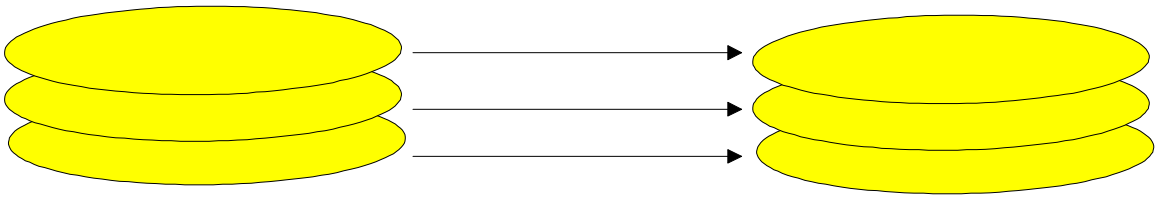
GREYSTONE

DATAFASTER

Model D-106

SCSI



Software version 1.19
Manual version 1.02

D-UMAN-0004A - 11/00A

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1.0 INTRODUCTION

1.1 GENERAL DESCRIPTION

The **Greystone DataFaster** is a high performance device that replicates data stored on a master disk drive to from 1 to 4 target disk drives, in parallel. This duplication process can be performed directly by a user from the controls of the **DataFaster**.

The copy process, which includes bit for bit verification, can replicate data at rates exceeding 2 megabytes per second. If hardware data verification is turned off, this rate exceeds 4 megabytes per second. The **DataFaster** can maintain this rate throughout the entire copy process. The limiting factor is the rate at which the slowest target drive can accept data on a continuous basis. As an example: four 1.2 Gigabyte target disk drives can be duplicated and verified, in parallel, in less than 10 minutes. This means that the process on a per drive basis takes less than 2.5 minutes per 1.2 Gigabyte disk drive.

During the duplication process all the data is copied and verified in hardware on a byte by byte basis. This comparison guarantees accurate data replication.

1.1.1 Stand-alone Mode

The Standalone mode is simply a single **Greystone DataFaster** which plugs into a standard AC wall plug. The duplication process is performed by merely connecting the master drive, connecting the target drives, turning on the power and pushing the **START** push-button. Using the **DataFaster** as a standalone device allows the user to duplicate disk drives with a single push of a button. No training is necessary.

2.0 FEATURES

- Stand-alone Duplication System of similar drives
- **DataFaster** supports conventional, differential, fast and wide SCSI interfaces
- Drives do not have to be set to specific addresses during the duplication process
- System warns the user when drives of differing sizes are about to be copied (user can choose to continue regardless)
- Data from the master drive can be split on the target drives into 1, 2 or 3 independent areas
- Each **DataFaster** can duplicate up to four SCSI disk drives
- Each drive operates independently of the other drives; each drive has its own, independent SCSI controller
- Power for one master and four target disk drives included
- Firmware upgrades through an external port
- One year factory warranty

3.0 SPECIFICATIONS

3.1 POWER (@ 0 - 50 °C)

AC INPUT	90 - 264 VAC	47 - 63 Hz
DC OUTPUT (power supply)	+5VDC	+12VDC
RATED	20.0 A	8.0 A
PEAK	20.0 A	8.0 A
EACH DISK DRIVE	2.5 A (max.)	1.5 A (max.)
TOTAL ALL DRIVES	10.5 A (cont.)	6.0 A (cont.)
	12.5 A (peak)	8.0 A (peak)

With all drives connected the total disk drive power consumption should not exceed 140 watts continuous or 170 watts peak (10 seconds). To reduce the peak power requirements during the power up sequence, the **DataFaster** provides a **Power On Delay** function to stagger the spin up of each disk drive. The **Power On Delay** operation is detailed in section 6.3 of this manual.

3.2 PHYSICAL

Width: 16"

Length: 16"

Height: 2.5"

Weight: 9.0 lbs. (4.1 Kg.)

3.3 TEMPERATURE

Operating 0 - 50 °C

4.0 INSTALLATION

4.1 UNPACKING

The **D-106** is supplied with all cables and power necessary to duplicate from a master disk drive to four target disk drives. Included in the package is the product manual and warranty information. Please retain the shipping box and packing material in case the device must be returned to the factory.

1 - F- SCSI-D106-D
1 - AC Power Cable
1 - 9" 68-Pin Master Control Cable
1 - 10" 4-Pin Master DC Power Cable
4 - 5" 68-Pin Target Control Cables
4 - 7" 4-Pin Target DC Power Cables
5 - 68-Pin to 50-Pin Adapters
1 - Product Manual

Remove the **D-106** from the packing material and place on a clean surface. Due to the nature of **CMOS** integrated circuits, use of anti-static equipment is strongly recommended. If you do not use anti-static equipment, before touching the **D-106** be sure to ground yourself to release excess static electricity.

The power supply receives AC power from the wall socket. The power supply is set up for 220VAC, 50 Hz or 110VAC, 60 Hz.

4.2 SOFTWARE INSTALLATION

Not applicable

4.3 HARDWARE INSTALLATION

4.3.1 Stand-alone Installation

Installation of the stand-alone **DataFaster** can be done in just a few minutes. There is no software to pre-load.

The AC power cable must be plugged into a power outlet (110VAC or 220VAC, 47 to 63Hz). The **DataFaster** is strapped for either 110VAC, 60 Hz or 220VAC, 50Hz.

There are 5 sets of DC 4 pin power cables and 50 pin data cables. One set of cables (**master**) is already installed in the **DataFaster**. The remaining 4 sets of cables are the target cables. These are to be plugged into the top of the **DataFaster**. Ensure that the pin alignment (pin 1 to pin 1) is correct for the data connector. The DC connector is keyed. **DO NOT** force the connectors into place.

Apply power to the **DataFaster** by turning the power switch S1 (right rear) to the "**ON**" position. The **DataFaster** will perform a series of self tests (ROM, RAM, I/O). The self tests will test internal memory and I/O. The self test takes only a few seconds and at the end of the test the **Main Menu** will be displayed on the LCD. The **DataFaster** is now ready for use.

The default values upon power up is as follows:

- Four target disk drives selected
- 14 seconds power up delay programmed between each disk drive
- Mirror option "ON"
- Copied Data verification "ON"
- Unwritten block verification "OFF"

4.4 FIRMWARE DOWNLOAD FROM A PC

4.4.1 Download Software

DataFaster's are shipped with Flash ROM as resident memory. Firmware can be changed by downloading it from a standard PC, through the parallel port (LPT1). By running the Greystone Download Software (SLOAD.EXE) provided with any **DataFaster** revision level change, the user can change firmware revisions as soon as they become available.

4.4.2 Download Procedure

The Greystone Download Software is an executable file called "SLOAD.EXE". It can be run from a floppy or it may be loaded onto the system hard disk drive. The following directions assume that the download will take place from the hard drive, drive "C".

1. Turn power off to the DataFaster .
2. Connect a 25 pin, D-sub type cable (male on both ends) from any parallel port (LPTn) of the PC to the parallel port of the DataFaster .
3. Apply power to the DataFaster .
4. The PC should be running DOS 2.0 or above and display the **C:>** prompt.
5. At the C:> prompt, type: "**SLOAD xxxxxxxx.BIN**", where
   SLOAD = Software Download Program
   xxxxxxxx.BIN = Firmware revision file name

Upon running SLOAD, The LCD on the DataFaster should display "Download Parallel Port" for approximately 2 seconds and then perform a self-test. At the end of the self-test the Main Menu should appear showing the new revision level of firmware.

5.0 OPERATION

Normal operation of the **DataFaster** just involves connecting the disk drives and pressing the **START** button to begin the duplication process.

The **DataFaster** allows the drives to have any SCSI device address of 0 through 6. The **DataFaster** automatically determines the drives address when the process is started.

For customizing the operation of the **D-106** a system of menus are used. The **POSITION** P/B and the **ENTER** P/B are used to navigate through the menus and to select various options.

The user selects a menu by positioning the cursor with the **POSITION** push-button (P/B). To activate the menu the user just depresses the **ENTER** P/B. The Menus are organized in a tree like structure beginning with the OPTIONS menu.

Similarly to enable or disable an option the user first positions the cursor using the **POSITION** P/B. For menus where the user selects one of several options the user just presses the **ENTER** P/B when the cursor is adjacent to the desired option. For menus which have several independent options the **DataFaster** will toggle the option On or Off with each press of the **ENTER** P/B.

Number values are changed by positioning the cursor to the desired digit using the **POSITION** P/B and then depressing the **INCREMENT** P/B or the **ENTER** P/B repeatedly until the desired number or character appears.

5.1 FUNCTION P/Bs (Front Panel)

START - The **START** P/B is used to start or stop the copy process.

ENTER - The **ENTER** P/B is used to enter a function or store a value.

INCREMENT - When in a menu: The **INCREMENT** P/B is used to cycle through values or characters for storing.
- When a copy process has completed: The **INCREMENT** P/B is used to step through the messages that provide additional information regarding errors that occurred during the duplication process

POSITION - The **POSITION** P/B enables the user to move the cursor through the menus.

5.2 REAR PANEL P/Bs, ADJUSTMENTS and CONNECTORS

RESET - The **RESET** P/B switch is located on the right rear panel of the **DataFaster.** When depressed the **DataFaster** is instantly reset to the initial power "on" sequence. The **RESET** P/B should not be depressed during the duplicate process. If depressed during the duplicate process the duplication will be interrupted and data loss could occur.

LCD - The **LCD** contrast adjustment is located on the center rear panel. It is a small slotted screwdriver adjustment that allows the user to increase or decrease the contrast of the LCD.

ADDRESS - The Address switch is used when **DataFasters** are connected to a host system. The 4 position piano style DIP switch is set to identify each **DataFaster** uniquely to the host. Each host computer interface allows up to 2 sets of 14 **DataFasters**.

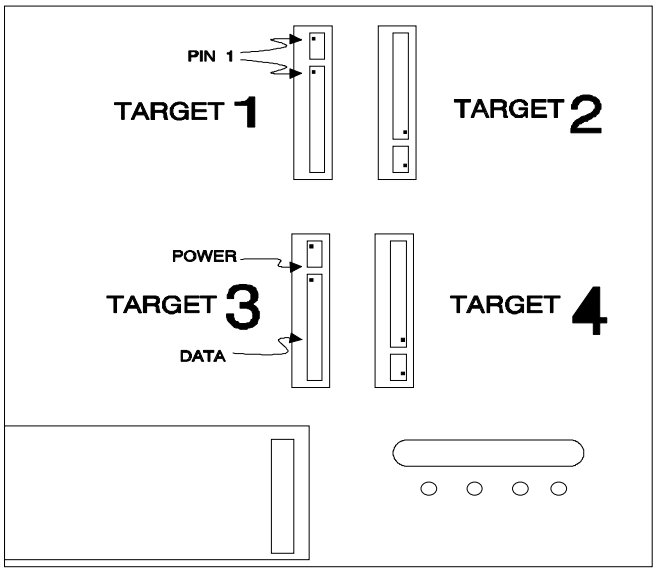
PARALLEL - The PARALLEL on the rear panel of the **DataFaster** is a standard D-SUB 25 connector. This port is used as the download port to upgrade **DataFaster** firmware.

INTERFACE - There are two Host Interface ports on the rear panel of the **DataFaster**. They are electrically the same. One Host Interface Connector is used as input/output to/from the host and the other Host Interface Connector is used as input/output to/from other **DataFasters**.

5.3 TOP COVER CONNECTORS

There are four 34-pin data connectors, four 68-pin data connectors and four 4-pin power connectors located on the top cover of the **DataFaster**. These connectors are the data and power for the target disk drives. The following figure indicates the location of each of the four target disk drives, the data and power connectors and “pin 1” for each connector.

Figure 1
DataFaster Top Cover



5.4 TYPICAL SEQUENCE OF EVENTS

The sequence of events during a duplicate operation is a simple three step operation. Read from master, Write to targets, Read from target and compare. During this three step operation there are many SCSI commands that are used in the structure of these three operations. The following are the command structure for the duplication process:

- Power on disk drives and wait for drives to come ready
- Read drive IDs
  - read target ID(s)
  - read master ID
  - verify master vs. target compatibility (if significant differences ask user)
- Perform copy
  - read master
  - write targets
  - while writing targets read next data from master
    - read targets
- Optionally Write and/or Verify remaining sectors

6.0 MENU OPERATION

6.1 MAIN MENU

GREYSTONE PERIPHERALS D106 V0.00
START = Start/Stop ENTER = Select Menu

The **MAIN MENU** is the default menu and will be displayed upon power up. In this menu the controls operate as follows:

The **START** P/B will start the duplication process using the values last stored in memory. After the duplication process is started it may be terminated by depressing the **START** P/B once more.

The **ENTER** P/B will cause the **DataFaster** to enter the Option Select Menu.

The **INCREMENT** button will step through any messages resultant from the previous duplication process.

6.2 OPTION SELECT MENU

TARGET SELECT MODE SELECT
DISK TEST SELECT POWER DELAY EXIT

Depressing the **ENTER** P/B at the main menu will cause the system to enter the **OPTION SELECT MENU**. Through this menu the user can select one of the four areas of customization allowed by the **DataFaster**. The four areas are: **TARGET SELECTION, MODE SELECT, DISK TEST SELECT**, and **POWER DELAY**. Each area of customization is described below.

The fifth option, **EXIT,** appears on this and all subsequent menus. In all menus choosing **EXIT** causes the system to return to the previous menu. In the case of the Option Select Menu choosing **EXIT** causes the system to return to the main (opening) menu.

6.2.1 TARGET SELECT Menu

TARGET SELECT MENU
ALL 1* 2* 3* 4* EXIT

The **TARGET SELECT MENU** is entered from the **OPTION SELECT MENU** by depressing the **ENTER** P/B while the cursor is positioned at **TARGET SELECT**.

An asterisk adjacent to a drive number indicates that the particular drive is enabled.

The master disk drive is always selected. The **TARGET SELECT MENU** only selects the target disk drives to be duplicated. If a target is not selected there is no power to that disk drive and the interface signals are tri-stated "off". **Power is not applied to the master or target drives until the user starts the duplication process.**

As shipped the default setting for **TARGET SELECT** is all four target drives selected. However, once the user changes the target select setting the **DataFaster** memorizes the settings until the user changes them again. The settings are retained even if power is removed from the system.

To select all the drives position the cursor to ALL, then depress the **ENTER** P/B.

To individually enable or disable a particular target drive move the cursor to the desired target and depress the **ENTER** P/B to change the targets state. An asterisk indicates an enabled target

6.2.2 MODE SELECT Menu

MODE SELECT MENU
COPY VERIFY GAPS SCALE AREAS EXIT

There are a large number of options available under the **MODE SELECT MENU**. Each of the five submenus will be described in detail below. In general:

COPY allows the user to choose to copy the entire master disk (mirror) or to copy just certain areas of the master disk.

VERIFY allows the user to choose whether or not hardware data comparison is made on data that is written to the target drives. It also controls the the verification of data areas which are not copied from the master drive.

GAPS allows the user to choose whether or not areas on the target drive which are not copied from the master are filled with zeros.

SCALE allows the user to choose display and data entry by either block count (how SCSI drives group data) or by megabytes.

AREAS is used along with the COPY menu listed above to allow the user to copy only certain areas of the master drive to the target.

EXIT, use to return to the Options Menu.

6.2.2.1 COPY MODE Menu

COPY MODE MENU
MIRROR (full drive) PARTIAL EXIT

To select the type of duplication position the cursor to **COPY,** depress the **ENTER** P/B. The **COPY MODE MENU** will be displayed. This function allows the user to select one of two modes of duplication.

MIRROR (full drive) mode causes the **DataFaster** to copy data directly from the master to all of the target drives. Depending on the sizes of the drives and other options chosen by the user one of following will be true at the end of the duplication process:

- When Master and Target are same size the Target is an exact copy of the Master.

- When the Master is larger than a target and the user allows the copy the target will end up with all the data from the Master that would fit. See section 7.

- When the Master is smaller than a target and the user allows the copy the target will get all the data from the Master. Other user options determine what happens to the remaining area of the target. For more detail see section 7.

To select the **MIRROR** mode, position the cursor to the word MIRROR and depress the **ENTER** P/B. An ASTERISK designates the selected mode.

PARTIAL mode causes the **DataFaster** to only copy specific areas of the Master to the target drives. The exact areas copied are defined in the AREAS MENU described in section 6.2.2.5 below. The user can define up to three separate areas on the target drives to receive data from one master.

PARTIAL mode copying requires the following conditions be met:

1. The block sizes of the master drive and all targets being used are the same.
2. The block sizes must be between 32 bytes and 16K bytes.
3. The block sizes must be an even submultiple of 1 MB (1MB = 2^20 = 1048576)
4. The total number of blocks (i.e. the capacity) of the master and all targets must be the same
5. The extents of any of the three areas may not overlap with the extent of any other area.

6.2.2.2 VERIFY MODE Menu

VERIFY MODE MENU
DATA AREAS GAP AREAS EXIT

The VERIFY MODE MENU allows the user to select when and if data on the target drives is verified by **DataFaster** hardware. The menu allows individual On/Off control of data verification for the two general types of Target areas defined by the **DataFaster**.

The DATA AREAS item refers to those areas copied from the Master to the Target. If the asterisk is present it indicates that the **DataFaster** will read and compare all data copied from the Master. If there is no asterisk then data will not be read and compared. Note, some SCSI drives do a hardware compare of data after writing. Not verifying data has the effect of doubling the data transfer speed.

The GAP AREAS item refers to those areas not copied from the Master. These areas are either written with zeros or not written at all depending on options chosen by the user in the WRITE MENU. An asterisk indicates that the **DataFaster** will read the non data areas. If they were written with zeros then they will be compared to zeros. If no gaps are written, then hardware compare is not done. If there is no asterisk, the data will not be read.

6.2.2.3 GAPS MODE Question

Do you wish to write zeros in areas not
holding data (gaps)? YES NO EXIT

This question allows the user to select if zeros will be written to the targets in those areas not defined as data from the Master.

The MIRROR MODE option only affects the situation where the target drive is larger than the Master drive. Specifically if the extra area of the target will be filled with zeros.

The PARTIAL MODE option affects areas on the target drives between each of the individually defined data areas. The **DataFaster** will NEVER write in the area between block zero and the first user defined data area on the target drive. Also, the DataFaster will NEVER write in the area between the end of the last area defined and the last block of the target.

6.2.2.4 SCALE SELECT Menu

Select blocks or megabytes for display
BLOCKS MEGABYTES EXIT

This menu allows the user to select if data for locations on the Target drives will be entered and displayed in Blocks (as defined in SCSI interface specs) or Megabytes.

Note: The starting location and size of each of the three areas is reset whenever SCALE SELECT is changed from BLOCKS to MEGABYTES or from MEGABYTES to BLOCKS. Also, the three areas are reset when selecting **MIRROR** mode rather than **PARTIAL** mode.

6.2.2.5 AREA DEFINITION

6.2.2.5.1 AREA DEFINITION OPENING Menu

You can define up to 3 areas for data
on the Target drive. CONTINUE EXIT

This question is the first in the sequence which allows the user to select 1, 2 or 3 areas on the target drive for data. Entry of information for each area is identical. For each area there are 3 questions presented.

6.2.2.5.2 DESTINATION AREA Starting Point

Set the starting point of destination area
to 00,000,000. NEXT EXIT

The first question for each area is asking for the first location on the Target drive where you wish to have data placed. For each of the three areas this value represents the distance from block zero on the target drive. For the first area this defaults to block 0. The second and third sections default to just after the last block used by the previous area.

If a previous value is already larger than the starting location then the value will be unchanged. The **DataFaster** will not allow you to set a value lower than the last block used on the previous calculation

You adjust each digit individually by selecting the digit with the **POSITION** P/B and changing its value with the **INCREMENT** P/B.

After defining an AREA STARTING POINT (remember there can be up to three areas) move the cursor to **CONTINUE** then press the **ENTER** P/B to proceed to the next question which allows the user to define the length of the area.

If the user chooses **EXIT** the **DataFaster** will retain what ever values presently exist for the other parameters and step back to the previous menu.

6.2.2.5.3 DESTINATION AREA Length

Set length of destination area
to 00,000,000. NEXT EXIT

The second question for each area is asking for the length of the section. For example: Assume the previous question (DESTINATION AREA STARTING POINT) had the value of 00,010,000 entered. If the DESTINATION AREA LENGTH were set at block 00,025,009 the area written on the target would be blocks 00,010,000 through block 00,034,999.

A value of 99,999,999 tells the **DataFaster** to continue the area to the end of the drive.

After defining the value, choose **NEXT** to proceed to the next question, or choose **EXIT** to mark this as the last area (thus removing any additional areas previously defined) and return to the MODE SELECT MENU.

6.2.2.5.4 ADDITIONAL AREA Question

Do you wish to define another area on
the target drives? YES NO EXIT

At this point the user tells the **DataFaster** whether or not another data area is desired. An asterisk is placed next to YES or NO to indicate to the user what option is presently active. This question is asked after the first area or the second areas length is defined.

If the user places the cursor at **YES** with the **POSITION** P/B and then presses the **ENTER** P/B it indicates that another area is desired and the **DataFaster** will proceed to the question about the areas starting location.

If the user places the cursor at **NO** or **EXIT** with the **POSITION P/B** and then presses the **ENTER P/B**, it indicates that the last area has been defined. The **DataFaster** will mark this as the last area (thus removing any additional areas previously defined) and return to the MODE SELECT MENU.

6.2.3 DISK TEST SELECT Menu

This menu allows the user to define the basic operating mode of the **DataFaster**. There are two independent selections provided on this menu.

The **RUN ONCE** and the **BURNIN** options are mutually exclusive (only one may be chosen at a time). For normal operation **RUN ONCE** is chosen. This causes the **DataFaster** to duplicate a set of disks and then stop operation.

The **BURNIN** option causes the **DataFaster**, after completing the duplication process, to begin the process again (after an approximate ten second delay). The **DataFaster** retains the pass/fail results as this process continues. The cycle stops when the user presses the **START** P/B. After stopping operation the user can use the **INCREMENT** P/B to review the exact reasons a drive was failed. This mode can be useful to test the operation of disk drives for extended periods.

The **DIAGNOSTICS** option controls retrys in the event of an error. If diagnostics is "On" (an asterisk appears) then retrys are not performed and drive operation is terminated at the first error.

6.2.4 Power Delay

Time allowed for drive Power-Up
14 SECONDS EXIT

The **POWER DELAY** menu enables the user to program a power "ON" delay of up to 99 seconds between each of the drives.

By depressing the **ENTER P/B** from the **MAIN MENU**, the system will display the **OPTION SELECT MENU**. Depress the **POSITION P/B** until the cursor is moved to the **POWER DELAY** selection. Upon depressing the **ENTER P/B**, the **POWER DELAY MENU** will be displayed.

The cursor will be positioned at the **EXIT** function. By depressing the **POSITION P/B** once, the cursor will be moved to MSD of the delay value. Depress the **INCREMENT P/B** until the desired value appears. The selected value will be stored. Depress the **POSITION** P/B one more time and the cursor will move to the next digit of the delay value. Repeat the previous operation to select the desired LSD value. The delay value can be from 14 to 99 seconds, the delay in seconds between each target drive having power applied. If a delay value of less than 14 is entered, the minimum delay default of 14 seconds is used.

7.0 STATUS AND ERROR REPORTING

7.1 DISPLAY

```
GREYSTONE PERIPHERALS      V1.00
Mirror        25%     DRIVE ENAB 1E34M
```

7.1.1 Top Line of Display

The top line of the display shows the firmware revision code. This information is displayed at all times except when the user is in the menu system of the **DataFaster**.

7.1.2 Second Line of Display - During Duplication Process

The second line of the display shows the status of the duplication process while drives are being duplicated. This line of the display is divided into three separate areas during the duplication process.

At the left side of line the type of duplication process is displayed, as follows:

- **Mirror** - Indicates that the system is in MIRROR mode and that data is being copied from the master to the target drives.
- **Area 1, Area 2 or Area 3** - Indicates that the system is in PARTIAL mode and that data is being copied from the master to one of the three areas defined by the user.
- **Gap 1, Gap 2** - Indicates that the system is in PARTIAL mode and that one of the non data areas between operator defined data areas is being written to or verified. Gap 1 is between Area 1 and Area 2. Gap 2 is between Area 2 and Area 3.
- **Filler** - Indicates that the **DataFaster** is in MIRROR MODE and is writing or verifying in the area of the target drives that remains after all of the data has been copied from the master.

The center of the second line shows the percentage of the copy process that has been completed. This value is based on the size of the largest target drive connected to the **DataFaster**. The system includes all information to be written to or verified (including areas filled with zeros or areas not filled but read). If the largest target is failed the **DataFaster** will recalculate the percentages based on the largest target remaining.
The right side of the second line shows the status of the drives connected to the system. Each character corresponds to a drive location. The codes are as follows:

- **1, 2, 3, 4** - Indicates a target drive location and that the process is continuing normally.
- **M** - Indicates that this drive location contains the Master drive.
- **.** (period) - Indicates that the user does not have this drive location enabled.
- **_** (underline) - Indicates that this location is enabled but that power has not been applied yet. This only appears during the power-up sequence.
- c - Indicates that this drive has completed the duplication process.
- E - Indicates that this drive was failed during the duplication process.
- s - Indicates that the user decided not to duplicate this drive. This occurs when the **DataFaster** determines that the target is larger or smaller than the data defined for it and the user answers NO when asked to copy regardless.
- x - Indicates that the **DataFaster** could not select a drive at this location.

7.1.3 Second Line of Display - After Duplication Process

Upon completion of the copy process this second line of the display indicates the results. One of the following 4 messages will appear at the left:

- Copy complete - this indicates that the process completed normally and that NO errors occurred.
- Stopped by operator - Indicates that the user stopped the duplication process. Even if no errors are displayed the targets should not be assumed to have valid data on them.
- Stopped:Master failed - Indicates that the process was stopped because the master drive failed. Use the **INCREMENT** P/B to determine why the drive(s) were failed
- Stopped:No targets left - Indicates that the process was stopped because all of target drives failed. Use the **INCREMENT** P/B to determine why the drive(s) were failed.

The user may interrogate the **DATAFASTER** to determine the nature of the error of each of the failed drives. The interrogation of errors will inform the user of the general description of the error.

To display the error depress the **INCREMENT** P/B. The LCD will display the error message for each failure with successive depressing of the **INCREMENT** P/B. The drive that the error refers to is shown at the right side of the display - flashing.

7.2 USER ACTION MESSAGES

These messages appear when the **DataFaster** has encountered a situation where user input is desired. These messages typically appear within 1 minute after the **START** P/B is pressed to begin the duplication process (the exact time depends on the Power delay set by the user and the individual drives).

If the user does not respond within 60 seconds to one of these messages the **DataFaster** will proceed with the duplication process using the default values.

Target block size does not match master. Reformat targets?
This message is displayed when the block size read from the master drive is different than the block size reported by one or more of the targets. If the user responds with a Yes the **DataFaster** will proceed to reformat all affected targets. If the user responds with No the affected targets will be dropped from the duplication process.

Note: The reformat process can take a long period of time and is drive dependent. There is no way for the **DataFaster** to know how long the process will take. During the reformat process the **DataFaster** will show the elapsed time since the reformat process began.

Default: The **DataFaster** will default to a Yes response if the user provides no answer.

Not enough space on targets for data. Copy regardless?
This message appears when the master is larger than the target drives or when the area defined for a PARTIAL copy exceeds the capacity of one or more target drives. If the user responds with a Yes the duplication process will proceed for all target drives. A No response will drop all affected targets from the duplication process. Data which does not fit onto the target drives will be truncated.

Default: The **DataFaster** will default to a Yes response if the user provides no answer.

Not enough data to fill targets.
This message appears when the master is smaller than the target drives or when the area defined for a PARTIAL copy does not fill the target drives to the last block on the drive. If the user responds with a Yes the duplication process will proceed for all target drives. A No response will drop all affected targets from the duplication process. See section 7 for a description of how the **DataFaster** handles the additional area on the target drives.

Default: The **DataFaster** will default to a Yes response if the user provides no answer.

7.3 ERROR MESSAGES

7.3.1 System Self-Test Error Messages

The **DataFaster** performs a series of self tests at start up. Specifically a ROM test, RAM test, and a BUFFER test. If any of the tests fail the word "Failed" will appear after the test message and the system will stop at this point.

To attempt to restart the system press the "Reset" button at the right rear of the **DataFaster**.

To attempt to run the system regardless of the error press both the **INCREMENT** and **POSITION** buttons at the same time.

ER: download PARALLEL
Indicates a transmission error while downloading firmware from the host computer via the parallel port.

**** EEPROM Error ** START=menu defaults**
Indicates that the contents of the memory used to store user preferences was found to be in error. Pressing the **START** P/B will cause this memory to be set with factory default settings. If this message is obtained the user should recheck and reset all desired options.

7.3.2 Final Error Messages

These messages are available after the duplication process has completed. They are viewed by pressing the **INCREMENT** P/B after the process has completed. To the right of each of these messages the identity of the affected drive is displayed (blinking).

Block size is too large.
This message concerns the master drive. It indicates that the duplication process could not proceed because the block size reported for the master exceeds the maximum block size of 16K bytes.

Block size is too small.
This message concerns the master drive. It indicates that the duplication process could not proceed because the block size reported for the master is smaller than the minimum block size of 32 bytes.

Not enough capacity on drive.
This message concerns the master drive. It indicates that the duplication process could not proceed because the number of blocks to be duplicated, as defined in the AREA MENU exceeds the capacity reported for the master drive.

No response from drive.
This message indicates that the controller operating this target was unable to complete a command and notify the systems main processor.

Drive not ready
This message indicates that the drive was given a command and failed to return with a "Ready" status.

Drive not present
This message indicates that the **DataFaster** was not able to select a drive at this location.

Stopped by operator
This message appears when the user responded with No to a question asking if the duplication process should proceed. For example, see the description of the "Not enough data to fill targets" message above.

System error, Retry
This message indicates that the control program detected an error made by the main processor. If the duplication process is repeated the error should not reoccur

System:Intfc locked, Retry
This message indicates that the main processor lost the ability to communicate with one or more of the interface processors.

System: No status, Retry
This message indicates that the main processor was unable to clear status on one or more interface processors.

Communication with drive
This message indicates that the interface processor was unable to communicate with the disk drive.

System data xfer, Retry
This message indicates that the interface processor detected an error while transferring data to or from the buffer memory.

Drive not found
This message indicates that the IO processor was unable to get any drive to select.

Drive: Could not select
This message indicates that although the system had been able to select a drive at this location, at this later time the system lost the ability to select a drive.

Drive: Bad phase, Data in
This message indicates that the controller was expecting a “Data In” phase and the drive sent back a command for a different phase.

Drive: Bad phase, Data out
This message indicates that the controller was expecting a “Data Out” phase and the drive sent back a command for a different phase.

Drive: Bad phase, Msg in
This message indicates that the controller was expecting a “Message In” phase and the drive sent back a command for a different phase.

Drive: Bad phase, Msg out
This message indicates that the controller was expecting a “Data In” phase and the drive sent back a command for a different phase.

Drive: Bad phase, Status
This message indicates that the controller was expecting a “Status” phase and the drive sent back a command for a different phase.

Drive: Unexpected phase
This message indicates that the controller was expecting one of several phases and the drive sent back a command for a different phase.

System: Incorrect Branch
This message indicates that the program in the controller for the affected drive detected an instruction path that was invalid. Try running the process again.

System: Command completion
This message indicates that the controller for the affected channel was not able to complete the command last issued to the drive.

System: No extended msg
This message indicates that the controller was expecting an “Extended Message” phase and the drive sent back a command for a different phase.

Drive: Data verify error
This message indicates that the **DataFaster** detected an error while performing hardware data comparison on the duplicated data.

7.3.3 PARTIAL COPY MODE Error Messages

Blk size<>1Meg submult.
Partial mode copy requires that the block sizes of the master and all target drives be an integral submultiple of 1Meg (1Meg = 1048576).

Block sizes not same.
Partial mode copy requires that the block sizes of the master and all target drives be the same.

Disk capacities not same.
Partial mode copy requires that the capacity of the master and all target drives be the same.

Area 2 / Area 1 conflict
Area 3 / Area 1 conflict
Area 3 / Area 2 conflict

These messages indicate that there is an overlap between the extents of the areas. All or part of the disk blocks in one area are the same as the disk blocks that are in the other area.

8.0 SAVING ENTERED PARAMETERS (EEPROM)

The **DataFaster** parameters (mode, target select, power delay, etc.) are stored in a small EEPROM. The entered parameters are stored when the user enters them and will remain the same until re-entered. These parameters will not change with reset or power "on".

9.0 PERFORMANCE AND OPERATION ASSISTANCE

Thank you for your support of Greystone. We have systems to meet all the disk drive computer interfaces - ***IDE, Enhanced, SCSI and PCMCIA***. We are happy to provide you with the brief explanation on how you can improve your throughput using our products. We have many ways to improve your efficiency. Please list your questions or applications or wants so that we may respond more fully to your requests.

These systems will provide you with a significant advantage in time, resources and throughput as well as verify the good working order of your Winchester disk drives. A single bench top system can duplicate the software, format and partitioning information onto 1-300 drives a day, thus saving you time, resources and money. Our duplication process complements the IDE and SCSI disk drive technologies. All IDE and SCSI drives are fully prepared and formatted at the factory when they are built. What is missing is the table on the drives telling them that they are loaded and where the data is located. In DOS this is called the File Allocation Table and the Partition Table. By copying the data exactly from a similar drive type that has this information installed

the new target drives receive this information in the exact same locations and thus become mirror replicas of the first master drive. The drives on board controllers record the locations of the data and all files are listed. The formal processes of formatting and partitioning these new drives is not necessary as the listing is complete.

The D106 has several modes that allow you to control your duplication throughput. The first is the MIRROR mode and it is the most reliable and simplest. In MIRROR our unit reads every block from the MASTER drive and writes it to the Targets - every byte - even if there is no data or files there. The **DataFaster** can operate at 2 megabytes per second or greater. Thus a 1 Gigabyte drive will take 500 seconds or a little over eight minutes to be duplicated and verified.

To save process time you can select the PARTIAL COPY mode and duplicate just parts of the master drive.

Additional options will allow you to check remaining disk space on target drives for errors. This will operate at speeds in excess of 4 megabytes per second.

In the event we find an error we stop the duplication process for that drive and provide a flashing error message on the LCD display. The user can step through each message simply by pressing the **INCREMENT** button.

These are the major advantages of our system and a brief explanation on how to use it. Please contact us when you receive your units and for further assistance in explaining and using our systems.

GREYSTONE DATA SYSTEMS

30983 San Clemente Street
Hayward, CA 94544, USA
Tel: 510-429-5848
Fax: 510-429-5844
www.greystoneds.com