

Programming and Running Poky Linux from SD Card on Freescale SABRE i.MX 6 Series Development Board

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Revision History

Date [MM/DD/YYYY]	Author [First and Last Name]	Revision [Letter]	Reason [Brief Description]
08/04/2015	Kris Zawada	A	Initial Release

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Purpose

The overall purpose of this HOW-TO Guide is to program an SD card with a valid image of embedded Linux and boot Freescale SABRE i.MX 6 Series development board with this image.

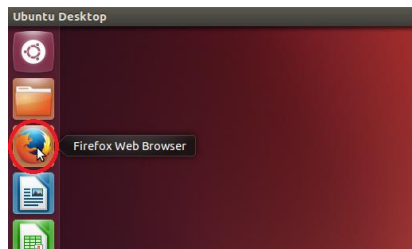
Requirements

- “Root” privileges on the host machine.
- Ability to access the Freescale website.
- Class 4 or Class 10 8 GB SD Card.
- Ubuntu Linux host machine, but another other Linux distribution will do.

Instructions

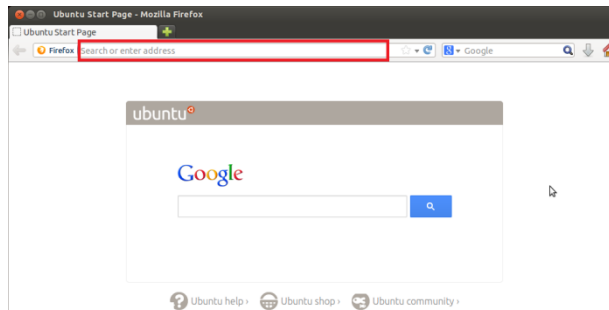
1. Download Linux SD Card Image

- a. From a Linux host machine (in this case Ubuntu 12.04.3 LTS) click on ‘Firefox Web Browser’ from the launcher to open it.

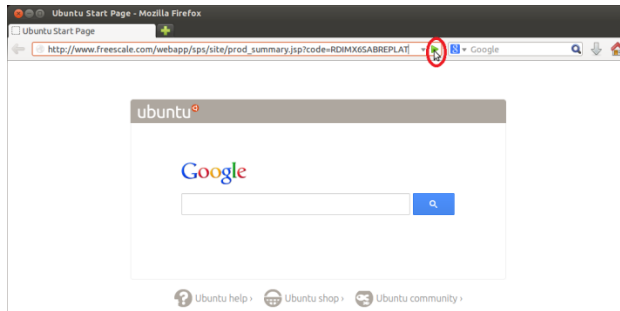


- b. In the address bar enter the address:

http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=RDIMX6SABREPLAT.



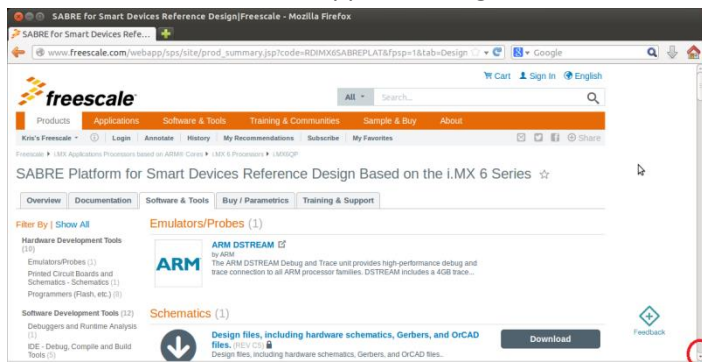
- c. Click on the “Go to the address in the Location Bar” button indicated by the green play icon.



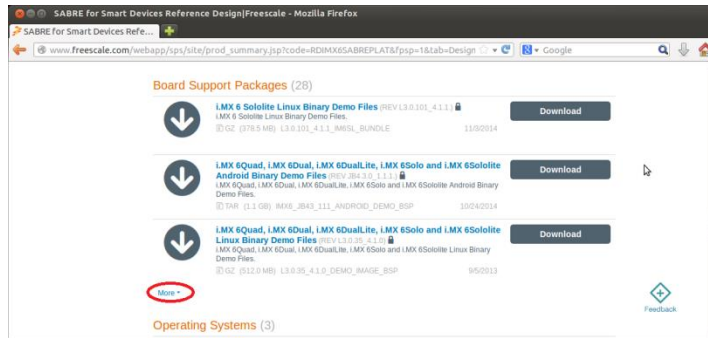
d. Click on the “Software & Tools” link on the main page.



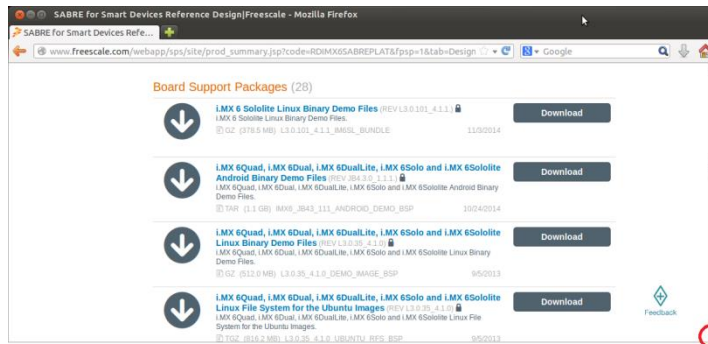
e. Scroll down until “Board Support Packages”.



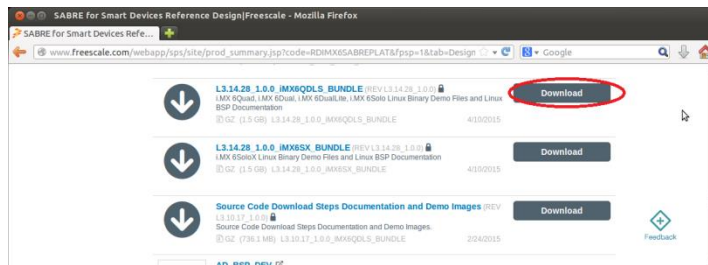
f. Click on the “More” link to expand the “Board Support Packages” link.



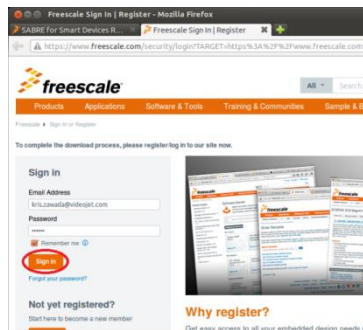
g. Scroll down until “L3.14.28_1.0.0_iMX6QDLS_BUNDLE” is shown.



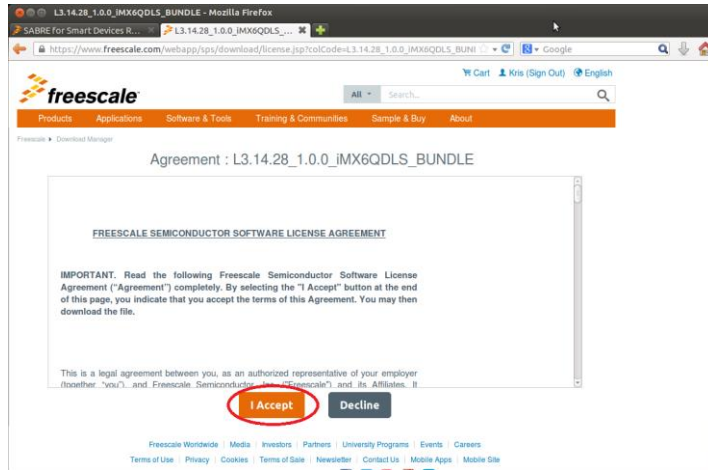
h. Click on “Download” to begin downloading the file.



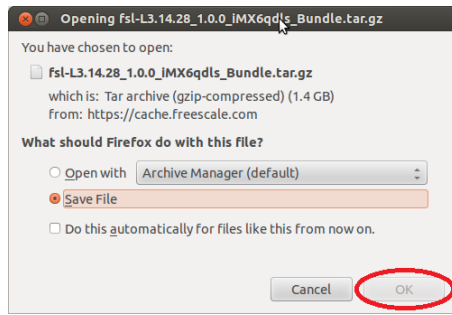
i. Click on “Sign in” to proceed. NOTE: The login information will auto fill if previously setup.



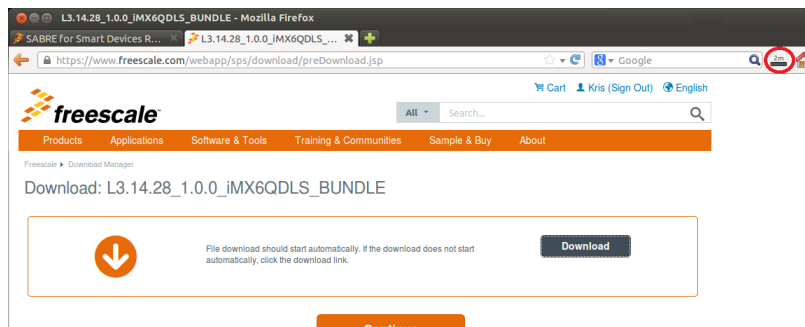
j. Click on “I Accept”.



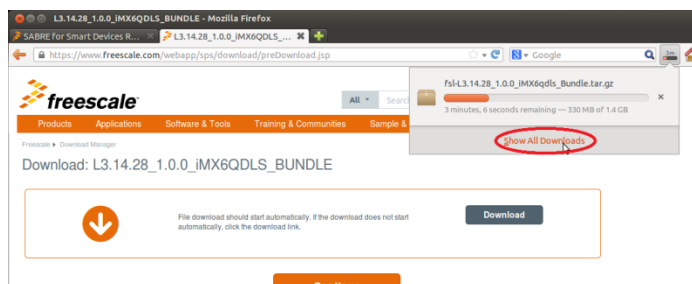
k. Click on "OK" to begin to save the file to disk.



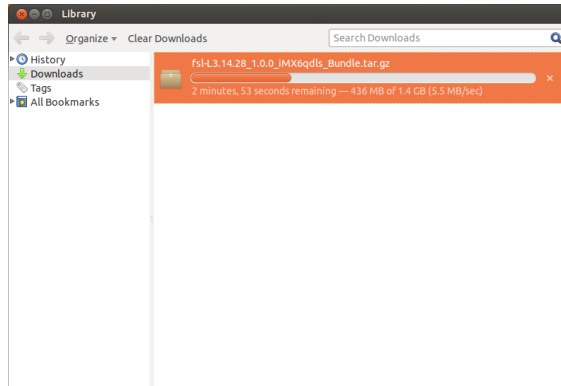
l. Click on the download status indicator next to the home button.



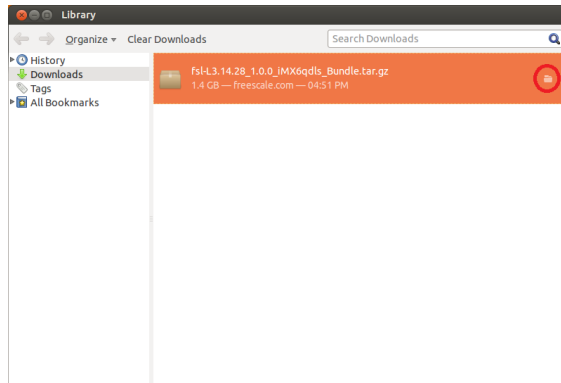
m. Click on "Show All Downloads".



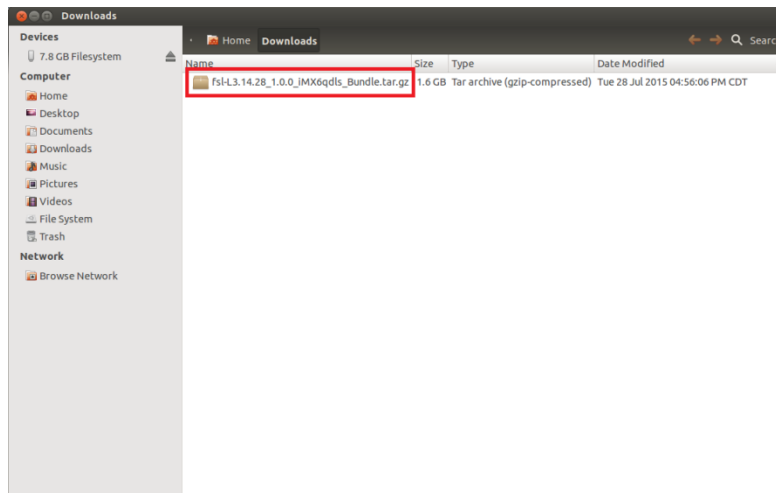
n. Wait until the download finishes.



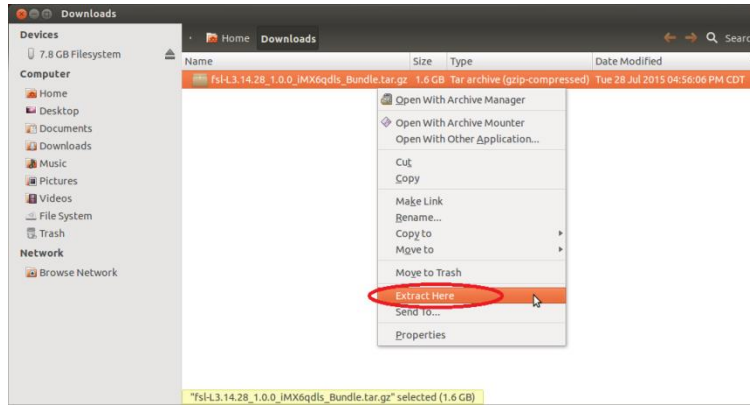
o. Once finished downloading, click on the folder icon to open the directory that the download is located in.



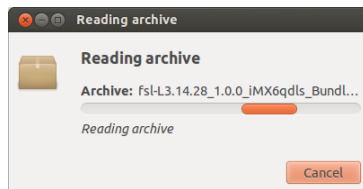
p. Verify tha the download exists.



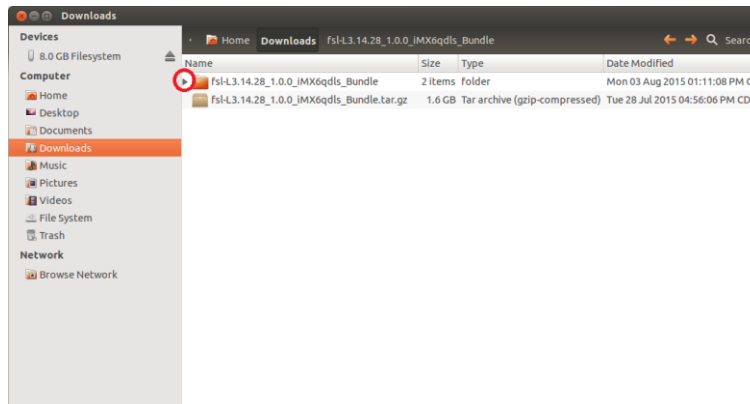
q. Right click on “fsl-L3.14.28_1.0.0_iMX6qdlS_Bundle.tar.gz” and select “Extract Here”.



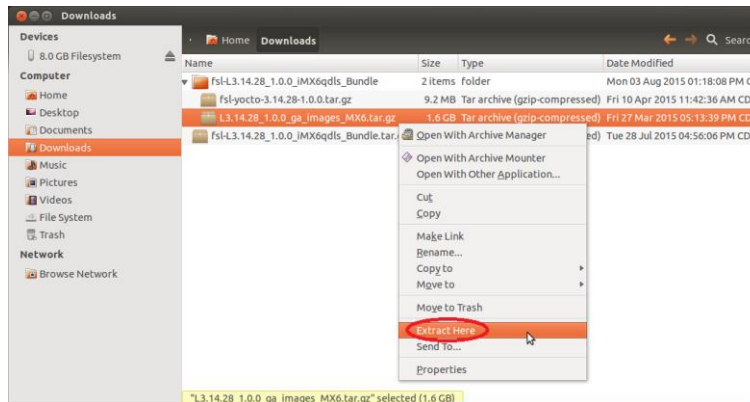
r. Wait until archive is extracted.



s. Once the archive is extracted click on the arrow next to the directory to expand it.



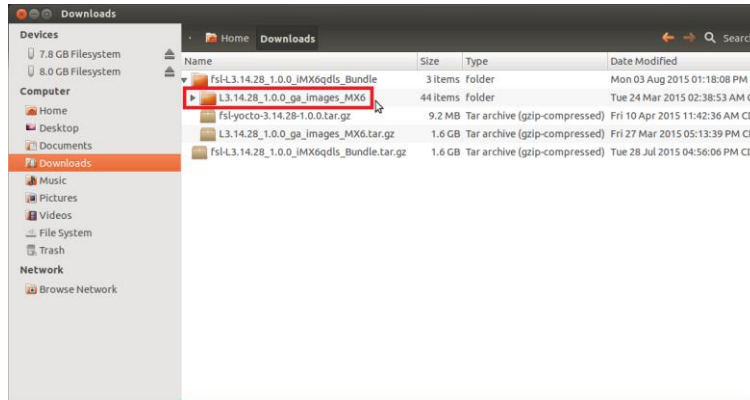
t. Right-click on "L3.14.28_1.0.0_ga_images_MX6.tar.gz" and select "Extract Here".



- u. Wait until archive is extracted.



- v. Once archive is extracted verify that a directory named “L3.14.28_1.0.0_ga_images_MX6” exists.



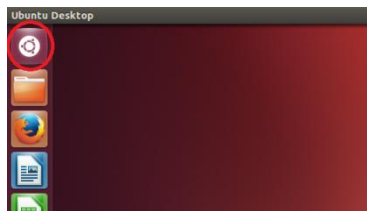
- w. Proceed to next step.

2. Program Linux image to SD Card

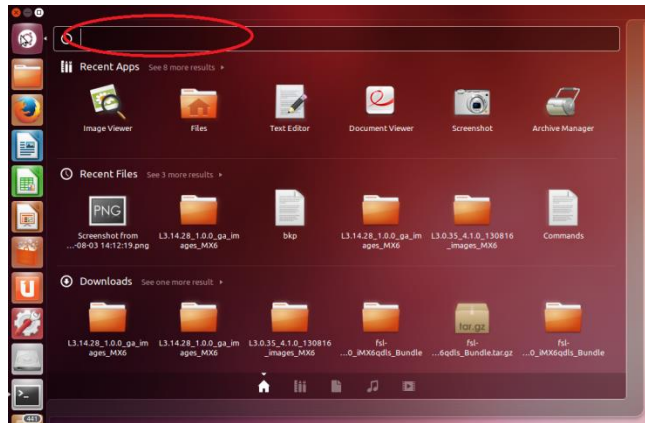
- a. Plug an SD card into the host computer.



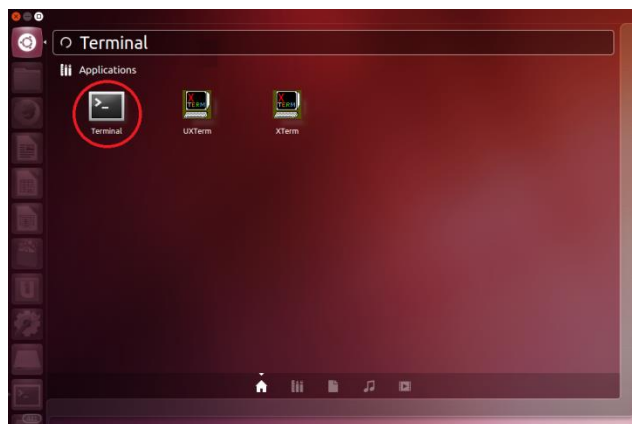
- b. Select “Dash Home” from the application launcher.



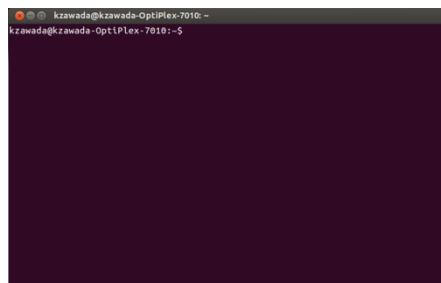
- c. Enter the word Terminal from in the search box.



d. Select the “Terminal” icon.



e. Wait until the terminal opens.



f. Execute the command “cat /proc/partitions” to view the mounted partitions on the host.

Terminal Syntax:

```
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions
```

```
kzawada@kzawada-OptiPlex-7010: ~  
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions
```

- g. Find the partitions associated with the SD card. In this case there are two mounts associated with the SD card. *NOTE: If the SD card is removed physically, these partitions will not be shown when the command above is executed. This is a good way to determine where it is being mounted.*

Terminal Syntax:

```
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions  
major minor #blocks name  
  
8 0 156250000 sda  
8 1 147873792 sda1  
8 2 1 sda2  
8 5 8373248 sda5  
11 0 1048575 sr0  
8 16 7782400 sdb  
8 17 7774208 sdb1  
kzawada@kzawada-OptiPlex-7010:~$
```

```
kzawada@kzawada-OptiPlex-7010: ~  
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions  
major minor #blocks name  
8 0 156250000 sda  
8 1 147873792 sda1  
8 2 1 sda2  
8 5 8373248 sda5  
11 0 1048575 sr0  
8 16 7782400 sdb  
8 17 7774208 sdb1  
kzawada@kzawada-OptiPlex-7010:~$
```

- h. Unmount the first partition by executing the command below.

Terminal Syntax:

```
kzawada@kzawada-OptiPlex-7010:~$ sudo umount /dev/sdb
```

```
kzawada@kzawada-OptiPlex-7010: ~  
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions  
major minor #blocks name  
8 0 156250000 sda  
8 1 147873792 sda1  
8 2 1 sda2  
8 5 8373248 sda5  
11 0 1048575 sr0  
8 16 7782400 sdb  
8 17 7774288 sdb1  
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb
```

- i. Notice that this first partition is not mounted, which is fine.

Terminal Syntax:

```
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb  
mount: /dev/sdb: not mounted  
kzawada@kzawada-OptiPlex-7010:~$
```

```
kzawada@kzawada-OptiPlex-7010: ~  
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions  
major minor #blocks name  
8 0 156250000 sda  
8 1 147873792 sda1  
8 2 1 sda2  
8 5 8373248 sda5  
11 0 1048575 sr0  
8 16 7782400 sdb  
8 17 7774288 sdb1  
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb  
mount: /dev/sdb: not mounted  
kzawada@kzawada-OptiPlex-7010:~$
```

- j. Unmount the second partition by executing the command below.

Terminal Syntax:

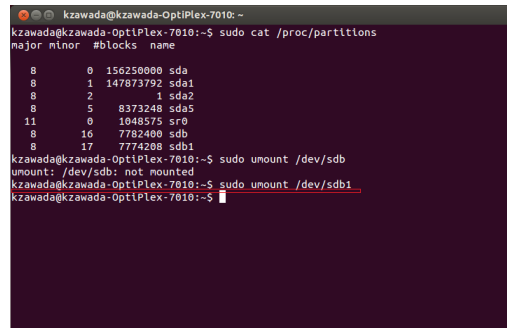
```
kzawada@kzawada-OptiPlex-7010:~$ sudo umount /dev/sdb1
```

```
kzawada@kzawada-OptiPlex-7010: ~  
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions  
major minor #blocks name  
8 0 156250000 sda  
8 1 147873792 sda1  
8 2 1 sda2  
8 5 8373248 sda5  
11 0 1048575 sr0  
8 16 7782400 sdb  
8 17 7774288 sdb1  
kzawada@kzawada-OptiPlex-7010:~$ sudo umount /dev/sdb  
mount: /dev/sdb: not mounted  
kzawada@kzawada-OptiPlex-7010:~$ sudo umount /dev/sdb1
```

- k. Notice that the second partition was unmounted successfully.

Terminal Syntax:

```
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb1
kzawada@kzawada-OptiPlex-7010:~$
```

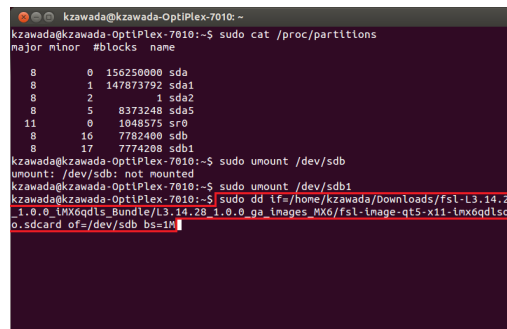


```
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions
major minor #blocks name
8 0 156250000 sda
8 1 147873792 sda1
8 2 1 sda2
8 5 8373248 sda5
11 0 1048575 sr0
8 16 7782400 sdb
8 17 7774288 sdb1
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb
mount: /dev/sdb: not mounted
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb1
kzawada@kzawada-OptiPlex-7010:~$
```

- I. Next enter the command below to program the SD card with the downloaded image.

Terminal Syntax:

```
kzawada@kzawada-OptiPlex-7010:~$ sudo dd if=/home/kzawada/Downloads/fsl-L3.14.28_1.0.0_iMX6qdlS_Bundle/L3.14.28_1.0.0_ga_images_MX6/fsl-image-qt5-x11-imx6qdlSolo.sdcard of=/dev/sdb bs=1M
```



```
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions
major minor #blocks name
8 0 156250000 sda
8 1 147873792 sda1
8 2 1 sda2
8 5 8373248 sda5
11 0 1048575 sr0
8 16 7782400 sdb
8 17 7774288 sdb1
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb
mount: /dev/sdb: not mounted
kzawada@kzawada-OptiPlex-7010:~$ sudo mount /dev/sdb1
kzawada@kzawada-OptiPlex-7010:~$ sudo dd if=/home/kzawada/Downloads/fsl-L3.14.28_1.0.0_iMX6qdlS_Bundle/L3.14.28_1.0.0_ga_images_MX6/fsl-image-qt5-x11-imx6qdlSolo.sdcard of=/dev/sdb bs=1M
```

- m. Wait until the program finishes writing to the SD card.

Terminal Syntax:

```
kzawada@kzawada-OptiPlex-7010:~$ sudo dd if=/home/kzawada/Downloads/fsl-L3.14.28_1.0.0_iMX6qdlS_Bundle/L3.14.28_1.0.0_ga_images_MX6/fsl-image-qt5-x11-imx6qdlSolo.sdcard of=/dev/sdb bs=1M
[sudo] password for kzawada:
1444+0 records in
1444+0 records out
1514143744 bytes (1.5 GB) copied, 118.306 s, 12.8 MB/s
kzawada@kzawada-OptiPlex-7010:~$
```

```
kzawada@kzawada-OptiPlex-7010:~$ sudo cat /proc/partitions
major minor #blocks name
8 0 156250000 sda
8 1 147873792 sda1
8 2 1 sda2
8 5 8373248 sda5
11 0 1048575 sr0
8 16 7782400 sdb
8 17 7774288 sdb1
kzawada@kzawada-OptiPlex-7010:~$ sudo umount /dev/sdb
umount: /dev/sdb: not mounted
kzawada@kzawada-OptiPlex-7010:~$ sudo umount /dev/sdb1
kzawada@kzawada-OptiPlex-7010:~$ sudo dd if=/home/kzawada/Downloads/fsl-L3.14.28
_1.0.0_LMX6qds_Bundle/L3.14.28_1.0.0_ga_images_MX6/fsl-image-qt5-x11-lmx6qdsol
o.sdcard or=/dev/sdb bs=1M
[sudo] password for kzawada:
1444+0 records in
1444+0 records out
1514143744 bytes (1.5 GB) copied, 118.306 s, 12.8 MB/s
kzawada@kzawada-OptiPlex-7010:~$
```

- n. Remove the SD card from the host SD card slot.



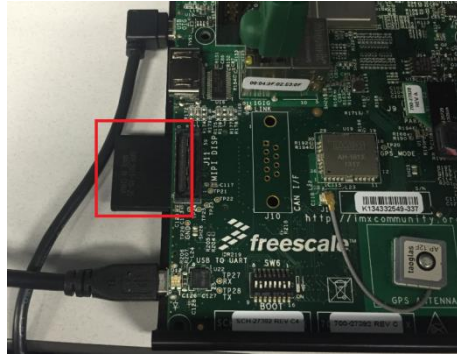
- o. Next, proceed to boot from Linux image on SD card.

3. Boot Linux Image from SD Card

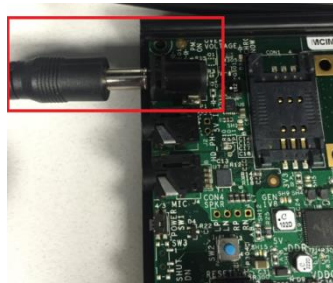
- a. Obtain a Freescale SABRE i.MX6 Series development board and ensure the keyboard, mouse, and debug connection are made.



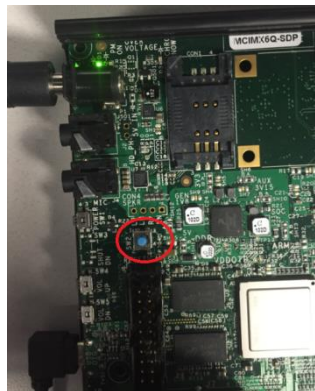
- b. Plug in the SD Card into the provided slot.



- c. Plug in the power cable.



- d. Press the reset button to cause the board to start booting from the SD card slot.



- e. Wait until boot progresses through the “freescale” screen.



- f. Wait until boot progresses through the “Linux penguin” screen.



- g. Wait until boot progresses through the “yocto project” screen.



- h. Once a Linux desktop is shown the image has booted.



- i. The debug terminal will indicate the boot progress as well. The login screen will indicate that the board has booted.

```

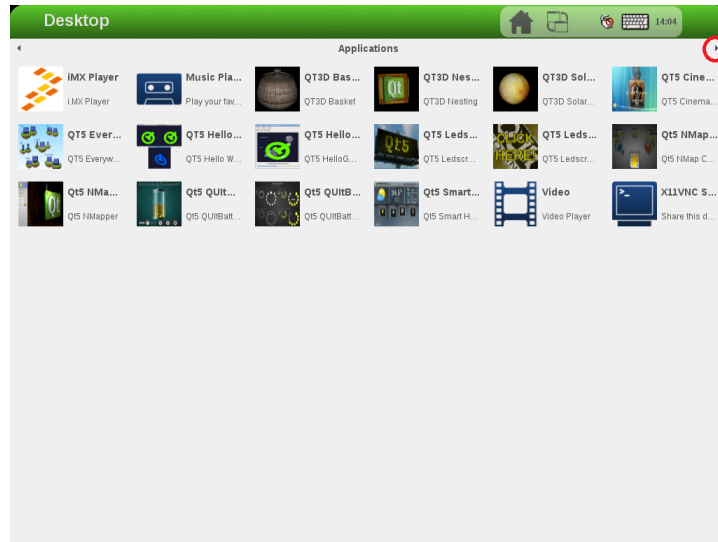
COM6115200baud - Tera Term VT
File Edit Setup Control Window Help
49c5+unBauKcEga0EP+ID9+uqtQkcPwCNFS1JBRk+atCVLwz1o6qD.G8D/45GNJokZ2ibog>9F.Plin
U?kshUduL1i1i1cm800>988k15du114001me11188p01209492007200UP89Vv>u917re9
Nhw4jJh8kMadiG1h00h00R300>W7R6hHPC54Mawgen194m2u42R/Pn>eat@inx6qdlisol
F:egayyins: m5 7137244367:44181182:29>v4178:84:3dcd:af:cc:344
#noophar-
Starting machind daemon...done.
Starting statd: done
Starting advanced power management daemon: No APM support in kernel
(Failed)
MSM daemon support not enabled in kernel
Starting syslogd/klogd: done
Starting avahi mDNS/DNS-SD Daemon: avahi-daemon [ok]
Starting telephony daemon
Starting lime NFS daemon
Starting OPprof (lib) server
Starting autohdmi
Running local boot scripts (<etc/rc.local>).
Poky (Yocto Project Reference Distro) 1.7 inx6qdlisol /dev/ttync0
inx6qdlisol login:

```

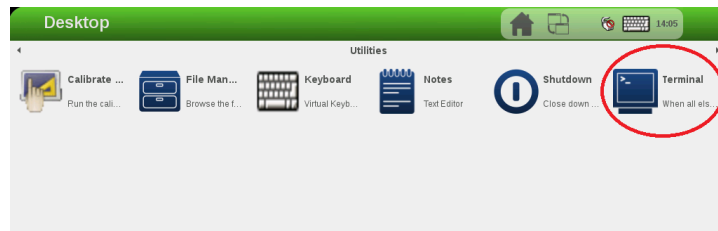
- j. Proceed to the next step to verify which version of Linux is loaded.

4. Verify Linux Image Version

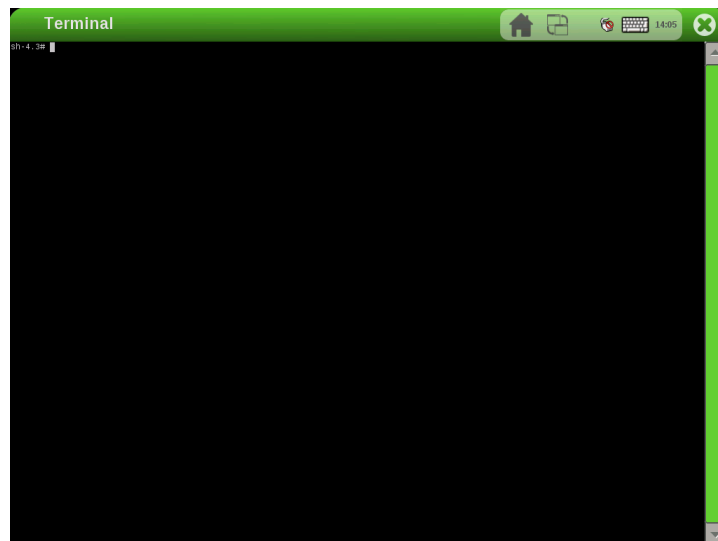
- a. From the main GUI screen click on the arrow to view the next set of icons/shortcuts.



b. Select the “Terminal” application.



c. Wait until the terminal application opens.



d. Execute the command below to determine the distribution of Linux.

Terminal Syntax:

```
sh-4.3# cat /etc/issue
Poky (Yocto Project Reference Distro) 1.7 \n \l
```

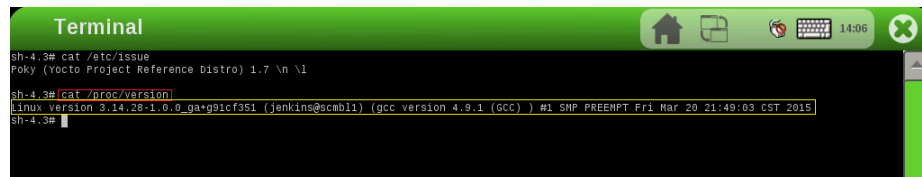
sh-4.3#



- e. Execute the command below to determine the Linux kernel version.

Terminal Syntax:

```
sh-4.3# cat /proc/version
Linux version 3.14.28-1.0.0_ga+g91cf351 (jenkins@scmb11) (gcc version 4.9.1 (GCC)
) #1 SMP PREEMPT Fri Mar 20 21:49:03 CST 2015
sh-4.3#
```



- f. Execute the command below to get the processor information.

Terminal Syntax:

```
sh-4.3# cat /proc/cpuinfo
processor       : 0
model name     : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant       : 0x2
CPU part         : 0xc09
CPU revision      : 10

processor       : 1
model name     : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant       : 0x2
CPU part         : 0xc09
CPU revision      : 10

processor       : 2
model name     : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant       : 0x2
CPU part         : 0xc09
CPU revision      : 10
```

```

processor      : 3
model name    : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant      : 0x2
CPU part        : 0xc09
CPU revision    : 10

Hardware      : Freescale i.MX6 Quad/DualLite (Device Tree)
Revision      : 0000
Serial        : 0000000000000000
Poky (Yocto Project Reference Distro) 1.7 \n \l

Linux version 3.14.28-1.0.0_ga+g91cf351 (jenkins@scmb11) (gcc version 4.9.1 (GCC)
) #1 SMP PREEMPT Fri Mar 20 21:49:03 CST 2015
processor      : 0
model name    : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant      : 0x2
CPU part        : 0xc09
CPU revision    : 10

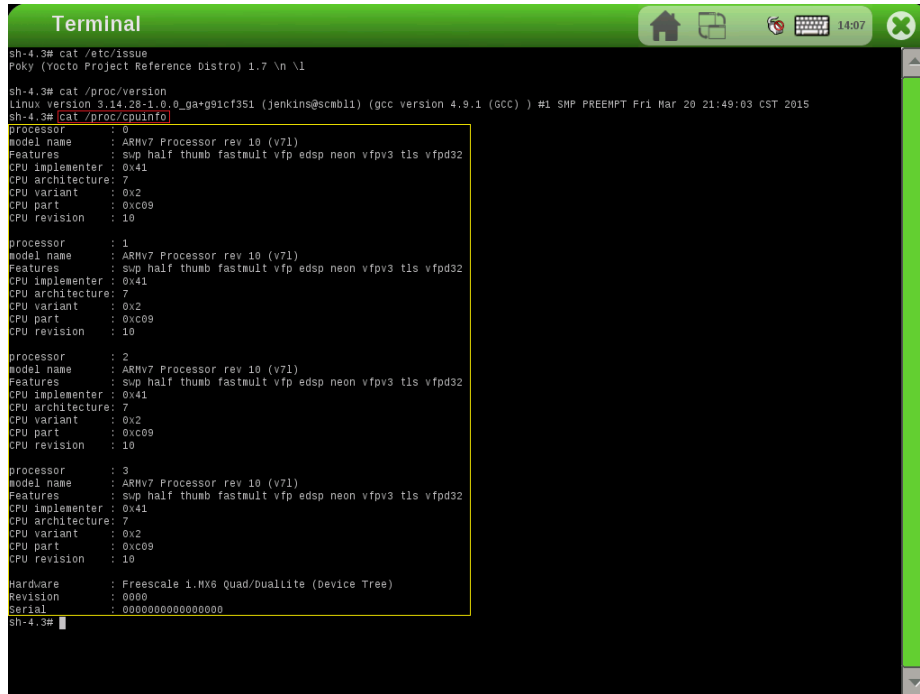
processor      : 1
model name    : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant      : 0x2
CPU part        : 0xc09
CPU revision    : 10

processor      : 2
model name    : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant      : 0x2
CPU part        : 0xc09
CPU revision    : 10

processor      : 3
model name    : ARMv7 Processor rev 10 (v7l)
Features      : swp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer      : 0x41
CPU architecture: 7
CPU variant      : 0x2
CPU part        : 0xc09
CPU revision    : 10

Hardware      : Freescale i.MX6 Quad/DualLite (Device Tree)
Revision      : 0000
Serial        : 0000000000000000
sh-4.3#

```



```
Terminal
sh-4.3# cat /etc/issue
Poky (Yocto Project Reference Distro) 1.7 \n \l

sh-4.3# cat /proc/version
Linux version 3.14.28-1.0.0_ga+g91cf351 (jenkins@scabb11) (gcc version 4.9.1 (GCC) ) #1 SMP PREEMPT Fri Mar 20 21:49:03 CST 2015
sh-4.3# cat /proc/cpuinfo
processor       : 0
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

processor       : 1
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

processor       : 2
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

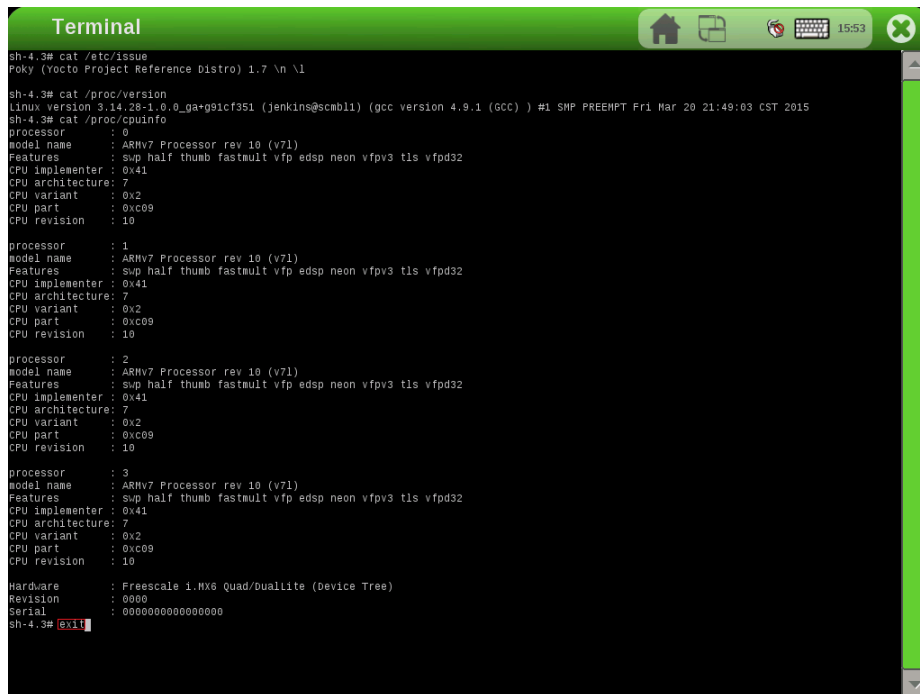
processor       : 3
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

Hardware      : Freescale i.MX6 Quad/DualLite (Device Tree)
Revision      : 0800
Serial        : 0000000000000000
sh-4.3#
```

g. Exit the terminal by typing in the command “exit”.

Terminal Syntax:

```
sh-4.3# exit
```



```
Terminal
sh-4.3# cat /etc/issue
Poky (Yocto Project Reference Distro) 1.7 \n \l

sh-4.3# cat /proc/version
Linux version 3.14.28-1.0.0_ga+g91cf351 (jenkins@scabb11) (gcc version 4.9.1 (GCC) ) #1 SMP PREEMPT Fri Mar 20 21:49:03 CST 2015
sh-4.3# cat /proc/cpuinfo
processor       : 0
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

processor       : 1
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

processor       : 2
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

processor       : 3
model name     : ARMv7 Processor rev 10 (v7l)
Features      : smp half thumb fastmult vfp edsp neon vfpv3 tls vfpd32
CPU implementer : 0x41
CPU architecture: 7
CPU variant   : 0x2
CPU part      : 0xc09
CPU revision  : 10

Hardware      : Freescale i.MX6 Quad/DualLite (Device Tree)
Revision      : 0800
Serial        : 0000000000000000
sh-4.3# exit
```

h. At this point the Linux is running from the SD card and is ready for further testing.

Tips & Warnings

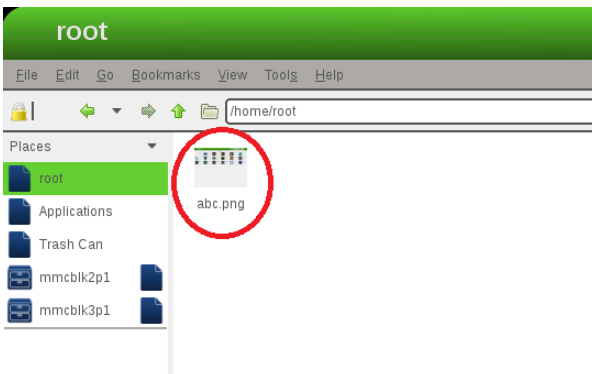
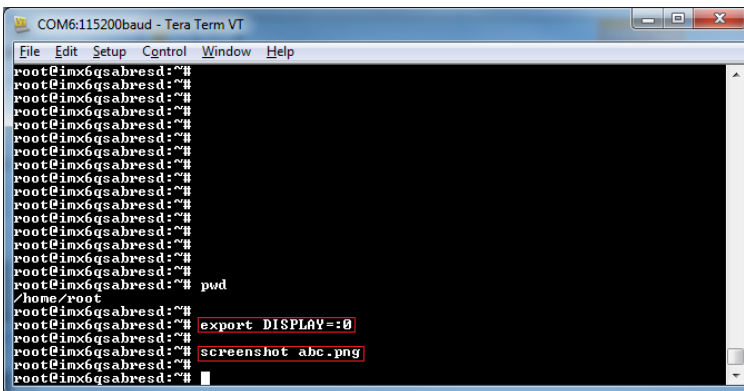
- To connect a keyboard and mouse use a 'Micro B male to a USB A female OTG' connector. Ensure the keyboard has a USB hub built in so the mouse can be daisy chained through the keyboard.



- To take a screenshot of the display use the commands below. This was discovered on the i.MX Community forums at the following link: <https://community.freescale.com/message/547830>.

Terminal Syntax:

```
root@imx6qsabresd:~# export DISPLAY=:0
root@imx6qsabresd:~# screenshot abc.png
```



- Either Ubuntu 12.04 LTS or Ubuntu 14.04 LTS will work great as a host machine.

- To logins use the user name 'root' and password is blank.

Related

- The Freescale SABRE i.MX 6 Series:
http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=RDIMX6SABREPLAT.
- Discussion on programing SD card is located here:
<https://community.freescale.com/message/547307>.