GDT
DataFastX
USER MANUAL

Revision 1
24 April 2013

TABLE OF CONTENTS

TABLE OF FIGURES

Revision	Date	Author	Description
1.0.0	November 21, 2012	Tam Ho	- Initial.
1.0.1	April 24, 2013	M. Smithwick	- Revised wording/format

Approvals	Title	Date	Signature

1 Introduction

The **DataFastX** disk duplicator is designed to be used as a stand-alone IDE and SATA duplication system to selectively copy program software and data from one *master source drive* to eleven *target disk drives*, simultaneously. Ideal for volume applications, its intelligent duplication mode enables the custom configuration of drives, including partitioning and formatting during the duplication process. Target drives that are identical to the source drive may also be "mirrored", or duplicated exactly, sector by sector.

o With the front panel, the **DataFastX** does not require a monitor, keyboard or mouse.

o The interface is friendly and easy to use with large 3.5-inch graphic LCD (480*320).

o Supports full SATA III giving the full and fastest duplication speeds for SATA drives.

o Supports TGC-OPAL security for duplication of OPAL compliant SED drives.

o Supports the OPAL Trusted Platform Module (TPM).

o Supports DOD 5220M disk drive erasure.

o Has a special erasure mode for the quickest erasure of SATA III drives.

o With user configurable options even difficult to duplicate drives can be duplicated.

o Duplication of HPA areas are supported.

o One button duplication supported. Insert drives and push button to duplicate.

2 Mechanical interface

Figure 1: Mechanical interface

1   POWER button
2   Front Panel (It includes: a 3.5-inch color LCD (480*320) user display, LED bar to display the process status, buttons to control (UP, DOWN, LEFT, RIGHT, SELECT, CANCEL, MIRROR, SMART)
3   Source drive port
4   Target 1 drive port
5   Target 2 drive port
6   Target 3 drive port
7   Target 4 drive port
8   Target 5 drive port
9   Target 6 drive port
10   Target 7 drive port
11   Target 8 drive port
12   Target 9 drive port
13   Target 10 drive port
14   Target 11 drive port

3   Definitions and Abbreviations

- LCD: Liquid Crystal Display.
- SATA: Serial Advanced Technology Attachment.
- PATA: Parallel Advanced Technology Attachment.
- DF: Data Fast.
- OPAL: Disk drive security specification by the Trusted Computing Group
- SED: Self encrypting disk drive

4   User guide

4.1 Getting start

Here is the process to turn on the machine:
- **Step 1a**: Plug in the power cord to a 110 VAC power source.
- **Step 1b**: Turn on the power supply from the switch on the rear of the machine.
- **Step 2**: Press the POWER button on the front of machine.
- **Step 3**: The machine will boot follow with below process:
  - o As the **DataFastX** booting, the LCD will show the configuration hardware screen and then switch to the Loading screen. (Total time about 60 seconds).
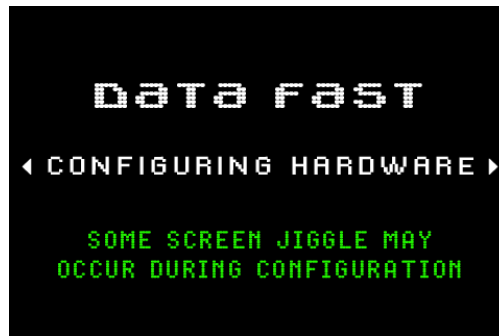
Figure 2: Configuration hardware screen
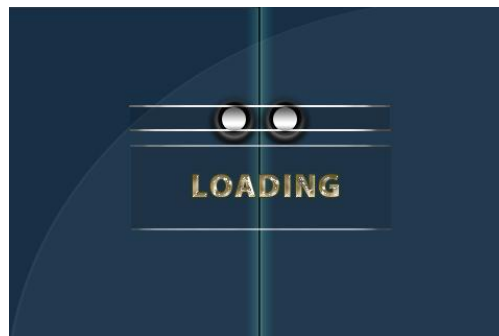
Figure 3: Loading screen

  - o Then the **DataFastX** logo will be showed as an opened door step by step.
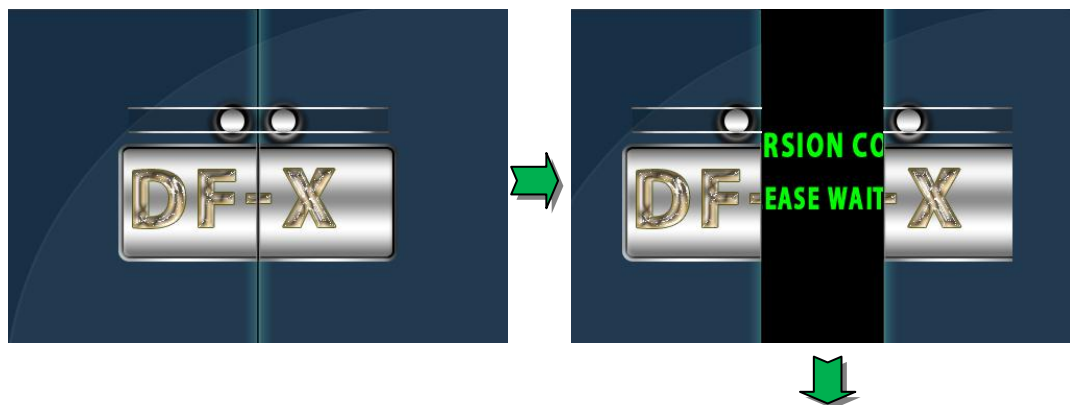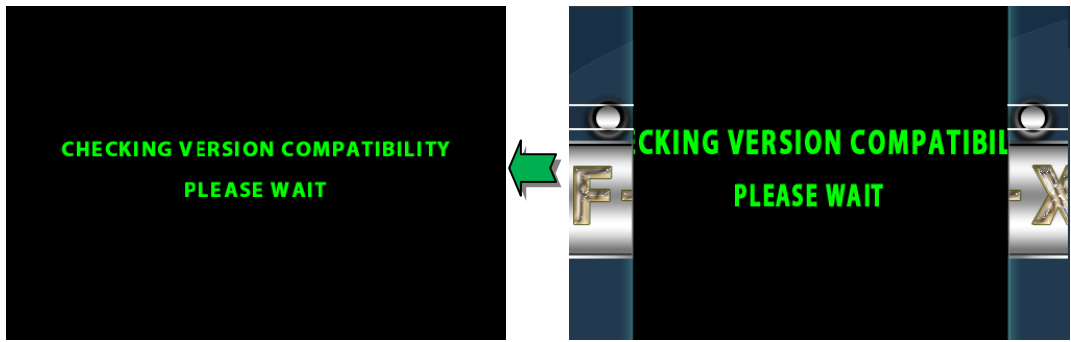
Figure 4: Open the Door screen

- o The software will check the version compatibility between software and firmware.
  - ▪ If compatible the machine will login to the main menu.
  - ▪ If they are not compatible the machine will upgrade the corresponding firmware automatically.

- **Step 4:** The machine is ready to use when the main menu is shown:

Figure 5: Main Menu

4.2 Front Panel

- The **New DataFastX** front panel consists of a 3.5-inch graphic LCD screen (480*320), 8 control buttons and an LED bar for displaying the status of processes.

Figure 6: Front Panel with LCD, status LED and control buttons

- o **UP**: Move up to select the function or select hard drive...
- o **DOWN**: Move down to select the function or the hard drive...
- o **LEFT**: Move left to select the function or the hard drive...
- o **RIGHT**: Move right to select the function or the hard drive...
- o **CANCEL**: Cancel a process, a setting… or come back the previous screen.
- o **SELECT**: Select a function, remove a hard drive, and execute a function.
- o **MIROR**: Execute the Mirror Copy function.
  - ▪ This function can be used directly or after the check disk process to execute the Mirror Copy function.
- o **SMART**: Execute the Smart Copy or Twin copy function (dependent on the Smart Copy mode settings).
  - ▪ This function can be used directly or after the check disk process to execute the Smart Copy function.
- o **LED bar**: It includes 10 LEDs (1 LED represents 10% of the process). It is used to show the percent of the current process (copying, checking disk, wiping disk…).

4.3 User interface structure
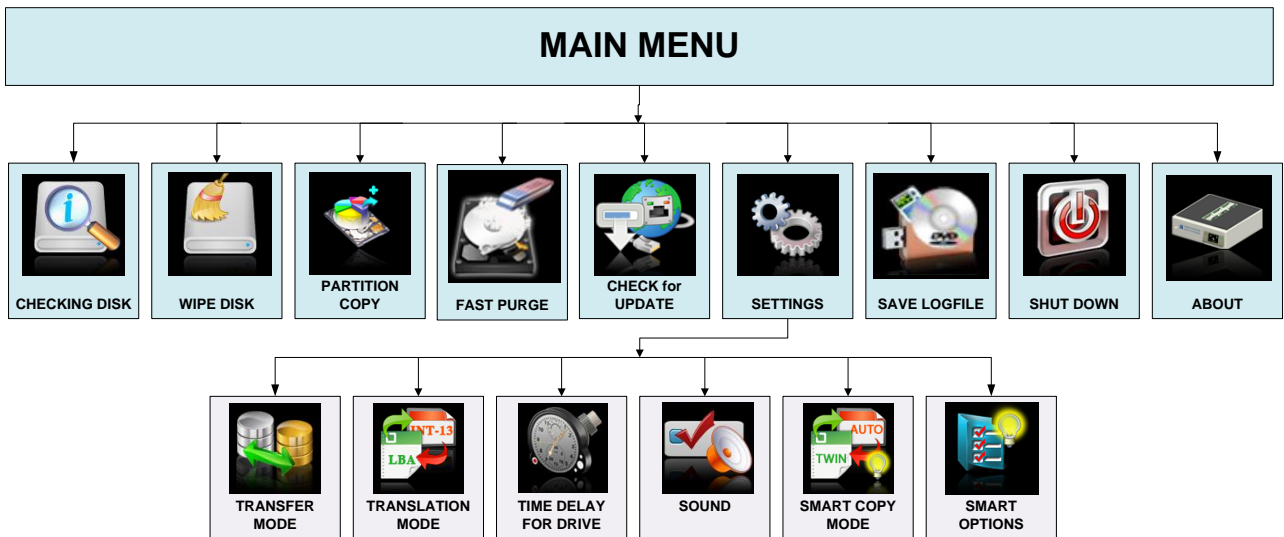
Figure 7: User interface structure

4.4 Main functions

- The main functions of the **DataFastX** are:
  - o Checking Disk
  - o **Wipe Disk, Mirror Copy, Smart Copy, Partition Copy (Standard Jobs)**
  - o FAST Purge
  - o Check for Update
  - o Settings
  - o Save Logfile
  - o Shutdown
  - o About

4.4.1 Checking Disk

Figure 8: Main menu: Checking Disk function

- Checking Disk powers up the drives and reads the drive information. The DFX user can view information about the drive or use this as a preparation step before executing any of the standard jobs such as: Mirror Copy, Smart Copy, Partition Copy, Wipe Disk and FAST Purge.
- When the user chooses the Checking Disk function, the screen will show the following:
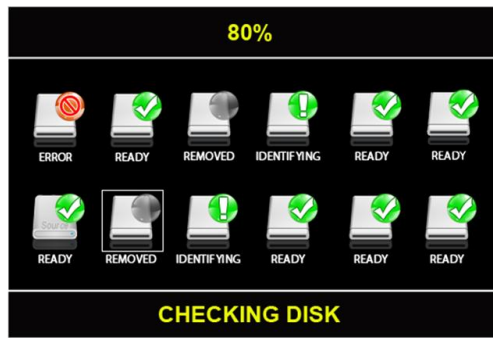
Figure 9: Checking disk screen

- During the Checking Disk process, the user can use the UP/DOWN/LEFT/RIGHT buttons to navigate between drives and use the Select button to remove a disk.
    o Each disk icon has an LED icon. The meaning of each LED icon is:
        ▪ ● Green: Active and getting disk information.
        ▪ ● Red: The drive startup and information processed errored.
        ▪ ● Grey: The drive was removed from the process by the end user.
    o The disk icon indicates participation in the process by its color:
        ▪ ● Colored Icon: indicates the disk is part of the Checking Disk function.
        ▪ ● Grey Icon: indicated the disk has been removed from the process by the user.
    o The Checking Disk process goes through several steps as follows:
   ▪ START-UP: preparing to check disk.
        ▪ TURNING ON: the drive is powered on, and waiting to boot up.
        ▪ CHECKING: waiting for disk to come ready.
        ▪ IDENTIFYING: getting the drive information.
        ▪ READY: drive identified successfully.
        ▪ ERROR: an error occured during Checking Disk.
        ▪ REMOVED: drive removed by end user.
- During the Checking Disk process, the LED bar will display the status of the process.
- After completing the Checking Disk process, the REVIEW JOB SETUP screen will appear:

Figure 10: Review Job Setup screen

- This screen is the same as the Checking Disk screen except:
    o All LEDs are solid.
    o Status text: NO DISK, REMOVED or brief drive information.
    o The top of the screen text shows the drive model.
- The user can view the drive's information in detail by pressing and holding the SELECT button. The disk detail is shown in 2 pages, the UP and DOWN buttons can be used to switch between the pages.
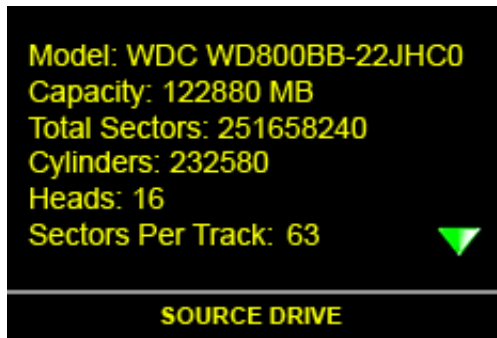
Figure 11: Detail of disk (Page 1)
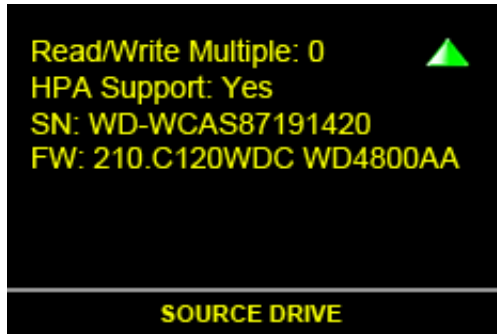
Figure 12: Detail of disk (Page 2)

- When the Review Job Setup screen appears, you can execute two Standard Jobs: Mirror Copy and Smart Copy by pressing either the MIRROR or SMART button.

4.4.2 Mirror Copy

- The Mirror Copy mode is valid only for target drives which have the same number of cylinders, heads and sectors per track as the source drive.
- There are two methods used to execute the Mirror Copy function:
    - o The first method: press the Yellow MIRROR button on the console. The DFX will go to the Checking Disk screen and then go to the MIRROR COPY process without showing the Review Job Setup screen.
    - o The second method: press the MIRROR button on Review Job Setup screen after the Checking Disk process.
- If the Source drive or Target drives have an HPA region the following screen will show before the duplication process:

Figure 13: Setting up HPA region screen

- Here is the duplication process screen:
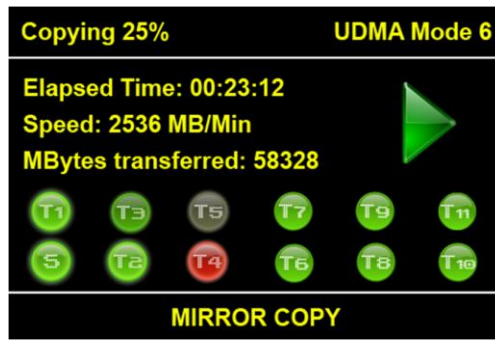
Figure 14: Copying process

- This screen is divided into three areas:
  - The status area (on the top):
    - Shows the current status: Copying /Wiping / Paused.
    - Shows the percent (0% to 100%).
    - Shows the current transfer mode.
  - The job name (on the bottom): MIRROR COPY (SMART COPY / TWIN COPY / WIPE DISK / PARTITION MIRROR / PARTITION SMART)
  - The current job information:
    - Elapsed time in hh:mm:ss format
    - Speed in MB/min
    - Total of Mbytes transferred
    - Animation icons for each drive:
      - / .. : Source / Target is working
      - / .. : Source / Target is idle
      - / .. : Source / Target is error
      - .. : Target is removed
- During the copying process, the status bar (10 LEDS) will be updated as followed:
  - The 10 segment LED shows the entire copying process. Each LED segment is 10% of the copy.
  - The first LED segment will flash until 10% of the copying process is completed, then it will stop flashing and turn solid.
  - The next LED segment will start flashing.
  - Note: While transitioning to the next 10%, both LED segments will flash.
- During the copying process, the user can pause the process by pushing the CANCEL button and then restart the process by pushing the SELECT button. To cancel the process push the CANCEL button two times.
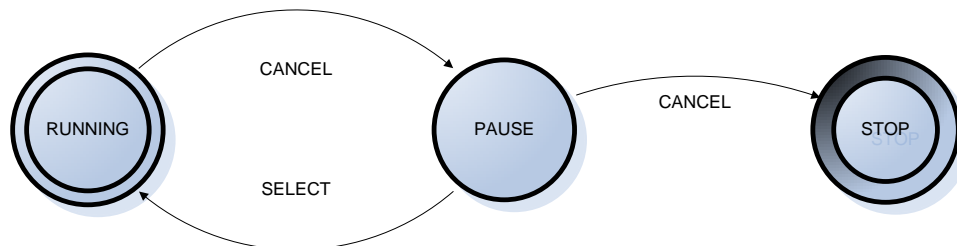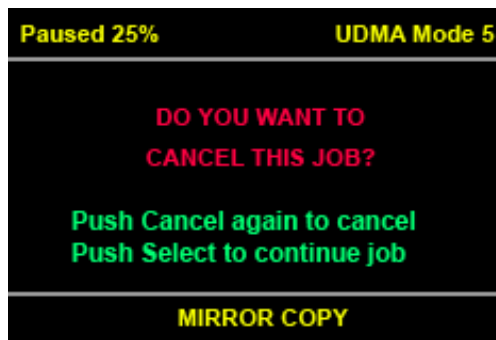
Figure 15: Copying process cycle

- When the duplication process is complete the result screen will be shown as follows:
    - o Job completed successfully:

Figure 16: Complete successfully screen

    - o Job completed unsuccessfully:

Figure 17: Complete unsuccessfully screen

- The Alert Sound will be activated when the job is completed if the sound signal is enabled in the system options.
- On the result screen the user can press the SELECT button to view the duplication status report and press the CANCEL button to return to the Main Menu. Here is the status report:
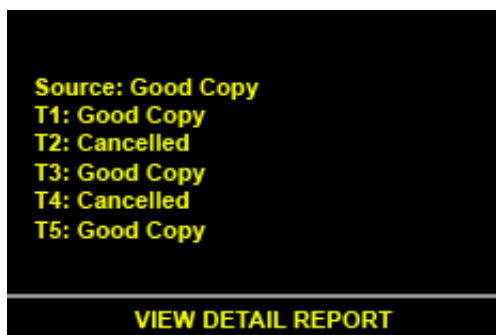
Figure 18: Status report for the copying process

4.4.3 Smart Copy

- This Smart Copy mode duplicates the files system structures and user data from the source drive to the designated targets keeping the basic source's partition structure intact.
- If the file system of a source partition is unknown and the source and target drives have matching heads and sector/track configuration, the target partition size will be set equal to the source partition, and the contents will be "partition mirror" copied.
- If the file system is known (with FAT12, FAT16, FAT32, NTFAT, or NTFS, Ext2, Ext3), the target partition size will be automatically adjusted, based on the ratio of the capacity of the source drive to the capacity of the target drive. Data will be copied file-by-file, adjusting target FAT size, and cluster size as needed.
- There are two methods to execute the Smart Copy function:
  - The first method: press the SMART button on Main Menu.
  - The second method: press the SMART button on Review Job Setup screen after the Checking Disk process.
- The interface of the Smart Copy process is the same as the Mirror Copy process.

4.4.4 Wipe Disk

- When the "Wipe Disk" option is enabled, you can erase your target drives. This option will fill the target drives with zeros. To use the DOD Wipeout Smart Option you should visit the Smart Options section.
- To execute the Wipe Disk function the user can select the Wipe Disk function on the Main Menu.

Figure 19: Main Menu: Wipe Disk function

- The interface of the Wipe Disk process is same as the Mirror Copy process.

4.4.5 Partition Copy

- When in the "Partition Copy" mode the user can easily add partitions from the source drive to the target drive by selecting the desired partitions.
- To execute the Partition Copy function the user can select the Partition Copy function on the Main Menu.

Figure 20: Main menu: Partition Copy function

- In this function instead of displaying the Review Job Screen after Checking Disk, the screen will show the Partition List Info of Source drive:

Figure 21: Partition List Info screen

- In this screen the control buttons function as follows:
  - o UP/DOWN buttons: move up and down to select partitions.
  - o LEFT/RIGHT buttons: disable/enable the selected partitions.
  - o CANCEL button: cancel the Partition Copy process.
  - o MIRROR button: execute the Partition Mirror copy function.
  - o SMART button: execute the Partition Smart copy function.
- When the Partition List Info screen appears, you can execute two Standard Jobs: Partition Mirror and Partition Smart by pressing either the MIRROR button or SMART button.
- The interface of the copying process is same as the Mirror Copy process interface.

4.4.6 FAST Purge

- When the "FAST Purge" option is enabled you can erase target drives. This option will fill the target drives with zeros. This process is faster than the Wipe Disk function.
- To execute the FAST Purge function, the user can select the FAST Purge function on the Main Menu.

- The interface of the FAST purge process is the same as the Mirror Copy process.

4.4.7 Check for Update

- The function is used to check for updating the software and firmware.

Figure 23: Main Menu: Check for Update function

- There are two ways to update the **DataFastX**: "**Update via USB**" and "**Update via Internet**". At this time updating via the Internet is not supported.

Figure 24: Check for Update: select protocol screen

- After selecting the "UPDATE VIA USB" method, the **DataFastX** will find the update software on the USB drive:

Figure 25: Check for Update: Found a new version screen

Figure 26: Check for Update: No new version found

- The downloading and upgrading process:
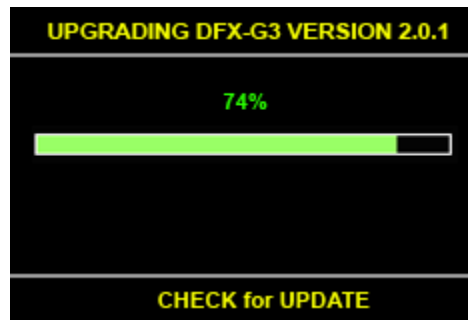
Figure 27: Check for Update: Upgrading software screen.

- Downloading firmware process:
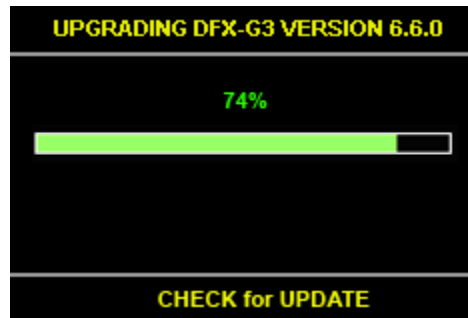
Figure 28: Check for Update: Downloading firmware for LCD module process

- Writing the device driver:
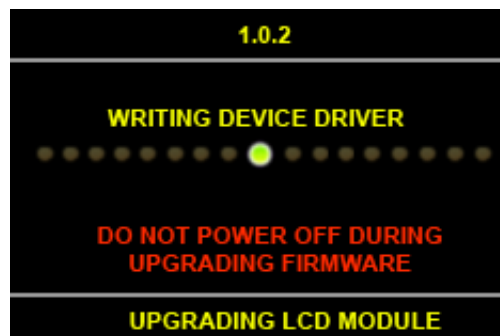
Figure 29: Check for update: Writing device driver for LCD module screen

- Writing update file:
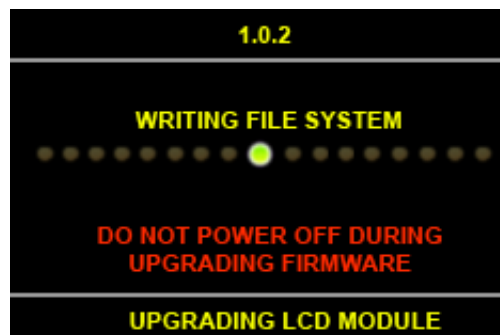
Figure 30: Check for Update: Writing update file

- Writing the application:
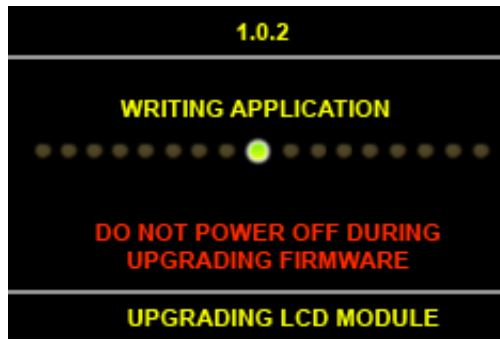
Figure 31: Check for Update: Writing the application

- If the update is successful the new **DataFastX** will reboot automatically after 5 seconds. Otherwise, a failure message will be displayed.
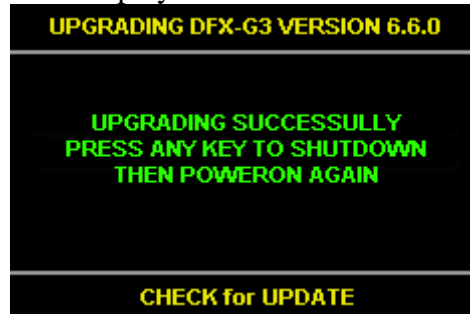
Figure 32: Check for Update: Upgrade successful
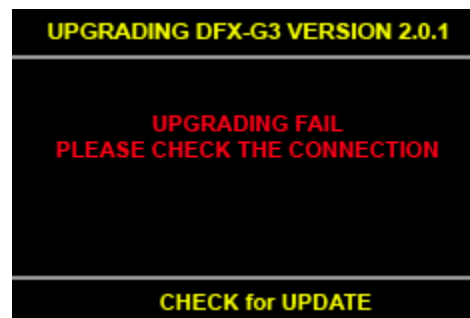
Figure 33: Check for Update: Upgrade failed

4.4.8 Settings

- The system settings permit the user to set global parameters that are common to all jobs. Select settings from the main menu to set system settings.

Figure 34: Main Menu: Settings function

- The System Settings function includes the following functions:
    o Transfer Mode

- o Translation Mode
- o Time Delay for Drive
- o Verification
- o Sound Signal
- o Smart Copy Mode
- o Smart Options

4.4.8.1 Transfer Mode

Figure 35: Settings Menu: Set Transfer Mode

Transfer Mode

- This option permits setting the maximum UDMA mode to be used in the duplication process. Sometimes older drives can not support the higher UDMA speeds. The DFX will automatically reduce the UDMA mode during the copy process, however this setting gives more control of the UDMA mode to the user.

Sectors/Transaction

- This option permits setting the number of sectors for each read or write transaction.
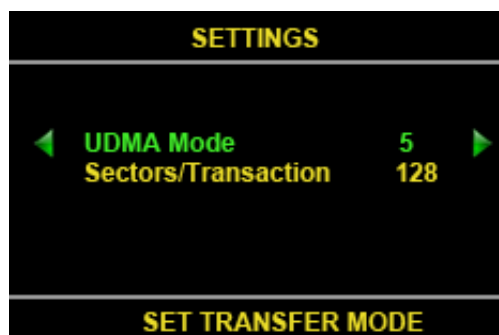
Figure 36: Set Transfer Mode screen

- In this screen the control buttons operate as follows:
  - o UP/DOWN button: select the UDMA mode or Sectors per Transaction option.
  - o LEFT/RIGHT button: decrease/increase the value of the options.
  - o CANCEL button: return to the Settings Menu without saving the new settings.
  - o SELECT button: Save the new settings.

4.4.8.2 Translation Mode

Figure 37: Settings Menu: Set Translation Mode

Enable LBA translation

- When enabled, this option will ensure the translated heads value will be a power of 2. When disabled, the translated heads value may or may not be a power of 2.

Enable Interrupt 13 translation

- When enabled, drives larger than 4GB with 16 heads will automatically have their head count reduced to 15 heads for translation purposes.
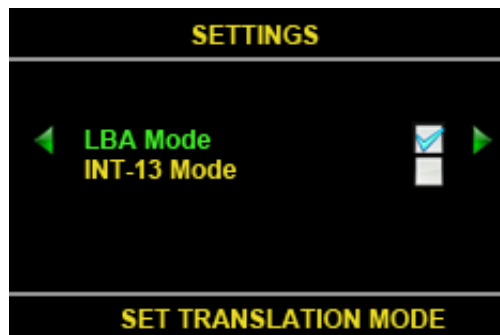
Figure 38: Set Translation Mode screen

- There are 3 options for this setting:
    - o Enable LBA Mode.
    - o Enable INT-13 Mode
    - o Disable both LBA Mode and INT-13 Mode.

- In this screen the buttons function as follows:
    - o UP/DOWN buttons: move between LBA mode and INT13 mode.
    - o LEFT/RIGHT buttons: disable/enable the selected mode.
    - o CANCEL button: return to the Settings Menu without saving the new settings.
    - o SELECT button: Save the new settings.

4.4.8.3 Time Delay for Drive

Figure 39: Settings Menu: Set Time Delay for Drive

Drive power-up delay

- A slight delay is added between each drive power on step. This is to protect the power supply and electronics from power supply surges. This parameter sets the time delay in seconds between each drive spin-up. (Default is 5 sec.) At the default delay setting all drives will be powered up after 60 seconds.

Drive power-setting time

- This is a time delay used after power is applied to allow the drive electronics to settle and the drive to come up to speed before further interrogation and recalibration of the drive. (Default is 5 sec.)

Drive command timeout

- This is the time allowed for a drive to respond to a command before declaring a timeout error. If the drive does not respond within the allowed time, it has failed - indicating a problem, such as not connected. Most drives will respond in 5 seconds. (Default is 15 sec.)

Drive spindown time

- This is the time allowed for spin down after power is turned off to the drives and before the ' Safe to remove drive ' message is displayed. This setting gives the drive time to store the last data written to the drive after the power is removed. (Default is 7 sec.)

Drive command delay

- After the drive has received and acknowledged a command the system will delay before checking for completion of the command.

Drive command retry

- This is the number of times the system will send a command to the drive before declaring the drive is not operable.
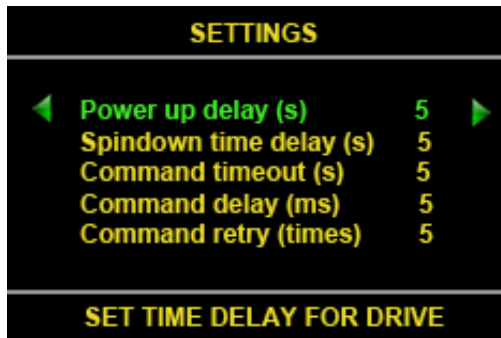
Figure 40: Set Time Delay for Drive

- In this screen, the function of the control button as follow:
    o UP/DOWN buttons: select which option to set.
    o LEFT/RIGHT buttons: decrease/increase the value of the selected option.
    o CANCEL button: return to the Settings Menu without saving the new settings.
    o SELECT button: Save the new settings.

4.4.8.4 Verification

Figure 41: Settings Menu: Set Verification

- When this option is enabled, the data on the target drives is read back and compared to the source drive after the duplication process.
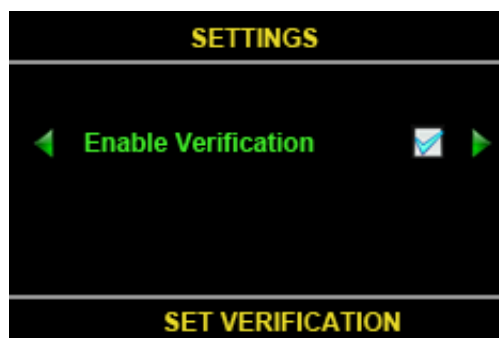
Figure 42: Set Verification screen

- In this screen, the function of the control button as follow:
    o LEFT/RIGHT: disable/enable Verification.
    o CANCEL button: return to the Settings Menu without saving the new settings.
    o SELECT button: Save the new settings.

4.4.8.5 Sound Signal

Figure 43: Settings Menu: Set Sound signal

Sound Signal

- When this option is checked at the end of every job the DFX emits an alert sound on the speaker.
- When the button sound is selected every button press on the front console will produce a sound.

Figure 44: Set Sound signal screen

- In this screen, the function of the control button as follow:
    - UP/DOWN: select the Alert Sound or Button Sound option to change.
    - LEFT/RIGHT: disable/enable sound signal.
    - CANCEL button: return to the Settings Menu without saving the new settings.
    - SELECT button: Save the new settings.

4.4.8.6 Smart Copy Mode

Figure 45: Settings Menu: Set Smart Copy Mode

Automatic Smart

- If the system has different drives (differences of capacity, manufacturer, model, cylinders, sectors or heads) or file systems of FAT, FAT32, NTFS and EXT2/3/4 choosing Smart Copy for duplicating from a source to target with require less time than Mirror Copy.
- With this copy mode, the target partitions will be resized to the ratio of the master's partitions and the sectors that contain data will be cloned from a source drive to a target and skip the blank sectors.

Twin Copy

- For faster Smart copying when the source and target drives have the same capacity., the TwinCopy mode identifies data and file system structure locations on the source disk and uses a quick mirror copy to duplicate only those areas to the target disks. The twin copy supports the following file systems: FAT, FAT32, NTFS and EXT2/3/4(Linux).

Figure 46: Set Smart Copy Mode screen

- There are 2 options for this setting:
    - o Enable Automatic Smart.
    - o Enable Twin Copy.

- The control buttons operates as follows:
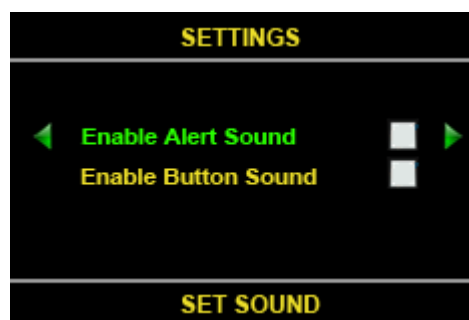   - o UP/DOWN buttons: Select Automatic Smart or Twin copy modes.
    - o LEFT/RIGHT: disable/enable the selected item.
    - o CANCEL button: return to the Settings Menu without saving the new settings.
    - o SELECT button: Save the new settings.

4.4.8.7 Smart Options
- The *Smart Option* suite of utilities is designed to make the DataFast hard disk duplication product line more productive and useful. The *Smart Option* utilities are not part of the standard DataFast features; they are available as add-on order options with the initial purchase or can be ordered later on as an upgrade.

Figure 47: Settings Menu: Set Smart Options

NTFS Smart Option

- This option allows the DataFast unit to Smart Copy an NTFS partition from the Source to the Target Drives. The target partitions will be scaled correctly for the size of the target drives. This greatly reduces the time required to duplicate most disks with the Microsoft Windows NT file system. For example, a 640GB NTFS drive requires approximately 50 minutes to duplicate in the standard NTFS Partition Mirror copy mode that is part of all Greystone IDE duplication products.
- The *NTFS Smart Option* will enhance the duplication process by only copying the data from the Source drive to the Target drives and NOT copying blank sectors. A typical 640GB partition with 64 GB of actual data will take about 10 minutes (80% less time) to duplicate using the *NTFS Smart Option*. Approximately 40 minutes is saved with the *NTFS Smart Option*. This means the NTFS Smart Option can duplicate 55 disk drives in the same time the default copy mode will duplicate 11 disk drives.
- Using an NTFS Source drive with a data load that is 5% the size of the NTFS partition, it is possible to duplicate approximately 110 drives using the *NTFS Smart Option* in the same time it takes to duplicate 11 drives using the standard NTFS Partition *Mirror copy*, a gain of 10 to 1.

Ext2/3

- Ext2/3/4 is the Linux supported file system. This option enables the DataFast unit to copy the data found on the EXT-2/3/4 file system partition to the targets while ignoring empty or unused sectors. The benefits are similar to the benefits of the NTFS Smart Copy.

DoD Wipeout

- The *DoD Wipeout Smart Option* enables Target drives to be completely "sanitized" (erased) or otherwise overwritten in accordance with the Department of Defense document number DoD 5220.22-M specifications. The only higher security measure recommended is the destruction of the disk drive - (a.k.a.) also known as "pulverization of drive".
- The disk sanitization is performed in the following steps:
    - o Overwrite all addressable locations with a random character.
    - o Overwrite all addressable locations with the complement of the character.
    - o Overwrite all addressable locations with a random character.
    - o Verify all addressable locations were overwritten with the random character.

Enable SATA

- The *Enable SATA Smart Option* enables the operator to work with the Serial ATA (SATA) disk drives.

HPA Copy Smart Option

- *Host Protect Area (HPA)* is a feature that was defined in ATA standard. A reserved area for data storage outside the normal operating system file system which is required for several specialized applications.
- When the HPA feature is activated on Smart Option, you can see the HPA status of disk drives.
- The HPA Smart Option expands the HPA area permitting duplication of the HPA area to the target drives.
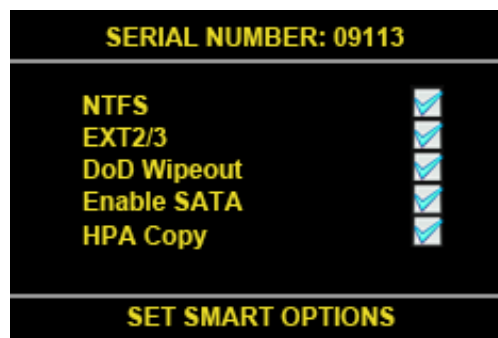- You can also expand target drives to full capacity and then set the HPA address to a user specified value.

Figure 48: Set Smart Options screen

- The buttons for this screen work as follows:
    o UP/DOWN buttons: Select the Smart Option to set.
    o LEFT/RIGHT: disable/enable the selected item.
    o CANCEL button: return to the Settings Menu without saving the new settings.
    o SELECT button: update Smart Options from the license file that contain on the USB drive.

How do I get a Smart Option License file?

- When the Smart Options screen is displayed, write down the internal serial number that is displayed on the top. Call **Greystone Data Technologies** at (510) 661-6793 (Pacific Time) or send an email to techsupport@greystonedatatech.com to ask technical support.
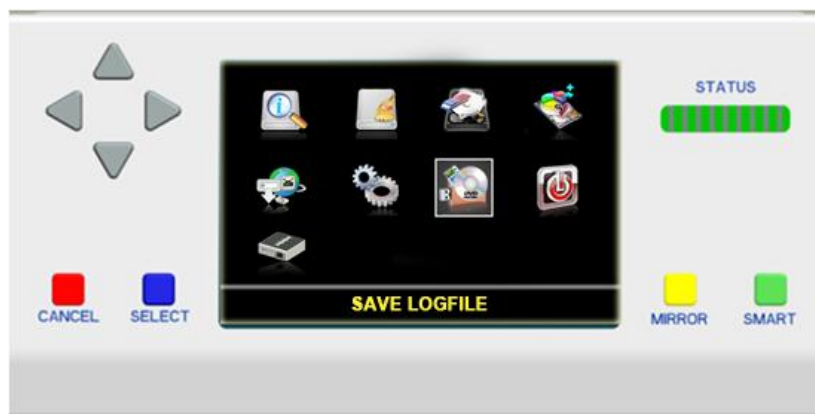
4.4.9 Save Logfile

Figure 49: Main menu: Save Logfile function

- There are two options in Save Logfile menu: save to USB or save to DVD.

Figure 50: Save logfile menu

- All jobs will be recorded in the INFORMATION.TXT file. The following information is logged:
  - o Date and time
  - o Type of copy
  - o Source and target drives
  - o Status of copy operation
  - o Total MB copied
  - o Duration of Copy
  - o Startup and shutdown times of the program
- This function is used to copy the logfile from the DataFastX to the USB or DVD drive (just use DVD-RW, DVD+RW).
- Before executing this function, the user has to insert R/W DVD into DVD ROM or put the USB memory stick into the upper right hand USB slot in the back of the DFX.
- Then the DataFast X will copy the latest Logfile onto the DVD or USB memory stick and show the following screen:

Figure 51: Copying Logfile screen

- Here is the result screen:

Figure 52: Copying Logfile result

4.4.10 Shut down

Figure 53: Main Menu: Shut down function

- There are two actions in Shut down menu: turn off or restart the system
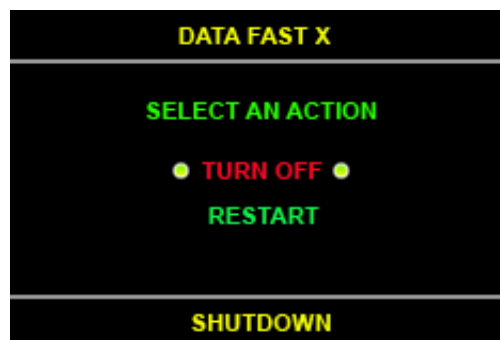
Figure 54: Shut down screen

- The buttons have the following actions in this screen:
    - o UP/DOWN buttons: chose the action to perform.
    - o SELECT button: execute the selected action.
    - o CANCEL button: return the Main Menu.

- When user selects Turn Off or Restart the **DataFastX** will show a door closing.
    - o If user chooses Turn off: the closed door logo will be displayed until the machine's power is turned off.
    - o If user chooses Restart option the screen will go back the booting screen.
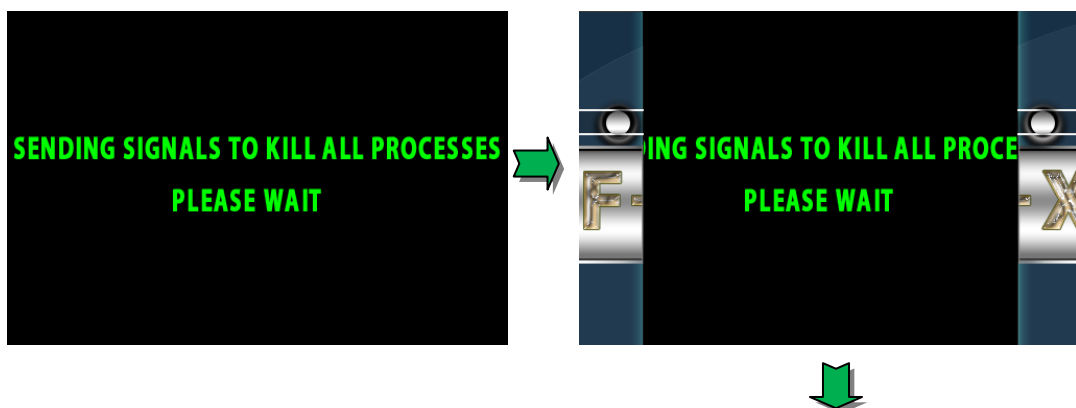
Figure 55: Close the door screen

4.4.11 About

Figure 56: Main Menu: About function

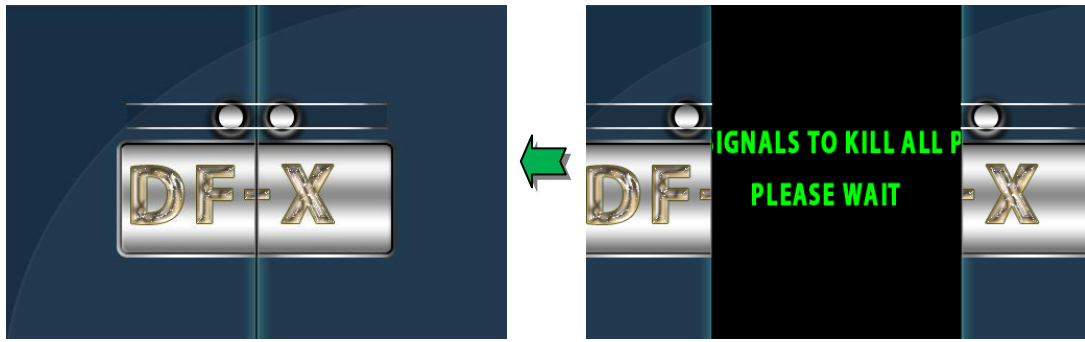- The About screen shows information about the **DataFastX** including the following information: Software Version, Hardware Version, Firmware Version, and Serial Number.
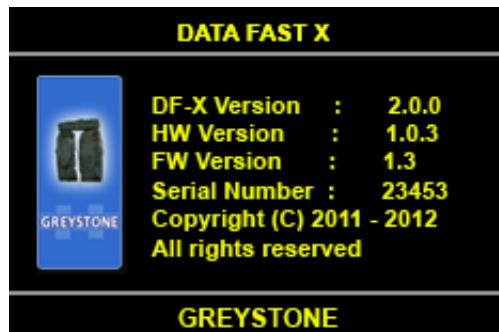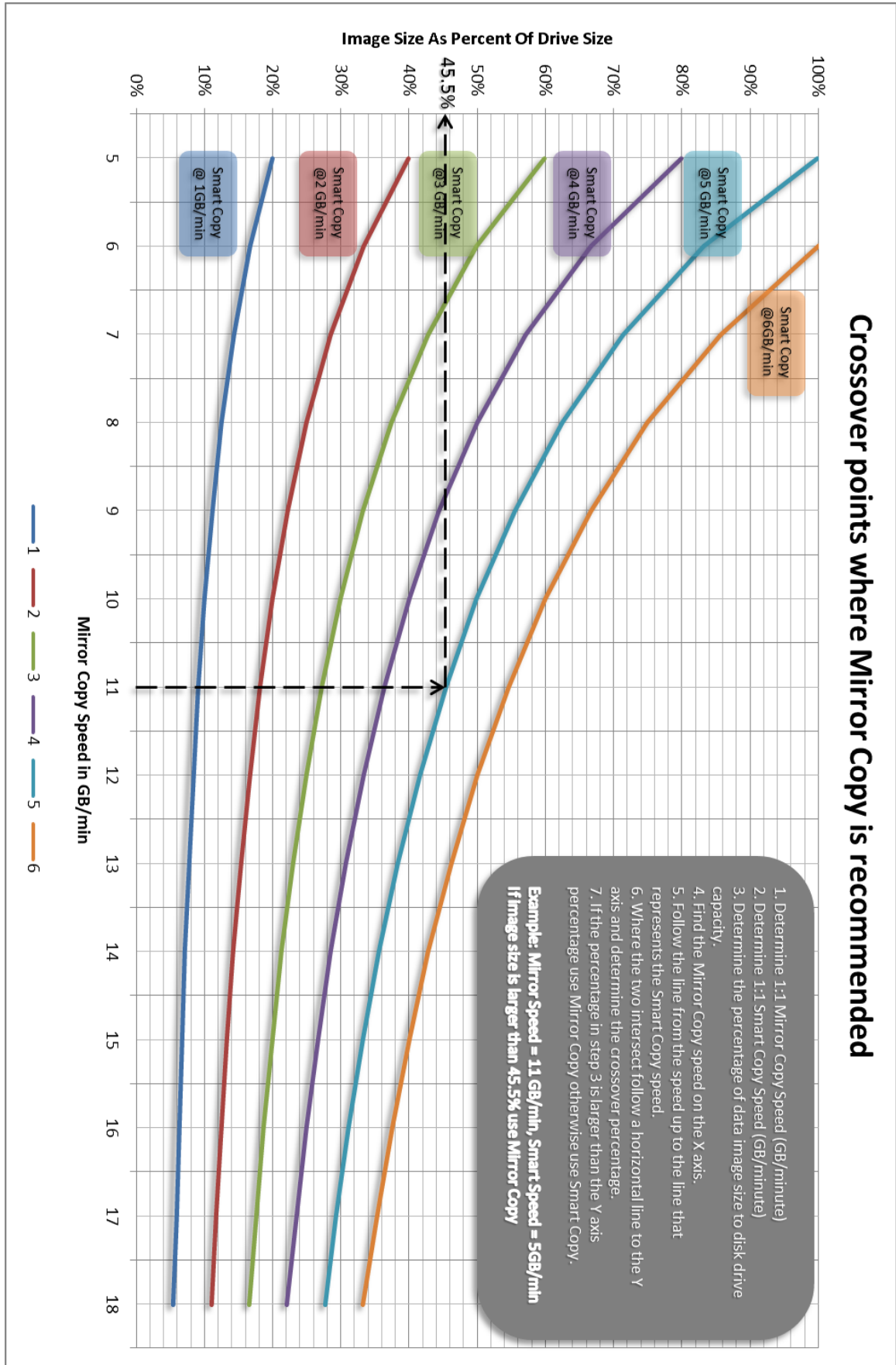

Figure 57: About screen

-------------- End --------------

5 Mirror Copy Decision Chart

Crossover points where Mirror Copy is recommended

Image Size As Percent Of Drive Size

Mirror Copy Speed in GB/min

Legend: 1, 2, 3, 4, 5, 6

Smart Copy @1GB/min
Smart Copy @2 GB/min
Smart Copy @3 GB/min
Smart Copy @4 GB/min
Smart Copy @5 GB/min
Smart Copy @6GB/min

1. Determine 1:1 Mirror Copy Speed (GB/minute)
2. Determine 1:1 Smart Copy Speed (GB/minute)
3. Determine the percentage of data image size to disk drive capacity.
4. Find the Mirror Copy speed on the X axis.
5. Follow the line from the speed up to the line that represents the Smart Copy speed.
6. Where the two intersect follow a horizontal line to the Y axis and determine the crossover percentage.
7. If the percentage in step 3 is larger than the Y axis percentage use Mirror Copy otherwise use Smart Copy.

Example: Mirror Speed = 11 GB/min, Smart Speed = 5GB/min If image size is larger than 45.5% use Mirror Copy

For example: If the file system image size is 20GB and the drive size is 120GB with the example shown the choice would be to **Smart Copy** because *17% is less than the 45.5% crossover point*.