# HDS 9000 Ultra IDE Duplicator



**CORPORATE SYSTEMS CENTER**

## Eight Drive Ultra Duplicator Features

Congratulations on your purchase. The HDS 9000 eight drive Ultra Duplicator is a stand-alone hardware package used to make identical duplicates of IDE hard disk drives. The HDS 9000 Ultra offers these features:

- **Full drive duplication ability.**  Any IDE drive can be copied, producing a perfectly identical backup copy. System builders can use the unit to quickly install identical drives and pre-load software. Bit-by-bit duplication ensures accurate copies are made.

- **Performance is virtually unaffected by the number of drives attached.**  Duplication speed is virtually unaffected by the number of drives attached.  In addition, each IDE drive has a separate IDE port. The failure of one target drive will not affect the others.

- **Support for all IDE drives** including: IDE, Enhanced IDE, and Ultra DMA mode drives. Master/Salve jumper changes are unnecessary.  All drives are set as "single drive" and "master".

- **A totally self-contained workstation** including drive power supply, LCD panel, and push buttons. No connection to a PC is required.

## Package Contents

1. The Ultra 1 to 8 duplication chassis
2. Eight 80 pin IDE interface cables
3. Four Drive power supply "Y" connection cables
4. Power Cord
5. Eight 2.5" IDE Adapters
6. Drive Tray Key (attached to power supply at the rear of the unit)

Spare cable sets may be ordered by calling (408) 588-1110 and requesting P/N 128KIT
Please do not substitute 40 pin cables. Short 80 pin "ultra" cables are required for reliability.

Additional removable trays for source drives may be ordered using part number 128T.

## Quick Setup

1. Remove the copier from its shipping carton. Save the carton and protective foam in case the copier ever requires service.

2. Make sure that the top-panel power switch is in the OFF position.

3. Attach the power cord.

4. Ensure that nothing blocks either the ventilation slots on the bottom of the chassis or the fan on the rear panel of the chassis.

5. Connect the IDE drive cables to the eight connectors located on the top of the chassis. The cables are keyed so that they cannot be installed backwards. Be sure that the master and target drives are in the appropriate locations.

6. Connect the drive power supply cables to the top of the chassis.

7. Place the hard drives to be duplicated on the anti-static pads on top of the unit.

8. Place your original source drive in the metal tray, securing it with the appropriate fasteners. Rotate the key clockwise. *The drive tray will need to be locked to enable power to the source drive*.

9. Jumper all drives as "master" or "single drive", depending on the drive.

10. Switch the power ON. The copier will perform an internal self-test. The duplication process will start automatically if the **AutoStart** option is enabled.

## Drive Handling Precautions

Don't risk damaging a drive by connecting it with the power turned on.  Damage to the drive or the HDS 9000 may result.  Switch the power off first, then connect and double-check the cabling. Be sure all cables are oriented correctly before switching the power on.

Turn power on only after double-checking connections. The HDS 9000 performs a power-up self-test. This allows time for drives to spin up and become ready. Use caution when handling drives to prevent damage from static electricity.

## Identifying Attached Drives

*Warning:*  An incorrectly located source or target drive could result in loss of data. Be certain that the original source drive is always located in the removable tray in the front of the HDS 9000.

## Front Panel Display and Controls

The copier is controlled using the five front panel buttons as shown below.  These buttons are used to start the duplication process, and to control a variety of partial copy modes.

Note that no setting changes to the unit are required, unless you intend to make partial copies of hard drives.



**OPTIONS MENU / NEXT OPTION**
Hold this key down after powering up the unit to enter the setup menu.  After holding this button down, the first setup option, **Start Copy Automatically on Power Up** will be displayed. This option can be changed using the **Change Options** button as described below.

**START COPY**
The **Start Copy** button is used to manually begin duplication if **Start Copy Automatically on Power Up** is not selected.  The **Start Copy** button can also be used to abort setup and begin copying without saving options.

**MB+ / CHANGE OPTION**
This button is used to change the status of the partial copy options, and to increment the maximum number of megabytes to copy.

**MB-**
This button is used to decrement the maximum number of megabytes to copy.

**SAVE OPTION**
This button is used to save partial copy options after they have been changed.

**ABORT**
Pressing the MB- and Save Option buttons simultaneously during copy will abort duplication.

## Status Prior to Duplication

A typical status display prior to duplication is shown below:

```
CSC Ultra 1 to 8 IDE Copier V1.0dak
Start Key to Start Full Drive Copy
Maxtor 90430D3        LBA[0] 008249472
ST36531A              LBA[8] 012706470
```

The total number of addressable logical blocks on the source and target drives is displayed. Each LBA is equivalent to a sector on the drive, or 512 total bytes. The number in parenthesis (for example [0]) is the number of the attached drive. The number zero is used for the source drive. If the LBA's on all attached drives are not identical, please refer to the warnings on page 10 about copying dissimilar drives.

Please note that partial copy options will not interpret the data structures and partitions on the drives. Partial copy options only limit the amount of raw data duplicated. This copier will not resize partitions on a hard disk.

If no source disk is detected, a screen will suggest that you check the following:

- The source drive should be jumpered as a master.

- The tray should be fully inserted.

- The key should be rotated fully clockwise, and green power LED should be illuminated.

## Status Display During Duplication

A typical status display during duplication is shown below:

```
Copy from Maxtor 90430D3         008249472
to 8 drives                       4223.7 Me
000%        12345678             000040960
00000 00 00 00000000              21.0 Meg
```

In the center the display, an asterisk * is displayed if a target drive is not detected or is not attached.  If the target drive is functioning correctly, the number of that drive is displayed.  If a drive fails and is disabled during duplication, the letter D is shown in place of the drive number.  If a target drive is smaller than the source drive, the letter P will be displayed to alert the user that a partial copy is being made.

The first five digits in the lower left-hand corner of the display show the number of read errors encountered when copying data from the source drive.

The next two pairs of two-digit numbers display the hexadecimal error codes received from the source drive.  00 00 is displayed if no errors are detected.

The last eight digits display the number of errors (zero to 9) on the eight target drives.  If more than 9 errors are detected, these digits will loop.

If the IDE drives you are copying do not properly support IDE PIO modes or Multiple Sector Transfer modes, the duplicator will automatically switch into a lower performance mode and disable these features.  If this occurs, the letters "P" and "M" will be displayed in the center of the LCD.

## Status After Duplication

Typical status displays after duplication are shown below:

**COPY COMPLETE OK TO REMOVE DRIVES**...

These longer messages will scroll to make them readable on the smaller display.  If errors are detected during duplication, a message similar to:

**COPY COMPLETE ERRORS ON DRIVES 01234**

is displayed.  The source drive is unit #0, and the targets are numbers 1-4.

If the copy was manually cancelled, the message:

**COPY INCOMPLETE – USER ABORTED NO ERRORS**

Will be displayed.  If the copy was aborted and errors were detected, this message will be displayed:

**COPY INCOMPLETE–USER ABORTED ERRORS ON DRIVES 01234**

Pressing any key after duplication is complete
will display the messaged from the previous
screen.

## Duplication Between Different Size Drives

This copier is designed to clone identical drives. Duplication between different sized drives is not recommended. Compatibility problems can occur when copying between different sized drives. Copying a file system from a 9GB drive to a 47GB drive, for example, will yield a 47GB drive with a partition structure that is intended for a 9GB drive. It is best to copy identical drives whenever possible.

When this is not possible, both the preformatted source drive and the destination drive should be formatted in LBA mode. IDE drives may need a motherboard CMOS setting enabled prior to formatting to select LBA mode.

The integrity of the partition sector can damaged when copying between different sized drives. This is because the system places the partition sector at Cylinder 0, Track 0, Sector 0, Maximum head. If the number of sectors per track or the number of heads in a given system installation changes, the location of the partition sector will also change. If the partition sector cannot be located, the destination drive will be unusable.

It is safe to copy from a smaller source drive to a larger target drive, and then back to a smaller target drive *of identical size to the original source drive.*

## Attaching IDE Drives

All drives should be jumpered as "Master" when being copied on the Ultra duplicator.

After duplication, if two drives are connected in an IDE system, one drive must be configured as a master, and the other drive must be configured as a slave. This usually involves adding or removing a jumper on the slave drive. When a single IDE drive is connected to the system, it must be configured as a master. The "slave present" jumper should be disabled if only one IDE drive is connected, or enabled if two are connected.

Some IDE drives have a "Single Drive" jumper marked "SD", and this jumper must be enabled for the drive to operate properly as a master drive.

Master/Slave control jumpers on IDE drives are typically labeled "M/S". Slave Present jumpers on IDE drives are typically marked "SP".

Only short 80 pin "ultra" cables should be used with this unit. Using longer 40 pin cables will introduce electrical noise, which could compromise data integrity. Please call the factory at (408) 588-1110 if you are in need of replacement cable sets.

## Entering The Setup Menu

The setup menu uses various parameters to reduce the total amount of data copied. If you are copying entire drives, leave all setup menu options "OFF". If you want to limit the amount of data copied to less than an entire drive, change the appropriate setup option.

To enter the set up menu, hold all the **Options Menu** button down for about 20 seconds while turning the power on. The first setup option, **Auto Start** will be displayed.

## Setup Menu Options

Use the Next button to scroll through the following options. If you would like to change an option, press the On/Off button. Press the Save button to permanently save the new settings. The settings will be retained even after the power is turned off.

Version 1.0 includes the following setup options:

### Start Copy Automatically on Power Up

The **Start Copy Automatically on Power Up** option is used to automatically start the duplication process when the power is turned

on.  Enable **Start Copy Automatically on Power Up** for ease of use in a production environment.  Disable **Start Copy Automatically on Power Up** for manual operation.  If **Start Copy Automatically on Power Up** is disabled, you will need to press the Start Copy key before the copying process begins.

## Partial Copy Until MB Limit Reached

The **Partial Copy Until MB Limit Reached** option allows the user to adjust the amount of megabytes copied in increments of 100MB. After selecting YES by pressing the Change Options Button, the amount being copied may be adjusted. To adjust the amount of megabytes copied, press the MB+ button to increment, and MB- button to decrement.  After setting this option, press NEXT OPTION to proceed to the next option. 1GB (gigabyte) equals 1,000MB (megabytes).

## Copy Detected Partitions

The **Copy Detected Partitions** option limits the amount of data copied to the amount stored in valid partitions on the source hard drive.  Use this option to speed up duplication if the source drive is not entirely filled with data. Factory default is OFF.

## Disable Multi-Block Transfers

The **Disable Multi-Block Transfers** option is now automatically activated. If a drive does not support this feature, the copier will limit the amount of blocks copied to one per cycle. *When activated, this will slow the duplication process substantially.* A letter "M" is displayed in the center of the screen when this occurs. This feature is automatically controlled in the current software version.

## Disable PIO Mode

The **Disable PIO Mode** option is now automatically activated. If a drive does not support this feature, the copier will disable IDE Fast PIO modes, changing the transfer speed of data to the target drives. *When activated, this will slow the duplication process substantially.* A letter "P" is displayed in the center of the screen when this occurs. This feature is automatically controlled in the current software version.

## Attaching 2.5" Notebook Drives

Each notebook drive connected to the system must be configured as a master.  Please refer to the figure below for proper orientation of the adapter board:



**Warning:** Some notebook drives are not "keyed".  Be extremely cautious when mating the adapter board to notebook drives. Incorrect orientation will cause damage to the notebook adapter, and possibly to the drive as well.  The adapter card should project above the metal surface on the top of the drive, not below it.  Both rows of connector pins must be completely inserted in the adapter.

**Different adapters may have different orientations.  Check the instruction sheet**

**provided with the adapter to confirm orientation.**

The eight jumper pins located below the IDE interface connector correspond to the eight master/slave jumper pins located on the drive. Check the drive manufacturer's documentation for the appropriate master and slave settings, as these jumpers vary between manufacturers.

## Data Recovery Using Disk Duplication

The HDS 9000 is a useful tool for data recovery applications. Many damaged or weak hard drives can be copied using the automatic error recovery system built into the Ultra.

## Data Recovery Tips & Tricks

Hard drives use a mechanical servo system, which must position the recording heads to within millions of an inch.  As a drive wears over time, mechanical parts in the headstack and spindle warp, loosen, and bend.  In general, hard drives are less reliable when exposed to heat.  Many data recovery services seal drives in a moisture proof bag, and then cool them in a refrigerator or freezer before attempting to recover data. Some data recovery labs place an ice-pack on top of the source drive to improve its reliability. This is often enough to make a marginal drive work long enough to copy the entire disk.

Another technique frequently used by data recovery services is the "board swap".  This involves replacing the defective drive's control board with a known good unit. To successfully accomplish a board swap, an exactly identical model and revision of drive must be used.  The Ultra copier is a popular tool for data recovery applications.

## Physical Specifications

| | |
|---|---|
| Line Voltage | 100-127 or 200-240VAC selectable |
| Frequency | 50–60 Hz Single Phase |
| Power Consumption | 245 Watts Maximum |
| Height | 4.0 Inches |
| Width | 18.0 Inches |
| Depth | 18.0 Inches |
| Weight | 16 lbs |

## Performance Ratings

| | |
|---|---|
| Duplication Speed | Up to 1GB/min to all attached drives |

*Note:* Performance is limited by the speed of the attached drives.  Faster drives support higher duplication speeds.

## Compatible Drives

| | |
|---|---|
| IDE Hard Drives: | IDE, E-IDE, UDMA, 2.5" notebook IDE |

## Technical Support



To save time and effort, please read this manual completely before calling for tech support. Start with our web site: www.driveduplicators.com.  You may FAX questions to (408) 969-2655. To contact tech support, dial (408) 330-5595 and please have the following ready so we can better serve you:

❑   A copy of your invoice and customer number.

❑   The firmware revision level installed in the system. This information is displayed immediately after the unit is switched on. This manual was written for 1.0 DAK software release versions.

❑   A description of the drives attached to your unit.

CSC

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# Limited One Year Warranty

The terms of this warranty may be legally binding. If you do not agree to the terms listed below, return the product immediately in original unopened condition for a full refund. CSC warrants this duplicator to be free from defects in materials and workmanship for a period of one year from the date of the CSC original invoice. The software, firmware, and accompanying written materials are provided "AS–IS" without warranty. The risk as to the results and performance of the unit is assumed by the purchaser. CSC's entire liability and exclusive remedy as to defective hardware shall be, at CSC's option, either (a) return of the purchase price (for units returned within 15 days of purchase), or (b) replacement or repair of the hardware that does not meet CSC's quality control standards and has been returned through proper RMA procedures. CSC's liability for repair or replacement is to CSC's customer *only*. No warranty service will be provided without an original invoice from CSC and an RMA number provided by technical support. Returns must be shipped prepaid to CSC. RMA authorization numbers are valid for 15 days from date of issue. This warranty does not cover products opened, modified, subjected to rough handling, or used in applications for which they were not intended.  No oral advice or verbal statements made by CSC's employees, dealers, or distributors shall in any way increase the scope of this warranty. CSC makes no warranty as to merchantability or fitness for any particular purpose. Due to the wide range of hardware and software available, CSC cannot guarantee compatibility with all system configurations. CSC assumes no liability for incidental or consequential damages arising from the use or inability to use this product. This warranty gives you specific legal rights. You may also have other rights that vary from state to state. Some states do not allow the exclusion of liability for consequential damages, and some of the above limitations may not apply.

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