



**DEVELOPMENT KIT
QUICK START GUIDE**

Introduction



Thank you for choosing the **Aurora SBX™ Development Kit**.

With this kit we aim to kick start the development of your application and provide you with the tools necessary for the complete evaluation of your future projects.

This Single Board Computer is an ARM® Cortex®-A9 based high-performance, low power all-in-one embedded platform that provides a ready-to-use development environment suitable to support and speed up development of a variety of applications. Aurora SBX™ has been built from the ground up to support the latest in display technology. Used together with Densitron's leading range of TFT displays, Aurora SBX™ provides an 'out-of-the-box' HMI (Human Machine Interface) development solution.

The kit includes Linux® and Android™ BSPs as well as a virtual machine* with Qt® framework and Android™ Studio to provide a complete application and GUI (Graphical User Interface) development environment.

Via proprietary LVDS, RGB and standard display interfaces, the Aurora SBX™ hardware allows easy display integration**. Furthermore, for your final product the Aurora SBX™ hardware provides production scalability in regard to microprocessor, memory size and interfaces, so once you are happy with the evaluation please contact us at Densitron for more options.

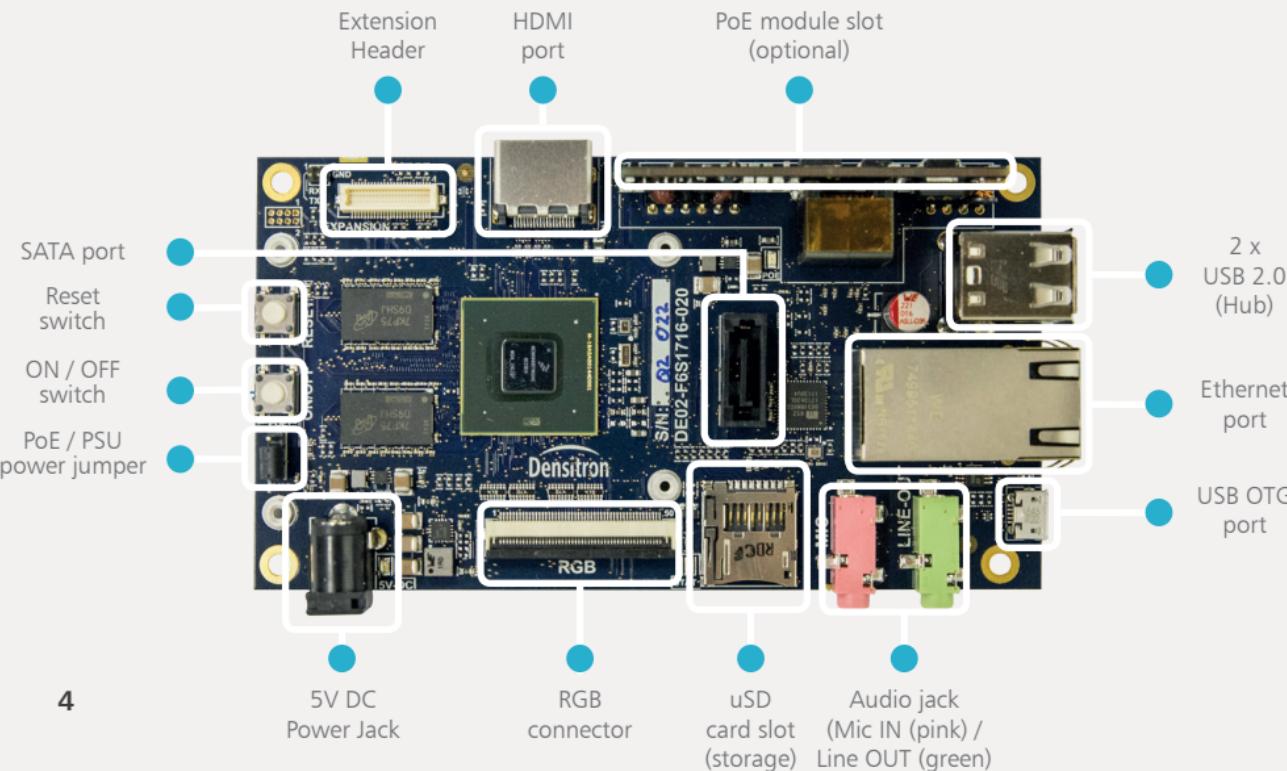
* VirtualBox image. VirtualBox virtualisation software required.

** With Densitron display adapters



SBC Front

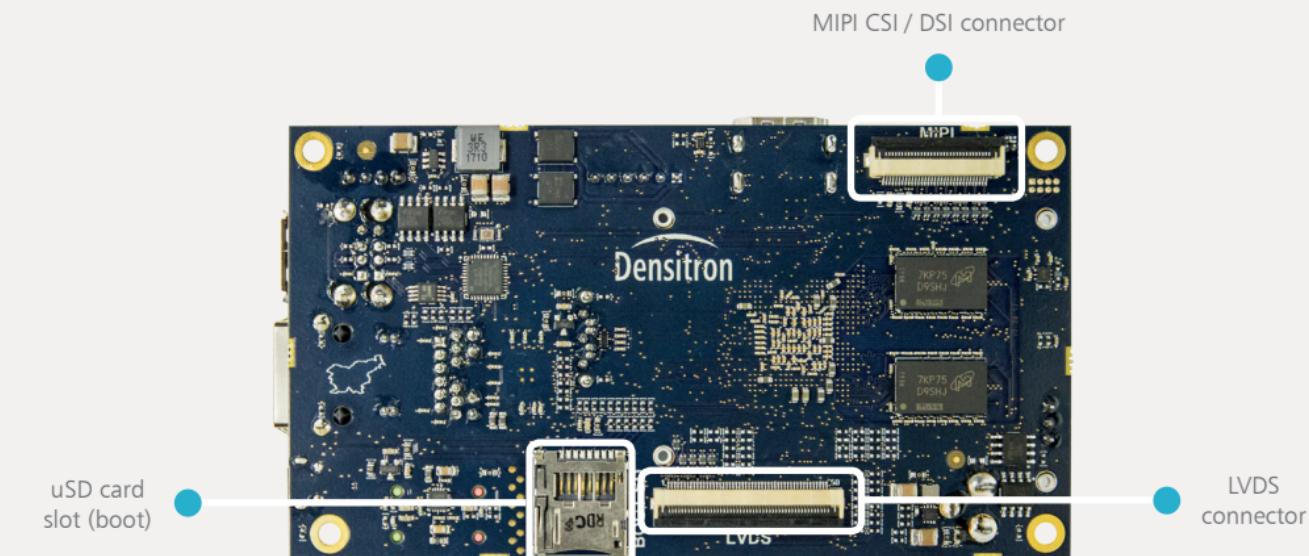
Aurora™
SBX



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SBC Back

Aurora™
SBX



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Quick Specs



Hardware Features

- NXP® i.MX6 Quad core APU
- 4x ARM® Cortex®-A9 up to 1.0 GHz per core
- 2GB DDR3 RAM
- uSD-Card storage
- Integrated Ethernet Gigabit PHY

BSP Software

- Linux® Ubuntu 16.0.4 LTS (4.9 Linux® kernel)
- Linux® Yocto Krogoth 2.1 FSL (4.1.15 Linux® kernel)
- Android™ 7.0 Nougat
- Qt® Open Source (qt-everywhere/opensource install package)*

Display Interfaces

- RGB, LVDS, HDMI, MIPI (2-lane)

Communication Interfaces

- 10/100/1000 Mbit LAN
- 2 x USB 2.0 Host (Hub)
- 1x USB 2.0 OTG
- Expansion Connector:
2 x I2C, 2 x UART, 1 x SPI, 2 x CANbus,
1 x USB 2.0 Host (Hub)
- 1x SD card, audio (line out, mic)
- 1x SATA, GPIO MIPI cam and display connector / expansion connector

Extras

- PoE add on module (optional)
- Dedicated RGB and LVDS connector (for Densitron display adapters)

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Development Kit Startup



1 Check uSD Card

The Linux® uSD card already comes pre-inserted into the boot uSD card slot. If you want to boot to Android™ simply exchange this card. The uSD card sockets are Push-Push type.

2 Connect a Monitor or Display (Optional)

Connect the kit via HDMI to a display monitor. If your kit includes or you have obtained a Densitron display adapter connect it to the appropriate interface connector (LVDS, RGB, MIPI). Observe the proper flexible flat cable (FFC) orientation as per included instructions (also available on the USB memory stick).

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3 Power on the Kit

Connect the supplied power supply, first connecting the cable to the power jack on the Aurora SBX™ hardware and then plugging the power supply into the outlet. Once connected a red power LED will come on and the boot sequence will automatically begin.

4 Boot Sequence

Every boot sequence begins with the Aurora SBX™ logo showing on the attached display. When booting into Linux® first the Linux penguins will appear in the top left corner of the screen (one for every available processor ARM® core) followed shortly by Linux® desktop. Linux® system boot information can be viewed in the terminal window on your PC if connected via debug UART. When booting into Android™ the boot animation appears followed by the Android™ home screen.

5 Accessing Aurora SBX™ via network SSH (Optional - for Linux®)

Connect Aurora SBX™ to your network using a standard Ethernet cable. Aurora SBX™ is enabled to use DHCP by default. You will need to consult your networking equipment to find the IP address assigned to Aurora SBX™. Once you have the IP address, you can connect to Aurora SBX™ via the SSH protocol using the default port (22). The user and password are both set to 'aurora' as default.

6 Connect Debug USB-to-Serial Adapter (Optional)

Connect the supplied debug adapter board to the EXTENSION HEADER. Connect the USB cable to your PC. You may have to install the USB-to-serial driver (available on the USB memory stick or via download from ftdichip.com). Set the following terminal configuration:

115.2 kbaud, 8 data bits, 1 stop bit, no parity.

7 Connect Debug USB OTG (Optional - for Android™)

Connect the supplied micro USB cable to the OTG port. Install Android Studio on your PC to use debug function. For more information go to <https://developer.android.com/studio/command-line/adb.html>

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Densitron Display Adapters



The Aurora SBX™ Development Kit provides support for various Densitron TFT (IPS) displays with the Densitron display adapters. Through the proprietary RGB, LVDS and standard HDMI connector a line of display adapters can easily be connected to the hardware, providing a true HMI solution with an all-in-one development system for GUI and multimedia oriented applications and display evaluation. Some of the available display adapters are:

10.1" DMT101DHHCMI-1A

1280 X 800 Hi FRC HDMI with USB PCT

2U 8" DMT080YYNLCMU-1A

1600 x 480 TFT with PCT

5" DMT050WVNXCMI-1A

480 x 854 IPS TFT RGB with PCT

4.3" DMT043WVNXCMI-1A

480 x 800 IPS TFT RGB with PCT

The range of displays and adapters available is constantly changing and expanding, please contact us at embedded@densitron.com or visit www.densitron.com for the latest information.

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The development kit is intended for evaluation and engineering development purposes only. Any use beyond this scope is not permitted and is done solely at the customer's own risk. The customer is required to have expertise in electrical and computer engineering for the installation and use of this product. Further the development kit must be handled or monitored by personnel with electronics training and good engineering practice standards must be observed.

The products and documentation are not designed, authorised or warranted to be suitable for use in medical, military, aircraft, space or life support equipment nor in applications where failure or malfunction of the products can reasonably be expected to result in a personal injury, death or severe property or environmental damage.

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About Densitron

Densitron is a creator of display technology which is tailored to the needs of customers around the world. We take a consultative approach to design, partner with our customers to understand their particular requirements and then create bespoke products to address those. With offices in Asia, Europe and North America and experienced application engineers based worldwide, our global approach to innovation is always underpinned by a thorough local knowledge and understanding of cultural requirements.

Our customers depend on us for our:

- In-depth knowledge of the latest display and embedded technology
- More than 40 years of experience in designing electronic displays and embedded boards
- Expertise in market sectors ranging from broadcast and medical to security and automotive

For support contact embedded@densitron.com.

Visit www.densitron.com for more Aurora SBX™ Linux® and Android™ support and links.