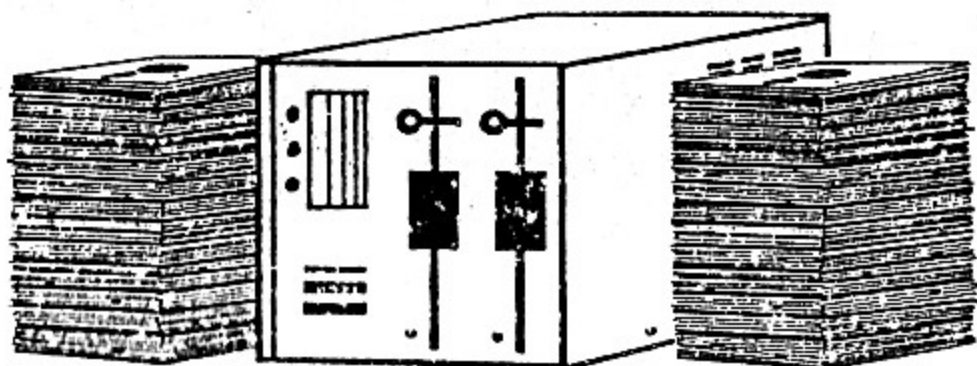


FOR THE
COMMODORE 64/128
AND THE MSD SD-2

MASS DUPLICATOR



- 15 second backup for standard format disks! (full verify option included)
- 18 second full GCR "quick-nibble" for protected disks!
- 9 second disk format! Format two disks at the same time, still 9 seconds!
- Auto back-up: Boot up, then disconnect the computer! The drive will automatically detect disks being inserted and removed.
- Simple to install, just plug in our chip.
- A Must if you have more than a few disks to copy!



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written by Lawrence Hiler

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MSD MASS DUPLICATOR INTRODUCTION

To start off, we would like to thank you for purchasing the Mass Duplicator! We are sure you'll find it to be the fastest and most reliable way to backup your Commodore 64 & 128 software.

Once installed you will never have to wait more than a few seconds to duplicate or format any disk. This is a long way from the 20-minute-copy waits back in the old days!

One quick plea to the 'pirates' or software 'collectors' out there. With the MASS DUPLICATOR and a couple of hours, one can copy almost 500 disks! If each one of these disks contains one or more copyrighted programs, you are depriving a great many hard working programmers of their living. This program can be a useful tool or an originality-killing weapon depending on how you use it..please keep this in mind.

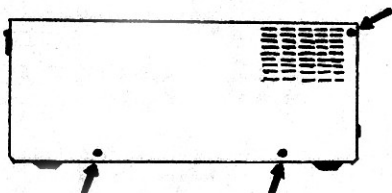
The first section of this manual covers installing the RAM chip in your MSD SD-2. The next section explains how to load the software based Mass Duplicator into your computer. We will then discuss what commands are available and the function of each one. Finally, we will explain the installation and operation of the ROM based Mass Duplicator.

DISK BASED PROGRAM INSTRUCTIONS

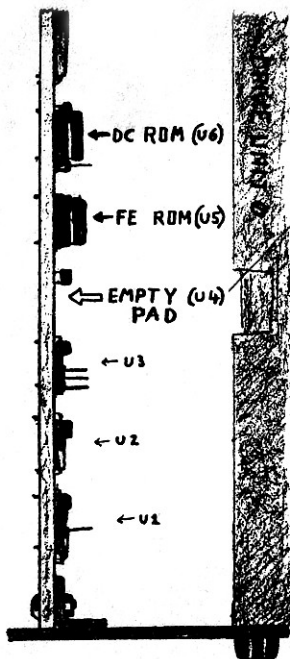
RAM CHIP INSTALLATION

First off, check the RAM chip that was included in your MASS DUPLICATOR package. Remove it from the protective material and inspect the pins of the socket. If any are bent, carefully try and straighten them. If any are broken off, take the chip to your local electronic supply store and have them put it in a new socket.

Now the fun part. Unplug all cables and wires from your MSD SD-2 and remove any disks. Take it to a flat clean work area and set it down with a side facing you. As shown in figure 1, you will see three Phillips screws on the outer case. Using a screwdriver, remove these. Make sure not to lose them. Turn the drive so the other side is now facing you. You will see three more screws. Remove these also.



← Figure 1



SRAM CHIP

UM 6116-2 w/ socket
2K x 8 (16K)

← Figure 2

ALL C128's HAVE 1

1541, 1541-II, 1571 HAVE 1

12800R HAS 2

Slowly lift off the case and set it aside. Turn the drive so that the doors and LEDs face you. From above look down at the lower left hand corner of the drive. A view as in figures 2 & 3 should be visible. Locate the three chips labeled U1, U2, and U3, also locate the two socketed chips U5 and U6. In between U3 and U5 there is an empty area labeled U4; this is where you will install the RAM chip. Hold the chip (in socket) with its small notch pointing upwards. Line up the pins with the corresponding holes at the U4 area on the circuit board. Carefully push the pins into the holes. While holding the chip in place turn the drive so that the green printed circuit board is now facing you.

All the pins from the chip should now be protruding from the board (24 in all) as shown in figure 4. With your thumb or a flat screwdriver bend each pin outward (to the front and back of the drive) and downward (towards the circuit board). Make sure each pin is making solid contact with the outside of each hole. If you wish, and are experienced in this area you may take a LOW wattage soldering iron and solder each pin to the circuit board. This is the recommended way to install our chip as it guarantees solid connections at each pin. Take a quick look at the U5 & U6 chips. They are the ROMs that contain the program the MSD SD-2 uses to operate. They should be labeled V2.3. If they are not, you may have the old V2.0 ROMs that MSD changed due to bugs in the code. These will have to be updated before the software based MASS DUPLICATOR will run. You can also check your ROM version by reading the error channel of the drive after power-up.

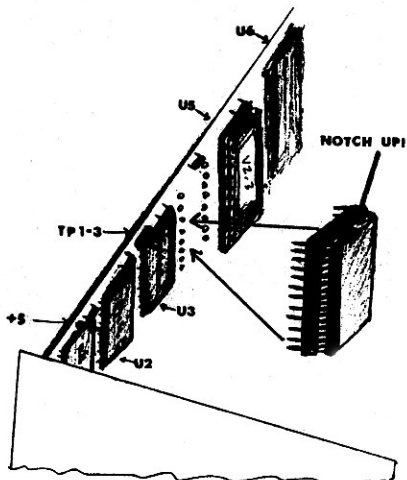
Please note that if you are installing the entire Mass Duplicator system, the U5 and U6 chips will be replaced by our newly programmed Fast and Auto Copy ROMs. In this case, even an out of date ROM in your system will be of no negative consequence.

ORIGINAL ROMS

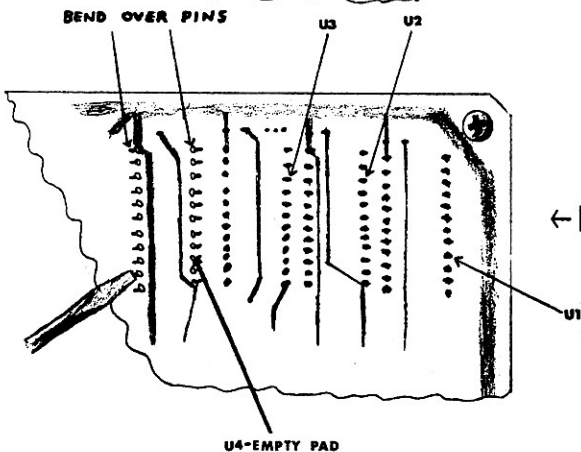
U5 FE V2.3 = MSD-FE.U5 CS= 9272
U6 DC V2.3 = MSD-DC.U6 CS= 7240

CLD ROMS

U5 FC ROM = CLD-FC.U5 CS= 3A53
U6 AC ROM = CLD-AC.U6 CS= 6F99



← Figure 3



← Figure 4

TESTING THE INSTALLATION

Before closing up the drive, reconnect it to the computer and the power cable. Turn it and the computer on. Place the disk you received into drive 0.

Type: **LOAD"CHIP TEST"8,1** and hit RETURN

This will load and run a program that will test the newly installed RAM chip in your drive. The result of the test will be printed to the screen. If it shows that the chip is installed correctly, proceed to the next section. If it is NOT installed correctly, turn off the power to the drive and check each pin to make sure it is making solid contact with the metal around its hole. Also, check the notch on the chip and make sure it is facing upwards. Start the test over again.

If after a second test the chip is still not installed correctly, you should have it soldered into place. This is a simple task for any competent electronics technician. Try the test again. If the chip still fails the test, remove it from the socket (with a small flat screwdriver) and send it back to us with an explanation of the problem. It may be worthwhile to call our tech line first.

FINISHED INSTALLATION

Now that your RAM is installed, power up the system and prepare to load the main program!

LOADING INSTRUCTIONS

Place the MASS DUPLICATOR disk into the MSD. The disk must be in drive 0, and the drive must be device #8. The MSD SD-2 must also be hooked up to your 64 or 128 with the serial cable. The MASS DUPLICATOR will not load through an IEEE interphase card.

Type: **LOAD"0"8,1** and hit RETURN

The screen should blank and seven seconds later the main menu should appear. If this does not happen, reset everything and try the load again. If it still refuses to load re-try the chip test. If the 'chip-test' reports the installation is correct the disk may be defective. Send it back to us with an explanation of the problem.

THE COMMANDS

First let's discuss the letter commands: D, V, M, and Q.

- D) Directory will give you a list of the files on disks in either or both drives and the disk names. Any error encountered will be reported.
- V) Toggle Write Verify switches ON and OFF the write verification. When write verify is ON, the data read in is checked against the data written out. The copy time will increase but you are assured of a reliable backup.

The two nibblers and both fast format routines do NOT verify. Selecting the nibblers or formatters will automatically turn write verify off. The quality of the job done depends upon the quality of the blank disk you use.

- M) Modify Quick Nibbler Functions lets you tailor the nibbler to suit your backup needs. Because this is a complicated task, we will cover this function later.

Q) Quit lets you exit the MASS DUPLICATOR. Resetting or turning the computer off will do the same thing. If at ANY time you wish to abort ANY function and return to the main menu press RUN/STOP and firmly hit the RESTORE key. If the drive was working at the time it may have to be reset.

Cursor Keys and Space Bar:

CRSR (up/down) will adjust the starting track for the copiers (not the fast formatters). It's range is from 1 to 40 tracks.

CRSR (left/right) will adjust the ending track for the copiers (not the fast formatters). It's range is also from 1 to 40 tracks. The normal range is: Starting Track = 1, Ending Track = 35.

SPACEBAR toggles the direction of the backup process. If you wish, you may copy from drive 1 to drive 0. Make sure this is set correctly before you start copying!

Number keys 1 through 6:

- 1) The Quick Copier should be used when backing up standard format disks. It will produce a fast reliable copy in 15 seconds, or 22 seconds with write verify. Each sector on the disk MUST have a correct 'Header & Data block identifier'. If there is a 20, 21, or 22 error on the disk, the copier will 'lock-up'. If this happens, turn the drive off then on again. Either correct the error or use the Quick Nibbler. Any other errors 23, 24 (non-standard GCR), 27 & 29 will be copied over to the destination disk.
- 2) The Quick Nibbler should be used to backup protected disks. It will copy all normal read errors (20-29), renumbered tracks, extra or duplicate sectors, non-standard GCR, very large data blocks, modified sync lengths, data in gaps, density variations, blank & sync tracks, and some synchronized & fat track schemes in 18 seconds.

To copy some of these protections you will have to Modify the Nibbler Functions'.

Please note: due to the drive units the MSD SD-2 uses, it CANNOT half-track like the 1541/71.

- 3) The Auto Copier works the same way as the Quick Copier. When selected, it will install itself in your drive; you may then disconnect the drive from the computer. It will wait until two disks are inserted and begin copying in about three seconds. The green POWER light will blink and the drive will make a faint 'clicking' sound as it awaits the disks. As each disk is inserted the red DRIVE 0 & 1 lights will come on. When it has finished the backup, the POWER light will blink again. Remove both disks, and insert two more. The Auto copier always copies tracks 1 to 35.
- 4) The Auto Nibbler is NOT the same as the Quick Nibbler. Due to memory restraints inside the MSD SD-2, some of the features have been cut back. The Auto Nibbler should also be used to backup protected disks. It will copy all normal read errors (20-29), renumbered tracks, non-standard GCR, blank & sync tracks, and some synchronized & fat track schemes in 18 seconds.

If you can copy a disk using the Quick Nibbler without modifying it's functions, the Auto Nibbler should do it as well. It functions the same as the Auto Copier once installed in the drive, but always copies tracks 1 to 40.

Both Nibblers should never stop or 'lock-up'. Although each nibbler is about as powerful as can be created on the MSD, they will not duplicate all the varied protection schemes used. If the copy you create will not function, it probably means the nibbler missed some small bit of the protection. Since most of these fancy schemes will not even run on the MSD there shouldn't be a problem...but if you are planning to use the copy on a 1541/71 the use of a 'parameter' system is suggested. We suggest the Maverick, distributed by Software Support International. Just backup the disk using the proper copier and run the parameter on it using the 1541/71. In many cases, programs that wouldn't load on your MSD will now function properly.

- 5) The Single Fast Formatter will format a blank disk or one you no longer need in nine seconds. You will be prompted for the disk name (16 or less characters in length) and a disk ID. The ID may be up to five characters in length. The extra three characters will replace the "2A" located after the user ID on most disks. These characters are a redundant DOS type and are not needed. If you leave the last ID space blank (position five) the MSD and 1541 drives will automatically put in a "1" when a directory is called up. The disk MUST be in drive 0. When completed the disk will be completely formatted (tracks 1-35) and the BAM & directory sectors will be written.
- 6) The Dual Fast Formatter works the same way as the Single version but you will be prompted for two names and two IDs. The first name & ID will be formatted onto the disk in drive 0, the second on the disk in drive 1. Make sure that the correct disks are in the drive before hitting RETURN! Once formatted all old data is LOST!

MODIFYING QUICK NIBBLER FUNCTIONS

If you are not familiar with terms such as 'sync mark' and 'density', or do not understand the make-up of a Commodore disk this section is not for you...but you may read it anyway if you wish!

After hitting 'M' on the main menu, a new screen will appear. This screen allows you to modify the way the Quick Nibbler (NOT the Auto Nibbler) looks at a disk when attempting a backup.

The CRSR (up/down) key will select the track you wish to modify.

The '+' & '-' keys will change the number of sync marks to read from that track. A normally formatted disk will have two sync marks per sector (21 sectors = 42 sync marks). To copy an extra sector bump the sync marks up by two.

The 'D' key will change the data Density rate. Four different densities can be selected. If the software you are trying to backup uses multiple densities per track the Quick Nibbler will not be able to produce a working copy.

The 'S' key puts the nibbler into 'short Sync Mode'. This mode is used when a track is packed with a lot of data (by slowing down the drive when the disk was created, adding an extra sector, etc.). It reduces the length of a sync mark from 40 bits to about 10 which is the bare minimum. On a normal disk this can save up to 157 bytes (260 bits = 40 bits x 21 sectors x 2 sync marks - 10 bits x 21 x 2) which can be used to write the extra data. Note; some drives may have trouble reading a sync mark this short.

A table of normal values is provided as a reference. If you wish to reset all the values to their original state press RUN/STOP and hit RESTORE.

To return to the main Menu press 'M' or hit RETURN.

BACKING UP THE MASS DUPLICATOR DISK

You Can't! So be careful!

FAST COPY ROM INSTRUCTIONS

INSTALLATION INSTRUCTIONS

LEFT

(46) Before this chip is installed, you must have previously installed and checked the RAM chip as per the instructions at the beginning of this manual. With that operation complete, again inspect the MSD PC board. Locate the FE ROM as shown in figure 2 of the manual; it will be labeled U5 on the printed circuit board. Figure 3 also shows the position of the FE ROM. It is to the ~~right~~ of the Mass Duplicator chip and is labeled 'V2.3'. Carefully remove the ROM from the U5 socket using a small flat headed screwdriver or a chip removal tool. Place the Fast Copy chip into the socket making sure the notch is pointing up. Check that the pins line up with the holes in the socket then press the chip into place. Your Fast Copy ROM is now installed. Now reconnect the drive to the computer and the power cable. Turn it on and make sure it is functioning correctly. If anything seems different than usual turn the drive off and check your installation. If the installation seems correct, the chip may be defective. Return it to us with an explanation of the problem (it may be worthwhile to call our Tech Line first).

USING THE FAST COPY COMMANDS

Now that your MSD SD-2 is equipped with the new ROM you can invoke the new copy commands from any computer hooked up to the drive, whether serial or IEEE-488.

The first command is "FASTC". This will perform a 15 second backup from one drive to the other. To copy from drive 0 to drive 1, the syntax is as follows: `OPEN15,8,15,"FASTC1=0":CLOSE15` Don't be confused by the '1=0'. This is Commodore's way of saying that the disk, in drive 1 will equal the disk in drive 0 when the backup is complete.

The second command is "FASTV". It will perform a 22 second backup of a disk. The data written to the destination disk will be verified to make sure it matches what has been read from the source disk. Both commands can be abbreviated, "FC" for "FASTC" and "FV" for "FASTV". Remember the syntax is `DESTINATION=SOURCE (Fx1=0 or Fx0=1)!`

If a disk error is encountered during a backup, the process will stop and a drive light will flash, this light will signify a source or destination error. Reading the error channel will always return a '20, READ ERROR, IT, SS' whether it was a read or write error. The track number (IT) will be the track the error occurred on.

AUTO COPY ROM INSTRUCTIONS

INSTALLATION INSTRUCTIONS

Before this chip is installed, you must have previously installed and checked the RAM chip as per the instructions at the beginning of this manual. With that operation complete, again inspect the PC board on your MSD. Locate the DC ROM as shown in figure 2. It will be labeled U6 on the printed circuit board. Figure 3 also shows the position of the DC ROM. It is to the right of the Fast Copy ROM (FE ROM - U5) and beneath a pin labeled GND. Carefully remove the ROM from the U6 socket, using a small flat headed screwdriver or a chip removal tool. Place the Auto Copy chip into the socket making sure the notch is pointing up. Check that the pins line up with the holes in the socket then press the chip into place.

Your Auto Copy ROM is now installed. Before closing up the drive, reconnect it to the computer and the power cable. Turn it on and make sure it is functioning correctly. If anything seems different than usual turn the drive off and check your installation. If the installation seems correct, the chip may be defective. Return it to us with an explanation of the problem (it may be worthwhile to call our Tech Line first).

USING THE AUTO COPY FUNCTIONS

Now that your MSD SD-2 is equipped with the new ROM you can invoke the new auto copy functions at any time simply by turning on the drive. It does not have to be connected to a computer at the time. If it is connected to a computer or other devices there is no need to disconnect it as it will become totally transparent when in Auto Copy mode!

To enable the 15 second, no verify, backup, place the disk you wish to copy into drive zero. This disk must be write protected or be partially inserted so that the write protect sensor will be covered. Turn on the drive. When it is powered-up, the drive 1 LED should be on, and the power LED should be flashing. Now place the destination disk into drive 1. The drive 1 LED should go off and then when the disk is fully inserted, all the LEDs should start to flash a pattern for about 2 seconds, this will give you time to close the drive door(s). The copying will now begin.

To enable the 22 second, verified backup, the drive 1 write protect sensor must also be covered when the drive is turned on. Do this by partially inserting the destination disk into drive 1. After the drive is powered up, fully insert the disk to begin copying. After a backup is completed, the power LED will flash again. Check the drive 0 LED. If it is also flashing, an error has occurred during the copying process. It may be a read error on the source disk or a write/verify error on the destination disk. Correct it and try again. To continue copying, remove the destination disk and insert another. Copying will begin again after the 2 second pause. Some quick notes: The backup process is always from drive 0 to drive 1. The source disk can be left in the drive or exchanged at will. It does not effect the auto-copy sequence. The duplicate command (D0=1) now defaults to the Fast Copy routine (FV0=1). Resetting the drive will NOT start the auto copy sequence; the drive must be turned off then back on. The Auto Copy ROM will only work if the Mass Duplicator and Fast Copy chips are installed in the MSD SD-2.

WARRANTY AND DISCLAIMER

--> 30 Day Limited Warranty <--

Chip Level Designs will exchange this product within 1 month from the date of purchase to the original purchaser if defective in manufacture. The merchandise for exchange must be returned to our current distribution outlet, Software Support International, along with proof of purchase. The repair or replacement will be free of charge, provided that the returned product has not been subject to misuse, damage, excessive wear, or tampering. This warranty is in lieu of all other warranties, expressed or implied.

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Defective products should be returned to:

Software Support International
2700 N.E. Andresen Rd, #A-1
Vancouver, Wa 98661
Tech Line : (206) 695-9648

Include a COPY OF YOUR INVOICE as well as the filled out BLUE RETURN FORM included with your purchase.