

## Summary

The AMD Kria™ KR260 Robotics Starter Kit is comprised of a non-production version of the K26 system-on-module (SOM), the robotics carrier card, and thermal solution. The SOM is very compact and only includes key components such as an AMD Zynq™ UltraScale+™ MPSoC based silicon device, memory, boot, and security module. The robotics carrier card allows various interfacing options that includes a power solution, multiple Ethernet interfaces, SFP+ connectivity, an SLVS-EC sensor interface, and a microSD card. The thermal solution has a heat sink, heat sink cover, and fan. The Kria KR260 Robotics Starter Kit is designed to provide customers a platform to evaluate their target applications and ultimately design their own carrier card with AMD K26 SOMs. While the SOM itself has broad applicability across markets and applications, target applications for the Kria KR260 Robotics Starter Kit are factory automation, communication, control, and vision, specifically robotics and machine vision.

*Figure 1: Kria KR260 Robotics Starter Kit*



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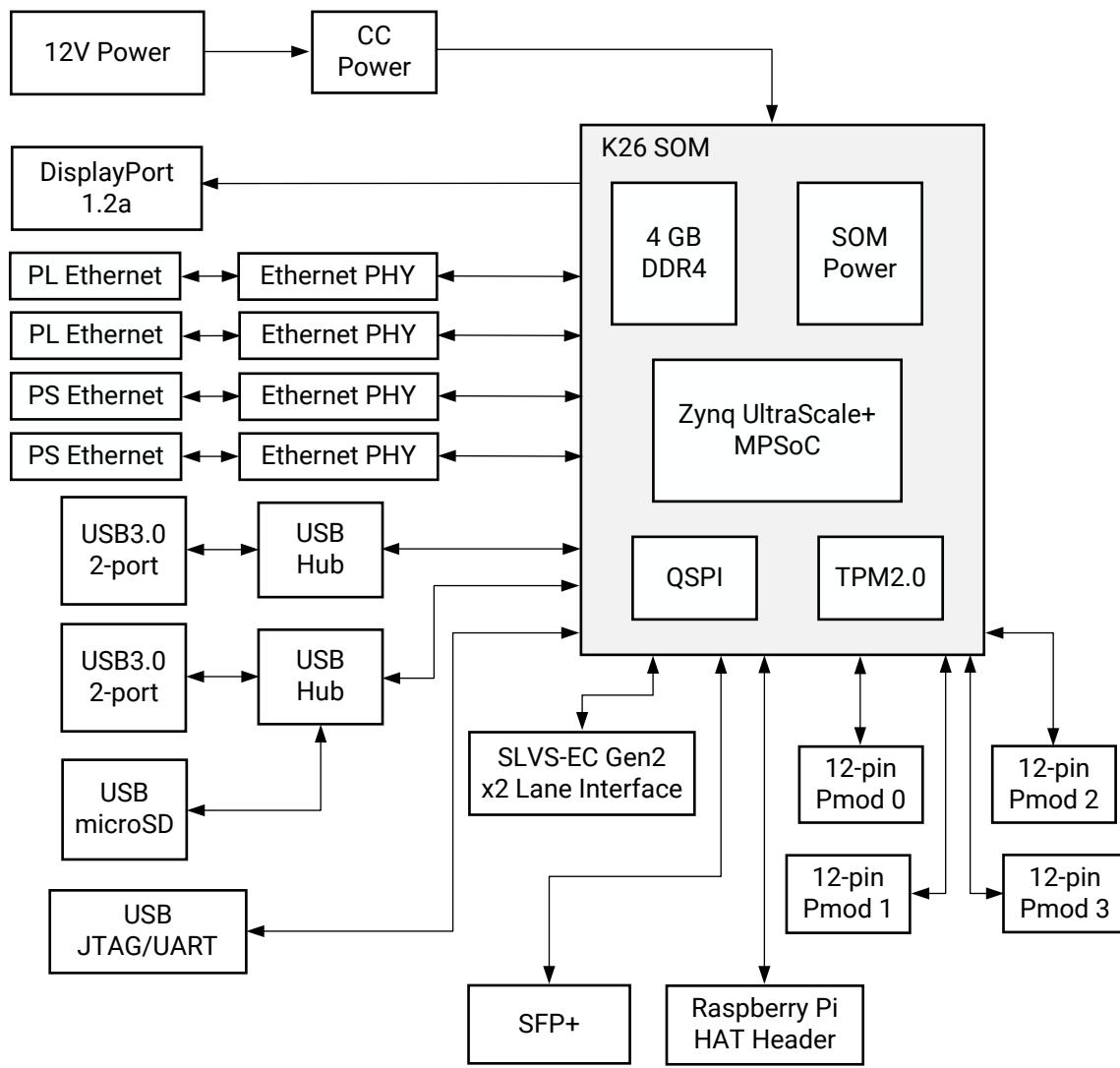
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## Product Details

The Kria KR260 Robotics Starter Kit is an evaluation platform for the K26 SOM focused on robotics applications. The kit brings together a Zynq UltraScale+ MPSoC based SOM with user selectable, robotics focused peripherals and a set of pre-built accelerated applications. The KR260 and its base K26 SOM are supported for full user customization through AMD Vitis™ platforms, customizable acceleration overlays, and AMD Vivado™ tools hardware board files. The integrated combination of hardware, platform, and software provides a quick out-of-box experience for developers that can then be leveraged for product designs.

**Note:** The SOM on the Kria KR260 Robotics Starter Kit does not populate the eMMC.

*Figure 2: KR260 Starter Kit Block Diagram*



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**Table 1: Kria KR260 Robotics Starter Kit Product Details**

Specification	Description
Thermal cooling solution	Active
Weight	235g
Form factor	SOM + Carrier Card
Dimensions of the KR260 Starter Kit	132 mm x 140 mm x 36 mm
Dimensions of the SOM with thermal solution	60 mm x 77 mm x 27 mm
Dimensions of the carrier card	132 mm x 140 mm x 34 mm
System logic cells	256K
Block RAM blocks	144
UltraRAM blocks	64
DSP slices	1.2K
Ethernet interfaces	One PS Gb RGMII Ethernet One PS Gb SGMII Ethernet Two PL Gb Ethernet (RGMII) with support for time sensitive networking (TSN) and Ethernet for control automation technology (EtherCAT)
Enhanced small form-factor pluggable connector	x1 SFP+ connector supporting 10GigE
Scalable low-voltage signaling with embedded clock (SLVS-EC)	x1 SLVS-EC Gen2 x2 lanes interface
DDR memory	4 GB (4 x 512 Mb x 16 bit) [non-ECC] DDR4
Primary boot memory	512 Mb QSPI
Secondary boot memory	microSD card
Device Security	Zynq UltraScale+ MPSoC hardware root of trust (RoT) in support of secure boot. Infineon TPM2.0 in support of measured boot.
Raspberry Pi hardware attached on top (HATs) connector	x1
PMOD 12-pin interface	x4
USB3.0 interface	2x USB 3.0/2.0 downstream (Host), each with two user physical ports
DisplayPort 1.2a	x1 DisplayPort video output supporting 1920 x 1080 at 60 Hz

## Ordering Information

**Table 2: Ordering Information**

Product SKU	Device	Temperature Grade	Encryption	Description
SK-KR260-G-ED	XCK26-C	Commercial	Disabled <sup>1</sup>	KR260 Starter Kit with encryption disabled
SK-KR260-G <sup>1</sup>	XCK26-C	Commercial	Enabled	KR260 Starter Kit with encryption enabled

**Notes:**

1. Trade compliance requires that customers in China and Russia only order encryption disabled (-ED) versions of the KR260 Starter Kit.

## Power and Electrical

This section describes the power requirements, power-on sequence, power-on reset sequence, and power management functions.

**Table 3: KR260 Starter Kit Power Specifications**

Parameter	Description
DC input power	+12V, 3A
Recommended power adapter	The CUI Inc. <a href="#">SMI36-12-V-P6</a> adapter connected using a center-pin positive barrel connector (2.5 mm ID, 5.5 mm OD)
SOM supply	+5V, 3A ( $V_{CC\_SOM}$ )
SOM power telemetry	Current sense device is available through the I2C bus to monitor the current on the $V_{CC\_SOM}$ power rail
USB 3.0	5.0V, 900 mA per port (1.0A limit per port)
Pmod interface from Digilent Inc.	3.3V, 100 mA (1.0A limit, shared across all four Pmod expansion interfaces)
Raspberry Pi Expansion Header	3.3V (1.0A limit), 5.0V (1.0A limit)
SFP+	3.3V (600 mA)
Framos FPA SLVS-EC	1.8V (800 mA), 3.8V (1.0A)
microSD card	3.3V (200 mA)

### KR260 Starter Kit Power On Sequence

1. External power adapter supplies 12V power
2. Carrier card on-board regulator generates 5V supply and provides power to other voltage regulators
3. SOM power rail ( $V_{CC\_SOM}$ ) is powered by a 5V supply
4. When the 5V regulator output voltage level is within the specified range and a power-good signal is asserted and the `POWER_OFF_C2M_L` (`PWROFF_C2M_B` in schematic) signal is deasserted by the carrier card
5. SOM on board power on sequencing starts
6. Carrier card provides PS and PL  $V_{CCO}$  voltage rails after the SOM asserts the `VCCOEN_PS_M2C` and `VCCOEN_PL_M2C` signals

### KR260 Starter Kit Power On Reset

1. The SOM reset signal `PS_POR_L` (`PS_POR_B` in schematic) is held in reset until the `PS_PGOOD` (`CC_PS_PGOOD` in schematic) signal is asserted.
2. To perform a hard reset on the SOM, use the reset push-button on the carrier card to assert the `PS_POR_L` (`PS_POR_B` in schematic) signal.
3. All the PS and PL I/O device reset signals on the carrier card are held in reset until 25 ms after the PS and PL power domain are powered up and stable.

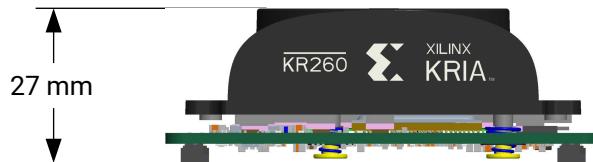
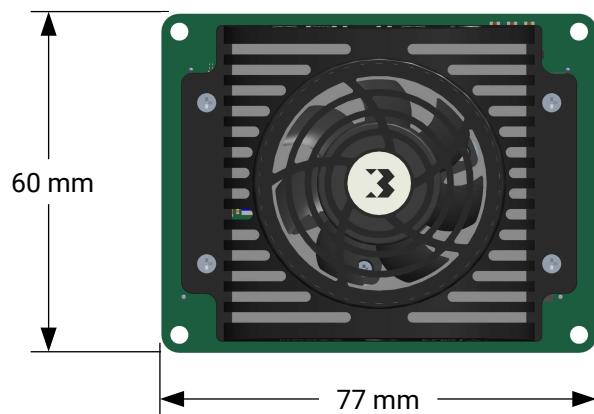
# Mechanical

This section outlines the mechanical specifications of the Kria KR260 Robotics Starter Kit.

**Table 4: Kria KR260 Robotics Starter Kit Mechanical Details**

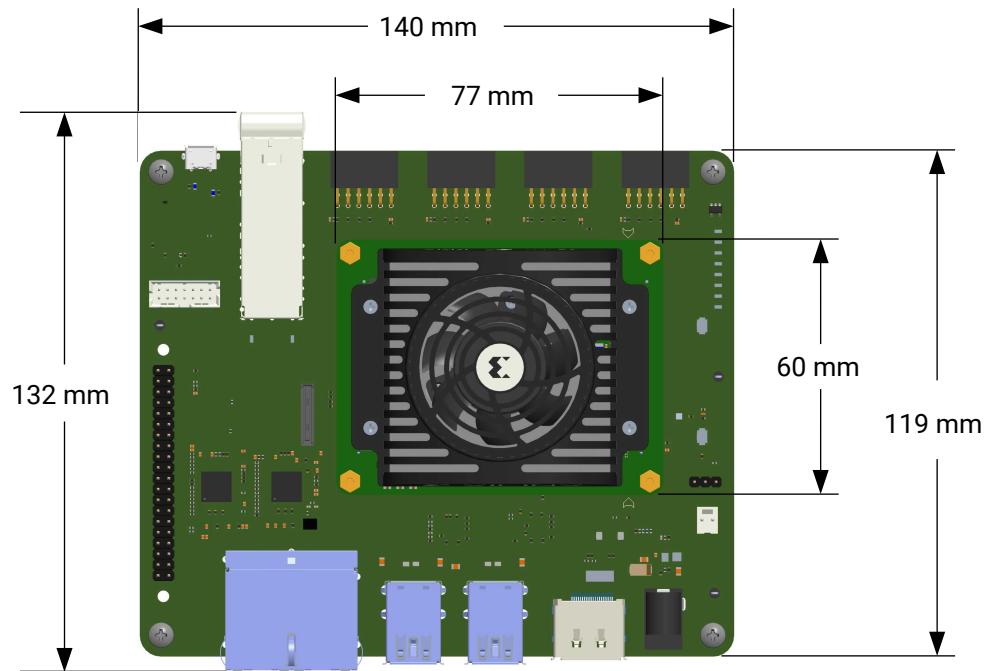
Specification	Dimensions
Dimensions of the KR260 Starter Kit	132 mm x 140 mm x 36 mm
Dimensions of the SOM with thermal solution	60 mm x 77 mm x 27 mm
Dimensions of the carrier card	132 mm x 140 mm x 34 mm

**Figure 3: Kria K26 Starter Kit SOM Mechanical Dimensions**



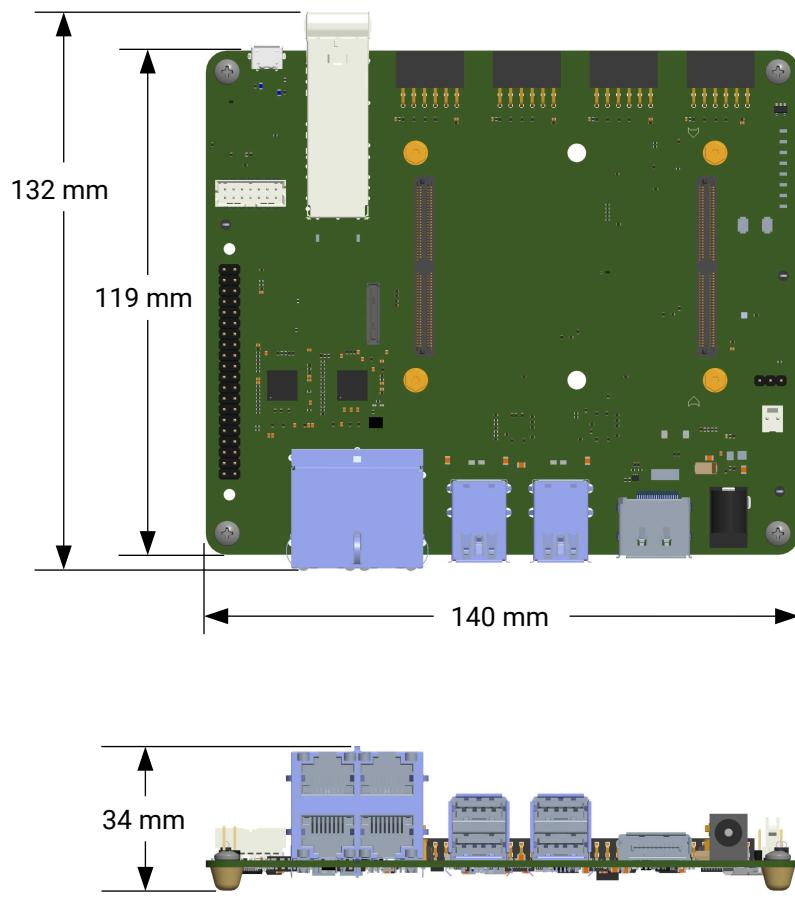
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Figure 4: Kria KR260 Robotics Starter Kit Mechanical Dimensions



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Figure 5: Kria KR260 Robotics Starter Kit Carrier Card Mechanical Dimensions



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## Starter Kit Firmware and Software

The KR260 Starter Kit is preloaded at the time of manufacturing with a supporting set of boot and platform recovery firmware. The boot firmware is maintained in the QSPI non-volatile memory device and the robotic carrier card fixes the Zynq UltraScale+ MPSoC device boot mode to QSPI32. The operating system (OS) and application software are managed in the microSD card secondary boot device. Linux is the default OS for the AMD example applications. A pre-built Linux image is provided for the KR260 Starter Kit on the [Kria SOM Wiki](#).

## Thermal

### Operating and Storage Temperature Conditions

Table 5: Operating and Storage Temperatures and Humidity Condition

Specification	Condition
Operating temperature	0°C to 35°C <sup>1</sup>
Storage temperature	0°C to 70°C
Operating humidity, non-condensing	8% to 90%, and a dew point of -12°C
Storage humidity, non-condensing	5% to 95%

**Notes:**

1. The Kria KR260 Robotics Starter Kit is for evaluation purposes only. The operating temperature range is not fully tested, it is a general guideline. Use the Kria KR260 Robotics Starter Kit in a typical lab environment. Do not operate beyond room temperature.

### KR260 Starter Kit Cooling Solution

The KR260 Starter Kit uses an active cooling solution to support the K26 SOM total maximum thermal power dissipation of 15W.

## Supported Tools

The Kria KR260 Robotics Starter Kit is enabled in the AMD Vivado and AMD Vitis™ tools. For details on getting started with the kit see the *Kria KR260 Robotics Starter Kit User Guide* ([UG1092](#)).

## Reliability

The Kria SOM Starter Kits are not designed or qualified for production use. The kits undergo a basic level of testing and reliability and should pass all the certification requirements necessary for evaluation kit purposes (for example RoHS and CE). To develop and deploy a production quality product based upon this starter kit, design your own (compatible) carrier cards and test them to the appropriate and required certification standards for your end application. By purchasing the K26 SOM (available in commercial (C) or industrial (I) temperature grades) and designing your own (compatible) carrier card, you leverage the advantages of the K26 SOM in your end application.

# Regulatory Compliance Statements

## Safety

The following safety standards apply to all products listed in this document.

IEC 62368-1, 2nd Edition, 2014/A11:2017, *Information technology equipment – Safety, Part 1: General requirements*

EN 55032:2015, *Emission*

EN 55035:2017/ALL:2020, *Immunity*

## RoHS Compliance

- RoHS Directive 2011/65/EU
- RoHS 3 Directive 2015/863

## EU WEEE Logo



## Manufacturer Declaration European Community



## Manufacturer Declaration

Xilinx declares that the equipment described in this document is in conformance with the requirements of the European Council Directives listed below:

- RoHS 3 Directive 2011/65/EU, 2015/863
- REACH Regulation 1907/2006

- POP Regulation 2019/1021

These products follow the provisions of the European Directive 2014:30 and 2014/35EU.

Dette produkt er i overensstemmelse med det europæiske direktiv 2014:30 and 2014/35EU.

Dit product is in navolging van de bepalingen van Europees Directief 2014:30 and 2014/35EU.

Tämä tuote noudattaa EU-direktiivin 2014:30 and 2014/35EU määräyksiä.

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Dieses Produkt entspricht den Bestimmungen der Europäischen Richtlinie 2014:30 and 2014/35EU.

Þessi vara stenst reglugerð Evrópska Efnahags Bandalagsins númer 2014:30 and 2014/35EU.

Questo prodotto è conforme alla Direttiva Europea 2014:30 and 2014/35EU.

Dette produktet er i henhold til bestemmelsene i det europeiske direktivet 2014:30 and 2014/35EU.

Este produto cumpre com as normas da Diretiva Européia 2014:30 and 2014/35EU.

Este producto cumple con las normas del Directivo Europeo 2014:30 and 2014/35EU.

Denna produkt har tillverkats i enlighet med EG-direktiv 2014:30 and 2014/35EU.

This declaration is based upon compliance of the Class A products listed above to the following standards:

EN 55032 (CISPR 32 Class A) RF Emissions Control

EN 55035:2017 (CISPR 35) Electromagnetic compatibility of multimedia equipment – Immunity requirements

EN 62368-1, 2nd Edition, 2014/A11:2017 *Information technology equipment – Safety, Part 1: General Requirements*

EN 50581:2012 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

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 **CAUTION!** In a domestic environment, Class A products could cause radio interference, in which case the user may be required to take adequate measures.

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 **ATTENTION!** Dans un environnement domestique, les produits de Classe A peuvent causer des interférences radio, auquel cas l'utilisateur peut être tenu de prendre des mesures adéquates.

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 **VORSICHT!** In einer häuslichen Umgebung können Produkte der Klasse A Funkstörungen verursachen. In diesem Fall muss der Benutzer möglicherweise geeignete Maßnahmen ergreifen.

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## Responsible Party

Xilinx, Inc.  
2100 Logic Drive, San Jose, CA 95124  
United States of America  
Phone: (408) 559-7778

## References

These documents provide supplemental material useful with this guide:

1. *Kria KR260 Robotics Starter Kit User Guide* ([UG1092](#))
2. *Kria K26 SOM Data Sheet* ([DS987](#))
3. *Kria K26 SOM Thermal Design Guide* ([UG1090](#)) in the *Kria SOM Power Design Manager* and *Thermal Lounge*
4. *Kria SOM Carrier Card Design Guide* ([UG1091](#))

## Revision History

The following table shows the revision history for this document.

Section	Revision Summary
<b>7/02/2023 Version 1.1</b>	
Product Details	Added note about eMMC status.
Thermal	Updated the storage temperature guidance.
<b>5/17/2022 Version 1.0</b>	
Initial release.	N/A

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