Installing Debian 11 Bullseye and Debian 12 Bookworm/sid Headless

Libre Computer AML-S905X-CC

Debian 11 Bullseye Stable Headless Overview

- Debian is an open source Linux distribution maintained by community.
  - Debian releases a stable version roughly every two years.
  - "deb" packaging system controlled by the "apt" tool.
  - Software repositories are broken down into "main", "contrib", "non-free".
    - main: official packages that comply with [Debian Free Software Guidelines](#)
    - contrib: packages with non-free package dependencies
    - non-free: packages with non-free licenses
- Version 11 codename "Bullseye" was released on August 14th, 2021.
  - Linux 5.10
- Headless does not install a GUI or Windowing System.
  - Minimal packages ideal for fast bootup time in IoT applications, servers, and remote ssh.
  - Designed for intermediate and advanced Linux users. Not recommended for GUI.
- Installing from official Debian sources for maximum security.
  - Pre-packaged images by non-official sources may pose security risk.
- Window Managers and audio may not work properly in this release!
  - Better use Debian sid or Ubuntu jammy with newer kernel and userspace utilities.

Debian 12 Bookworm/sid Headless Overview

- Debian releases a CI unstable daily.
  - Features the latest packages of many open source projects.
- Version 12 codename "Bookworm" will be release mid-2023.
  - Linux 5.20+
- Great for testing Linux graphical features
  - Kernel
  - Wayland
  - Graphics
  - Sound
  - Much more!

Prerequisite

Please follow the instructions carefully so that you don't miss any important steps. If you miss a step, the resulting installation may not boot. The installation takes ~30 minutes but may depend on your storage devices and thermal headroom.

- MicroSD card flashed with Board Firmware + MBR EFI partition
  - https://github.com/libre-computer-project/libretech-firmware/tree/aml-s905x-cc/v2022.04/mbruefi
  - xz compressed, MUST decompress before flashing to MicroSD card or it will not work
  - Linux decompress command: `xz -dk aml-s905x-cc.xz`
  - For other operating systems, please Google.
- USB flash drive flashed with Debian netinst arm64 (not amd64):
  - 11 Bullseye: https://www.debian.org/CD/netinst/
  - 12 Bookworm/sid: https://cdimage.debian.org/cdimage/daily-builds/sid_d-i/current/arm64/iso-cd/
- Use raw disk imaging utility to flash images on MicroSD and USB flash drive
  - Windows: Win32DiskImager
  - macOS: Disk Utility
  - Linux: gnome-disks or dd

Booting Installer

1. Attach HDMI cable to the board
2. Attach USB keyboard to the board
3. Attach USB mouse to the board (optional)
4. Attach eMMC 5.x Module to the board (optional)
5. Insert flashed MicroSD card and USB drive
6. Insert USB Drive and MicroSD card
7. Attach MicroUSB Power to the board
8. Wait for the board to load GRUB
9. Select Graphical Install with your keyboard

Troubleshooting Booting Installer

- If there is a pre-existing image on eMMC and your device does not boot from MicroSD card, you need to remove the bootloader from the eMMC.

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Continue Through Installer Until Network Setup

Choose the language to be used fo

Language:

Albanian
Amharic
Arabic
Asturian
Bangla
Basque
Belarusian
Bosnian
Bulgarian
Burmese
Catalan
Chinese (Simplified)
Chinese (Traditional)
Croatian
Czech
Danish
Dutch
Dzongkha
English
Esperanto
Estonian
Finnish
French
Galician
Georgian
German
Greek
Gujarati
Hebrew
Hindi
Hungarian
Icelandic
Indonesian
Irish
Italian
Japanese
Kabyle

If you get this message: "No device for installation media was detected."

Try unplugging and re-plugging your USB key in a different USB port.

Screenshot

Go Back   Continue

Network Setup

Configuring the network

Network autoconfiguration failed

Your network is probably not usin the DHCP protocol. Alternatively, the DHCP server may be slow or some network hardware is not working properly.

1. This is an expected failure and will be fixed in Debian upstream in the future. It does not affect ethernet in the installed OS.
    a. Select Continue
    b. Select "Do not configure the network at this time"
    c. Select Continue

Screenshot

Continue

Network Setup Continued

1. Enter your hostname. This is the name of your computer on your network.
    a. It can be any alphanumeric sequence but must start with a letter.
    b. A typically naming convention is user-machine, eg: john-aml-s905x-cc or john-lepotato.

Setup Root and Users

1. You will be asked to set the root password. The root user is a super-user the ability to modify the system. This is <u>NOT</u> an optional step or you will not be able to install any packages. There is no sudo!
2. Full name for the user (optional): Your name
3. Username for your account: The username you plan to use to login
4. User password: The password you plan to use to login

Partition disks

The installer can guide you through partitioning a disk (using different standard schemes) or, if you prefer, you ca[...]will still have a chance later to review and customise the results.

If you choose guided partitioning for an entire disk, you will next be asked which disk should be used.

Partitioning method:

Guided - use the largest continuous free space
Guided - use entire disk
Guided - use entire disk and set up LVM
Guided - use entire disk and set up encrypted LVM
Manual

Disk Setup

You must select "Manual" and Continue.

Screenshot

Go Back   Continue

Disk Setup MicroSD Card

This is an overview of your currently configured partitions and mount points. Select a partition ... table.

- **Guided partitioning**
- Configure software RAID
- Configure the Logical Volume Manager
- Configure encrypted volumes
- Configure iSCSI volumes

▽ MMC/SD card #1 (mmcblk0) - 32.0 GB SD 00000
-     >   #1   primary   132.1 MB   B   K   ESP
-     >   #2   primary   2.0 GB   f   swap   swap
-     >   #3   primary   29.9 GB   f   btrfs   /

MMC/SD card #2 (mmcblk1) - 63.6 GB MMC HCG8e▯
SCSI1 (0,0,0) (sda) - 16.0 GB Kingston DT Ultimate G2

Undo changes to partitions
Finish partitioning and write changes to disk

1. The instructions below are for installing to MicroSD card. The bootloader must be preserved on the MicroSD card during partitioning or the device will not boot when installation is complete.
   a. If you want to install on eMMC module, skip the instructions below and go to the next page.
2. Under mmcblk0 Select "FREE SPACE" and Continue
   a. Select "Create a new partition"
   b. Type "1GB" for the New Partition Size
   c. Select "Primary" and "Beginning"
   d. Select "Use as" and change to "swap area"
   e. Select "Done setting up the partition" and Continue
3. Under mmcblk0 Select "FREE SPACE" and Continue
   a. Select "Create a new partition"
   b. Leave New Partition Size to its default value and Continue
   c. Select "Primary"
   d. Select "Use as" and change to "btrfs journaling file system"
   e. Done setting up the partition
4. Under mmblk0 Select fat32 and Continue
   a. Select "Use as" and change to "EFI System Partition"
   b. Done setting up the partition
5. Select "Finish partitioning and write changes to disk"
   a. When prompted "Write the changes to disks?" Select Yes

Screenshot   Help   Go Back   Continue

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Partition disks

This is an overview of your currently configured partitions and mount points. Select a part...

Guided partitioning
Configure software RAID
Configure the Logical Volume Manager
Configure encrypted volumes
Configure iSCSI volumes

▽ MMC/SD card #1 (mmcblk0) - 32.0 GB SD 00000
    >   #1   primary   132.1 MB   fat32
         pri/log   31.9 GB   FREE SPACE
▽ MMC/SD card #2 (mmcblk1) - 63.6 GB MMC HCG8e⊞
    >   1.0 MB   FREE SPACE
    >   #1   536.9 MB   B   f   ESP
    >   #2   62.0 GB   f   btrfs   /
    >   #3   1.0 GB   f   swap   swap
    >   1.0 MB   FREE SPACE
SCSI1 (0,0,0) (sda) - 16.0 GB Kingston DT Ultimate G2

Undo changes to partitions
Finish partitioning and write changes to disk

Disk Setup eMMC Module

1. The instructions below are for installing to eMMC Module <u>only</u>.
   a. Installation on eMMC does not require MicroSD card to boot since we will write the bootloader to the eMMC module boot0 partition.
2. Select mmcblk1 and Continue
   a. When prompted "Create new empty partition table on this device?", select "Yes" and Continue
3. Under mmcblk1 Select "FREE SPACE" and Continue
   a. Select "Automatically partition the free space" and Continue
   b. Select "All files in one partition (recommended for new users)" and Continue
4. Under mmcblk1 Select "ext4" and Continue
   a. Select "Use as" and change to "btrfs journaling file system"
   b. Done setting up the partition
5. Select "Finish partitioning and write changes to disk"
   a. When prompted "Write the changes to disks?" Select Yes

Screenshot   Help   Go Back   Continue

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Package Manager

No network mirror was selected.

If you are installing from a netinst CD image and choose not to use a mirror, you will end up with

Continue without a network mirror?

○ No

◉ Yes

When prompted "No network mirror was selected.

Continue without a network mirror?" Select Yes

Screenshot

Go Back   Continue

Configuring popularity-contest

The system may anonymously supply the distribution developers with statistics about the most u... packages should go on the first distribution CD.

If you choose to participate, the automatic submission script will run once every week, sending st... https://popcon.debian.org/.

This choice can be later modified by running "dpkg-reconfigure popularity-contest".

Participate in the package usage survey?

◉ No

○ Yes

Popularity Contest

You can optionally participate in the Debian package survey.

Screenshot

Continue

At the moment, only the core of the system is installed. To tune the system to your needs, you c

Choose software to install:

- ☑ **standard system utilities**

Software Selection

Keep the "standard system utilities" and Continue

Screenshot

Continue

Unable to install GRUB in dummy
Executing 'grub-install dummy' failed.

This is a fatal error.

GRUB Boot Loader

GRUB Installer will fail and this is expected.
We will install GRUB manually. Continue twice.

Screenshot

Go Back | Continue

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Debian installer main menu

Choose the next step in the install process:

Choose language
Access software for a blind person using a braille display
Configure the keyboard
Detect and mount installation media
Load installer components from installation media
Detect network hardware
Configure the network
Set up users and passwords
Configure the clock
Detect disks
Partition disks
Install the base system
Configure the package manager
Select and install software
Install the GRUB boot loader
Continue without boot loader
Finish the installation
Change debconf priority
Check the integrity of installation media
Save debug logs
Execute a shell
Eject a CD from the drive
Abort the installation

Select "Execute a shell" and Continue twice.

Screenshot

Continue

Execute a shell

Interactive shell

```
BusyBox v1.30.1 (Debian 1:1.30.1-6+b3) built-in shell (ash)
Enter 'help' for a list of built-in commands.

~ # chroot target
# echo $PWD
/
# boot/efi/distrofix.sh
```

distrofix.sh

1.   Debian install requires some modifications to make the installation bootable.
     a.   We have supplied a distrofix.sh script to make the necessary changes.
2.   Type the following command sequences
     a.   chroot target
     b.   For MicroSD card installation:
          i.   /boot/efi/distrofix.sh
     c.   For eMMC module installation:
          i.   mount /dev/mmcblk0p1 /mnt
          ii.   /mnt/distrofix.sh
          iii. umount /mnt
     d.   exit
     e.   exit

Screenshot

Go Back

GRUB Boot Loader

Choose the next step in the install process:

Choose language
Access software for a blind person using a braille display
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Detect and mount installation media
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Continue without boot loader
Finish the installation
Change debconf priority
Check the integrity of installation media
Save debug logs
Execute a shell
Eject a CD from the drive
Abort the installation

Select "Continue without boot loader" and Continue.

Screenshot

Continue

Installation complete

Installation is complete, so it is time to boot into your new system. Make sure tallation.

Installation Complete

1.   Remove the USB drive and MicroSD card
2.   Continue

Screenshot

Go Back   Continue

Where to go from here?

- Login as root, install sudo, add user to sudo group, and remove root access
  - apt update
  - apt dist-upgrade
  - apt install sudo
  - adduser USERNAME sudo #replace USERNAME with your username
  - passwd -l root
- Need SSH? apt install ssh
- Treat it like any Debian Linux installation. Everything should be standard.
- Update to latest kernel with ethernet fix and media acceleration:
  - https://drive.google.com/drive/folders/1myi-D8PqMkyz2EC3DyIUcNcq1t4gKiY6?usp=sharing
  - dpkg -i linux-*_arm64.deb
- Debian 12 Bookworm/sid only
  - apt install weston

Known Issues

- Debian 11
  - Reboot hangs on stock kernel
- 3D rendering limited to 1920 width/height by Mali-450
- Sometimes ethernet hangs with stock kernel
  - Install latest kernel from previous page
- Leave a comment or questions to help us improve this document.