DARC™ VX208

USER GUIDE

D261508-1.0 - September 2023

kontron

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Disclaimer

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Intended Use

You understand and agree that your use of Kontron devices as a component in High Risk Applications is entirely at your risk. To minimize the risks associated with your products and applications, you should provide adequate design and operating safeguards. You are solely responsible for compliance with all legal, regulatory, safety, and security related requirements concerning your products. You are responsible to ensure that your systems (and any Kontron hardware or software components incorporated in your systems) meet all applicable requirements. Unless otherwise stated in the product documentation, the Kontron device is not provided with error-tolerance capabilities and cannot therefore be deemed as being engineered, manufactured or setup to be compliant for implementation or for resale as device in High Risk Applications. All application and safety related information in this document (including application descriptions, suggested safety measures, suggested Kontron products, and other materials) is provided for reference only.

⚠CAUTION	Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled. Please follow the “General Safety Instructions” supplied with the system.
NOTICE	You find the most recent version of the “General Safety Instructions“ online in the download area of this product.
NOTICE	This product is not suited for storage or operation in corrosive environments, in particular under exposure to sulfur and chlorine and their compounds. For information on how to harden electronics and mechanics against these stress conditions, contact Kontron Support.

Revision History

Revision	Brief Description of Changes	Date of Issue
1.0	Initial Issue	2023-Sept

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 https://www.kontron.com/terms-and-conditions.

Kontron sells products worldwide and declares regional General Terms & Conditions of Sale, and Purchase Order Terms & Conditions. Visit https://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.

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 https://www.kontron.com/support-and-services.

Customer Comments

If you have any difficulties using this user guide, 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 user guide on our website.

Symbols

The following symbols may be used in this user guide

⚠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.
NOTICE	NOTICE indicates a property damage message.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
	**Electric Shock!** This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. 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 and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.
	This symbol indicates general information about the product and the user guide. 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 product must be carried out by sufficiently skilled personnel only.

⚠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 Instruction

NOTICE

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.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.

⚠CAUTION

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

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 user guide or received from Kontron 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 user guide.

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.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit https://www.kontron.com/about-kontron/corporate-responsibility/quality-management.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

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 the product 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

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

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1. Manual Overview

1.1. Objective

This guide provides general information, hardware instructions, operating instructions and functional description of the DARC™ VX208.
The on-board programming, on-board firmware and other software (e.g. drivers and BSPs) are described in detail in separate guides (see section "Related Publications").

This hardware technical documentation reflects the most recent version of the product. The “Release Notes" (see section "Related Publications") might help to keep track of potential evolutions.

A vertical bar in the margin identifies functional changes that differ from previous version of the document.

In this document:
DARC™ VX208 stands for all the DARC product variants
DARC-VX208 stands for DARC-VX208 product variant
DARC-VX208-H stands for DARC-VX208-H product variant

1.2. Audience

The scope of this guide is to cover, as much as possible the range of people who will handle or use the DARC™ VX208, from unpackers/inspectors, through system managers and installation technicians to hardware and software engineers. Most chapters assume a certain amount of knowledge on the subjects of single board computer architecture, interfaces, peripherals, system, cabling, grounding and communications.

1.3. Scope

This guide describes all variants of the DARC™ VX208 series.

1.3.1. Terminology, Definitions and Abbreviations

Table 1: Terms and acronyms

Term or Acronym	Definition
BIOS	Basic Input/Output System.
BSP	Board Support Package.
Core	A processing unit including instruction cache, data cache, and often L2 cache.
GPU	Graphics Processing Unit.
ESD	Electrostatic Discharge.
MTBF	Mean Time Between Failure.
Option	A feature which requires a specific order code.
Processor	According to Intel® terminology, the processor - synonymous with SoC Refers to the 11th Gen Intel® Core™ processor.
PCIe	Synonym of PCI Express.
Provision	A feature not yet available.
RMA	Return Merchandise Authorization.
TDP	Thermal Design Power: the target power level of the processor. It represents the maximum sustained power expected from realistic applications. It is an input to the thermal design of the board.
TPM	Trusted Platform Module: An international standard for a secure crypto-processor based on a dedicated hardware device and integrating cryptographic keys. Promoted by consortium TCG (Trusted Computing Group).
UEFI	Unified Extensible Firmware Interface.

2. System Overview

The Kontron DARC™ VX208 is a very high performance embedded computing platform based on the VPX technology designed for tough SWaP constrained missions.
The combination of its sealed compact enclosure and power-to-performance optimization make the Kontron DARC™ VX208 ideally suited for typical military applications requiring high performance, reduced size, weight and power in an environmentally ruggedized platform like CSIR (Command/Control, Electronic warfare, Electro-Optical Infrared Sensor Processing) or Vetronics (Vehicle Management, Crew Controls and Displays, Mission computing, Video processing, Image fusion, 360° awareness, Tracking).
Based on the Intel® Core™ i7-1185GRE quad-core processor, the DARC™ VX208 combines dense processing and I/O connectivity.
Its two optical 10 GbE ports make the DARC™ VX208 ideal for radars or any other applications requiring high bandwidth to handle and transmit a large amount of data. Networked video streaming and processing, such as image fusion, are also possible through an optional GPU hardware acceleration for real-time situational awareness.
Multiple expansion slots allow the customization of the platform interfaces, making the Kontron DARC™ VX208 configurable for various customer needs…

Kontron DARC-VX208 website page:
https://www.kontron.com/en/products/darc-tm-vx208/p170982

Figure 1: DARC™ VX208 Overview

2.1. Main Features

› **Processor**
The processing node of the DARC™ VX208 implements an 11th Gen Intel® Core™ processor (Intel® Core™ i7-1185GRE quad core CPU @ 1.8 GHz) coupled with 32 GByte soldered DDR4 memory with ECC.

https://ark.intel.com/content/www/us/en/ark/products/208082/intel-core-i71185gre-processor-12m-cache-up-to-4-40-ghz.html

› **Power Supply Unit**
The DARC™ VX208 has a power supply according to MIL-STD-1275E.
The nominal input is +28 VDC (range +18 VDC to +36 VDC).

Storage

The following storage features are available:

- System memory,32 GB soldered DDR4 with ECC
- Removable mass storage from 32 GB to 2TB (SSD)
- Internal storage, optional, from 32 GB to 1TB (SSD)
- 256 Mbit SPI serial flash memory used to store BIOS code
- 256 kbit Serial-I2C EEPROM used to store system data (VPD: Vital Product Data)

Graphic device

Table 1: GPU MXM Module

	DARC-VX208	DARC-VX208-H
Graphic module (MXM 3.1)	NVIDIA GeForce GTX 1050 Ti	NVIDIA RTX A1000

External I/O connectivity

Table 2: Interface List

Function	DARC-VX208	DARC-VX208-H
USB3.0	Not implemented	X 1
USB2.0	X 3	X 4
RS232	X 1 (without RTS & CTS)	X 1 (with RTS & CTS)
RS485 Half Duplex	X 2	X 2
DVI-D Single link	X 2	X 2
10G Base-SR 10 Gigabit Ethernet	X 2	X 2
1G Base-T 1 Gigabit Ethernet	X 2	X 2
Battery Holder	Not implemented	Implemented

Software

Kontron is able to produce and support BSPs and drivers for the latest operating system revisions.

Kontron grants his customer owners of a maintenance agreement a hotline software support and regular software updates. A dedicated web site is also available for online updates and release downloads.

The DARC™ VX208 system is provided with the BIOS AMI Aptio V UEFI (BIOS User Manual- D273077) and supporting Linux Fedora remix distribution.

Windows 10 BSP is also available for our customers on request.

Contact Kontron for further information regarding operating systems and software support.

Harsh Environment

The DARC™ VX208 is designed to ensure stable operation in harsh environments, especially in armored ground vehicles, in compliance with MIL-STD standards.

Security Solution

The key for Kontron with this new module platform is security. The DARC™ VX208 is provisioned with a TPM2.0 (Trusted Platform Module) security chip, securing system software by enabling trusted boot operation on Linux with x86 and by verifying local or remote attestation. It ensures secure SSL/TLS network communication by enabling authentication and by providing associated certificate and private keys.

2.2. Ordering Information

Table 3: DARC™ VX208 Order Codes

ORDER CODE	ARTICLE	Description
1067-2578	DARC-VX208	Processor 11th Gen Intel® Core™, Tiger Lake -1185GRE Intel® Core™ i7, quad core CPU @ 1.8 GHz - 256 GB Removable Tray - RAM 32 GB - MXM **Industrial Grade MXM GPU Nvidia 1050TI** - Trusted Platform Module (TPM 2.0) – 3 x USB2.0 ports - 1 x RS232 serial port (without flow control) – 2 x RS485 serial ports – 2 x DVI-D single link interfaces – 2 x 10G Base-SR 10 Gigabit Ethernet interfaces - 2 x 1G Base-T 1 Gigabit Ethernet- 28V DC according to MIL-STD 1275E.
1070-2897	DARC-VX208-H	Processor 11th Gen Intel® Core™, Tiger Lake -1185GRE Intel® Core™ i7, quad core CPU @ 1.8 GHz - 256 GB Removable Tray - RAM 32 GB - MXM **Industrial Grade MXM GPU Nvidia A1000** - Trusted Platform Module (TPM 2.0) – **1 x USB3.0 port - 4 x USB2.0 ports** - 1 x RS232 serial port **(with flow control)** – 2 x RS485 serial ports – 2 x DVI-D single link interfaces – 2 x 10G Base-SR 10 Gigabit Ethernet interfaces - 2 x 1G Base-T 1 Gigabit Ethernet- 28V DC according to MIL-STD 1275E - battery holder.

Table 4: Cable kit Order Codes

The following cables can be ordered (**development use only**):

	Reference (Product Designation)	Kontron P/N	Function	Interfaces
P1	DARC_CBL_1102S	1065-8651	28VDC Power supply	
P2	DARC_VX208_CBL_P2-A	1069-5461	1G Base-T Ethernet	P15 : ETH0 P16: ETH1
P3	DARC_VX208_CBL_P3-A	1069-5462	USB & Serial Lines	P20 : USB 2.0 (USB0) P21 : USB 3.0 (USB2) P23 : RS232 (COM3)
P4	DARC_VX208_CBL_P4-A	1069-5463	DVI & USB	P30 : DVI (DVI2) P31 : USB2.0(USB1)
P5	DARC_VX208_CBL_P5-A	1069-5464	DVI & Serial Lines	P40 : DVI (DVI1) P41: RS485 (COM1) P42 :RS485 (COM4)
P6	510346 STA FM 04 2,00 977-PLC-1501-00	1069-8858	10G BASE-SR Ethernet (Optical)	10G ETH0 (LC duplex) 10G ETH1 (LC duplex)
P7	31698 191-PLC-1127-00_B	1070-2281	USB3	USB3.0

2.3. I/O Interfaces

2.3.1. DARC-VX208 Interfaces

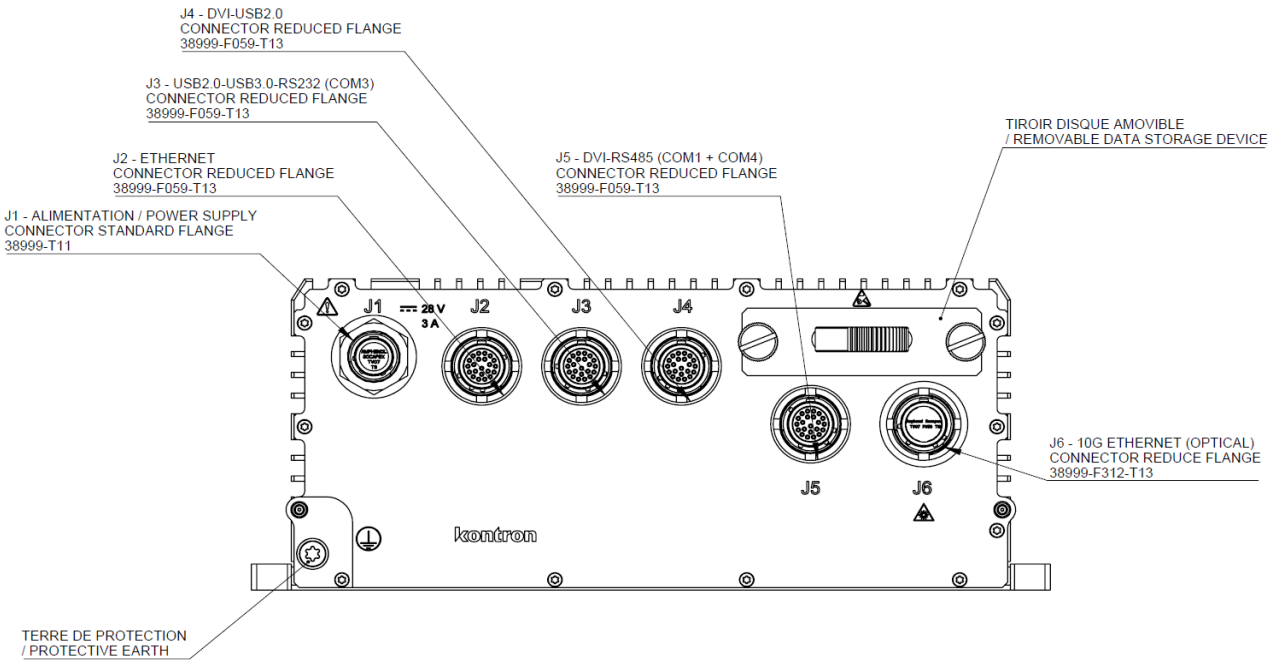
2.3.1.1. DARC-VX208 I/O Interfaces

Table 5: DARC-VX208 I/O Interfaces

	Mil-STD-38999 Connector Reference	DARC Connector Amphenol Reference	Cable Connector Amphenol Reference	
J1	TV07ZN 1102	TV07ZN 1102	TVS06RF1102 S	28 V Power Supply
J2	24ZC35SA	TV 07 ZNCI 13-35 SA F059 LF	TVS06RF1335PA	2 x Ethernet 10/100/1000BASE-T
J3	24ZC35SB	TV 07 ZNCI 13-35 SB F059 LF	TVS06RF1335PB	2 x USB 2.0 1 x RS232
J4	24ZC35SD	TV 07 ZNCI 13-35 SD F059 LF	TVS06RF1335PD	1 x DVI Single link 1 x USB2
J5	24ZC35SC	TV 07 ZNCI 13-35 SC F059 LF	TVS06RF1335PC	1 x DVI Single link 2 x RS485
J6	24ZC04PN	TV 07 ZN 13-04 S LC F312 (Mechanical part only) STA 00R EF 13 N X018 ZN C 4A1 F312 (With Multimode contacts MIL 29504/04 mounted)	TV 06 ZN 1304 P LC (Mechanical part only)	2 x Ethernet 10G Base-SR (Optical)

2.3.1.2. DARC-VX208 I/O Front Side

Figure 2: DARC-VX208 Front Side View



2.3.2. DARC-VX208-H Interfaces

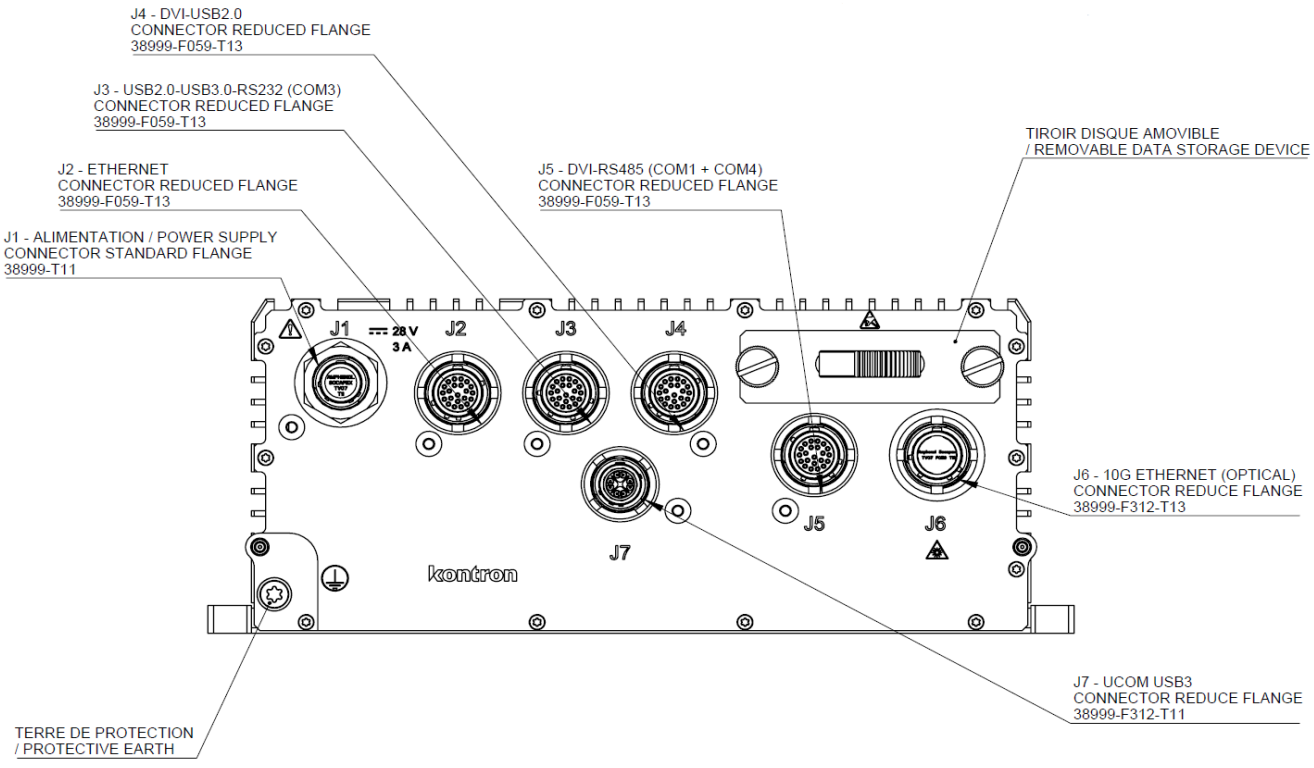
2.3.2.1. DARC-VX208-H I/O Interfaces

Table 6: DARC-VX208-H I/O Interfaces

	Mil-Std-38999 Connector Reference	DARC Connector Amphenol Reference	Cable Connector Amphenol Reference	
J1	TV07ZN 1102	TV07ZN 1102	TVS06RF1102 S	28 V Power Supply
J2	24ZC35SA	TV 07 ZNCI 13-35 SA F059 LF	TVS06RF1335PA	2 x Ethernet 10/100/1000BASE-T
J3	24ZC35SB	TV 07 ZNCI 13-35 SB F059 LF	TVS06RF1335PB	3 x USB 2.0 1 x RS232
J4	24ZC35SD	TV 07 ZNCI 13-35 SD F059 LF	TVS06RF1335PD	1 x DVI Single link 1 x USB2
J5	24ZC35SC	TV 07 ZNCI 13-35 SC F059 LF	TVS06RF1335PC	1 x DVI Single link 2 x RS485
J6	24ZC04PN	TV 07 ZN 13-04 S LC F312 (Mechanical part only) STA 00R EF 13 N X018 ZN C 4A1 F312 (With Multimode contacts MIL 29504/04 mounted)	TV 06 ZN 1304 P LC (Mechanical part only)	2 x Ethernet 10G Base-SR 10 (Optical)
J7	TV07 UCOM-USB3 CI ZN-11 SN F059	TV06UCOM-USB3CZN-11P	TV06UCOM-USB3CZN-11P	1 x USB 3.0

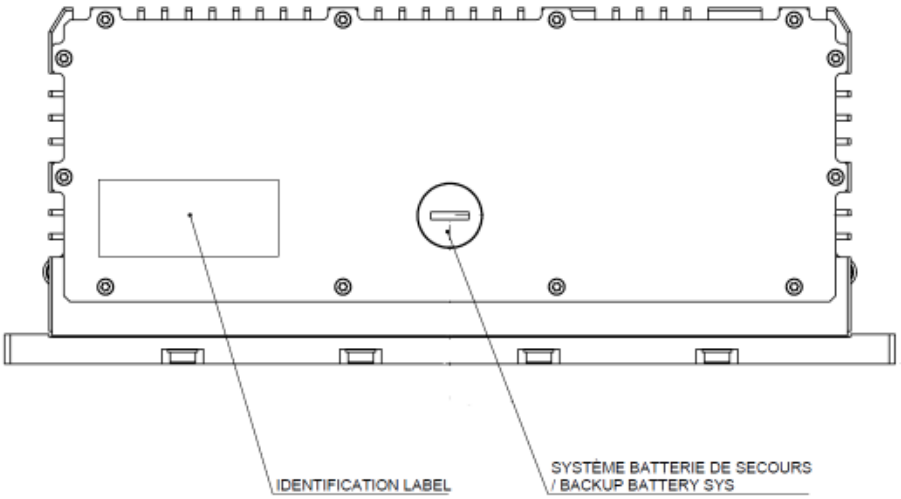
2.3.2.2. DARC-VX208-H Front Side View

Figure 3: DARC-VX208-H Front Side View



2.3.2.3. DARC-VX208-H Rear Side View

Figure 4: DARC-VX208-H Front Side View



2.3.3. Technical specifications

2.3.3.1. DARC-VX208 Specification

Table 7: Technical Specifications

Feature	
Processor	Intel® Core™ i7-1185GRE quad-core @1.8GHz
Virtualization	Support of Intel® VT-x virtualization
Security	TPM2.0, secure boot support
Operating System	Linux 64 bits, Windows 10 on -request
Graphic module (MXM 3.1)	NVIDIA GeForce GTX 1050 Ti – 1493MHz - Max Resolution 7680x4320@60Hz 2x DVI-D single link
RAM memory	32 GByte DDR4 3200 MT/s by default
Mass Storage	1x internal SSD (via M.2 socket below, not implemented by default) 1x externally removable Tray – 256 GByte SATA SSD
USB	3 x USB 2.0
Serial	1 x RS232 **without RTS/CTS** 2 x RS485 Half Duplex
Ethernet	2 x optical 10Gigabit Ethernet links (10GBASE-SR) 2x 10/100/1000 Mbps Ethernet links (1000BASE-T) compliant to STANAG 4754
Battery Holder	Not implemented
Power Input	28V DC according to MIL-STD 1275E.

Table 8: Mechanical Specification

Height	120 mm
Width	272 mm housing - 300 mm overall
Depth	202 mm housing - 233 mm overall
Weight	7.54 kg
Chassis	Aluminum chassis (6060), plates painted in black (RAL 9004)

Figure 5: DARC-VX208 - Dimensions - Front Side Overview (in mm)

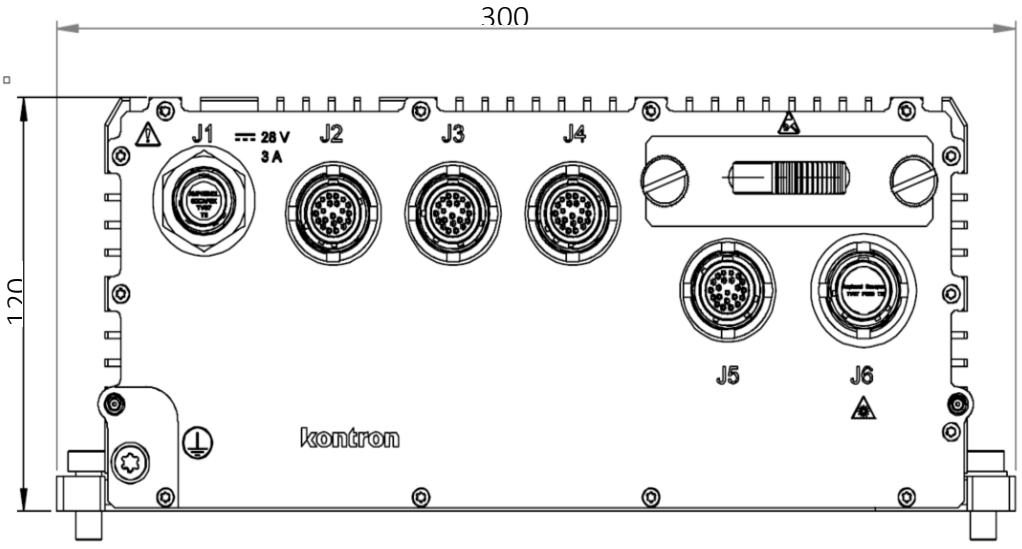


Figure 6: DARC-VX208 - Dimensions – Top view (in mm)

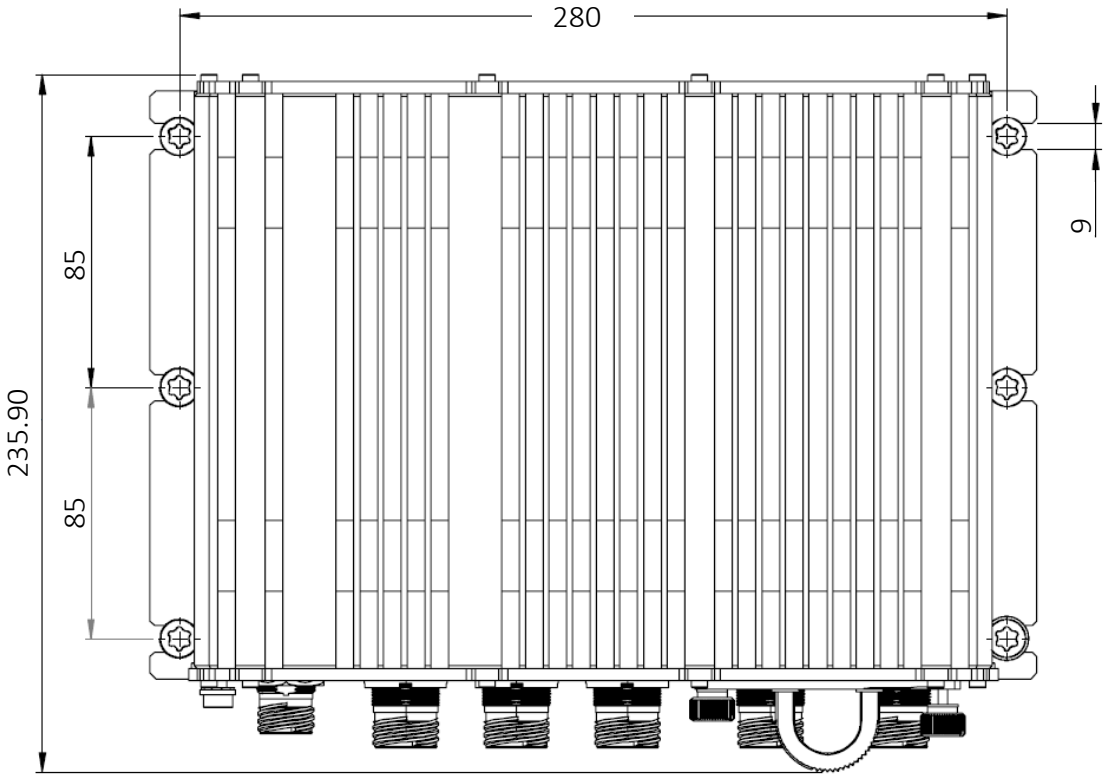
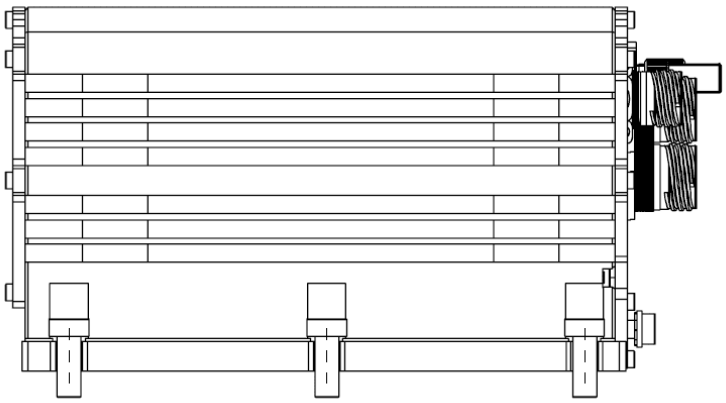


Figure 7: DARC-VX208 - Dimensions – Side view (in mm)



2.3.3.1. DARC-VX208-H specification

Table 9: Technical Specifications

Feature	
Processor	Intel® Core™ i7-1185GRE quad-core @1.8GHz
Virtualization	Support of Intel® VT-x virtualization
Security	TPM2.0, secure boot support
Operating System	Linux 64 bits, Windows 10 on -request
Graphic module (MXM 3.1)	NVIDIA RTX A1000 - Base= 1192MHz, Boost= 1627MHz -Max Resolution 7680x4320@60Hz 2x DVI-D single link
RAM memory	32 GByte DDR4 3200 MT/s by default
Mass Storage	1x internal SSD (via M.2 socket below, not implemented by default) 1x externally removable Tray – 256 GByte SATA SSD
USB	1 x USB 3.0 4 x USB 2.0
Serial	1 x RS232 with RTS/CTS 2 x RS485 Half Duplex (BIOS switchable)
Ethernet	2 x optical 10Gigabit Ethernet links (10GBASE-SR) 2x 10/100/1000 Mbps Ethernet links (1000BASE-T) compliant to STANAG 4754
Battery Holder	Implemented
Power Input	28V DC according to MIL-STD 1275E.

Table 10: Mechanical Specification

Height	120mm
Width	272 mm housing - 300 mm overall
Depth	202 mm housing - 251 mm overall
Weight	7.8 kg
Chassis	Aluminum chassis (6060), plates painted in black (RAL 9004)

Figure 8: DARC-VX208-H - Dimensions - Front Side Overview (in mm)

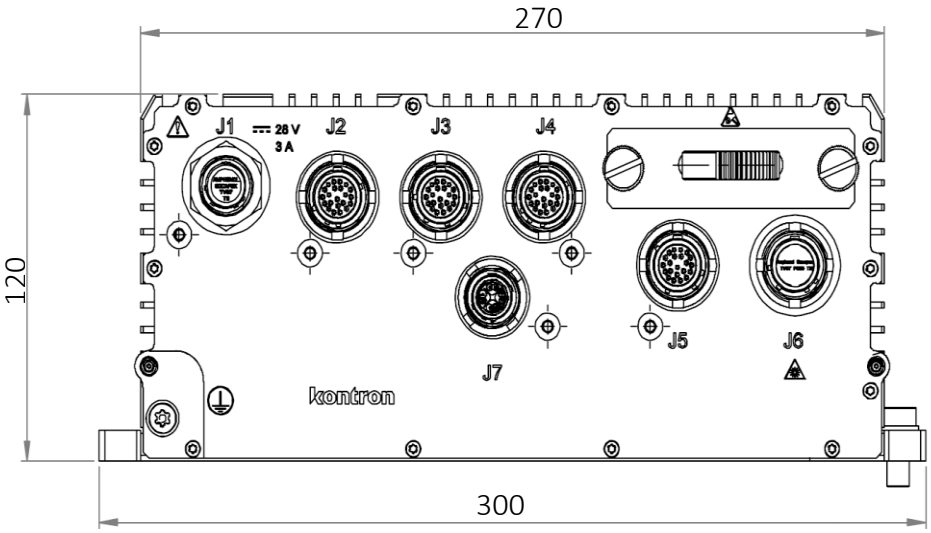


Figure 9: DARC-VX208-H - Dimensions – Top view (in mm)

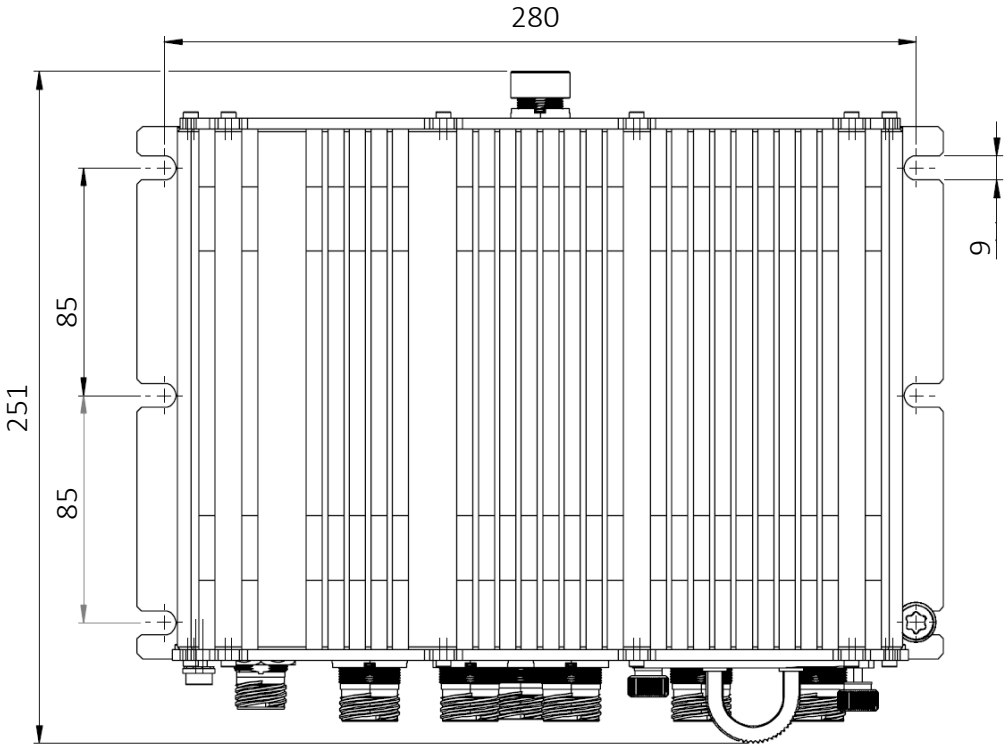
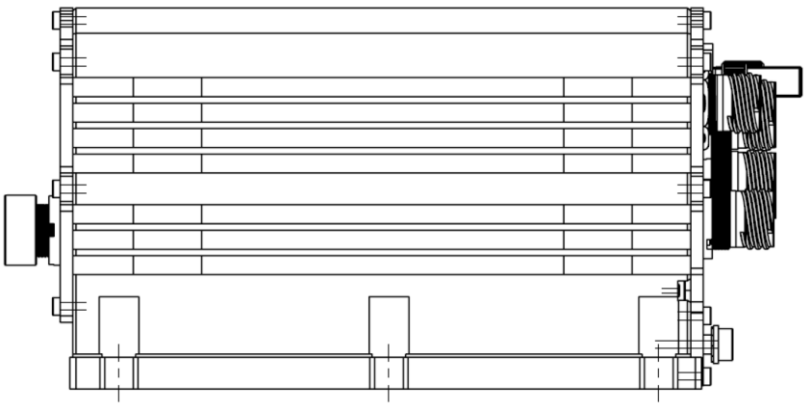


Figure 10: DARC-VX208-H - Dimensions – Side view (in mm)



2.3.4. Reliability

MTBF reliability prediction made according to the MIL-HDBK-217F standard.

Table 11: MTBF Environment Standards

Product	GB@25°C (hours)
DARC-VX208	80 420
DARC-VX208-H	66 738

3. Environmental Specifications

3.1. Operating and Storage Conditions

Table 12: Environment Standards

Operating temperature	MIL-STD-810G, Method: 502.6, Procedure: II, -46°C MIL-STD-810G, Method: 501.6, Procedure: II, +55°C MIL-STD-810G, Method: 502.6, Procedure: II, C1 induced conditions in AECTP 230 Edition 1, Leaflet 2311/2 Table 13 MIL-STD-810G, Method: 501.6, Procedure: III, Tactical-Standby at 71°C to operational start at 55°C
Storage temperature	MIL-STD-810G, Method: 501.6, Procedure: I, Table 501.6-III, -46°C MIL-STD-810G, Method: 502.6, Procedure: I, C1 induced conditions in AECTP 230 Edition 1, Leaflet 2310/1 Table 4 MIL-STD-810, Method: 503.6, Procedure I-D, +20°C to +55°C
Altitude	MIL-STD-810G, Method: 500.6, Procedure II, 10 000 ft (3 048m), operational MIL-STD-810G, Method: 500.6, Procedure I, 15 000ft (4 572m), storage DEF STAN 00-035 Part 3 Issue 5, Test: CL11, flight pressure change
Fluids Contamination	MIL-STD-810G, Method: 504.2, Procedure: I, table 504.2-1 - C1- solvents & cleaning fluids, C2- Insecticides, not listed in table 504.2-1- C3- Detergent
Dust protection	MIL-STD-810G, Method 510.6, Procedure I - Blowing Dust
Water protection	MIL-STD-810G, Method 506.6, Procedure III - Drip
Salt Fog protection	MIL-STD-810G, Method 509.6
Vibration	MIL-STD-810G, Method: 514.7, Procedure: I, Figure 514.7C-4 MIL-STD-810G, Method: 514.7, Procedure: I, Level: AECTP 400, Figure B-2
Shock	MIL-STD 810G, Method 516.7, Procedure: II, Figure 516.7-9 and Table 516.7-III MIL-STD-810G, Method: 516.7, Procedure: II, Table 516.7-VI MIL-STD-810G, Method: 516.7, Procedure: I, Figure 516.7-9 and Table 516.7-III MIL-STD-810G, Method: 516.7,Procedure: VI
EMI /EMC /RFI	MIL-STD-461F, RE102, Frequency range: 2MHz to 18GHz, RE102-4, Curve “Army ground” MIL-STD-461F, CE102, Frequency range: 10KHz to 10MHz, Curve “basic” MIL-STD-461F, CS101, Frequency range: 30Hz to 150KHz and 150KHz to 250KHz (with limit value at 150kHz), Voltage limit: Figure CS101-1, Power limit: Figure CS101-2, curve #2 MIL-STD-461F, CS114, Frequency range: 10kHz to 200MHz, Figure CS114-1, curve #3 from 10kHz to 1MHz and curve #4 from 1MHz to 200MHz MIL-STD-461F, CS115, Figure CS115-1,Section 5.13.2 MIL-STD-461F,CS116, Frequency range: 10 kHz to 100 MHz, Figure CS116-1, Section 5.14.2 MIL-STD-461F, RS103, Frequency range: 2 MHz to 18 GHz, Limit: 50V/m MIL-STD-464C, Section: 5.2 MIL-STD-464C, Section: 5.11 MIL-STD1275E, sections 5.1.3.1 and 5.3.3.2 are replaced by VG96916 Part 5 (2013-08) 5.3.
Humidity	MIL-STD-810G, Method: 507.6, Procedure Ib, natural cycles, DEF(AUST) 5168 Table 5 B1(A), 100%

3.2. Product Conformity and Compliance to Standards

CE	RoHS directive 2011/65/EU and 2015/863 - EN50581:2012
REACH	Article 33 Regulation (EC) No 1907/2006 (REACH)

4. Installation Instructions

4.1. Safety Requirements

Prior any installation works ensure that there are no live wires on the installation site.

Do not handle the device if there is any damage visible.

Do not operate the DARC™ VX208 with foreign objects inside the chassis.

Further do not insert any retrieval device into the device while it is connected to power.

Kontron rejects all liability for any and all damages resulting from operation of the unit with foreign objects inside the chassis.

The DARC-VX208 has to be installed in a restricted area (locking area) and operated only by trained and qualified personnel. Only personnel with appropriate qualifications, trainings and authorization are permitted to install and work with the DARC-VX208. Restricted access area is controlled by the authority responsible for the location.

This device shall only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements.

The DARC™ VX208 has to be mounted by its lateral mounting brackets (one on each side) before cabling.
The product shall be powered through an external protective device 4A rated.

DARC™ VX208 contains electrostatically sensitive devices. 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 the system chassis.

4.2. Mechanical Structure

The DARC™ VX208 housing is based on an aluminum box with connectors for external interfacing including a case ground point.
The DARC-VX208 is designed for ambient air convection cooling. As the unit does not have a fan for forced air cooling, integrators must verify the application cooling design prior to integration in an application.

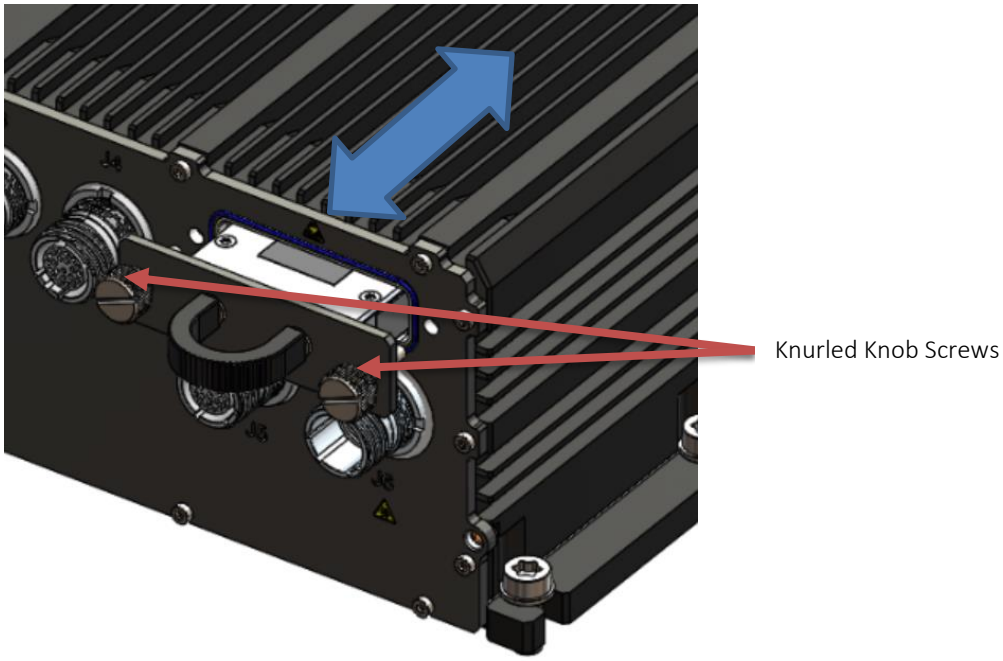
4.3. Mounting Pre-requisites

Because the mounting position may impact thermal and mechanics properties, the DARC™ VX208 system shall be integrated according to the following recommendations:

- Tray insertion
- Physical Mounting
- Free space
- Cabling
- Grounding Point Cabling

4.3.1. Drawer SSD installation

Figure 11: Removable Drawer SSD Overview



Do not force to insert the SDD drawer in wrong direction, or the drawer will be damaged

Do not remove the drive during working condition. Make sure that the storage device is powered down before removal

ESD Sensitive Device! Care must be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.

› Insertion/Uninsertion drawer

- › Loosen the two (2) knurled knob screws to release them from the DARC™ VX208 , but still clamped to the front of the drawer, then pull the drawer outside.
- › Insert the SDD drawer in the DARC-VX208 housing and tighten the two (2) knurled knob screws to the torque of **0.4 N.m.**

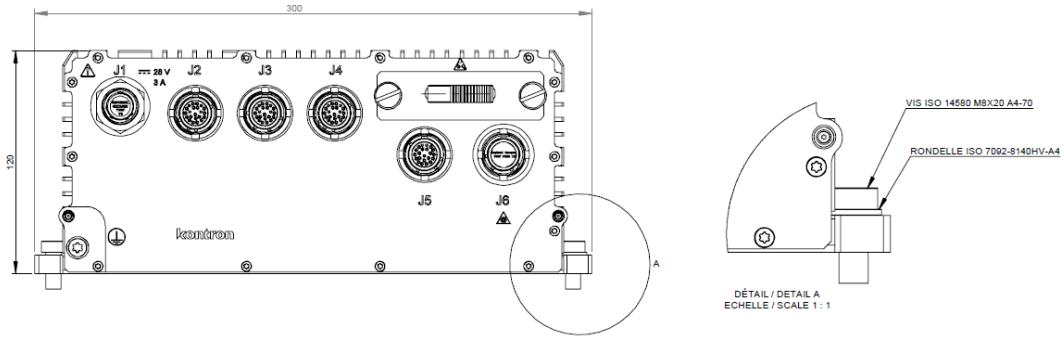
Specified torque for knurled knob screw is : 0.4 N.m

Enough space must be reserved for extraction of the removable disk .
Recommended space is at least 200 mm.

4.3.2. Physical Mounting

The DARC-VX208 system is designed to be operated in vertical or horizontal position with attached mounting. It is also allowed to install the DARC-VX208 as a stand-alone (desktop) device.

Figure 12: DARC-VX208 Mount

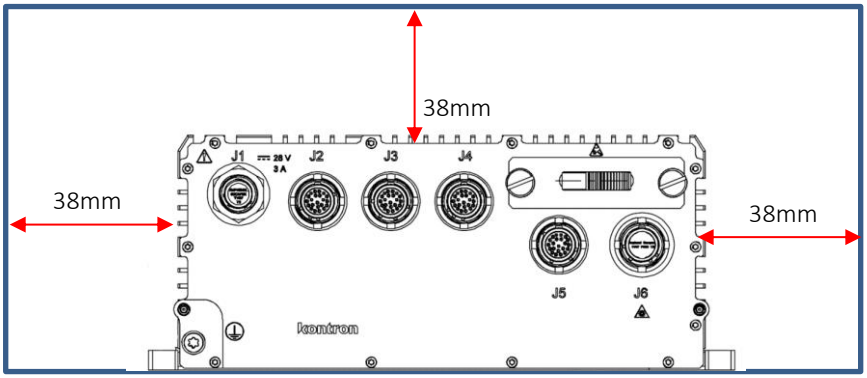


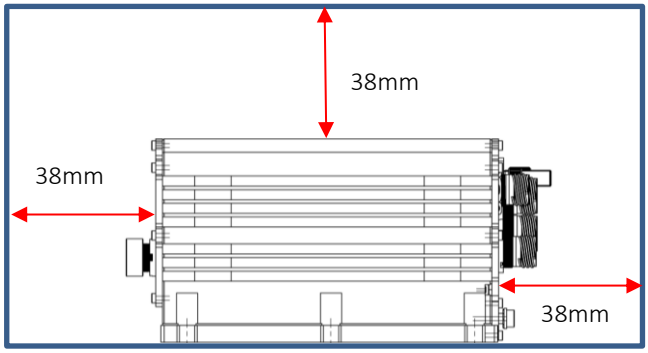
4.3.3. Free space

Free air convection is where the cooling air moves around the system without the assistance of air movers, such as fans. In general the warm air is going to rise, so air movement will tend to be up.
It is expected that this system will be installed on a flat metal conducting surface as shown in the following diagrams and it is recommended to have 1.5” keep out area around the system

The keep out area is defined by the following minimal distances:

Figure 13: DARC-VX208 Cooling keep-out area





The air surrounding into the free volume shall not exceed +55°C in continuous.

This “keep out area” recommendation must be considered if there is no airflow around the equipment. The distances can be drastically reduced if there is a constant airflow of at least 1.5m/s around the equipment

4.3.4. Cabling

The box unit environment shall allow the access to all connectors with consideration of the cables minimum radius. The cables must be of sufficient length as to guarantee that the box unit can be safely installed or removed from its mounting position and have the cables be installed or removed without the possibility of the box unit falling or otherwise being damaged.

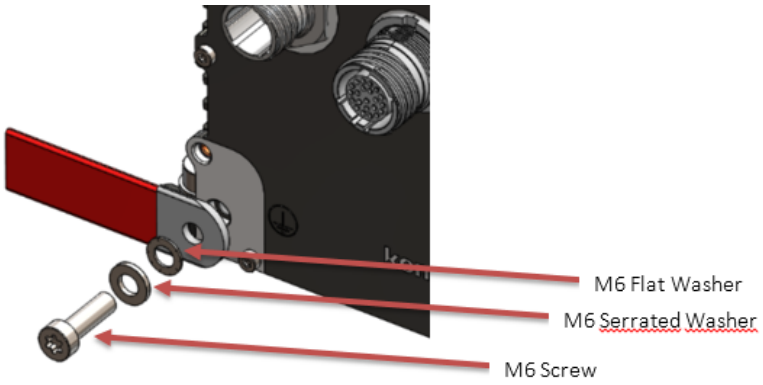
The ground point must be connected in priority first.
The power cable must be chosen in accordance with the power supply specifications. It must adhere to the following points: • Its length must not exceed 5 meters • CE marking present • It must be able to withstand the worst-case scenario for both input current and ground current.
The IO cables must adhere to the following lengths: • fully shielded from end to end and ensure good ground continuity • 10 meters maximum for serial lines • 100 meters maximum for Ethernet connections (CAT6a cable type) • 2 meters maximum for USB2.0 connections • 0.5 meter maximum for USB3.0 connection

4.3.5. Grounding Point Cabling

As the operational grounding concept of the DARC-VX208 calls for a ground point connection of the chassis to external ground, there must always be a ground connection to the chassis.
This is accomplished via the ground point indicated by the ground symbol on the front side of the DARC™ VX208, it is an M6x20 screw with its washers for attaching external ground cabling to the DARC™ VX208. This grounding wire must be connected to the vehicle's chassis or a central grounding point.

Specified torque for M6 screw is : 1.8N.m

Figure 14: Assembly of the Grounding Point Connection



4.3.6. Grounding Recommendation for Power Supply Cable

Each shield end of power cable shall be connected to external ground (same as chassis ground). This is automatically done on J1 connector side. It shall be done by user for the other cable's end.

5. Getting Started with DARC™ VX208

This section describes the main recommendations before starting to plug and play with the DARC™ VX208 system.

Before using your system, become familiar with the system components and check that everything is connected properly. Following a proper cabling procedure will prevent a false power-on condition, which could result in unit operational failure.

5.1. Receipt of the Equipment

5.1.1. Checking the Packages

Inspecting the packing cartons and verifying their condition is the responsibility of the customer and should be carried out upon delivery.

- Inspect the packing and check its condition:
  - no broken corners,
  - general state of the case (no rips or holes),
  - condition of the bands and the clips.
- If you wish to report any damage in transit, you should make out a full report, and also note the damage on the packing list that accompanies the equipment. Ensure that the report and the packing list are signed by yourself and also by the transport agent, and send a copy of these documents to:
  - the transport company,
  - Kontron.

5.1.2. Unpacking

Unpacking the equipment must be carried out under the supervision of an authorized technician.

- Open the package and take out the items one by one.
- Inspect each item and make a note of any possible defects (scratches, marks or blemishes, damaged cables, etc.). If necessary, make a report of any damage or defects.
- Check the equipment against the packing list and report any missing items.

It is recommended that you keep the package and the anti-shock protection. This will be required if you decide to move your system to a different site.

DARC™ VX208 contains electrostatically sensitive devices. 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 the system chassis.

5.2. System Identification

Labels are present on the rear and contains information related to the revision of the system:

Current contents of these labels is defined in “DARC-VX208_RN_D273009” release note document

5.2.1. System configuration label

The System configuration label contains information related to the revision:

- Model: DARC-VX208
- S/N: xxxxxxxxxxxxxxx (16 digits chronologic Serial Number)
- PN: 4-4 digit
- Revision

Revision is defined by one letter and two numbers split by a dot (example: A2.1) plus an optional letter.

The meaning of each digit is defined as following:

- First digit (letter) defines a Major Hardware and/or Mechanical revision.
- Second digit (number) defines a Major Mechanical revision
- Third digit (number) defines a BIOS/PBIT revision
- Forth digit (letter) is an optional digit used for minor revision (Hardware and/or Mechanical)

Table 13: ECL description

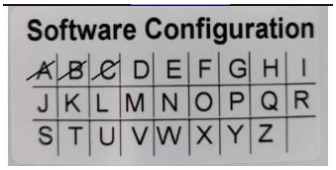
DARC-VX208	A-Z	1-9	.	1-9	A-Z
Revision Definition	(Letter) Hardware Revision	(Number) Mechanical Revision	Dot	(Number) Software Revision (BIOS/PBITs)	(Optional Letter) Used for minor revision.

Example of label and position in the system below:

Figure 15: System identification label

5.2.2. Software configuration label

The software configuration label is used to follow any BIOS and/or cPLD update



Current contents of this label is defined in “DARC-VX208_RN_D273009” release note document

5.3. Plug and Play with DARC™ VX208

The following sections are valid for a Linux operating system with its DARC™ VX208 BSP installed.

See Chapter 2 - Installation Instructions when deploying the DARC™ VX208system in final operational environment.

5.3.1. Plug

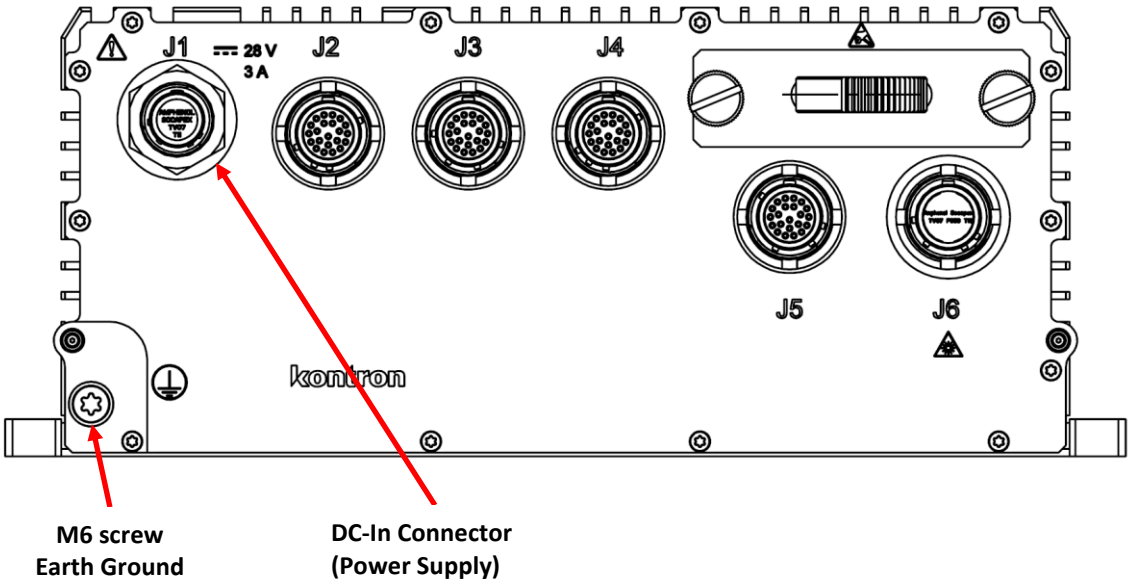
5.3.1.1. Grounding Connection

The DARC-VX208 earth ground must be connected to vehicle's chassis or a central grounding point using M6 screw terminal point located on the front panel, refer to section 4.3.5 for further details on how to realize this connection. This earth ground shall remain connected and shall be the last disconnected or the first connected during operations of cabling.

5.3.1.2. DC IN Power Connection

The DARC™ VX208 DC IN power must be connected by a MIL-STD-38999 DC IN connector to a DC power source via a DC power supply cable. It is recommended that the last connection attached to the system should be the power cable.

Figure 16: Front panel with DC Power connector



The DARC™ VX208must be connected DC mains power supply complying with EN 62368-1 standard. It must be observed that wiring and short-circuit/overcurrent protection is performed according to the applicable standards, regulations and respect to the electrical specification of the DARC-VX208.
The product shall be protected by a device of protection against over 4A current (fuses for instance).

5.3.1.3. System Connection

Two methods:

1. Graphical session (recommended):
   - Connect a display for graphical session (display and cables not provided) to the DVI Port (J4 or J5 connector)
   - Plug a USB keyboard and mouse in USB 2.0 connector (J3 connector).
2. Serial console:

- Connect to the DARC-VX208 via COM 3 serial connector (J3 connector) and use a serial terminal emulator as putty or minicom for example.

By default it is as 115200 bauds, 8-bit, no parity, 1 stop bit.

Refer also to section 9 for BIOS settings regarding serial console redirection.

Also refer to chapter 5 of “Linux BSP Fedora 36 Remix Live - Release Notes” document (ref. D275280)

- To start the system
  - Power on the DC power supply module via DC IN connector (section 5.3.1.2).
  - A Linux login prompt should appear shortly.

- To stop the system
  - Manual method (Default):

Shutdown the OS: with the shutdown menu in graphical session, or using the «halt-p» command from a Linux terminal.

5.3.2. Play (Refer to Linux Release Note)

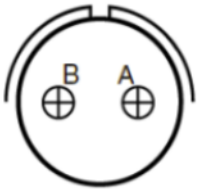
To use the BSP Fedora 36 remix image provided by Kontron, install specific packages on a different Linux version or build you own customized live image, please refer to “Linux BSP Fedora 36 Remix Live - Release Notes” document (ref. D275280)

6. Physical I/Os

6.1. J1 - DC IN Power Supply Connector

Connector references are listed in paragraph 2.3 I/O Interfaces.

Figure 17: J1 connector (Front View)



Pin	Signal
A	+ 28 V
B	0 V

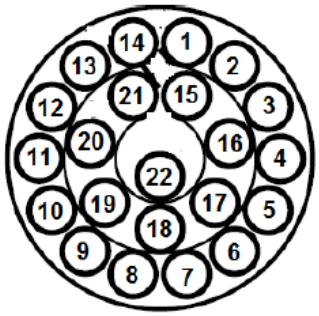
Table 14: J1 connector pin assignment

PIN	PIN Name	Signal Name
A	Vin+	POWER IN + (+VDC)
B	Vin-	POWER IN - (GND)

6.2. J2 - Ethernet Connector

Connector references are listed in paragraph 2.3 I/O Interfaces

Figure 18: J2 connector (Front View)



Warning: View of the front face of male insert

Table 15: J2 connector pin assignment

PIN	PIN Name	Signal Name
1	GBE0_DD-	1G Ethernet Port 0 D-
2	NC	Not Connected
3	GBE1_DA-	1G Ethernet Port 1 A-
4	NC	Not Connected
5	GBE0_DA-	1G Ethernet Port 0 A-
6	GBE1_DC-	1G Ethernet Port 1 C-
7	GBE1_DC+	1G Ethernet Port 1 C+
8	GBE0_DC+	1G Ethernet Port 0 C+
9	GBE0_DC-	1G Ethernet Port 0 C-
10	GBE1_DB-	1G Ethernet Port 1 B-
11	NC	Not Connected
12	GBE0_DB-	1G Ethernet Port 0 B-
13	NC	Not Connected

14	GBE1_DD-	1G Ethernet Port 1 D-
15	GBE0_DD+	1G Ethernet Port 0 D+
16	GBE1_DA+	1G Ethernet Port 1 A+
17	GBE0_DA+	1G Ethernet Port 0 A+
18	GBE1_GND	Ethernet Port 1 Ground
19	GBE1_DB+	1G Ethernet Port 1 B+
20	GBE0_DB+	1G Ethernet Port 0 B+
21	GBE1_DD+	1G Ethernet Port 1 D+
22	GBE0_GND	Ethernet Port 0 Ground

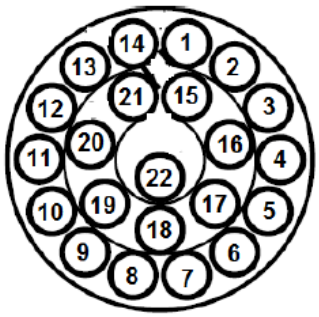
The Ethernet transmission should operate using a CAT6a cable with a maximum length of 100 m.

6.3. J3 – USB and SERIAL Connector

6.3.1. DARC-VX208

Connector references are listed in paragraph 2.3 I/O Interfaces

Figure 19: DARC-VX208 - J3 connector (Front View)



Warning: View of the front face of male insert

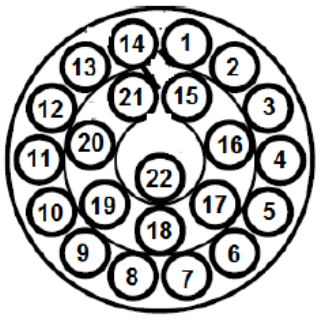
Table 16: DARC-VX208 - J3 connector pin assignment

PIN	PIN Name	Signal Name	Observations
1	USB0: V-Bus/ +5V	USB Power	
2	USB0: GND-Power	Ground for power return	
3	USB0: TX-	Super speed transceiver differential pair	Do not connected
4	USB0: TX+	Super speed transceiver differential pair	Do not connected
5	USB0: RX-	Super speed receiver differential pair	Do not connected
6	USB0: RX+	Super speed receiver differential pair	Do not connected
7	USB0: D-	USB 2.0 differential pair (negative)	
8	USB0: D+	USB 2.0 differential pair (positive)	
9	COM3: TX	RS232 Serial line transmitter	
10	COM3: RX	RS232 Serial line receiver	
11	Not Connected	Not Connected	
12	Not Connected	Not Connected	
13	USB2: GND-Power	Ground for power return	
14	USB2: V-Bus/ +5V	USB Power	
15	Not Connected	Not Connected	
16	USB0: SHIELD TX	Shield	Do not connected
17	USB0: SHIELD RX	Shield	Do not connected
18	USB2: D+	USB 2.0 differential signal (positive)	
19	COM3: SHIELD /GND	RS232 Serial line shield	
20	Not Connected	Not Connected	
21	Not Connected	Not Connected	
22	USB2: D-	USB 2.0 differential signal (negative)	

6.3.2. DARC-VX208-H

Connector references are listed in paragraph 2.3 I/O Interfaces

Figure 20: DARC-VX208-H - J3 connector (Front View)



Warning: View of the front face of male insert

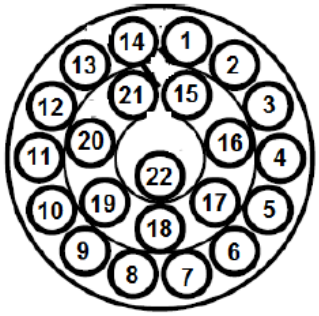
Table 17: DARC-VX208-H - J3 connector pin assignment

PIN	PIN Name	Signal Name
1	USB3: V-Bus/ +5V	USB Power
2	USB3: GND-Power	Ground for power return
3	USB4: GND-Power	Ground for power return
4	Not Connected	Not Connected
5	Not Connected	Not Connected
6	Not Connected	Not Connected
7	USB3: D-	USB 2.0 differential pair (negative)
8	USB3: D+	USB 2.0 differential pair (positive)
9	COM3: TX	RS232 Serial line Transmitter
10	COM3: RX	RS232 Serial line receiver
11	COM3: CTS	RS232 Serial line CTS
12	COM3: RTS	RS232 Serial line RTS
13	USB2: GND-Power	Ground for power return
14	USB2: V-Bus/ +5V	USB Power
15	USB4: V-Bus/ +5V	USB Power
16	SHIELD	Shield
17	SHIELD	Shield
18	USB2: D+	USB 2.0 differential signal +
19	COM3: SHIELD /GND	RS232 Serial line shield
20	USB4: D-	USB 2.0 differential pair (negative)
21	USB4: D+	USB 2.0 differential pair (positive)
22	USB2: D-	USB 2.0 differential signal (negative)

6.4. J4 – DVI and USB Connector

Connector references are listed in paragraph 2.3 I/O Interfaces

Figure 21: J4 connector (Front View)



Warning: View of the front face of male insert

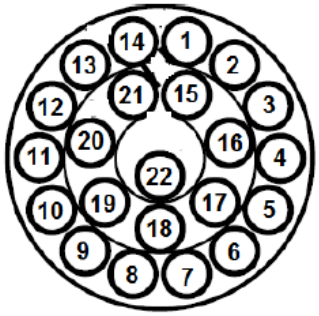
Table 18: J4 connector pin assignment

PIN	PIN Name	Signal Name
1	DVI2_2+	DVI2 Digital red differential pair (positive)
2	DVI2_2-	DVI2 Digital red differential pair (negative)
3	DVI2_1+	DVI2 Digital green differential pair (positive)
4	DVI2_1-	DVI2 Digital green differential pair (negative)
5	DVI2_0+	DVI2 Digital blue differential pair (positive)
6	DVI2_0-	DVI2 Digital blue differential pair (negative)
7	DVI2_HPD	DVI2 Hot Plug Detect
8	USB1: D+	USB 2.0 differential signal (positive)
9	DVI2_CLK+	DVI2 Clock differential pair (positive)
10	DVI2_CLK-	DVI2 Clock differential pair (negative)
11	USB1: +5V	USB power
12	DVI2_CLK	DVI2 DDC Clock
13	DVI2_DTA	DVI2 DDC Data
14	Not Connected	Not Connected
15	DVI2_SHIELD_2	DVI2 link 2 Shield
16	DVI2_SHIELD_1	DVI2 link 1 Shield
17	DVI2_SHIELD_0	DVI2 link 0 Shield
18	USB1: D-	USB 2.0 differential signal (negative)
19	DVI2_SHIELD_CLK	DVI2 Clock Shield
20	USB1: GND	USB1 Ground for power return
21	DVI2_+5V	DVI2 Power
22	DVI2_0V	DVI2 Power Return

6.5. J5 – DVI and SERIAL Connector

Connector references are listed in paragraph 2.3 I/O Interfaces

Figure 22: J5 connector (Front View)



Warning: View of the front face of male insert

Table 19: J5 connector pin assignment

PIN	PIN Name	Signal Name
1	DVI1_2+	DVI1 Digital red differential pair (positive)
2	DVI1_2-	DVI1 Digital red differential pair (negative)
3	DVI1_1+	DVI1 Digital green differential pair (positive)
4	DVI1_1-	DVI1 Digital green differential pair (negative)
5	DVI1_0+	DVI1 Digital blue differential pair (positive)
6	DVI1_0-	DVI1 Digital blue differential pair (negative)
7	DVI1_HPD	DVI1 Hot Plug Detect
8	COM4+	RS485 Serial Line 2 (positive)
9	DVI1_CLK+	DVI1 Clock differential pair (positive)
10	DVI1_CLK-	DVI1 Clock differential pair (negative)
11	COM1+	RS485 Serial Line 1 (positive)
12	DVI1_CLK	DVI1 DDC Clock
13	DVI1_DTA	DVI1 DDC Data
14	N/C	Not Connected
15	DVI1_SHIELD_2	DVI1 link 2 Shield
16	DVI1_SHIELD_1	DVI1 link 1 Shield
17	DVI1_SHIELD_0	DVI1 link 0 Shield
18	COM4-	RS485 Serial Line 2 (negative)
19	DVI1_SHIELD_CLK	DVI1 Clock Shield
20	COM1-	RS485 Serial Line 1 (negative)
21	DVI1_+5V	DVI1 Power
22	DVI1_0V	DVI1 Power Return

6.6. J6 – Optical Ethernet Connector

Connector references are listed in paragraph 2.3 I/O Interfaces

Figure 23: J6 connector (Front View)

Table 20: J6 connector pin assignment

PIN	PIN Name	Signal Name
1	10G_ETH_TX0	10 GB Ethernet 0 transmitter fiber
2	10G_ETH_RX0	10 GB Ethernet 0 receiver fiber
3	10G_ETH_TX1	10 GB Ethernet 1 transmitter fiber
4	10G_ETH_RX1	10 GB Ethernet 1 receiver fiber

6.7. J7 – USB3.0 Connector

Connector references are listed in paragraph 2.3 I/O Interfaces

Figure 24: J7 connector (Front View)

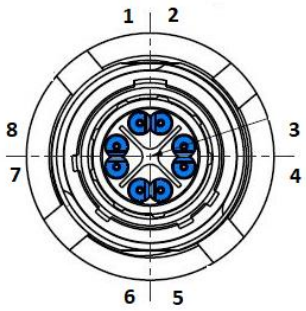


Table 21: J6 connector pin assignment

PIN	PIN Name	Signal Name
1	USB0: V-Bus/ +5V	USB Power
2	USB0: GND-Power	Ground for power return
3	USB0: D- (USB 2.0)	USB 2.0 differential pair (negative)
4	USB0: D+ (USB 2.0)	USB 2.0 differential pair (positive)
5	USB0: RX-	Super speed receiver differential pair (negative)
6	USB0: RX+	Super speed receiver differential pair (positive)
7	USB0: TX-	Super speed transceiver differential pair (negative)
8	USB0: TX+	Super speed transceiver differential pair (positive)
Shell	USB0: SHIELD	360° shield

7. Power and Thermal Specifications

7.1. Power Considerations

7.1.1. Power Supply

The considerations presented in the ensuing sections must be taken into account by user when specifying the DARC-VX208 environment.

7.1.1.1. Input Voltage

The input nominal voltage of the DARC-VX208 (Vnom) 28 VDC

Table 22: DARC-VX208 Input Voltage

INPUT VOLTAGE RANGE	DURATION	DARC-VX208 BEHAVIOR
18 VDC < Vin < 36 VDC	No limit	Working, normal operation conditions

7.1.2. Power Consumption

The power consumption tables below list the voltage and power specifications for the DARC™ VX208 system.
The values were measured in condition defined in the table for several power modes.
The processor dissipates the majority of the thermal power.

Table 23: DARC™ VX208 Consumption: based on current measurement

TDP configuration	TDP (15W) @ 1.8 GHz		
Software state	CPU load < 5%	CPU load around 30%	CPU load > 90%
DVI (GPU load)	GPU load < 5% (idle)	GPU load > 90%	GPU load >90%
USB keyboard/mouse/stick	X	X	X
Serial lines		X	X
2 x Gigabit Ethernet links		X	X
2 x Optical Ethernet link		X	X
Max. Total Power Consumption	**42.5W**	**53.3W**	**71.6W**

Conditions: 22°C ambient temperature 28 VDC input voltage

7.1.2.1. Nominal input current

The nominal current intensity represents the maximum value of the average current absorbed under steady-state conditions, considering the most adverse operating and power supply conditions.

Table 24: Nominal input current

Nominal Input Voltage (Un)	Nominal Input Current (In)
28VDC	1.8 A

7.1.2.2. Inrush current

Inrush current refers to a temporary, high surge of electrical current that occurs when power is initially applied to an electronic device or system. This surge can be several times higher than the nominal operating current of the device and it may have unwanted consequences on other systems connected on the same power rail. The protection circuit must be calibrated according to this value.

Table 25: Inrush current

Nominal Input Voltage (Un)	Inrush Current
28VDC	60A (< 100 µs) 9A (<500µs)

7.2. Power Supply and Thermal Monitoring

To ensure optimal and long-term reliability of the DARC-VX208 product, all internal components must remain within the maximum temperature specifications. In the same way, all internal voltages must remain within the operating limits to prevent from internal power supply failures. The most critical component into the system are the CPU, GPU and power supply unit.

Operating the DARC-VX208 above the maximum operating voltage and temperature limits defined in sections 3-Environmental Specifications and 7.1.1 - Power Supply may result in permanent damage to the inside components.
To ensure monitoring inside the box, the system get temperature from thermal sensors integrated in the processor.
Default critical voltage and temperature sensor thresholds are set on system to protect system from damage and secure system reliability.
Above those critical thresholds, system will warn or force a system shutdown depending on the error severity level detected.

7.3. Thermal Considerations

The following section provides users with the necessary information to satisfy thermal requirements when implementing DARC™ VX208.

› Convection Cooling

To ensure the best possible basis for operational stability and long-term reliability, the DARC™ VX208 product has optimized fins to guarantee the controlled active thermal energy dissipation.
The physical size, shape, and construction of the chassis ensure the lowest possible thermal resistance in natural convection environment and in horizontal or vertical position.
To cool the DARC™ VX208 system in well conditions, free minimal volume shall be respected around the system. This free volume is defines in section 4.3.3 - Free space

To provide sufficient heat dissipation for the cooling of the DARC™ VX208, never cover the cooling fins of the chassis. Do not place any object on the device.

› System consideration when external surrounding air temperature is above 55°C:

DARC™ VX208 system withstands 55°C of surrounding air temperature in continuous.
The cPLD monitors the CPU temperature and shuts down automatically the system in the case of a CPU temperature higher than 100°C,

Contact Kontron for advanced thermal system management.

8. Additional System Features

8.1. Trusted Platform Module (TPM 2.0)

The embedded DARC-VX208 CPU is compliant to TPM 2.0. A Trusted Platform Module (TPM) stores RSA encryption keys specific to the host system for hardware authentication. The term TPM refers to the set of specifications applicable to TPM chips. The LPC bus connects the TPM Chip to the CPU.
Each TPM chip contains an RSA key pair called the Endorsement Key (EK). The pair is maintained inside the chip and cannot be accessed by software. The Storage Root Key (SRK) is created when a user or administrator takes ownership of the system. This key pair is generated by the TPM based on the Endorsement Key and an owner-specified password.
A second key, called an Attestation Identity Key (AIK) protects the device against unauthorized firmware and software modification by hashing critical sections of firmware and software before they are executed. When the system attempts to connect to the network, the hashes are sent to a server that verifies that they match the expected values. If any of the hashed components have been modified since last started, the match fails, and the system cannot gain entry to the network.

8.2. Video capabilities

8.2.1. Processor Graphic Unit

8.2.1.1. DARC-VX208

Table 26: DARC-VX208 Supported graphics unit

Graphics Unit
NVIDIA GeForce GTX 1050 Ti – 1493MHz

8.2.1.2. DARC-VX208-H

Table 27: DARC-VX208-H Supported graphics unit

Graphics Unit
NVIDIA RTX A1000 - Base= 1192MHz, Boost= 1627MHz

8.2.2. DVI Display Resolution

Table 28: Supported Maximum DVI Resolution

Standard	Supported Maximum Resolution
DVI Single Link	1920x1200@ 60Hz

9. uEFI BIOS

9.1. Starting the uEFI BIOS

The DARC-VX208 is provided with a Kontron-customized, pre-installed and configured version of Aptio ® V uEFI BIOS based on the Unified Extensible Firmware Interface (uEFI) specification and the Intel® Platform Innovation Framework for EFI. This uEFI BIOS provides a variety of new and enhanced functions specifically tailored to the hardware features of the DARC-VX208.

The BIOS version covered in this document might not be the latest version. The latest version might have certain differences to the BIOS options and features described in this chapter.

Register for the EMD Customer Section to get access to BIOS downloads and PCN service.
https://www.kontron.com/en/customer-section

The uEFI BIOS comes with a Setup program that provides quick and easy access to the individual function settings for control or modification of the uEFI BIOS configuration. The Setup program allows for access to various menus that provide functions or access to sub-menus with further specific functions of their own.

To start the uEFI BIOS Setup program, follow the steps below:

1. Power on the board.
2. Wait until the first characters appear on the screen (POST messages or splash screen).
3. Press the <DEL> key.
4. If the uEFI BIOS is password-protected, a request for password will appear. Enter either the User Password or the Supervisor Password, press <RETURN>, and proceed with step 5.
5. A Setup menu appears.

The uEFI BIOS Setup program uses a hot key navigation system. The hot key legend bar is located at the bottom of the Setup screens.
The following table provides a list of navigation hot keys available in the legend bar.

Table 29: DARC-VX208 – Hot keys Overview

Hot Key	Hot key Functionality Description
<F1>	<F1> key invokes the General Help window
<->	<Minus> key selects the next lower value within a field
<+>	<Plus> key selects the next higher value within a field
<F2>	<F2> key loads previous values
<F3>	<F3> key loads optimized defaults
<F4>	<F4> key Saves and Exits
<Left/Right>	<Left/Right> arrows selects major Setup menus on the menu bar For example, Main screen or Advances screen.
<Up/Down>	<Up/Down> arrows select fields in the current menu. For example, a Setup function or a sub-screen
<ESC>	<ESC> key exits a major Setup menu and enters the Exit Setup menu. Pressing the <ESC> key in a sub-menu displays the next higher menu level
<RETURN>	<RETURN> key executes a command or selects a submenu

9.2. Setup Menus

The Setup utility features menus listed in the selection bar at the top of the screen:

- Main
- Advanced
- Chipset
- Kontron
- Security
- Boot
- Save & Exit

The left and right arrow keys select the Setup menus. The currently active menu and the currently active uEFI BIOS Setup item are highlighted in white.

Each Setup menu provides two main frames. The left frame displays all available functions. Configurable functions are displayed in blue. Functions displayed in grey provide information about the status or the operational configuration.

The right frame displays an Item Specific Help window providing an explanation of the respective function.

9.3. Main Setup Menu

On entering the uEFI BIOS the Setup program displays the Main Setup menu. This screen lists the Main Setup menu sub-screens and provides basic system information as well as functions for setting the system language, time and date.

9.4. BIOS version

The BIOS version is accessible in DMI table under OS (dmidecode for Linux) and BIOS SETUP in system information in Main menu.

9.5. BIOS setting (default)

The BIOS Console is available on COM2(BIOS numbering) /COM3 (J3 Front connector)

Parameters for this serial line interface are: 115200 bauds, 8-bit, no parity, 1 stop bit, no flow control.

10. Technical Support

For technical support, contact our Support Department:
E-Mail: support.KFR@kontron.com
Phone: +33-498-163-400

Make sure you have the following information available when you call:
Product ID Number (PN),
Serial Number (SN)

The serial number can be found on the Type Label, located on the product's rear side.

Be ready to explain the nature of your problem to the service technician.

11. Warranty

Due to their limited service life, parts that by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law. This applies to the CMOS battery, for example.

If there is a protection label on your product, then the warranty is lost if the product is opened.

12. Returning Defective Merchandise

All equipment returned to Kontron must have a Return of Material Authorization (RMA) number assigned exclusively by Kontron. Kontron cannot be held responsible for any loss or damage caused to the equipment received without an RMA number. The buyer accepts responsibility for all freight charges for the return of goods to Kontron's designated facility. Kontron will pay the return freight charges back to the buyer's location in the event that the equipment is repaired or replaced within the stipulated warranty period. Follow these steps before returning any product to Kontron.
Visit the RMA Information website: https://www.kontron.com/en/support/rma-information

TO REQUEST A RETURN MATERIAL AUTHORIZATION (RMA) NUMBER

1. E-mail to repair.KFR@kontron.com with the following information:
    a. Part number, serial number of the material to be returned,
    b. Failure description or reason for return
2. Once everything is completed, an RMA form will be sent to you if your equipment is under warranty. If your equipment is not under warranty, a quote will be sent and the RMA will be sent when we receive your PO.
3. Print the RMA form and put it with the material to be returned
4. Ship the goods to the address indicated on the RMA form

The goods for repair must be packed properly for shipping, considering shock and ESD protection.

Goods returned to Kontron Modular Computers S.A.S in non-proper packaging will be considered as customer caused faults and cannot be accepted as warranty repairs.

About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT) and offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through a combined portfolio of hardware, software and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

For more information, please visit: **www.kontron.com**

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