Clonezilla Basics for Windows Embedded

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1 Introduction: Cloning the Master Image

Cloning a master image for mass production is an important step for Windows Embedded Standard and Windows Embedded Industry. First, the image must be rolled back to create the master, which is accomplished using sysprep. Here is an example command:

Sysprep /generalize /oobe /shutdown /unattend:c:\myunattend.xml

The unattended XML file is a small answer file that handles several of the Out-of-Box Experience (OOBE) screens as well as accounts, run–time key, computer names, etc. There are those that say you don't need sysprep, but failure to run sysprep and just copy the image can run into technical consequences. In short, one must run sysprep to duplicate the image.

Once the image has been rolled back, the next step is to capture the master image for deployment to other systems. The books: Starter Guide for Windows® System Image Manager, Professional's Guide To Windows® Embedded 8 Standard, and Professional's Guide To Windows® Embedded Standard 7 - 2nd Edition cover creating the unattended file and running sysprep, but what is not covered is an actual full disk capture utility. There are several hardware disk duplication solutions for hard drive and compact flash cards. International Microsystems Inc. and Logicube are two companies that offer hardware duplication products. . There are also software solutions, but some of the most popular like Norton Ghost are going end-of-life in favor of licensed server-based solutions. Microsoft has solutions to capture partitions into WIM files, but when multiple partitions need to be captured, the WIM file solution is very cumbersome. Simple and inexpensive software image capture solutions are becoming hard to find. Luckily, the Linux community has developed a solution called Clonezilla that captures full disk images; and best of all, it is a free solution that can be used to capture a Windows Embedded master image.

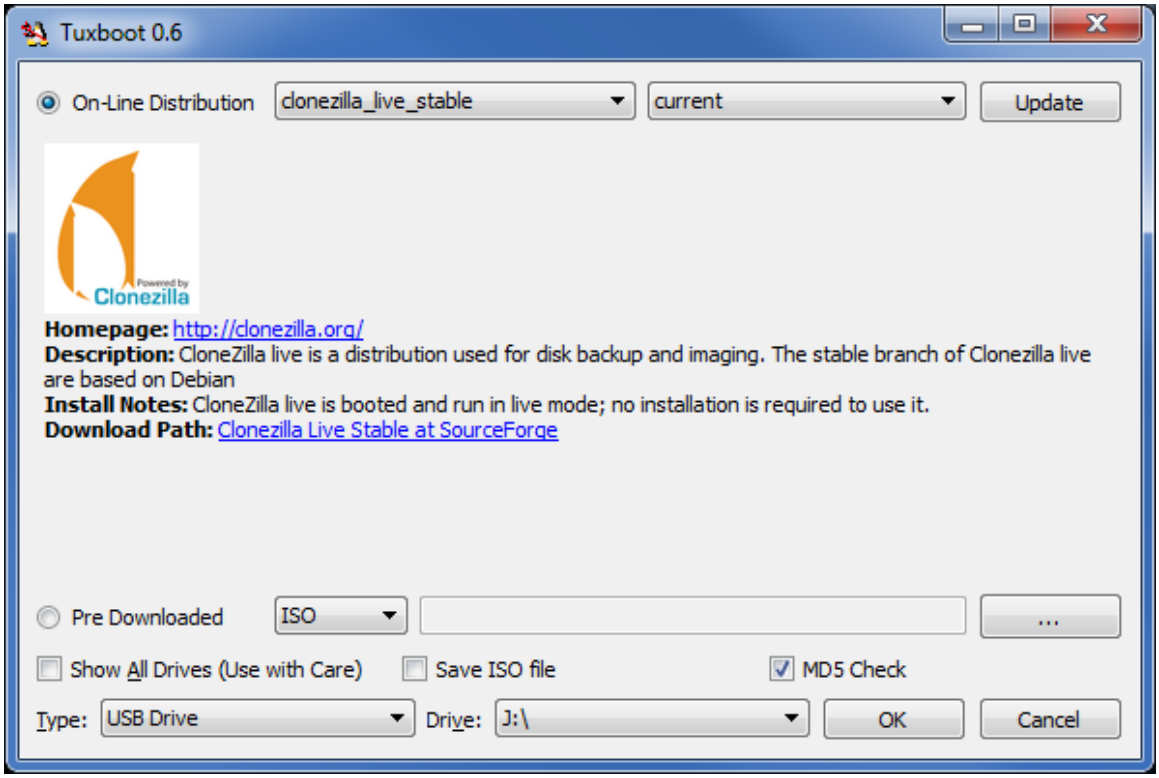
This paper walks through the steps to create a Clonezilla disk to capture and deploy a Windows Embedded master disk image. You will need two USB flash disks. One will hold the Clonezilla boot disk image (USB disk size 8 GB), and the other will hold the captured image (USB flash disk size 32 GB or greater recommended).

***Note**: This paper is based on Clonezilla 2.2.3-25 live image. The steps and pictures will be different for later versions.*

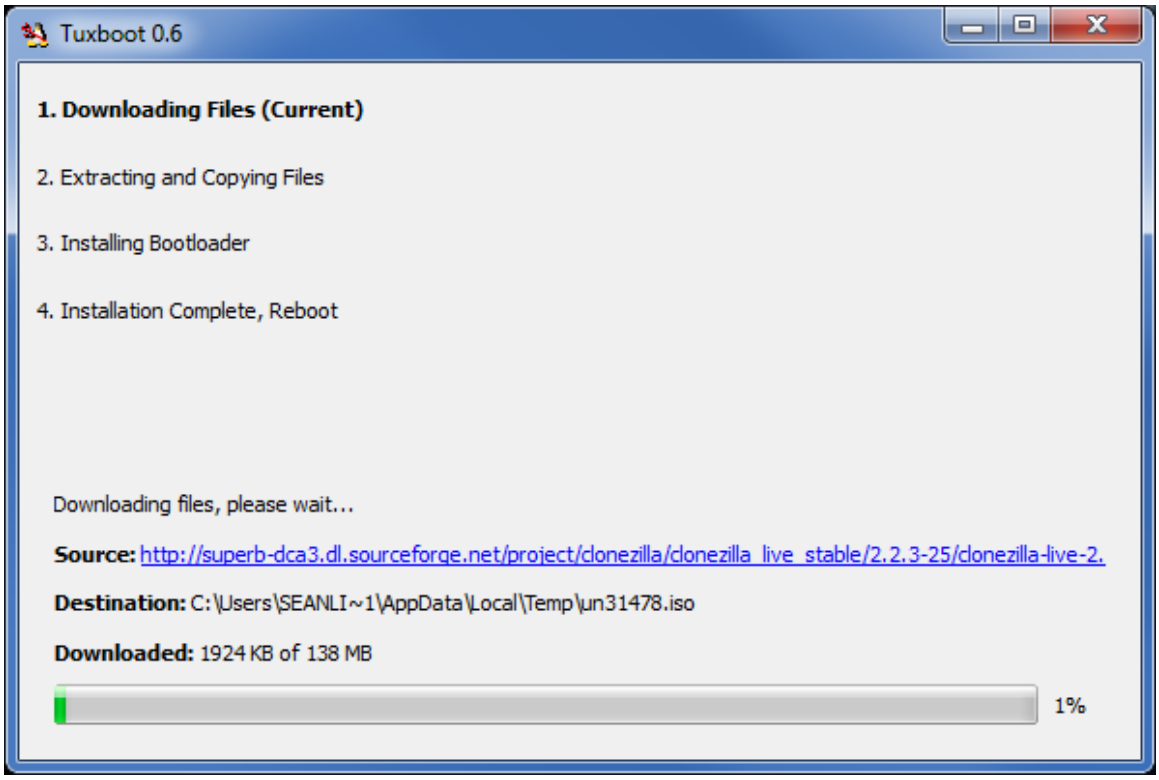
2 Generate Clonezilla boot disk

We start on the development machine, and download a utility to help create the Clonezilla boot disk.

1. Download Tuxboot from tuxboot.org. The actual download comes from SourceForge.
2. Format the smaller USB flash disk as FAT 32. Format the larger flash disk as exFAT.
3. Plug the smaller USB flash disk into the development machine and run Tuxboot.
4. The Tuxboot application will start. Make sure that **clonezilla_live_stable** is selected for the On-Line Distribution. Also, point to the correct USB flash drive.



5. Click **OK** to start the process. The Clonezilla ISO will be downloaded, mounted locally, and then copied over to the flash disk.

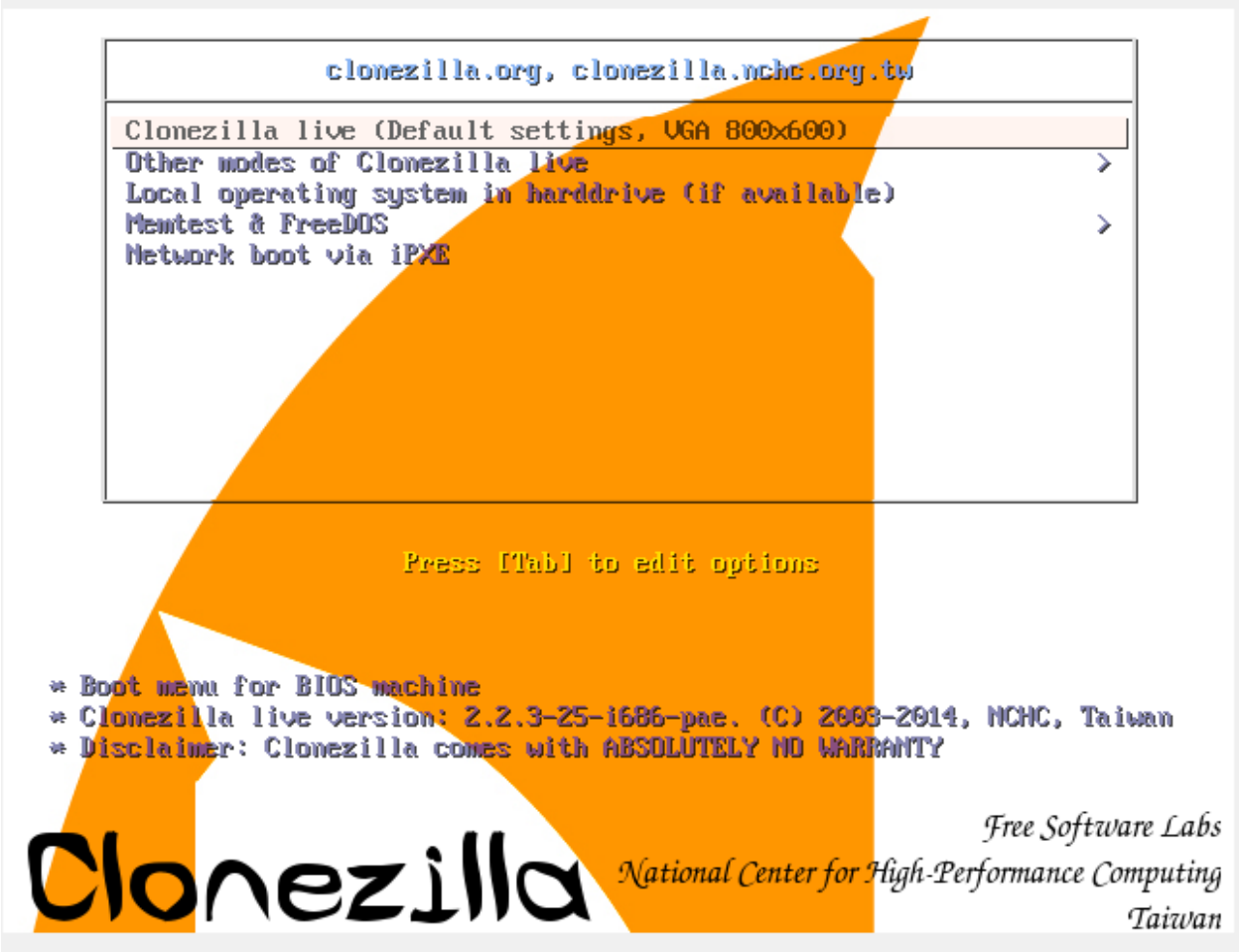


6. Do not reboot when asked. Just Exit Tuxboot.
7. Safely eject the USB flash drive.

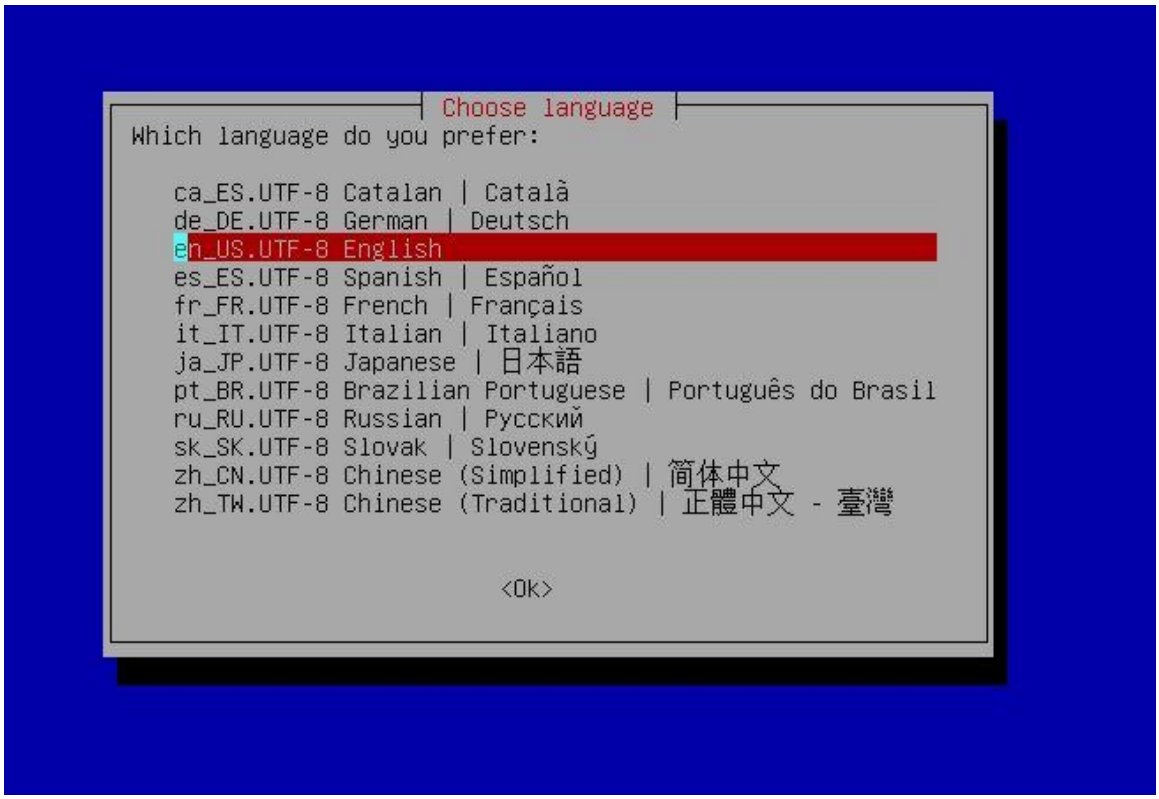
3 Capture Disk Image

Now, we move to the target system that holds the master image.

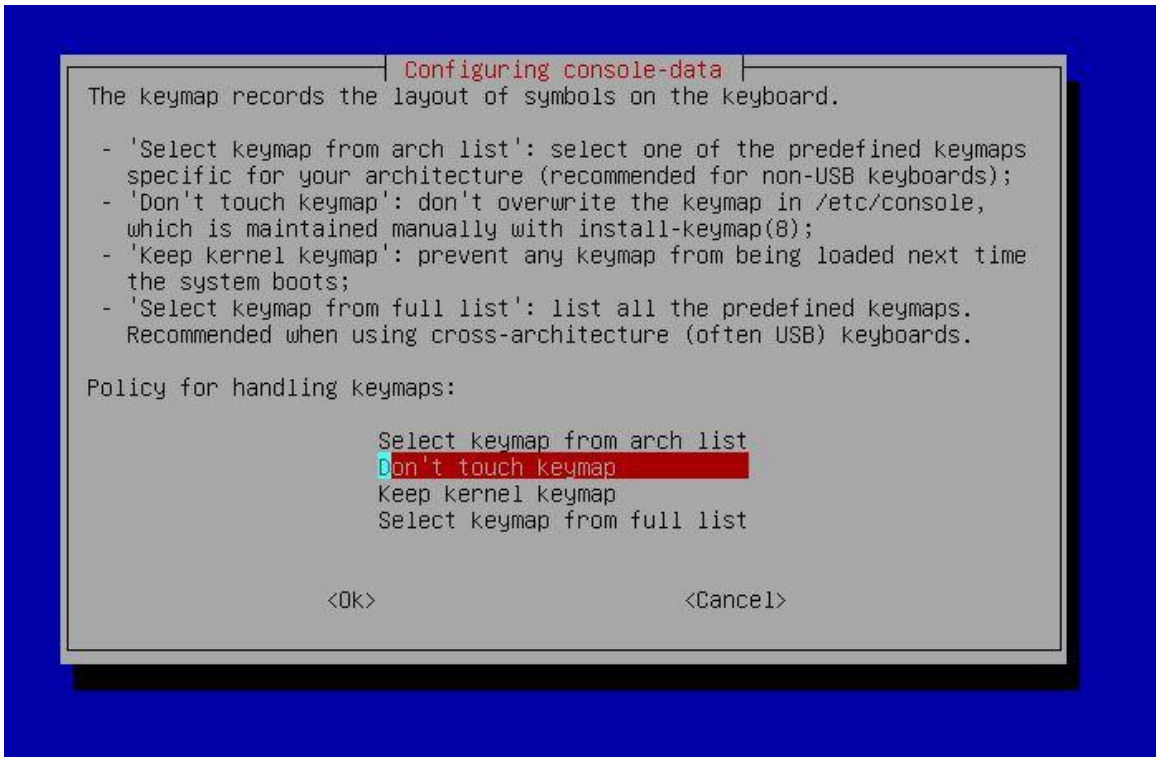
1. Plug the Clonezilla boot disk that we just created into the target system.
2. Boot the target and make sure the BIOS is set up to boot from the USB flash disk.
3. The Clonezilla boot screen appears. Select **Clonezilla Live (Default settings, VGA XXXxYYY)** and hit **Enter**.



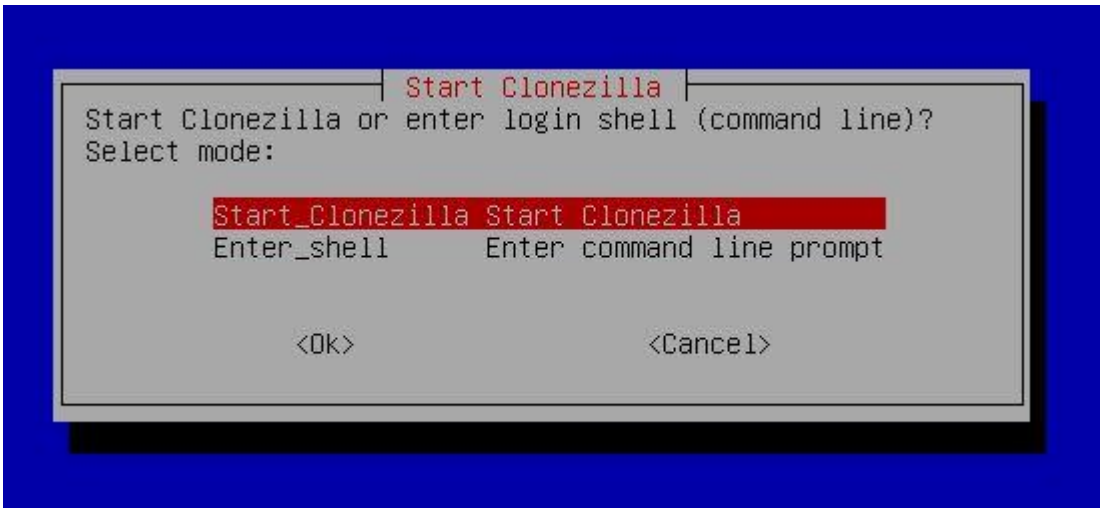
4. The OS will load. Select **English** as the language to use and hit **Enter**.



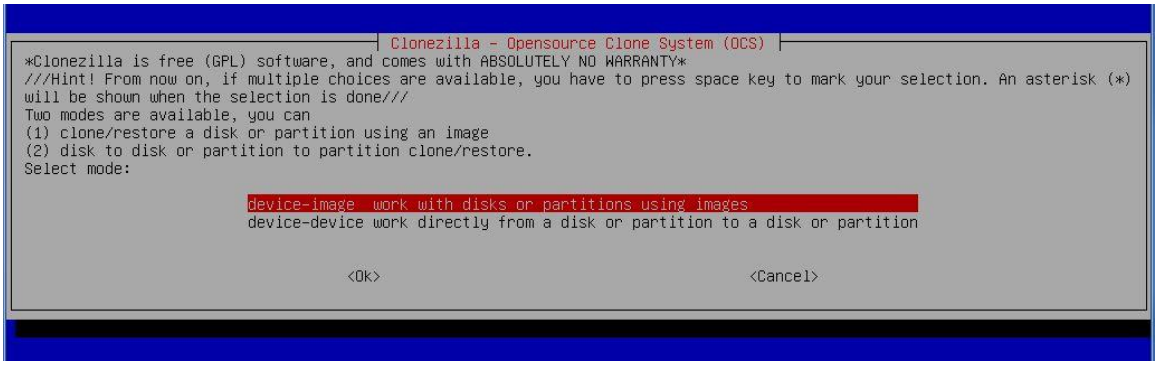
5. Keep the default **Don't touch keymap** and hit **Enter**.



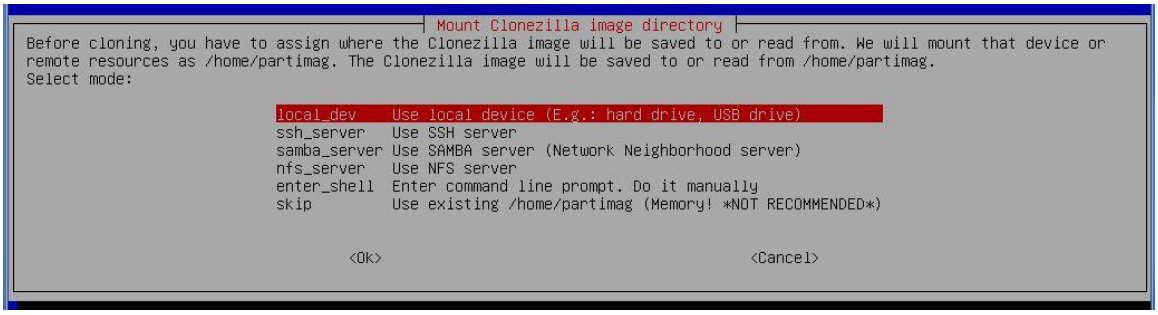
6. The default **Start_Clonezilla Start Clonezilla** should be selected, hit **Enter**.



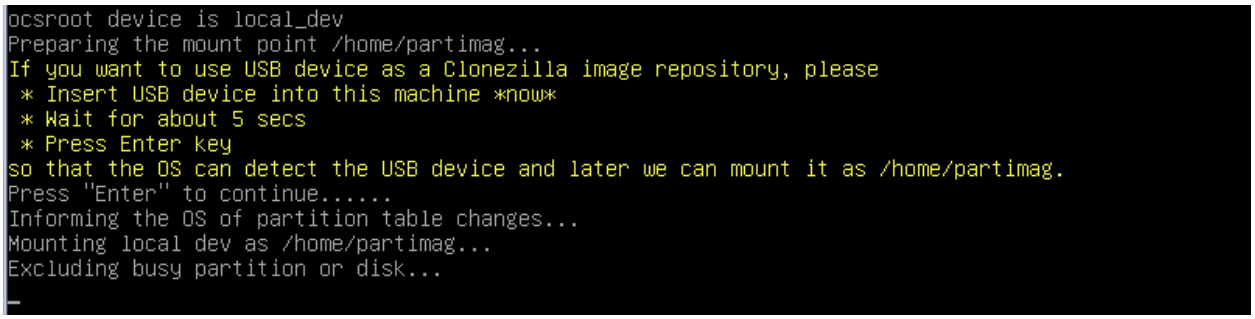
7. In the next menu, select **device-image work with disks or partitions using images** as the operation mode and hit **Enter**.



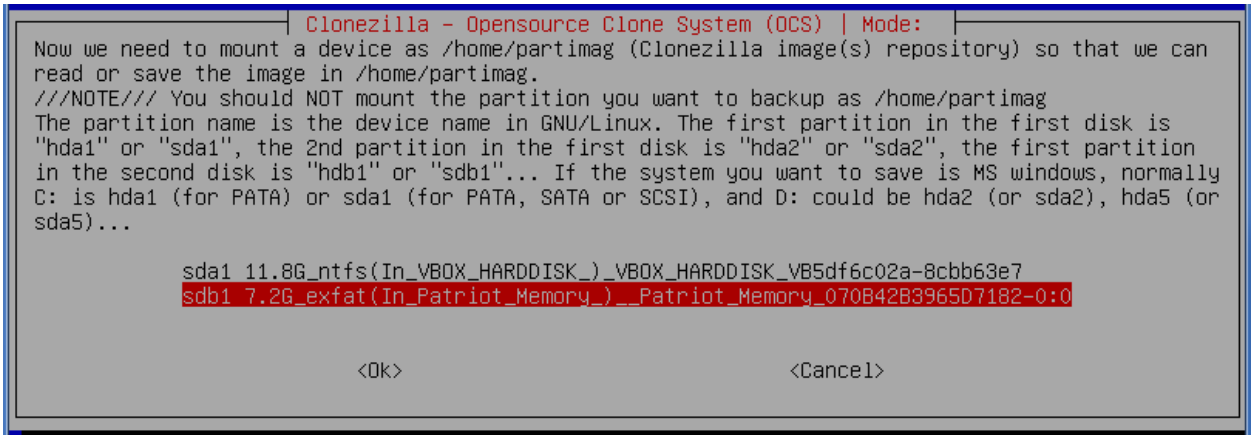
8. The next menu is for the image directory. Keep the default, **local_dev**, and hit **Enter**.



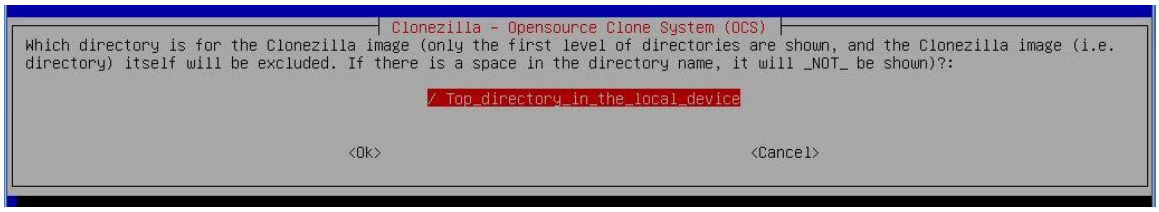
9. Insert the larger USB flash disk when prompted, wait about 5 seconds, and then hit **Enter**.



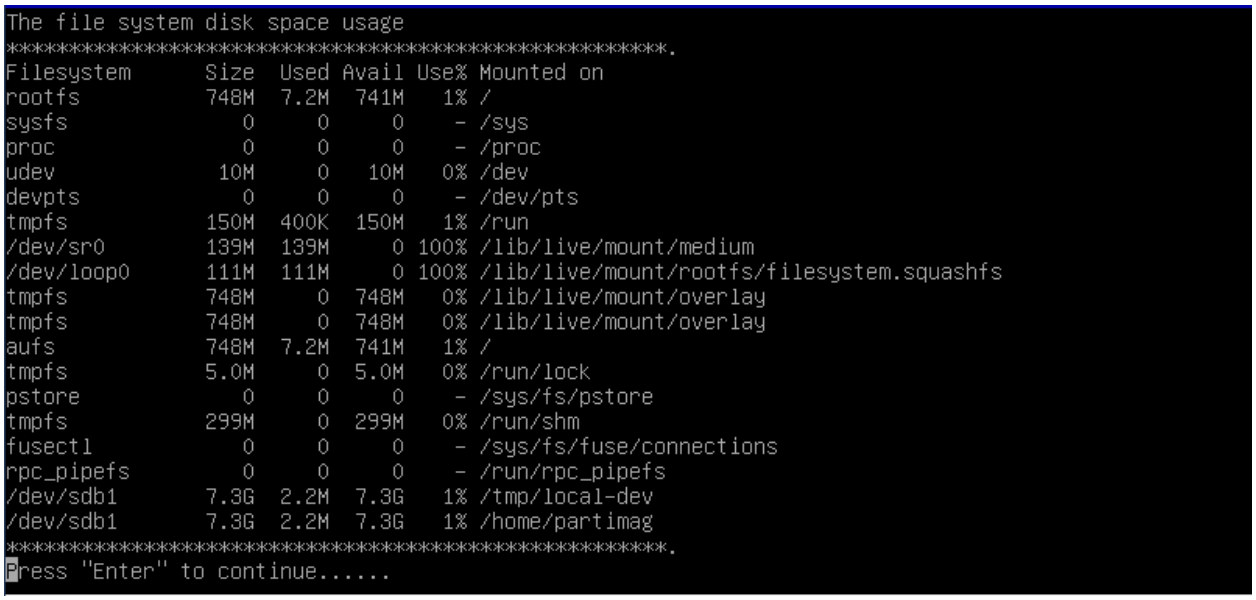
10. The system will mount and prepare the UBS flash disk for the image. You will be asked for the home directory to store the image. Select the USB flash disk image (**sdx1**) and hit **Enter**.



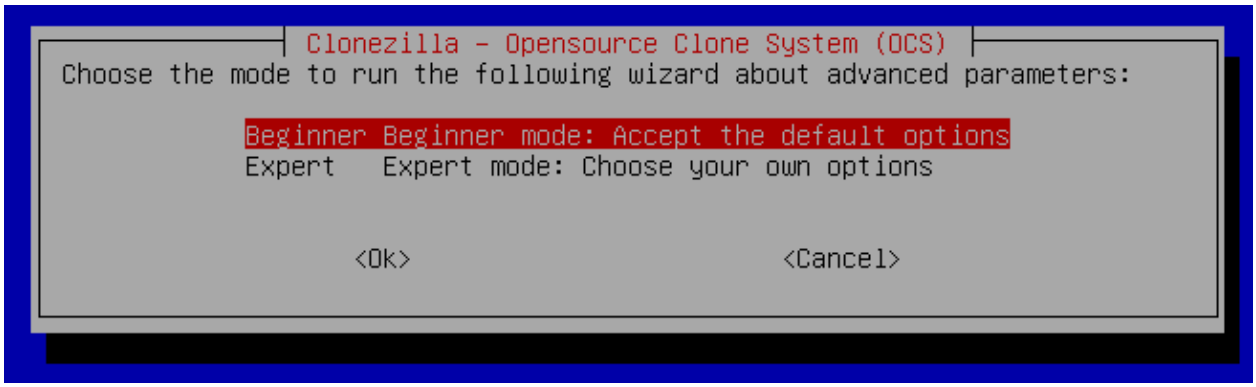
11. The top directory is the default, hit **Enter**.



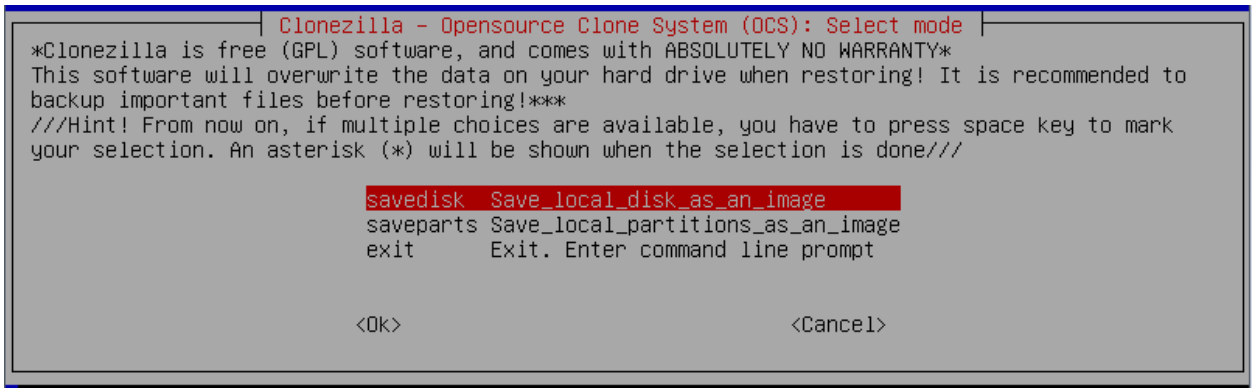
12. A summary will appear, hit **Enter**.



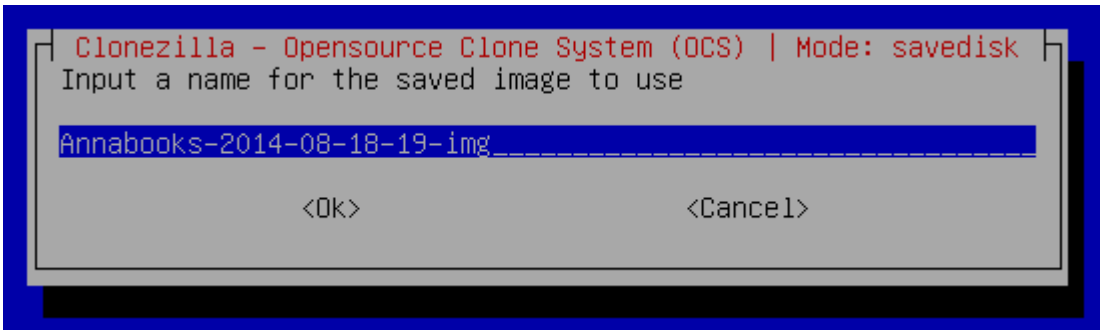
13. The clone wizard starts. Select **Beginner** and hit **Enter**.



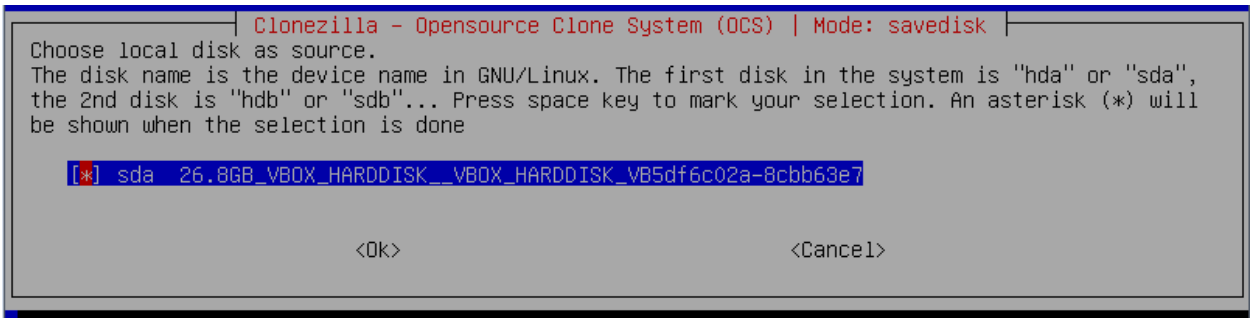
14. The Select Mode screen appears. Select **save disk**, and hit **Enter**.



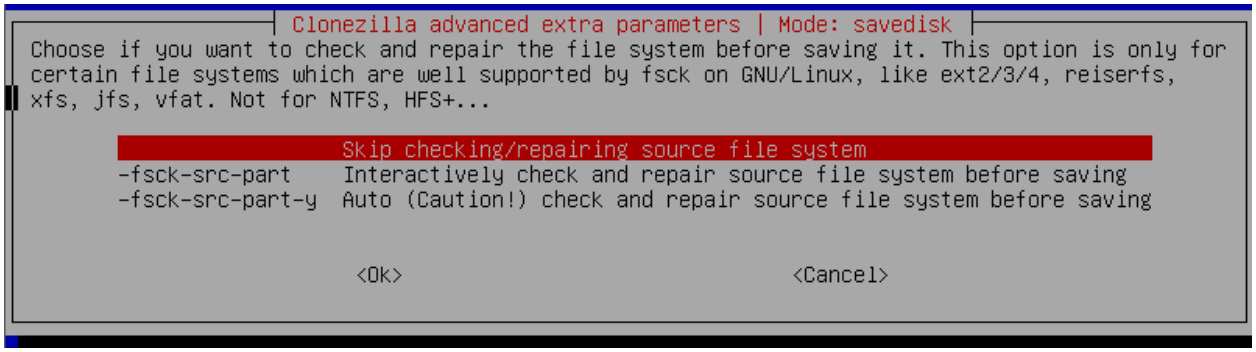
15. An image name with date has been started. Rename the image as you like. For example “Annabooks-2014-08-18-19-img”, hit **Enter**.



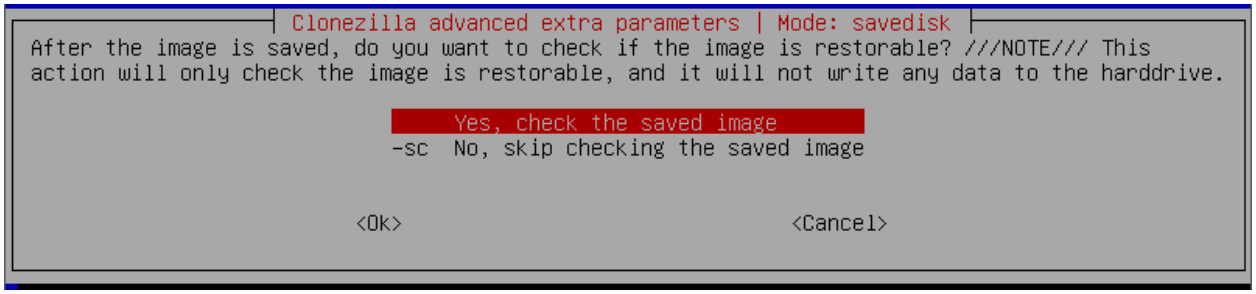
16. The hard disk will be selected as the default source. Hit **Enter**.



17. Select **Skip checking/repairing source file system**, hit **Enter**.

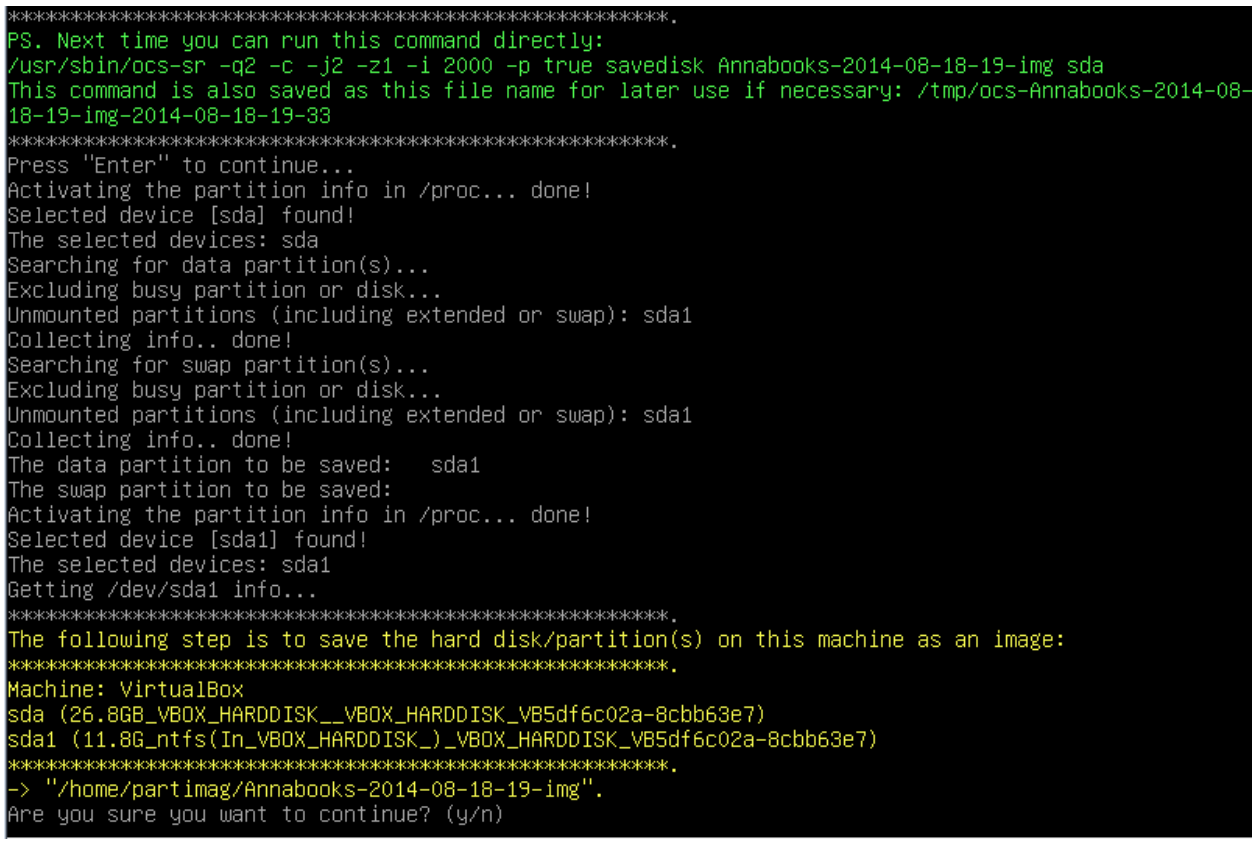


18. Check save disk image option appears, the default is **Yes, check the saved image**. Hit **Enter**.

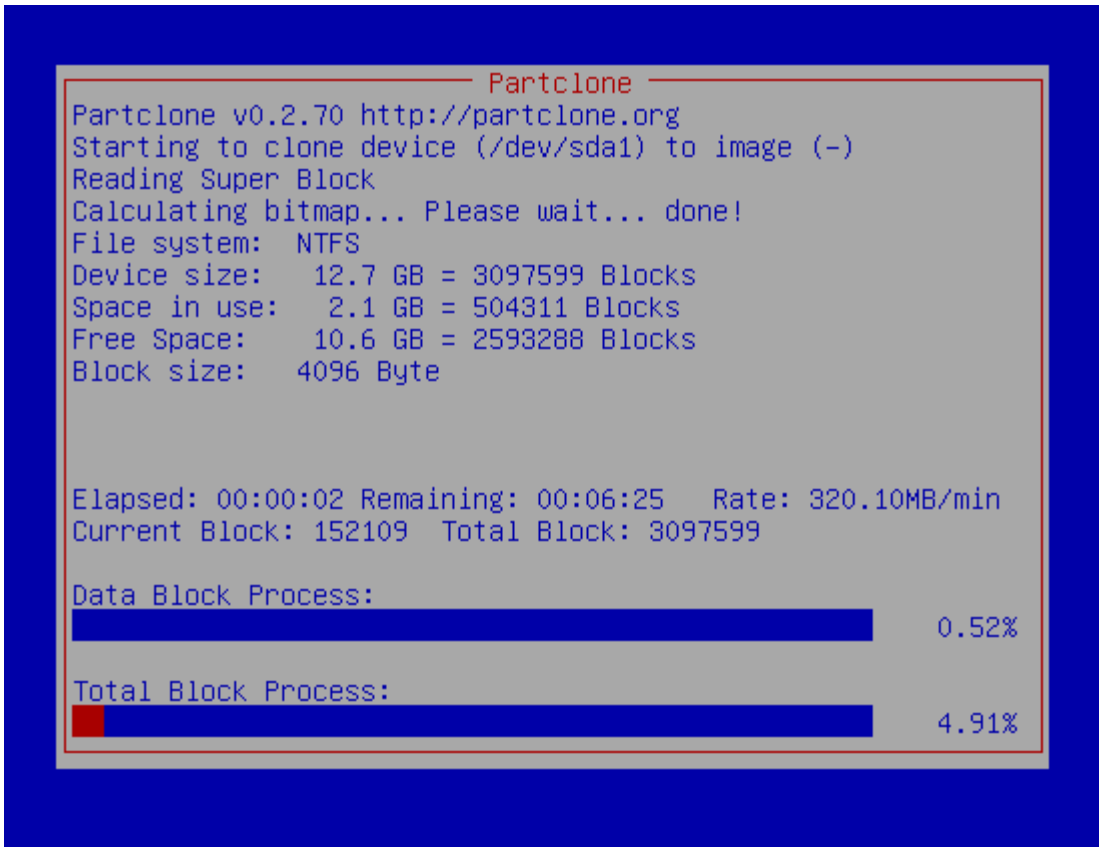


19. Hit **Enter** to continue.

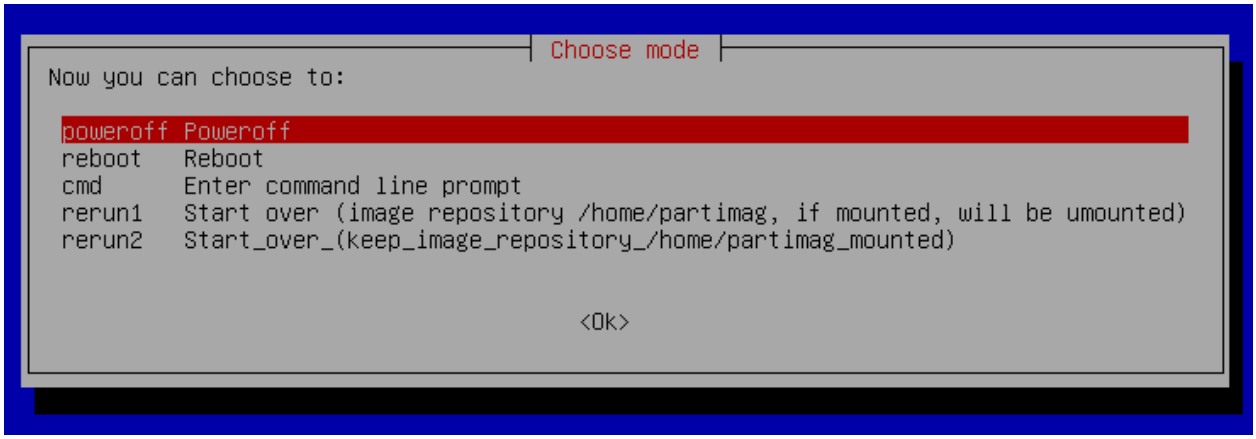
20. Click **y** at the prompt and hit **Enter** to begin the backup process.



21. The capture and check process takes several minutes depending on image size. Hit **Enter** when completed



22. Select **Poweroff** to Power down the system, and hit **Enter**.

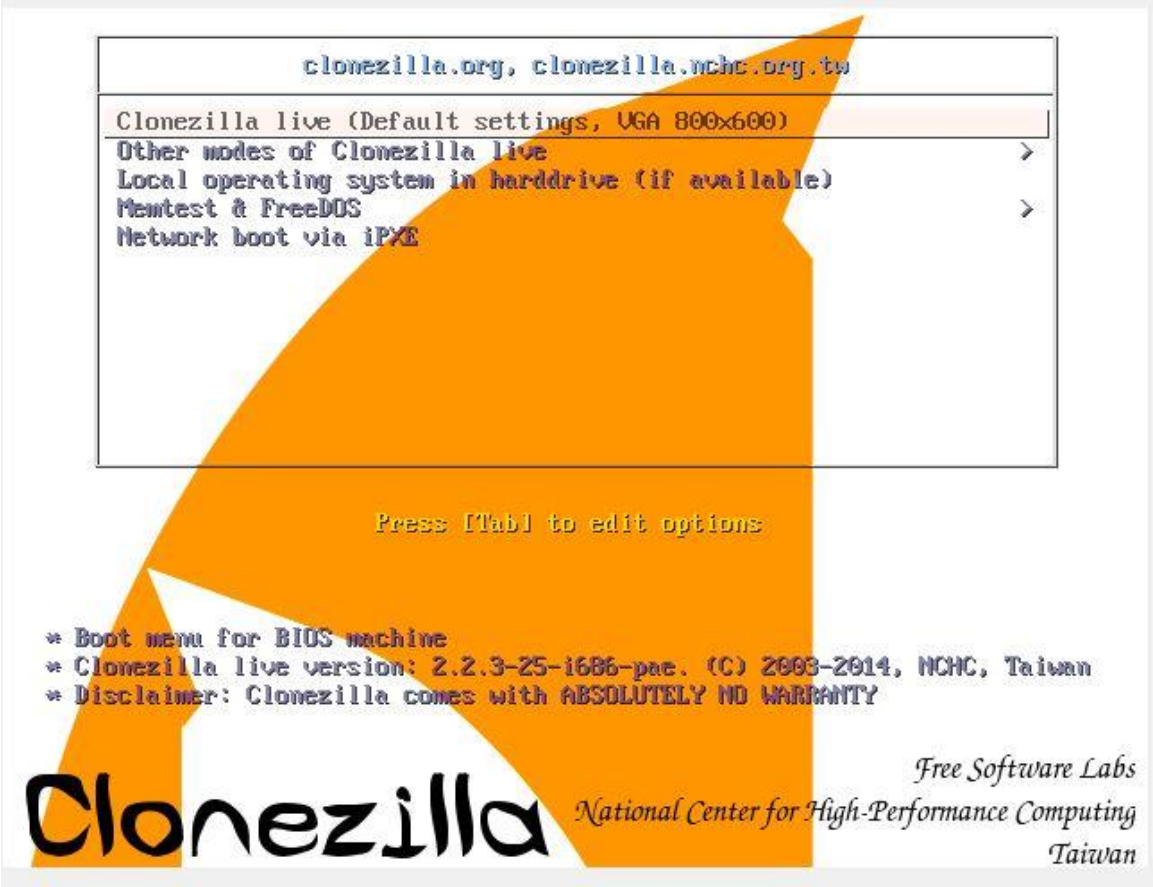


23. Remove both flash disks after the target powers down.

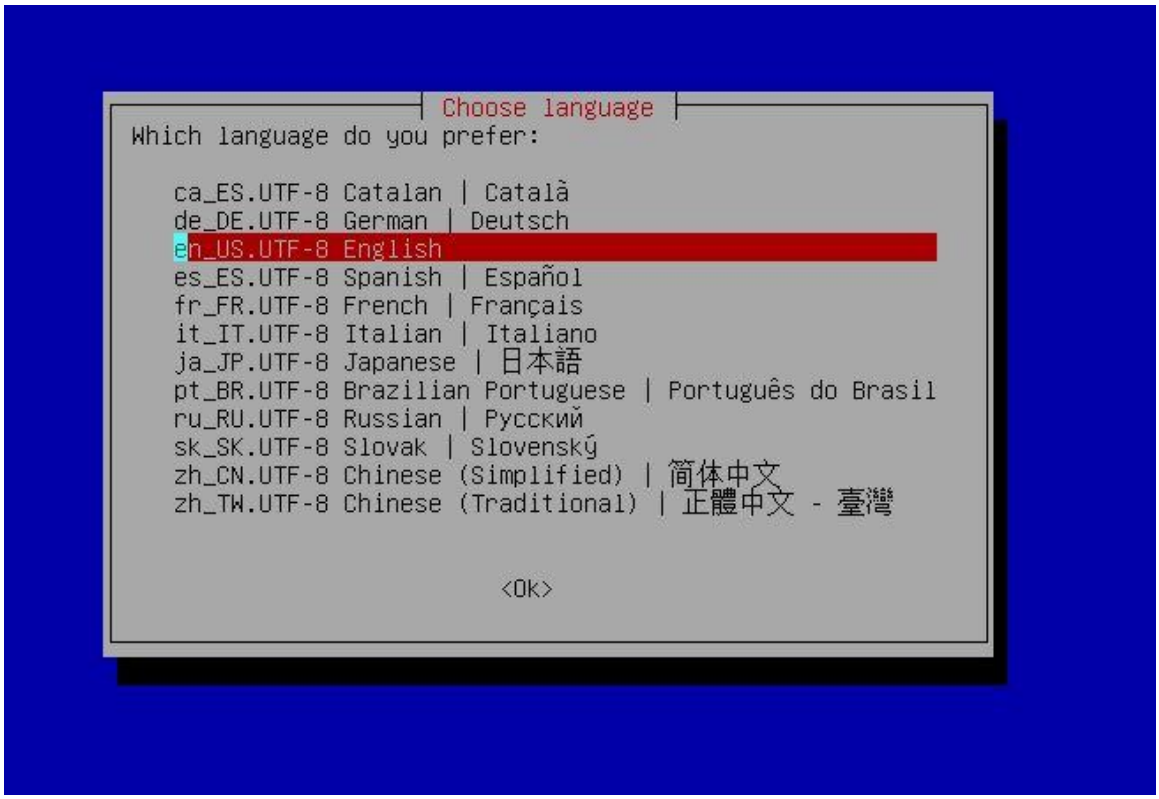
4 Deploy the Captured Disk Image

The two USB disks to capture the image can now be used to deploy the image to other systems.

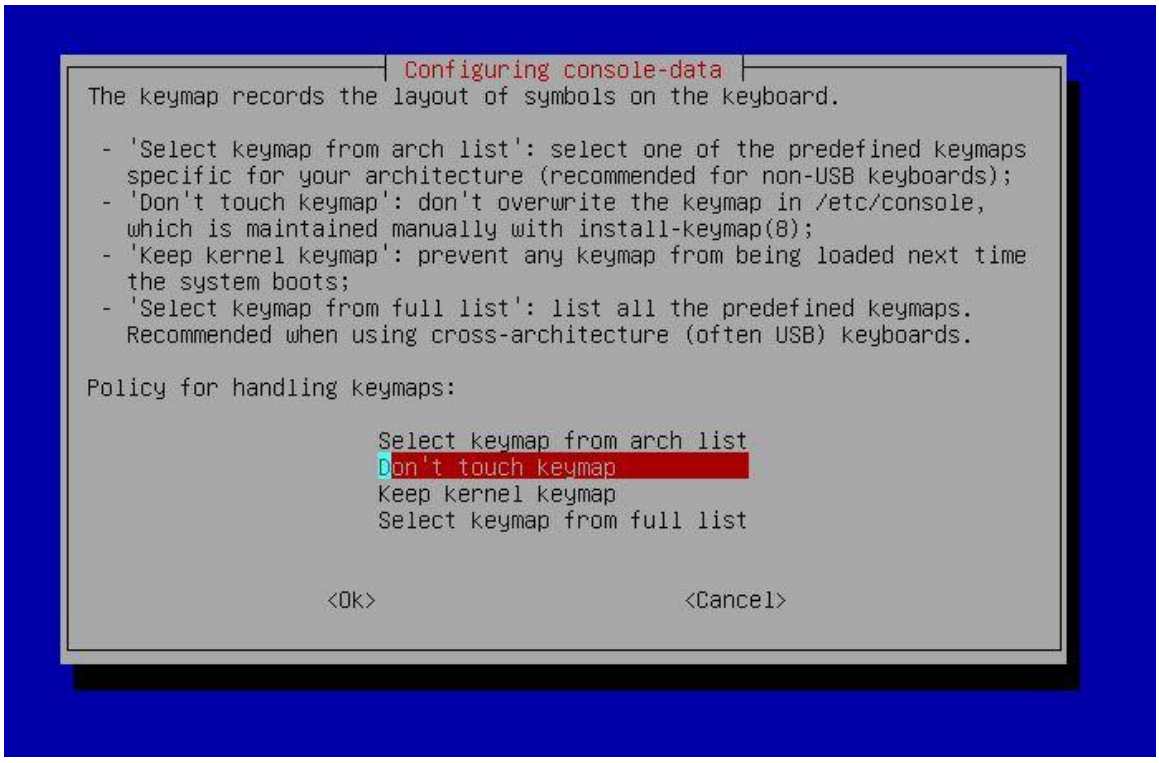
1. Plug the Clonezilla boot disk into the target system.
2. Boot the target and make sure the BIOS is setup to boot from the USB flash disk.
3. The Clonezilla boot screen appears. Select **Clonezilla Live (Default settings, VGA XXXxYYY)** and hit **Enter**.



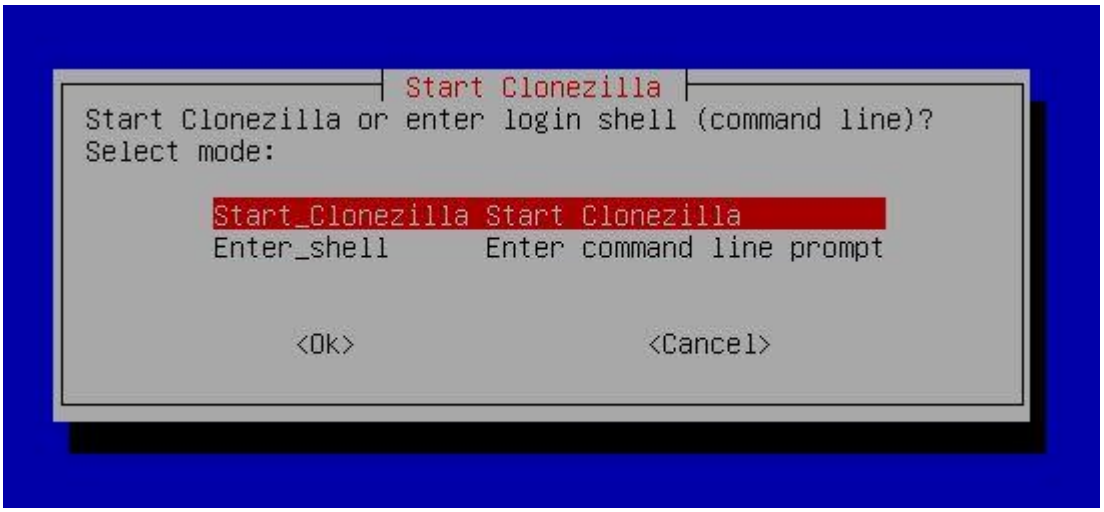
4. The OS will load. Select **English** as the language to use and hit **Enter**.



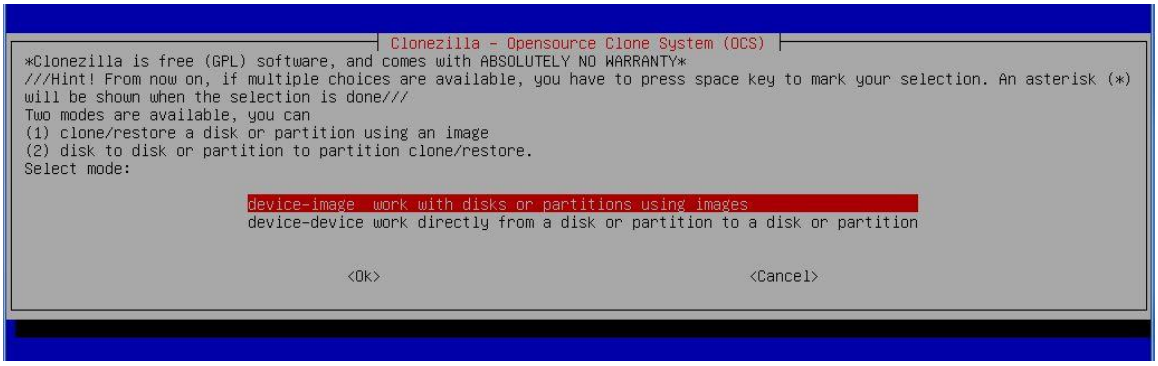
5. Keep the default **Don't touch keymap** and hit **Enter**.



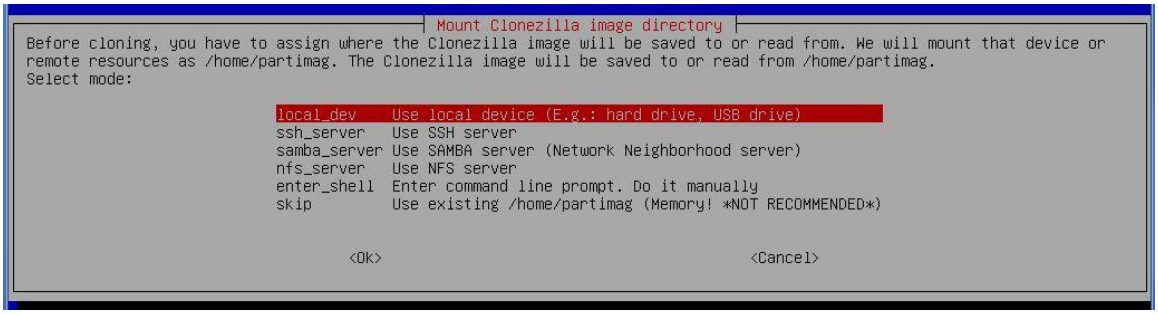
6. The default **Start_Clonezilla Start Clonezilla** should be selected, hit **Enter**.



7. In the next menu, select **device-image work with disks or partitions using images** as the operation mode and hit **Enter**

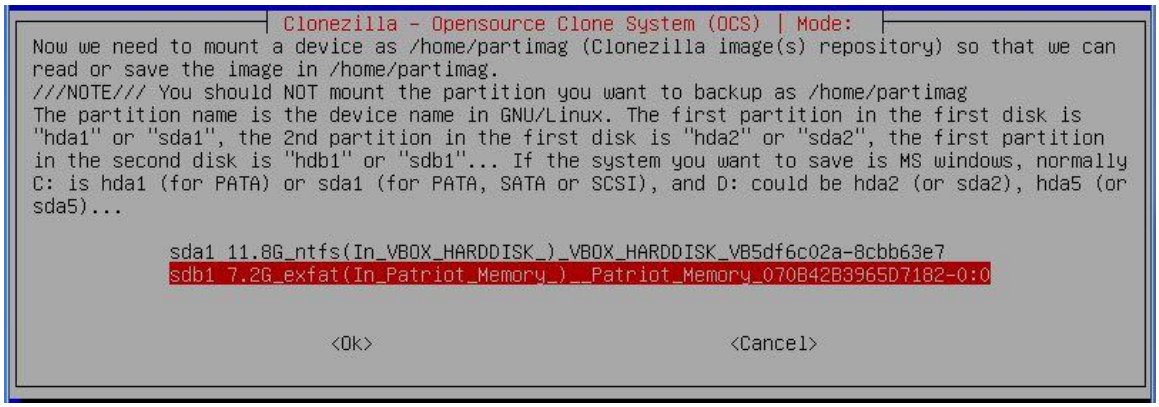


8. The next menu is for the image directory. The default is for **local_dev**, hit **Enter**.

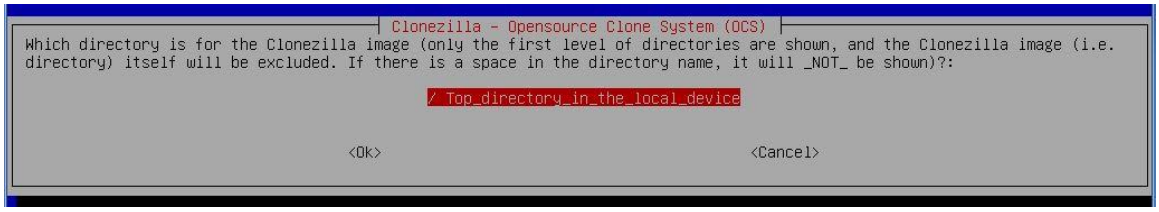


9. Insert the larger USB flash disk when prompted, wait about 5 seconds, and then hit **Enter**.

10. The system will mount and prepare the UBS flash disk for the image. You will be asked for the home directory to store the image. Select the USB flash disk image (**sdx1**) and hit **Enter**.



11. The top directory is the default, hit **Enter**.



12. A summary will appear, hit **Enter**.

```
The file system disk space usage
*************************************************.
Filesystem      Size  Used Avail Use% Mounted on
rootfs          748M  7.2M  741M   1% /
sysfs              0     0     0    - /sys
proc               0     0     0    - /proc
udev             10M     0   10M   0% /dev
devpts             0     0     0    - /dev/pts
tmpfs            150M  400K  150M   1% /run
/dev/sr0         139M  139M     0 100% /lib/live/mount/medium
/dev/loop0       111M  111M     0 100% /lib/live/mount/rootfs/filesystem.squashfs
tmpfs            748M     0  748M   0% /lib/live/mount/overlay
tmpfs            748M     0  748M   0% /lib/live/mount/overlay
aufs             748M  7.2M  741M   1% /
tmpfs            5.0M     0  5.0M   0% /run/lock
pstore             0     0     0    - /sys/fs/pstore
tmpfs            299M     0  299M   0% /run/shm
fusectl            0     0     0    - /sys/fs/fuse/connections
rpc_pipefs         0     0     0    - /run/rpc_pipefs
/dev/sdb1        7.3G  745M  6.5G  11% /tmp/local-dev
/dev/sdb1        7.3G  745M  6.5G  11% /home/partimag
*************************************************.
Press "Enter" to continue.....
```

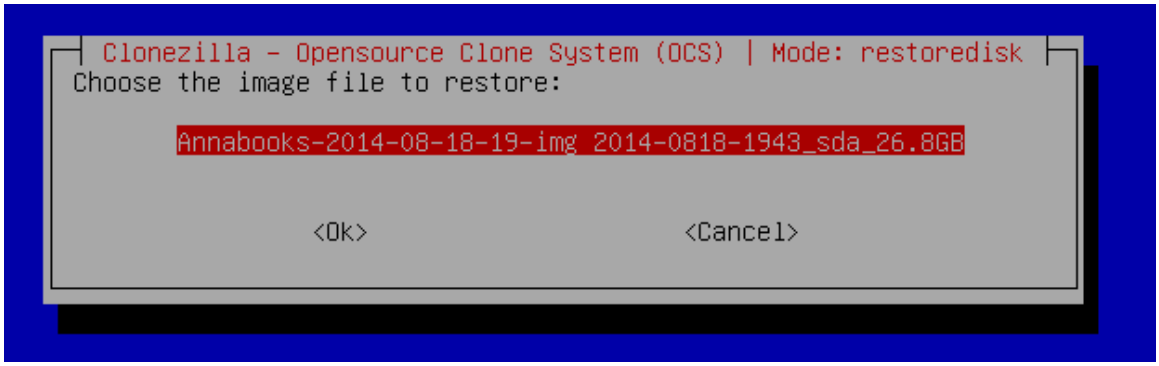
13. The clone wizard starts. Select **Beginner** and hit **Enter**.

```
┤ Clonezilla - Opensource Clone System (OCS) ├
Choose the mode to run the following wizard about advanced parameters:

  Beginner Beginner mode: Accept the default options
  Expert   Expert mode: Choose your own options

          <Ok>                          <Cancel>
```

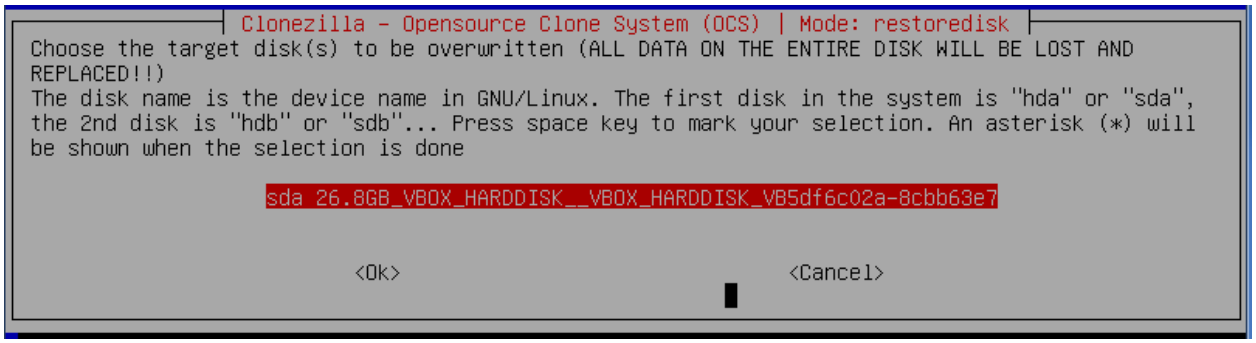
14. The Select Mode screen appears. Select **restoredisk** and hit **Enter**.

```
┤ Clonezilla - Opensource Clone System (OCS): Select mode ├
*Clonezilla is free (GPL) software, and comes with ABSOLUTELY NO WARRANTY*
This software will overwrite the data on your hard drive when restoring! It is recommended to
backup important files before restoring!***
///Hint! From now on, if multiple choices are available, you have to press space key to mark
your selection. An asterisk (*) will be shown when the selection is done///

              savedisk            Save_local_disk_as_an_image
              saveparts           Save_local_partitions_as_an_image
              restoredisk         Restore_an_image_to_local_disk
              restoreparts        Restore_an_image_to_local_partitions
              1-2-mdisks          Restore_an_image_to_multiple_local_disks
              recovery-iso-zip    Create_recovery_Clonezilla_live
              chk-img-restorable  Check_the_image_restorable_or_not
              cvt-img-compression Convert_image_compression_format_as_another_image
              exit                Exit. Enter command line prompt

                        <Ok>                          <Cancel>
```

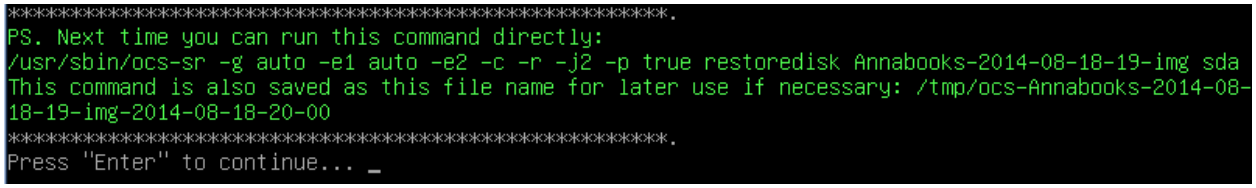
15. The system will search the disk for an image. Since there is only one image on the disk, it is already select, so hit **Enter**.



16. Select the hard drive and hit **Enter**.



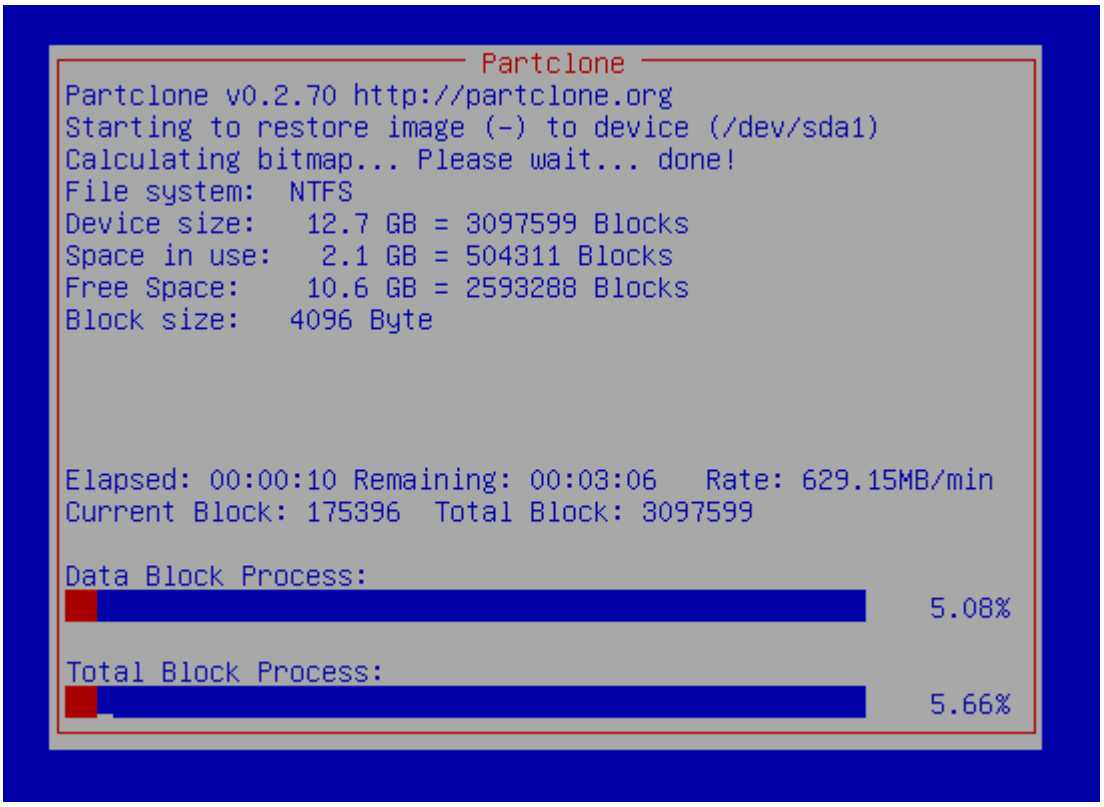
17. Hit **Enter** again.



18. Enter **y** at the prompt and hit **Enter**.
19. One more time, enter **y** at the prompt and hit **Enter**.

```
Activating the partition info in /proc... done!
Getting /dev/sda1 info...
*******************************************************.
The following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
imag/Annabooks-2014-08-18-19-img" -> "sda sda1"
The image was created at: 2014-0818-1943
WARNING!!! WARNING!!! WARNING!!!
WARNING. THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
 BE LOST:
*******************************************************.
Machine: VirtualBox
sda (26.8GB_VBOX_HARDDISK__VBOX_HARDDISK_VB5df6c02a-8cbb63e7)
sda1 (11.8G_ntfs(In_VBOX_HARDDISK_)_VBOX_HARDDISK_VB5df6c02a-8cbb63e7)
*******************************************************.
Are you sure you want to continue? (y/n) y
OK, let's do it!!
This program is not started by clonezilla server.
*******************************************************.
Let me ask you again.
The following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
imag/Annabooks-2014-08-18-19-img" -> "sda sda1"
The image was created at: 2014-0818-1943
WARNING!!! WARNING!!! WARNING!!!
WARNING. THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
 BE LOST:
*******************************************************.
Machine: VirtualBox
sda (26.8GB_VBOX_HARDDISK__VBOX_HARDDISK_VB5df6c02a-8cbb63e7)
sda1 (11.8G_ntfs(In_VBOX_HARDDISK_)_VBOX_HARDDISK_VB5df6c02a-8cbb63e7)
*******************************************************.
Are you sure you want to continue? (y/n) _
```

20. The process can take several minutes. Hit **Enter** when completed.



21. Select to **Poweroff** to power down the system, and hit **Enter**.

22. Remove both flash disks after the target powers down.
23. Boot the system again and let the Windows cloning process run on the system.

Once the master Clonezilla image has been created, it can be deployed any number of times to identical target hardware systems. This could easily be incorporated as part of the manufacturing process for an embedded system product.