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Installing Slackware on the RockPro64

	Target
Platform	AArch64/ARM64
Hardware Model	Rock Pro64
Document Version	1.04, Mar 2024
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Video Tutorial

This tutorial is also available in video form.

The video tutorial demonstrates the original installation approach where the Slackware installation media was separate. A single Slackware Installer image is provided that contains all of the media, so it's easier than shown in the video.

Pine64 also provide unboxing and setup videos which you may find useful.

Help / Support

Please post questions to the Slackware ARM forum.

Installation Lifecycle

The Installation consists of a number of distinct stages:

1. Acquiring all required hardware
2. Downloading and verifying the Slackware assets
3. Writing the Initialisation Bootware to the Micro SD card
4. Setup of the RockPro64 hardware
5. Initialising the RockPro64 with the Bootware
6. Writing the Slackware Installer to the Micro SD card
7. Booting the Slackware Installer
8. Installing Slackware
9. Completing the installation
10. Booting the Slackware OS
11. Post installation configuration and tweaks

Requirements

Hardware

Item	Specification	Notes
RockPro64	2GB RAM or 4GB RAM model	-
RockPro64 Power Supply ('PSU')	Pine64's own	There is a cheaper alternative, but this version is recommended. Note that the link here is for the EU version - a US version is also available in the Pine64 store
Micro SD Card	16GB **minimum capacity**, Class 10 (fast speed), good quality make	Used as Slackware's /boot partition
USB Multi-Card Reader	Must accept Micro SD cards	Used to write the Bootware on your host Linux computer. This isn't required if your host computer has a Micro SD card reader.
USB to Serial adapter	PL2303 chip. Other models may work, but this one has been tested. If your model has the option to set voltages, ensure **3volts** is set!	Optional: This document covers installing using an HDMI monitor (you can find information about the Serial/UART adapter at the foot of this document), but a USB to Serial/UART adapter is recommended if you want to access the Boot Loader and Linux tty (serial line) remotely. The serial adapter is also required for developers needing to debug the boot process.
Jumper or Dupont cable	See images below	This is to bridge the pins required for initial firmware deployment and/or Hardware Model recovery
Wifi and Bluetooth module	Pine64's own	Optional
Heat sink and CPU fan	Pine64's own	Either a heat sink or fan are required. Some of the cases have built-in heat sinks, so check the options
SATA power cable	Pine64's own	Optional - depends if you use the SATA PCI card and choose to power the drives from the board (see notes below around stability)
Real Time Clock ('RTC') battery holder	Pine64's own	An RTC is used to keep the time when the Hardware Model is powered down. This is recommended but optional. Time can also be set via NTP once the OS has booted.

Hardware: Storage

This table provides a list of options that have been tested with Slackware AArch64 on the RockPro64 - you only need one storage controller.

Item	Specification	Notes
USB to SATA adapter	Many models will work, but this one has been tested.	For a simple installation you require either storage attached to a USB interface, or using a SATA PCIe card (see below).

Item	Specification	Notes
PCIe dual port SATA 3.0 Interface Card	JMICRON+JMB582	Recommended 2-port SATA card
PCIe quad port SATA 3.0 Interface Card	MZHOU / Marvell chipset	Recommended 4-port SATA card
SATA storage / SSD	The Kingston-SA400S37-240G has thoroughly proved itself in the Slackware ARM build infrastructure - most build machines use these, but any SSD or spinning hard disk should work	Will contain the Operating System. You can install to other storage, but this documentation covers this particular configuration only.

> ⚠ PINE64 have their own dual port PCIe SATA controller but two of them have failed for this author, and as such cannot be recommended. For SATA it's recommended to use one of the two controllers in the table above.

> ⚠ When selecting a USB to SATA adapter it's best to choose one that is powered externally rather than from the USB port.

Notes on storage setup

The setup documented here (2.5“ SSD connected to a USB-to-Serial adapter for power and data) has proven stable for this author.

However, powering spinning 3.5” SATA drives from the RockPro64 directly have resulted in instability of the hardware. This was resolved by powering the drives and CPU fan from an external power supply. The Slackware AArch64 primary build machines run with this power configuration and have proven stable over time.

eMMC

From the factory, your RockPro64 may contain an eMMC storage module. During the development of Slackware AArch64, it was found that the life span of these storage modules is short which makes them inappropriate for housing an Operating System. Whilst it's possible to use eMMC with Slackware, this documented installation process does not provide a supported path and the eMMC should be removed.

Computing / Network Environment

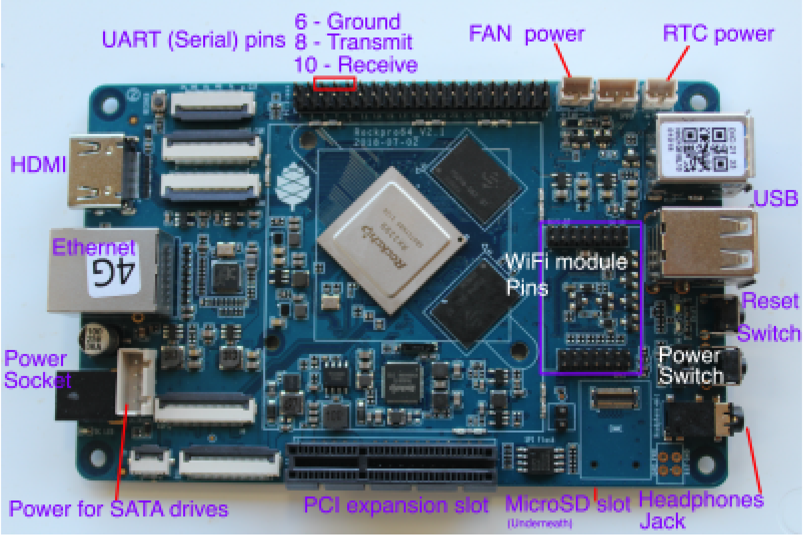
Item	Specification	Notes
Host Computer: an Internet-connected computer running an existing Linux distribution	The Host Computer needs approximately **5GB free storage** to download the required software assets. **You must be able to obtain *root* access to this Host computer**.	This will be used to download the Slackware distribution from the Internet and write the Slackware Installer to the Micro SD card.

Hardware Setup

In this section we'll prepare the physical aspects of the RockPro64 to receive Slackware Linux.

1. Place the computer onto a non-conductive surface ready for setup

If you have a case, install the board into it. If you do not, it should be placed onto a non-conductive surface such as plastic, wood or rubber.



Remove eMMC storage module

In the image above you will see that the eMMC module has been removed (bottom right, left hand side of 'Head phones jack'). See the note above for the reasons behind this.

Gently prize the eMMC module from the board and store it some place safe as you may wish to experiment with it in the future.

If you are planning on using the RockPro64 as an 'embedded' device, the eMMC may be sufficient. However, for a regular OS upon which you will be reading/writing/updating, it has insufficient longevity for this author to recommend its use for Slackware

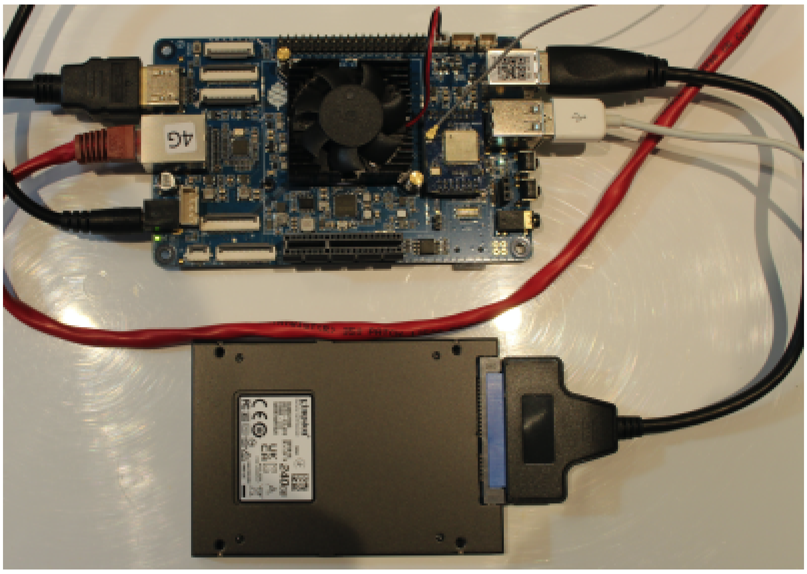
2. Connect the peripherals

- Connect the CPU fan or heat sink

If you prefer hardware rather than software control for the fan over software, check out this video.

- Connect the Wifi & Bluetooth module (optional)
- Connect the storage (the image shows the USB-to-SATA adapter, but you may use the PCI card). If using the USB adapter, connect it to the **blue USB3.0 port**.
- Connect the Ethernet cable
- Connect the HDMI cable
- Connect the USB keyboard and mouse

The basic hardware setup is complete.



Software and Network Environment Setup

In this section, we'll prepare the Linux Host Computer to receive and download the Slackware assets required for the installation.

1. Downloading the Slackware Linux AArch64 Distribution and Installation Assets

The '$' prefixes in the commands indicates the shell prompt - it's not to be typed/copied

Open a shell on the Linux Host Computer.

Prepare a directory to hold and serve the Slackware Distribution

We'll download the Slackware Linux distribution into a directory named 'slackware'.

The contents of this directory will be served via an HTTP server to the LAN (Local Area Network), so only place the Slackware assets here.

```
$ cd ## returns to the root of your home directory
$ mkdir slackware
$ cd slackware
```

Determine where you are within the Host Computer's Filesystem

```
$ pwd
/home/mozes/slackware
```

Note the directory location returned - you'll need this later

Installing the Slackware ARM GPG key

The Slackware ARM GPG key will be used to verify the Bootware and Slackware Installation images.

```
$ curl -sSL https://www.slackware.com/infra/keys/arm/GPG-KEY | gpg --import -
```

Set the version of Slackware AArch64 to download

At the time of writing, the only version available is 'current'.

```
$ SLKVER=current
```

Set the Hardware Model

```
$ HWM=rk3399_generic
```

Set the Internet media distribution server

If you are using a mirror server rather than the master Slackware ARM server, set it here. The format is: <hostname>::<rsync module name>

```
$ SLKSRV=ftp.arm.slackware.com::slackwarearm
```

Download the Bootware

Note the period/full stop after the rsync commands - this instructs rsync to download to the current directory (it's not punctuation!)

The U-Boot Boot Loader that will be installed onto the SPI flash:

```
$ rsync -PavL $SLKSRV/platform/aarch64/bootware/recovery/rk3399/flash-spi-rockpro64.img.xz .
$ rsync -PavL $SLKSRV/platform/aarch64/bootware/recovery/rk3399/flash-spi-rockpro64.img.xz.asc .
```

The Bootware (recovery/initialisation) images are approximately 400KBytes in size.

Download the Slackware Linux Installer

```
$ rsync -PavL $SLKSRV/platform/aarch64/bootware/installer-aio/slackwareaarch64-${SLKVER}/${HWM}.img.xz.asc slkaio.img.xz.asc
$ rsync -PavL $SLKSRV/platform/aarch64/bootware/installer-aio/slackwareaarch64-${SLKVER}/${HWM}.img.xz slkaio.img.xz
```

The Slackware Installer images are approximately 5 GBytes in size.

Verify the Downloads

```
$ gpg --verify-files *.asc
```

The output should be similar to this:

```
gpg: assuming signed data in `flash-spi-rockpro64.img.xz'
gpg: Signature made Fri 27 Jan 2023 08:53:24 AM -00 using RSA key ID 1623FC33
gpg: Good signature from "Slackware ARM (Slackware ARM Linux Project) <mozes@slackware.com>"
gpg: WARNING: This key is not certified with a trusted signature!
gpg:          There is no indication that the signature belongs to the owner.
Primary key fingerprint: 36D3 7609 2F12 9B6B 3D59  A517 F7AB B869 1623 FC33
gpg: assuming signed data in `slkaio.img.xz'
gpg: Signature made Thu 19 Jan 2023 08:34:27 PM -00 using RSA key ID 1623FC33
gpg: Good signature from "Slackware ARM (Slackware ARM Linux Project)
```

```
<mozes@slackware.com>"
gpg: WARNING: This key is not certified with a trusted signature!
gpg:          There is no indication that the signature belongs to the
owner.
Primary key fingerprint: 36D3 7609 2F12 9B6B 3D59  A517 F7AB B869 1623 FC33
```

If you see 'BAD signature' you should re-download as it may have become corrupt. If this doesn't help, drop a note to the Slackware ARM forum

Write the Initialisation Bootware to the SD Card

Slackware stores the U-Boot Boot Loader firmware within the SPI flash of the Hardware Models that use the RK3399 SoC (including the Pinebook Pro, RockPro64 et al).

In this step, we'll write the Boot Loader firmware to the same Micro SD card that will later be used to contain the Slackware Installer, and subsequently the Slackware OS' /boot partition. If you have multiple Micro SD cards available, you may prefer to use separate SD cards; but this document assumes the availability of a single Micro SD card.

Elevate yourself to root

On your Host Computer, obtain root:

The # prefix indicates that you're using the **root** user - it's not to be typed in!

```
$ su -   ## Note the hyphen - it's required
```

Check what block devices are present

Prior to inserting the Micro SD Card into the USB adapter, we need to see what's already present within the OS so that we can easily locate our Micro SD card:

```
# lsblk -d
NAME MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda    8:0    0 465.8G  0 disk
```

As you can see, this Host Computer there is a single storage device - *sda*.

Now insert the Micro SD card into your USB Card Reader and connect the adapter to a free USB port on the Host Computer.

Run lsblk again:

```
# lsblk -d
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda      8:0    0 465.8G  0 disk
sdc      8:32   1    58G  0 disk
sdd      8:48   1     0B  0 disk
```

As you can see, *sdc* is 58GBytes in size. This is the Micro SD card (in this example, it's labeled as '64GB' on the exterior of Micro SD card).

If your Micro SD card has existing partitions, you will not see them surfaced in this list - use *lsblk -b* to view them.

You'll also observe the presence of *sdd* - often the USB adapter itself obtains a block device. You can ignore this as it's 0Bytes.

Write the Bootware Initialisation Image to the Micro SD Card

Still as the **root** user, we'll switch to the directory to which the the Slackware assets have been downloaded (see earlier steps):

```
# cd /home/mozes/slackware/
```

Write the Bootware Initialisation Image to the device identified as our Micro SD card. You'll then exit the root shell, returning to your usual standard user environment:

All data on this Micro SD Card will be erased! Ensure you have inserted the correct card!

```
# dd if=/dev/zero of=/dev/XXX count=10 bs=1M    ## Replace /dev/XXX with the correct block device (presented above by the lsblk tool) on your Host Computer
# xzcat flash-spi-rockpro64.img.xz > /dev/XXX  ## Replace /dev/XXX with the correct block device (presented above by the lsblk tool) on your Host Computer
# sync
```

Remove the Micro SD card from the Host Computer

Now that we've written the Bootware Initialisation Image to the Micro SD card, you need to remove it from the Host Computer.

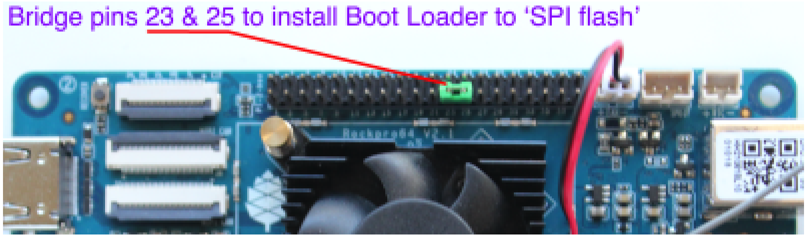
Keep the root shell open as we'll be using it again in the subsequent steps.

Installing the Boot Loader to SPI flash

You need to perform this one-time step to flash a Slackware version of the U-Boot Boot Loader to the SPI flash of the RockPro64.

This is required if your RockPro64 is brand new out of the box, or has previously had another Linux distribution running on it.

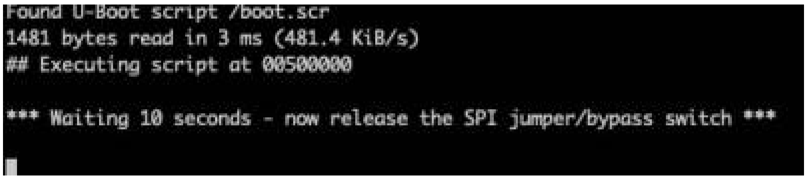
If you reinstall Slackware you do **not** need to repeat this step, as long as the Slackware version of U-Boot remains within the SPI flash.



1. Position the jumper/Dupont cable so that it links pin 23 (SPI_CLK_M2) and pin 25 (GND)
2. Insert the Micro SD card into the RockPro64's Micro SD slot
3. Connect the power to the RockPro64
4. Power on the RockPro64: hold down the Power button for 2 seconds (it may also auto-power on)

Do NOT connect any USB peripherals yet as these tend to cause the flashing process to hang

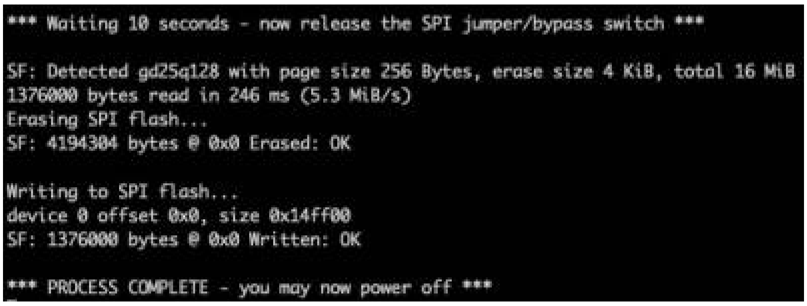
After a few seconds, you should see a message appearing on the screen - instructing you that the process will begin in 10 seconds' time.



```
Found U-Boot script /boot.scr
1481 bytes read in 3 ms (481.4 KiB/s)
## Executing script at 00500000

*** Waiting 10 seconds - now release the SPI jumper/bypass switch ***

```

Now *remove the jumper/Dupont cable*

The flashing process will begin and takes approximately 1 minute to complete.



```
*** Waiting 10 seconds - now release the SPI jumper/bypass switch ***

SF: Detected gd25q128 with page size 256 Bytes, erase size 4 KiB, total 16 MiB
1376000 bytes read in 246 ms (5.3 MiB/s)
Erasing SPI flash...
SF: 4194304 bytes @ 0x0 Erased: OK

Writing to SPI flash...
device 0 offset 0x0, size 0x14ff00
SF: 1376000 bytes @ 0x0 Written: OK

*** PROCESS COMPLETE - you may now power off ***
```

Once the process completes, *hold the power button for approximately **8 seconds***. The RockPro64 will power off.

Write the Slackware Installer image onto the MicroSD card

Now that the Boot Loader has been installed to the RockPro64's SPI flash, we will install the Slackware Installer image onto the same MicroSD card.

- Remove the MicroSD card from the RockPro64
- Insert the MicroSD card back into the Host Computer (as in the earlier section)

Write the Slackware Installer to the Micro SD card

Follow the instructions in the previous section to determine which block device name it occupies.

Typically the block device will remain the same (in this tutorial it's /dev/sdc) but you should verify each time using **lsblk**.

The # prefix indicates that you're using the **root** user - it's not to be typed in!

Enter the directory into which the Slackware assets were downloaded previously:

```
# cd /home/mozes/slackware
# xzcat slkaio.img.xz | dd status=progress bs=4M iflag=fullblock of=/dev/XXX
## Substitute /dev/XXX with the correct block device
# sync
# exit
```

Remove the MicroSD card from the Host Computer

You may now disconnect the USB adapter from the Host Computer and remove the MicroSD card.

Run lsblk again to confirm that the block device assigned to the Micro SD card is no longer present:

```
# lsblk -d
NAME MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda    8:0    0 465.8G  0 disk
```

Logout from the root user

```
# logout
```

You no longer require the Host Computer.

Installing Slackware

To proceed, you must have:

- Connected the storage to the RockPro64
- Connected the HDMI monitor
- Connected the keyboard (and optionally, mouse)
- Inserted the Micro SD card containing the Slackware Installer

Encrypted storage

If you'd like to encrypt your storage, check the Disk Encryption Guide.

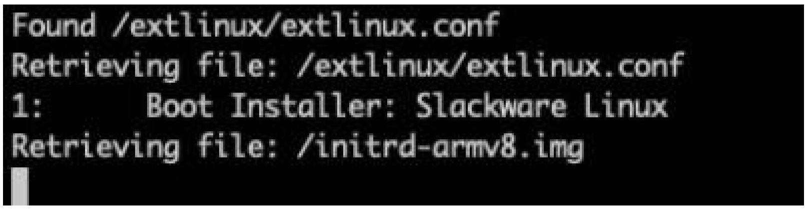
Begin installation

Disconnect any USB storage devices that aren't required for the OS installation

Power on the RockPro64

Press the Power Button for aproximately two seconds

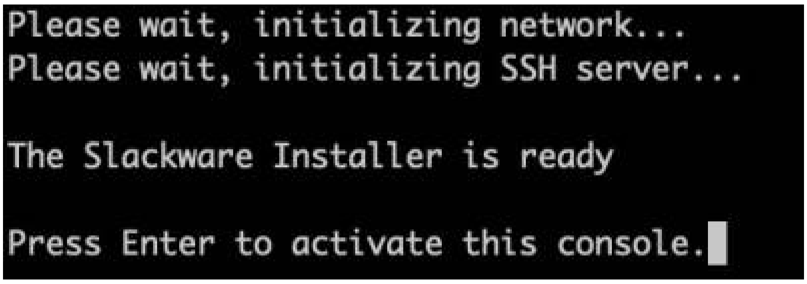
After a few seconds, the you will see the following on screen:



```
Found /extlinux/extlinux.conf
Retrieving file: /extlinux/extlinux.conf
1:      Boot Installer: Slackware Linux
Retrieving file: /initrd-armv8.img
```

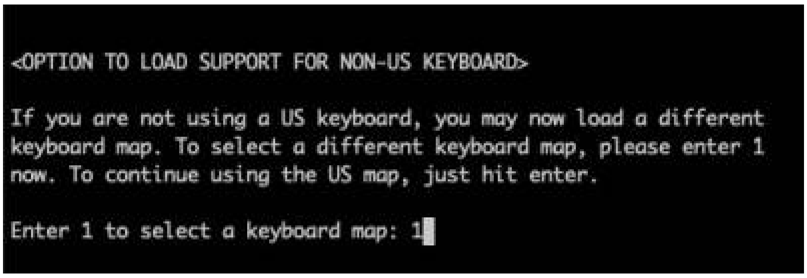
It takes several seconds to load and boot the installer, and it may take several seconds more for any further output to appear on the HDMI monitor. The process of obtaining an IP address via DHCP can also delay the ability to interact with the Installer.

Once an IP address has been obtained, you will be presented with a prompt. Press **ENTER**

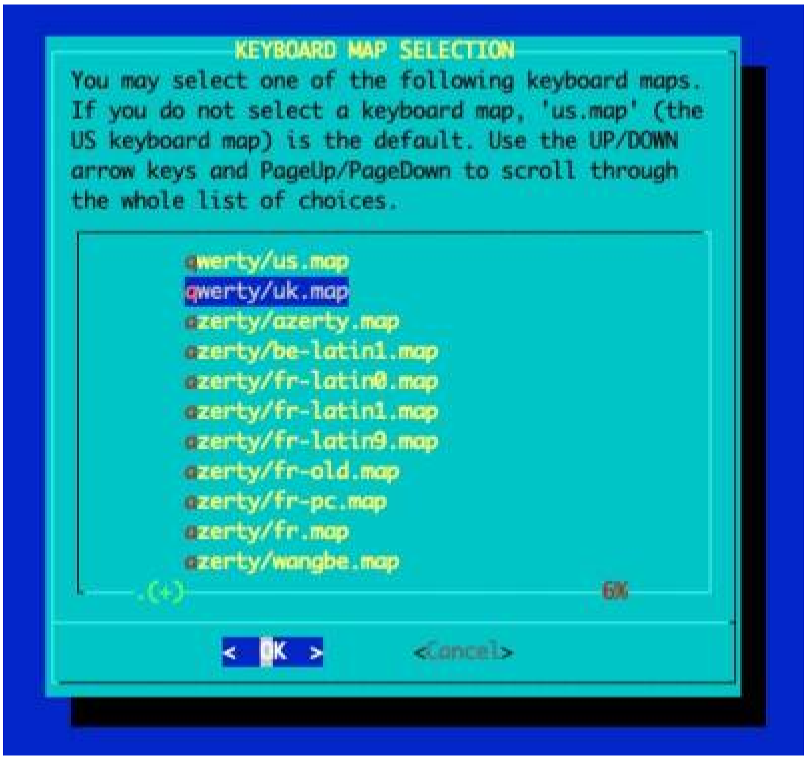


```
Please wait, initializing network...
Please wait, initializing SSH server...

The Slackware Installer is ready

Press Enter to activate this console.
```

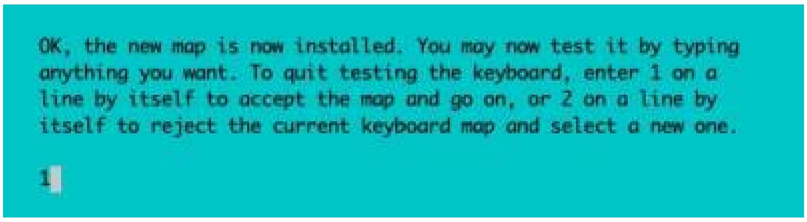
Set the keymap



```
<OPTION TO LOAD SUPPORT FOR NON-US KEYBOARD>

If you are not using a US keyboard, you may now load a different
keyboard map. To select a different keyboard map, please enter 1
now. To continue using the US map, just hit enter.

Enter 1 to select a keyboard map: 1
```



```
KEYBOARD MAP SELECTION
You may select one of the following keyboard maps.
If you do not select a keyboard map, 'us.map' (the
US keyboard map) is the default. Use the UP/DOWN
arrow keys and PageUp/PageDown to scroll through
the whole list of choices.

        qwerty/us.map
        qwerty/uk.map
        azerty/azerty.map
        azerty/be-latin1.map
        azerty/fr-latin0.map
        azerty/fr-latin1.map
        azerty/fr-latin9.map
        azerty/fr-old.map
        azerty/fr-pc.map
        azerty/fr.map
        azerty/wangbe.map
```



```
OK, the new map is now installed. You may now test it by typing
anything you want. To quit testing the keyboard, enter 1 on a
line by itself to accept the map and go on, or 2 on a line by
itself to reject the current keyboard map and select a new one.

1
```

Font size

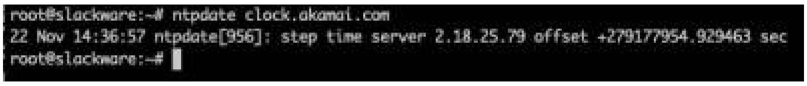
If you're using a smaller monitor, such as one with a screen size less than 20 inches, it may be necessary to adjust the console font size to ensure that menus and other interface elements fit correctly on the screen. If so, type this into the shell prompt:

```
setfont ter-v18n
```

Set the date/time

Even if you have a battery pack for the RTC (Real Time Clock), the date on your system may be incorrect. We will sync the date from a highly-available NTP server:

```
ntpdate clock.akamai.com
hwclock -w
```



```
root@slackware:~# ntpdate clock.akamai.com
22 Nov 14:36:57 ntpdate[956]: step time server 2.18.25.79 offset +279177954.929463 sec
root@slackware:~# 
```

Setup disk partitions

For this installation a basic partitioning scheme will be created.

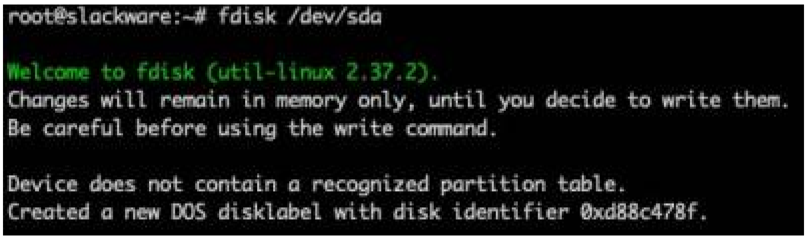
Partition

Partition number	Device name	Size	Purpose
1	/dev/sda1	4GB	Swap
2	/dev/sda2	Rest of storage	OS root ('/') partition

/boot will reside on the Micro SD card and is automatically configured by the Slackware Installer

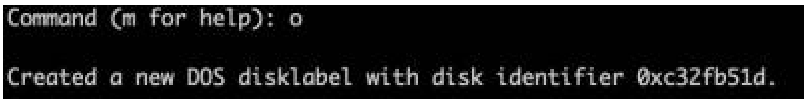
Open fdisk against the /dev/sda block device. In this guide, /dev/sda will be your primary storage, and in this guide is the SSD connected to the USB adapter.

```
fdisk /dev/sda
```



```
root@slackware:~# fdisk /dev/sda

Welcome to fdisk (util-linux 2.37.2).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0xd88c478f.
```

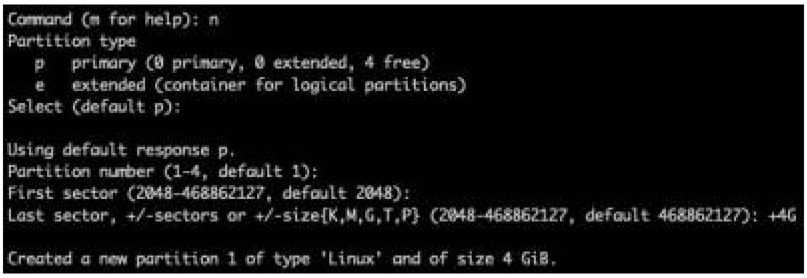
Clear an existing partition table: Press 'o' to clear the partition table



```
Command (m for help): o

Created a new DOS disklabel with disk identifier 0xc32fb51d.
```

Create the Swap partition:

Type 'n' for new partition:



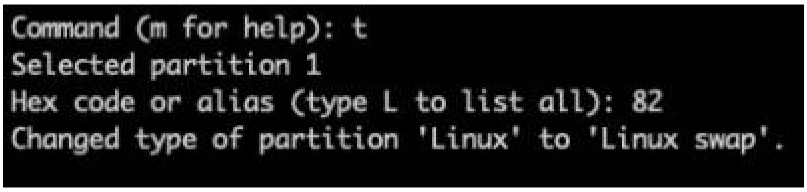
```
Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (1-4, default 1):
First sector (2048-468862127, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-468862127, default 468862127): +4G

Created a new partition 1 of type 'Linux' and of size 4 GiB.
```

Type 'p' for primary partition type:

Press ENTER for the 'First sector'

Type '+4G' for the 'Last Sector'/size:

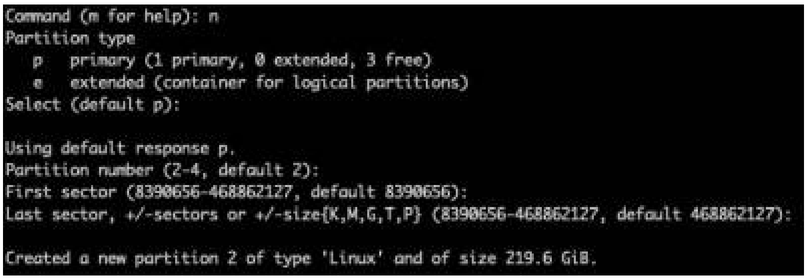
Change the partition type to 'Swap'. Type 't' then hex code '82':



```
Command (m for help): t
Selected partition 1
Hex code or alias (type L to list all): 82
Changed type of partition 'Linux' to 'Linux swap'.
```

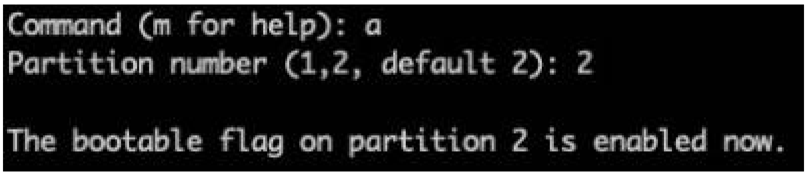
Create the partition for the root filesystem ('/'):

Type 'n' for new partition. Press ENTER to accept the defaults - this will create partition 2 as the maximum size available.



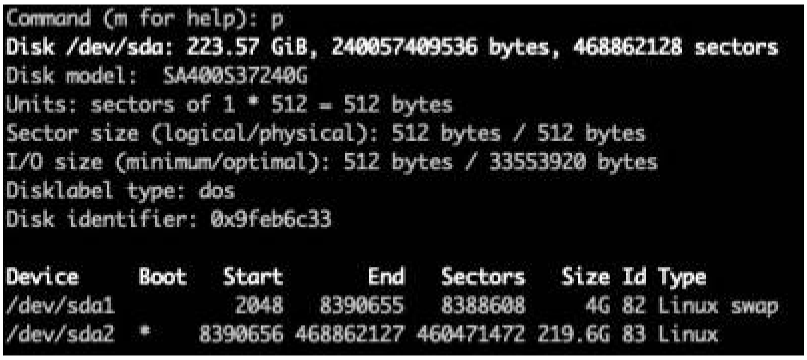
```
Command (m for help): n
Partition type
   p   primary (1 primary, 0 extended, 3 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (2-4, default 2):
First sector (8390656-468862127, default 8390656):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (8390656-468862127, default 468862127):

Created a new partition 2 of type 'Linux' and of size 219.6 GiB.
```

Type 'a' to mark the root partition (number 2) as bootable Type '2' to select partition 2.



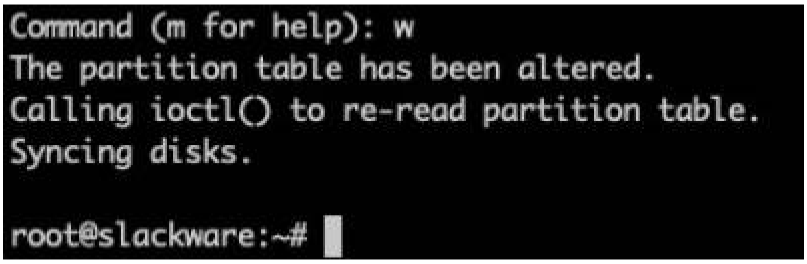
```
Command (m for help): a
Partition number (1,2, default 2): 2

The bootable flag on partition 2 is enabled now.
```

Type 'p' to print to view the partition table.



```
Command (m for help): p
Disk /dev/sda: 223.57 GiB, 240057409536 bytes, 468862128 sectors
Disk model:  SA400S37240G
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 33553920 bytes
Disklabel type: dos
Disk identifier: 0x9feb6c33

Device     Boot   Start       End   Sectors   Size Id Type
/dev/sda1          2048   8390655   8388608     4G 82 Linux swap
/dev/sda2  *    8390656 468862127 460471472 219.6G 83 Linux
```

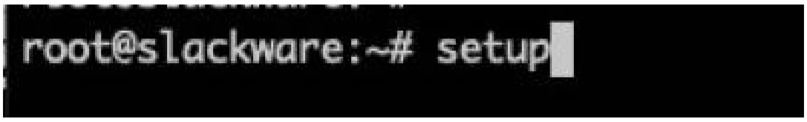
Type 'w' to write the partition table:



```
Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

root@slackware:~#
```

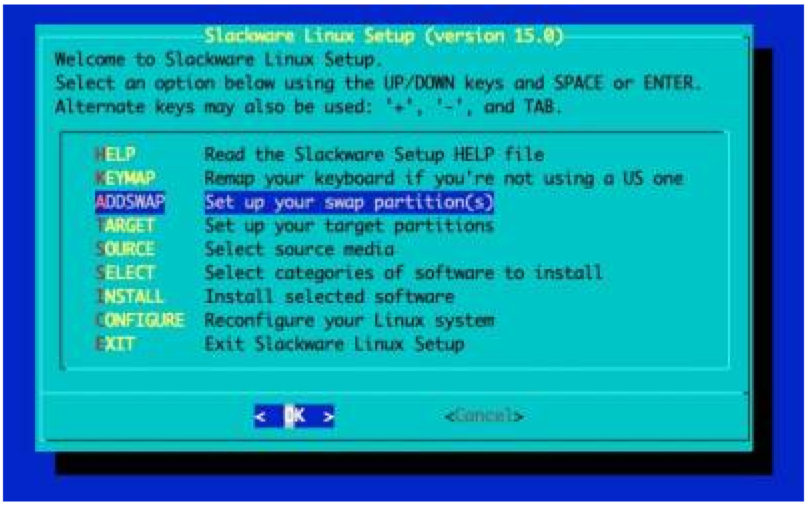
fdisk will now exit.

Load the Setup menu

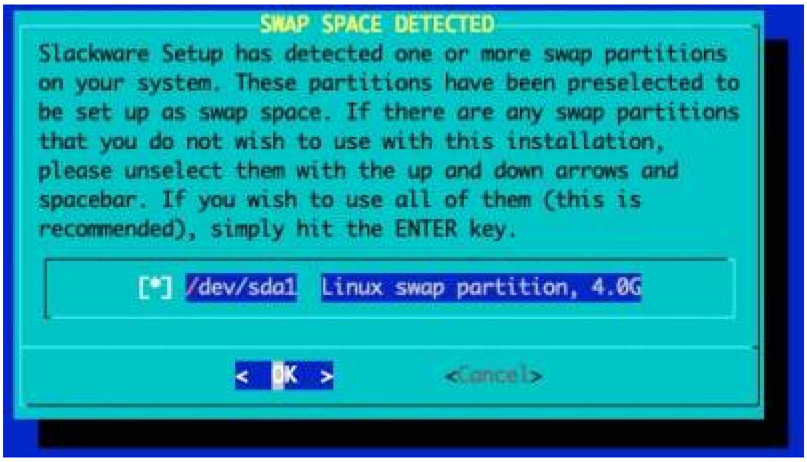


```
root@slackware:~# setup
```

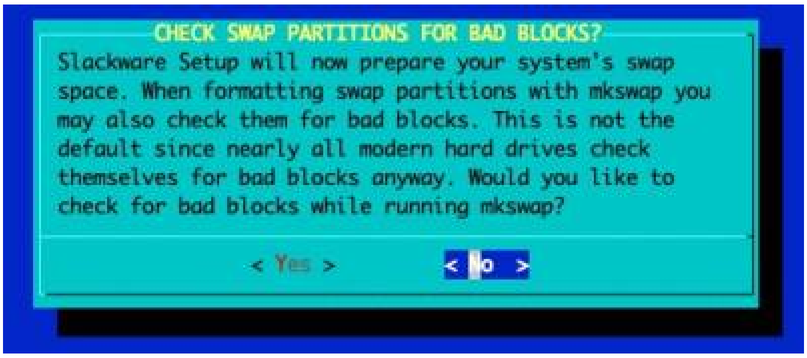
Setup Swap partition



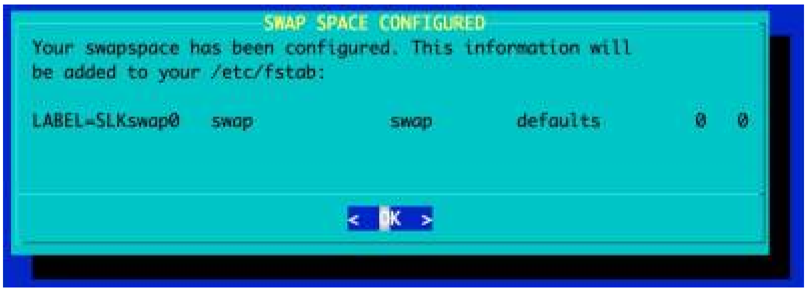
```
Slackware Linux Setup (version 15.0)
Welcome to Slackware Linux Setup.
Select an option below using the UP/DOWN keys and SPACE or ENTER.
Alternate keys may also be used: '+', '-', and TAB.

HELP       Read the Slackware Setup HELP file
KEYMAP     Remap your keyboard if you're not using a US one
ADDSWAP    Set up your swap partition(s)
TARGET     Set up your target partitions
SOURCE     Select source media
SELECT     Select categories of software to install
INSTALL    Install selected software
CONFIGURE  Reconfigure your Linux system
EXIT       Exit Slackware Linux Setup

        <  OK  >          <Cancel>
```



```
SWAP SPACE DETECTED
Slackware Setup has detected one or more swap partitions
on your system. These partitions have been preselected to
be set up as swap space. If there are any swap partitions
that you do not wish to use with this installation,
please unselect them with the up and down arrows and
spacebar. If you wish to use all of them (this is
recommended), simply hit the ENTER key.

[*] /dev/sda1  Linux swap partition, 4.0G

        <  OK  >          <Cancel>
```

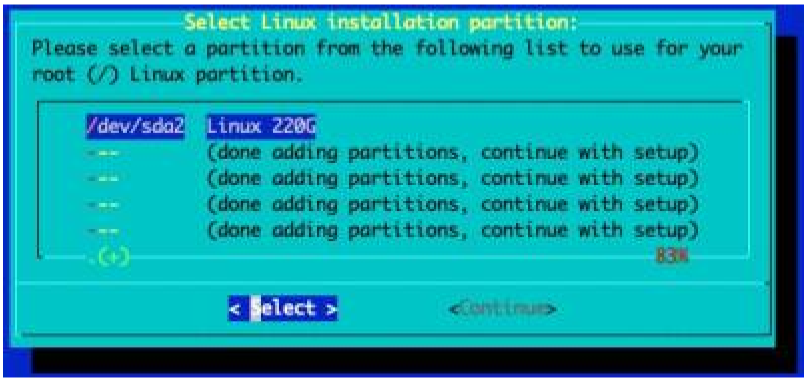


```
CHECK SWAP PARTITIONS FOR BAD BLOCKS?
Slackware Setup will now prepare your system's swap
space. When formatting swap partitions with mkswap you
may also check them for bad blocks. This is not the
default since nearly all modern hard drives check
themselves for bad blocks anyway. Would you like to
check for bad blocks while running mkswap?
```

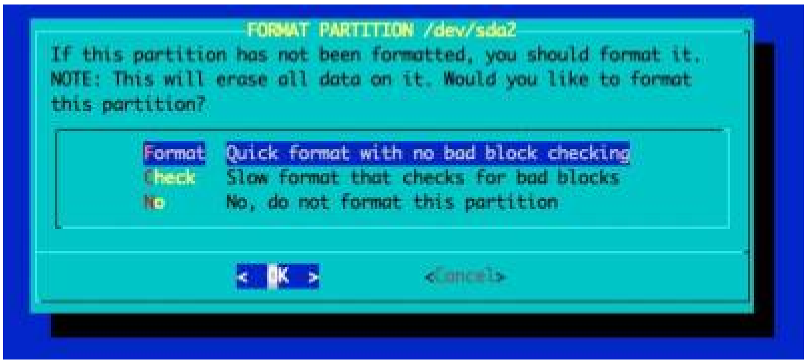


```
SWAP SPACE CONFIGURED
Your swapspace has been configured. This information will
be added to your /etc/fstab:

LABEL=SLKswap0   swap          swap        defaults        0   0
```

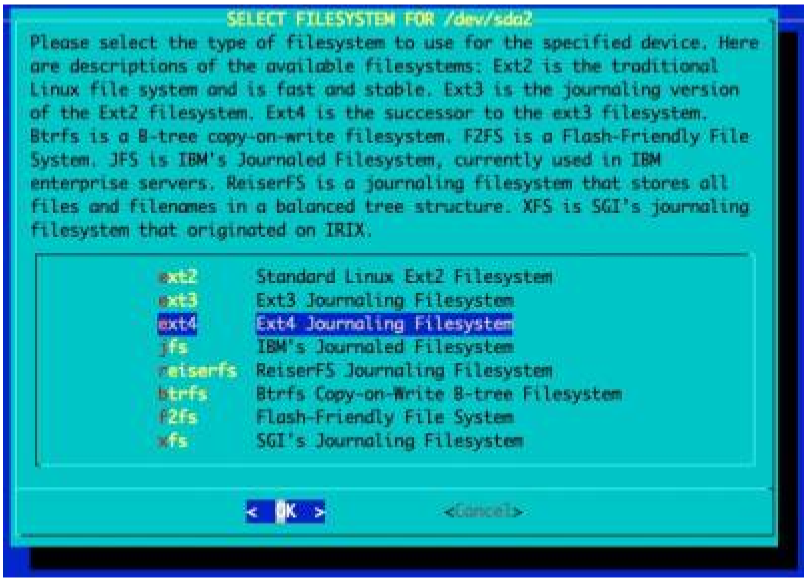
Select and format the partition for the OS' root file system



```
Select Linux installation partition:
Please select a partition from the following list to use for your
root (/) Linux partition.

    /dev/sda2   Linux 220G
    ---         (done adding partitions, continue with setup)
    ---         (done adding partitions, continue with setup)
    ---         (done adding partitions, continue with setup)
    ---         (done adding partitions, continue with setup)
    .(+)                                               83%
```



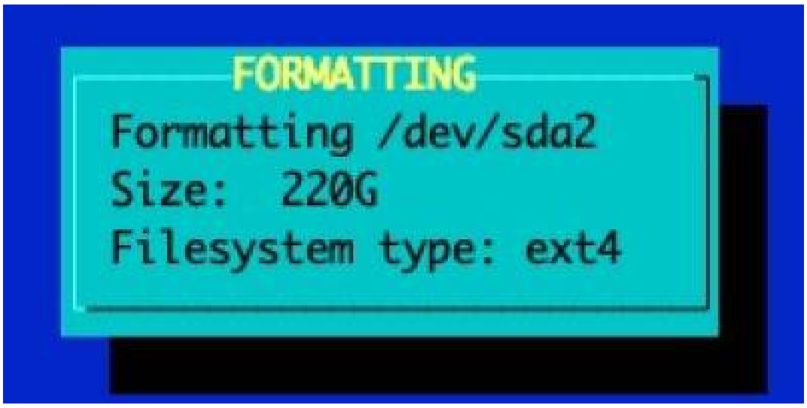
```
FORMAT PARTITION /dev/sda2
If this partition has not been formatted, you should format it.
NOTE: This will erase all data on it. Would you like to format
this partition?

        Format   Quick format with no bad block checking
        Check    Slow format that checks for bad blocks
        No       No, do not format this partition
```



SELECT FILESYSTEM FOR /dev/sda2

Please select the type of filesystem to use for the specified device. Here are descriptions of the available filesystems: Ext2 is the traditional Linux file system and is fast and stable. Ext3 is the journaling version of the Ext2 filesystem. Ext4 is the successor to the ext3 filesystem. Btrfs is a B-tree copy-on-write filesystem. F2FS is a Flash-Friendly File System. JFS is IBM's Journaled Filesystem, currently used in IBM enterprise servers. ReiserFS is a journaling filesystem that stores all files and filenames in a balanced tree structure. XFS is SGI's journaling filesystem that originated on IRIX.

```
ext2      Standard Linux Ext2 Filesystem
ext3      Ext3 Journaling Filesystem
ext4      Ext4 Journaling Filesystem
jfs       IBM's Journaled Filesystem
reiserfs  ReiserFS Journaling Filesystem
btrfs     Btrfs Copy-on-Write B-tree Filesystem
f2fs      Flash-Friendly File System
xfs       SGI's Journaling Filesystem
```

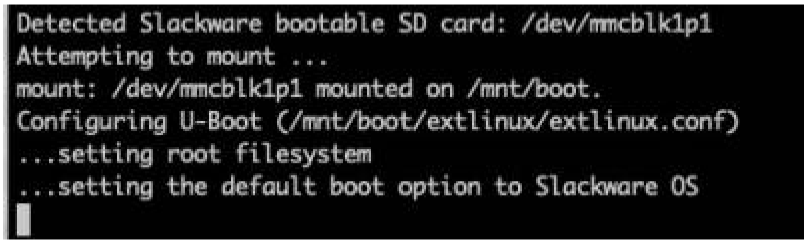


FORMATTING

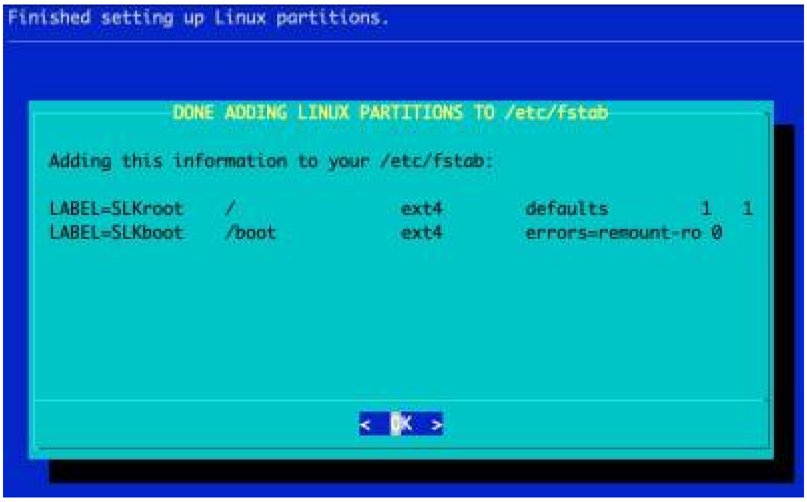
Formatting /dev/sda2
Size: 220G
Filesystem type: ext4

Boot Loader Configuration

The Installer will configure the Boot Loader and the OS' /etc/fstab automatically:



```
Detected Slackware bootable SD card: /dev/mmcblk1p1
Attempting to mount ...
mount: /dev/mmcblk1p1 mounted on /mnt/boot.
Configuring U-Boot (/mnt/boot/extlinux/extlinux.conf)
...setting root filesystem
...setting the default boot option to Slackware OS
```



```
Finished setting up Linux partitions.

DONE ADDING LINUX PARTITIONS TO /etc/fstab

Adding this information to your /etc/fstab:

LABEL=SLKroot    /              ext4      defaults         1   1
LABEL=SLKboot    /boot          ext4      errors=remount-ro 0
```

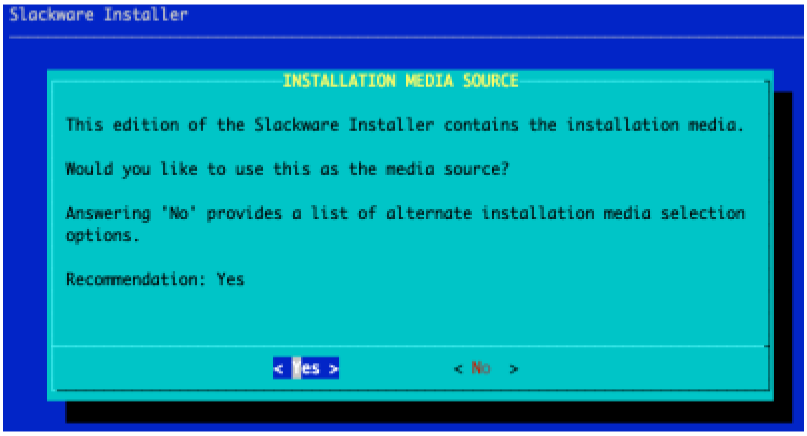
On the ARM platform, the Swap and root file systems are addressed by labels (*see above:* '*LABEL=*') where as on x86/64 it's addressed by a direct reference to the block device (e.g. /dev/sda).

The swap partitions are labeled '*SLKswap<x>*', the root file system '*SLKroot*', and the /boot partition '*SLKboot*'.

The rationale behind this divergence is that on x86 the root file system is typically on a storage bus (SCSI, SATA, ATA), where the physical configuration (which port the storage is connected to) of the storage rarely changes. This can be the case on ARM, but it's generally to a lesser extent and the root file system may be connected to a hot-plug bus such as USB. This lends itself to the risk of device re-ordering across boot cycles (e.g. /dev/sda becomes /dev/sdb), causing boot failure.

Please be aware that the Slackware Installer *only* labels the swap and root file system. Therefore you are advised to manually label the file systems and modify the OS /etc/fstab accordingly. If you have only a single storage device and don't plan on adding more, you can use the settings that the Slackware Installer configures.

Select Source Media



```
Slackware Installer

INSTALLATION MEDIA SOURCE

This edition of the Slackware Installer contains the installation media.

Would you like to use this as the media source?

Answering 'No' provides a list of alternate installation media selection
options.

Recommendation: Yes
```

Press ENTER to say 'Yes'.

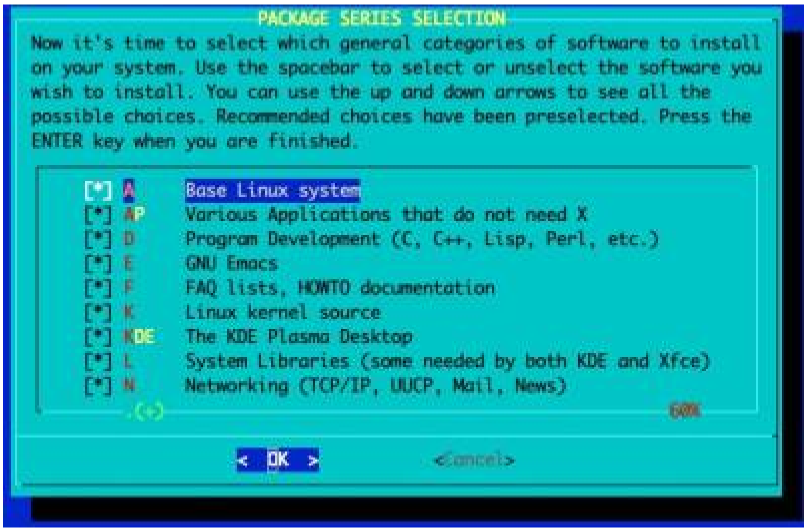
If you would like to install from an alternate media source, pick 'No' and you will be presented with options to install over NFS, USB and HTTP amongst others.

Ordinarily you should always say 'Yes' unless you've been directed to do otherwise.

Package Series Selection

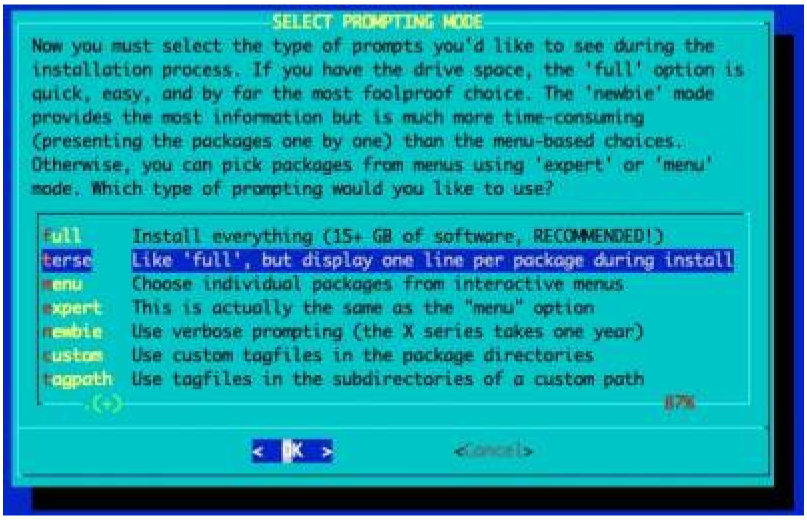
You can now choose the package sets to install. The recommendation is to install everything. A full Slackware installation will occupy approximately 15GB.

If you do not plan to use the graphical window manager such as KDE, you should de-select it.



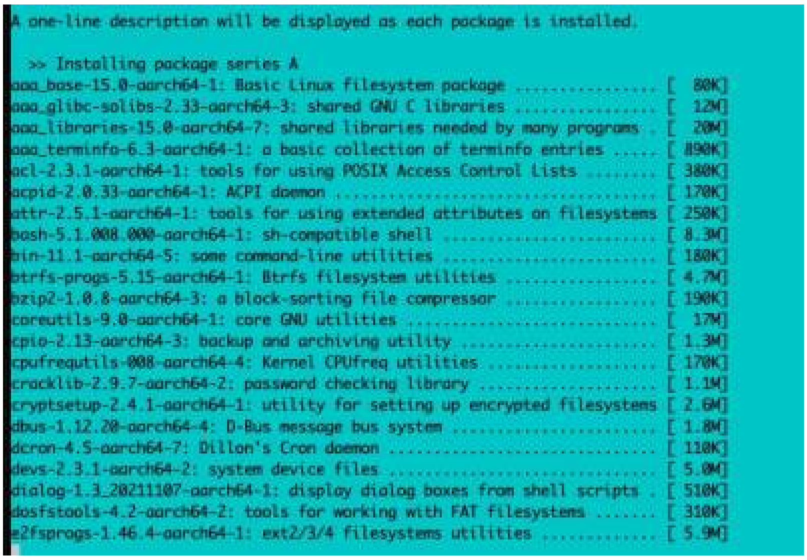
```
                     PACKAGE SERIES SELECTION
 Now it's time to select which general categories of software to install
 on your system. Use the spacebar to select or unselect the software you
 wish to install. You can use the up and down arrows to see all the
 possible choices. Recommended choices have been preselected. Press the
 ENTER key when you are finished.

      [*] A      Base Linux system
      [*] AP     Various Applications that do not need X
      [*] D      Program Development (C, C++, Lisp, Perl, etc.)
      [*] E      GNU Emacs
      [*] F      FAQ lists, HOWTO documentation
      [*] K      Linux kernel source
      [*] KDE    The KDE Plasma Desktop
      [*] L      System Libraries (some needed by both KDE and Xfce)
      [*] N      Networking (TCP/IP, UUCP, Mail, News)
        .(+)                                                    60%

                  <  OK  >           <Cancel>
```

Pick the 'terse' option:



```
                      SELECT PROMPTING MODE
 Now you must select the type of prompts you'd like to see during the
 installation process. If you have the drive space, the 'full' option is
 quick, easy, and by far the most foolproof choice. The 'newbie' mode
 provides the most information but is much more time-consuming
 (presenting the packages one by one) than the menu-based choices.
 Otherwise, you can pick packages from menus using 'expert' or 'menu'
 mode. Which type of prompting would you like to use?

 full     Install everything (15+ GB of software, RECOMMENDED!)
 terse    Like 'full', but display one line per package during install
 menu     Choose individual packages from interactive menus
 expert   This is actually the same as the "menu" option
 newbie   Use verbose prompting (the X series takes one year)
 custom   Use custom tagfiles in the package directories
 tagpath  Use tagfiles in the subdirectories of a custom path
     .(+)                                                      87%

                  <  OK  >           <Cancel>
```

The packages will begin installing:

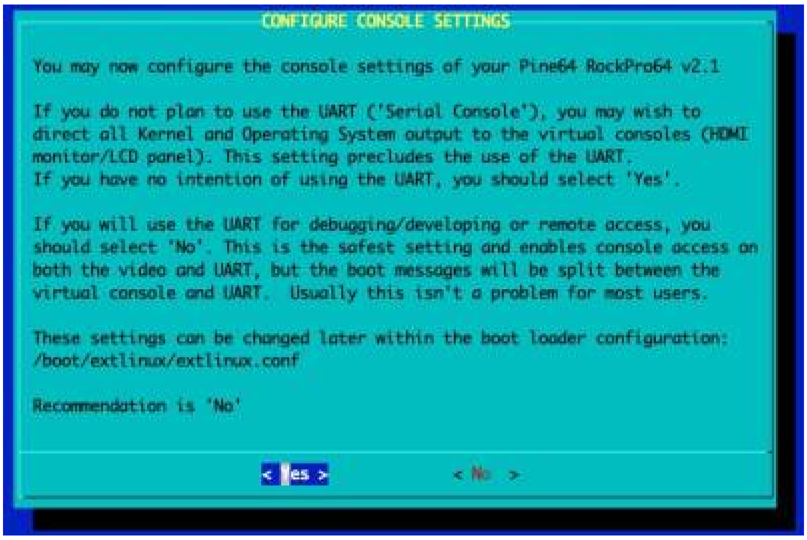


```
A one-line description will be displayed as each package is installed.

  >> Installing package series A
aaa_base-15.0-aarch64-1: Basic Linux filesystem package ................. [  80K]
aaa_glibc-solibs-2.33-aarch64-3: shared GNU C libraries ................. [  12M]
aaa_libraries-15.0-aarch64-7: shared libraries needed by many programs .. [  20M]
aaa_terminfo-6.3-aarch64-1: a basic collection of terminfo entries ...... [ 890K]
acl-2.3.1-aarch64-1: tools for using POSIX Access Control Lists ......... [ 380K]
acpid-2.0.33-aarch64-1: ACPI daemon ..................................... [ 170K]
attr-2.5.1-aarch64-1: tools for using extended attributes on filesystems [ 250K]
bash-5.1.008.000-aarch64-1: sh-compatible shell ......................... [ 8.3M]
bin-11.1-aarch64-5: some command-line utilities ......................... [ 180K]
btrfs-progs-5.15-aarch64-1: Btrfs filesystem utilities .................. [ 4.7M]
bzip2-1.0.8-aarch64-3: a block-sorting file compressor .................. [ 190K]
coreutils-9.0-aarch64-1: core GNU utilities ............................. [  17M]
cpio-2.13-aarch64-3: backup and archiving utility ....................... [ 1.3M]
cpufrequtils-008-aarch64-4: Kernel CPUfreq utilities .................... [ 170K]
cracklib-2.9.7-aarch64-2: password checking library ..................... [ 1.1M]
cryptsetup-2.4.1-aarch64-1: utility for setting up encrypted filesystems [ 2.0M]
dbus-1.12.20-aarch64-4: D-Bus message bus system ........................ [ 1.8M]
dcron-4.5-aarch64-7: Dillon's Cron daemon ............................... [ 110K]
devs-2.3.1-aarch64-2: system device files ............................... [ 5.0M]
dialog-1.3_20211107-aarch64-1: display dialog boxes from shell scripts . [ 510K]
dosfstools-4.2-aarch64-2: tools for working with FAT filesystems ....... [ 310K]
e2fsprogs-1.46.4-aarch64-1: ext2/3/4 filesystems utilities .............. [ 5.9M]
```

Configure the Console Settings

If you plan on using the UART/'Serial' console, you should select 'No' here. If you plan on exclusively using an HDMI monitor, you should pick 'Yes'.

This setting can be reset to the default by editing /boot/extlinux/extlinux.conf and removing the 'console=' setting once the OS has booted

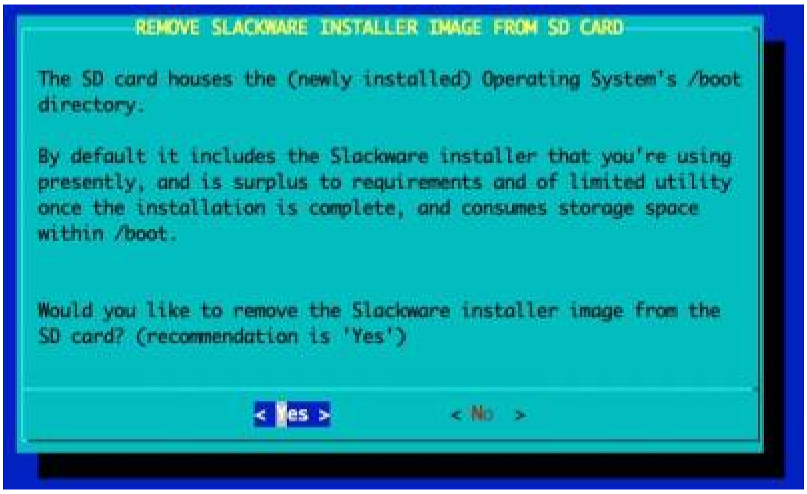


```
CONFIGURE CONSOLE SETTINGS

You may now configure the console settings of your Pine64 RockPro64 v2.1

If you do not plan to use the UART ('Serial Console'), you may wish to
direct all Kernel and Operating System output to the virtual consoles (HDMI
monitor/LCD panel). This setting precludes the use of the UART.
If you have no intention of using the UART, you should select 'Yes'.

If you will use the UART for debugging/developing or remote access, you
should select 'No'. This is the safest setting and enables console access on
both the video and UART, but the boot messages will be split between the
virtual console and UART.  Usually this isn't a problem for most users.

These settings can be changed later within the boot loader configuration:
/boot/extlinux/extlinux.conf

Recommendation is 'No'
```

Remove the Slackware Installer from the SD card

The Micro SD card is transformed from being the Slackware Installer into the Slackware OS's /boot partition. At this stage, if the installation has worked for you (at certain points in the Slackware installer you are past the point of no return) you can delete the Installer. However, if something has gone wrong you can reset the RockPro64 and reboot the installer without having to re-deploy the Slackware Installer image from your Linux Host Computer.

Generally you should say 'Yes' here.



REMOVE SLACKWARE INSTALLER IMAGE FROM SD CARD

The SD card houses the (newly installed) Operating System's /boot directory.

By default it includes the Slackware installer that you're using presently, and is surplus to requirements and of limited utility once the installation is complete, and consumes storage space within /boot.

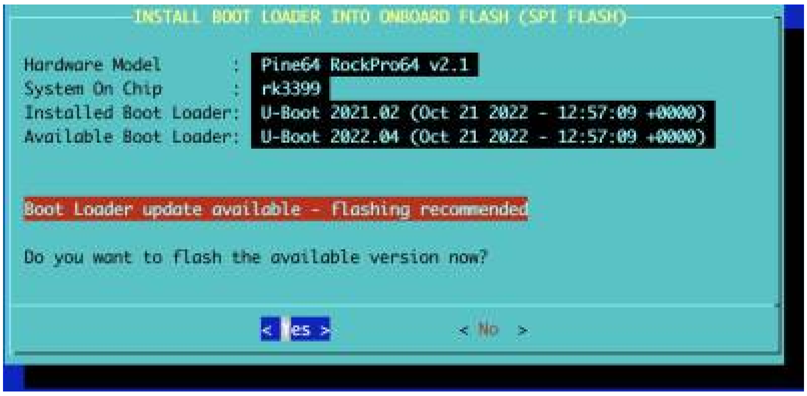
Would you like to remove the Slackware installer image from the SD card? (recommendation is 'Yes')

You may be tempted to retain the Slackware Installer, but note that the Installer contains Linux Kernel modules for the Kernel that the Installer was originally shipped with. This means that as soon as you upgrade the Slackware Kernel package, the Installer will fail to boot. The option to retain the Installer is present purely because on a number of occasions, this author only realised that the installation was incorrectly performed upon completion, and needed to reinstall. Retaining the Installer avoids the requirement to re-deploy the image to the SD card.

Install the Boot Loader to SPI flash

The initial Boot Loader flash performed earlier in these instructions typically contains an older version of the Boot Loader, where as the version packaged within the Installer contains the most recent version.

When an upgrade is required, in most cases you'll see a screen like this which provides information about the currently installed Boot Loader and the newer version available:



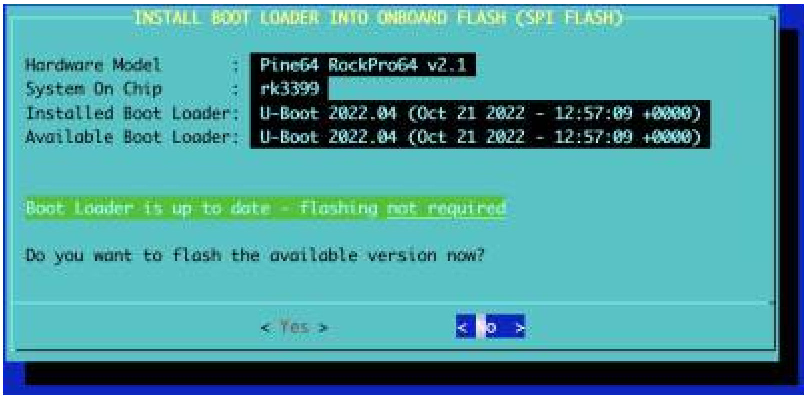
INSTALL BOOT LOADER INTO ONBOARD FLASH (SPI FLASH)

```
Hardware Model        : Pine64 RockPro64 v2.1
System On Chip        : rk3399
Installed Boot Loader: U-Boot 2021.02 (Oct 21 2022 - 12:57:09 +0000)
Available Boot Loader: U-Boot 2022.04 (Oct 21 2022 - 12:57:09 +0000)
```

Boot Loader update available - flashing recommended

Do you want to flash the available version now?

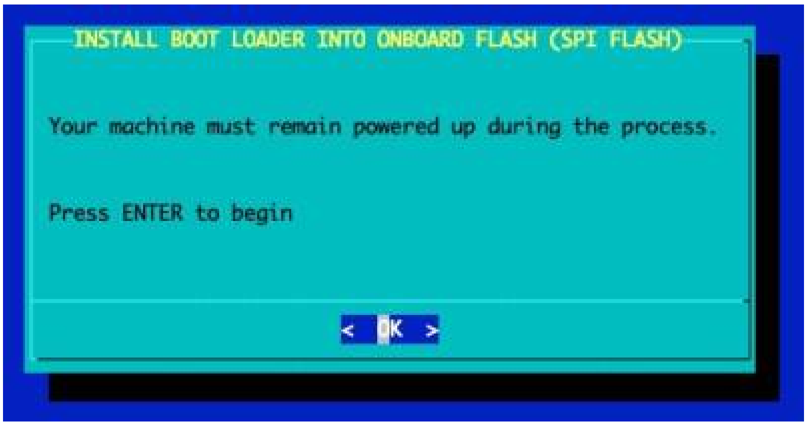
If the installed Boot Loader matches the currently available version, you will be advised that flashing is unnecessary. However, you can re-flash it if you wish.



```
Hardware Model       : Pine64 RockPro64 v2.1
System On Chip       : rk3399
Installed Boot Loader: U-Boot 2022.04 (Oct 21 2022 - 12:57:09 +0000)
Available Boot Loader: U-Boot 2022.04 (Oct 21 2022 - 12:57:09 +0000)

Boot Loader is up to date - flashing not required

Do you want to flash the available version now?
```

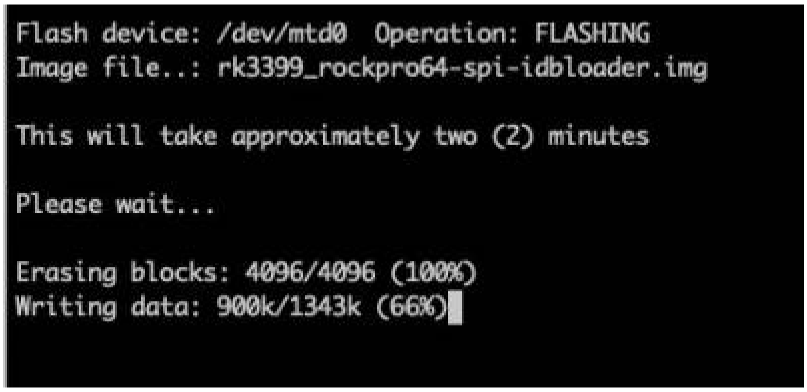
If you proceed with flashing, the work flow looks like this and takes approximately two minutes to complete.

You must ensure the system has sufficient power/is plugged in. If the machine powers off before flashing completes, you would need to re-flash using the bootable SD card as described earlier within this guide.

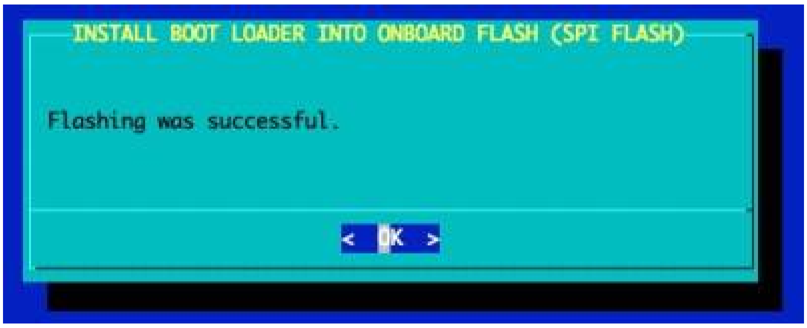


Your machine must remain powered up during the process.

Press ENTER to begin



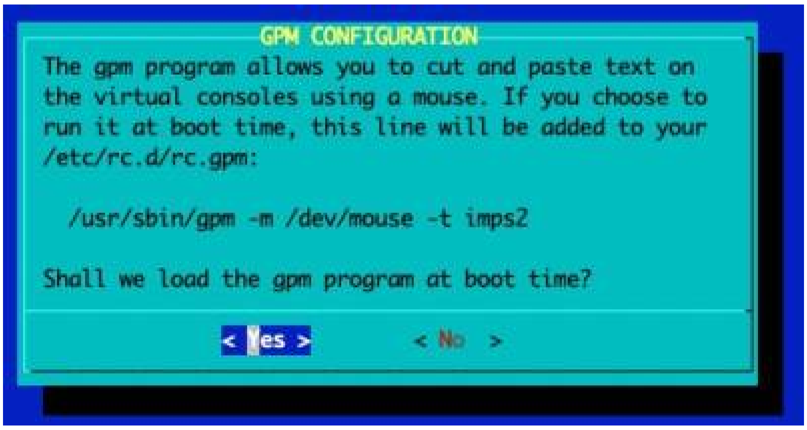
```
Flash device: /dev/mtd0  Operation: FLASHING
Image file..: rk3399_rockpro64-spi-idbloader.img

This will take approximately two (2) minutes

Please wait...

Erasing blocks: 4096/4096 (100%)
Writing data: 900k/1343k (66%)
```



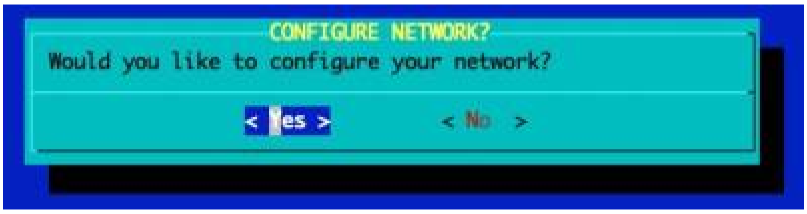
Flashing was successful.

Post Installation Configuration

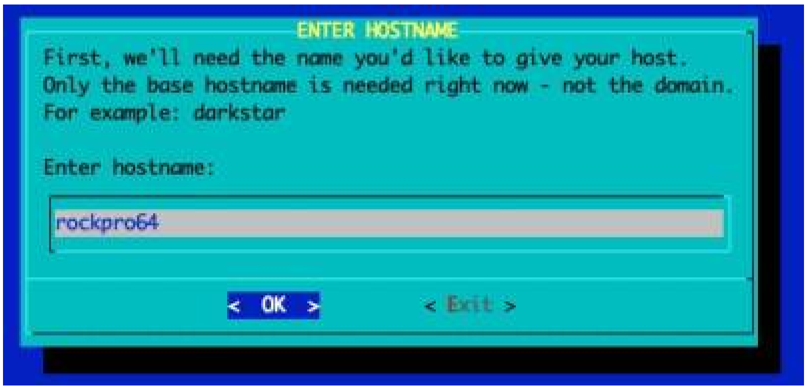
The Slackware Installer will walk you through the standard Slackware setup. The on-screen instructions will suffice.



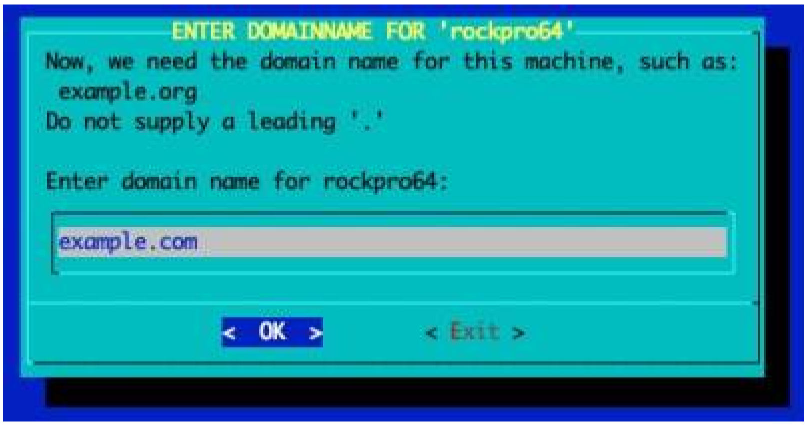
```
GPM CONFIGURATION
The gpm program allows you to cut and paste text on
the virtual consoles using a mouse. If you choose to
run it at boot time, this line will be added to your
/etc/rc.d/rc.gpm:

  /usr/sbin/gpm -m /dev/mouse -t imps2

Shall we load the gpm program at boot time?
```



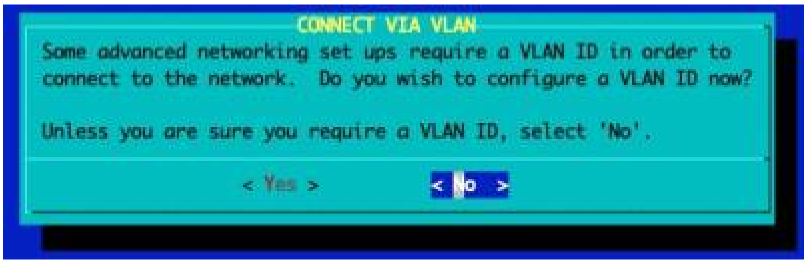
```
CONFIGURE NETWORK?
Would you like to configure your network?
```



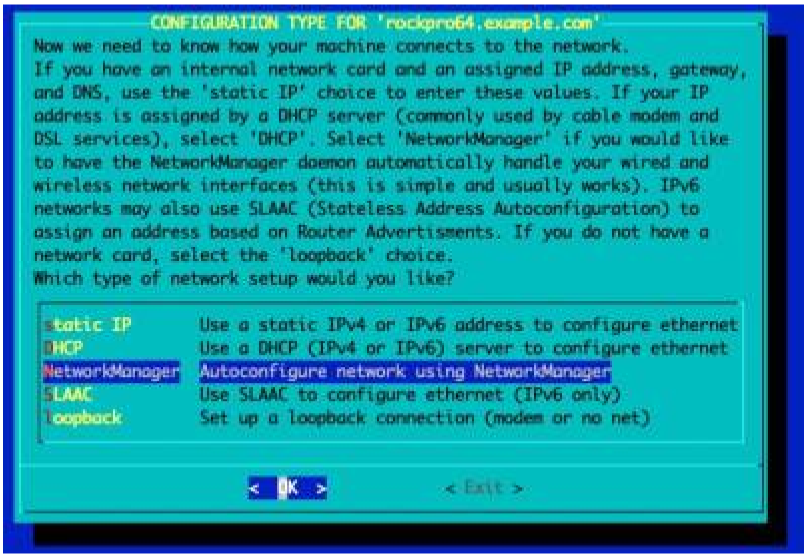
```
ENTER HOSTNAME
First, we'll need the name you'd like to give your host.
Only the base hostname is needed right now - not the domain.
For example: darkstar

Enter hostname:

rockpro64
```



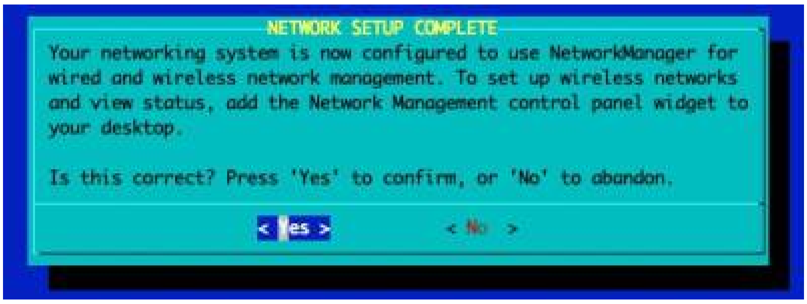
```
ENTER DOMAINNAME FOR 'rockpro64'
Now, we need the domain name for this machine, such as:
 example.org
Do not supply a leading '.'

Enter domain name for rockpro64:

example.com
```



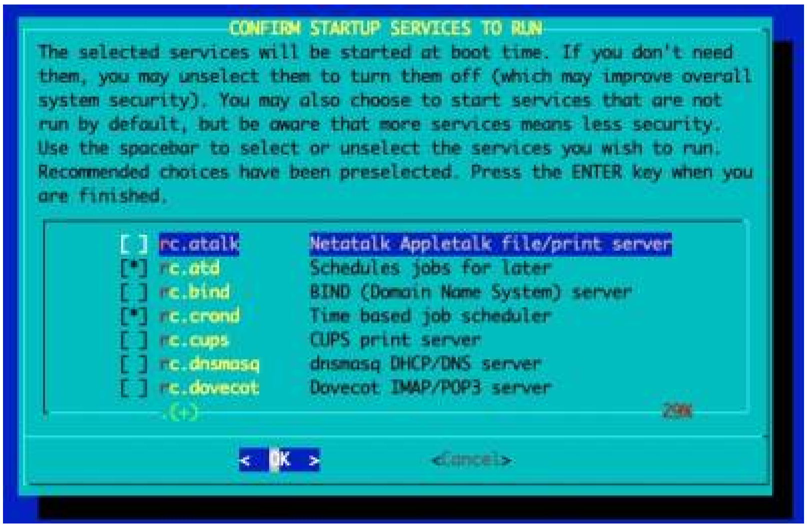
```
CONNECT VIA VLAN
Some advanced networking set ups require a VLAN ID in order to
connect to the network.  Do you wish to configure a VLAN ID now?

Unless you are sure you require a VLAN ID, select 'No'.
```



```
CONFIGURATION TYPE FOR 'rockpro64.example.com'
Now we need to know how your machine connects to the network.
If you have an internal network card and an assigned IP address, gateway,
and DNS, use the 'static IP' choice to enter these values. If your IP
address is assigned by a DHCP server (commonly used by cable modem and
DSL services), select 'DHCP'. Select 'NetworkManager' if you would like
to have the NetworkManager daemon automatically handle your wired and
wireless network interfaces (this is simple and usually works). IPv6
networks may also use SLAAC (Stateless Address Autoconfiguration) to
assign an address based on Router Advertisments. If you do not have a
network card, select the 'loopback' choice.
Which type of network setup would you like?

static IP       Use a static IPv4 or IPv6 address to configure ethernet
DHCP            Use a DHCP (IPv4 or IPv6) server to configure ethernet
NetworkManager  Autoconfigure network using NetworkManager
SLAAC           Use SLAAC to configure ethernet (IPv6 only)
loopback        Set up a loopback connection (modem or no net)
```



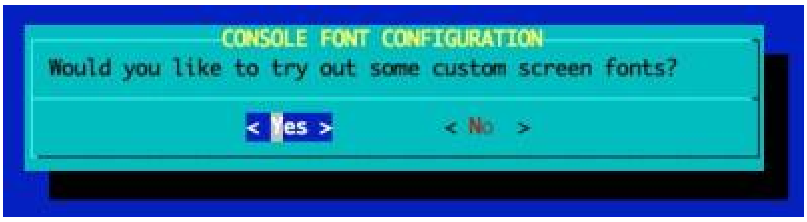
```
NETWORK SETUP COMPLETE
Your networking system is now configured to use NetworkManager for
wired and wireless network management. To set up wireless networks
and view status, add the Network Management control panel widget to
your desktop.

Is this correct? Press 'Yes' to confirm, or 'No' to abandon.
```



```
CONFIRM STARTUP SERVICES TO RUN
The selected services will be started at boot time. If you don't need
them, you may unselect them to turn them off (which may improve overall
system security). You may also choose to start services that are not
run by default, but be aware that more services means less security.
Use the spacebar to select or unselect the services you wish to run.
Recommended choices have been preselected. Press the ENTER key when you
are finished.

        [ ] rc.atalk       Netatalk Appletalk file/print server
        [*] rc.atd         Schedules jobs for later
        [ ] rc.bind        BIND (Domain Name System) server
        [*] rc.crond       Time based job scheduler
        [ ] rc.cups        CUPS print server
        [ ] rc.dnsmasq     dnsmasq DHCP/DNS server
        [ ] rc.dovecot     Dovecot IMAP/POP3 server
            (+)                                           29%
```

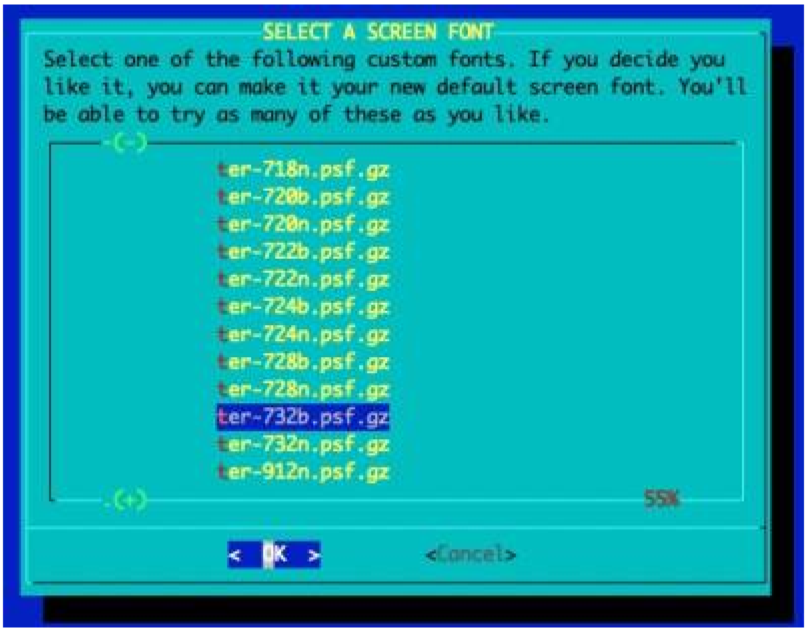
Select a Console Font

It's recommended for the RockPro64 and Pinebook Pro that a larger console font is configured.



CONSOLE FONT CONFIGURATION

Would you like to try out some custom screen fonts?

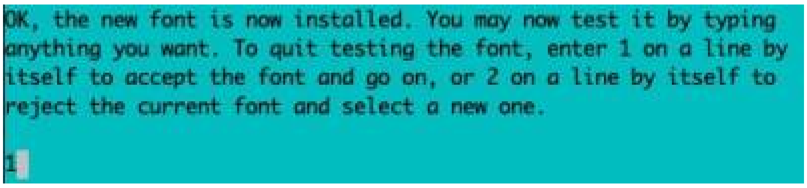


SELECT A SCREEN FONT

Select one of the following custom fonts. If you decide you like it, you can make it your new default screen font. You'll be able to try as many of these as you like.

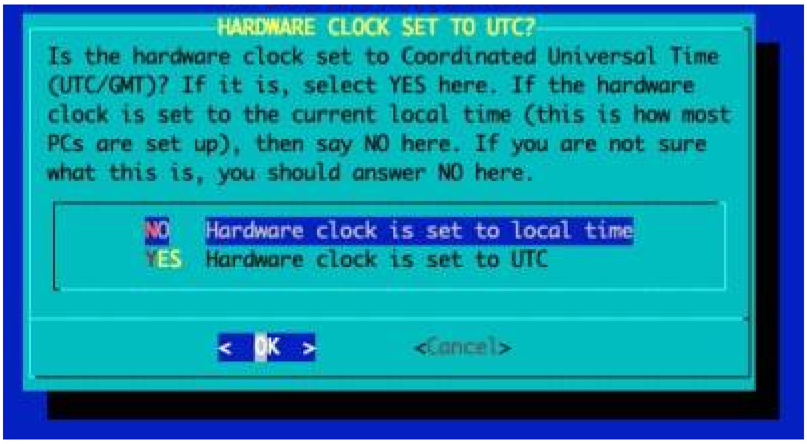
```
ter-718n.psf.gz
ter-720b.psf.gz
ter-720n.psf.gz
ter-722b.psf.gz
ter-722n.psf.gz
ter-724b.psf.gz
ter-724n.psf.gz
ter-728b.psf.gz
ter-728n.psf.gz
ter-732b.psf.gz
ter-732n.psf.gz
ter-912n.psf.gz
```

The recommended font is 'ter-732b.psf'. This is the font used within the Installer.



```
OK, the new font is now installed. You may now test it by typing
anything you want. To quit testing the font, enter 1 on a line by
itself to accept the font and go on, or 2 on a line by itself to
reject the current font and select a new one.

1
```

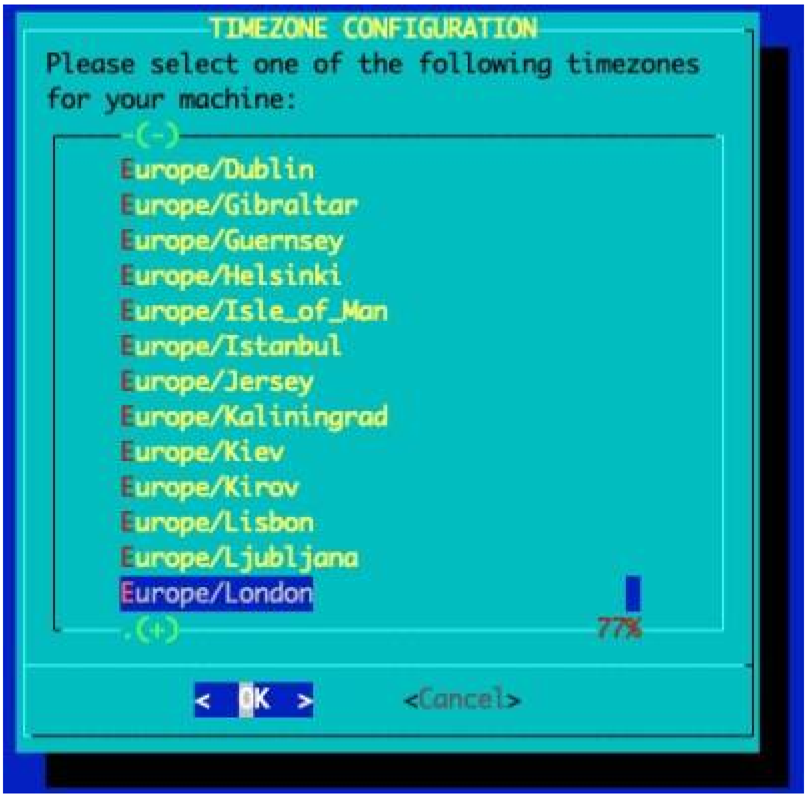
Continue Post Installation Configuration



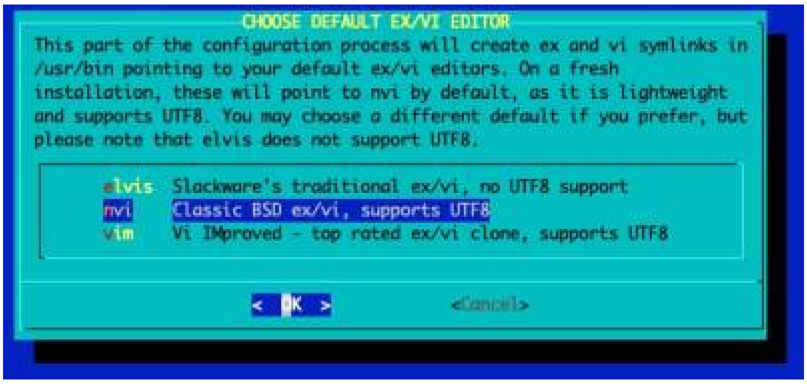
HARDWARE CLOCK SET TO UTC?

Is the hardware clock set to Coordinated Universal Time (UTC/GMT)? If it is, select YES here. If the hardware clock is set to the current local time (this is how most PCs are set up), then say NO here. If you are not sure what this is, you should answer NO here.

```
NO   Hardware clock is set to local time
YES  Hardware clock is set to UTC
```



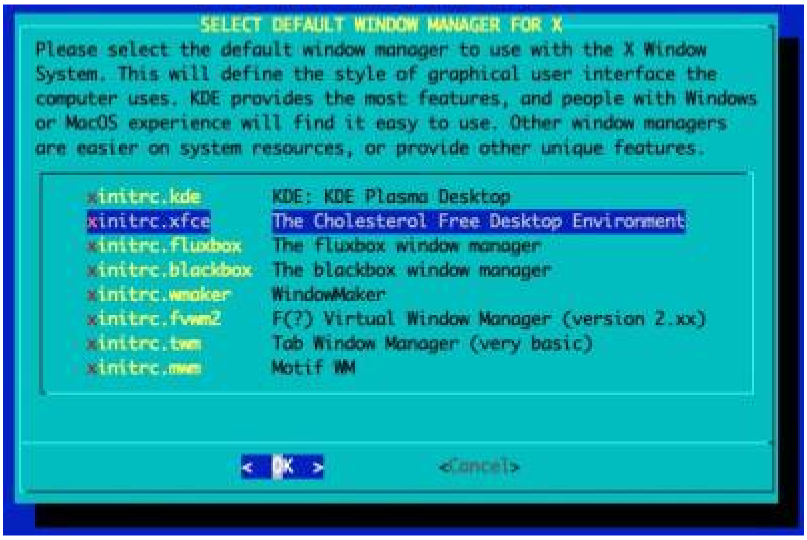
```
TIMEZONE CONFIGURATION
Please select one of the following timezones
for your machine:
-(-)
  Europe/Dublin
  Europe/Gibraltar
  Europe/Guernsey
  Europe/Helsinki
  Europe/Isle_of_Man
  Europe/Istanbul
  Europe/Jersey
  Europe/Kaliningrad
  Europe/Kiev
  Europe/Kirov
  Europe/Lisbon
  Europe/Ljubljana
  Europe/London
.(+)                                  77%
```



```
CHOOSE DEFAULT EX/VI EDITOR
This part of the configuration process will create ex and vi symlinks in
/usr/bin pointing to your default ex/vi editors. On a fresh
installation, these will point to nvi by default, as it is lightweight
and supports UTF8. You may choose a different default if you prefer, but
please note that elvis does not support UTF8.

    elvis  Slackware's traditional ex/vi, no UTF8 support
    nvi    Classic BSD ex/vi, supports UTF8
    vim    Vi IMproved - top rated ex/vi clone, supports UTF8
```

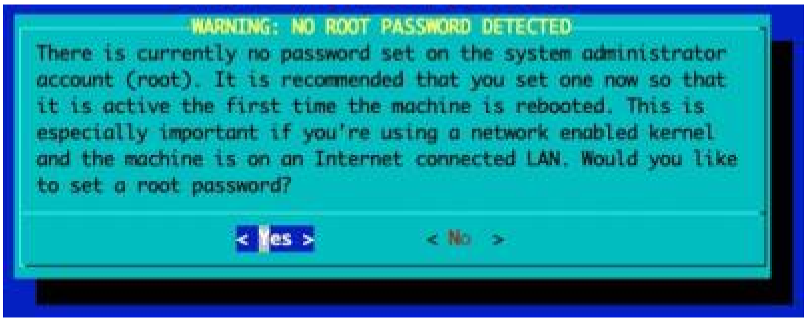
Configure GUI Window Manager

This author recommends using XFCE as it's light weight versus KDE.



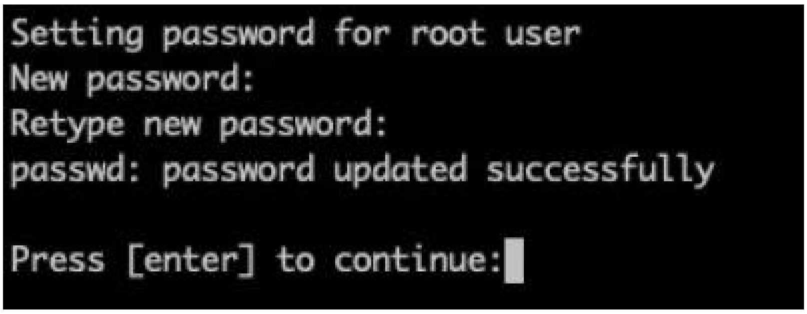
```
SELECT DEFAULT WINDOW MANAGER FOR X
Please select the default window manager to use with the X Window
System. This will define the style of graphical user interface the
computer uses. KDE provides the most features, and people with Windows
or MacOS experience will find it easy to use. Other window managers
are easier on system resources, or provide other unique features.

    xinitrc.kde        KDE: KDE Plasma Desktop
    xinitrc.xfce       The Cholesterol Free Desktop Environment
    xinitrc.fluxbox    The fluxbox window manager
    xinitrc.blackbox   The blackbox window manager
    xinitrc.wmaker     WindowMaker
    xinitrc.fvwm2      F(?) Virtual Window Manager (version 2.xx)
    xinitrc.twm        Tab Window Manager (very basic)
    xinitrc.mwm        Motif WM
```

Continue Post Installation Configuration



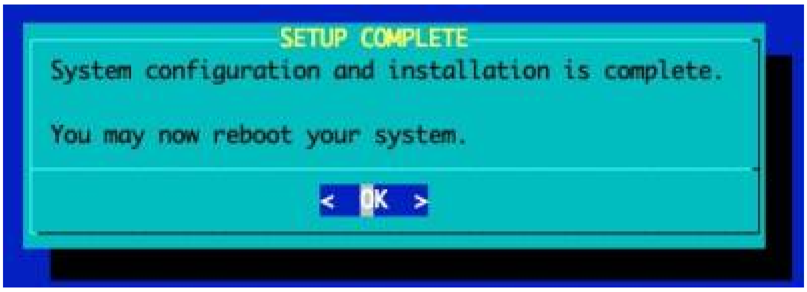
WARNING: NO ROOT PASSWORD DETECTED

There is currently no password set on the system administrator account (root). It is recommended that you set one now so that it is active the first time the machine is rebooted. This is especially important if you're using a network enabled kernel and the machine is on an Internet connected LAN. Would you like to set a root password?



```
Setting password for root user
New password:
Retype new password:
passwd: password updated successfully

Press [enter] to continue:
```

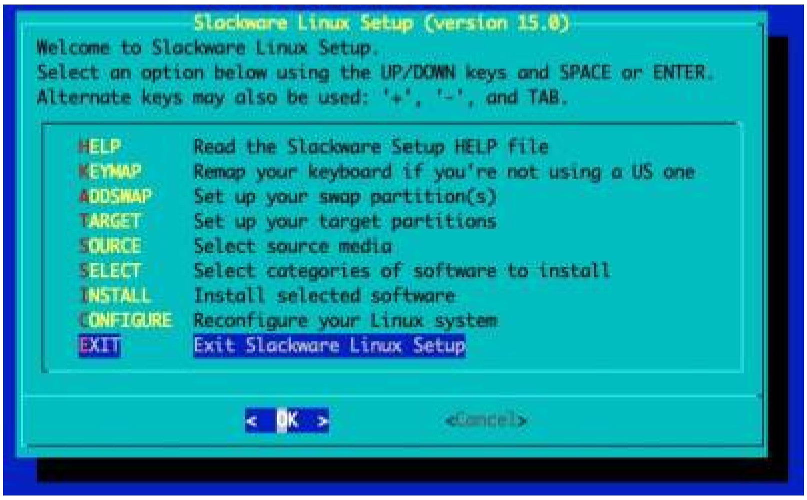
Slackware Setup Complete



SETUP COMPLETE

System configuration and installation is complete.

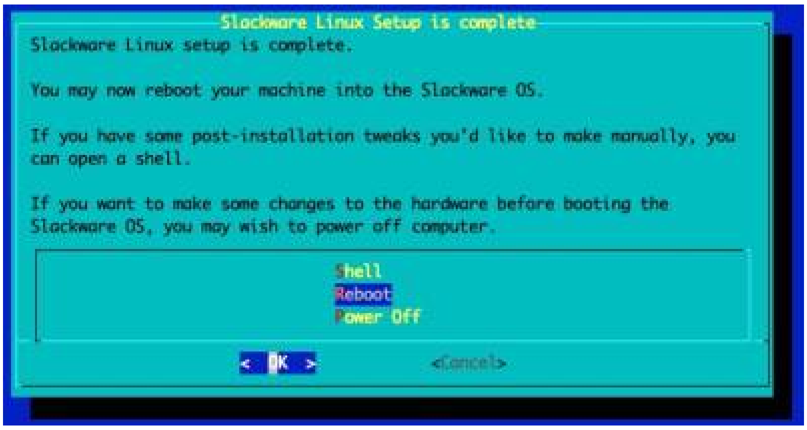
You may now reboot your system.



Slackware Linux Setup (version 15.0)

Welcome to Slackware Linux Setup.
Select an option below using the UP/DOWN keys and SPACE or ENTER.
Alternate keys may also be used: '+', '-', and TAB.

```
HELP       Read the Slackware Setup HELP file
KEYMAP     Remap your keyboard if you're not using a US one
ADDSWAP    Set up your swap partition(s)
TARGET     Set up your target partitions
SOURCE     Select source media
SELECT     Select categories of software to install
INSTALL    Install selected software
CONFIGURE  Reconfigure your Linux system
EXIT       Exit Slackware Linux Setup
```



Slackware Linux Setup is complete

Slackware Linux setup is complete.

You may now reboot your machine into the Slackware OS.

If you have some post-installation tweaks you'd like to make manually, you can open a shell.

If you want to make some changes to the hardware before booting the Slackware OS, you may wish to power off computer.

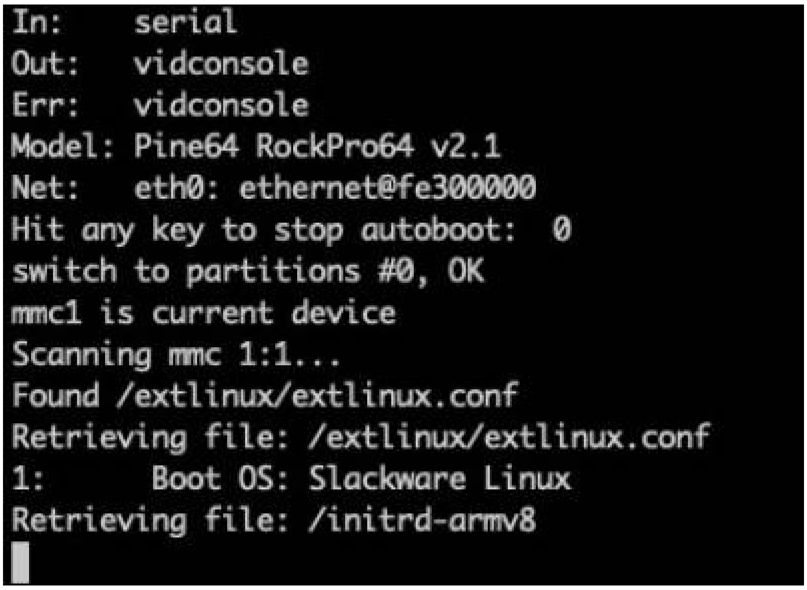
Generally you'll want to reboot into the OS.

However, if you are planning on setting up RAID or need to customise the Operating System Initial RAM Disk, you should select 'Shell'.

The Slackware OS will be found within '/mnt'. You can use the 'os-initrd-mgr' tool (Video tutorial).

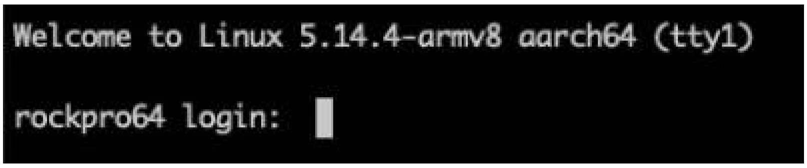
Booting the Slackware OS

The Slackware Installer will reboot into the Slackware OS.



```
In:    serial
Out:   vidconsole
Err:   vidconsole
Model: Pine64 RockPro64 v2.1
Net:   eth0: ethernet@fe300000
Hit any key to stop autoboot:  0
switch to partitions #0, OK
mmc1 is current device
Scanning mmc 1:1...
Found /extlinux/extlinux.conf
Retrieving file: /extlinux/extlinux.conf
1:      Boot OS: Slackware Linux
Retrieving file: /initrd-armv8
```

Login to the Slackware OS



```
Welcome to Linux 5.14.4-armv8 aarch64 (tty1)

rockpro64 login:
```

You may now login as 'root', using the password you set within the installer.

Post Installation Configuration

There are a few post-installation configuration tasks to complete.

Add a plebeian user

You should add a plebeian (non-root) user using the 'adduser' tool.

This is documented here.

CPU fan speed

The CPU fan speed is controlled statically during boot.

By default it'll set the speed to '65' which is the lowest speed. If you want to change this:

As root, edit the Hardware Model run control configuration file:

```
# vi /etc/rc.d/rc.platform.conf # or substitute 'vi' for your favourite editor
```

Within that configuration you'll find examples. Un-comment and set accordingly and reboot.

If you do not have a fan (typically you'll have a heatsink instead) you can also disable the fan. Within the config file uncomment the variable `CPU_FAN_OFF=Yes`.

NTP (Network Time Protocol) setup

If your RockPro64 does not have an RTC battery backup, you may wish to configure it to set time from an NTP Server.

Managing Slackware on the RockPro64

Keeping the Slackware OS up to date

One of the preferred tools to keep your system up to date is slackpkg.

Upgrading the Kernel: in Slackware x86/64 manual steps are required after upgrading the Kernel packages. In Slackware ARM, you simply upgrade the Kernel packages and reboot.

Loading Additional Linux Kernel Modules within the OS Proper

Often Kernel modules for discovered hardware will be automatically loaded, but occasionally you will need to manually configure the loading of some modules.

```
/etc/rc.d/rc.modules.local
```

This file is a shell script that is run as one of the last steps before the OS has fully booted. You can enter `modprobe` commands here to load the specific modules you require.

Configuration files within the directory `/lib/modprobe.d/` can be used to configure the parameters of the modules. Existing files within that directory serve as reference examples should you need them.

Loading Additional Linux Kernel Modules early in the boot sequence

There are a number of peripherals that may require Kernel modules loading early on in the boot sequence. An example of this would be RTCs (Real Time Clocks) or storage controllers that are required to access the file systems on which the OS lives.

Usually you won't need to load modules early in the boot sequence. See the previous section about loading modules from within the OS Proper.

To load Kernel modules during the early boot sequence, read:

```
/boot/local/README.txt
```

As root, the easiest way to begin is by renaming the example script:

```
mv /boot/local/load_kernel_modules.post.sample
/boot/local/load_kernel_modules.post
```

Then add the appropriate module loading commands to: `/boot/local/load_kernel_modules.post` You can also add shell code here to initialise a peripheral - writing something to the peripheral's Kernel interface, for example.

Use a graphical login manager

If you prefer to use a graphical login manager, you can configure the default runlevel as 4:

```
su -
```

```
sed -i 's?id:3:?id:4:?g' /etc/inittab
reboot
```

Slackware repository partition

The Slackware Installer image contains a type `ext4` partition labeled `SLKins_aio-pkgs` from which the packages are installed.

```
root@slackware:~# mount LABEL=SLKins_aio-pkgs /mnt/zip
root@slackware:~# cat /mnt/zip/README.txt
This file system contains the Slackware repository that is used during the
installation of Slackware.

Once you've booted into your OS you can delete or change this partition if
you
wish, or perhaps you might like to retain it for future reference.

root@slackware:~#
```

Most users simply leave the partition alone, as it causes no issues.

Customising the Slackware Linux Kernel

If you'd like to customise the Linux Kernel, the easiest way is to follow the HOWTO guide and use the Slackware ARM Kernel build script to create new packages.

Reducing Boot Time

Slackware ARM ships with a generic OS InitRD (Operating System Initial RAM Disk - the environment that prepares the machine to boot the Operating System Proper), so as to support a wide range of Hardware Models.

However, this isn't the optimal setup once the Slackware OS has been installed because the generic OS InitRD typically exceeds 250MB, which in some cases can add several seconds to the boot time whilst it's loaded from the SD card.

The `os-initrd-mgr` (Operating System Initial RAM Disk Manager) tool has an option to synchronize the OS InitRD's Kernel modules with *only* those presently loaded within the Operating System.

To do this:

```
$ su -c 'os-initrd-mgr --sync-loaded-kmods' -  # note the final -
```

> To have this setting persist across Kernel upgrades, you must upgrade the `a/kernel-modules` package before `a/kernel`. If not, it'll revert to the generic OS InitRD until you next reboot. If you are using `slackpkg` to manage upgrades, this is handled for you.

This option isn't the default, but you can make it so by following the instructions within `/etc/os-initrd-mgr.conf.sample`

This way when you upgrade the Kernel packages in the order described above, it'll automatically synchronize the modules.

> os-initrd-mgr has a safety check to only proceed when the running Kernel and incoming Kernel are at the same major version and patch level.
>
> For example, when running Linux 5.17.1, upgrading to 5.17.2 will work; but an upgrade of Linux 5.17.1 → 5.18.1 will require a reboot then to run os-initrd-mgr again to re-sync.

> If at any point you want to revert to the generic OS InitRD, simply reinstall the `a/kernel` package (and unset the setting if you configured it in `/etc/os-initrd-mgr.conf`).

Installing extra Software

Slackware comes with a good base of software applications, but there are plenty more available in the Open Source Ecosystem.

The best way to add new software is to use the build scripts from SlackBuilds.org.

Managing the Boot Loader firmware

During the Slackware installation process, you are offered the opportunity to flash the Boot Loader to the SPI flash. Occasionally, updates will be made available to the Boot Loader to address bug fixes and provide improvements.

Slackware provides a package `hwm-bw-rk3399` within the a series that contains the latest Boot Loader firmware and contains the `bootloader-flash-rk3399` tool to manage the upgrade life cycle.

Upgrading the Boot Loader firmware

1. Upgrade to the latest available version of the package `hwm-bw-rk3399` (using `slackpkg` as

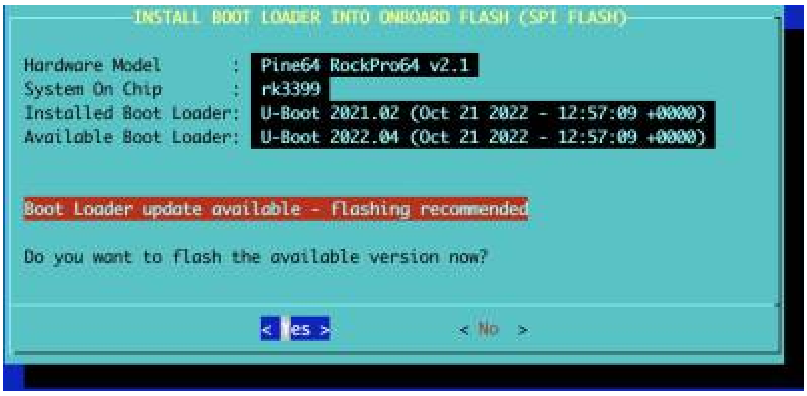
described within this document).

2. As root, run the `bootloader-flash-rk3399` tool.

In this example we'll run the Boot Loader management tool as the `root` user using the `su` tool:

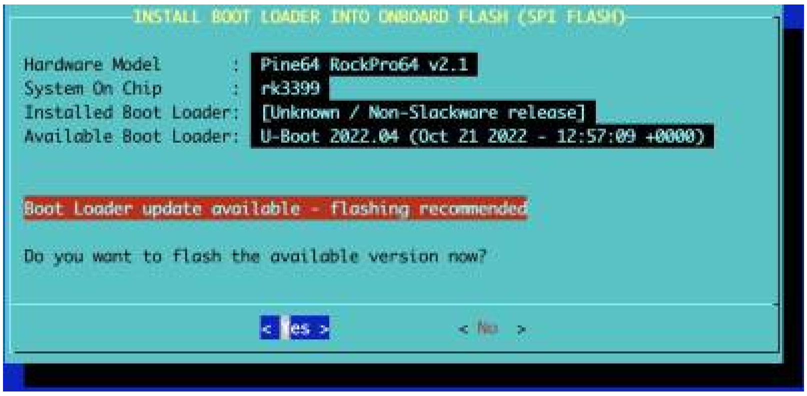
```
$ su -c 'bootloader-flash-rk3399' -  # You must include the trailing '-' character
```

When an upgrade is required, in most cases you'll see a screen like this which provides information about the currently installed Boot Loader and the newer version available:



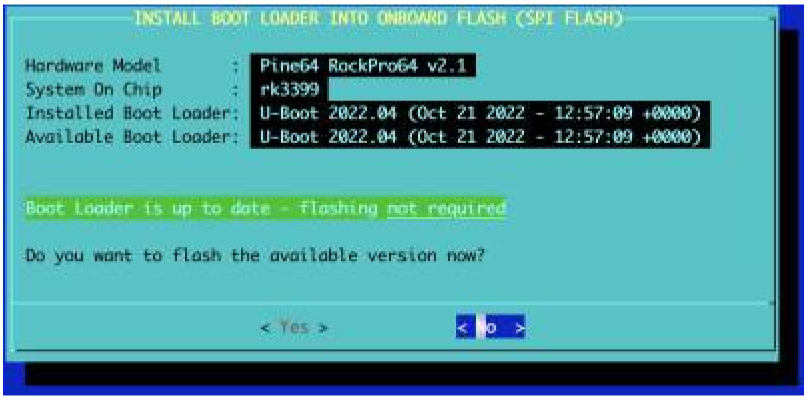
```
INSTALL BOOT LOADER INTO ONBOARD FLASH (SPI FLASH)

Hardware Model        : Pine64 RockPro64 v2.1
System On Chip        : rk3399
Installed Boot Loader: U-Boot 2021.02 (Oct 21 2022 - 12:57:09 +0000)
Available Boot Loader: U-Boot 2022.04 (Oct 21 2022 - 12:57:09 +0000)

Boot Loader update available - flashing recommended

Do you want to flash the available version now?
```

If you've wiped the Boot Loader from SPI flash or have installed a non-Slackware firmware build, you will see a screen like this where the existing installed Boot Loader is unrecognised:



```
INSTALL BOOT LOADER INTO ONBOARD FLASH (SPI FLASH)

Hardware Model        : Pine64 RockPro64 v2.1
System On Chip        : rk3399
Installed Boot Loader: [Unknown / Non-Slackware release]
Available Boot Loader: U-Boot 2022.04 (Oct 21 2022 - 12:57:09 +0000)

Boot Loader update available - flashing recommended

Do you want to flash the available version now?
```

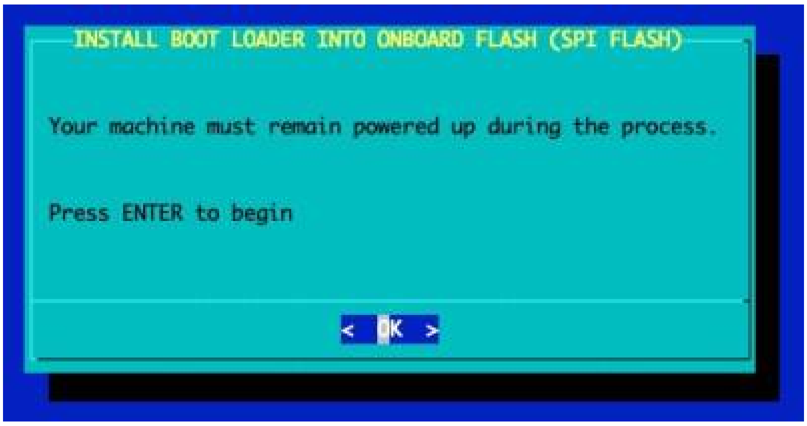
If the installed Boot Loader matches the currently available version, you will be advised that flashing is unnecessary. However, you can re-flash it if you wish.



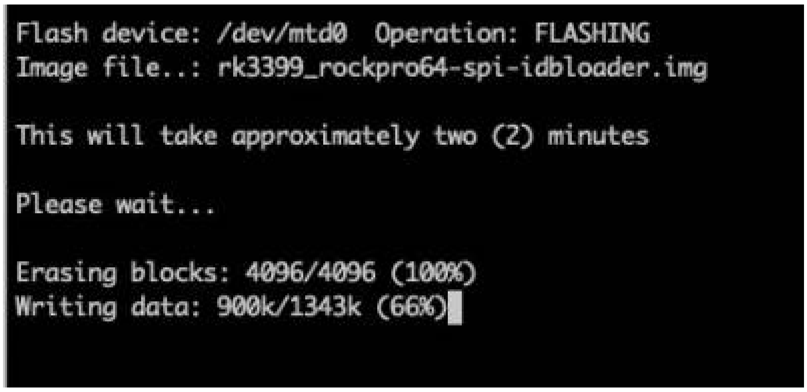
```
INSTALL BOOT LOADER INTO ONBOARD FLASH (SPI FLASH)

Hardware Model        : Pine64 RockPro64 v2.1
System On Chip        : rk3399
Installed Boot Loader: U-Boot 2022.04 (Oct 21 2022 - 12:57:09 +0000)
Available Boot Loader: U-Boot 2022.04 (Oct 21 2022 - 12:57:09 +0000)

Boot Loader is up to date - flashing not required

Do you want to flash the available version now?
```

If you proceed with flashing, the work flow looks like this and takes approximately two minutes to complete.

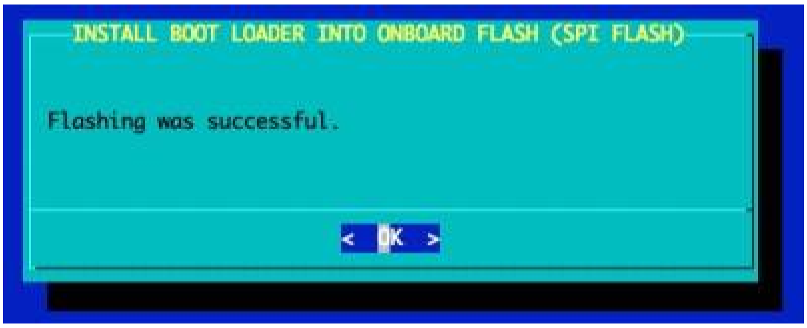
You must ensure the system has sufficient power/is plugged in. If the machine powers off before flashing completes, you would need to re-flash using the bootable SD card as described in the initial installation instructions.



```
INSTALL BOOT LOADER INTO ONBOARD FLASH (SPI FLASH)

Your machine must remain powered up during the process.

Press ENTER to begin
```



```
Flash device: /dev/mtd0  Operation: FLASHING
Image file..: rk3399_rockpro64-spi-idbloader.img

This will take approximately two (2) minutes

Please wait...

Erasing blocks: 4096/4096 (100%)
Writing data: 900k/1343k (66%)
```



```
INSTALL BOOT LOADER INTO ONBOARD FLASH (SPI FLASH)

Flashing was successful.
```

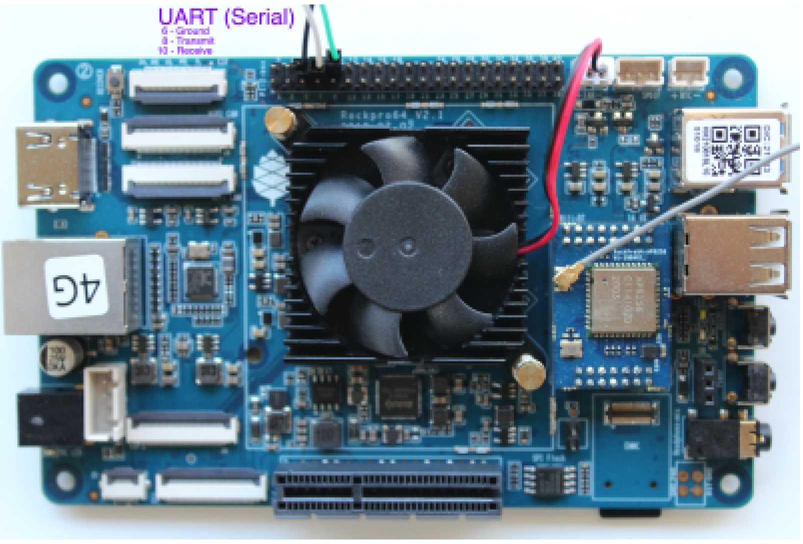
Using the Serial/UART adapter

This documentation discusses using the RockPro64 without the UART/Serial console.

If you'd like to use one, there are two that have been tested.

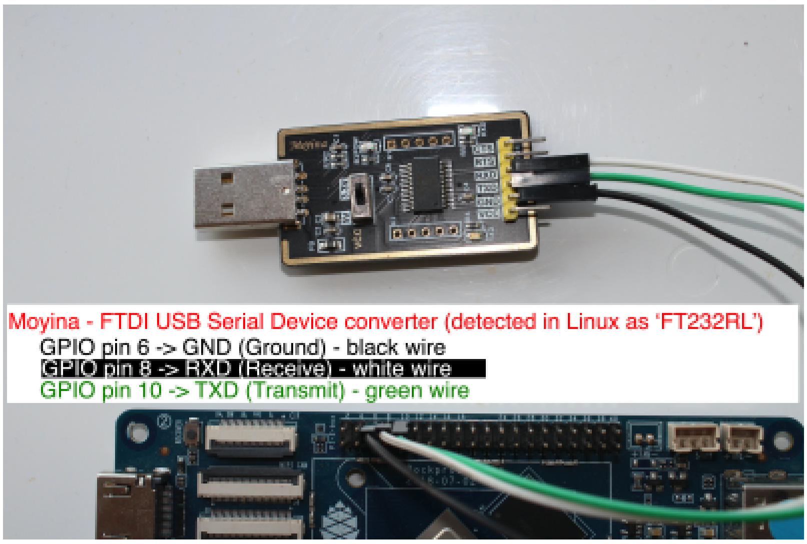
USB Serial Device converter: Prolific Technology Inc / PL2303

This image below shows the PL2302 (the Serial adapter listed in the Hardware table at the head of this document) connected to the RockPro64:



USB Serial Device converter: FTDI / FT232RL

This is the model shown here.


Moyina - FTDI USB Serial Device converter (detected in Linux as 'FT232RL')
GPIO pin 6 -> GND (Ground) - black wire
GPIO pin 8 -> RXD (Receive) - white wire
GPIO pin 10 -> TXD (Transmit) - green wire

Using the USB Serial Device converter on the Linux Host Computer

Once wired up, connect the USB end of the adapter into your Linux Host Computer, and use the following command.

This assumes that there are no other similar adapters occupying `/dev/ttyUSB0`. If so, you will need to adjust the device name accordingly (e.g. perhaps `/dev/ttyUSB1`).

```
screen  -T screen-256color /dev/ttyUSB0 1500000
```

Known bugs and limitations

None presently.

Supporting the Slackware ARM project

Maintenance of the Slackware ARM port takes not only a lot of time, but also has financial costs such as the on-going use of electricity, Internet hosting and purchasing and maintenance of ARM hardware.

Once you find yourself enjoying using the ARM port of Slackware, please take a few moments to show your appreciation through sponsorship.

Contributing to the Slackware ARM project

There are a plethora of ARM devices on the market which requires initial R&D and continuous testing. If you'd like to help Slackware support more ARM boards, please check out the documentation explaining how to get involved.

From:
https://docs.slackware.com/ - **SlackDocs**

Permanent link:
https://docs.slackware.com/slackwarearm:inst_sa64_rk3399_rockpro64

Last update: **2024/03/19 09:34 (UTC)**