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# **born\_digital\_bootcamp Documentation**

*Release 1.0*

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## Welcome to Born-Digital Bootcamp!

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The following instructions will help you get started with our Collections Services born-digital processing project and earn the much-coveted **Digital Archives Pin!**

### 1.1 Things to know:

- Each person is responsible for twenty pieces of born-digital media from the Nathaniel Mackey papers. The bulk of the digital media included in the Mackey papers are 3.5” floppy disks, but there are also a handful of 5.25” floppy disks and optical discs. It doesn’t matter which of these disks you work on, providing you complete the process for twenty pieces of media.
- **For each piece of digital media, each person will complete the following tasks:**
  - *Capturing a disk image using either the KryoFlux (for floppy disks) or dd (for optical discs).*
  - *Migrating the disk image to a format suitable for ingest into the Keep.*
  - *Generating a Fiwalk report for each disk image and scanning each disk image for viruses.*
  - *Preparing the disk image and any supplemental files for ingest into the Keep using BagIt.*
  - *Ingesting each packaged disk image into the Keep and completing Keep object metadata records.*
- **Each person will be assigned a range of numbers that you should use as unique identifiers for your twenty disk images.**
  - ERR: 1297\_03 - 1297\_23
  - JB: 1297\_24 - 1297\_44
  - CH: 1297\_45 - 1297\_65
  - LS: 1297\_66 - 1297\_86
  - SQ: 1297\_87 - 1297\_107
  - MO: 1297\_108 - 1297\_128

- CB: 1297\_129 - 1297\_149
  - RTS: 1297\_150 - 1297\_170
  - DW: Whatever remains
- Each person will find an envelope in the lab with their name on it. Please use this envelope to store disks as you complete the imaging process. As you make progress, you may need to get a larger envelope/box.
  - All Born-Digital Bootcamp documentation will be made available on this site. If you have any feedback or questions about the documentation, please don't hesitate to get in touch!

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### Switching between BitCurator and Windows

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The following instructions describe the steps required to switch between BitCurator and Windows on the Digital Archives Lab computers. Both Dell computers have both BitCurator and Windows installed.

#### 2.1 To switch from BitCurator to Windows:

1. Click the **Settings** icon in the very top-right corner of the BitCurator desktop.
2. From the drop-down menu, select **Shut Down...**
3. Click the large **Restart** button.
4. Pay attention as the computer restarts. As soon as you see the Dell boot screen, hit **F12**. You should see the message **Preparing one-time boot menu** in yellow.
5. Use the arrow keys to scroll to **Windows Boot Manager** and hit **enter**.
6. Windows will boot. Log-in as normal.

#### 2.2 To switch from Windows to BitCurator:

1. Click the **Windows** icon in the very bottom-left corner of the Windows desktop.
2. Click the **On/Off** icon and select **Restart**.
3. Pay attention as the computer restarts. As soon as you see the Dell boot screen, hit **F12**. You should see the message **Preparing one-time boot menu** in yellow.
4. Use the arrow keys to scroll to **ubuntu** and hit **enter**.
5. Use the arrow keys to scroll to **BitCurator-1.8.12 GNU/Linux** and hit **enter**.
6. After a few minutes, you will be prompted to enter a log-in username. Type the BitCurator user name and hit **enter**.

7. You will be prompted for a password. Type the BitCurator password and hit **enter**.
8. Hit the up arrow key until you see the following command:

```
sudo mount -o remount,rw '/dev/sda2'
```

9. Hit **enter**.
10. Hit the up arrow key until you see the following command:

```
sudo service lightdm start
```

11. Hit **enter**. The BitCurator GUI will launch.



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## Transferring data from floppy disks using the KryoFlux

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### 3.1 Before you begin:

- This workflow uses tools stored in Windows. If necessary, restart the Digital Archives Lab workstation and boot to the Windows hard drive. You can find instructions on how to do this [here](#).
- **Make sure the Digital Archives' Lab workstation is not connected to the internet.** Unplug the yellow ethernet cord at the back of the computer.
- As you unpack the KryoFlux, pay attention to the labels on the data cable and the KryoFlux enclosure. These will help ensure that the floppy disk drive and the KryoFlux are connected correctly.
- As you are setting up the KryoFlux, avoid placing any drives on the metal shelves over the workstations.

### 3.2 Set-up instructions:

1. Using the data cable, connect the KryoFlux to the correct floppy disk drive.
  - The data cable has three connectors: one for the KryoFlux; one for 3.5" floppy disk drives; and one for 5.25" floppy disk drives. Each connector on the cable is clearly labelled.
  - The data cable's red wire signifies pin 1. When connecting the data cable to the KryoFlux, be sure to align the red wire with the **Pin 1** label on the KryoFlux enclosure.
2. Using the USB cable, connect the KryoFlux to the lab workstation.

#### Check that the associated driver is correct:

3. In the Windows Search Box, type *device manager* and hit **enter**.
4. From the list, select **Universal Serial Bus Controllers**. If you see **KryoFlux Disk System** listed here, you can skip to step 11.
5. If you do not see **KryoFlux Disk System** listed, select **Ports (COM & LPT)**.
6. Right-click on **Bossa Program Port**.

7. Select **Update driver software**.
8. Select **Browse my computer for driver software**.
9. Select **Let me pick from a list of device drivers on my computer**.
10. At this stage you should see **KryoFlux Disk System** listed. Select it and hit **Next**. You should see the following confirmation message: **Windows has successfully updated your driver software**. Hit **Close**.

### 3.3 Complete KryoFlux set-up:

**NOTE:** All terminal commands are case-sensitive.

11. Type `cmd` into the Windows Search Box to open a terminal window.
12. Type the following command into the terminal window in order to navigate to the DTC folder and hit **enter**:

```
cd ..\..\.."Program Files (x86)"\kryoflux_2.51_windows\dtc
```

13. Type the following command and hit **enter**

```
dtc -c2
```

**NOTE:** The resulting prompt will likely say: **Control command rejected by the device. CM: maxtrack = 83**.

14. Ensure that the power cable is plugged in and connect the power adaptor to the back of the floppy disk drive.
  - The power adaptor has two connectors: the smaller one is for 3.5" floppy disk drives and the larger one is for 5.25" floppy disk drives. Both are clearly labelled.
  - When working with the 5.25" drive, in particular, be careful to make sure that the adaptor is properly aligned.
  - When disconnecting the adaptors, grip the white plastic piece and not the wires, as these are quite fragile and easily come loose if mishandled.
15. Insert a floppy disk.
16. Re-type the following command and hit **enter**:

```
dtc -c2
```

**NOTE:** The resulting prompt will likely say something like: **CM: maxtrack = 83**.

### 3.4 Capture stream files:

17. Ensure that the Digital Archives hard drive dock is powered on.
18. Type the following command and hit **enter**:

```
dtc -p -fJ:\digitalArchives\diskImages\[collectionName]_diskImages\  
[MSSnumber_ID]\[MSSnumber_ID] -i0 -i4 -i9 -i18
```

*For example:*

```
dtc -p -fJ:\digitalArchives\diskImages\Lomax_diskImages\  
785_01\785_01 -i0 -i4 -i9 -i18
```

**NOTE:** You may need to double check the drive letter associated with the Digital Archives hard drive dock, as it may not always be J:. If necessary, substitute the correct drive letter at the beginning of the file path. 19. Imaging will begin. Progress will be logged in the terminal window.

### 3.5 Verify correct encoding format:

20. Review the terminal output to determine which encoding format is correct:

- Incorrect formats will register as `unformatted`.
- The correct format will be listed as `OK`.
- If MFM is the correct format, use `-i4` in step 21.
- If Apple DOS 400/800 is the correct format, use `-i9` in step 21.
- If neither format is correct, make a note of this and set disk aside for further review at a later date.

### 3.6 Capture correctly encoded disk image:

21. Type the following command and hit **enter**:

```
dtc -fJ:\digitalArchives\diskImages\[collectionName]_diskImages\
[MSSnumber_ID]\[MSSnumber_ID] -i0 -fJ:\digitalArchives\
diskImages\[collectionName]_diskImages\
[MSSnumber_ID]\[MSSnumber_ID].img -i[4 or 9] -m1 -l8
```

*For example:*

```
dtc -fJ:\digitalArchives\diskImages\Lomax_diskImages\
785_01\785_01 -i0 -fJ:\digitalArchives\diskImages\
Lomax_diskImages\785_01\785_01.img -i4 -m1 -l8
```

22. Once imaging is complete, remove the floppy disk from the drive.
23. Label the disk with its `MSSnumber_ID`. Be sure not to obscure any original labels.

### 3.7 Repeat for remaining floppy disks:

24. Insert next floppy disk.
25. Repeat from step 18.

**Time-saving tip:** Use the up arrow to page through commands that you have previously run in the terminal window. Once you have found the correct command, you can edit it as needed before running it again.

### 3.8 Disconnect the KryoFlux:

26. Click the **Safely remove hardware** icon and select **KryoFlux Disk System**.
27. Once it is safe to remove the KryoFlux, carefully disconnect the power (taking care not to pull on the wires), then the USB cable, and finally the data cable.

28. Replace all components in the Kryoflux box and return to the cabinet.

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## Migrating KryoFlux image files in preparation for ingest

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### 4.1 Before you begin:

- This workflow uses tools stored as part of the BitCurator suite. If necessary, restart the Digital Archives Lab workstation and boot to the BitCurator hard drive. You can find instructions on how to do this [here](#).
- Ensure that the Digital Archives Lab workstation is not connected to the Internet by unplugging the ethernet cable.

### 4.2 Locate existing image files:

1. Ensure that the Digital Archives hard drive dock is powered on.
2. Open a terminal window but right-clicking anywhere on the Desktop and selecting **Open Terminal**.
3. Navigate to the directory in which existing image files are stored:

- In the terminal window, type:

```
cd ../../media/bcadmin/New\ Volume/digitalArchives/diskImages/  
Mackey_diskImages
```

- Hit **enter**.

### 4.3 Calculate the MD5 checksum for the existing image file:

4. Calculate and log the MD5 checksum for first existing raw disk image file. In the terminal, type the following command and hit **enter**:

```
md5sum [MSSnumber_ID]/[MSSnumber_ID].img >[MSSnumber_ID]/imgMD5.txt
```

*For example:*

```
md5sum 1297_24/1297_24.img >1297_24/imgMD5.txt
```

This will create a new text file inside your folder that contains the MD5 checksum for the raw disk image.

## 4.4 Migrate the existing raw disk image using ewfacquire:

5. In the terminal, type the following command and hit **enter**:

```
ewfacquire ./[MSSnumber_ID]/[MSSnumber_ID].img -C ["MSSnumber_ID"] -D  
["Description of media"] -e ["your netID"] -E ["Collection name"] -f  
"encase6" -m "removable" -M "logical" -N "Migration from img" -c  
"deflate" -o 0 -S "1.4 GiB" -P 512 -g 64 -t ./[MSSnumber_ID]/  
[MSSnumber_ID]
```

*For example:*

```
ewfacquire ./1297_24/1297_24.img -C "1297_24" -D "3.5 inch floppy  
disk" -e "netID" -E "Nathaniel Mackey papers" -f "encase6" -m  
"removable" -M "logical" -N "Migration from img" -c "deflate" -o 0  
-S "1.4 GiB" -P 512 -g 64 -t ./1297_24/1297_24
```

6. As prompted in the terminal window, hit **enter** five times. Look for acknowledgement that a new forensically packaged disk image has been successfully created: you should see an acquire start and completion time, an MD5 hash (checksum) calculated over the data, and a confirmation message reading `ewfacquire: SUCCESS`.

## 4.5 Verify the new disk image using ewfverify:

7. In the terminal, type the following command and hit **enter**:

```
ewfverify [MSSnumber_ID]/[MSSnumber_ID].E01  
>[MSSnumber_ID]/verify[MSSnumber_ID].txt
```

*For example:*

```
ewfverify 1297_24/1297_24.E01 >1297_24/verify1297_01.txt
```

This will create another new text file inside your folder that contains verification information for the new forensically packaged disk image. Open and review the file to ensure that verification has been successful.

## 4.6 Compare checksums for raw disk image and forensically packaged disk image:

8. Open both the **MD5** and **verify** text files created at steps 4 and 7. Compare the first few characters in each MD5 hash to ensure that they match.

## 4.7 Repeat for remaining raw disk images:

7. Repeat from step 4.

**Time-saving tip:** Use the up arrow to page through commands that you have previously run in the terminal window. Once you have found the correct command, you can edit it as needed before running it again.





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## Generating Fiwalk reports, with virus checking

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### 5.1 Before you begin:

- This workflow uses tools stored as part of the BitCurator suite. If necessary, restart the Digital Archives Lab workstation and boot to the BitCurator hard drive. You can find instructions on how to do this [here](#).
- Ensure that the Digital Archives Lab workstation is not connected to the Internet by unplugging the ethernet cable.

### 5.2 Run Fiwalk with the ClamAV plugin:

1. Ensure that the Digital Archives hard drive dock is powered on.
2. Open a terminal window but right-clicking anywhere on the Desktop and selecting **Open Terminal**.
3. In the terminal, type the following command and hit **enter**:

```
cd /home/bcadmin/.fiwalk
```

4. In the terminal, type the following command and hit **enter**:

```
fiwalk -c clamconfig.txt -X /media/bcadmin/New\  
Volume/digitalArchives/diskImages/  
[collectionName]_diskImages/[MSSnumber_ID]/fiwalk.xml  
/media/bcadmin/New\ Volume/digitalArchives/diskImages  
/[collectionName]_diskImages/[MSSnumber_ID]/  
[disk image filename with extension]
```

*For example:*

```
fiwalk -c clamconfig.txt -X /media/bcadmin/New\  
Volume/digitalArchives/diskImages/Mackey_diskImages/1297_01/
```

```
fiwalk.xml /media/bcadmin/New\ Volume/digitalArchives/  
diskImages/Mackey_diskImages/1297_01/1297_01.E01
```

### 5.3 Review fiwalk.xml:

5. Once you've run the command listed above, you should find a **fiwalk.xml** file in the same folder as your disk image. Open **fiwalk.xml**.
6. For each file listed in **fiwalk.xml**, review the `<clamav>` tags. As long as the file is not infected with any viruses, their contents will be 0. If you notice that one or more files are contaminated, consult the digital archivist.

### 5.4 Repeat for remaining disk images:

7. For each remaining disk image, repeat from step 4.

**Time-saving tip:** Use the up arrow to page through commands that you have previously run in the terminal window. Once you have found the correct command, you can edit it as needed before running it again.

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## Packaging disk images and supplemental files using BagIt

---

### 6.1 Before you begin:

- This workflow uses tools stored in BitCurator. If necessary, restart the Digital Archives Lab workstation and boot to the BitCurator hard drive. You can find instructions on how to do this [here](#).
- Ensure that the Digital Archives Lab workstation is not connected to the Internet by unplugging the ethernet cable.

### 6.2 Create folders:

1. Ensure that the Digital Archives hard drive dock is powered on.
2. Ensure that the Digital Archives hard drive is mounted inside BitCurator. If necessary, double-click the **New Volume** icon in the toolbar on the left-hand side of the screen. Once the Digital Archives hard drive is mounted, a **New Volume** icon will appear on the Desktop.
3. Double-click the **New Volume** icon on the Desktop and navigate to the **Mackey\_diskImages** folder.
4. Create a new folder inside the **Mackey\_diskImages** folder. Name the folder using your netID or name.
5. Move into the folder created at step 4.

**NOTE:** Before beginning the process of creating bags, each forensically packaged disk image (.E01) must be placed with any supplemental files inside a folder named using the MSSnumber\_ID (e.g., 1297\_01). There are two ways to create these folders:

#### *Option 1 (easy but tedious)*

1. Create each folder one-by-one by right-clicking and selecting **New Folder**.
2. Name each folder using the MSSnumber\_ID.

#### *Option 2 (fast but requires the command line)*

1. Launch a terminal window.

2. Navigate to the folder created at step 4 by typing the following command:

```
cd ../../media/bcadmin/New\ Volume/digitalArchives/diskImages/  
Mackey_diskImages/[your new folder]
```

3. Type the following command to create all 20 folders at once and hit **enter**:

```
mkdir 1297_{[ID]..[ID]}
```

*For example:*

```
mkdir 1297_{150..170}
```

6. Each folder needs to contain the following files:

- (a) The forensically packaged disk image (.E01)
- (b) The imgMD5.txt file created during migration from a .img file to a .E01 file
- (c) The verify[MSSnumber\_ID].txt file also created during migration from a .img file to a .E01 file (e.g., verify1297\_24.txt)
- (d) The fiwalk.xml file

You can either copy and paste the relevant files into their folder or use the command line to move files (instructions forthcoming).

## 6.3 Create a Bag:

7. Launch a terminal window, if you don't already have one open.
8. Type the following command into the terminal window in order to package your first disk image folder as a Bag and hit **enter**:

```
bagit.py --md5 --sha1 --contact-name=[your netID]  
./[MSSnumber_ID]
```

*For example:*

```
bagit.py --md5 --sha1 --contact-name=netID  
./1297_173
```

9. Wait for terminal prompt (\$) to reappear.

## 6.4 Validate the Bag:

10. Type the following command in order to ensure that the newly created Bag is valid and hit **enter**:

```
bagit.py --validate ./[MSSnumber_ID]
```

*For example:*

```
bagit.py --validate ./1297_150
```

11. Wait for a confirmation message that the Bag is valid.

## 6.5 Repeat for remaining folders:

12. For all remaining folders, repeat from step 8.

**Time-saving tip:** Use the up arrow to page through commands that you have previously run in the terminal window. Once you have found the correct command, you can edit it as needed before running it again.



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## Ingesting packaged content into the Keep

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### 7.1 Move packaged content to the server:

#### 7.1.1 Before you begin:

- This workflow uses tools stored in Windows. If necessary, restart the Digital Archives Lab workstation and boot to the Windows hard drive. You can find instructions on how to do this [here](#).
- Ensure that the Digital Archives Lab workstation **is** connected to the Internet by plugging in the ethernet cable if necessary. Unlike many of our processes, ingest into the Keep does require a network connection.

#### 7.1.2 Connect to the VPN:

1. Launch the BIG-IP Edge Client from the Windows by double-clicking the icon pinned to the taskbar at the bottom of the screen.
2. Click **Connect**.
3. Log-in using the stored Emory NetID and password. If no stored log-in details are available, you may contact either John, Carrie, Elizabeth, or Dorry.
4. Wait until the connection status has changed to **Connected**. Once connected, the BIG-IP Edge Client window will close automatically.

#### 7.1.3 Connect to the server via SFTP:

5. Launch Filezilla by double-clicking the Filezilla icon on the Desktop.
6. From the drop-down **File** menu, select **Site Manager...**
7. Find and double-click your netID from the list of sites on the left-hand side of the **Site Manager...** window.
8. Enter your password and hit **OK**.

9. Filezilla will connect to the server.

**Note:** When looking at the Filezilla window, the file tree for your local computer will be listed on the left-hand side. Once connected to the server, you will see the file tree for the server on the right-hand side. Moving files stored locally to the server simply requires that you drag them from the local file tree and drop them into the relevant folder in the server file tree.

### 7.1.4 Move Bags to the server:

10. In the local file tree, navigate to your Bags' location. This is probably `D:\digitalArchives\diskImages\Mackey_diskImages`.
11. One by one, drag and drop your verified Bags from their local folder to the **diskimage** folder on the server side.
12. View the **Successful Transfers** tab at the bottom-left of the Filezilla window to verify that transfer has been completed successfully.

## 7.2 Ingest Bags from the server into the Keep:

### 7.2.1 Before you begin:

- The following steps can be performed from your own computer and do not require that you be in the Digital Archives Lab.

### 7.2.2 Ingest Bag into the Keep:

13. Log into the Keep at <https://keep.library.emory.edu>.
14. Click **ingest uploaded content**.
15. In the **Collection** box, begin typing **Mackey** and select **1297 Nathaniel Mackey papers** from the list that pops up.
16. From the **File to ingest** drop-down menu, select the first of your Bags.
17. Hit **Submit**.

### 7.2.3 Complete Keep object metadata record:

18. Click on the newly-ingested object's PID in order to view its metadata record.
19. Complete **Descriptive Metadata**:

The following fields should auto-populate:

- Collection
- Title
- Resource Type
- Genre
- Identifier

Refer to the floppy disk label. If the label contains any notes regarding dates or content, enter them where relevant.



- Dates can be added to the **Covering Dates** field. Neither a date range nor full dates are required, so add as much or as little information as you have.
- Other label information can be added to the **Abstract** field.

20. Complete **Technical Metadata**:

The following fields should be completed:

- **Imaging Date:** Enter the date on which you imaged the disk.
- **Creating Application:** From the drop-down menu, select the application used to create the disk image. For all of our Mackey floppy disks, this will be **ewfacquire 20140608**.
- **Original Environment Software:** Type *none* in all three **Original \* Environment Software** fields.
- **Hardware - Name:** Type *3.5" floppy disk*.
- **Hardware - Type:** Select **removable media** from drop-down menu.
- **Other information:** Type *Data originally transferred using KryoFlux. Raw disk image file migrated to Expert Witness Format using ewfacquire.*

21. Complete **Rights Metadata**:

The following field should be completed:

- **Access Status:** Select **13: Metadata only** from the drop-down menu.

22. Hit **Save**.

#### 7.2.4 Repeat for remaining Bags:

23. For each remaining Bag, repeat from step 14.



## CHAPTER 8

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### Indices and tables

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- `genindex`
- `modindex`
- `search`