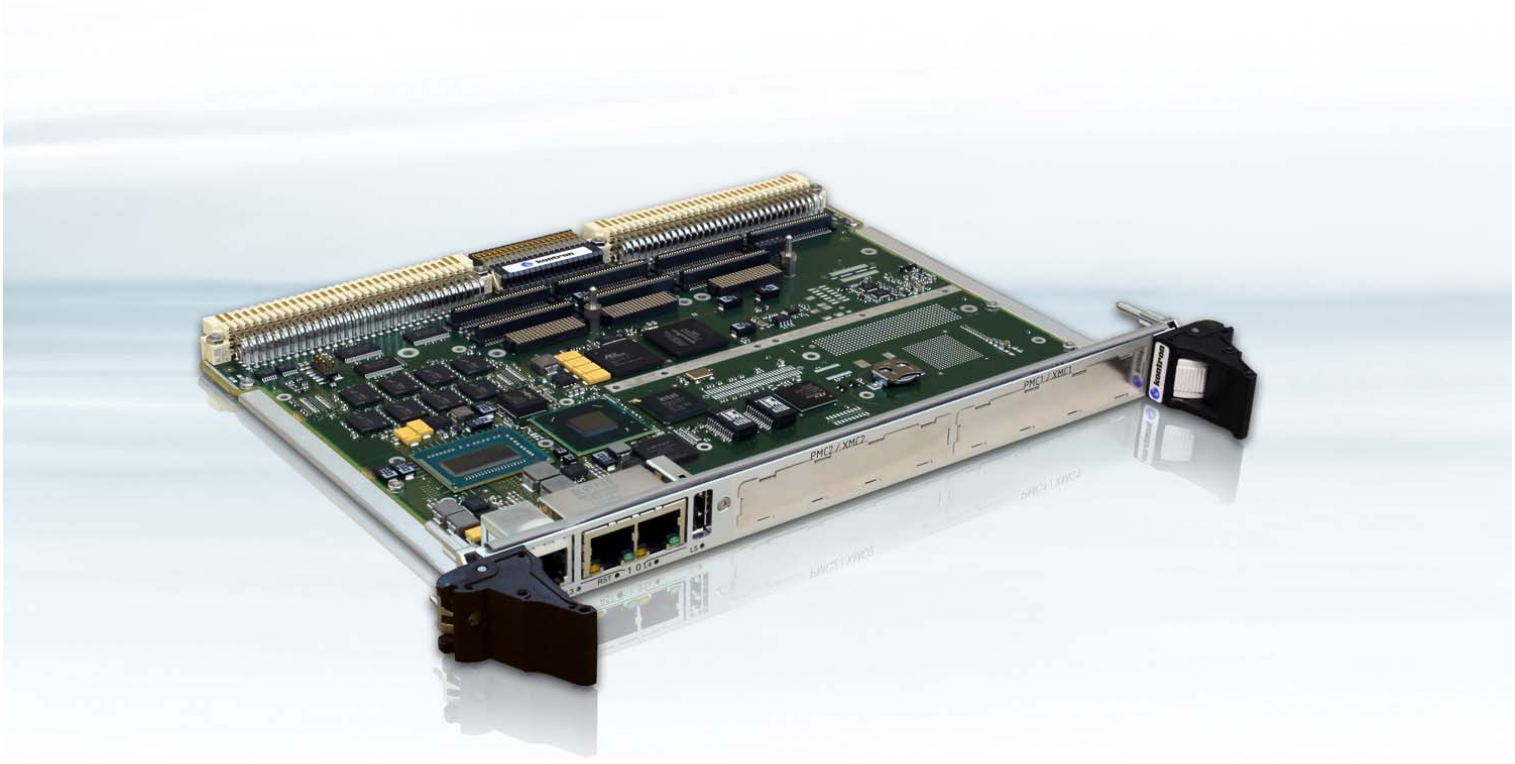
HARDWARE
RELEASE NOTES



VM6052 / VM6054

CA.DT.B17-8e - November 2017

POSSIBILITIES START HERE kontron

VM6052/VM6054 Hardware Release Notes

Disclaimer

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REVISION HISTORY

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Revision	Brief Description of Changes	Date of Issue
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7e	Updated sections: - 4.3.2 Functional E.C. Levels for VM6052/VM6054 PCB-B, PCB-C and PCB-D - 4.6 Items Detailed Description for VM6052/VM6054 Functional E.C. Levels	11-2017
6e	Updated sections: - 4.3.2 Functional E.C. Levels for VM6052/VM6054 PCB-B, PCB-C and PCB-D - 4.6 Items Detailed Description for VM6052/VM6054 Functional E.C. Levels	11-2017
5e	New sections: - 4.5 Revision Guide Table for VM6052/VM6054-RC Mechanical E.C. Levels - 4.8 Items Detailed Description for VM6052/VM6054-RC Mechanical E.C. Levels - Appendix B2: VM605x RC compliancy to VITA 47 standard	05-2016
4e	Updated chapters/sections: - 3 / General Information - 4 / Board Revision Guide - 5.2 - Revision Guide Table - MOD-GXA E.C. Levels - 5.3 - Items Detailed Description for MOD-GXA E.C. Levels New section: - 5.4 - EFT Board Known Limitations (ECL1001)	03-2016
3e	New functional E.C. Levels: 3x004xy and 3x005xy for VM605x New section: 5 - Board Revision Guide for MOD-GXA	01-2016
2e	Updated chapters/sections: - Chapter 3 - General Information - Section 4.5 - Items detailed description for functional E.C. Levels	08-2015
1e	New Functional E.C. Levels: 2x002 and 2x003 New Mechnanical E.C. Levels: A1, A2, A3 and A4 Update of Chapter 3 - General Information New sections: - Appendix A - Compliance to REACH Directive - Appendix B - Compliance to VITA 47 Standard - Appendix C - PMC Excursion	07-2015
0e	Initial Version	06-2014

Customer Support

Please contact our support team at support.KFR@kontron.com

Customer Service

As a trusted technology innovator and global solutions provider, Kontron extends its embedded market strengths into a services portfolio allowing companies to break the barriers of traditional product lifecycles. Proven product expertise coupled with collaborative and highly-experienced support enables Kontron to provide exceptional peace of mind to build and maintain successful products.

For more details on Kontron's service offerings such as: enhanced repair services, extended warranty, Kontron training academy, and more visit http://www.kontron.com/support-and-services/services.

Customer Comments

If you have any difficulties using this manual, discover an error, or just want to provide some feedback, contact Kontron support. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised manual on our website.

SYMBOLS

The following symbols may be used in this manual:

⚠DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	NOTICE indicates a property damage message.
	**Electric Shock!** This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.
	**ESD Sensitive Device!** This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.
	**HOT Surface!** Do NOT touch! Allow to cool before servicing.
	**Laser!** This symbol inform of the risk of exposure to laser beam from an electrical device. Eye protection per manufacturer notice shall review before servicing.
	This symbol indicates general information about the product and the user manual. This symbol also indicates detail information about the specific product configuration.
	This symbol indicates important information which must be read carefully.
	This symbol precedes helpful hints and tips for daily use.

FOR YOUR SAFETY

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

⚠CAUTION

Warning!
All operations on this device must be carried out by sufficiently skilled personnel only.

⚠CAUTION

Caution, Electric Shock!
Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.
Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instructions

ESD Sensitive Device!
Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

GENERAL INSTRUCTIONS ON USAGE

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version, that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present manual.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

ENVIRONMENTAL PROTECTION STATEMENT

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

Environmental protection is a high priority with Kontron.
Kontron follows the DEEE/WEEE directive.
You are encouraged to return our products for proper disposal.

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- Reduce waste arising from electrical and electronic equipment (EEE)
- Make producers of EEE responsible for the environmental impact of their products, especially when they become waste
- Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE

Improve the environmental performance of all those involved during the lifecycle of EEE

TERMS AND CONDITIONS

Kontron warrants products in accordance with defined regional warranty periods. For more information about warranty compliance and conformity, and the warranty period in your region, visit http://www.kontron.com/terms-and-conditions

Kontron sells products worldwide and declares regional General Terms & Conditions of Sale, and Purchase Order Terms & Conditions. Visit http://www.kontron.com/terms-and-conditions

For contact information, refer to the corporate offices contact information on the last page of this user guide or visit our website CONTACT US.

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1 / Introduction

This document describes the engineering evolution of the referenced products to the up-to-date ones which are detailed in the Kontron hardware documentation.

Functional changes that differ from previous version of the document are identified by a vertical bar in the margin.

You will find in the following pages:

This document applies to all available VM6052/VM6054 Environment Classes: Standard (SA), Extended Temperature Air-Cooled (WA), Rugged Air-Cooled (RA) and Rugged Conduction-Cooled (RC) versions.

If a specific information applies only to a specific environment class, it is clearly specified in the information description. For example, the reference VM6052/VM6054/RC applies only to VM6052/VM6054 Rugged Conduction-Cooled environment class.

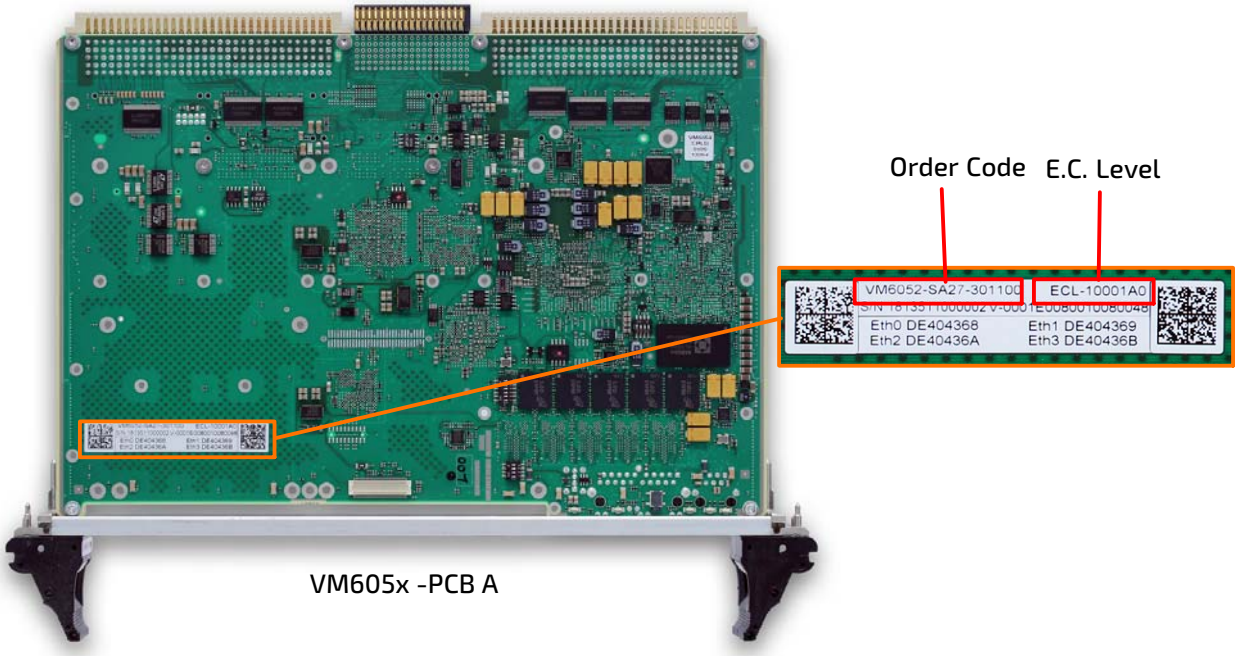
This document refers to the up-to-date release of the following hardware documentation:

- VM6052/VM6054 User's Guide CA.DT.B16

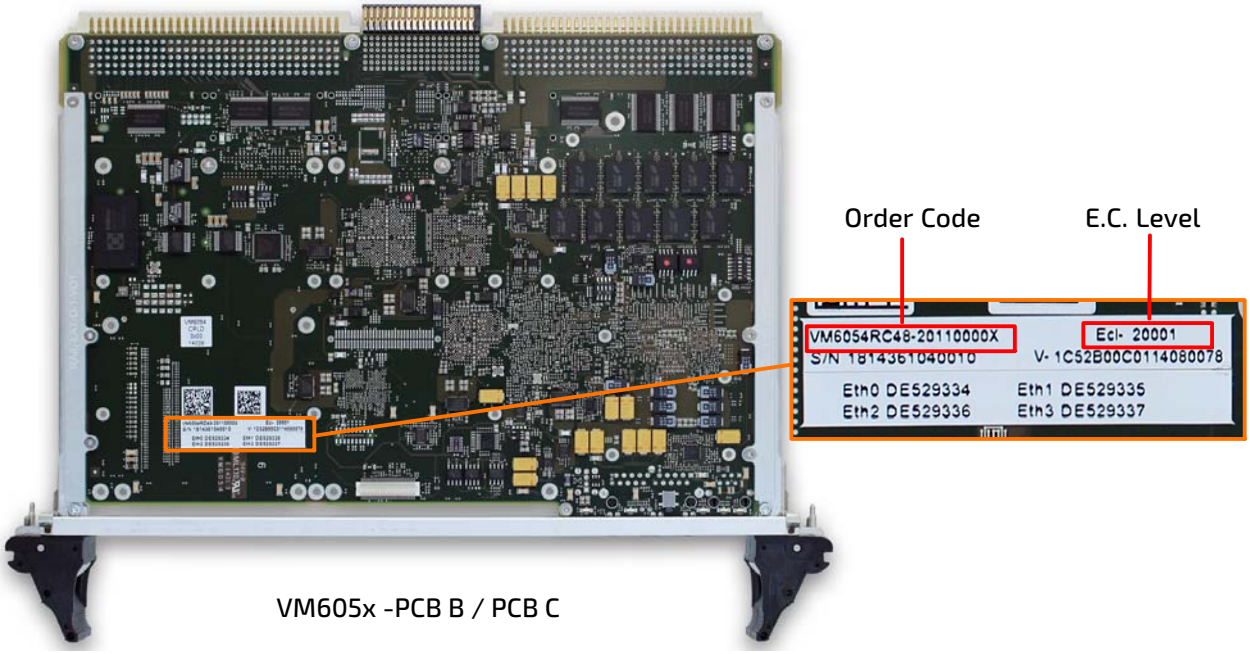
2 / Board Identification

2.1 Engineering Change Level and Order Code for VM605x

The Engineering Change Level (E.C. Level) and the Order Code informations are available on the "Board Identification" label, located on the bottom side of the board.



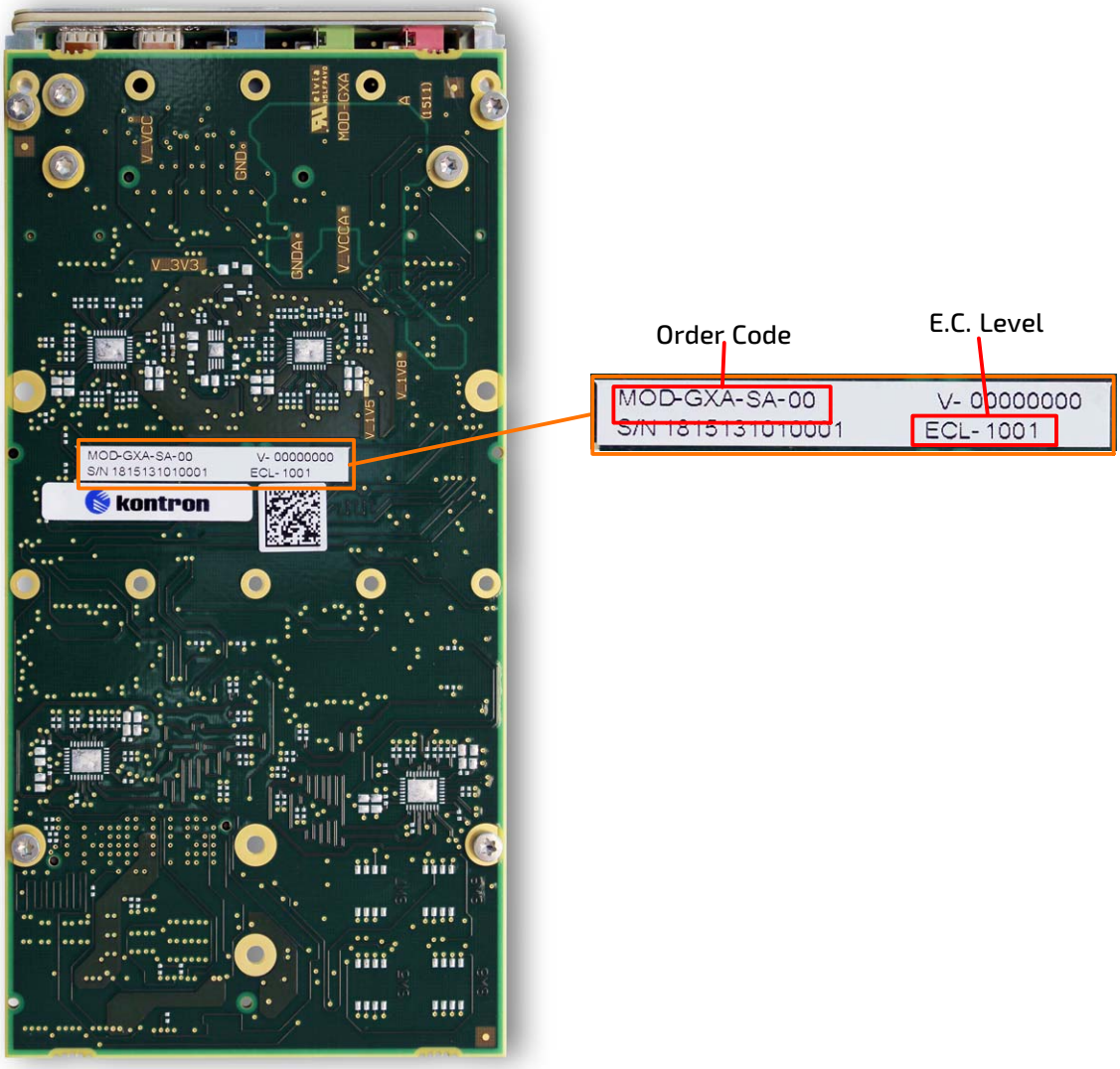
VM605x -PCB A



VM605x -PCB B / PCB C

2.2 Engineering Change Level and Order Code for MOD-GXA

The Engineering Change Level (E.C. Level) and the Order Code informations are available on the "Board Identification" label, located on the bottom side of the board.



3 / General Information

Personal Injuries

VM6052/VM6054/SA/WA

- Do not touch the CPU heatsink while removing the board from a rack because it can get very hot.
- Be careful while handling the board, because of the cutting edges of the heatsink.
- Do not place the board on any surface or in any form of storage container until the board and its heatsink have cooled down to room temperature.

VM6052/VM6054/RC/RA

- Do not touch the ruggedizer while removing the board from a rack because it can get very hot.
- Do not place the board on any surface or in any form of storage container until the board and its ruggedizer have cooled down to room temperature.

PMCs Signaling Level

The PCI PMC V(I/O) voltage level is +3.3V only. It is not +5V tolerant. The user must check that its PMC type is compatible with this signaling voltage (refer to the Chapter "PMC Sites" in the VM6052/VM6054 User's Guide).

EMC Gasket

In order to protect the EMC gasket located in the front panel, be careful during the insertion of the boards in the rack. It is recommended to insert the boards in a rack starting from the higher slot number and extract them starting from the lowest slot number.

Power Supplies

On +5V power supply,monotonic rise time have to be included between 1 ms and 25 ms at Power on.

On +3.3V power supply, monotonic rise time have to be included between 1 ms and 25 ms at Power on.

For a power off condition to be valid, the +5V and +3.3V power supply input should remain at 0V for at least one second.

Height of the Board when fitted with the Optional Hard Disk Storage Kit - CRP 3979

The height of the VM6052/VM6054 board fitted with the hard disk storage kit (KITDISK25- SATA) is slightly higher than the maximum height as specified by the VME standard.

15.4 mm instead of the required standard of 13.7 mm

- Mounting kit:	5.9	mm away from the PCB
- 2.5" disk:	9.5	mm thick

Total:	15.4	mm

Components Height on Top Side of the Board- CRP 3980

The front panel connectors are marginally higher than the maximum height specified by the VME standard. List of components of the VM6052/VM6054 that do not respect the VME standard (13.7 mm top height):

- Front panel Ethernet connectors: . . . . . 13.80 mm
- Front panel USB connector: . . . . . 13.83 mm
- Front panel Console (RJ-11) connector: . . . . . 13.84 mm

No impact since the exceeding height is located very close to the front panel.

Mounting Ribs confict with front IO connector on RA/RC class board (graphic option) - CRP 3981

Ribs used to improve the PMC conduction cooling are in conflict with Front IO connector when it is fitted. Ribs cannot be used on VM6052/VM6054 RA/RC classes board using this connector to graphic module.

Weak impact because graphic module is plugged on the PMC slot and it do not require improvement cooling.

PMC excursion VITA 20 requirement not satisfied with RC class Ruggedizer - CRP 3982

PMC location does not satisfy the PMC excursion requirement in VITA 20 standard (see appendix C). The distance from PMC edge to VM6052/VM6054 edge size must be higher than 19.7 mm as specified by the VME standard.

- 13.75 mm instead of the required standard of 19.7 mm at minimum

Ejector has been reduced to do not disturb with PMC.

Breaking ESD contact before board connector locking - CRP 4260

ESD discharge strip is reduced in order to integrate the pre-cut of PCB for RC version. This means that ESD contact is broken with the earth when board is plugged in the chassis. VM6052/VM6054 is compliant with IEEE1101.10 §9.1.2 instead of §9.1.1 as previous VME boards.

Turbo boost mode

Turbo boost mode is not supported on VM6052 and VM6054 board and this mode is not guaranteed by Kontron. This feature is disabled by default in BIOS setting.

VITA 31.1 Compliance

The P0 Ethernet routing allows to support VITA 31.1 backplane networking but the P0 pinout looks not compliant with the VITA 31.1 standard because:

The pins in P0 connector position 1 and 6 are used for PMC I/O, misc signal and rear USB power supplies, whereas VITA 31.1 specifies to keep them Not Connected (NC) to avoid the possibility of interfering with the Ethernet signals.

- **VM6052/VM6054 P0 Pin Assigment**

PIN	P0 CONNECTOR					
	ROW A	ROW B	ROW C	ROW D	ROW E	ROW F
1	PMC2 IO 39	PMC2 IO 38	PMC2 IO 37	PMC2 IO 36	PMC2 IO 35	GND
2	ETH2 BI_DA+	ETH2 BI_DA-	GND	ETH2 BI_DC+	ETH2 BI_DC-	GND
3	ETH2 BI_DB+	ETH2 BI_DB-	GND	ETH2 BI_DD+	ETH2 BI_DD-	GND
4	ETH3 BI_DA+	ETH3 BI_DA-	GND	ETH3 BI_DC+	ETH3 BI_DC-	GND
5	ETH3 BI_DB+	ETH3 BI_DB-	GND	ETH3 BI_DD+	ETH3 BI_DD-	GND
6	RESET#	USB2 PWR	NVMRO	RTC-BAT	USB3 PWR	GND

- VITA 31.1 Standard - P0 Pin Assigment

PIN	P0 CONNECTOR					
	ROW A	ROW B	ROW C	ROW D	ROW E	ROW F
1	N.C.	N.C.	N.C.	N.C.	N.C.	GND
2	+Txa LPa_DA+	-Txa LPa_DA-	GND	LPa_DC+	LPa_DC-	GND
3	+Rxa LPa_DB+	-Rxa LPa_DB-	GND	LPa_DD+	LPa_DD-	GND
4	+Txb LPb_DA+	-Txb LPb_DA-	GND	LPb_DC+	LPb_DC-	GND
5	+Rxb LPb_DB+	-RXb LPb_DB-	GND	LPb_DD+	LPb_DD-	GND
6	N.C.	N.C.	GND	N.C.	N.C.	GND

To support more efficiently the VITA 31.1 backplane:

- The VM6052/VM6054 board family uses shielded HSHM P0 connector which suppresses the interference between adjacent pin positions in P0 connector.
- The pins in P0 connector position 1 may be NC by removing 0 ohm network resistor.

FDM-SATA mezzanine module support

It is recommended to use FDM-SATA with E.C. Level higher than or equal to EC4000. The height compatibility with mechanical part of VM605x (heatsink and ruggedizer) is not ensured for FDM-SATA with E.C. Level lower than EC4000.

Onboard disk carrier support

Onboard SATA disk carrier (KIT-DISK25-SATA) is NOT supported on Rugged Conduction version and on Rugged Air-cooled version. P5 connector is not accessible and not equipped on these versions of VM605x boards.

Onboard SATA disk carrier (KIT-DISK25-SATA) is supported on Standard Air-cooled version and extended Air-cooled version (WA) but P5 connector is a manufacturing option (refer to chap 1.2.3 of CA.DT.B19) and it is not equipped by default, depending on product order code.

4 / Board Revision Guide for VM6052/VM6054

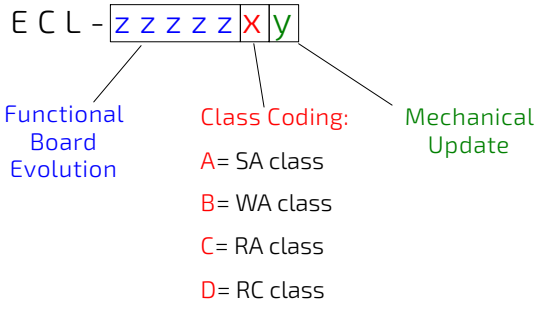
4.1 How to Use the Board Revision Guide Table

1. Find the E.C. Level associated to your board as described in the Chapter 2 "Board Identification" page 2.
2. Find the column associated to the E.C. Level of your board in this table.
3. Check for a specific item in the table lines:
   - 3.1. A x (cross) in the E.C. Level column indicates that this item applies to this E.C. Level.
   - 3.2. No x (cross) in the E.C. Level column indicates that this item does not apply to this E.C. Level.
   - 3.3. If the functionality described by the item is not available on your board don't take into account this item. To know the functionalities available or not on your board, read the User's Guide associated with your board version.

Each item is fully described in section 4.6 "Item Detailed Description" page 9.

4.2 E.C. Level Coding

The E.C. Level of VM6052/VM6054 board is composed of a functional part coding and a mechanical part coding. The five first digits are used to code the functional board evolution and the two last digits are used to code the mechanical board evolution, as described as follows:



4.3 Revision Guide Table for VM6052/VM6054 Functional E.C. Levels

4.3.1 Functional E.C. Levels for VM6052/VM6054 PCB-A

Item	CRP	Description	E.C. Levels - PCB-A					
			1x000xy	1x001xy	1x002xy			
1	-	Potential spurious interrupt on SERIQ	X	X				
2	-	Internal VME bridge power supply may not start correctly	X	X				

x and y are the mechanical E.C. Levels.

4.3.2 Functional E.C. Levels for VM6052/VM6054 PCB-B, PCB-C and PCB-D

Item	CRP	Description	E.C. Levels - PCB:							
			B				C	D		
			2x002xy	2x003xy	2x004xy	2x005xy	3x015xy	4x015xy	4x016xy	4x017xy	4x037xy
3	4250 4252	Board management enhancement	X								
4	-	M66EN of PMC site 1 sensitivity to noise	X								
5	-	VME DMA transfer errors	X								
6	4263	Internal power supply failure after reboot command and VME activity	X	X					X	X	X
7	4264	Processor core supply failure on VM6054	X	X	X	X					
8	4268	Correctable PCIe Error on XMC slot 1	X	X	X	X	X	X	X	X	X
9	4265	MOD-GX DisplayPort B resolution limitation on VM605x	X	X	X	X	X	X	X	X	X
10	4273	VME bridge DMA feature hangs up after a VME bus error	X	X	X	X	X	X	X	X	X
11	4266	Important loss of USB voltage when using a long USB cable	X	X	X	X	X	X	X	X	X
12	4256	False detection of RTC battery low with PBIT	X	X	X						
13	4267	False under voltage LED's error code on VM605x	X	X	X						
14	4298	Onboard Ethernet issue at temperature below 0°C	X	X							
15	4299	USB Over current limit too high (2 Amps max)	X	X	X						
16	-	PEX8112 PCIe/PCI32 bridge detection failure			X	X	X	X			
17	-	RTC and XMC slot 2 I2C address conflict	X	X	X	X	X	X	X		
18	-	Battery holder ripping out	X	X	X	X	X	X	X	X	

x and y are the mechanical E.C. Levels.

4.4 Revision Guide Table for VM6052/VM6054-SA Mechanical E.C. Levels

These E.C. Levels apply to SA and WA classes.

Item	CRP	Description	E.C. Levels				
			A1	A2	A3	A4	A5
SA-1	4270	Tolerance not respected from component/shape to left lateral stiffener	X				
SA-2	4271	VM605x issue during random vibration test according to VITA 47 level V1	X	X			
SA-3	4272	Deterioration of front panel textile EMC gasket	X	X	X		

4.5 Revision Guide Table for VM6052/VM6054-RC Mechanical E.C. Levels

Item	CRP	DESCRIPTION	E.C. LEVEL						
			D0	D1					
RC-1	-	Centering pin prevent from 64bits PMC mounting on slot 1	X						
RC-2	-	Ruggedizer update to support PCB C & D	X						

4.6 Items Detailed Description for VM6052/VM6054 Functional E.C. Levels

Each item applies only to a specific group of E.C. levels.
Refer to the table available in section 4.3 and 4.4 “Revision Guide” page 8 to find the specific E.C. levels associated to a specific item.

Item #1 Potential spurious interrupt on SERIQ

Description : Potential problem on the local bus including Trusted Platform Module and XDP connector.

Impact: The TPM and XDP connector on local bus may not be available. Spurious interrupt may appear. Only for PCB A.

Workaround: No workaround.

Fix: Fixed in E.C. Levels 18002xy and 10002xy respectively for VM6052 and VM6054 boards. TPM and XDP function do not work.

Note: With the PCB-B, it will be possible to access the TPM and XDP connector.

Item #2 Internal VME bridge power supply may not start correctly

Description : Internal VME bridge power supply may not start correctly. At low temperature the board may fail to start with LEDs error code: L1=red, L2=red, L3=off L4=red, L5=orange.

Impact: The board does not start, the LED colors are: L1=red, L2=red, L3=off, L4=red, L5=orange. Only for PCB A.

Workaround: No workaround.

Fix: Fixed in E.C. Levels 18002xy and 10002xy respectively for VM6052 and VM6054 boards.

Item #3 Board Management Enhancement - CRP 4250 & 4252

Description :	Board management enhancements
Impact:	PROCHOT LED does light on red when low frequency is forced by switch.
Workaround:	Do not force low CPU frequency using switch.
Fix:	Fixed in E.C. Level EC2x003.

Item #4 M66EN of PMC site 1 sensitivity to noise

Description :	Inadequate filtering on M66EN of PMC site 1.
Impact:	No functional impact observed.
Workaround:	No workaround.
Fix:	Fixed in E.C. Level EC2x003.

Item #5 VME DMA transfer errors

Description :	The 250 µs granularities of VME timeout 8-bit register (VME_TIM_ DTBTOUT) may not be enough on VME bridge release 0x45 (ALMA2f), VME DMA transfer errors may appear.
Impact:	With VME bridge release 0x45, if VME timeout register is not configured as infinite value, VME DMA transfer may fail with DMA errors. In the same way, with infinite timeout VME errors may occur too.
Workaround:	Set infinite timeout value in 8-bit register (VME_TIM_ DTBTOUT).
Fix:	E.C. Level EC2x003 including VME bridge release 0x46 fixes this erratum. In this new release, the maximum value of VME timeout register is increased to 2.047 ms instead of 250 µs. Note that the increasing value of timeout needs to do some improvements to set 8112 PCI bridge registers to optimize performance on PCI bus with different PCI device (VME bridge and PMC for example).

Item #6 Internal power supply failure after reboot command and VME activity - CRP 4263

Description :	Following VME DMA activity, a reboot command on Linux system may cause an error on internal power supply.
Impact:	Internal power supply failure may occur after VME DMA activity and reboot command. Note that reset appears on backplane with this failure.
Workaround:	Program PEX8112 arbiter to park PCI bus on PEX8112 after a PCI transfer. Set bit [3:1] of PCI Control register to 001b. This register is accessed by the PCI memory base address register 0, offset 100Ch.
Fix:	Fixed in some E.C. Level (see table 4.3.2) with new issue, see item #16 for description and impact.

Item #7 Processor core supply failure on VM6054 - CRP 4264

Description :	Processor power supply may fail on high current demands under adverse board supply conditions.
Impact:	If +5VDC VME power supply is set under 5.0V, when processor power consumption goes above 25W, a processor core PSU failure may appear with (LED 1, LED 3 and LED 5 lit on red). This occurs only with quad core processors under heavy load (VM6054).
Workaround:	Set the +5VDC VME power rail above 5.0V and limit package processor power consumption to 25W. Optimal problem prevention is to set 5V VME rail to 5.1V.
Fix:	Fixed in E.C. Level 3x004xy and higher.

Item #8 Correctable PCIe Error on XMC slot 1 - CRP 4268

Description :	Correctable PCIe errors occur on PCIe link connected from processor to XMC slot 1. These errors appear when using an XMC on slot 1. Occurrence is below the bit error rate defined in PCIe standard.
Impact:	No impact because errors are automatically corrected by hardware.
Workaround:	No workaround.
Fix:	No plan to fix

Item #9 MOD-GX DisplayPort B resolution limitation on VM605x - CRP 4265

Description :	VM605x board associated with a MODGX-SA does not support a resolution of 2560x1400 @ 60 Hz on DisplayPort B interface on front panel. The problem is only present on port B, not on port D.
Impact:	Display loss on front panel.
Workaround:	Prefer 1920x1200 resolution on DisplayPort B.
Fix:	No plan to fix.

Item #10 VME bridge DMA feature hangs up after a VME bus error - CRP 4273

Description :	Due to infinite timeout set in VME bridge (default Linux setting), a DMA engine hangs up after a VME bus error if DMA access is performed on non-allocated VME address. New DMA access cannot be generated afterwards.
Impact:	DMA engine hangs up.
Workaround:	Avoid to do access in non-allocated VME address from DMA controller or set VME timeout to max value.
Fix:	No plan to fix.

Item #11 Important loss of USB voltage when using a long USB cable - CRP 4266

Description :	The voltage of USB device can be lower than the voltage defined in USB standard (4.75V) for 500 mA of current consumption, when using a USB cable with poor quality or when the VME power supply is set to minimum voltage according to VITA 1.1 standard (4.875V).
Impact:	USB device may not work fine and may be disconnected before to be removed.
Workaround:	Use cable with 3 meters maximum length. Plug USB device with current consumption limited to 250mA.
Fix:	Limit the cable length and limit current to comply with USB voltage.

Item #12 False detection of RTC battery low with PBIT - CRP 4256

Description :	In case of the 5V VME PSU falls down very fast, a PBIT sequence may report a wrong battery failure after a power-on event, this despite the battery voltage is in range (higher than 2.9V).
Impact:	After a board power-off, a low battery default may be logged in RTC RV8564C2 device. When the default occurs, LED 4 is lit on red on front panel. Date and time are not impacted.
Workaround:	No workaround.
Fix:	Fixed in E.C. Level 2x005.

Item #13 False under voltage LED's error code on VM605x - CRP 4267

Description :	In case of under voltage condition on 5V and/or on 3.3V VME power rail, the LED's error code displayed on front panel of VM605x may not be compliant to User's Guide, section 4.7 LEDs.
Impact:	No significant impact. In case of 3.3V VME power rail under voltage condition, a power supply default occurs (LED1 and LED3 light on red). In case of 5V VME power rail under voltage condition, LED1 may be lit on green, board is in reset state waiting for power supply sequencing.
Workaround:	No workaround.
Fix:	Fixed in E.C. Level 2x005.

Item #14 Onboard Ethernet issue at temperature below 0°C - CRP 4298

Description :	When temperature decreases below 0°C, uncorrectable errors may appear on PCIe links between processor and 82580 Ethernet controller. SA class products are not concerned by this errata.
Impact:	When this issue occurs, four onboard Ethernet Interfaces are no longer operating. Ethernet ports are disconnected.
Workaround:	Set PCIe link at 2.5 Gb/s (gen 1) minimizes risk to come across the issue. Contact Kontron support to know the PCIe express speed configuration procedure using BIOS setting.
Fix:	Partially fixed in E.C. Levels 2x004 and 2x005 for PCB-B boards. Fixed in E.C. Level 2x014 and higher for PCB-B boards. Fixed in E.C. Level 3x015 and higher for PCB-C boards. Fixed in E.C. Level 4x015 and higher for PCB-D boards

Item #15 USB Over current limit too high (2 Amps max) - CRP 4299

Description :	The USB interfaces over current trigger threshold does not meet board design (max current limit is 1.25A on USB ports (front and rear)..
Impact:	In case of using a USB device with current consumption higher than 1.5A, USB power components may overheat. USB interface may be damaged.
Workaround:	Limit total USB devices consumption to a max of 1.25A (USB Standard per device limit is 500 mA tp.). Auxiliary USB power supplies may help for external devices such as HDD.
Fix:	Fixed in E.C. Level 2x004.

Item #16 PEX8112 PCIe/PCI32 bridge detection failure

Description :	In case of BIOS setting modification or BIOS upgrading, PCIe/PCI32 bridge device is no longer detected in PCI configuration cyle. PEX8112 device is not detected by BIOS.
Impact:	VME and PMC 32bit functions are no longer available.
Workaround:	No workaround.
Fix:	Fixed in E.C. Level 4x016.

Item #17 RTC and XMC slot 2 I2C address conflict

Description :	In case of using an XMC card embedding an EEPROM device on the I2C bus, if this XMC card is plugged on PMC/XMC slot 2, this results in an I2C address conflict between onboard RTC device and embedded EEPROM.
Impact:	Read and write access issue on RTC device and on possible EEPROM embedded on XMC card plugged on slot 2.
Workaround:	Prefer slot 1 to plugged XMC.
Fix:	Fixed in E.C. Level 4x017.

Item #18 Battery holder ripping out

Description :	RAYOVAC BR1225X-BA lithium battery do not suit to the battery holder of VM6052-54 boards. Battery insertion is always very tight. This erratum applies only on SA and WA board classes.
Impact:	One of the pad of the battery holder may rip out when attempting to insert the BR1225 battery..
Workaround:	Used RENATA CR1225MFR reference for SA and WA classes only.
Fix:	Fixed in E.C. Level 4x037.

4.7 Item Detailed Description for VM6052/VM6054-SA Mechanical E.C. Levels

Each item applies only to a specific group of E.C. levels.
Refer to the table available in section 4.4 “Revision Guide” page 9 to find the specific E.C. levels associated to a specific item.

Item #SA-1 Tolerance not respected from component/shape to left lateral stiffener - CRP 4270

Description:	On VM6052 and VM6054 SA/WA, tolerances are not respected between mechanical fixing point of left lateral stiffener and the PCB hole pad.
Impact:	Despite PCB coating, an electrical risk may appear between the stiffener and shape/component close to the hole pad and fixing point.
Workaround:	No workaround.
Fix:	Fixed by mechanical E.C. level A2.

Item #SA-2 VM605x issue during random vibration test according to VITA 47 level V1 - CRP 4271

Description:	Processor core supply issue or CATastrophic ERRor may appear on VM6052 and VM6054 during random vibration test according to VITA 47 level V1.
Impact:	May damage the VM6052 and VM6054
Workaround:	Do not used VM605x board in harsh environment, it is recommended to use equipment in lab for development only.
Fix:	Fixed by mechanical E.C. level A3.

Item #SA-3 Deterioration of front panel textile EMC gasket - CRP 4272

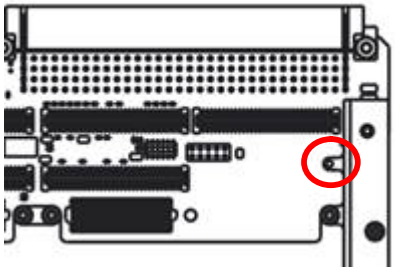
Description:	When storage temperature comes up to 70°C, EMC gasket may deteriorate and may come sticky.
Impact:	EMC gasket may come sticky.
Workaround:	Avoid storing board in ambient temperature higher than 70°C and avoid maintaining pressure (or contact) on EMC gasket.
Fix:	Fixed by mechanical E.C. level A4.

4.8 Items Detailed Description for VM6052/VM6054-RC Mechanical E.C. Levels

Each item applies only to a specific group of E.C. levels.
Refer to the table available in section 4.5 “Revision Guide” page 9 to find the specific E.C. levels associated to a specific item.

Item #RC-1 Centering pin prevent from 64bits PMC mounting on slot 1

Description : Centering pin (stud) highlighted by red circle in picture below prevent from 64-bit PMC mounting on slot 1. Extra connector for this kind of PMC bumps into this pin.



Impact:	Mounting of 64-bit PMC boards on slot 1 may be not possible. No problem for 32-bit PMC boards.
Workaround:	Fixed by mechanical E.C. Level D1 on VM6052/VM6054 PCB-C or higher.

Item #RC-2 Ruggedizer update to support PCB C & D

Description :	D1 is a base E.C. Level of VM6052/VM6054 PCB-C and PCB-D boards. Some counter boards (pockets) have been modified to be well suitable with component height and placement modification on top side of these new PCB.
Impact:	No impact. Ruggedizer with E.C. Level D1 cannot be mounted on VM6052/VM6054 boards PCB-B.

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5 / Board Revision Guide for MOD-GXA

5.1 How to Use the Board Revision Guide Table

1. Find the E.C. Level associated to your board as described in the Chapter 2 "Board Identification" page 2.
2. Find the column associated to the E.C. Level of your board in this table.
3. Check for a specific item in the table lines:
   - 3.1. A x (cross) in the E.C. Level column indicates that this item applies to this E.C. Level.
   - 3.2. No x (cross) in the E.C. Level column indicates that this item does not apply to this E.C. Level.
   - 3.3. If the functionality described by the item is not available on your board don't take into account this item. To know the functionalities available or not on your board, read the User's Guide associated with your board version.

Each item is fully described in section 5.3 "Item Detailed Description" page 16.

5.2 Revision Guide Table - MOD-GXA E.C. Levels

Item	CRP	Description	E.C. Levels					
			1001					
1	4301	HDMI connector pin are not compliant to IPC standard.	X					
2	4302	Right and left channels of microphone and line-in are inverted	X					
3	4308	Left channel of microphone input does not work	X					

5.3 Items Detailed Description for MOD-GXA E.C. Levels

Each item applies only to a specific group of E.C. levels.
Refer to the table available in section 5.2 and 4.4 “Revision Guide” page 15 to find the specific E.C. levels associated to a specific item.

Item #1 HDMI connector pin are not compliant to IPC standard. - CRP 4301

Description :	Earth pins of two HDMI connectors do not completely through the PCB, this is not conformed to IPC610 standard.
Impact:	No functional impact.
Workaround:	No workaround.
Fix:	No plan to fix.

Item #2 Right and left channels of microphone and line-in are inverted - CRP 4302

Description :	Right and left channels of microphone input and line-in input are inverted on MOD-GXA board.
Impact:	On stereo device, right and left channels are respectively seen as left and right channels for microphone input and line-in input.
Workaround:	Codec device allows inverting right and left channel. Contact Kontron support to know how to proceed.
Fix:	No plan to fix.

Item #3 Left channel of microphone input does not work - CRP 4308

Description :	Left channel of microphone input does not work. Right channel operates well, channel seen operating system side, which means channels inversion (refer to CRP 4298) is taken into account.
Impact:	No impact because microphones are not stereo device. Right channel is used by default.
Workaround:	No workaround.
Fix:	No plan to fix.

5.4 EFT Board Known Limitations (ECL1001)

- No HDMI interfaces available on rear of VM6052 or VM6054 board using a MOD-GXA board, these features have not been verified and tested.
- No audio interface available with MOD-GXA in bottom side configuration, configuration use to keep free PMC slots of VM605x board, this feature has not been verified and tested,.
- No extended operating temperatures lower than 10°C and higher than 30°C.
- No compliance to environmental standard (EMC, vibration, shock, EN60950).
- No VM6050 board compatibility, this feature has not been verified and tested.

Appendix A - Compliance to REACH Directive

A.1 Definitions

- REACH Directive: EU Directive 1907/2006
- SVHC Candidate List: June 16 2014; 155 substances
- Communication Requirement per REACH Directive: If any SVHC on candidate list is present in the product with a concentration above 0.1% by weight (ie 1000 ppm), the provider is obliged to inform the recipients of the article along the supply chain about the chemical name(s) and how the article can be safely used.
- Article definition per REACH Directive: Under REACH Directive, an article is defined as an object which during production is given a special shape, surface or design, which determines its function to a greater degree that does its chemical composition.

  Several objects can be identified on an electronic board: Electronic components, mechanical parts, thermal interfaces, labels, printed Circuit Board (PCB), bare board (electronic components assembled on PCB), whole board (bare board with mechanical parts)...

  Whether the 0.1% threshold should apply to the entire electronic board or to its individual components depends on the interpretration of the Directive and may differ from one country to another.
- Part: In this document, synonymous with electronic component.

A.2 SVHC List Verification

The verification performed by Kontron has been made at part level: Nine parts contain SVHC with concentration greater than 0.1% threshold as shown in the following table.

In the last row, the quantity of substance identified in these parts has been compared to the total mass of the bare board: the concentration is always well below the 0.1% threshold.

MANUFACTURER	Rayovac	Murata	Murata	Murata	Yageo	Yageo	Yageo	Yageo	Yageo
MANUFACTURER PART NUMBER	BR1225X-BA	GRM155R71C223KA01D	GRM188R60J225KE01D	GRM155R71C224KA12D	YC124JR-0710KL	YC124JR-0733RL	YC124JR-0739RL	YC124JR-0747KL	YC124JR-078K2L
PART DESCRIPTION	Lithium battery	Capacitor	Capacitor	Capacitor					
QTY	1	7	13	27	3	2	14	2	15
SUBPART NAME	Composition	Outer electrode-Glass							
SUBSTANCE NAME	1,2-dimeth o-xyethane	Diboron trioxide							
SUBSTANCE CAS NUMBER	110-71-4	1303-86-2							
BARE BOARD MASS (MG)	303000								
PART MASS (MG)	907,185	1,6	6,3	1,6					
SUBPART MASS (MG)	NA	0,0191	0,1103	0,0191	0,0408				
SUBSTANCE QUANTITY (MG)	81,64665	0,00382	0,02206	0,0382	0,00326				
CONCENTRATION OF SUBSTANCE IN PART (PPM)	9	0,23875	0,35016	0,23875	0,1326				
RATIO SUBSTANCE IN PART / BARE BOARD MASS (PPM)	0,0269461	0,0000088	0,0000946	0,0003404	0,0000032	0,0000022	0,0000151	0,0000022	0,0000161

Appendix B - Compliance to VITA 47 Standard

Kontron products were developed and tested to provide all features necessary to ensure its compliance with VITA 47 standard, revised September 2007.

B.1 VM6052 and VM6054 SA and WA Compliancy

VM6052 and VM6054 SA and WA classes ensure compliancy or design to meet with VITA 47 section according to the table below:

	VITA 47 Section	Compliant	Design to Meet	Not Applicable	Not Compliant	Level
Operating temperature, AC1 class	4.1		X			0°C/55°C
Non operating temperature, C1 class	4.2	X				-40°C/+85°C
Temperature cycling, C1 class	4.3		X			-40°C/+85°C 500 cycles
Vibration, V1 class	4.4		X			5 Hz to 100 Hz Power Spectral Density (PSD) = 0.04 g2/Hz
Schock, class OS1	4.5	X				20g, 11 millisecond, half-sine
Humidity	4.6	X				95% HR
Altitude	4.7	X				-1,500 feet (-460 meters), +60,000 feet (+18,300 meters)
Rapid decompression	4.8				X	from 8,000 feet (2,440 meters) to 60,000 feet (18,300 meters)
Attitude	4.9		X			
Fungus resistance	4.10				X	
Electrostatic discharge resistance	4.11				X	from 0 to 15 kV as discharged from a 150 pf capacitor through a 330 ohm resistor
Corrosion resistance	4.12				X	
Soldering	5.1.1	X				In accordance with IPC/EIA J-STD-001, Class 2 or Class 3
Conformal coating	5.1.2	X				Conformal coating per IPC-CC-830 Class B
PCB fabrication	5.1.3	X				IPC-A-600, Class 2 or Class 3
Interchangeability	5.2	X				
Status Lights	5.3		X			In accordance with VITA 40
Internal fans	5.4			X		
Acoustic generation by fans	5.5			X		
Liquid cooled	5.6			X		
Materials restrictions	6.1		X			As defined by either MIL-HDBK-454, Guideline 1, Paragraph 4.9
Flammability	6.2		X			EN 60950-1 Class V-1, or UL 94 Class V-1
Maximum surface temperature	6.3	X				
Non-hermetic devices with switching contacts	6.4	X				
Unit voltages	6.5	X				Less than 60 V d.c.
Liquid cooled (safety)	6.6			X		

	VITA 47 Section	Compliant	Design to Meet	Not Applicable	Not Compliant	Level
Toxicity	6.7			X		
Material compatibility with spray coolants	6.8			X		
Precautions for Water Based Coolants	6.9			X		
Quality system	7	X				ISO 9001:2000

- "Compliant" means tested according to VITA 47 standard
- "Not Compliant" means not tested according to VITA 47 standard and not design to meet
- "Not Applicable" means not applicable to plug-in unit
- "Design to Meet" means design to be compliant with VITA 47 standard but not tested according to VITA 47 standard

B.2 VM6052 and VM6054 RC Compliancy

VM6052 and VM6054 RC class ensures compliancy or design to meet with VITA 47 section according to the table below:

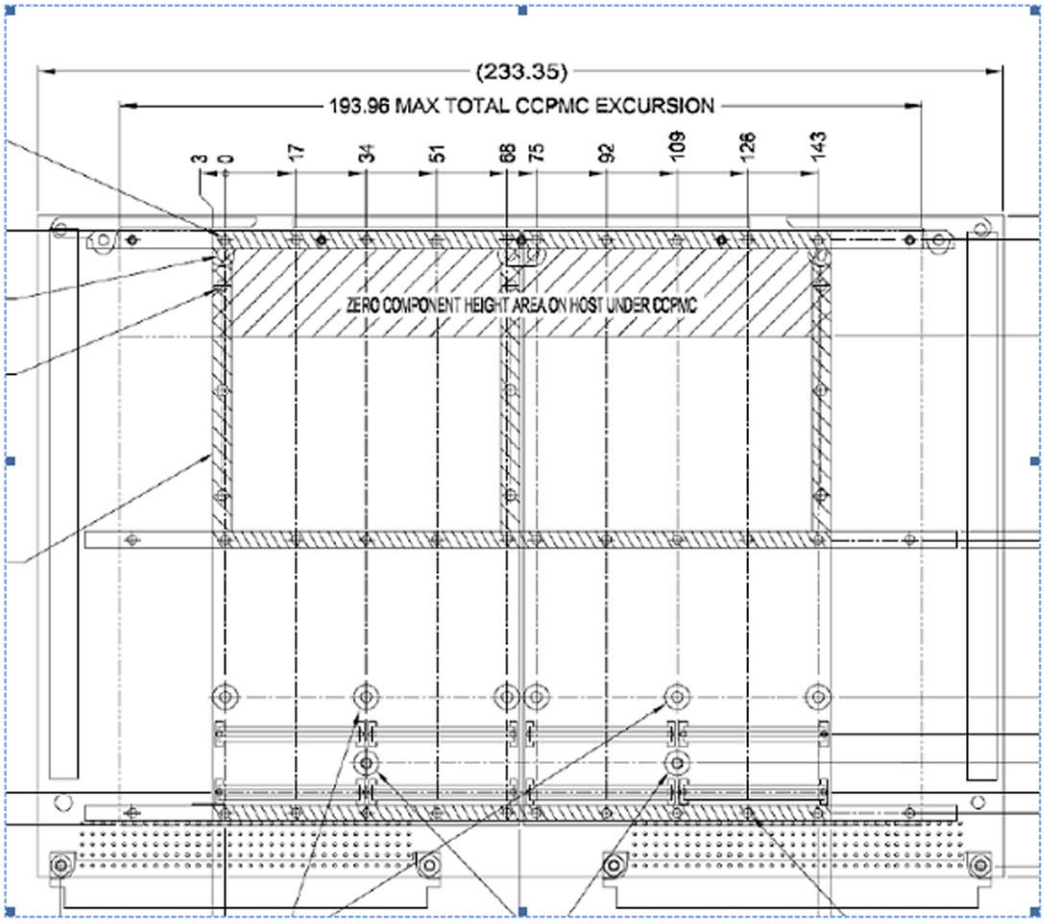
	VITA 47 Section	Compliant	Design to Meet	Not Applicable	Not Compliant	Level
Operating temperature, CC3/CC4 class	4.1		X			-40°C/70°C ; -40°C/85°C
Non operating temperature, C3 class	4.2	X				-50°C/+100°C
Temperature cycling, C3 class	4.3		X			-50°C/+100°C 500 cycles
Vibration, V3 class	4.4	X				5 Hz to 100 Hz Power Spectral Density (PSD) increasing at 3 dB/octave100 Hz to 1000 Hz PSD = 0.1 g2/Hz5 Hz to 100 Hz PSD decreasing at 6 dB/octave
Schock, class OS2	4.5	X				40g, 11 millisecond, half-sine
Humidity	4.6	X				95% RH
Altitude	4.7	X				-1,500 feet (-460 meters), +60,000 feet (+18,300 meters)
Rapid decompression	4.8				X	from 8,000 feet (2,440 meters) to 60,000 feet (18,300 meters)
Attitude	4.9		X			
Fungus resistance	4.10				X	
Electrostatic discharge resistance	4.11				X	from 0 to 15kV as discharged from a 150 pf capacitor through a 330 ohm resistor
Corrosion resistance	4.12				X	
Soldering	5.1.1	X				in accordance with IPC/EIA J-STD-001, Class 2 or Class 3
Conformal coating	5.1.2	X				conformal coating per IPC-CC-830 Class B
PCB fabrication	5.1.3	X				IPC-A-600, Class 2 or Class 3
Interchangeability	5.2	X				
Status Lights	5.3		X			in accordance with VITA40
Internal fans	5.4			X		
Acoustic generation by fans	5.5			X		

	VITA 47 Section	Compliant	Design to Meet	Not Applicable	Not Compliant	Level
Liquid cooled	5.6			X		
Materials restrictions	6.1		X			as defined by either MIL-HDBK-454, Guideline 1, Paragraph 4.9
Flammability	6.2		X			EN 60950-1 Class V-1, or UL 94 Class V-1
Maximum surface temperature	6.3	X				
Non-hermetic devices with switching contacts	6.4	X				
Unit voltages	6.5	X				less than 60 V d.c.
Liquid cooled (safety)	6.6			X		
Toxicity	6.7			X		
Material compatibility with spray coolants	6.8			X		
Precautions for Water Based Coolants	6.9			X		
Quality system	7	X				ISO 9001:2000

- "Compliant" means tested according to VITA 47 standard
- "Not Compliant" means not tested according to VITA 47 standard and not design to meet
- "Not Applicable" means not applicable to plug-in unit
- "Design to Meet" standard means design to be compliant with VITA 47 standard but not tested according to VITA 47

Appendix C - PMC Excursion

PMC Excursion



About Kontron - An S&T Company

Kontron is a global leader in IoT/Embedded Computing Technology (ECT). As a part of technology group S&T, Kontron offers a combined portfolio of secure hardware, middleware and services for Internet of Things (IoT) and Industry 4.0 applications. With its standard products and tailor-made solutions based on highly reliable state-of-the-art embedded technologies, Kontron provides secure and innovative applications for a variety of industries. As a result, customers benefit from accelerated time-to-market, reduced total cost of ownership, product longevity and the best fully integrated applications overall.

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