VOOM DriveWiper 3™
User Guide

Hard Drive Wiper / Sanitizer Unit

DriveWiper 3^{TM} User's Guide

DriveWiper 3 is a registered trademark of Voom Technologies, Inc.
All other brand names, product names, and company names in this document
are trademarks or registered trademarks of their owners.

Second Edition

7 August 2013

(Based on the 1-03 release)

DriveWiper 3 is designed, developed, and manufactured in the USA.

VOOM Technologies, Inc.
110 St. Croix Trail South
Lakeland, Minnesota 55043
Telephone 651-998-1618
Fax 651-436-4030

Table of Contents

Voom Technologies, Inc. © 2004-2013 Proprietary www.voomtech.com

1 Information

1.1 Technical Documentation

Specifications and information contained in this manual are furnished by Voom Technologies, Inc. for informational use only and are subject to change at any time without notice and should not be construed as a commitment by Voom Technologies, Inc. Voom Technologies, Inc. assumes no responsibility or liability for any errors or inaccuracies that may appear in this manual; including the products, firmware and included accessories.

1.2 Data Protection Information

The user must be aware that an improper system configuration can lead to data corruption. Please read the System Configuration chapter of this manual carefully before attempting to wipe any data. Voom Technologies, Inc. is not responsible for any loss of data resulting from the use, disuse or misuse of this product.

2 Technical Support

2.1 Support by Telephone

Technical support is available to registered owners of Voom Technologies, Inc. products by telephone Monday through Friday 8:00am to 4:00pm, Central Time Zone at 651-998-1618.

2.2 Support by E-Mail

Voom Technologies, Inc. technical support is available by e-mail at support@voomtech.com.

2.3 Technical Support Tips

Call from a telephone where you have access to your DriveWiper 3 Unit . Please be prepared to provide the following information:

- ⑤ Name, telephone number, e-mail address
- ⑤ Model number and version of the product
- ⑤ Make and model of your hard drives
- ⑤ Symptoms of the problem

3   Preface

3.1   Product Contents

DriveWiper 3 Unit
0.5m SATA cables (three shipped)
18" PATA ribbon cable
Standard serial communication cable
AC adapter with power cord
HD1 DC power cord
HD2,3 DC power cord with Y-adapter for 2 drives
User Guide

3.2   Requirements

The DriveWiper 3 Unit supports PATA and SATA hard drives. In addition, it supports both the DoD 5220.22-M and NAVSO P-5239-10 specifications for clearing and sanitizing sensitive information from a hard drive.

3.3   Introduction

The DriveWiper 3 Unit is primarily designed to erase information from a disk drive. It provides three distinct ATA buses. This triple bus architecture allows the hardware to simultaneously wipe the data from all drives. The unit automatically detects the Master/Slave settings on a PATA drive, freeing the user from the hassle of reconfiguring the drive prior to and after performing a drive wipe operation. The PATA port shares a bus with SATA HD1. DriveWiper 3 always places all of the drives in "standby" mode after each operation has completed.

It currently supports the following operations:

- ⑤ Performs a functional test of the current system configuration.
- ⑤ Wipes all information from a drive with a DoD or NAVSO clear operation.
- ⑤ Sanitizes (permanently erases) a drive with a multi pass DoD or NAVSO sanitize operation.
- ⑤ Initiate an ATA Security Erase Unit command.
- ⑤ Unlocks/removes an existing HPA and/or DCO from each drive.

It also supports error recovery for drives that operate intermittently. If the unit is unable to read/write a sector after 6 consecutive attempts, it will increment the appropriate drive access error counter, and continue with the wipe operation. The total number of drive access errors (read or write), along with a list of the Logical Block Addresses (LBAs) associated with each of the errors (maximum of 16 for each access type), will be displayed to the user when the operation

completes.

The user interface for the DriveWiper 3 Unit supports both a LCD (2 line x 20 character) managed through a button control panel and a serial port that can be connected to any standard terminal. The user can execute commands by entering them from the button control panel, the attached terminal, or a combination of both. The status information is always displayed to both the LCD and the attached terminal.

The DriveWiper 3 Unit also supports erasing disk drives that are configured with a Host Protected Area (HPA) and/or Drive Configuration Overlay (DCO). An HPA is a reserved area for data storage outside the normal operating file system. A DCO restricts access to selected drive capabilities, typically including some portion of the available data storage space. If an HPA and/or DCO is found on either of the attached drives, they will automatically be removed and the entire drive will be erased.

Note: When performing an ATA Security Erase Unit command, the hard drive is running stand alone and does not communicate with the DriveWiper 3 unit until it has completed the erase. Any error recovery is up to the drive manufacturer.

The user interface for the DriveWiper 3 Unit supports a LCD (2 line x 16 character) managed through a button control panel. and a serial port that can be connected to any standard terminal. The user can execute commands by entering them from the button control panel, the attached terminal, or a combination of both. The status information is always displayed to both the LCD and the attached terminal.

3.4   Definitions

This section describes much of the technical verbiage used throughout this document.

Master Hard Drive: The primary hard drive on a PATA bus. Typically holds the operating system installation.
Slave Hard Drive: A secondary hard drive on a PATA bus. It is connected to the slave device connector.
Jumper: Refers to the hard drive jumper located at the back of the hard drive. This jumper configures the hard drive as a slave or master hard drive based on the number of hard drives used and the hard drive cable used.
DoD: The Untied States Department of Defense.
NAVSO: The United States Navy Staff Office.
Wipe: The process of erasing every sector of a disk drive.
Sanitize: The process of erasing every sector on a disk drive via a multiple pass approach which renders data recovery ineffective.
Erase: The Security Erase Unit command. Erases all sectors on the device and also clears the User password.
Security Feature Set: An optional feature set in the ATA Specification. When a User password is set, the ATA device is locked unless unlocked by the User password.
Ctrl: The keyboard control key.
Host Protected Area (HPA): A reserved area for data storage outside the normal operating file system.
Device Configuration Overlay (DCO): A virtual device configuration for the hard drive which may change the drive size and/or other properties.
Logical Block Address (LBA): The address of a sector on a hard drive.
HD or HDD: Hard Drive, also called the Hard Disk Drive.
SSD: Solid State Device or Solid State Drive
GB: Gigabyte: 1000000000 bytes.
MB: Megabyte: 1000000 bytes.
KB: Kilobyte.   1024 bytes.

4 System Configuration

This chapter describes how to connect hard drives to the DriveWiper 3 Unit using the component assemblies provided.

Note: Do not leave unconnected data cables plugged into the DriveWiper 3 Unit. A non-terminated cable may act as an antenna causing high data error rates. (Connecting a cable at both ends terminates it properly.)

4.1 Installing Drive 1

The Drive 1 (HD1) power and SATA data ports are on the left side of the Unit. The Drive 1 PATA data port is in the center of the back of the Unit . Use the DC power cable with single connectors on both ends to power Drive 1.

Please follow the steps described below to install a Source Drive:

1. **Power off the DriveWiper 3 Unit**.
2. Attach the black connector on one end of the DC power cable to the port on the left side of the DriveWiper 3 Unit.
3. Attach the other end of the DC power cable to the power receptacle of the hard drive. Remove the SATA power adapter for a PATA drive.
4. SATA only: Attach a SATA data cable between the hard drive and the SATA data port on the left side of the DriveWiper 3 Unit.
5. PATA only: Attach the PATA ribbon cable between the hard drive and the PATA data port on the back of the DriveWiper 3 Unit. Make sure the **blue** connector is attached to the Unit. For jumper settings, refer to the PATA Jumper Settings section.

Note: Connect only one hard drive to the HD1 bus at a time. The HD1 SATA and PATA ports share the same bus.

4.2   Installing Drives 2 and 3

The Drive 2 and 3 (HD2, HD3) power and SATA data HD3 ports are on the right side of the DrieWiper 3 Unit. The HD2 SATA data port is on the back of the DriveWiper 3 Unit . Use the DC power cable with the dual SATA power connectors to power the Destination Drives.

Please follow the steps described below to install Drives 2 and 3:

1. **Power off the DriveWiper 3 Unit**.
2. Attach the single black connector on the end of the DC power cable to the port on right side of the DriveWiper 3 Unit.
3. Attach one power connector on the other end of the DC power cable to the power receptacle of each hard drive.
4. Attach a SATA data cable between each hard drive and the HD2 or HD3 SATA data ports on the right side and back of the DriveWiper 3 Unit.

5 Command Description

The purpose of this chapter is to provide a detailed description of each of the commands supported by the DriveWiper 3. Refer to the Button Interface or Serial Interface chapters of this document for information on how to execute each of the commands. Please refer to the Troubleshooting chapter of this document for information relating to any failure case.

5.1 System Test Command

This feature is designed to verify that the drives are connected properly. This command simply reads a fixed number of sectors from the specified drive(s) which ensures that the cables have been installed properly.

5.2 Wipe Drive Command

This feature removes all of the information from a disk drive by writing a fixed data pattern to every sector on the drive. It supports both the DoD 5220.22-M and NAVSO P-5239-10 specifications for clearing information from a hard drive.

5.2.1 DoD Option

The DoD option requires only a single pass. It simply writes a fixed character of all ZEROs to the entire disk drive.

5.2.2 NAVSO Option

The NAVSO option requires two passes, one to write and one to verify. First, it writes a fixed character of all ONEs to the entire disk drive. Then, it verifies that the fixed character was written correctly to the entire disk drive.

5.2.3 Continue/Stop on Error Option

If a non-recoverable write error occurs the drive which had the error will be allowed to continue wiping or will be deactivated depending on the choice. The default option for the Wipe operation is to continue.

5.3 Sanitize Drive Command

This feature permanently erases all of the information from a disk drive by writing a sequence of data patterns to every sector on the drive. It supports both the DoD 5220.22-M and NAVSO P-5239-10 specifications for sanitizing information from a hard drive.

5.3.1 DoD Option

The DoD option requires a total of four passes, of which three are used for

writing and one for verifying. First, it writes a fixed character of hex 35 to the entire disk drive. Next, it writes the compliment of the initial fixed character, hex CA, to the entire disk drive. Finally, it writes an arbitrary character, hex 97, to every byte of every sector on the disk drive and verifies that the arbitrary character was written correctly to the entire disk drive.

5.3.2   NAVSO Option

The NAVSO option requires a total of eight passes, of which seven are used for writing and one is used for verifying. It begins by writing a fixed character of all ONEs to the entire disk drive. Next, it writes the compliment of the initial fixed character, all ZEROs, to the entire disk drive. Then, it repeats the previous two operations three more times for a total of 6 passes. Finally, it writes a random character (e.g., 0xDC) to every sector on the disk drive and verifies that the character was written correctly to the entire disk drive.

5.3.3   Continue/Stop on Error Option

If a non-recoverable write error occurs the drive which had the error will be allowed to continue wiping or will be deactivated depending on the choice. The default option for the Sanitize operation is to stop the drive. Any failure to properly write the drive is a failure to sanitize the drive.

5.4   Unlock Drive Command

This feature is designed to unlock the Host Protected Area (HPA) and/or Drive Configuration Overlay (DCO) of a disk drive. This command will permanently remove the HPA and/or DCO from the drive and restore the MAX LBA to its initial value, allowing access to the entire disk drive.

Note: If a disk drive has a DCO defined on it which limits its size, DriveWiper will not report the drive's maximum size until after the drive has been unlocked.

Note: Each of the wipe and sanitize commands will automatically perform this unlock procedure prior to executing its associated operation on the disk drive.

5.5   Set Date and Time Command

This feature allows the user to set the date and time of the DriveWiper 3 Unit's internal clock.

5.6   Security Erase Unit Command

This feature will initiate the ATA Security Erase Unit command. This command is only available via the Serial Interface. All LBAs on the drive will be erased and the User Security password will be cleared. A Security password must be set prior to executing this command. See Security Set Password for more information on the Security Feature Set.

Not all hard drives support the ATA Security Feature Set. The DriveWiper 3 unit will let the user know if the Security Feature Set is not supported when the command is attempted.

5.7   Security Set Password Command

This feature will initiate the ATA Security Set Password command. This command is only available via the Serial Interface.

Not all hard drives support the ATA Security Feature Set. The DriveWiper 3 unit will let the user know if the Security Feature Set is not supported when the command is attempted.

5.7.1   Security Feature Set Passwords

There are two passwords associated with the Security Feature Set, Master and User. The Master Security password does not activate Security. It exists to allow the drive to be re-purposed if the User Security password is forgotten. The User Security password when set will activate the Security Feature Set locking the drive unless the User password is known.

The DriveWiper 3 unit will only allow the Master Security password to be set.

The Master Security password can be set and reset at will without knowing the old Master password.

6 Button Interface

The button control panel and the LCD are designed to be the normal user interface. The button panel consists of the following three buttons:

Button	Function	Description
Yellow	Menu	This button is designed to step through each of the menu or parameter items. It always steps in a forward direction.
Green	Enter	This button is designed to either select a menu or parameter item, or acknowledge status information.
Red	Cancel	This button is designed to either abort the entering of a new command or the execution of the previous command.

The LCD is used to display each of the menu items, the progress of the current command, and to acknowledge the command status information.

Whenever commands are entered from the button control panel, all status information (e.g., failure information and completion status), must be acknowledged by the operator. A special arrow character [←] displayed in the lower right hand corner of the LCD indicates that the unit is waiting for acknowledgment of the data currently displayed in the LCD. Generally speaking, press the <enter> button each time the arrow character is displayed in order to continue executing the current command.

Note: When operating from the button control panel, the user may terminate an executing command by pressing the <cancel> button.

The button command menu is organized into a series of levels and parameter values. When displayed, the command information is displayed on the top line of the LCD and the parameter information on the bottom line. The level information is separated from the command information using a colon (e.g., [1:System Test] refers to level 1, and a command of "System Test"). Each of the parameters associated with a particular command (e.g., DoD/NAVSO) are displayed under the command once it has been selected. The prompting hierarchy used to organize the set of supported commands is shown in the following table.

Level	Prompt	Description
1	System Test	Perform a system test.
2	Wipe Drive	Wipes all information from a disk drive.
	DoD (1 Pass)	Wipes per the DoD specification.
	NAVSO (2 Passes)	Wipes per the NAVSO specification.
	Cont on error	Continue on non-recoverable write error.
	Stop on error	Fail the drive which has a write error.
3	Sanitize Drive	Sanitizes all sectors on a disk drive.
	DoD (4 Pass)	Wipes per the DoD specification.
	NAVSO (8 Passes)	Wipes per the NAVSO specification.
	Stop on error	Fail the drive which has an error.
	Cont on error	Continue on non-recoverable write error.
4	Unlock Drive	Remove an HPA and/or DCO from the drive.
5	Set Date/Time	Set the date and time.
6	Update System	Update the system firmware.

Step-by-step examples of the operations that the user can perform through the button interface are described in the following sections.

6.1   System Test Procedure

The following table describes the sequence associated with performing a system test of the current configuration using the button panel interface.

LCD interface	Comments
`DriveWiper3 1-03` `Ready`	From the main window, press <menu> to display the initial menu item.
`1:System Test`	Press <enter> to execute the system test command.
`Testing System` `OK? (or cancel)`	Press <enter> to acknowledge that you want to proceed.
`Drive 1:    80GB`	The status displayed after it discovers the attached drive.
`Testing Drive 1`	Interim status of the system test of drive 1.
`Drive 2:    80GB`	The status displayed after it discovers the attached drive.
`Testing Drive 2`	Interim status of the system test of drive 2.
`Task Done` `                ←`	The status displayed after it completes the system test.

6.2   Wipe Drive Procedure

The following table describes the sequence associated with performing a NAVSO wipe of a disk drive using the button panel interface.

LCD interface	Comments
`DriveWiper3 1-03` `Ready`	From the main window, press <menu> to display the initial menu item.
`1:System Test`	Press <menu> again to advance to the next menu item.
`2:Wipe Drive`	Press <enter> to execute the wipe drive command.
`2:Wipe Drive` `  DoD (1 Pass)`	Press <menu> to advance to the next parameter item.
`2:Wipe Drive` `  NAVSO (2 Passe`	Press <enter> to execute the wipe drive command using the NAVSO option.
`2:Wipe Drive` `  Cont on error`	Press <enter> to allow all drives to continue after a non-recoverable write error.
`Wipe All Drives` `OK? (or cancel)`	Press <enter> to acknowledge that you want to proceed or <cancel> to abort.
`Drive 2:    80GB`	The status displayed after it discovers the attached drive.
`Wipe   3.74GB/m` `00:01:25`	Interim status.
`Wipe   3.74GB/m` `5.3GB/80GB`	Message will toggle every few seconds.
`Verify  3.74GB/m` `00:05:12`	Interim status.
`Verify  3.74GB/m` `19.4GB/80GB`	Message will toggle every few seconds.
`Drive 2` `0 errors       ←`	(No) error notification status.
`Task Done` `             ←`	After viewing the completion status, press <enter> to return to the main window.

6.3   Sanitize Drive Procedure

The following table describes the normal sequence associated with performing a DoD sanitize operation of both disk drives using the button panel interface.

LCD interface	Comments
`DriveWiper3 1-03` `Ready`	From the main window, press <menu> to display the initial menu item.
`1:System Test`	Press <menu> again to advance to the next menu item.
`2:Wipe Drive`	Press <menu> again to advance to the next menu item.
`3:Sanitize Drive`	Press <enter> to execute the sanitize drive command.
`3:Sanitize Drive` `  DoD (4 passes)`	Press <enter> to execute the sanitize drive command using the DoD option.
`3:Sanitize Drive` `  Stop on error`	Press <enter> for the option to deactivate a drive which has had a non-recoverable write error.
`Wipe All Drives` `OK? (or cancel)`	Press <enter> to acknowledge that you want to proceed or <cancel> to abort.
`Drive 1:` `40GB`	The status displayed after it discovers the first attached drive.
`Drive 2:` `34GB`	The status displayed after it discovers the second attached drive.

`HPA Start:`
`32GB`
`HPA Size:`
`2GB`
	The status of the HPA on Drive 2.

`Unlocking Drive 2`	The status displayed as it is removing the HPA on the drive.
`Clearing Drive 2` `DCO`	The status displayed as it is removing the DCO on the drive.
`Drive 2 Unlocked`	The status displayed when it is finished unlocking the drive.

`Wipe[1]  6.8GB/m`
`00:09:15`
 	
`Wipe[1]  6.8GB/m`
`63/80GB`
	Interim status. The "[1]" indicates that it is performing pass 1 of 4.
	
	Message will toggle every few seconds.

`Wipe[2]  6.8GB/m`
`00:05:31`
 	
`Wipe[2]  6.8GB/m`
`37/80GB`
	Interim status. The "[2]" indicates that it is performing pass 2 of 4.
	
	Message will toggle every few seconds.

LCD interface	Comments
`Wipe[3]  6.2GB/m` `00:11:43`	Interim status. The "[3]" indicates that it is performing pass 3 of 4.
`Wipe[3]  6.2GB/m` `76/80GB`	Message will toggle every few seconds.
`Verify   6.8GB/m` `00:03:56`	Interim status. Pass 4 verifies what was written in pass 3.
`Verify   6.8GB/m` `26/80GB`	Message will toggle every few seconds.
`Drive 1` `0 errors        ←`	(No) error notification status.
`Drive 2` `0 errors        ←`	(No) error notification status.
`Task Done` `                ←`	After viewing the completion status, press <enter> to return to the main window.

6.4   Unlock Drive Procedure

The following table describes the normal sequence associated with unlocking a disk drive using the button panel interface.

LCD interface	Comments
`DriveWiper3 1-03` `Ready`	From the main window, press <menu> to display the initial menu item.
`1:System Test`	Press <menu> again to advance to the next menu item.
`2:Wipe Drive`	Press <menu> again to advance to the next menu item.
`3:Sanitize Drive`	Press <menu> again to advance to the next menu item.
`4:Unlock Drive`	Press <enter> to execute the unlock drive command.
`Removing DCO/HPA` `OK? (or cancel)`	Press <enter> to acknowledge that you want to proceed or <cancel> to abort.
`Drive 1 info`	Interim status.
`HPA Start189.4GB` `HPA Size:  5.1GB`	The status of the HPA on Drive 1.
`Drive 1 info`	Interim status.
`DCO Start194.5GB` `DCO Size:  5.4GB`	The status of the DCO on Drive 1.
`HD1 HPA removed` `HD1 DCO removed`	The status displayed after it removes the HPA and DCO.
`Task Done` `                ←`	After viewing the completion status, press <enter> to return to the main window.

15

6.5   Set Date and Time Procedure

The following table describes the normal sequence associated with setting the date and time:

LCD interface	Comments
DriveWiper3 1-03 Ready	From the main window, press <menu> to display the initial menu item.
1:System Test	Press <menu> again to advance to the next menu item.
2:Wipe Drive	Press <menu> again to advance to the next menu item.
3:Sanitize Drive	Press <menu> again to advance to the next menu item.
4:Unlock Drive	Press <menu> again to advance to the next menu item.
5:Set Date/Time	Press <enter> to execute the set date and time command.
Month 06/22/10 12:45	Allows incrementing the Month by pressing <enter>. Press <menu> to advance.
Day 06/22/10 12:46	Allows incrementing the Day by pressing <enter>. Press <menu> to advance.
Year 06/22/10 12:47	Allows incrementing the Year by pressing <enter>. Press <menu> to advance.
Hour 06/22/10 12:48	Allows incrementing the Hour by pressing <enter>. Press <menu> to advance.
Minute 06/22/10 12:49	Allows incrementing the Minute by pressing <enter>. Press <menu> to advance.

Note: Pressing <cancel> at any time will exit Set Date/Time.

7 Serial Interface

The serial interface is primarily provided as a means for providing the user access to additional commands, command parameters, detailed status information, and detailed failure messages. It is designed to operate with the following serial port configuration settings:

Parameter	Value
Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	none

Note: When operating from the serial interface, the user may terminate a command by entering a <Ctrl C> character.

The serial interface command menu can be displayed anytime by entering `help` or '?.' Any command options are preceded by a '-' and all optional parameters are enclosed in brackets. The `help` command is shown below:

```
=> help
User Commands:
  Test                      Test system configuration
  Wipe     [-DNCF]          Wipe the disk drive(s)
           D (default) or N specifies DoD5520 or NAVSO protocol
           C (default) or F specifies Continue or Fail on error
  Sanitize [-DNCF]          Sanitize the disk drive(s)
           D (default) or N specifies DoD5520 or NAVSO protocol
           C or F (default) specifies Continue or Fail on error
  Unlock                    Remove HPA/DCO from disk drive(s)
  SecurityErase  -[u|m] [1|2|3] Security Erase the disk drive(s)
           u or m (default) specifies user or master password
           default choice is ALL drives; or choose 1, 2 or 3
  SecuritySetPass [1|2|3]    Set Master Security Password on
disk drive(s)
           default choice is ALL drives; or choose 1, 2 or 3
```

Note: Entering the hidden "verbose" command results in additional status and error information displayed to the terminal.

All examples provided in this chapter are of typical operation.

Using a terminal program capable of serial communications, such as Tera Term, configure the terminal program and the serial port (usually COM1) as described below:

Voom Technologies, Inc. © 2004-2013 Proprietary www.voomtech.com

1. Launch the terminal program. To find it via the Windows *Start* menu:

   ```
   All Programs->Tera Term->Tera Term
   ```

2. Create a new connection by entering "`File->New Connection`" from the main menu bar. Tera Term may automatically popup the New Connection dialog. Select the communications port being used and click OK.
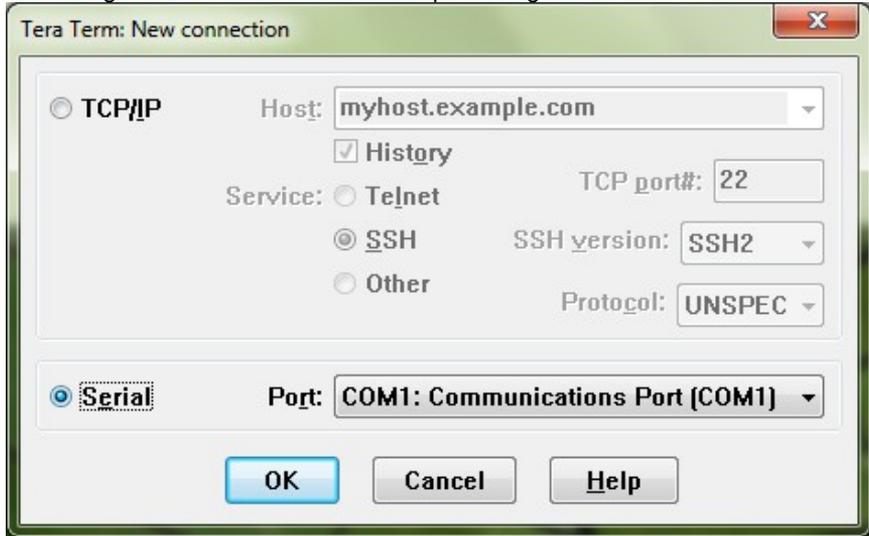
3. Configure the serial port as shown below and click OK. Choose "`Setup ->Serial Port...`" from the main menu bar.
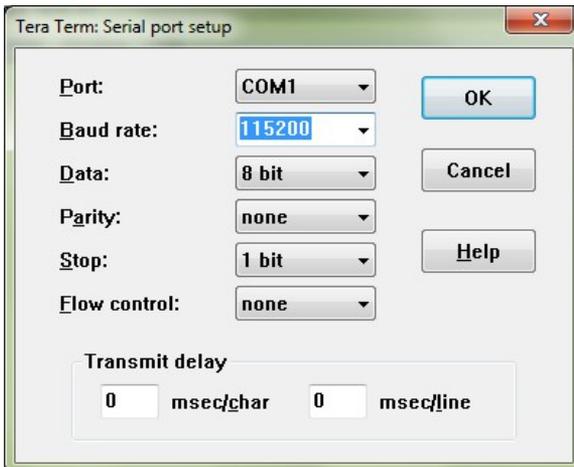
4. If communications between the computer and the DriveWiper 3 have been established the startup text and "=>" prompt will be visible after the unit is turned on. Once the prompt is displayed the `help` command may be entered.
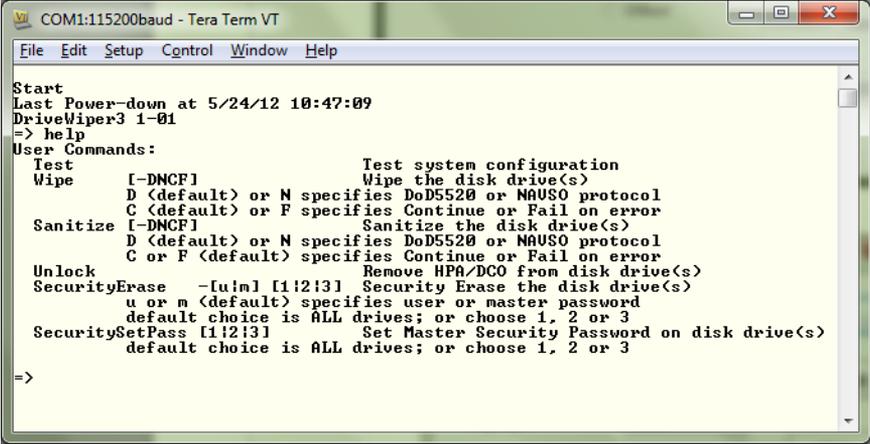
```
COM1:115200baud - Tera Term VT
File  Edit  Setup  Control  Window  Help

Start
Last Power-down at 5/24/12 10:47:09
DriveWiper3 1-01
=> help
User Commands:
  Test                           Test system configuration
  Wipe      [-DNCF]              Wipe the disk drive(s)
            D (default) or N specifies DoD5520 or NAVSO protocol
            C (default) or F specifies Continue or Fail on error
  Sanitize [-DNCF]               Sanitize the disk drive(s)
            D (default) or N specifies DoD5520 or NAVSO protocol
            C or F (default) specifies Continue or Fail on error
  Unlock                         Remove HPA/DCO from disk drive(s)
  SecurityErase  -[u|m] [1|2|3]  Security Erase the disk drive(s)
            u or m (default) specifies user or master password
            default choice is ALL drives; or choose 1, 2 or 3
  SecuritySetPass [1|2|3]        Set Master Security Password on disk drive(s)
            default choice is ALL drives; or choose 1, 2 or 3

=>
```

7.1   System Test Procedure

When using the serial interface, the command syntax for testing the system is given below:

```
Test
```

The following examples show the output from a typical system test command (one example for each of the three possible drive configurations) when using the serial port interface.

```
=> test
Testing System
OK (y/n)? y
Initializing...
              Drive 1   found
              Drive 2 missing
              Drive 3   found
Drive 1 ST380815AS 80.0GB  (156301488 LBAs)
Drive 3 FUJITSU MHV2060BH 60.0GB  (117210240 LBAs)
Spinning Up Drive 1
Spinning Up Drive 3
Reading 2048 sectors from Drive 1 drive
Reading 2048 sectors from Drive 3 drive
2 drives found
```

7.2   Wipe Drive Procedure

When using the serial interface, the command syntax for wiping disk drives is given below:

```
Wipe -[DNCF]
      D         Use the DoD standard (default)
      N         Use the NAVSO standard
      C         Continue on non-recoverable error (dflt)
      F         Fail drive on non-recoverable error
```

The 'D' and 'N' options are mutually exclusive.
The 'C' and 'F' options are mutually exclusive. Failing a drive will deactivate that one drive.

```
=> wipe -n
Wipe All Drives
OK (y/n)? y
```

```
Initializing...
              Drive 1   found
              Drive 2 missing
              Drive 3   found
Drive 1 ST380815AS 80.0GB  (156301488 LBAs)
Drive 3 FUJITSU MHV2060BH 60.0GB  (117210240 LBAs)
Drive 1 HPA Start72.4GB
Drive 1 HPA Size: 5.1GB
Drive 1 DCO Start77.5GB
Drive 1 DCO Size: 2.5GB
Drive 1 HPA removed
Drive 1 DCO removed
Spinning Up Drive 1
Spinning Up Drive 3
Wiping 156301488 sectors on Drive 1
Wiping 117210240 sectors on Drive 3
00:00:10, 1483776 sectors, 82.4MB/s (4.3GB/m average)
00:00:20, 3161088 sectors, 82.8MB/s (4.6GB/m average)
00:00:31, 4838400 sectors, 82.8MB/s (4.7GB/m average)
. . .
00:31:18, 234114048 sectors, 40.9MB/s (3.8GB/m average)
Wipe of Drive 3 complete
00:31:28, 235073664 sectors, 51.4MB/s (3.8GB/m average)
00:31:38, 236105856 sectors, 51.4MB/s (3.8GB/m average)
00:31:49, 237138048 sectors, 51.3MB/s (3.8GB/m average)
. . .
00:38:50, 273511728 sectors, 37.0MB/s (3.6GB/m average)
Wipe of Drive 1 complete
Verifying 156301488 sectors on Drive 1
Verifying 117210240 sectors on Drive 3
00:00:10, 1612800 sectors, 83.8MB/s (4.8GB/m average)
00:00:20, 3290112 sectors, 83.7MB/s (4.9GB/m average)
00:00:30, 4967424 sectors, 83.3MB/s (4.9GB/m average)
. . .
00:30:42, 234049536 sectors, 41.4MB/s (3.9GB/m average)
Verify of Drive 3 complete
00:30:52, 234976896 sectors, 52.7MB/s (3.9GB/m average)
00:31:02, 236009088 sectors, 52.7MB/s (3.8GB/m average)
00:31:12, 237041280 sectors, 52.6MB/s (3.8GB/m average)
. . .
00:38:04, 273511728 sectors, 37.6MB/s (3.6GB/m average)
Verify of Drive 1 complete
Drive 1:  Wipe completed, 0 total errors
Drive 3:  Wipe completed, 0 total errors
Task Done
```

7.3   Sanitize Drive Procedure

When using the serial interface, the command syntax for sanitizing disk drives is given below:

```
Sanitize -[DNCF]
        D       Use the DoD standard (default)
        N       Use the NAVSO standard
        C       Continue on non-recoverable error
        F       Fail drive on non-recoverable error (dflt)
```

The 'D' and 'N' options are mutually exclusive.
The 'C' and 'F' options are mutually exclusive. Failing a drive will deactivate that one drive.

```
=> sanitize
Wipe All Drives
OK (y/n)? y

Initializing...
             Drive 1   found
             Drive 2   found
             Drive 3   found
Drive 1 ST380815AS 80.0GB  (156301488 LBAs)
Drive 2 ST380811AS 80.0GB  (156301488 LBAs)
Drive 3 ST380815AS 80.0GB  (156301488 LBAs)
Spinning Up Drive 1
Spinning Up Drive 2
Spinning Up Drive 3
Wiping 156301488 sectors on Drive 1
Wiping 156301488 sectors on Drive 2
Wiping 156301488 sectors on Drive 3
00:00:10, 3773952 sectors, 219.9MB/s (11.2GB/m average)
00:00:20, 8225280 sectors, 219.9MB/s (12.2GB/m average)
00:00:30, 12579840 sectors, 219.9MB/s (12.5GB/m average)
. . .
00:23:09, 468904464 sectors, 106.8MB/s (10.3GB/m average)
Wipe[1] of Drive 1 complete
Wipe[1] of Drive 2 complete
Wipe[1] of Drive 3 complete
Wiping 156301488 sectors on Drive 1
Wiping 156301488 sectors on Drive 2
Wiping 156301488 sectors on Drive 3
00:00:10, 4354560 sectors, 217.5MB/s (13.0GB/m average)
00:00:20, 8805888 sectors, 218.3MB/s (13.1GB/m average)
00:00:30, 13160448 sectors, 215.4MB/s (13.0GB/m average)
```

```
. . .
00:23:08, 468904464 sectors, 106.9MB/s (10.3GB/m average)
Wipe[2] of Drive 1 complete
Wipe[2] of Drive 2 complete
Wipe[2] of Drive 3 complete
Wiping 156301488 sectors on Drive 1
Wiping 156301488 sectors on Drive 2
Wiping 156301488 sectors on Drive 3
00:00:10, 4451328 sectors, 219.9MB/s (13.1GB/m average)
00:00:20, 8805888 sectors, 219.5MB/s (13.1GB/m average)
00:00:31, 13257216 sectors, 219.9MB/s (13.1GB/m average)
. . .
00:23:07, 468904464 sectors, 104.8MB/s (10.3GB/m average)
Wipe[3] of Drive 1 complete
Wipe[3] of Drive 2 complete
Wipe[3] of Drive 3 complete
Verifying 156301488 sectors on Drive 1
Verifying 156301488 sectors on Drive 2
Verifying 156301488 sectors on Drive 3
00:00:10, 4548096 sectors, 228.2MB/s (13.6GB/m average)
00:00:20, 9192960 sectors, 228.2MB/s (13.6GB/m average)
00:00:31, 13837824 sectors, 228.2MB/s (13.6GB/m average)
. . .
00:22:19, 468904464 sectors, 109.5MB/s (10.7GB/m average)
Verify of Drive 1 complete
Verify of Drive 2 complete
Verify of Drive 3 complete
Drive 1:  Sanitize completed, 0 total errors
Drive 2:  Sanitize completed, 0 total errors
Drive 3:  Sanitize completed, 0 total errors
Task Done
```

7.4   Unlock Drive Procedure

When using the serial interface, the command syntax for unlocking a disk drive (e.g., permanently removing its HPA) is given below:

Unlock

```
=> unlock
Removing DCO/HPA
OK (y/n)? y

Initializing...
              Drive 1 missing
              Drive 2 missing
              Drive 3   found
Drive 3 SAMSUNG SP2004C 200.0GB  (390721968 LBAs)
Drive 3 HPA Star189.4GB
Drive 3 HPA Size: 5.1GB
Drive 3 DCO Star194.5GB
Drive 3 DCO Size: 5.4GB
Drive 3 HPA removed
Drive 3 DCO removed
Spinning Up Drive 3
Task Done
```

7.5 Security Erase Unit Procedure

The Security Erase Unit command is only available via the serial interface. The command syntax for initiating a Security Erase Unit command is given below:

```
SecurityErase -[u|m] [1|2|3]
        u      use the User password
        m      use the Master password (default)
        1      Erase only drive 1
        2      Erase only drive 2
        3      Erase only drive 3
               (default is all drives)
```

```
=> securityerase 2
Erasing Drive
OK (y/n)? y

Initializing...
            Drive 1   found
            Drive 2   found
            Drive 3 missing
Drive 1 ST31500341AS 1500.3GB  (2930277168 LBAs)
Drive 2 WDC WD1600AAJS-00YZCA0 160.0GB  (312581808 LBAs)

Please enter the Master Password
> ****

Drive 2:  Beginning security erase.
Spinning Up Drive 2
00:00:10 Mfr guess is 30 min
00:00:20 Mfr guess is 30 min
. . .
00:30:00 Mfr guess is 30 min
00:30:10 Mfr guess is 30 min
Drive 2:  security erase completed successfully
Task Done(00:30:12, 0B)
```

Note: A Security password must be set for Security Erase Unit to succeed.

Note: The maximum password length is 32 characters.

Important: Use Security Erase Unit instead of Wipe/Sanitize for SSDs to prevent unnecessary writes which will shorten the life of the SSD.

7.6   Security Set Password Procedure

The Security Set Password command is only available via the serial interface. The command syntax for initiating a Security Set Password command is given below:

```
SecuritySetPass [1|2|3]
        1       Set Master password only drive on 1
        2       Set Master password only drive on 2
        3       Set Master password only drive on 3
                (default is all drives)
```

```
=> securitysetpass
Setting Security Password
OK (y/n)? y

Initializing...
              Drive 1   found
              Drive 2 missing
              Drive 3 missing
Drive 1 ST31500341AS 1500.3GB  (2930277168 LBAs)

Please enter the Master Password
> ****


Please Re-enter the Password
> ****

Drive 1:  Setting Master password.
Task Done(00:00:01 0B)
```

Note: The maximum password length is 32 characters.

Due to the sensitive nature of security procedures VoomTech has chosen not to implement the feature of setting a User Security password, which activates the Security Feature Set on the device. We allow the setting of a Master Security password because an active password is necessary to initiate the Security Erase Unit command. Master Security passwords do not activate the Security Feature Set. The purpose of the Master Security password is for re-purposing the device if the User Security password has been forgotten.

8   Special Precautions

This chapter describes some scenarios that require special attention in order to prevent unexpected results when operating the DriveWiper 3 unit. Each of these situations is described in detail.

8.1   Using the Buttons

The system automatically de-bounces each of the switch operations. In addition, to avoid unexpected results caused by "double-clicking" any of the buttons, all previous button status is cleared after each prompting message is displayed to the LCD. Therefore, each prompting message will be displayed for a minimum of ½ a second before the unit will respond to any operator input from the buttons.

The user may experience up to a 30 second response delay if the hardware is waiting for a drive to respond (e.g., spinning up a drive).

8.2   Powering Off the DriveWiper 3

Powering off the unit while testing, wiping, sanitizing or erasing a drive is not recommended. Before powering off the unit, make sure that it is in the idle state by canceling any command that is currently executing. To cancel a command from the button interface, first press the <cancel> button and then respond to each of the prompts until the "Ready" status is indicated on the LCD. To cancel a command from the serial interface, first enter <Ctrl C>, then respond to each of the user prompts until the "=>" is displayed on the terminal.

Note: Powering off the unit or canceling a command will result in a partially wiped/erased drive.

8.3   PATA Jumper Settings

Theoretically, any jumper setting should work provided the PATA Source Drive is connected to the end of the ribbon cable (black connector). In practice however, the jumper setting may matter.

● If the PATA Drive has a "single" drive jumper setting, use it. This setting tells the drive it is the only drive on the cable and the initialization times will be faster. (This setting may be called "force 1 drive.")
● If the DriveWiper 3 Unit does not see a PATA Drive using one jumper setting, try a different one. Some drives may respond in a way which is incompatible with the Unit in one setting versus another. If such a drive is found, please let VoomTech know the drive model and which jumper setting did not work.

Known incompatible settings (incompatible setting marked with X):

Model	Master	Cable Select	Slave	Single
IBM Deskstar DTLA-305020		X	X	
Western Digital Caviar 84AA	X			

8.4   Security Erase Unit Behavior

We have noticed some hard drives will not succeed with the Security Erase Unit command. These drives are:
• Seagate Barracuda 7200.9 family
• Seagate Barracuda 7200.10 family
• Hitachi Deskstar HDS721680PLA380

Security Erase Unit *did* succeed with Seagate Barracuda 7200.7, 7200.11 and 7200.12 family drives.

9   Troubleshooting

This chapter describes operation failures that may occur during the execution of the commands previously described.

9.1   Standard Commands

Since the same information is displayed to both the LCD and the serial interface, we will use the LCD format to describe each of these conditions. The following table provides a brief description of the most common events leading up to each failure condition and also describes some suggestions for resolving the problem:

LCD information	Detailed description
`Drive x` `-no drive found←`	This message is displayed whenever one of the following conditions occurs: ⑤ No power to the specified drive. ⑤ No ATA cable to the specified drive. ⑤ Unable to identify the specified drive. Hint: Make sure that the ATA cable is installed correctly (blue end to the to the drive wiper unit and black end to the drive).
`Drive x` `-reset error   ←`	This message is displayed whenever the following condition occurs: ⑤ An error was detected while reseting the specified drive. Hint: Repeat the command, as the disk drive may be intermittent.
`Drive x` `-identify error←`	This message is displayed whenever the following condition occurs: ⑤ An error was detected while attempting to read the drive configuration attributes from the specified drive. Hint: Repeat the command, as the disk drive may be intermittent.
`Drive x` `-select error  ←`	This message is displayed whenever the following condition occurs: ⑤ An error was detected while attempting to select the specified drive. Hint: Repeat the command, as the disk drive may be intermittent.

`Drive x` `-read error    ←`	This message is displayed whenever the following condition occurs: ⑤ A read error was detected while testing the specified drive. Hint: Repeat the command, as the sectors on the specified drive may be intermittent.
`Drive x` `-wipe error    ←`	This message is displayed whenever the following condition occurs: ⑤ Attempting to initialize a wipe operation with an invalid data pattern. This should never happen under normal operating circumstances. Hint: Please report this problem to the customer service department so that can be corrected in the next software release.
`Drive x` `-sanitize error←`	This message is displayed whenever the following condition occurs: ⑤ The number of sectors wiped does not match the number of sectors verified. This should never happen under normal operating circumstances. Hint: Repeat the command, as either the wipe or verify operation failed to complete successfully.
`Drive x` `-verify error  ←`	This message is displayed whenever the following condition occurs: ⑤ Attempting to initialize a verify operation with an invalid data pattern. This should never happen under normal operating circumstances. Hint: Please report this problem to the customer service department so that can be corrected in the next software release.
`Drive x` `-unlock drive e←`	This message is displayed whenever the following condition occurs: ⑤ An error was detected while attempting to remove the HPA from the specified drive. Hint: Power off the unit, then repeat the command as each drive can only be unlocked one time without being powered off.

`Insufficient Me` `[Power Off Unit`	This message is displayed whenever the following condition occurs: ⑤ The operating system has exhausted all of its memory resources. This should never happen under normal operating circumstances. Hint: Please report this problem to the customer service department so that can be corrected in the next software release.

9.2   Serial Interface Only Commands

`Drive x:  Command Failed:  Command aborted`
The most likely reason this error will be reported is if the security password supplied did not match or was not set on the device.
Try a power cycle to clear the device status and try again.
Any other reason is undocumented. The device being erased likely failed to complete the command.

10 Warranty

10.1 Limited Warranty

Voom Technologies, Inc. (VoomTech) warrants the Shadow 2 hardware against defects in material and workmanship under normal use and service for one (1) year from the original date of purchase. Voom, at its option, shall repair or replace the defective unit covered by this warranty.

VoomTech does not warrant this product to be free of interruption or errors.

This warranty covers only defects that arise from normal usage of the product, as it is intended by Voom and indicated in this User Guide and does not cover other issues, including those arising from:
- Improper maintenance or handling,
- Use of parts or supplies not included with the product or approved for usage by VoomTech,
- Operations that deviate from those intended or indicated in this User Guide,
- Misuse or abuse of the product, modification of the product that is unauthorized by Voom, subjecting the product to abnormal working conditions (including, but not limited to, water or lightning damage) or tampering with the product.

Upon notification of defect in materials or workmanship and return of the product in accordance with the Warranty Return Instructions and in concurrence with the warranty conditions as indicated above, VoomTech shall either repair or replace the product at its discretion. VoomTech reserves the right to replace the product with a new or like-new product that has functionality equal to or exceeding that of the originally purchased product.

Voom will be obligated to repair or replace the product only after the product has been returned according to the instructions found in this chapter and has been received by VoomTech.

This warranty is valid only if the product is used in conjunction with devices indicated in this User Guide.

Repair or replacement as provided under this warranty is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose, and Voom Technologies, Inc., shall in no event be liable to purchaser for indirect or consequential damages of any kind or character.

Some states do not allow the exclusion or limitation of incidental or consequential damages or allow limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

10.1.1 Wearable Parts

The data cables are subject to wear and should be replaced on a regular basis. The DC power cables and data cables are considered "wearable" parts and as such are not covered under the warranty except for initial manufacturer defects.

10.2 Warranty Return Instructions

For timely warranty repair and return of the Product please follow the procedure outlined below.

1. Contact a VoomTech representative (651-998-1618) to obtain a Return Material Authorization (RMA) number.
2. Please be prepared to provide the VoomTech representative with the product serial number, the invoice number and the date of purchase in order to facilitate this process.
3. Once you receive a RMA number, please pack the Product in its original packaging or any other secure box so that no damage may occur.
4. Deliver the Product **shipping prepaid** to:

    Voom Technologies, Inc.
    110 St. Croix Trail South
    Lakeland, MN   55043
    Attention: RMA _____

5. Shipping with proper insurance and a tracking number is highly advised.
6. Please be sure to include in the return package complete contact information including return shipping information. Please also include a brief description of the problem and a copy of the RMA number.
7. If you do not obtain an RMA, your return will not be able to be processed immediately and may be returned unprocessed.

NOTE: Voom Technologies, Inc. is not responsible for items lost or damaged in transit.

11 Specifications

This chapter describes the specifications for the Model No. XLDWPL-1 DriveWiper unit.

AC Electrical Requirements	
AC Adapter Voltage	Universal AC, 100 VAC/240 VAC
Frequency	50-60 Hz
Current	1.3 Amps
Output Voltage	12 VDC @ 7 A
Manufacturer	FSP Group Model: FSP084-DMAA1 or equivalent
Fusing	5 Amp slow blow (5X20 mm) internal

Operating Environment	
Temperature	50 to 95 Degrees F
Relative Humidity	20% to 80% (non condensing)
Altitude	0 to 8000 Feet

Physical Characteristics	
Height	1.5 inches
Width	5.625 inches
Depth	4 inches
Weight	I pound (excluding accessories)

11.1   CE

Users need to notify any information technology equipment users within a 60 meter radius that DriveWiper may interfere with other electronic equipment. Although the manufacturer has not observed electromagnetic interference from the DriveWiper with other electronic equipment in its development lab or offices, this is not an indication that the user will not experience electromagnetic interference from the DriveWiper with other electronic equipment within the 60 meter radius.

11.2   FCC Exemption

This device is exempt from FCC regulations under Part 15, Section 103 c.