USB MEDIA FILE TRANSFER MANUAL

Digital Preservation Unit

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THE WORKFLOW

Part I: Preparation

- 1. Prepare directory
- 2. Photograph media
- 3. Update record in tracking database

Part II: Transfer Files

- 4. Configure hardware for disk imaging based on media format
- 5. Transfer files and generate checksums

Part III: Brunnhilde

- 6. Navigating to the BitCurator Virtual Machine
- 7. Run Brunnhilde

Part IV: Bagging and Transfer to Storage

- 8. Package SIP using BagIt
- 9. Validate bag
- 10. Transfer to the Network Attached Storage (NAS)

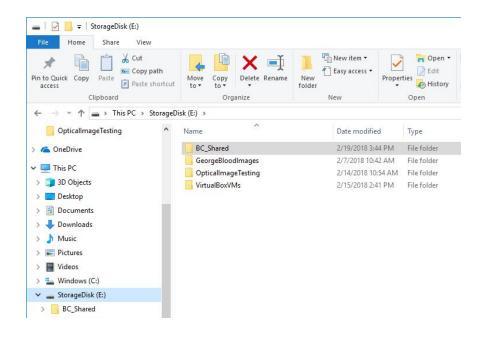
PART I: PREPARATION

[STEP 1] Prepare Directory/Media

- Barcode all media.
 - All media should be barcoded at the beginning, during the inventorying process.
 - If the media has a storage case or container, the media item and the storage case or container should be given the same barcode.
- Prepare the directory for disk images, reports, and bagged folders by creating three folders in the BC_Shared folder, which is the folder that is shared by the BitCurator Virtual Machine (BC VM) and the host computer.
 - This is to distinguish between the folder you generate when you create a disk image, the final bagged folder created through Bagger, and the reports that will be sent off to Special Collections.
 - Within the Files folder, you will later create a folder with the barcode of the media. You will also need to create a folder for your files called files (see last screenshot in [Step 6])

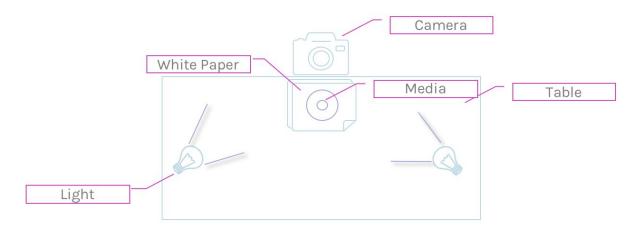


The sf_BC_Shared folder can be found on the BC desktop or in the StorageDisk
 (E:) hard disk on the host computer's desktop.



[STEP 2] Photograph Media

- Next, set up your photographing station by placing a white piece of paper under the cloth to make the backdrop as white as possible.
 - Make sure to put the paper as close to edge of the table as possible.
 - If there is lint or other debris on the white backdrop, use tape to make it as clean as possible.
- Place the media you are photographing about an inch or two away from the edge of the table.
- Point the lights at a 45 degree angle towards the media, but not so directly that the reflection of the light is too strong.
 - ▶ You can also adjust the strength of the lights by pulling them closer or back.



- Attach the camera to the tripod and angle the camera lens so that it can capture a flat image of the media.
 - You may not be able to get it completely flat without photographing outside of the white backdrop. Get it as flat as possible.



- Zoom into the media to ensure that there is only the white backdrop in the background.
- Photograph the front and back sides of the media.
- Photograph the front and back sides of the storage case for the media. This is especially important if the case contains relevant writing or a barcode. (However, both the media and its case should have a unique ID handwritten on them).
 - Take 3 sets of photos (resulting in a total of 8 photos per media and case) that are set to different exposures.
 - To set the exposure, turn the camera on.
 - Then, click the button with the +/- signs that is situated on the right hand side of the camera.
 - Take photos of the front and back of the media at exposures 0.0, +0.3, and +0.7.
- Upload images to the computer using the camera cable.
- Select the photos with the most similar lighting of the highest quality. Once the photos have been moved into the metadata folder scratchspace, delete all the photos

on the camera before unmounting.

- Rename the photos with the barcode underscore and description of the image.
 - Some descriptions you can use are:
 - MediaFront
 - MediaBack
 - CaseFront
 - CaseBack
 - Notes01
 - An example for an optical disk would "1234567890_MediaFront"
- Save the photographs you have taken of the media in the barcoded folder for the disk image. These will be dragged into the *metadata* folder that Brunnhilde generates.

[STEP 3] Update Record in Tracking Database

Before you begin, create a working database that includes an inventory of all the objects you have in your collection. Most of the time, if the content is coming from Special Collections, there will be some metadata transferred with the content. This information can be incorporated into the working database along with metadata we will create during the imaging process and the media's transfer to and from Special Collections. An example of this working database is the one for the John Sayles collection.

The following information should be inputted into the working database prior to imaging:

- Last handled: date the media/media image was last handled
- <u>Collection:</u> John Sayles
- Unique ID: copy from the inventory spreadsheet
- <u>Barcode</u>: barcode of media
- <u>Label:</u> label on the media
- <u>Type:</u> type of media

The following information should be inputted into the working database after/while imaging:

- Imaging Results: drop down
- <u>Bad Sectors:</u> note any bad sectors from the imaging results
- Mount Results: drop down (based on Brunnhilde results)
- <u>Virus Check Results</u>: drop down (based on Brunnhilde results)
- Bag Check: write "Y" or "N" for whether package was bagged or not
- Reports Created: "Y" or "N" for for whether reports directory for Special Collections and the Digital Preservation Librarian have been copied from the metadata folder.
- Transfer Check: write "Y" or "N" for whether bag was transferred or not

PART II: TRANSFER FILES

[STEP 4] Configure Hardware for Disk Imaging

ALL MEDIA

- Confirm that BitCurator is in WRITABLE mode.
- The drive icon at the top right hand corner of the screen will be red if writable mode is activated.
- We are setting BitCurator to writable due to a mounting related quirk that the read-only mode creates.



USB DRIVES & HARD DRIVES:

- Connect the external hard drive or USB drive directly to the write-blocker while it is turned off. Follow the instructions in the forensic bridge's QuickStart Guide.
- We have been connecting the forensic bridges to the USB port on the back of the computer because it is faster and more direct connection to the computer.
- Once the drive is connected, turn on the write-blocker.
- The media will be detected by BitCurator.
 - If the device is not detected, turn the write-blocker off again and make sure the connection is secure at both the write-blocker input, as well as, the computer input.
 - The USB drive icon will appear in the navigation bar on the left of the screen once detected.



[STEP 5] Transfer Files and Generate Checksums

• Open FTK Imager on the host computer desktop.



- It will prompt you to enter the username and password. Enter the information and the FTK Imager will open.
- Once FTK Imager is open, select "Add Evidence Item".

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Evidence Tree ×	File List				
	Name	Size	Туре	Date Modified	

A window that says "Select Source" will pop open. Click "Physical Drive" and select the files folder in your barcoded folder as your "Source Drive Selection". Then, click "Finish".

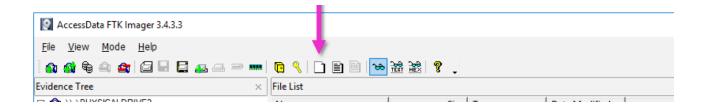
 Physical Drive Logical Drive Image File Contents of a Folder (logical file-level analysis only; excludes deleted, unallocated, etc.) 	C Logical Drive C Image File C Contents of a Folder
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	(logical file-level analysis only; excludes deleted, unallocated, et

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• Once you have chosen the file to add as evidence, you will see it appear under the "Evidence Tree" section.

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E- 2 \\.\PHYSICALDRIVE2	Name		Size	Туре	Date Modified
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	× .fseventso	d	0	Directory	3/7/2018 2:35:4
⊞ [root]	.Trashes		4	Directory	12/20/2017 12:
└────────────────────────────────────	390150922	238198	4	Directory	1/29/2018 2:02:
[Inallocated space]	Files		4	Directory	3/7/2018 7:11:4
	NewWork	flow Examples	4	Directory	2/14/2018 9:05:
	System Vo	olume Infor	4	Directory	5/19/2017 9:30:
	BAN_L~1	1.LOG	33	Regular File	12/7/2017 1:59:
	× !enu.c32		60	Regular File	3/10/2017 11:3
	Trashes	5	4	Regular File	12/20/2017 12:
	.ubuntu-	-16.04.3-desk	4	Regular File	1/29/2018 10:5
	Capture.P	PNG	467	Regular File	12/15/2017 1:5
	Capture.P	NG.FileSlack	2	File Slack	
	Capture1.	PNG	49	Regular File	12/15/2017 1:5
	Capture1.	PNG.FileSlack	4	File Slack	
	Floppy Di	isk Informati	22	Regular File	9/28/2017 5:58:
	Floppy Di	isk Informati	3	File Slack	
		HORRdisk.iso		Regular File	2/21/2018 3:13:
	HORRdisk	k.iso.FileSlack	1	File Slack	
	NASIist.to	t	1	Regular File	2/7/2018 12:21:
	NASIist.tx	t.FileSlack		File Slack	
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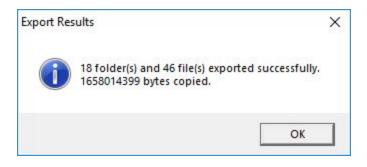
 Once FTK Imager has added the evidence item, the "Export Files" icon will become selectable.



- Once the "Export Files" icon becomes selectable, highlight any and all files that are NOT [unallocated space]. Then, click on the "Export Files" icon and it will prompt you to select a destination folder.
- Create a new folder called *files* and store the image in that file.
- Once you select the destination, FTK Imager will begin copying the files and exporting them to your destination folder.

Export Files		×
Copying files		
C:\Users\\stuch1\Desktop\Te	st\USB Test 2\[root] \ubuntu-16.04.3-c	desktop-amd64.iso
	Cancel	

• You will know that the exporting is finished when you see the following pop-up:



 Once you are finished, right click the drive and select "Remove Evidence Item" and close out of FTK Imager.

PART III: BRUNNHILDE

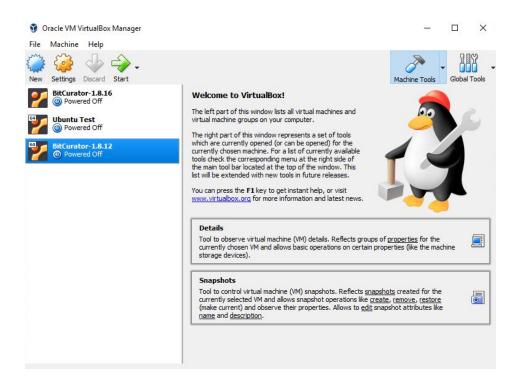
[STEP 6] Navigating to the BitCurator Virtual Machine

- In order to run Brunnhilde, you must access the BitCurator (BC) environment using a virtual machine (VM). The BC VM has already been set up by the Digital Preservation Librarian.
- Double click the "Oracle VM VirtualBox" on the host computer's desktop.



▶ Then, select the "BitCurator-1.8.12" VM and click "Start".

- If you have already used this, it will automatically be highlighted when you launch the VirtualBox and all you will have to do click "Start".
- It will take a while for the BC VM to warm up. There will be two pop-ups that have to do with your keyboard and mouse. Ignore these or just close out of them by clicking the "x".



- Once the BC VM loads, you can use all the tools that come in the BC package and access the BC_Shared folder, which is located on the BC VM desktop.
- When you are ready to shut everything down, just click on the power button at the top right hand corner of the BC VM screen, scroll all the way down on the dropdown menu, and select "Shut Down...".

[STEP 7] Run Brunnhilde

- Open the Brunnhilde GUI in the Forensics and Reporting folder.
- You can choose to run a directory or a disk image. But for our purposes, choose directory.
- In the "Source" section, select the disk image.
- In the "Destination" section, store the image in the barcoded folder that matches the respective media.
- ► In the "Accession number/Identifier" section, input the following output file name:
 - ⊳ "Metadata"

Status				
metadat	a			
Accessio	n number/ide	ntifier		
s and Me	dia/sf_BC_Sha	are/RobertAltman	5.25/Disk Images/39015092242018	Browse
Destinat	ion			
Media/sl	f_BC_Share/R	obertAltman5.25/	/Disk Images/39015092242018/files	Browse
Source				
irectory	Disk Image	Options		

- In the options tab, make sure the following boxes are checked/selected: ►
 - \triangleright Scan for viruses
 - md5 \triangleright
 - Scan archives files (zip, tar, gzip, warc, arc) Include Siegfried warnings in HTML report \triangleright
 - \triangleright
 - Run bulk-extractor \triangleright

Virus scanniı				
Scan for v				
_		(note: may take mu	ich longer)	
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Checksum al	gorithm			
md5	🔘 sha1	🔘 sha256	🔿 sha512	
Disk image o	ptions			
Remove f	iles carved from di	sk image at end of	process	
Extract A	ppleDouble resour	ce forks from HFS	disks	
General opti	ons			
🗹 Scan arch	ive files (zip, tar, g	zip, warc, arc) 🛛 🐼	Run bulk_extractor	
🗹 Include Si	egfried warnings i	n HTML report	Throttle Siegfried	

- Go back to the disk image tab and click "Start scan".
 - It will typically take less than a second for Brunnhilde to run on the floppy disk image because of its small size. However, for larger files, it will take longer.
- Once the scan is completed, click "OK" to close the box that appears saying "Finished Brunnhilde scan complete."
- Navigate to the bulk_extractor folder and click on the "view items as a list" icon in the upper righthand corner to change the display of the files. Filter by "size" and delete all files measuring 0 bytes.
 - These clutter up the bulk_extractor folder and do not provide us with any useful information about the disk image.
- Drag the photos taken earlier that are in the barcoded file into the newly created metadata folder.
- Make a copy of the "tree.txt", "formats.csv", and "metadata.html" files into the Reports folder with the folder name being the barcode of the media. Follow this path to get to Reports.
 - The "tree.txt" and "metadata.html" files will be in the metadata folder while the "formats.csv" file will be in the csv_reports folder.
 - > This is the package of reports that will be sent to Special Collections.

PART IV: BAG AND TRANSFER TO STORAGE

[STEP 8] Package SIP Using BagIt

***NOTE: It is important to follow these steps in order to ensure that the metadata saves properly.

Now, switch from the BC VM to the host computer's desktop, and open the "bagger.bat-Shortcut".



- On the upper lefthand corner, click "Create New Bag".
- Select the "UMICH-DISK-Imaging Profile".
- Click on the small green plus sign.
 - You will be prompted to "Add File or Directory".
 - Select the parent folder containing the disk image and metadata (do not double click).
 - ▷ Click "Open".

× – 🗆 Bagger 2.7.3	
<u>File Window H</u> elp	
Create New Bag Open Existing Bag	Image: State Bag In Place Image: State Bag Is Bag Complete Image: State Bag Is Bag Is Bag State Bag Is Ba
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Payload 😈	File name:
data	Profile: UMICH-Disk-Imaging Bag version: 0.97
80	Add File or Directory ze Type?:
Tag Files	boot mnt tmp cdrom opt usr dev proc var etc root core home run initrd.img ib sbin initrd.img ib a sbin initrd.img ib a spin vmlinuz ost+found srv vmlinuz.old Name: All Files Open Cancel
	X X
	Console 🔷 🔯 💈
	Complete: 🕞 Valid: 🕞 Profile Compliant: 🕞
	 [Fri Sep 08 15:00:51 EDT 2017]: This space will contain messages generated by the creating and updating of bags. Mouse over the status label to see its description. [Fri Sep 08 15:00:56 EDT 2017]: A new bag has been created in memory.

- Under the "Payload" section on the left, the folder you selected will show. Select (only click once) the folder prior to saving your bag.
 - It is recommended that you do this in the beginning in case you forget to do it at the end.
- Fill out the profile with metadata by consulting the Imaging Metadata Report.
- Once you are finished selecting the parent folder and filling out the metadata, click "Save Bag As..."
- In the "Save Bag Dialog":

 \triangleright

- Navigate to the designated directory and create a file with the barcode as the title inside the parent folder.
- Make sure to leave "Holey Bag" unchecked.
 - Select the following:
 - None
 - Generate Tag Manifest?:
 - Generate Payload Manifest?:
 - SHA-1 (for "Tag Manifest Algorithm:" and "Payload Manifest Algorithm:")

🕌 Save Bag Dialog	- 0 X
Save Bag Define the Bag settings	
Save in:	/home/bcadmin/Desktop/drobo/BaggedFolders/39015092236545
Holey Bag?:	Holey Bag
Base URL	
Serialize Type?:	● none ○ zip
Generate Tag Manifest?:	
Tag Manifest Algorithm:	sha1 👻
Generate Payload Manifest?:	
Payload Manifest Algorithm:	sha1 👻
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- Once all of the above are selected, click "OK"
- The Bag Info will then be generated. The results will appear in Bagger and the Bag will be created in the specified directory.

[STEP 9] Validate Bag

• After the bag is generated, click "Validate Bag" to validate the bag you just created.

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e	A 100	9	8		
Create <u>New Bag</u> <u>Open Existing Bag</u>	Create Bag In Place Validate Bag	Is Bag Complete	<u>C</u> lose Bag	<u>S</u> ave Bag	Save <u>B</u> ag As
🕑 Bagger 🛛 💠 🔯 👯	Bag Info				
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🖻 🗁 data 📃	Hardware R	US <mark>B via Writ</mark> eBlockei	-		
- 🗋 39015092294704/metada - 🗋 39015092294704/metada	recordsTitle	Robert Altman Archi	ve		
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39015092294704/metada	BarcodeNumber/Identifier R	39015092294704			



[STEP 10] Transfer to the Network Attached Storage (NAS)

- At then end of the week, connect scratchspace to a computer connected to the NAS.
 - Connect scratchspace to a USB 3 port. The bottom of the port will say "SS" or the port will be the color blue.
 - The scratchspace should automatically appear. Open up the "Bagged Folder" directory.
- Search for "Tera" in Windows menu bar and select "Teracopy". A window like this will appear:

⋙ TeraCopy 3.26	- 🗆 X
Drag files or folders here	
More	
\odot \odot \equiv	On finish: keep panel open 🗸

- Information from the previous transfer may load. If it does, click the for a fresh window and the little "x" on the top right to exit out of the old window.
- Press the little window button on the top right to extend the window. The new area is where files from scratchspace are dragged. The screen should now look like this:

>>>> TeraCopy 3.26					×
Drag files or f	olders here			8	×
More					
File list	Target	Options	Lo	og	
Menu		⊠ Aι	uto-scroll All fi	les	~
	Drag files o	or folders here			
⊕ 🕒 🗏			On finish: keep	panel o	open ~

Select the files from the open "Bagged Folder" window and drag them into TeraCopy.
 Files will appear like this:

⋙ TeraCopy 3.26				9 <u>452</u>		X
File list contains 98 items, select the operation					8	×
0.0%					30 MB	
Copy Move	Test	Delete				
File list	Target		Options	Log		
Menu			🗹 Auto-scro	All fil	les	~
F:\Transferred Bags\39015092238339					Folder	
F:\Transferred Bags\39015092238339\bag-info.txt					1 KB	
F:\Transferred Bags\39015092238339\bagit.txt					55 Bytes	
F:\Transferred Bags\39015092238339\data					Folder	
F:\Transferred Bags\39015092238339\data\39015092238339					Folder	
F:\Transferred Bags\39015092238339\data\39015092238339\carved_files.zip					227 KB	
F:\Transferred Bags\39015092238339\data\39015092238339\image					Folder	
F:\Transferred Bags\39015092238339\data\39015092238339\image\39015092238339.E01					314 KB	
⊕ 🕒 🗏			On	finish: keep	panel c	open 🗸

- ▶ Under the "Target" tab, select "Browse" \rightarrow public(//192.158.255.10)(Z:) \rightarrow "TransferQueue".
- "Options" tab should stay the same with "Prompt on filename collision" and "MD5" as default.
- Press "Copy..." near the top of the screen. Selecting "Move..." will remove directories from scratchspace and onto NAS.
- The "Log" tab reflects directories that have successfully/failed copying.
- When TeraCopy is finished, check the "TransferQueue" directory to see if files have been copied.
- Move bags from "Bagged Bags" to "Transferred Bags" on scratchspace.
- Eject scratchspace.