Fling on SolidRun HoneyComb LX2K

Arm

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Table of Contents

1 Info

The NXP LayerScape LX2160A-based SolidRun HoneyComb is a feature-rich Mini ITX platform designed for the standard COM Express type 7 form factor – allowing developers easy access to supported modules, with powerful networking and connectivity options.

The HoneyComb is based on the NXP LayerScape LS2160A SoC with 4 x Cortex-A72 cores and supports up to 64 GiB ECC and non-ECC RAM. The platform also supports SATA, USB3, PCIe, m.2 Key M, GbE and SFP+ connectivity.

The anticipated use case is "Mid-Edge": a "beefy" virtualized edge gateway or microserver.

The official support resources are available at https://developer.solid-run.com/knowledge-base/honeycomb-lx2k/

The official purchase info is available at https://www.solid-run.com/nxp-lx2160a-family/honeycomb-workstation/

2 Required and supported hardware

Minimally, you need:

- A HoneyComb carrier board with the CEx7 module.
- DDR4 SO-DIMM RAM.
- An ATX power supply.
- 1 x micro SD card for UEFI firmware.
- 1 x USB or PCIe NIC.
- 1 x USB drive for installer
- 1 x USB, SATA or NVMe drive for actual ESXi installation
- 1 x microUSB cable for serial console.

The following hardware is supported:

- USB, SATA and NVMe (PCIe or m.2 Key M) storage
- USB and PCIe networking
- Serial console

As you will note, SD card and onboard GbE/SFP+ ports are not supported. SD card is only used to keep UEFI firmware.

3 Preparation

3.1 Assembling a system

This document does not cover assembly instructions, which are typical of ATX/ITX systems. Please use official SolidRun support resources as needed at https://developer.solid-run.com/knowledge-base/honeycomb-lx2k/ (e.g. around what RAM is supported, etc).

3.2 Serial console access

The serial console is provided via the microUSB connector in the front of the board. It is the first microUSB jack to the left of the RJ45 port.

Fire up your terminal emulation and connect to the device on your PC. The parameters used to open this port:

```
Baud Rate     → 115200
Data Bits     → 8
Parity        → None
Stop Bits     → 1
Flow Control → None
```

3.2.1 'screen' terminal emulator

Note: device names below may be different. Check your system.

On Linux:

```
$ screen /dev/ttyUSB0 115200
```

On macOS:

```
$ screen /dev/tty.usbserial-A900UE2E
```

3.2.2 'minicom' terminal emulator

Note: device names below may be different. Check your system.

With **minicom**, you will have to configure settings the first time you use it. To access menus, you will have to use the **CTRL** key in Linux, and **ESC** key on macOS. These directions will refer to this key as **META**.

On Linux:

```
$ minicom -c on -D /dev/ttyUSB0
```

On macOS:

```
$ minicom -c on -D /dev/tty.usbserial-A900UE2E
```

Now press **META-Z**:

Now press **O**:

Use arrow key to navigate to **Serial port setup** and press the **ENTER**:

Now press **E**:

Press **E** again, then **ENTER**.

```
Welcome to minicom 2.7.1

OPTI+-------------------------------------------------------------+
Comp| A -    Serial Device     : /dev/tty.usbserial-A900UE2E    |
Port| B - Lockfile Location     : /usr/local/Cellar/minicom/2.7.1/var |
    | C -    Callin Program     :                                |
Pres| D -   Callout Program     :                                |
    | E -    Bps/Par/Bits       : 115200 8N1                     |
    | F - Hardware Flow Control : No                             |
    | G - Software Flow Control : No                             |
    |                                                            |
    |    Change which setting? █                                 |
    +-------------------------------------------------------------+
            | Screen and keyboard    |
            | Save setup as dfl      |
            | Save setup as..        |
            | Exit                   |
            +------------------------+

Meta-Z for help | 115200 8N1 | NOR | Minicom 2.7.1 | VT102 | Offline | 1-A900UE2E
```

Make sure settings **F** and **G** both say **No** to any kind of flow control. Press **ENTER** when done, then navigate to **Save setup as dfl** and press **ENTER**.

```
Welcome to minicom 2.7.1

OPTIONS:
Compiled on Oct  6 2019, 23:16:03.
Port /dev/tty.usbserial-A900UE2E, 23:35:36

Press Meta-Z for help on special keys

            +-----[configuration]------+
            | Filenames and paths      |
            | File transfer protocols  |
            | Serial port setup        |
            | Modem and dialing        |
            | Screen and keyboard      |
            | Save setup as dfl        |
            | Save setup as..          |
            | Exit                     |
            +--------------------------+

Meta-Z for help | 115200 8N1 | NOR | Minicom 2.7.1 | VT102 | Offline | 1-A900UE2E
```

Use **ESC** to exit out of the menus.

3.3 Updating UEFI firmware

UEFI is kept on the micro SD card. Use Balena Etcher[1] or similar (e.g. dd on Linux, BSD or macOS) to perform a "raw" write of the firmware file directly to the micro SD card.

You can ignore the warning about the missing partition table, it's a binary file.

Download the firmware from https://drive.google.com/file/d/1WS3ZuXHP_iNLt7Eaxu8PcO5FbffsdqEP/view?usp=sharing

Note: once updated, https://developer.solid-run.com/knowledge-base/lx2160a-firmware/ will be the authoritative source of HoneyComb UEFI firmware.

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1 https://www.balena.io/etcher/

4 Install ESXi-Arm

Follow the generic installation steps, with a few caveats.

4.1 Automated installation.

If using a kickstart script, the NIC name for a USB NIC is **vusb0**. The NIC name for a PCIe NIC is **vmnic0**.

4.2 Booting the installer

Plug the USB key with installer into an assembled HoneyComb system and turn it on. Enter UEFI configuration by mashing the **ESC** key. Then, use the arrow keys to navigate to **Boot Manager**:

```
SolidRun CEX7 Platform
Cortex-A72                                      2.00 GHz
EDK II                                          32767 MB RAM



  Select Language              <Standard English>        This selection will
                                                         take you to the Boot
> Device Manager                                         Manager
> Boot Manager
```

Press **ENTER**, then navigate to the USB drive with the installer.

```
/------------------------------------------------------------------\
|                          Boot Manager                            |
\------------------------------------------------------------------/

                                            Device Path :
  VMware ESXi                               VenHw(0D51905B-B77E-45
  UEFI Misc Device                          2A-A2C0-ECA0CC8D514A,0
  UEFI Misc Device 2                        00010030000000000)/USB
  UEFI Shell                                (0x1,0x0)
  UEFI INTEL SSDSC2KB240G7 PHYS739403JZ240AGN
  UEFI Samsung SSD 970 EVO Plus 250GB S59BNJ0N108110T
  1
  UEFI PXEv4 (MAC:EE3106C80011)
  UEFI PXEv6 (MAC:EE3106C80011)
  UEFI HTTPv4 (MAC:EE3106C80011)
  UEFI HTTPv6 (MAC:EE3106C80011)
  UEFI Samsung Flash Drive FIT 0377319070025344
```

Press **ENTER**, and the installer will boot:

```
<6>Loading /ixgben.v00
<6>Loading /lpfc.v00
<6>Loading /lpnic.v00
<6>Loading /lsi_mr3.v00
<6>Loading /lsi_msgp.v00
<6>Loading /lsi_msgp.v01
<6>Loading /lsi_msgp.v02
<6>Loading /mtip32xx.v00
<6>Loading /ne1000.v00
<6>Loading /nenic.v00
<6>Loading /nfnic.v00
<6>Loading /nhpsa.v00
<6>Loading /nmlx4_co.v00
<6>Loading /nmlx4_en.v00
<6>Loading /nmlx4_rd.v00
<6>Loading /nmlx5_co.v00
<6>Loading /nmlx5_rd.v00
```

4.3 Post install

Write support to UEFI NVRAM variables from an OS is not supported on the HoneyComb at the moment. The side-effect here is that the ESXi installer will not be able to update boot options, and boot into ESXi may take a really long time as other boot options fail.

After ESXi install completes, remove the install USB drive. After the system reboots, re-enter UEFI setup and navigate to **Boot Maintenance Manager**:

```
SolidRun CEX7 Platform
Cortex-A72                                          2.00 GHz
EDK II                                              32767 MB RAM



   Select Language            <Standard English>         This selection will
                                                         take you to the Boot
 > Device Manager                                        Maintenance Manager
 > Boot Manager
 > Boot Maintenance Manager
```
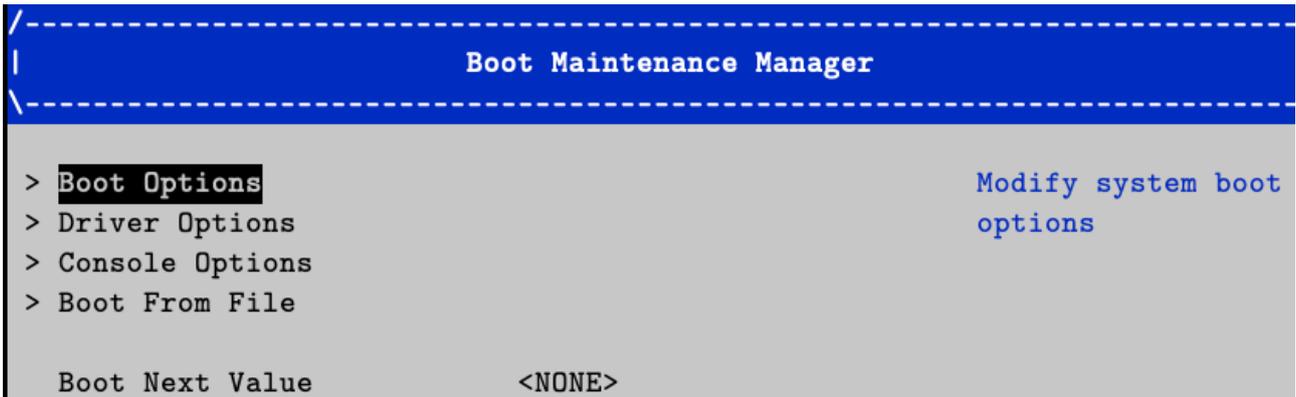
Press **ENTER** and select **Boot Options**:

```
/----------------------------------------------------------
|                    Boot Maintenance Manager
\----------------------------------------------------------

> Boot Options                                  Modify system boot
> Driver Options                                options
> Console Options
> Boot From File

  Boot Next Value              <NONE>
```

Press **ENTER** and select **Change Boot Order**:

```
/----------------------------------------------------------\
|                        Boot Options                       |
\----------------------------------------------------------/

> Go Back To Main Page                          Will be valid
> Add Boot Option                               immediately
> Delete Boot Option
> Change Boot Order
```

Press **ENTER** twice, and use arrow keys to navigate to the device ESXi is installed to (in this case, it was NVMe):

```
/----------------------------------------------------------\
|                      Change Boot Order                    |
\----------------------------------------------------------/

  Change the order         <UEFI Misc Device>      Change the order
                           <UEFI Misc Device 2>
         /-------------------------------------------------\
         | UEFI Misc Device                                |
         | UEFI Misc Device 2                              |
         | UEFI Shell                                      |
         | UEFI INTEL SSDSC2KB240G7 PHYS739403JZ240AGN     |
         | UEFI Samsung SSD 970 EVO Plus 250GB S59BNJ0N108110T 1 |
```
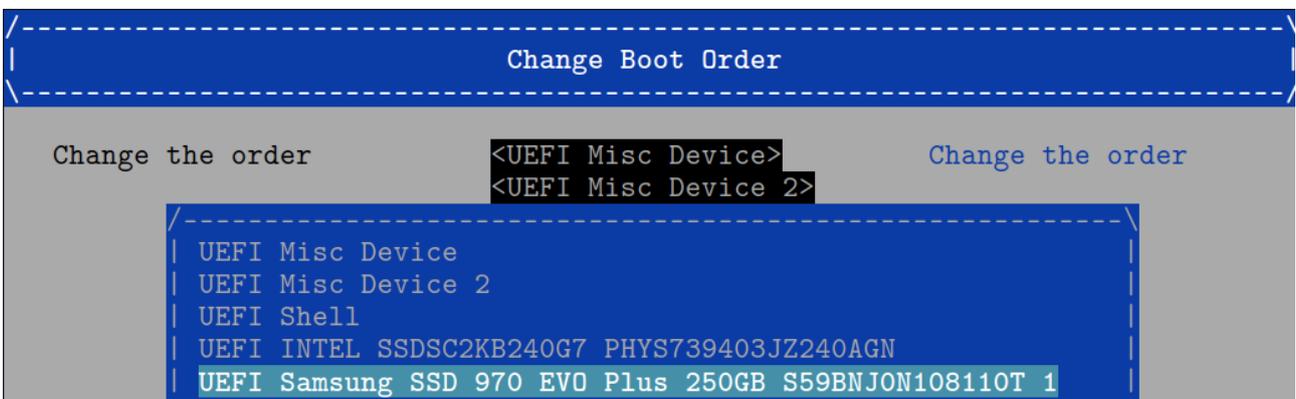
Keep pressing the **+** key until the drive is at the top of the list.

```
/-------------------------------------------------------------\
|-------------------------------------------------------------|
|                     Change Boot Order                       |
|-------------------------------------------------------------|
\-------------------------------------------------------------/

   Change the order        <UEFI Misc Device>         Change the order
                           <UEFI Misc Device 2>
         /---------------------------------------------------------\
         | UEFI Samsung SSD 970 EVO Plus 250GB S59BNJ0N108110T 1   |
         | UEFI Misc Device                                        |
         | UEFI Misc Device 2                                      |
         | UEFI Shell                                              |
         | UEFI INTEL SSDSC2KB240G7 PHYS739403JZ240AGN             |
```
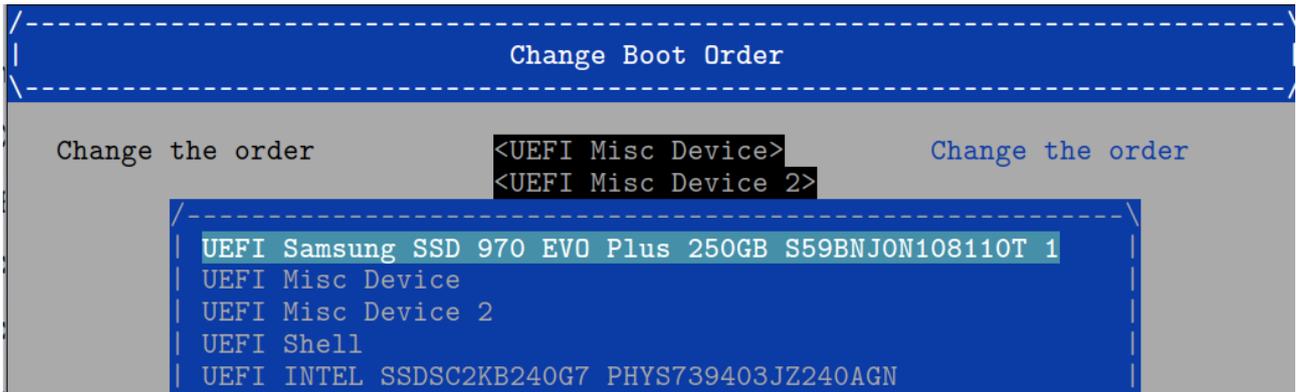
Press **ENTER** to complete the selection. Now use down arrow to navigate to **Commit Changes and Exit**:

```
                          <UEFI HTTPv6
                          (MAC:EE3106C80011)>

   Commit Changes and Exit
   Discard Changes and Exit

                                                                    ■
/-------------------------------------------------------------\
|              F9=Reset to Defaults        F10=Save           |
| ^v=Move Highlight    <Enter>=Select Entry    Esc=Exit       |
\-------------------------------------------------------------/
                                         Configuration changed
```
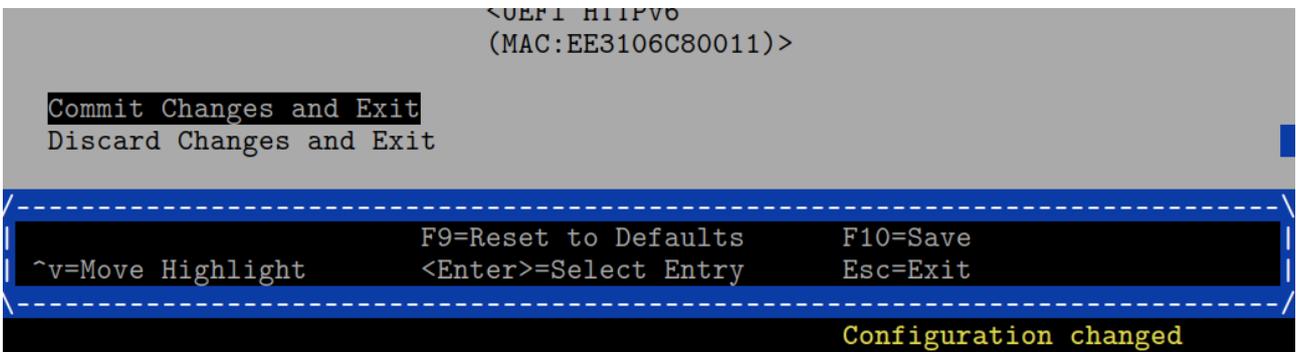
Press **ENTER** and **ESC** out as before to the main UEFI setup screen. Navigate to **Continue**:

```
SolidRun CEX7 Platform
Cortex-A72                                      2.00 GHz
EDK II                                          32767 MB RAM



   Select Language           <Standard English>         Continue

 > Device Manager
 > Boot Manager
 > Boot Maintenance Manager

   Continue
```
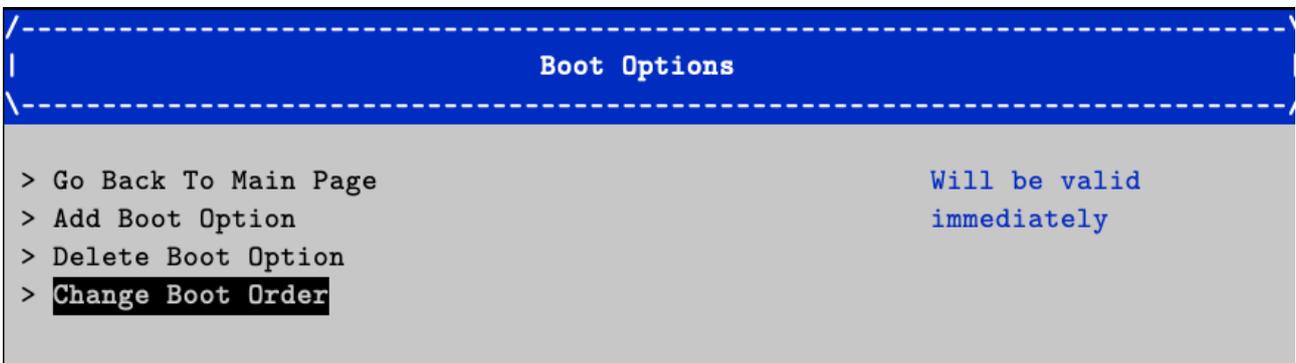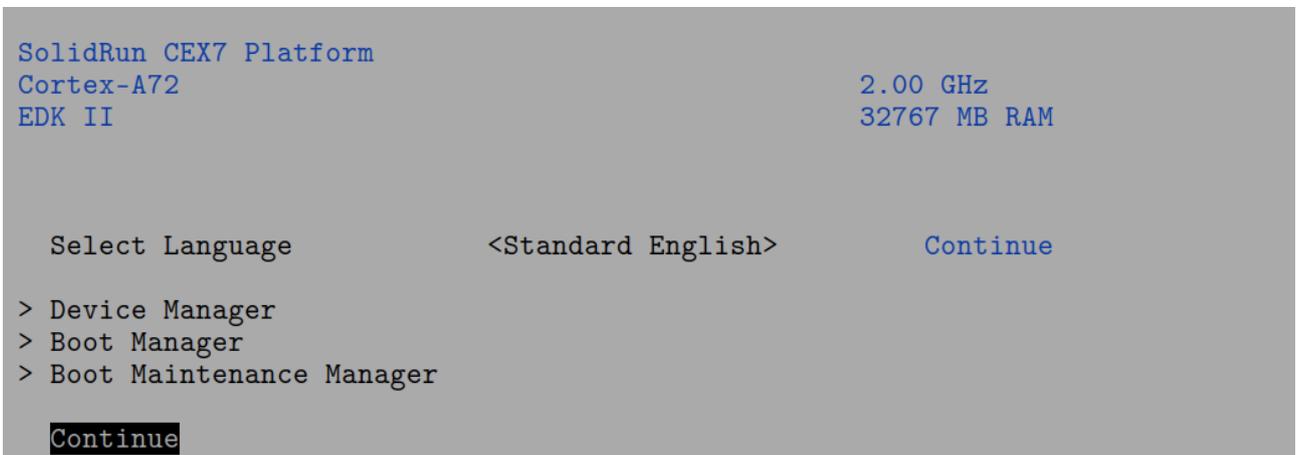
ESXi will boot.

4.4 NTP

The HoneyComb does have a battery RTC. The time may not have been set correctly. It is highly recommended that you configure NTP, especially if adding the FRWY to a vCenter (ideally, matching the NTP servers used by vCenter to avoid time skew issues).