

HAPPY 810 ENHANCEMENT  
INSTALLATION INSTRUCTIONS

HE810S-H <X>

HE810S-L <>

HE810S-X <>

FOR ATARI 810 DISK DRIVES  
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**WARNING**

This 810 ENHANCEMENT should only be installed by a person familiar in working with hand tools, integrated circuits, and electronic machine disassembly and assembly. Installation should not be attempted by a beginner.

Installation of this ENHANCEMENT in your 810 DISK DRIVE MAY VOID YOUR WARRANTY!

Read the instructions completely before performing the work. If you do not feel comfortable in doing the installation yourself, then have a competent electronic technician do it for you.



**L I M I T E D   W A R R A N T Y**  
**H A P P Y   8 1 0   E N H A N C E M E N T   G U A R A N T E E**

HAPPY COMPUTING guarantees the HAPPY 810 ENHANCEMENT in the following ways with the listed conditions and exclusions.

- 1) The performance of the disk drive with the HAPPY 810 ENHANCEMENT will change as per the information contained in HAPPY COMPUTING's 810 ENHANCEMENT information package.
- 2) The HAPPY 810 ENHANCEMENT board assembly is guaranteed to be free from defects in materials and workmanship for a period of one year from the date of purchase. During this one year period HAPPY COMPUTING will repair the malfunctioning ENHANCEMENT board and provide standard carrier return shipment at no charge. HAPPY COMPUTING will not reimburse you for the shipping charges needed to send the board to HAPPY COMPUTING, nor will HAPPY COMPUTING reimburse you for the labor required to remove or reinstall the board into your disk drive.
- 3) After the first year, HAPPY COMPUTING will repair the board charging for the parts, labor, and return shipment as required. All repairs carry a one year guarantee on the parts and labor used to replace the defective components.

**C O N D I T I O N S   A N D   E X C L U S I O N S** OF THIS ONE YEAR GUARANTEE

- 1) The initial one year warranty stated in item 2 above shall become null and void if any of the below stated conditions letters A thru E become or are true:
  - A) If the 810 ENHANCEMENT board is tampered with, OR
  - B) If the disk drive is subject to abuse beyond normal wear, OR
  - C) If any circuit in the disk drive not on the ENHANCEMENT board becomes defective and electrically or mechanically destroys the ENHANCEMENT board, OR
  - D) If there has been obvious negligence during installation or removal of the ENHANCEMENT board on the part of the person doing this work, with respect to the instructions provided, OR
  - E) If the warranty card is not filled out and returned to HAPPY COMPUTING.
- 2) HAPPY COMPUTING's warranty covers the ENHANCEMENT board only, damage to any other circuit or mechanism caused by the ENHANCEMENT or otherwise is not HAPPY COMPUTING's responsibility.
- 3) HAPPY COMPUTING will provide service only for the HAPPY 810 ENHANCEMENT.
- 4) HAPPY COMPUTING assumes no liability for loss of business or income due to malfunction of the HAPPY 810 ENHANCEMENT, nor any other liability for consequential damages.
- 5) This entire guarantee is not transferable and applies only to the original purchaser.

# УСТАНОВКА ПРИБОРА СИГНАЛА УДАРНОГО ВОЛНА В СИСТЕМУ

## СИГНАЛА УДАРНОГО ВОЛНА В СИСТЕМУ OUTLINE OF INSTALLATION

Приемник для приема сигналов от прибора-излучателя ударного волна в систему УДАР  
1) DISK PREPARATION

2) SET UP THE WORK AREA AND TOOLS

3) TOP COVER REMOVAL

4) BOTTOM COVER REMOVAL

5) SIDE BOARD REMOVAL

6) RF SHIELD REMOVAL

7) INTEGRATED CIRCUIT REMOVAL

8) ENHANCEMENT BOARD INSTALLATION

9) INTEGRATED CIRCUIT PLUG IN

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11) RF SHIELD INSTALLATION

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Приемник для приема сигналов от прибора-излучателя ударного волна в систему УДАР  
1) DISK PREPARATION

2) SET UP THE WORK AREA AND TOOLS

3) TOP COVER REMOVAL

4) BOTTOM COVER REMOVAL

## DISK PREPARATION

Prepare at least 3 scratch disks so that you don't have to ruin any good disks during the try out phase.

Initialize the 3 disks with the DOS INITIALIZE command. Then write DOS files on each of these disks. Verify that each disk boots correctly, and place a write protect tab on each disk. Set these disks aside and prepare your work area and tools.

Once the scratch disks are prepared, you may disconnect all cables from your 810, and move it to your work area described below.

## WORK AREA AND TOOLS

### WORK AREA

Your work area should have enough space to hold all parts and tools without cramping your style. There should be adequate lighting. A large clean desk top is ideal. Place a protective cover over the work area so as not to scratch the surface during the job.

### STATIC ELECTRICITY

Wear clothes and shoes (or no shoes) such that NO static electricity is present in your work area. Cotton is good for this purpose. Preferably, the work area should be situated on a bare floor rather than a carpet. Static electricity can damage your disk drive and your ENHANCEMENT board's components.

### TOOLS NEEDED

- 1) Medium size phillips screwdriver with a sharp tip, a magnetic shaft, and a shaft at least 4 inches long.
- 2) A container to hold the screws and parts removed during disassembly. An aluminum pie pan is good for this (no pie of course).
- 3) A needle nose pliers to straighten pins on the integrated circuits and the pins on the enhancement board, and to bend the metal tabs on the RF shield.
- 4) An XACTO knife or similar tool to lift the plastic tabs off the top cover.
- 5) A tool to lift integrated circuits out of their sockets without bending the pins too much, such as an IC removal tool for 24, 28 and 40 pin devices, or a firm metal nail file, or a small screwdriver with a thin wide flat blade.
- 6) Only if you are installing the HE810S-X will you need soldering equipment. Use a fine tip pencil soldering iron of less than 40 watts, and rosin core solder. Do not use a soldering gun or acid core solder.

## DISK DRIVE REMOVAL TOP COVER REMOVAL

ready two or six pointed tools. Once the cover is open, then any tool or radio device is used to support  
**PLASTIC HOLE COVERS REMOVAL**

With one of the tools, or a flat 1/8" off set, or a sharp flat instrument, insert the blade under the corner of  
Using the XACTO knife blade or a similar firm sharp flat instrument, insert the blade under the corner of  
each plastic tab cover. These covers are located on top of the disk drive in each of the four round  
small indentations. Pry upward gently and carefully so as not to cut the plastic. Lift each cover off  
and place them sticky side down on the slotted area at the read of the top cover. This will make them  
easy to lift off and replace later.

### UNSCREW AND REMOVE THE TOP COVER

Using the phillips screwdriver, unscrew each of the four screws and leave them in the holes in the top  
cover. At this point, if your screwdriver does not fit correctly, find one that does so as not to ruin the  
screw heads.

### TOP COVER

Lift the top cover off and place it out of the way, where it will not be damaged.  
and the side cover panel. Turn the metal back when the back of the drive is facing you. Remove the two side  
screws and remove the metal back. Turn the metal back over. If the metal back is not removed, the metal  
cover will not be removed.

## BOTTOM COVER REMOVAL

With one of the tools, or a sharp flat instrument, insert the blade under the corner of  
The entire internal mechanism is attached to the bottom cover with five screws. With the front of the  
disk drive facing you there are 3 screws located on the right, and two on the left. All five screws go  
through the bottom metal plate, into the bottom plastic cover.

### SCREWS

At this point, do not remove any screws which attach the circuit boards.

The 3 screws on the right are easily visible and are located one at the front, one at the middle, and one  
at the rear, all at the same altitude, and in line with each other. Remove these and place them in the  
container. There will probably be a lockwasher under the middle screw.

The 2 screws on the left should now be removed. There is one at the rear lying inside a right angle  
bend in the metal at the rear. The one at the front is more difficult to find. It is located between the  
vertical side board and the disk mechanism, and is also between the metal cover on this circuit board  
and the plastic front cover panel of the disk drive.

Now lift the front of the internal mechanism slightly and remove the plastic front panel; put it aside.  
The entire mechanism assembly may now be removed from the bottom cover by lifting it out. Lift up at  
the front, a slight pressure at the rear of the bottom plastic cover will allow the I/O connector to clear  
the cover.

Now set the internal mechanism assembly aside. Set the bottom cover aside. You are now ready to remove  
the side board.

be broken against a hard surface, and the cartridges based off of it, as well as the way from left sideboards to right side boards, could easily be broken, and it is important to be as careful as possible.

## SIDE BOARD REMOVAL

Once you have removed the front panel, you are now ready to begin the removal of the side board.

The side board is the 11 inch long board on the left side, and usually has a metal cover on it. This is the processor controller board. It actually contains a microcomputer, just like your 400/800/1200 personal computer.

### PULL OFF CONNECTORS

There are two 5 wire connectors at the right rear of the side board. The one more towards the front is usually brown, the other purple. Grasp each connector by the connector, not by the wires, and pull to the right, and off the side board. In newer drives the front connector has 2 wires, not 5.

### REMOVE SCREWS

There are three screws holding the side board onto the assembly. Two screws, one at the rear, and one at the front are visible by looking at the board from the left hand side. The third screw is in the middle on the angle bracket, and goes into the bottom metal base. Remove all three screws, and put them in your container.

### BOARD NOW COMES OUT

The side board remains attached by the long connector at the rear which connects the side board to the read board. Using two hands, grasp the side board at the front and the rear, and lift the side board up and out of the connector. Do not use any side to side motion, instead rock the board at the front from front to back, using the added leverage at the front of the board. Be very careful as to not bend the pins in this connector.

Set the whole assembly aside in a safe place where it will not be damaged, proceed to remove the RF shield. Now in front of you, should be the side board and tools only.

### RF SHIELD REMOVAL

Remove the two phillips screws which hold the angle bracket on the side board, place the bracket and screws in your container.

Beneath the ATARI logo toward the front of the side board, on the side opposite to the side where the switch is mounted is a small metal tab. Bend this metal tab so it is perpendicular to the side board. The RF shield may now be removed by opening up the two halves at either side of the board. Put the RF shield into a safe place out of the way.

## TAKE A BREAK!

The work you are about to do on the side board requires patience, and great care. Damage caused by static electricity is most susceptible at the next steps. Damage caused by any lack of responsible handling at this point can be disasterous, resulting in perhaps hundreds of dollars of damage. Give yourself a break, have a soda (no alcohol), and psych yourself into a relaxed but yet attentive mood.

REMEMBER: Static electricity is very efficient and can damage your board. Do not touch your board until you have grounded yourself to the board.

### INTEGRATED CIRCUIT REMOVAL

When removing integrated circuits from their sockets be very carefull as to bend the pins as little as possible. The integrated circuits you are removing have a combined value of well over FIFTY DOLLARS! Remove each integrated circuit described by prying them, a little on each side at a time with your tool inserted between the underside of the integrated circuit and the socket on the sides of the IC 90 degrees from where the pins are located. Place each IC removed pins down on the conductive surface of your container. Sometimes the ICs described below will have a "HOUSE NUMBER" rather than the number indicated, use the pin count and location as a guide to selecting the correct ICs.

Place the side board with the component side up, components facing you. Orient the board so that the switch and red lights are toward the left. If there is a smaller daughter board mounted on the side board proceed with the daughter board removal section, otherwise skip over it.

### DAUGHTER BOARD REMOVAL

First remove the 40 pin integrated circuit from the daughter board. This is the 1771 disk controller IC. Lift the board upward as straight as possible while rocking the board slightly from right to left, so as not to bend any pins on the bottom of this board excessively.

Place the daughter board in a safe place. You now have access to the other two ICs to be removed.

### WHICH ICs ARE REMOVED

Capacitors C109, C107 and C102 are along the top left middle of the side board. Directly under C109 is IC A105 which is 1771 disk controller. This may have been removed from the daughter board in the above 'DAUGHTER BOARD REMOVAL' in which case this A105 position is where the daughter board plugged in. This is a 40 pin socket.

Directly under C107 is IC A102 which is the 2316 style read only memory IC, a 24 pin package. If you have an aftermarket EROM in this position be sure to remove any added wires which connect to this package. Any traces cut which go only to this A102 socket position need not be restored. Any traces which have been previously cut which go to any other place on the board will probably have to be restored. Since there are many possibilities, call HAPPY COMPUTING if you are not sure about your non standard board wiring.

Slightly to the right of directly under C102 is IC A101, the 6507 microcomputer IC, a 28 pin package. Remove only the 3 ICs indicated and place them in your container as described above.

## ENHANCEMENT BOARD INSTALLATION

Now remove the HE810S ENHANCEMENT board from its protective shipping material, and straighten any pins on the bottom plugs which may have been bent during shipping. Use extreme care when handling this board. The bottom plug pins are very sensitive to bending and breaking damage, and the components are easily damaged by static electricity.

During the ENHANCEMENT board installation below be very carefull as to not bend the pins on the board, while plugging it into the sockets. As you slowly push the connector plugs into the sockets, look at each pin from the underside of the board to make sure that EACH PIN IS GOING INTO THE SOCKET CUP, AND IS NOT BEING BENT TO THE SIDE. If you push the board on and bend any pin completely over, you will probably ruin the pin and the entire connector. Replacement of a connector on which you have bent the pins is a very expensive job!

If you have the HE810S-X proceed with the section below, otherwise skip the next section.

### HE810S-X INSTALLATION

Remove the seperate 40 pin plug from its protective shipping material, and straighten any pins which may have been bent during shipping. You will notice that the pins on either side of the connector plug are different sizes. Carefully plug the side with the smaller diameter pins into the A105 socket position on the 810 side board, pushing it in all the way. The side with the thicker diameter pins, and the thick metal step should now be facing up out of the plug.

Line up the 28 pin plug on the ENHANCEMENT board with the A101 socket position on the side board, while the 40 pin plug pins stick up through the 40 holes on the ENHANCEMENT board, and carefully press the 28 pin plug all the way into the A101 socket. Once you are sure that the 28 and 40 pin plugs are all the way into the sockets, and everything is lined up correctly, proceed with the soldering below.

Use a fine tip soldering pencil of less than 40 watts and rosin core solder. DO NOT USE A SOLDERING GUN, DO NOT USE ACID CORE SOLDER!

Hold the ENHANCEMENT board so it is as close the parallel to the side board as possible, and solder the four end pins into place. Be carefull as to not touch any other parts with the hot soldering pencil. Once you are satisfied that the board alignment is correct, then soldering all 40 pins into place. Do not use excessive solder, and make sure there are no solder bridges. Skip over the -H and -L installation below.

### HE810S-H and HE810S-L INSTALLATION

To error is only human (TO REALLY FOUL THINGS UP REQUIRES A COMPUTER!). Did you order and receive the correct type of ENHANCEMENT board for your side board? Look at the A105 socket on your side board. If the A105 socket is black you should be installing the -L type. If the A105 socket is blue or reddish brown you should be installing the -H type. The -L type always has a black 40 pin plug mounted a fraction of an inch off the bottom of the ENHANCEMENT board. The -H version may have either a black or a reddish brown plug, and the plug will always be mounted pushed as far as possible into the bottom of the ENHANCEMENT board. Contact HAPPY COMPUTING, or your dealer if you have the wrong type of ENHANCEMENT board.

Align the 40 pin plug with the A105 socket on the side board, while you align the 28 pin plug with the A101 socket on the side board. Be sure that all pins on the plugs are directly over the socket cup holes while you slowly and carefully push the plugs into the sockets. While you are pushing the plugs into the sockets, be sure that no pin is out of the socket and is being bent to the side. Once you are convinced that the board is correctly installed, proceed with IC insertion.

## INTEGRATED CIRCUIT INSERTION

You will be installing the 40 pin 1771 IC and the 28 pin 6507 IC previously removed, into the ENHANCEMENT board which is now mounted on the side board. DO NOT ATTEMPT TO INSERT THESE ICs BEFORE THE ENHANCEMENT BOARD HAS BEEN PLUGGED IN AS ON THE PREVIOUS PAGE, THE PRESSURE MAY RUIN THE PINS ON THE ENHANCEMENT BOARD.

You will not be re-installing the 24 pin ROM IC or the old daughter board.

## **PIN 1 ORIENTATION**

#### PIN 1 ORIENTATION

Both the 40 and 28 pin IC must be correctly oriented before inserting them into the socket. There is always some identifying mark on the IC body at one end. This mark may be a square or round indentation in the body, or a raised bump.

The 28 and 40 pin IC are both oriented in the same direction. The pin one side of the 28 pin IC points toward the two 14 pin ICs beneath it, and the 40 pin IC pin 1 side points towards the serial number label on your ENHANCEMENT board.

If you plug these ICs in backwards and turn the power on, you will most likely destroy them.

### INSERTING THE ICs INTO THE SOCKETS

Straighten each pin **PERFECTLY** on the 40 pin and 28 pin ICs. When installing these ICs, push them in slowly and carefully with the pin 1 oriented as explained above. As you push each IC into the dual socket strips be carefull that each pin is exactly positioned over each hole in the collet socket cup. If any pin is not going in perfectly straight, then remove the IC, straighten the pins, and try again. The pins on the ICs will not tolerate much bending. An IC with a broken pin is totally useless, and will have to be replaced. The combined cost of these ICs is at least twenty five dollars, so work slowly and carefully!

Before proceeding, please be sure that each of these ICs is correctly oriented, with the pin 1 side facing in the direction as explained above, and all pins correctly inserted into the socket cups. It is close to impossible to diagnose any problem with this installation, except to make sure that each component and board is plugged in correctly. Push each IC and the ENHANCEMENT circuit board down firmly into the sockets as far as they will go.

## INITIAL TRY OUT

At this point it is recommended that rather than put the disk drive completely back together first and then try it out, that instead you do a try out with a minimum amount of reassembly.

For this purpose, you will temporarily install the side board back in the assembly, so that you can test that your installation has been successful. There is no need to install the RF shield or any screws in order to do this.

Proceed with the side board installation below for these initial tests.

### SIDE BOARD PLUG CONNECTION

Line up the pins on the rear board in the 810 assembly with the connector on the rear of the side board such that each pin goes into the connector and gently push the side board onto this connector while making sure that all pins are in the socket and are not being bent out to the side.

Straighten all 5 pins on each of the 2 connectors at the right rear of the side board, and prepare to push the 2 push on connectors into place. The connector which goes toward the front is usually reddish-brown and has a wire sequence from top to bottom of black, green, green, red, black. The push on connector which goes toward the rear is usually purple and has a wire sequence from top to bottom of black, white, red, green, brown. In the newer drives the rear connector will have 5 wires and the front connector will have 2 wires. The two wires on the front connector face down.

Be sure that each of the 5 pins on the 2 connectors is in a socket, that is that the connectors are correctly aligned with the pins, before proceeding.

## TRY IT OUT

Place the disk drive assembly carefully into the bottom case. Remember that right now the side board is only supported by the connector it plugs into so avoid any tension on the side board. Be sure that there are no loose screws in the bottom case or other items which may interfere with the mechanism.

Connect the power to the disk drive and the I/O cable. Make sure that the select switches are set to drive 1. Boot the computer from one of the scratch disks and verify fast and smooth disk reading. Using a PREVIOUSLY UNFORMATTED DISK, format that disk, write DOS files to it, and then verify that this newly formatted disk boots correctly. You have, if all goes well, now realized some of the speed improvement that your HAPPY 810 ENHANCEMENT provides.

Once you have verified that the disk drive seems to be working properly, read the instructions on the DIAGNOSTIC program provided by HAPPY COMPUTING and do a trial run of this diagnostic making sure that all tests "PASS". Let the diagnostic run in the continuous mode to be sure there is no warm up problem.

If you are having trouble making the disk drive work correctly at this point, then see the section "TROUBLE SHOOTING".

## TRY IT OUT

After this final adjustment work with both of the main boards back in the unit and in a quiet environment to insure that the unit is operating correctly. If you have any questions or concerns, call the factory at 800-541-2388.

### RF SHIELD INSTALLATION

If all went well with the initial try out, then again remove cables for power and I/O from the 810 and move it back to your work area. Remove the bottom cover from the assembly as per "BOTTOM COVER REMOVAL". Remove the side board from the assembly as per "SIDE BOARD REMOVAL". Prepare to install the RF shield.

If there is a small soft plastic bumper inside one of the metal covers remove it. CAREFULL, the edges of the metal cover are very sharp! This bumper was in place originally for the purpose of holding the daughter board in place during shippment. The ENHANCEMENT board which plugs in with two plugs does not need this bumper. Place the metal cover over the side board and insert the tab you had previously bent through the board, and through the catch on the cover on the other side of the board. Bend the tab down as you originally found it. Attach the angle bracket to the side board with 2 small phillips head screws. The screws go through the 2 holes in the metal cover on the component side of the circuit board, through the board, through the metal cover on the other side of the board, and screw into the angle bracket. The angle bracket is mounted as it was originally. The small angle portion of the bracket faces down, and away from the circuit board.

After the RF shield is installed, plug the unit back in and turn it on. If the unit is operating correctly, then you are ready to move on to the next section.

### SIDE BOARD INSTALLATION

## TRY IT OUT

Plug in and connect the side board as per the instructions "SIDE BOARD PLUG CONNECTION" on the previous page.

Install the screws which hold the side board in place in the same location from which you originally removed them.

### SECOND TRY OUT

It is recommended that at this point you again verify that the disk drive is properly operating. Follow the instructions on the previous page "TRY IT OUT".

At this point you are ready to move on to the next section.

Now it is time to install the bottom cover. Make sure all the wires and cables are out of the way of the bottom cover.

### **BOTTOM COVER INSTALLATION**

Now it is time to install the bottom cover. Make sure all the wires and cables are out of the way of the bottom cover.

If all went okay in the second try out then proceed to install the assembly in the bottom cover. Remove the power and I/O cables from the disk drive before proceeding.

There are 6 small rubber bumpers inside the bottom case, where the screws go through. Five of these bumpers actually have a matching screw hole which is used. The sixth bumper and screw hole in the middle hole is not utilized by ATARI due to the problem of getting the screw in with the RF shield in place. Be sure that all six bumpers are in place.

Line up the plastic face plate with the switch and lights on the side board and insert the front plate into the slots in the bottom case which are at the front, use the two deeper slots which are present. There are also 3 slots along the bottom of the bottom case at the front in addition to the slots which are at the side of the front opening. Do this front face plate alignment while gently lifting and lowering the entire assembly.

Peer down through each of the holes in the bottom plate and line up each of the 5 screw holes with the hole in the bottom cover; a flashlight might help you do this.

Install the screws first just a few turns so that you can easily insert all five screws before tightening. The screw which is at the front left is practically impossible to get to unless you are an ALIEN, so a magnetic screwdriver is desirable. If your magnetic screwdriver is too weak, or not still magnetic, you might try using a little toothpaste or stiff axle grease to hold the screw on the tip of the screwdriver while installing this screw. Be carefull though and do not get any of this foreign substance on any other part in the disk drive.

**DO NOT OVERTIGHTEN THE SCREWS!**, as you will strip the threads; only medium tight is needed.

### **TOP COVER INSTALLATION**

Position the top cover over the unit and align it with the bottom cover and front panel. Tighten the screws, again do not over tighten. Replace the plastic screw cover tabs over the screw holes and press firmly into place. If these tabs are removed and installed several times, or get dirty, the sticky stuff won't be adequate. A small smidgeon of rubber cement will help in this case.

### **FINAL TRYOUT**

Reinstall the disk drive cables and verify proper operation of the disk drive. Use the HAPPY BACKUP PROGRAM to make backup copies of both sides of this disk. CONGRATULATIONS! You will now have a disk that can be used in your computer for both sides of the disk. This is a great accomplishment and you should be proud of yourself.

## NOTES ON ENHANCEMENT REMOVAL

Obviously the steps required to remove the ENHANCEMENT board are about the same as installing it, except for the components on the side board.

When removing the ENHANCEMENT board from the side board use most of the force in the upward direction. Be carefull as to not bend the pins on the ENHANCEMENT board plugs excessively.

Reinstall the 3 original integrated circuits in the following positions and with the stated pin 1 orientation:

6507 IC the 28 pin microcomputer is installed in socket A101 with pin 1 side AWAY FROM C102, and TOWARD IC Z103.

1771 40 pin package without daughter board is installed in socket A105 with pin 1 AWAY FROM C109 and TOWARD C108. This is the same pin 1 orientation as the 28 pin 6507. The 2316 ROM is installed with pin 1 facing the opposite way as the 1771 and 6507.

**TROUBLE SHOOTING**

## TROUBLE SHOOTING

Problems that can cause the installation to not work correctly include the following with the stated solutions:

- 1) Improper installation: ICs inserted in the wrong positions or not properly oriented. A102 ROM not removed. Connectors not correctly lined up are not fully inserted. Wires pulled loose from connectors. Bent or broken pins on ICs, connectors, or plugs. Repair or correct as necessary as per the instructions.
- 2) Disk drive not operating before installation. FORGET IT! Installing the ENHANCEMENT in a nonfunctional disk drive will not produce a functional disk drive.
- 3) Bad 6507 28 pin IC. It is possible that a bad 6507 might work in an unenhanced 810 but will not work in the ENHANCEMENT board. Try a different 6507. In this case the 6507 was marginally defective to begin with.
- 4) Defective ENHANCEMENT board. The board was fully tested prior to being shipped from HAPPY COMPUTING. Damage in transit is possible. Return defective boards to HAPPY COMPUTING for free repair during the warranty period. This does not include pins on the ENHANCEMENT board which are broken by you. The pins are thoroughly examined by HAPPY COMPUTING prior to shipment. Before returning the board be sure that something else in the drive is not at fault such as the 6507, and that you can restore the drive to its original working condition without the ENHANCEMENT.

HAPPY 810 ENHANCEMENT  
WARP SPEED SOFTWARE  
INSTRUCTIONS

FOR USE WITH THE HAPPY 810 ENHANCEMENT  
INSTALLED IN ATARI 810 DISK DRIVES  
WITH ATARI PERSONAL COMPUTERS

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READ THIS INSTRUCTION MANUAL COMPLETELY  
BEFORE USING A DISK DRIVE ENHANCED  
WITH THE HAPPY 810 ENHANCEMENT

note: ATARI is a trademark of Atari Inc.



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## RULES FOR DISK DRIVE USAGE - REMINDERS

Never insert or remove disks when the disk drive is active (when the top red light is on).

Never turn the disk drive on or off while a diskette is inserted.

Always place a write protect tab on a disk, remove this only when you intend to write on the disk.

## NEW RULES FOR THE HAPPY 810 ENHANCEMENT

If you have an add on write protect disable switch this switch must have a position where the normal write protect detection mechanism is enabled, and the switch should be left in that position at all times on your ENHANCED drive, except when you wish to write on the backside or on a write protected disk, for the ENHANCEMENT to work correctly and pass diagnostics.

When first powered on the ENHANCED disk drive is in the buffered reading "FAST MODE". DOS formatted disks are always safe to use in the "FAST MODE".

Purchased software items on diskettes should always be protected with a write protect tab. Some copyguarded disks may not work with the "FAST MODE". In fact some copyguarded disk programs may misinterpret "FAST MODE" as a pirated copy and may attempt to erase your disk or backup.

Before trying to read in a purchased software item for the first time on an ENHANCED disk drive, be sure there is a write protect tab on it. Some disks may not work correctly with a write protect tab. Always backup these disks before removing the write protect tab, or run SLOW IT DOWN.

The HAPPY 810 ENHANCEMENT does not erase disks, but a purchased software item which misinterprets "FAST MODE" as a pirated copy might!

## SLOW IT DOWN - when to enable SLOW MODE

### RPM PROGRAM

Use SLOW IT DOWN when you are going to use an RPM program on your disk drive. Without running SLOW IT DOWN, a standard RPM program will not function correctly, and will show a very fast RPM. This is not correct, the 810 ENHANCEMENT does NOT cause the disk to turn faster. If you run the SLOW IT DOWN program, these standard RPM programs will now function correctly.

European users will find that most RPM programs will not read correctly with the PAL 50 Hz television system. Instead of showing 288 RPM, they show 288 times 60/50 = 346 RPM, even though the RPM is really 288. Sixty Hz is the American NTSC vertical retrace rate, and 50 Hz is the European PAL vertical retrace rate, which most programs rely on for RPM measurements.

For this purpose HAPPY COMPUTING provides an easy to use and accurate RPM program for use with an ENHANCED disk drive. This program does not require running SLOW IT DOWN, and will read correctly on both 50 and 60 Hertz systems.

### COPYGUARDED DISKS

Use slow it down to run copyguarded disks which will not work correctly in the "FAST MODE". Note that the HAPPY BACKUP PROGRAMs and the COMPACTOR PROGRAM have a feature to force backup copies to be produced in a way such that they will automatically run in the "SLOW MODE", without running SLOW IT DOWN. See the SPECIAL RECOVERY MENU instructions.

## WARP SPEED SOFTWARE MENU PROGRAM

### PURPOSE

The WARP SPEED SOFTWARE MENU PROGRAM provides access to most other programs on the WARP SPEED SOFTWARE disk. The menu program is also used to enable the tracer, display tracer information, enable the SLOW MODE of operation on ENHANCED disk drives, and display information about the current operating environment in the personal computer. The menu program is always the first program loaded into the personal computer when the WARP SPEED SOFTWARE disk is first booted. WARP SPEED DOS is the only function which is not accessed from the menu program. WARP SPEED DOS is accessed through other means explained in the documentation on the WARP SPEED DOS program.

### FUNCTION

The menu program is the self booting portion of the WARP SPEED software disk. When first booted the menu program unlocks and recovers the tracer information from any ENHANCED disk drive on which the tracer was previously enabled. The menu program is always booted in drive one in the system, drive one may be any ATARI serial bus, single density compatible disk drive. Drive one does not have to be an ENHANCED drive. The menu program allows the user to select a function by pressing the number on the personal computer keyboard that corresponds to the number of that function displayed next to the name of that function on the video screen.

### BUILT IN FUNCTIONS

Once the menu program is booted, and the menu displayed, access is immediately provided to those functions which are built into the menu program without reaccessing the WARP SPEED SOFTWARE DISK. These include the following:

- 0) WARP SPEED DOS (message printed only)
- 1) SLOW IT DOWN
- 2) ENABLE TRACER
- 3) DISPLAY TRACER INFORMATION

A description of each of the above built in functions is provided in this section on the menu program.

### FUNCTIONS NOT BUILT INTO THE MENU PROGRAM

Other functions available through the WARP SPEED SOFTWARE menu require accessing a disk drive and loading that program into memory. The menu program will automatically provide the setup needed by the desired program, load that program into the personal computer memory, and transfer control to that program. Once the requested program begins to load into memory it is not possible to return to the menu program without rebooting the personal computer from the WARP SPEED SOFTWARE DISK. These functions which require accessing a disk drive to load include the following:

- 2) DIAGNOSTIC
- 3) SECTOR COPIER
- 4) HAPPY BACKUP PROGRAM
- 5) HAPPY COMPACTOR PROGRAM
- 6) MULTI DRIVE PROGRAM

A separate section describing the purpose, function, and usage of each of these programs is included.

## MENU PROGRAM - INFORMATION DISPLAYED

The menu of the self booting menu program displays information about the environment in which the WARP SPEED SOFTWARE is operating. This information includes the personal computer memory size, whether or not there is an enabled AXLON RAMDISK inserted into the personal computer, which disk drives connected to the personal computer are enabled as HAPPY ENHANCED drives, and whether or not the tracer information has been recovered from the most recent disk execution trace. This information is of importance to the WARP SPEED SOFTWARE user. The meaning of these items is discussed below.

### PERSONAL COMPUTER MEMORY SIZE

The personal computer memory size displayed by the menu program is the total amount of contiguous random access memory available for holding programs and data. The amount of memory is usually 16K, 24K, 32K, 40K, 48K, or 52K. All of the WARP SPEED SOFTWARE programs require 16K memory minimum except WARP SPEED DOS which requires 24K minimum.

The WARP SPEED SOFTWARE uses all available memory after the space occupied by each program for storing the disk data being copied. With one disk drive it is especially desirable to have as much personal computer memory as possible available to the WARP SPEED SOFTWARE programs, so that fewer insertions of source and destination disk are needed.

Certain plug in or switch selected options in the personal computer cause less contiguous memory to be available. For example any cartridge plugged in may cause 8K, 16K, or even 20K less memory to be available in a 48K or 52K computer. In the newer ATARI XL computers which have the built in BASIC and 48K memory, if you do not hold the OPTION button down while turning on the power to the personal computer to boot the WARP SPEED SOFTWARE menu program you will have 8K less memory available. Paying attention to the personal computer memory size will alert you to the need to select switch options, plug in memory boards and or remove cartridges that may be temporarily stealing memory.

### RAMDISK YES or NO

If you have a bank selected RAMDISK (trademark of AXLON) plugged in and enabled in your personal computer the menu program will display RAMDISK = YES, otherwise the menu program will display RAMDISK = NO. The RAMDISK is especially important for use of the SECTOR COPIER program where it is fully supported. Looking at the status of your RAMDISK (if you have one) on the menu display will tell you whether or not you have the select switch in the correct position.

### HAPPY DRIVES - WHICH DRIVE NUMBERS

The menu program displays the drive numbers of all ENHANCED disk drives which are plugged into the personal computer and turned on. ENHANCED disk drives which have been placed in the "SLOW" mode do not appear to the system as a HAPPY drive. If you turn off or on an ENHANCED disk drive, re-enable the fast mode on a previously "SLOWED DOWN" ENHANCED disk drive, or change the drive select switches on an ENHANCED drive, press reset so the menu program will report the new HAPPY drive numbers.

Most of the programs on the WARP SPEED SOFTWARE disk will only work with HAPPY ENHANCED disk drives that are recognized by the menu program. Always press reset after changing the ENHANCED drive configuration once the menu program is loaded. Having the menu program recognize the proper HAPPY drive configuration allows the WARP SPEED SOFTWARE to select the source and destination drives.

### HAVE TRACER INFORMATION - YES or NO

This display tells you whether or not the TRACER had been enabled and the execution trace "TRACKS USED" information has been recovered upon the load of the WARP SPEED MENU PROGRAM. See the section on ENABLE TRACER, COPY PER TRACER, and COMPACT program for further information.

## LOADING THE WARP SPEED SOFTWARE

The HAPPY COMPUTERS WARP SPEED SOFTWARE programs disk is a self booting disk that is booted in disk drive 1. Drive 1 may be any ATARI serial bus connected, single density compatible disk drive. Boot this disk as with any other self booting disk. It is suggested that you remove any plug in cartridges before booting, and on the newer XL computers which have built in BASIC you should hold the OPTION button down while turning on the personal computer so that all of the 48K memory will be available. Do NOT use the ATARI TRANSLATOR with the WARP SPEED SOFTWARE.

Once the WARP SPEED SOFTWARE disk is booted the menu of functions is displayed, examine the information at the bottom of the screen as per the previous page before proceeding to select a function. Press the number corresponding to the function you wish to execute as displayed on the menu. You may press the number of the function you want before the menu program finishes booting if you remember that number, see the SLOW IT DOWN example below.

### SLOW IT DOWN WHAT IT DOES

SLOW IT DOWN reprograms your ENHANCED disk drive in such a fashion as to restore the original unenhanced slower reading function. In addition SLOW IT DOWN locks out the programability of your enhanced disk drive which makes it appear to the personal computer as a standard unenhanced 810 disk drive.

Once SLOW IT DOWN is executed it prevents mischievous software suppliers from tampering with your enhanced 810's programability, and from detecting the presence of the 810 ENHANCEMENT, which some software suppliers may object to due to its backup capability.

Once SLOW IT DOWN has been executed, the only way possible to restore the "FAST MODE" and drive programability is to turn the disk drive off, and then on again. DO NOT TURN THE DISK DRIVE OFF AND ON WITH A DISK INSERTED!

### SLOW IT DOWN - PLACE AN ENHANCED DRIVE IN THE SLOW MODE

Press 1 on the menu to select SLOW IT DOWN, the slow it down display screen will appear, and the current HAPPY ENHANCED disk drives will be displayed. If there are no HAPPY drives, SLOW IT DOWN cannot be executed. Press the drive number of the HAPPY drive you wish to place in the SLOW MODE. If drive numbers are pressed which are not HAPPY ENHANCED drives, there is no effect.

If you press return and return to the menu you will notice that the drive you just slowed down does not appear in the list of HAPPY DRIVES. That drive will stay in the SLOW MODE until that disk drive is turned off and then on again, without regard to what the personal computer does. Once SLOW MODE is enabled you may immediately proceed to use the disk drive and computer as needed in the SLOW MODE; it is not necessary that you return to the WARP SPEED SOFTWARE menu.

Previous revisions of the HAPPY BACKUP PROGRAM self booting disk had the SLOW IT DOWN program to place only drive 1 in the slow mode on the back side of the disk as a self booting program. You may continue to use this program to place drive 1 in the slow mode if you have it. To quickly place drive 1 in the slow mode with the WARP SPEED SOFTWARE disk just hold the "1" button down on the keyboard while booting the menu program. This will effectively select "1" from the menu which is SLOW IT DOWN, and then select drive 1 for slow mode.

## THE TRACER FUNCTION

### PURPOSE

The TRACER function of the ENHANCEMENT is a valuable tool. The TRACER determines which tracks on a disk are used by a particular self booting disk program. The data resulting from the TRACE of a self booting disk is used by the COPY PER TRACER command in the HAPPY BACKUP programs, and by the COMPACT disk command in the HAPPY COMPACTOR program. The COMPACTOR program would not be possible without the TRACER function. Copying disks with the TRACER will usually take less time than copying the whole disk, especially if more than 1 copy is made, since less than the total 40 tracks of the disk are copied.

With disks that are formatted by DOS, the directory may be examined using one of the many disk utility tools to determine which sectors on the disk are used. With a purchased software item which does not have a directory, the software supplier will usually not provide the software user with a list of which tracks on the disk are used. The tracer function of the WARP SPEED SOFTWARE provides the capability to determine the tracks used without a disk directory or published information from the software supplier.

### FUNCTION

The TRACER programs the HAPPY ENHANCED disk drive to observe and record the loading process of a self booting disk while that disk is loading. The tracer does NOT examine the program itself to determine the loading sequence. Instead the tracer is a program which runs in an ENHANCED disk drive that sees and remembers each read and write operation that occurred while a program was loading.

If the TRACER is enabled on a HAPPY drive in the drive 1 position that drive will be programmed to be in the SLOW mode and will, without the personal computer knowing it, remember the number of each track that was accessed while a program is loaded. If the TRACER is enabled on a HAPPY drive which is not in the drive 1 position (when drive 1 is not a HAPPY ENHANCED drive) that drive will watch the ATARI serial I/O bus and remember the number of each track that the personal computer told drive 1 to access, without drive 1 or the personal computer knowing this. While the TRACER is enabled on a HAPPY drive which is not drive 1 that drive will not respond to the personal computer at all, until the TRACER is unlocked.

The HAPPY drive programmed in the TRACER mode will continue to TRACE the loading process of disks until the WARP SPEED SOFTWARE menu program is re-booted, which unlocks the TRACER which was enabled on any HAPPY drive and returns the "TRACKS USED" information to the personal computer for use by the various WARP SPEED SOFTWARE programs.

### WHICH DISKS MAKE SENSE TO TRACE

The loading of any self booting disk may be traced. The trace of some self booting programs does not make sense. Programs which do not make sense to trace are those which reaccess the disk drive while the program is being executed. These programs include such items as graphic adventures, which reaccess the disk for each new screen displayed, or games which reaccess the disk after finishing a particular level of play.

Some self booting disks may first boot and display a title screen, and then continue booting. At some point the program may never need to reaccess the disk. This type of program may be successfully traced, provided you have executed it to the point where the disk is no longer accessed.

The most precise determination for the user to select whether or not to use the tracer on a particular self booting disk is as follows: if you can cause the self booting program to access all data on its disk that it will ever need, then a trace of that program execution will be complete and will contain all of the needed "TRACKS USED" information. If it cannot be determined that a self booting disk has accessed all of the tracks it will use, do not use the TRACER.

## USING THE TRACER FUNCTION

The TRACER function of the WARP SPEED SOFTWARE is automatic. From the menu of the WARP SPEED SOFTWARE press the number 7 to select the ENABLE TRACER FUNCTION. You must have a HAPPY ENHANCED drive turned on, connected to the personal computer, and selected as any drive from 1 to 4 for the TRACER to be enabled. After pressing 7 the menu program will display the drive number on which the tracer was enabled on, this will be the first ENHANCED drive in the system, starting with drive 1. If there is some problem encountered by the menu program when you request ENABLE TRACER this problem will be reported and the tracer will not be enabled.

Once the menu program reports that the tracer has been enabled you should remove the WARP SPEED SOFTWARE disk from drive one, and turn off the personal computer. Do not turn off the ENHANCED disk drive that the tracer was enabled on. If you do turn off the disk drive that the tracer was enabled on the tracer program setup and enabled in that drive and any tracer data will be lost.

Insert the self booting disk you wish to trace into drive 1 in your system and follow the booting procedure needed for that self booting disk as specified by the documentation for that self booting disk. Some programs may require a cartridge, such as BASIC, to boot correctly. Other programs demand that no cartridge be inserted, or require that you hold down the option button on the newer XL computers which have built in BASIC when turning on the personal computer, so that the built in BASIC is disabled.

You must execute the program you are tracing to the point where you are sure that all the data that program uses on the disk has been accessed at least once for the "TRACKS USED" tracer information to be correct. If you cannot be sure of this the TRACER should not be used with this disk. If this program is a game you may play the game, and even try to beat your old score. This is just for fun and not required. No matter what you do with the program the ENHANCED disk drive that has the tracer enabled will remember all the tracks that the program accessed.

Once the self booting disk you are tracing has completely accessed all tracks it uses you may then turn off the personal computer. Do not turn off the ENHANCED disk drive on which the tracer was enabled. Re-boot the WARP SPEED SOFTWARE disk menu program. If the tracer was enabled on drive 1, drive 1 will return to the FAST MODE automatically. If the tracer was enabled on an ENHANCED drive which was not drive 1 that drive will now respond to the computer as normal.

When a trace has been successfully completed the menu of the WARP SPEED SOFTWARE will show the following: HAVE TRACER DATA = YES. The tracer information may then be displayed by the DISPLAY TRACE function of the menu program, or may be used in the COPY PER TRACER command of the HAPPY BACKUP programs, or the COMPACT program command of the the HAPPY COMPACTOR program. If you turn off the personal computer the tracer's "TRACKS USED" information will be lost, and will not be available the next time you boot the WARP SPEED SOFTWARE disk, unless you re-enable the tracer and trace that self booting program again.

## DISPLAY TRACE FUNCTION

When the menu program reports "HAVE TRACER DATA = YES" you may display the tracks used information of the trace of a self booting disk by pressing the number 8 key. The track numbers for the 40 tracks numbered in decimal from 0 to 39 will appear on the video screen and next to each track number will be the word "YES" or the word "NO". A "YES" means that the self booting program just traced did access that track, a "NO" means it didn't. Also displayed at the bottom of the screen is the number of tracks used by the program in decimal, which is the number of tracks which had "YES".

If you write down the name of the program just traced, the tracks which were used, and the total number of tracks used and save this information in your records you will never have to use the tracer function again on this program. The HAPPY BACKUP programs and the HAPPY COMPACTOR program allow you to enter the "TRACKS USED" information directly without tracing the program again. Knowing the quantity of tracks used by a program is useful when you proceed to compact your library with the HAPPY COMPACTOR in an efficient manner; more on this later.

## DIAGNOSTIC PROGRAM PURPOSE

The DIAGNOSTIC on the WARP SPEED SOFTWARE disk checks the 810 ENHANCEMENT hardware, in addition to the some of the standard hardware of your 810 disk drive. It does not test all functions and elements of your 810 disk drive, this is performed by qualified service technicians. Please instruct your service technician to use the SLOW IT DOWN program before running any DIAGNOSTIC other than the WARP SPEED SOFTWARE DIAGNOSTIC, since the fast reading may interfere with other diagnostics. The WARP SPEED SOFTWARE DIAGNOSTIC is intended to check the HAPPY 810 ENHANCEMENT hardware and other hardware in your disk drive which is critical to proper ENHANCED disk drive performance.

## FUNCTION

The DIAGNOSTIC programs the ENHANCED disk drive to perform certain tests and reports to the user any failures. The diagnostic also includes an RPM test which may be used on an ENHANCED disk drive without running SLOW IT DOWN. The DIAGNOSTIC may be used only with ENHANCED disk drives.

## RUNNING THE DIAGNOSTIC

Boot the WARP SPEED SOFTWARE disk as described in these instructions. Be sure that the WARP SPEED SOFTWARE disk is still in drive 1 and press the number 2 to select the diagnostic. The diagnostic will be loaded from the disk and take control of the system. You cannot go back to the menu unless you re-boot the WARP SPEED SOFTWARE disk. As soon as the DIAGNOSTIC finishes loading you will see the DIAGNOSTIC title screen. If you press reset while the diagnostic is running the title screen will again be displayed and the program will restart.

To start the DIAGNOSTIC program enter the drive number (1-4) that you wish to run the diagnostic on. You then have the option of running either a single cycle or a continuous cycle test. Enter 0 to run a single cycle test, or enter 1 to run a continuous cycle test.

If you enter 0 for the single cycle test, and if all of the first tests are passing, you will be instructed to insert and remove any disk from the disk drive for the WRITE PROTECT test. The disk you are using need not be write protected. If you have a special WRITE PROTECT DEFEAT switch on your disk drive be sure that this switch is disabled. Then press start. DO NOT TURN OFF THE DISK DRIVE while doing this test. Failure of this test is not a failure of the ENHANCEMENT.

The continuous cycle test does not perform the WRITE PROTECT test since this requires human interaction. The continuous cycle test is used to allow the drive to run for extended periods (such as all night) to make sure there are no warm up problems.

Please note the following: The DIAGNOSTIC will always stop at the first failure with an error message. After running the diagnostic always turn the disk drive off and then on again before using it for any other purpose. Do not use a disk drive which fails the diagnostic. Have it fixed immediately.

## RPM MEASUREMENT

To run the RPM program hold the OPTION button down while you enter the drive number (1-4) on which you want to run the RPM TEST. Then insert a DOS formatted non-copyguarded disk into that drive, and press start. The RPM is continuously updated about every 1/2 second, and has an accuracy of plus or minus 1/2 RPM. The desired value for most disk drive usage is between 285 and 288 RPM. The RPM may be adjusted by a qualified technician while the RPM program is running.

Your drive needs service if the RPM is not in this range, or if the RPM varies by more than plus or minus 1 RPM while the RPM program runs for about 3 minutes. Bad drive RPM is usually never caused by a failure of the HAPPY 810 ENHANCEMENT, since it does not affect the drive spindle motor speed control circuit. Press SYSTEM RESET to stop the RPM program and restart the DIAGNOSTIC program.

## SECTOR COPIER PURPOSE

The SECTOR COPIER PROGRAM (SCP) is used to duplicate standard format disks. Copyguarded disks should be backed-up with the HAPPY BACKUP PROGRAM, not the SCP. The SCP may be used with both ENHANCED and non-ENHANCED disk drives. The SCP may be used with 1 or 2 disk drives. A maximum of 2 source and destination disk insertions is needed to copy all 720 sectors with a 48K computer (and no cartridges inserted). The AXLON RAMDISK is supported by the SCP, only one disk insertion is needed with the RAMDISK, and as many as desired complete disk copies can be produced with only one insertion of the source disk when the RAMDISK is present.

The main advantage of the SCP over other sector copier programs is the speed when ENHANCED disk drives are used, maximum speed of duplication is realized when both source and destination drives are ENHANCED disk drives. With ENHANCED drives, the SCP uses fully buffered reading and write with verification along with higher serial bus transfer speeds to realize this speed improvement.

### FUNCTION

The SCP makes a sector by sector copy of the source disk on the destination disk. The sector copier functions by first filling all available memory with the data read from the source, and then writes with verification this data to the destination disk. The SCP does not examine the directory (if any) on the disk. Instead the user instructs the SCP precisely which sectors are to be copied. Errors encountered during reading or write verification are reported and copying terminates in this case.

### USE THE SECTOR COPIER

Be sure that the WARP SPEED SOFTWARE disk is in drive one and press the number 3 on the keyboard. Once the SCP is loaded the SELECTION MENU will appear. The selection menu allows one to change the operating parameters of the SCP from the default conditions.

### SELECTION MENU DISPLAY AND COMMANDS

The selection menu displays the current environment of the SCP, values will either be the default state from initial loading, or the last state which was selected. The default values only occur when the SCP is first loaded. The only displayed parameter which may not be changed by user keyboard entry is the "RAM DISK AVAILABLE YES/NO" parameter. If you have a RAMDISK and the selection menu says "NO", then either you have the 128K selection switch in the wrong position, or something in the computer's memory system is defective.

The starting and ending sector number for copying are displayed in both decimal and hexadecimal for your convenience. The default starting sector is 1, the default ending sector is 720. The default state results in the entire disk being copied. Change the start or end sector number only if you know exactly where you copying is to begin and end.

To change the starting sector number press the "B" key, which stands for begin. The SCP will then ask you to press the "D" key if you wish to enter the starting sector in decimal, or the "X" if you wish to enter the starting sector in hexadecimal. Once you press the "X" or "D" key you may enter the starting sector number followed by a carriage return. Sector numbers not falling between and including 1 and 720 decimal, or 1 and 200 hexadecimal are reported as a VALUE OUT OF RANGE and you are again asked to reselect "D" or "X" and re-enter the value. Starting sector numbers which exceed the currently displayed ending sector number are ignored with no error indication, so make the ending sector number higher first to avoid this case.

## SECTOR COPIER - SELECTION MENU CONTINUED

To change the ending sector number press the "E" key which stands for end. The SCP then allows the same selection sequence for entering the ending sector number as explained previously for the starting sector number. Ending sector numbers which are less than the currently displayed starting sector number are ignored, with no error indication, so make the starting sector number lower first to avoid this case.

The default source and destination drive numbers selected by the SCP depend on the HAPPY DRIVE configuration in the system, as determined by the WARP SPEED SOFTWARE menu program. If there are 2 HAPPY ENHANCED drives connected the first is selected as the source drive, and the second is selected as the destination drive. If there are no HAPPY ENHANCED drives in the system, or if there is only one HAPPY drive and it is drive 1, then drive 1 defaults to both source and destination drive. If there is only one HAPPY drive and it is not drive 1, then drive 1 is selected as the source drive and the HAPPY drive is selected as the destination drive.

To change the source and destination drive numbers from the currently displayed value press the "S" key for source drive number, or the "D" for destination drive number. Each time the key is pressed, the source or destination drive number will increase by one or fold back from 8 to 1.

The FORMAT BEFORE WRITE option default is NO. In this case the destination disk must have been previously formatted or a disk error will result during copying. When the format before write option is selected ("YES" displayed) the destination disk will be formatted before any writing on the first insertion. If the destination drive is an ENHANCED drive and the format before write option is "YES", then any sectors on the source disk which had all zeroes will not be copied to the destination disk since it is known that the ENHANCED drive writes all zero sectors during formatting. Skipping of zeroes is never done with non-ENHANCED drives since some disk drives do not write all zeroes during formatting. Press the "F" key to toggle the state of the FORMAT BEFORE WRITE display. Note that the format placed on the disks by the FORMAT BEFORE WRITE option is operating system independent, that is, no special data is written to directories, boot sectors, or VTOC. This has no bearing when the entire disk is copied.

## SECTOR COPIER - COPYING MENU

Exit from the SCP SELECTION MENU to the copying menu only when you are sure that you have selected the options you need, by pressing the "X" key on the selection menu. If the copying menu is displayed and there is a RAMDISK, or you have not yet started copying by pressing "C", inserting the source disk and pressing return, then you may press "R" from the COPYING MENU to return to the SELECTION MENU. Otherwise you cannot return to the SELECTION menu without rebooting the WARP SPEED SOFTWARE disk.

Pressing "C" on the copying menu starts the copying process, insert the source and destination disks into the disk drives indicated when you are told to do so. Copying is finished when the "DONE" message is printed. Errors in reading, formatting, or write verification are reported as disk errors. Pay close attention to the abbreviated messages that appear on the screen. At first glance a "DISK ERROR" may appear the same as the "DONE" message. If a disk error occurs, only the drive number that the error occurred on will be reported, not the sector number.

If you have a RAMDISK you may easily and quickly produce many copies of the same disk. Start by selecting the format before write option = YES. Select the starting and ending sectors. Be sure that a HAPPY ENHANCED drive is the destination drive and exit to the copying menu. Then begin copying using the "C" key to copy the first disk. After the first disk is copied use the "X" key to make each additional copy of the same source disk, without re-inserting the source disk. With an ENHANCED drive as the destination drive, and assuming no format or write retries (good disk drive and destination disks), each additional full disk copy takes about 82 seconds. That is to format, write and verify a whole disk. If you have data in the RAMDISK the data will be retained even if you return to the selection menu unless you change the starting sector number or make the ending sector number higher than it was when the source disk was read in.

## HAPPY BACKUP and HAPPY COMPACTOR PROGRAMS

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### PURPOSE

The HAPPY BACKUP PROGRAM (HBP), the MULTI DRIVE PROGRAM (MDP), and the HAPPY COMPACTOR PROGRAM (HCP) are intended for making duplicate backup copies of ATARI executable disks. These programs are all part of the WARP SPEED SOFTWARE programs disk from HAPPY COMPUTERS Inc. These three programs each have a specific purpose which makes their usage different from the other.

### LOADING THE HBP HCP or MDP

From the menu of the WARP SPEED SOFTWARE disk press the number which corresponds to the desired program as follows: HAPPY BACKUP - 4, HAPPY COMPACTOR - 5, MULTI DRIVE - 6. The menu program will not allow these programs to be executed if there is no HAPPY drive in the system. The menu program will not allow the MDP to be executed if there are not at least 2 HAPPY drives in the system.

### SOURCE and DESTINATION DRIVE SELECTION

The menu program will automatically pick the source and destination drives for these programs, the user may not select these, but may place the HAPPY drives at any of the first four drive select locations. The first encountered HAPPY drive is selected as the source drive. If there is only one HAPPY drive it will also be the destination drive, and in this case the MDP cannot be used. If there are at least 2 HAPPY drives in the system the next HAPPY will be assigned as the destination drive for the HBP and HCP, and will be assigned as the first destination drive for the MDP. If there are more than 2 HAPPY drives in the system they will be assigned by the menu program as destination drives for the MDP program which supports up to 3 simultaneous destination drives.

The menu program reports the source drive number and if this drive is not drive 1, the user will be instructed to place the WARP SPEED SOFTWARE disk into the source drive and press return. It is necessary that these programs load and calibrate from the drive that is used as the source drive. Be sure that you have placed the WARP SPEED SOFTWARE disk in the HAPPY DRIVE NUMBER shown before you press return. This step is not necessary when drive 1 is a HAPPY drive since it will be the source drive and the WARP SPEED SOFTWARE disk should already be inserted into it.

Once the requested program is loaded the main menu for that program will be displayed. You must re-boot the WARP SPEED SOFTWARE disk if you wish to select a different function from the menu. Common features of these three programs are now discussed.

### COMMON FEATURES OF HBF, HCP, and MDP

If you press the system reset on the personal computer during execution of these programs all current operations are terminated immediately (prior to completion), all HAPPY drives deactivate (drive motors turn off), and then pressing return will allow the user to return to the main menu. A slight delay may be encountered allowing the disk drives to complete the command they are now executing. Do not press system reset again until the disk drives all deactivate or the personal computer may lockup, requiring the user to re-boot the software.

## COMMON FEATURES OF HBP, HCP, and MDP - CONTINUED

A bug in Atari's personal computer operating system in older personal computers causes occasional delays of about 15 seconds in operations which read from or write to the disk drive. If this delay is encountered the best thing to do is wait it out! This is not an error condition.

Some source disks cause noticeable delays while they are being read in. In this case the HAPPY COMPUTERS disk read software is doing its best to try to recover from what may be a loss of data on the disk. It is not possible to distinguish a deliberate bad sector from a weak sector so the software retries for some period of time. The disk drive does not go grind... grind... as it may do when ordinary programs read bad sectors. Instead the system just sits there. Rest assured that the disk drive is hard at work trying to recover as much data as possible within a reasonable period of time.

Unless otherwise noted, all track numbers, track counts, and sector counts reported by these programs are in decimal. This is a change from previous versions of these programs where hexadecimal was used. It is felt that for most people, working in ordinary base 10 is easier.

## SPECIAL RECOVERY MENU

The three programs of discussion here all have a common option on the main menu. This is the "S" command key which selects the SPECIAL RECOVERY MENU. Most features on the SPECIAL RECOVERY MENU work the same in all three programs. The functions of the SPECIAL recovery menu and any differences in its use between these three programs are now discussed.

These backup programs are designed to require as little user intervention as possible, while still being efficient in operation. Some specialized features are provided by a secondary display and menu called the SPECIAL RECOVERY MENU. Use of these added features increases the flexibility, and provides additional capability for backing up some disks.

### R - RESTORE DEFAULT

When these programs are first loaded some conditions on the SPECIAL RECOVERY MENU are at preset or default conditions. Any changes made to the conditions on this menu remain in effect until the program is reloaded, or you press the "R" key while the SPECIAL RECOVERY MENU is displayed. This is a change from previous versions of our software. Now the default conditions are restored only when you press "R".

The default conditions are as follows:

CURRENT SCAN RETRIES = 04 (shown in hexadecimal)  
CURRENT SECTORS NEEDED = 12 (shown in hexadecimal)  
FORCED SLOW MODE = NO  
SKEW ALIGNMENT = NO  
DOS MODE = NO

In the sections that follow an explanation is provided as to what this all means, and how to change from the default values to other values. The "R" option is generally used if you should change your mind about steering away from the default conditions. If you press the "R" option, the above listed default conditions are restored and the programs return to their main menu.

### X - RETURN TO MAIN MENU

The "X" command key on the SPECIAL RECOVERY MENU is pressed when you wish to return to the main menu to begin copying. When you press "X" the main copying menu for that program will reappear.

## SPECIAL RECOVERY MENU CONTINUED

### D - DOS MODE TOGGLE - MDP ONLY

To better facilitate duplication of standard format disks the MDP has a feature which will alarm the user to error conditions when copying. The DOS mode defaults to NO. When the DOS mode is toggled to "YES" by pressing "D" the scan retries are increased to 7F hexadecimal which is 127 decimal, and a special internal flag is set. When DOS mode is YES, it is considered an error condition when any source disk track does not have 18 okay status sectors, and error is reported and copying terminates. This mode is useful when copying DOS formatted disks with the computer system unattended during copying. The "D" key is also useful as a method to easily increase the scan retries. By pressing "D" twice the retries are increased, and the DOS mode is not enabled.

### T - SELECT TRACER TRACKS

The T option of the special recovery menu is very powerful! It permits you to specify exactly which tracks you wish to backup from the source disk to the destination disk.

After selection the "T" option from the special recovery menu you will be prompted for a YES/NO/EXIT (Y/N/X) for each of the 40 possible tracks on the source/destination disk. The number of the track is displayed in decimal from 0 to 39 and you may specify "Y" to yes, include the track in the backup, "N" to no, do not include that track in the backup, or "X" to exit, all remaining tracks are set to "NO", and the main copying menu for that program will appear.

In all cases of using the "T" option from the special recovery menu where at least one track is specified as "Y" yes, then the "T" option COPY PER TRACER will now be available on the BACKUP program main menu, or the "C" option COMPACT PROGRAM will now be available on the COMPACTOR program main menu. This happens without actually having enabled the tracer and "TRACED" a disk's loading process.

Selecting the "T" option from the special recovery menu will erase any previous entries into the internal tracer data table so any previously "TRACED" disk information is now lost.

The "T" option on the special recovery menu is always used only when the user knows exactly which tracks are to be backed up. Examples of knowing this are listed below.

The first example is for backing up the software where the numbers of the tracks that are used is provided or known. The WARP SPEED SOFTWARE disk from HAPPY COMPUTERS uses tracks 0 thru 21, and would be difficult to trace since it requires multiple disk loads to get all tracks accessed. Select the "T" option from the SPECIAL RECOVERY menu and answer "Y" for tracks 0 through 21 decimal, and then type "X" when "Y/N/X" is requested for track 22, and use the "T" option for COPY PER TRACER from the main menu. Do not COMPACT the WARP SPEED SOFTWARE... this will not work.

The second example is for backing up a disk on which you have already run the "E" enable tracer option on the main menu and by using the DISPLAY TRACER option and recording the tracks actually reported as needed, enter them later into the "T" option of the special recovery menu for another backup at a later time without actually "TRACING" the loading process again.

The third example would be the "POOR MAN'S APPROACH" to creating your own copyguarded disk of your own software product (rather than by purchasing and using the versatile and easy to use HAPPY CUSTOMIZER PROGRAM). This might be done by copying some copyguarded tracks from an existing copyguarded disk, and placing those tracks of special information on your disk. CAUTION, IT MAY BE A VIOLATION OF COPYRIGHTS TO DUPLICATE SOMEONE ELSE'S COPYGUARD TECHNIQUE, so consult a legal advisor before doing this.

## SPECIAL RECOVERY MENU CONTINUED

### F - FORCED SLOW MODE TOGGLE

Many of the more recent copyguarding schemes require the use of SLOW mode on the ENHANCED disk drive to execute properly. This does present some inconvenience to the ENHANCED disk drive user even though SLOW IT DOWN is simple and fast to execute.

Now you can instruct the HBP to produce a backup copy which contains special information which will force the disk drive to automatically and temporarily switch to the slow mode while reading that backup copy. Therefore SLOW IT DOWN need not be run to read this disk. If you change disks the drive can automatically switch back into the "FAST" mode with no user intervention.

The "SLOW" mode invoked by creating a backup in the forced slow mode is not exactly the same as running SLOW IT DOWN. The slow mode invoked automatically by disks created in the forced slow mode does not lock out the enhanced drive's programmability and the ENHANCEMENT is therefore detectable by some of those nasty software suppliers. They are just making their own lives more difficult since they waste time and money writing code to detect the ENHANCEMENT, when after running the SLOW IT DOWN program, the ENHANCED drive is indistinguishable from the standard 810.

Never the less, the forced slow mode is very useful for the intended purpose. As of this writing, there are no known software items which included code specifically to detect a "NOT SLOWED DOWN" HAPPY ENHANCED disk drive; but in examining other non standard hardware configurations, this type of detection code is found, so it might be suspected that such code might be written for HAPPY COMPUTING'S products. In any case, if a disk backup produced in the forced slow mode does not execute correctly, you can always run the "SLOW IT DOWN" program to get around this problem.

Pressing "F" from the special recovery menu will toggle the forced slow mode from YES to NO and visa versa. If the display shows NO, then a forced slow mode disk will not be created. If the display shows YES, then the next backup copy produced will be in the forced slow mode. Forced slow mode with the COMPACTOR only has an effect with the destination disk for the "X" extract program command. For the forced slow mode to work with tracer copying, tracks 0, 1, and 2 must be written. Make sure the tracer does not skip over one of these tracks, by reselecting the tracer tracks if necessary.

### SECTORS NEEDED AND RETRIES

A brief explanation of how the source disk reading process works will help. Each track on the source disk is first scanned to determine how many sectors are present, and which sector numbers these are. This phase is called SCAN ANALYSIS. Once the quantity of sectors and their numbers are determined the data from the sectors is actually read. Therefore, source disk reading is actually done in 2 operations, one called SCAN ANALYSIS, the other called DATA READING. The sectors needed and retries affect only the SCAN ANALYSIS portion. The scan analysis requires that all the sectors be seen in just one revolution of the disk, so that the correct ordering of sectors can be duplicated. The DATA READ operation is already written to allow many retries if a soft error occurs during data read.

Disk which are weakly written or are written out of alignment with respect to your source drive may cause SOFT ERRORS during reading. SOFT ERRORS are disk read errors which may not occur when the disk again passes the read head and is read again. If a soft error occurs while the SCAN ANALYSIS is being done it is possible that one sector may be missed entirely. To help avoid missing a sector during SCAN ANALYSIS there are certain parameters that cause the SCAN ANALYSIS to re-read the track, trying to get more sectors. After each SCAN ANALYSIS a comparison is made to see if there are at least as many sectors as specified by the "SECTORS NEEDED = XX" parameter. If there are the program continues with DATA READING. If there are not enough sectors the program will retry the SCAN ANALYSIS. The number of times the program will retry is specified by the "SCAN RETRIES = XX" parameter. By changing these parameters you might be able to copy a weakly written or out of alignment source disk. The "+", "-", "\*", and "/" keys on the special recovery menu increase or decrease these parameters as indicated. By increasing the retries substantially you may be able to copy an otherwise uncopyable disk.

## SPECIAL RECOVERY MENU CONTINUED

### SKEW ALIGNMENT MODE - HBP and HCP, not in MDP

Skew alignment is a special mode of copying where the position of sectors on one track has an important relationship to the position of sector on another track. SKEW ALIGNMENT = YES is selected by pressing the "A" key on the SPECIAL RECOVERY MENU. When selected, the skew alignment mode will increase the time required to backup a disk. Skew aligned copying is not necessary with most disks. It is for these reasons that the skew alignment option defaults to NO.

It is noted here that the software vendors (companies) listed below may be legal, and or registered tradenames or trademarks. HAPPY COMPUTERS wishes to congratulate these companies for the fine products they produce. HAPPY COMPUTERS does not represent that the backing-up of software is legal, consult your own legal advisor for the current legal position on that issue. Therefore, this information is provided for educational purposes only. Software sold by the following companies may require the use of the skew alignment mode to produce an executable backup copy. These companies include ELECTRONIC ARTS, SYNAPSE, and PARADISE SOFTWARE, other companies may also require skew alignment mode.

### PROBLEMS WITH SKEW ALIGNED COPYING

Accurate skew alignment performed by the HAPPY COMPUTERS software depends on drive RPM being fairly steady for several revolutions (wow and flutter small). The RPM measurement may then be mathematically factored out from the desired alignment figure, which allows the source and destination drives to be turning at different RPMs while still accurately duplicating the alignment. The RPM of both drives should be within range of that specified in the DIAGNOSTIC documentation.

Constant RPM, even for a single revolution, seems to be a problem in some older 810 disk drives. In our opinion, the spindle motor speed regulation circuit as well as the power supply to this circuit in older 810 disk drives seems to have insufficient operational tolerance. Atari realized this problem and updated the 810 to the so called ANALOG, or GRASS VALLEY configuration, which in the opinion of HAPPY COMPUTERS, greatly improved the reliability and operational performance tolerance of the power supply, spindle motor speed control, and read/write amplifier circuitry. This ANALOG upgrade may be available at Atari service centers, or you may look into the ANALOG upgrade offering from HAPPY COMPUTERS, included with this manual (if still available). Other factors which affect the wow and flutter of the disk RPM include the wear and state of lubrication on the following parts: drive motor, drive belt, spindle bearings, disk cone bearing, and the destination diskette itself.

Since the HAPPY COMPUTERS skew alignment software does not rely on the disk index hole for accurate skew alignment there are other disk drive defects which can affect the accuracy of skew alignment. These include the stepper motor and driver circuitry, the read/write head and the entire read and write analog circuitry.

In summary, accurate skew alignment results only when the entire disk drive is functioning properly. HAPPY COMPUTERS experience with this problem shows that the majority of these problems can be cured by having the drive regularly serviced, including checking the variation in current through the spindle motor, cleaning, and proper lubrication. Also, installation of the ANALOG upgrade is a must. Almost never will the circuitry on the HAPPY ENHANCEMENT board have any bearing on these types of defects. It is unfair to blame HAPPY COMPUTERS for these problems. If we find these problems to be of significant proportion, then we may develop a diagnostic, but this is not our responsibility.

HAPPY COMPUTERS' tests of skew aligned copying using various ANALOG equipped 810 disk drives in good working order as both source and destination drives show no problem in backing up and compacting even the most demanding skew aligned disks with our current software. One problem easily remedied is to first warm up the destination drive by doing some un-needed copying or non skew aligned copying so that the motors and circuitry reach a stable operating temperature. If you have only one drive equipped with ANALOG circuitry in good operating condition, it is recommended that this drive be used for both source and destination drive when copying skew aligned disks.

## OTHER COMMON FEATURES OF HBP, HCF, and MDP

These programs will always tell the user what is now being done, and what the user is to do next. These programs always report successful completion, or report error conditions if completion is not successful. The message "DONE" will appear when a particular copying operation is finished. There is more to do unless you see "DONE". Each time a disk insertion is needed, read the message carefully as the disk drive number and which disk to insert is always shown.

As these programs read from the source disk the actual physical track number being read is reported. Completely unreadable tracks mean that no data is available to be read from that track. It is possible to read thin air and the indication will be unreadable format. When standard software attempts a read of an unreadable format track, a disk error will result and this may be part of the copyguard. Tracks with some data sectors will show the number of okay status sectors. If you are copying a standard format disk, formatted by DOS, you should always get 18 okay status sectors on each track, otherwise there is a bad sector on the source disk. When reading copyguarded disks a display of 18 okay status sectors does not necessarily mean there is no copyguard. These programs are not tools for examining the copyguards.

The destination disk does not need to be formatted. Any track written to on the destination disk is first erased and then overwritten with the format and data that was present on the source disk, and verified. If you accidentally have a write protect tab on a destination disk you will get an ERROR DURING WRITING RETRY (Y/N), remove the write protect tab and press Y to continue copying. This error may also occur if there is some problem with the destination disk or destination disk drive.

If you are using 2 HAPPY ENHANCED drives as source and destination, copying proceeds from start to finish without interruption (unless there is an error condition). If you are using 1 HAPPY drive (not with MDP) the program will first read in and fill memory with as much data as will fit in the personal computer memory, instruct you to insert the destination disk, write that data from memory to the destination disk, and continue this cycle until all desired tracks are copied. With the HBP you have the option, each time memory is filled with a group of tracks from the source disk, to write this data to as many destination disks as is desired. You must insert each destination disk after each time the source disk is read to ensure that all destination disks contain all the data. To do this answer "Y" to the question "ANOTHER COPY (Y/N)", answer "N" to this question if you are only making 1 copy. Copying is NOT finished when this message appears, copying is finished when the program says: "DONE".

## SPECIFIC PURPOSE AND USAGE HAPPY BACKUP

The HBP is, in our opinion, the most powerful backup program for use in backing up Atari personal computer software. The HBP allows the user to backup important software and use the backups while saving the original master. The more the backup program is used as a piracy device, the harder software companies will try to get around it, costing you and them more money, but making HAPPY COMPUTERS more money in revisions, since there is no lock that one mortal can make that another mortal cannot create the key to, unless the supernatural is employed. Please respect the copyrights of others.

## SPECIFIC PURPOSE AND USAGE OF MULTI DRIVE

The MDP makes efficient usage of the processing power of ENHANCED disk drives. Reading from the source disk is time overlapped with writing to the destination disk(s). In addition the MDP will support up to three ENHANCED destination drives, making up to three copies of the source disk, in just slightly more than the time required to make one copy. Any ENHANCED disk drive recognized by the menu program after the source drive will automatically be used as a destination drive. In order to remain efficient, the MDP does not support some of the newest copy protection methods. The MDP supports copying of custom format disks created with the HAPPY CUSTOMIZER PROGRAM (sold separately).

## DISK COPYING WITH HBP and MDP

The main menu option "C" will copy all 40 tracks from the source disk to the destination disk. The main menu option "T" will appear when the tracer data is available and will copy only those tracks specified by the "TRACKS USED" tracer information.

## SPECIFIC PURPOSE HAPPY COMPACTOR

The HAPPY COMPACTOR PROGRAM (HCP) is intended for use in reducing the number of disks required to BACKUP your disk library, and allows more convenient access to programs.

The HCP combines self booting ATARI disks which normally contain one program per disk, into one disk with many self booting programs. Most self booting disks use less than the full 40 tracks available on a disk, so ordinarily the rest of the space on the disk is wasted. The HCP allows the use of all tracks on a disk to store many self booting programs. Not all self booting programs can, or should be compacted. Normally most programs which meet the criterion explained in the section on ENABLE TRACER can be COMPACTED. The HCP does not compact programs in the sense of making them smaller, rather it compacts the the size of your backup library.

## FUNCTION

During COMPACTION, the HCP makes a track by track duplicate of the source disk, while placing a particular track's information from the source disk on a different track (usually) on the destination 'COMPACTED' disk. This is called TRACK RE-MAPPING. The destination disk tracks that are written are formatted, written, and verified with the same data present on the source disk. It is not necessary to format a destination disk prior to using the HCP. However, it is necessary that the destination COMPACTED disk be initialized with the HCP. All tracks written to the destination disk are completely replaced with that track's contents on the source disk. All analysis, reading, formatting, writing, remapping, and verification are performed automatically, and efficiently with no special user intervention required.

The HCP is actually a miniature operating system. Self booting programs on a compacted disk are referred to in a manner similar to other FILES. The HCP provides for creation (compact), copying (extract and move), killing (delete), and renaming of these files, as well as initial disk initialization.

The HCP creates a COMPACTED FORMAT disk which includes a self booting menu selection program and the actual compacted files. Access to these files is possible only with either the self booting COMPACTED disk menu, which allows only program execution, or the HCP itself. THE FILES ARE NOT DOS FILES. The resultant compacted disk must be booted on an ENHANCED disk drive in the drive 1 position, and that drive must not be in the slow mode. The self booting compacted disk automatically executes all files in the SLOW mode, so use of SLOW IT DOWN, and FORCED SLOW MODE is not necessary when compacting or moving compacted files. FORCED SLOW MODE may be used when extracting a file back to its original form.

## COMPACTED FILE NAMES

COMPACTED programs are identified by a name typed in by the user at initial COMPACT or MOVE time. These names may be up to 16 characters long and include any characters including embedded spaces. While typing in COMPACTED program names use only the BACKSPACE key to erase errors, do not use the CONTROL ARROW keys.

## INITIALIZE COMPACTED DISK

This main menu command places the self booting control program for a compacted disk on track zero of the destination disk, and clears the compacted disk directory. The destination disk track zero is formatted, written, and verified with this information, any information previously on track zero of this disk is erased. During initialization a code is placed on the disk which is the frame counter locations 18-20 from the personal computer, which may be treated as a random number. This special code is compared during execution of the "C", "X", and "M" commands to ensure that the correct compacted source or compacted destination disk has been inserted when requested. Otherwise this code is invisible to the user. If you get a message telling you "WRONG COMPACTED DISK INSERTED" then remove that disk and put the one that should be used into the disk drive shown.

## PROGRAM COMPACTING

Only self booting programs which can be completely traced can be compacted. See the ENABLE TRACER description in the WARP SPEED SOFTWARE menu program. A compacted disk is first created using the "I" initialize compacted disk command on the COMPACTOR main menu, only disks initialized by the COMPACTOR will be accepted when the user is told to insert a COMPACTED disk.

To compact a program first trace the program or enter the tracks used information directly using the special recovery menu "T" option. The "C" COMPACT PROGRAM command will then be available on the COMPACTOR program main menu. The "C" command will instruct you to insert source disk and destination compacted disk as needed. When copying is finished the COMPACTOR will ask for the program name. Once the name is entered the compacted disk's directories will be updated and the program will then be on the disk. If COMPACTION is interrupted by an error or by stopping the program, the compacted program will not take up space on the disk.

## EXTRACT and MOVE PROGRAM

Program extraction with the "X" command reverses the compaction process, re-creating a copy of the original source disk that is not compacted. The source disk is a compacted disk and the destination disk is not compacted. Forced slow may has a meaning only in this case with the compactor. COMPACTED programs may be moved from one compacted disk to another with the "M" command. In this case both the source disk and the destination disk are compacted.

## COMPACTED DISK IDENTIFICATION

Internal to the COMPACTOR program is the generation and checking of compacted disk id numbers. This id number is a random number placed on the compacted disk during initialization. When the user is instructed to insert a compacted disk into the source or destination drive during the execution of the "C", "X", or "M" command, the id number is checked to be sure that the correct disk is inserted.

## OTHER COMPACTOR COMMANDS

The other commands on the COMPACTOR menu not yet mentioned do a straight forward file management function. These commands include the following: D) DISPLAY DIRECTORY, R) RENAME COMPACTED PROGRAM, and K) KILL COMPACTED FILE.

## GETTING ORGANIZED

To efficiently reduce the number of disks required to backup your library you should keep careful records of how many tracks are used by each self booting program to be compacted by using the ENABLE TRACER and DISPLAY TRACER in the WARP SPEED SOFTWARE menu program. At the same time you may write down the tracks used info so that you don't have to trace the disk again when you are actually ready to compact it. Out of the 40 tracks on a disk, 39 are available to hold compacted programs since one track is used for the compacted disk self booting program and directories. Try to optimize your disk usage by using as many of the 39 tracks available.

## EXECUTING COMPACTED DISKS

The compacted disk boots in an ENHANCED disk drive in the drive 1 position. If the compacted program to be executed requires a cartridge or other special hardware that hardware must be connected. When the compacted disk is first booted the directory of compacted programs is displayed. Press the number corresponding to the program to be executed and the program will load and execute. Turning off and on the personal computer will cause the compacted disk directory to reappear. If the compacted disk is removed from the drive, and the write protect detect circuitry is working correctly, the track remapping will be disabled. This is useful with such programs as text editors. The editor may be on a mapped compacted disk and the data disk will not be mapped. Once the compacted disk is removed from the disk drive, it should not be re-inserted without first turning off the power on the personal computer or the wrong data may be read from the disk.

## DISK PROBLEMS AND TROUBLESHOOTING

PROBLEMS AND TROUBLESHOOTING ARE THE MOST COMMON PROBLEMS ENCOUNTERED BY USERS OF THE WARP SPEED SOFTWARE. THE FOLLOWING ARE THE MOST COMMON PROBLEMS AND TROUBLESHOOTING TIPS FOR THE WARP SPEED SOFTWARE.

Be sure that there is no write protect tab on the destination disk, that you are using good quality destination disks, and that your disk drive is aligned, and the speed adjusted correctly. Also be sure that the disk drive passes the WRITE PROTECT CHECK in the diagnostic. See our 810 PROBLEMS EXPLORED at the end of this manual.

### DISK ERRORS

Be sure that your disk drive passes the DIAGNOSTIC program run continuously, see the diagnostic instructions. A disk error is usually caused by faulty hardware, either the disk drive, cables, or personal computer may be at fault. No user identifiable explanation can be given concerning the error code encountered. See our 810 PROBLEMS EXPLORED at the end of this manual.

## BACKUP CAPABILITY GUARANTEE and REVISION POLICY

The WARP SPEED SOFTWARE comes with a guarantee that you will be able to backup any standard media single density disk which can be read with a STANDARD Atari 810 disk drive, and reliably executed on a 400, 800, or 1200 personal computer, producing an executable copy. If you find such a disk which cannot be correctly backed up, first contact HAPPY COMPUTERS by phone or mail, giving the name, manufacturer, and date of purchase of the disk, and the serial number of your ENHANCEMENT board. HAPPY COMPUTERS may have already discovered this problem from its customer base, and be working on or already have revised software. If the problem has not yet been discovered you will be instructed to send HAPPY COMPUTERS the original source disk for examination. If this disk contains copyrighted material, then only the original disk from the manufacturer can be accepted for examination. HAPPY COMPUTERS will examine this disk and revise the WARP SPEED SOFTWARE such that this disk can now be correctly backed-up, or if within 90 days from the date HAPPY COMPUTERS receives this disk from you HAPPY COMPUTERS cannot produce revised software which will correctly backup that disk you may at your option return your ENHANCEMENT board and your WARP SPEED SOFTWARE disk in working condition to HAPPY COMPUTERS for a full refund of all funds that HAPPY COMPUTERS was paid excluding all shipping, handling, and insurance charges. This guarantee is effective for five years after the date of purchase of the HAPPY 810 ENHANCEMENT. Proof of purchase will be required.

When sending a disk for examination you must include five dollars for return shipping and insurance.

In order to receive a revision it is required that you send HAPPY COMPUTERS the current fee being charged. At the time of this writing the fee is \$15.00 for the UNITED STATES, CANADA, and MEXICO, or \$25.00 US funds payable through a US bank for other countries. This price is subject to change without notice.

The main thrust of this guarantee is to provide our users with the capability to protect their software investment through the backup ability.

## 810 DISK DRIVE PROBLEMS EXPLORED

With several years of experience with modified and ENHANCED 810 disk drives, HAPPY COMPUTERS takes this opportunity to help its users with answers to problems that are commonly found with the 810.

First of all HAPPY COMPUTERS guarantees only the 810 ENHANCEMENT hardware. About half the 810 ENHANCEMENTS sent back to HAPPY COMPUTERS so far have not been defective in any way. The following rules are now effective immediately.

If you send HAPPY COMPUTERS an ENHANCEMENT for repair during the warranty period and this ENHANCEMENT is not actually defective in any way, there will be a \$25.00 service charge for testing, handling, and return shipping. This fee is \$35.00 for other countries. Please be sure your ENHANCEMENT is defective before sending it to HAPPY COMPUTERS. Whenever you send an ENHANCEMENT to HAPPY COMPUTERS always include a complete description of the problem and test cases, (disks if necessary) so that HAPPY COMPUTERS can duplicate the problem. If HAPPY COMPUTERS cannot duplicate the problem we will consider the ENHANCEMENT to be not defective and these charges will apply. If the board is defective we will repair it or replace it as per the terms in our ENHANCEMENT warranty.

### ENHANCEMENT FAILURE versus DRIVE FAILURE

The ENHANCEMENT really only has 2 failure modes, by virtue of design. This is either failure of the microprocessor or failure of the data separator. Failure of the microprocessor results in the drive just sitting there and spinning when turned on, with no response to the computer, not even boot error. Microprocessor failure will always show a failure in the DIAGNOSTIC. Failure of the data separator shows up in problems when reading from the disk. Either the disk will not read at all, will read very erratically, or will sometimes read okay and other times on the same disk not read at all. These problems may also be caused by other standard hardware in the drive which is not our responsibility.

### HEAT PROBLEMS

Some users report that the metal cover over the ENHANCEMENT gets hot. This is normal as the circuitry within the cover gives off about 5 watts of heat. The circuits within the cover, including the ENHANCEMENT, are usually tested to operate in a 70 degrees C ambient environment, the ICs themselves may be hotter, and yet will still function correctly. Seventy degrees C is too hot to hold on to.

### POWER SUPPLIES

It is true that installing the ENHANCEMENT draws more power from the drive 5 volt power supply. This is about a 7 to 10 percent increase. The power supply design, if working correctly will handle this with no problem. Power supplies on the brink of failure may be pushed over the edge, and not work when the ENHANCEMENT is installed. Usually in this case it is not the power supply's fault but is actually caused by excessive or erratic power being drawn by a defective drive spindle motor. In older drives, which had the voltage regulator IC and transistor in sockets, oxidation of these sockets is a problem. Removing these sockets and soldering these parts directly in will help. Installing the ANALOG upgrade helps even more since the 12 volt supply is greatly improved.

### ENHANCEMENT NEEDS TO BE RESEATED

Some users report that they must periodically reseat the ENHANCEMENT board to get proper drive operation. The plugs on the bottom of the ENHANCEMENT board have high quality gold plated contacts, whereas the sockets on the side board may be of low quality, or may be damaged or worn out. Most low profile sockets are only designed to be plugged into a couple of times before they fail to make proper contact. HAPPY COMPUTERS recommends that if this problem occurs that the sockets on the side board where the ENHANCEMENT plugs in should be replaced with high quality sockets with gold plated contacts.

## 810 PROBLEMS EXPLORED CONTINUED

### COMPATABILITY OF BACKUP DISKS

Some users report that a backup made on their drive will not work correctly in another 810 or in some other manufacturer's disk drive. The problem may be that the copyguard does not work on this manufacturer's disk drive at the particular RPM setting used, or other timing conditions including track to track stepping time. Disks not readable on other 810s can be a problem with the destination drive on which the disk was written, a problem with drive on which reading is attempted, or both! These problems usually stem from such areas as the read/write amplifiers, read/write head, data separator, floppy disk controller IC, motor speed control circuit, or power supplies. Atari has upgraded much of this and this ANALOG upgrade will be available for a limited time from us. The spookiest problems found have been in the stepper motor, and the read/write head in the drive which has trouble reading.

### PROBLEM SOLVING

The best solution to any problem is to first isolate the problem to a particular element in the disk drive. This usually requires that a complete working drive be available so that components can be exchanged until the problem is isolated. No sub-assembly or component is above suspicion while problem isolating takes place. HAPPY COMPUTERS is willing to help with technical problems that may be encountered, and has done this on many occasions in the past. If you call us please consider that we designed the ENHANCEMENT and know a great deal about disk drive failure modes. We cannot help you if you take the attitude that you already know all the answers!

### ANALOG UPGRADE OFFERING

We believe that when Atari stopped making 810 disk drives, they had a extra supply of disk drive parts that were assembled and tested but not built into disk drives. In any case, HAPPY COMPUTERS has come across a supply of these parts and has pieced together a kit of parts which will allow its registered owners to upgrade their older 810 disk drives to the newer ANALOG drive configuration.

HAPPY COMPUTERS' analysis of this newer design shows a marked improvement in the operational performance tolerance in the power supply, the motor speed control circuit, and the read/write amplifiers. To use this upgrade you should have a 50 Watt, 31 VA power adapter which HAPPY COMPUTERS cannot provide, you might be able to purchase this from Atari.

HAPPY COMPUTERS ANALOG UPGRADE kit includes the new power supply/motor speed control rear board, the new ANALOG top board which has the read/write amplifiers, a cable which interconnects these two boards, screws to mount the top board, and installation instructions. No soldering or wiring is needed to install this upgrade. Installing this upgrade is more difficult than installing the ENHANCEMENT in our opinion. We estimate that installation could require up to 2 hours.

These components are not guaranteed by HAPPY COMPUTERS but where marked "PASS" by the board assemblers and testers. HAPPY COMPUTERS has tested all of the power supply boards to be sure that the correct voltages are present, so that no damage to the other parts of your drive will result from installation. We do offer completely tested boards at a higher price, but with no guarantee. We will exchange any board which you find to be unsatisfactory within 30 days of our shipment. We will offer these boards at this price only to registered ENHANCEMENT owners as long as our supply lasts. Atari has been known to charge \$150.00 for this upgrade.

### PRICES SUBJECT TO CHANGE or UNAVAILABILITY WITHOUT NOTICE

The price for the kit where only the power supply is tested is \$49.95. The price for the kit with tested boards \$64.95. Shipping is included. Add tax in CA. For COD add \$5.05. For orders outside the US add \$10.00 shipping. Due to our low margin in selling these boards, dealer discounts are not available. If we had to manufacture this equipment ourselves in these low quantities it would cost us twice what we are selling them for, anyway these boards are copyrighted so we cannot do that.

**WARP SPEED DOS****PURPOSE**

The WARP SPEED DOS (WSD) is a software improvement to ATARI DOS 2.05 which greatly improves the speed of both reading and writing with verification. This improvement further utilizes the added performance made possible by the HAPPY 810 ENHANCEMENT. The speed improvement is realized only with 810 disk drives that have the HAPPY 810 ENHANCEMENT, other ATARI compatible disk drives or non-ENHANCED 810s will function with the WSD as usual (SLOW!). No hardware changes are needed for ENHANCED disk drives to run the WSD.

**DEFINITIONS****WARP SPEED DOS LOAD FILE (WSDLF)**

The binary load file from HAPPY COMPUTING which the user installs into standard unmodified ATARI DOS 2.05, creating WARP SPEED DOS. The WSDLF need only be used when the user wishes to create WARP SPEED DOS and re-select the AUTOMATIC WARP SHRINK OPTION. This load file is named "WARPDOS.BIN"

**WARP SPEED DOS SUPPORT MODULE (WSDSM)**

The memory resident portion of WARP SPEED DOS which supports the WARP SPEED disk drive operations. This support module is normally invisible to the user. The WSDSM resides in the personal computer random access memory. Because of this memory residence there may be conflicts with some pre-existing software. The WSDSM attempts to resolve memory conflicts through self relocation and 'shrinking'.

**WARP SPEED DOS DISK (WSDD)**

A self booting disk created by WARP SPEED DOS, by formatting a disk with WSD and using the "H" DUP menu option to write DOS files to that disk. This disk when booted will enable the WARP SPEED mode of operation on HAPPY COMPUTING ENHANCED 810 disk drives. The WSDD may be used just like a disk formatted by standard ATARI DOS 2.05, however during formatting the entire first track (18 sectors) of the disk are deallocated. This compares with 3 sectors on a disk formatted by standard ATARI DOS 2.05. Therefore a WSDD will have 15 less available sectors.

**WARP SPEED DOS (WSD)**

The programs present on a WSDD which implement the WARP SPEED function. This includes a boot program which is invisible to the user (except for the 18 sectors it occupies on the disk), the DOS.SYS file which is the ATARI file management system (FMS) plus the resident portion of the disk utilities package, and the DUP.SYS file which is the ATARI non-resident program that is called into memory by the 'DOS' call from BASIC (for example) which enacts the functions on the DISK OPERATING SYSTEM menu.

On the WSDD the file DUP.SYS has been renamed (automatically) to WDP.SYS. This is done since the original DUP.SYS program is not compatible with WSD and to facilitate preventing the user from calling the wrong disk utilities package into memory. For example if the user with the BASIC cartridge inserted boots a WSDD disk, and then calls the disk utilities package with the 'DOS' command from BASIC, only the WDP.SYS file may be loaded. If the disk currently inserted does not contain the WDP.SYS file, then the computer returns to BASIC.

The WDP.SYS file may be copied on to any ATARI rev 2.05 compatible disk, using the "O" or "C" DOS menu option. It is okay to have both the DUP.SYS and WDP.SYS file on the same disk since standard DOS will only call the DUP.SYS program and WSD will only call the WDP.SYS program.

The DOS.SYS file MUST only be written by the "H" write DOS files option of the DOS menu. The "H" command in the WSD menu may be used to only write DOS files to disks that are formatted by WSD. DO NOT use WSD to write DOS files to a disk formatted by standard ATARI DOS 2.05 since the extra 15 sectors have not been properly deallocated and loss of other data or programs may occur. DO NOT use the "O" or "C" WSD menu command to copy the DOS.SYS file.

## GENERAL USAGE ENVIRONMENT

You may use the WSDD to boot your system, contain AUTORUN.SYS files, and any other programs or data that you would normally use a standard ATARI DOS 2.0S format disk. You may also boot your system with the WSDD and then proceed to use other disks formatted by standard ATARI DOS 2.0S in the fashion of normal DOS and FMS usage. However, do not use WSD to write DOS files (menu "H" option) to any disk other than those that have been formatted by WSD. You may convert entire disks to WSD booting by first formatting a blank or unneeded disk with WSD, writing DOS files to that disk, and then copying all files except DOS.SYS and DUP.SYS from the original to the now WARP SPEED booting disk.

A disk which has WARP SPEED DOS installed, when booted, will place the WARP SPEED DOS SUPPORT MODULE into the memory of the personal computer. This support module uses additional memory in the personal computer to support the WARP SPEED improvement. Under many conditions the user need not be aware that this extra memory is being utilized. **YOU DON'T GET SOMETHING FOR NOTHING:** under some conditions the extra memory utilized by the WARP SPEED SUPPORT MODULE will cause WARP SPEED DOS to not be compatible with some programs.

## COMPATIBILITY

The WSD is available at present only for installation in standard, unmodified ATARI DOS 2.0S, for use with standard format disks. WARP SPEED DOS is not intended for use with self booting copyguarded disks, as it cannot be installed on these disks in a straight forward manner even though the disk may use the ATARI DOS file management system (FMS). WARP SPEED DOS is not available at present for other ATARI compatible operating systems such as LJK DOS or OSA+. HAPPY COMPUTING is willing to work with the authors of such operating systems so that they may also enjoy the benefits of WARP SPEED.

WARP SPEED DOS is NOT GUARANTEED to be compatible with all programs that run under standard ATARI DOS 2.0S. The restrictions are explained in this document. Most programs written in BASIC, PILOT, and machine language will be compatible with WSD so long as they either 1) respect the LOMEM pointer or 2) leave sufficient room in memory to fit the WSDSM. The WARP SPEED DOS support module has been written to try to accommodate as many programs as possible in that the WSDSM which supports WARP SPEED will relocate and shrink itself to make room for other programs. HAPPY COMPUTING has no responsibility to update the WARP SPEED DOS or software from other software suppliers to resolve compatibility problems. Further information is available for advanced users in that section.

## INSTALLATION FOR ALL USERS

This section provides installation details for all users. Once the WSDLF is installed and DOS files are written, this procedure need not be repeated since WSD can duplicate itself. If you use an ENHANCED disk drive for step 6 below you will realize some of the speed improvement at that point.

- 1) Turn off personal computer, remove all cartridges. Turn off 850 interface (if you have it).
- 2) Turn on disk drive, wait for busy light to go out.
- 3) Place a standard, unmodified ATARI DOS rev 2.0S disk into the disk drive, and boot this disk. The DUP.SYS "DISK OPERATING SYSTEM II VERSION 2.0S" menu should now appear.
- 4) Place the HAPPY COMPUTING disk which contains the WARPDOS.BIN file into the disk drive.
- 5) Use the menu "L" option to load the file "WARPDOS.BIN", remove the HAPPY COMPUTING disk from the disk drive. When the message "PRESS Y FOR AUTO SHRINK MODE" appears you should press any key EXCEPT "Y". WARP SPEED DOS is now enabled, press return to view the new menu.
- 6) Insert a disk which contains no valuable programs or data into the disk drive and use the "I" menu option to format that disk. Once the disk is successfully formatted use the "H" menu option to write DOS files to that disk.

## WARP SPEED DOS - DOs and DON'Ts

HAPPY COMPUTING provides WARP SPEED DOS on an "AS IS" basis with NO warranty as to fitness for a particular use. HAPPY COMPUTING assumes no liability of any kind for loss of programs or data due to malfunction of WARP SPEED DOS. The risk in using WARP SPEED DOS is left entirely to the user! For this reason HAPPY COMPUTING strongly suggests you observe the following list of DOs and DON'Ts! HAPPY COMPUTING makes these RULES and points out that without strict adherence to these rules, computer lockup and or complete or partial program dysfunction (your program bombs, BOOM!) can occur which may lead to loss of data or programs on diskettes!

- 1) DO NOT use WSD to write DOS files to a disk that is not formatted by WSD.
- 2) DO NOT use WSD with programs or data for the first time without making a backup of the program or data.
- 3) DO use WSD with programs that you have previously tested to be sure they are compatible with WSD.
- 4) DO NOT use the WSD menu function "K" SAVE BINARY FILE with a start address less than x'2500'.
- 5) DO NOT use the WSD menu function "K" SAVE BINARY FILE with a starting/ending address which causes the memory area x'3400' to x'3CFF' to be within the area saved, UNLESS you are using a MEM.SAV file AND that MEM.SAV file has been written to just prior to the most recent loading and entry of the DISK UTILITIES PACKAGE (DUP.SYS which is WDP.SYS for WSD).
- 6) Once an ENHANCED 810 is selected and used by WSD, DO NOT turn the power off for that disk drive. The following notes concern ENHANCED drives which have been selected since WSD was booted and for which the power has been cycled. First of all the drive will respond only with I/O errors, until you press system reset. If there has not been a WARP SHRINK you may press SYSTEM RESET, attempts to access an ENHANCED drive after SYSTEM RESET will reprogram the drive, allowing it to be used again without rebooting the system. If there has been a WARP SHRINK then pressing SYSTEM RESET will allow that drive to be used but it will not operate at WARP SPEED.
- 7) DO NOT POKE locations 1913,80 or 1913,87 while disk files are open from BASIC (for example).
- 8) DO poke locations 1913,80 or 1913,87 only while no disk file is open for writing. Close all disk files that are open for writing before switching between write with verify (WARP SPEED) and write without verify (standard speed).  
  
There is an occasion when the WARP SPEED write with verify will be less efficient than the standard speed write without verify, this would be in the case where you are intermixing reading of one sector with writing one sector, and you have only one disk drive. This inefficiency is caused by having only one track buffer in the one disk drive shared for both reading and writing operations.
- 9) DO NOT remove a diskette from a disk drive that is open for writing until writing is finished and the file is closed. If you, for example, open a file for writing while in BASIC, and write to that file, and then press the BREAK button before closing the file and remove the diskette you may find that the disk drive will then only respond with serial I/O errors. This problem may be fixed by pressing the SYSTEM RESET button.
- 10) DO NOT use WSD to read or write a diskette that was backed up by the FORCE SLOW MODE = YES feature of the HAPPY BACKUP PROGRAM, on an ENHANCED disk drive which is not operating in the SLOW MODE from SLOW IT DOWN. Disks created in the FORCED SLOW MODE cannot be read or written by WSD with ENHANCED disk drives operating in the fast mode.
- 11) DO NOT use the machine language calls to the ROM based disk I/O routines for reading (standard speed) from an ENHANCED disk drive that is also open for writing.

## WARP SHRINK

All users need to be aware of the meaning of the "WARP SHRINK" messages which WSD can produce. The term "WARP SHRINK" means that the WSDSM has attempted to shrink itself to accommodate a binary load file which is now loading into the personal computer memory. This binary load file may be loaded either by the DUP menu "L" command, or by the execution of an AUTORUN.SYS file.

Naturally the question must be: what happens when the WSDSM shrinks itself. The answer is that once the WSDSM has shrunk, you can no longer call the DUP.SYS program into memory by for example the 'DOS' command in BASIC. Also at the moment of "WARP SHRINK" all HAPPY COMPUTING ENHANCED drives in the system are identified and programmed with the WARP SPEED function. The result of this is that any ENHANCED drive with its power not turned on at the moment of "WARP SHRINK" will not be used as a WARP SPEED drive for further disk I/O operations. If you try to call DOS from, for example BASIC, after a warp shrink the personal computer will return to BASIC and DOS will not be entered.

### WARP SHRINK MESSAGES

There are three possible WARP SHRINK messages all have the form: cWARP shrink!

The small "c" character preceding the "WARP shrink!" actually represents one of three possibilities.

The first possibility is a blank (space) character. The warp shrink message preceded by the blank space means that the WSDSM has shrunk to make room for a binary load.

The second possibility is an inverse video capital "X" character. This message means that the WSDSM has computed that even if the WSDSM would shrink to its smaller size, the requested binary load file would still not fit in memory with the WSDSM. In this case the WSDSM does not shrink itself and loading of the load file is aborted.

The third possibility is an inverse video capital "A" character. This means that the WSDSM was told to always shrink itself upon initial boot up, and this shrink operation has just taken place.

### GETTING THINGS TO FIT - COMPATIBILITY

The standard non-shrunk size of the WSDSM module is about 2200 bytes. The shrunk size of the WSDSM is about 850 bytes. This big difference in size is due to the removal of the WSDSM automatic relocation program and the WSDSM WARP SPEED ENHANCED disk drive resident support code from the personal computer memory when the WSDSM has shrunk itself.

The size difference is large enough to have many binary load files not fit (they load too low in memory) unless the WSDSM is shrunk. There may also be many BASIC programs which use most of the personal computer memory and will require that the WARP SHRINK module shrink itself in order to have that program run. Automatic warp shrink must be used in this case.

### TURN OFF THE ATARI 850 INTERFACE!

The average user will find that many binary load files will run compatible with WSD if they simply do not allow the interface to boot itself during the initial personal computer loadup. Usually the 850 interface is booted by a short AUTORUN.SYS file. The memory used by the 850 interface support code does not conflict with the memory used by the WSDSM since both of these module relocate themselves into the next available LOMEM area. The memory needed by both the 850 support code and the WSDSM does however add up, and by not booting the interface you will might leave sufficient room for the program you would like to execute.

You may inhibit the 850 interface from booting and taking up memory if you either 1) turn off the interface during initial personal computer bootup, or 2) delete or rename the AUTORUN.SYS file that boots the interface. Note that if the interface is not booted only the "R:" serial port device will not be available. The printer will still work as soon as the 850 interface is turned back on.

## AUTOMATIC WARP SHRINK

When installing the "WARPDOS.BIN" binary load file, the user is asked to "PRESS Y FOR AUTO SHRINK". If you press "Y" at this point, and then write DOS files the WSDSM you create will cause an automatic shrink of the WSDSM on boot up. This is useful for running large programs in BASIC or for other binary load files (see advanced user section). You might as well delete the WDP.SYS file from this disk since the disk utilities package cannot ever be called from a disk that has automatic warp shrink.

## ADVANCED USER SECTION

The WSDSM resides at one of two places in memory. When the WSDM is first booted or when DUP.SYS (WDP.SYS in this case) is called into memory the WSDSM resides at locations x'3400' x'3CFF'. The WSDSM will continue to reside at these locations if the "L" command is used to load a binary load file and that load file does not load within the memory area x'1D00' to x'3CFF'.

The WSDSM will relocate to lower memory starting at the initial value of LOMEM (x'2E7',2) from FMS initialization, and will adjust the LOMEM pointer to be at 1 plus the current end of the WSDSM during FMS initialization such as when first booting the WSD disk or when RESET is pressed or when any of the following events occur: If a load file loads within the area x'1D00' to x'3CFF', or If the MEM.SAV file is loaded, or If the "B" option (execute cartridge), or the "M" option (run at address) is selected from the menu.

~~"(0) SET" will do just what it is designed to do. It will set the "MEM.SAV" file to be at the end of the WSDSM and will not be deleted when the WSDSM is deleted. This is useful for saving memory when the WSDSM is deleted.~~

### MEM.SAV CONSIDERATIONS

The MEM.SAV file is used as before however there are some important things to note. When the MEM.SAV file is first created by the "N" option in the WSD menu it will initially be 1 sector long. This really doesn't matter since MEM.SAV is always written by first deleting MEM.SAV and then re-creating it from memory when memory is actually saved.

The area written to the MEM.SAV file will start at the end of the LOMEM location of the WSDSM and continue to where the end of the WSDSM will be after DUP.SYS (WDP.SYS) is loaded. The original length of saved memory for standard DOS was a constant. Since the "DRIVES USED" and "MAXIMUM NUMBER OF CONCURRENTLY OPEN FILES" variables in FMS may be changed by the user, thus altering the initial value of LOMEM after FMS initialization, the WSDSM may start at a different point and so the MEM.SAV may begin at a different point, therefore no longer being of fixed length. It is important to not change the values of these FMS variables except using the procedure described herein.

It is not necessary to have a MEM.SAV file to ensure that the WSDSM is not overwritten by DUP.SYS (WDP.SYS) since WSDSM will automatically relocate itself above the DUP.SYS area when DUP.SYS is loaded.

If you wish to change the FMS variables controlling the number of disk drives or the max number of open files you must do this while in BASIC, then enter DOS with no MEM.SAV, and then press reset to return to BASIC. If you are creating an AUTOMATIC WARP SHRINK WSD you must do this and then re-enter DOS to load the WARPDOS.BIN file.

### CALLING WARP SPEED SECTOR I/O

Calling WARP SPEED sector I/O directly in machine language requires that the user setup the IOCB locations \$300 to \$30B exactly as if the \$E459 (serial I/O) vector was to be used. This requires a little more work than calling the disk I/O vector \$E453. Then rather than use the \$E459 vector you must do an indirect JSR through location \$7A3. Whats that? So you say the 6502 has no indirect JSR, right again! To do the job construct a one instruction subroutine of your own which consists of an indirect JMP (\$7A3) and do a JSR to your own subr... similar to the ATARI ROM vectors. You must read from a particular disk before you write to it, and do an extra read at the end of all writing to be sure that the last sectors are written.

# THE GRAVITATIONAL AUTOCORRELATION MODULE

**PURPOSE** *One of the main purposes of this book is to "X" many more in "X" which are not in the original version of the book.*

The AUTOC000 module is an AUTORUN.SYS file, for use with the BASIC cartridge and WARP SPEED DOS, on ATARI 400 and 800 computers that have a 52K memory system. This autorun file relocates the WSDSM, and the ATARI 850 interface handler program to the \$C000 memory area above the address space occupied by the BASIC cartridge. This frees up the ram space that both the WSDSM and 850 handler use in the LOMEM area. This actually gives the user more ram space for BASIC programs than was originally available with the 850 handler in LOMEM without WARP SPEED DOS.

The AUTOC000 module is for use with ATARI 400 and 800 computers that have the \$C000 to \$CFFF memory page available. This would be the case of a 52K ram system using memory boards such as from INTEC or MOSAIC. Although the ATARI 1200 computer has 64K memory, the operating system ROM must be disabled in order to use the upper 16K, so the \$C000 to \$CFFF memory area is not easily made available. Therefore the AUTOC000 module is not for use with 1200 computers.

With a cartridge inserted, such as BASIC, the \$C000 to \$CFFF memory space is not normally used at all, it is wasted! This memory space is now fully utilized by the AUTOLOAD file. In addition there is sufficient room to allow the video display screen memory to reside in the uppermost area of the \$C000-\$CFFF memory space as well for graphics modes 0 thru 5. Moving the video display memory can be done by executing a "POKE 106,208" and then executing a "GRAPHICS n". If you look at the "FREE (0)" memory space this is misleading and care must be taken in this case. The indication is that you have gained about 12K of memory since the space occupied by the BASIC cartridge ROM lies between the actual top of RAM and the video display memory, and this space cannot be utilized as RAM. The actual gain is only about 1K and BASIC will attempt to use its own memory space thinking this is ram, so the user must take care to only use about 1K more memory after doing this.

## USING AUTOC000.AUT

The file AUTOC000.AUT must be renamed to AUTORUN.SYS to use this feature. You may append other existing AUTORUN.SYS binary load files to the end of AUTOC000.AUT to have the execution continue with other AUTORUN functions, since the AUTOC000 AUT does not contain a RUN address.

The AUTOC000 program also causes an AUTOMATIC WARP SHRINK (see that section) so you cannot call DOS from BASIC if AUTOC000 has executed. Once AUTOC000 has executed correctly the message "WARP shrink to \$C000 complete" will appear. The relocate, WARP shrink, and 850 interface boot functions of the AUTOC000 program may be overridden while a disk is booting by holding down the OPTION button while the AUTORUN.SYS file is executing. This will allow DOS to be called from BASIC and the 850 interface handler will not boot, and presents a convenient way to call the DOS menu without changing disks. NOTE to OMNIMON users: OPTION need only be pressed after the disk has started booting.

## AUTOC000 ERROR CONDITIONS AND CAUSES

## ERROR #1

attempt to load AUTOC000 as a binary load file rather than AUTORUN.sys.

**either WSD is not installed or the disk already has AUTOMATIC WARP SHRINK set**

**WSD revision not compatible with AUTOC000 revision**