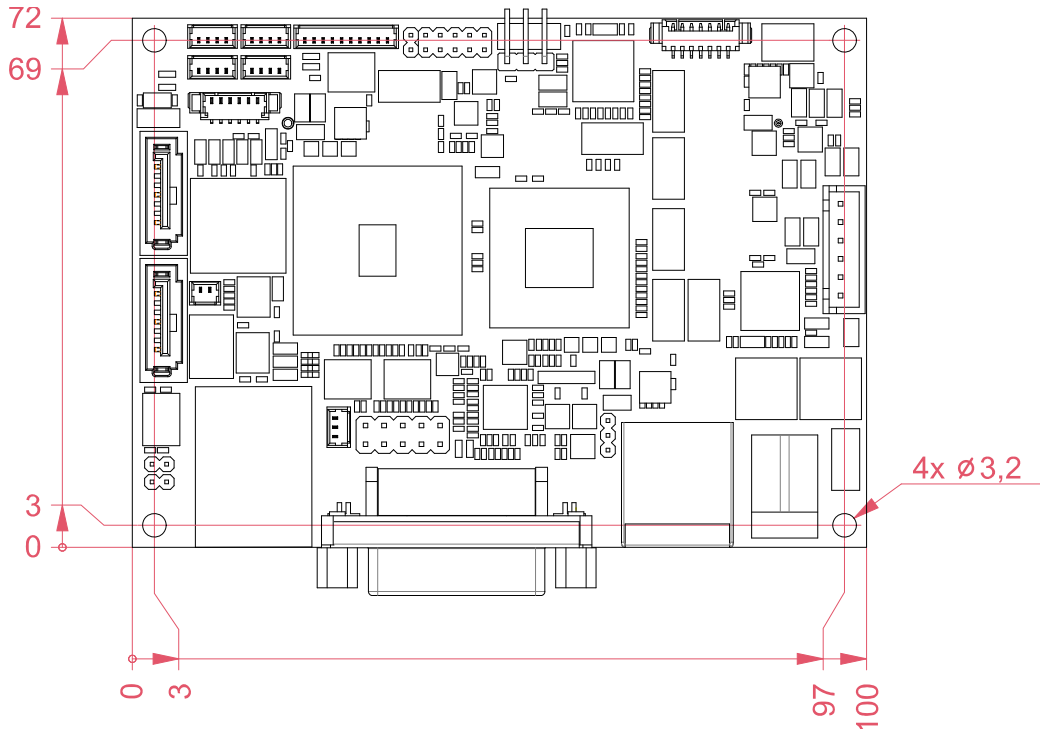
B.1.2 Bottom Side

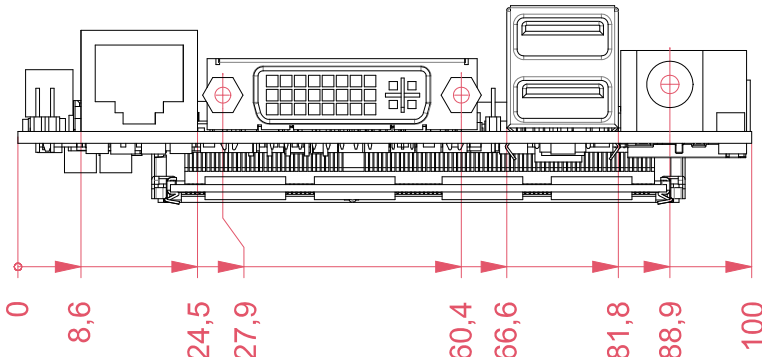


B.1.3 Battery Module



B.2 Mechanical Dimensions





B.2 Mating Connectors

The table notes mating connectors.

Identifier	Mating Connector	Comment
J1200	1.25 mm 7 pin (MOLEX 51021-0700 or comp.)	for backlight cables
J1503	1.25 mm 3 pin (MOLEX 51021-0300 or comp.)	for fan interface
J1800	1.25 mm 10 pin (MOLEX 51021-1000 or comp.)	for LPC interface
J1802 - J1803 J1805 - J1806	1.25 mm 4 pin (MOLEX 51021-0400 or comp.)	for USB adapter
J2200	1.25 mm 2 pin (MOLEX 51021-0200 or comp.)	for S/PDIF support
J2201	1.25 mm 6 pin (MOLEX 51021-0600 or comp.)	for audio support (Line in, Line out and Microphone)
J2901	2.5 mm 6 pin (Yimtex 510XW1*06STR)	external power connector
J2 (Battery Module)	1.25 mm 10 pin (MOLEX 51021-1000 or comp.)	for digital I/O interface

B.3 Pinout Tables

Pin	DVI-I J1100	JILI30 (LVDS) J1202	Backlight J1200
1	TMDS2-	FTX0-	N.C.
2	TMDS2+	FTX0+	BKLTADJ
3	GND	FTX1-	GND
4	N.C.	FTX1+	VDD
5	N.C.	FTX2-	VDD
6	DDC_CLK	FTX2+	GND
7	DDC_DATA	GND	BKLTON
8	VSYNC	FTXC-	
9	TMDS1-	FTXC+	
10	TMDS1+	FTX3-	
11	GND	FTX3+	
12	N.C.	STX0-	
13	N.C.	STX0+	
14	VCC5	GND	
15	GND	STX1-	
16	TMDS_HPD	STX1+	
17	TMDS0-	GND	
18	TMDS0+	STX2-	
19	GND	STX2+	
20	N.C.	STXC-	
21	N.C.	STXC+	
22	GND	STX3-	
23	TMDS_CLK+	STX3+	
24	TMDS_CLK-	GND	
25 / C1	REG	SDA	
26 / C2	GREEN	DATAENA	
27 / C3	BLUE	SCL	
28 / C4	HSYNC	VCC3/VCC5	
29 / C5	GND	VCC3/VCC5	
30		VCC3/VCC5	

Pin	microSD Socket J2000	LPC Interface J1800	Digital I/O J1804
1	DAT2	VCC3	VCC3
2	CD / DAT3	/RESET	GPIO4
3	CMD	LCLK	GPIO0
4	VCC3	/LFRAME	GPIO5
5	CLK	LAD0	GPIO1
6	GND	LAD1	GPIO6
7	DAT0	LAD2	GPIO2
8	DAT1	LAD3	GPIO7
9		SERIRQ	GPIO3
10		GND	GND

Pin	LAN J1900	USB Standard J1801	USB Extension J1802 ... J1806
1	TXD+ / BI_D1+	VCC5	GND
2	TXD- / BI_D1-	USB0-	USBn+
3	RXD+ / BI_D2+	USB0+	USBn-
4	BI_D3+	GND	VCC5
5	BI_D3-	VCC5	
6	RXD- / BI_D2-	USB1-	
7	BI_D4+	USB1+	
8	BI_D4-	GND	

Pin	S-ATA J1500/01	HD Audio J2201	S/PDIF J2200
1	GND	LINE_IN_L	SPDIF_OUT
2	TX+	MIC_IN	GND
3	TX-	LINE_IN_R	
4	GND	LINE_OUT_L	
5	RX-	GND	
6	RX+	LINE_OUT_R	
7	GND		

Pin	Power Header J2401	External Power J2901	Battery J1400
1	RST_BTN+	VCC5	VBAT
2	PWR_BTN+	VCC5	GND
3	RST_BTN-	GND	
4	PWR_BTN-	GND	
5	RECOVERY	VCC5	
6	RSVD	VDD	
7	PWR_LED-		
8	HDD_LED-		
9	PWR_LED+		
10	HDD_LED+		

Appendix C: Reference Documents

KONTRON Technology A/S can't guarantee the availability of internet addresses.

Document	Internet Address
Advanced Configuration and Power Interface (ACPI)	http://www.acpi.info/spec.htm
AT Attachment Storage Interface Specification (ATA)	http://t13.org
Digital Visual Interface (DVI)	http://www.ddwg.org
High Definition Audio Specification (HD Audio)	http://www.intel.com/standards/hdaudio
High Speed Serialized AT Attachment (S-ATA)	http://www.sata-io.org/developers
IEEE 802.3 Specification (Ethernet)	http://standards.ieee.org/getieee802
Low Pin Count Interface Specification (LPC-Bus)	http://developer.intel.com/design/chipsets/industry/lpc.htm
Open LVDS Display Interface Spec. (Open LDI)	http://www.national.com/analog/displays/open_ldi
PCI Express® Base Specification (PCI Express®)	http://www.pcisig.com/specifications
SD Specification (SD Card)	http://www.sdcard.org/developers/tech/sdio/sdio_spec
System Management Bus Specification (SMBus™)	http://www.smbus.org/specs
Universal Serial Bus Specification (USB)	http://www.usb.org/developers/docs
Unified Extensible Firmware Interface (UEFI)	http://www.uefi.org/specs
EFI Shells and Scripting	http://software.intel.com/en-us/articles/efi-shells-and-scripting

Appendix D: Certifications

DAkkS Deutsche Akkreditierungsstelle D-PL-11130-01-00

paconsult

TEST REPORT
No. 11-3981

Test Specimen:	KTA55/pITX Boards
Client:	Kontron Technology A/S Hamburger Straße181 D-22083 Hamburg
Present Persons:	

Purpose:

In connection with a laboratory simulation three Boards –KTA55/pITX– should be tested to vibration- and shock strains. The tests were given by the client and are described in the IEC 60068-2-64 and 60068-2-27 standards.

Summary:

The qualification tests were performed successfully. During the tests the specified function of the boards was checked and could be demonstrated. The detailed analysis of the specimen will be performed by the client.

Date of delivery:	08th of December, 2012	
Testing Period:	08th to 09th of December, 2012	
Pages:	24	
Appendix:	1	
Revision:	0	
Written:	Dipl.-Ing. J.Lüttmann (Laboratory Test Engineer) Signature	09th of January 2012
Reviewed:	Dr.-Ing. K.Esfahlani (Managing Director) Signature	09th of January 2012

paconsult GmbH · Environmental Testing Laboratory · Birkenau 3 · D-22087 Hamburg · Tel 040-229 48 79-0 · Fax 040-229 48 79-1 · e-mail info@paconsult.de

NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

03/20/2012

Kontron Technology A/s

Dr Neergaards Vej 5d
Hoersholm 2970, Dk

Our Reference:	File E194252, Vol. X1	Project Number	11CA32388
Your Reference:	KTA55		
Project Scope:	CULUS/CB EVALUATION OF KTA55/PITX		

UL's investigation of your product(s) has been completed under the above Reference Number and the product was determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Mark only at authorized factories under UL's Follow-Up Service Program.

To provide the manufacturer with the intended authorization to use the UL Mark, the addressee must send a copy of this notice to each manufacturing location currently authorized in File E194252, Vol. X1.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent in the near future. Until then, this letter authorizes application of the UL Mark for 90 days from the date of this letter.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL's requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL's requirements and continued use of the UL Mark may be withdrawn. UL may elect to withdraw use of the UL Mark if the Applicant or Manufacturer fails to comply with UL's requirements including ongoing compliance of the product, under UL's Follow-Up Service.

This is an electronically generated letter. Signatures are not required for this document to be valid.

Page 1 of 2

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Very truly yours,

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» Kontron Quality Data «

» KTA55-pITX Reliability Report

The following MTBF (Mean Time Before Failure) values were calculated using a combination of manufacturer's test data, if the data was available, and the Telcordia (Bellcore) issue 2 calculation for the remaining parts.

The Telcordia calculation used is "Method 1 Case 3" in a ground benign, controlled environment (GB,GC). This particular method takes into account varying temperature and stress data and the system is assumed to have not been burned in.

Figure 1 below shows MTBF de-rating for the E1 temperature range in an office or telecommunications environment. Other environmental stresses (extreme altitude, vibration, salt water exposure, etc) lower MTBF values.

» System MTBF (hours) = 252839 @ 40°C

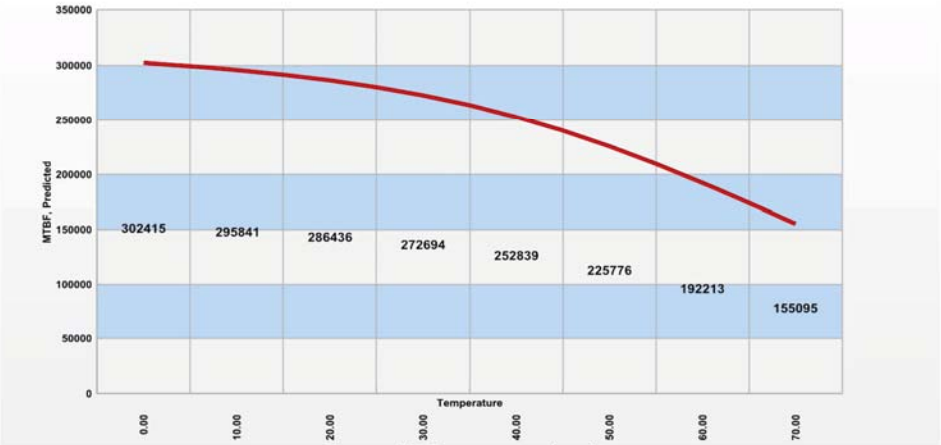

Figure 1. MTBF temperature de-rating.

Fans usually shipped with Kontron Technology products have 70,000-hour typical operating life(@ 40 degrees C). The above estimates assume no fan, but a passive heat sinking arrangement. Estimated RTC battery life (as opposed to battery failures) is not accounted for in the above figure and needs to be considered for separately. Battery life depends on both temperature and operating conditions. When the Kontron unit has external power; the only battery drain is from leakage paths.

If it's embedded, it's Kontron.

Appendix E: Document Revision

Revision	Date	Author	Changes
G	04/2016	GSZ	New memory SKU
S0031-F		MLA	Added reference to “15.1 Wrong BIOS Settings” in the Getting Started section.
S0031-E	12/14/12	MHU	Changes related to the presence of the RTC battery module
S0031-D	06/28/12	MHU	Added chapter 'Mechanical Dimensions' and change 'Full load supply current'
S0031-C	05/24/12	MHU	Remove the designator 'Fusion'
S0031-B	04/24/12	MHU	Added Appendix Certifications, in chapter Graphics Interface the subchapter Simultaneous Mode and some interface cable part numbers
S0031-A	12/14/11	MHU	Added and changed some table contents and Bios Setup entries (e.g. chapter 18.5.4, 18.6 and App. A1, A3 and A4)
S0031-0	09/30/11	HAM, MHU	Preliminary version

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