

BOARD SR No 007

COPY II PC™

OPTION BOARD

*Central Point
Software*
INCORPORATED

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INTRODUCTION:

Thank you for purchasing the Copy II PC Option Board! Contained in this package is almost everything you will need to use your IBM PC, IBM PC/XT, IBM PC/AT, Compaq, Zenith 150, Leading Edge model D or M, Magnum PC, NCR PC 4, or HP Vectra to make archival backups of virtually all IBM PC software.

The Option Board and software will give your computer the same type of disk duplication technology used by many software duplication firms (who put the copy protection on software in the first place). Why is it necessary to add a board to your computer? The answer is a bit technical but simplified greatly, most copy protection schemes rely on quirks of the floppy disk controller board in your PC. Because software-only backup programs (such as Copy II PC) must use this floppy disk controller, they are not able to make backups of some newer protection schemes. The Copy II PC Option Board, however, contains its own disk hardware and doesn't use the normal floppy disk controller at all! It simply transfers every bit of data from your original diskette onto the backup.

(We will continue to support Copy II PC and send you notification of improvements. Copy II PC has several advantages, such as being able to be run on PC's without extra hardware and the ability to run many popular programs from a hard disk without inserting the original floppy.)

You may notice as you use the Option Board Software that it doesn't fit as many tracks into memory as Copy II PC. This happens even though it uses all available memory in your computer. Why? The Option Board Software doesn't just read the data, as does Copy II PC, it also reads (and stores) all the stuff between data fields. This "stuff" is often called "sector IDs", "gaps", "sync bytes", "address marks", and "clock bits". You won't need to worry about all this, but this is partially why the Option Board can easily handle

many new protection schemes.

The Copy II PC Option Board also contains a "Track Editor". This will allow those of you with the urge to take a real look at protection schemes the chance to do so. The standard floppy disk controller is actually a simple computer on its own. When the PC wants some information from the diskette, it asks the floppy disk controller's "computer" to get it. Because of this, the PC has no way to look at the raw data on the diskette. Using the Option Board Editor, this limitation is bypassed, and the entire track will be visible to you.

In order to install the option board, all you will need is:

1. A standard screwdriver. (Other tools may be required for the Compaq Portable.)
2. About 30 minutes to read this manual and install the board.

Before you start, take a quick moment to verify that your Copy II PC Option Board package is complete. You should find:

1. This manual.
2. A diskette labeled "Copy II PC Option Board Software".
3. The Copy II PC Option Board and cable.
4. A postage-prepaid Product Questionnaire
5. An extra drive cable (Compaq Portable versions only).

Note that the Option Board may appear to have 4 missing IC's. This is normal and they are not needed. (They are labeled U2, U9, U11, and U15 on the board). Some boards do not have these empty spaces labeled, so this notice may not apply to you.

Please take a moment to fill out and return the postage-prepaid product questionnaire. When product enhancements become available, this is the only way we have to notify you of these improvements.

When this is done, you are ready to start! We suggest that you take a few moments to read this entire manual before starting the installation. You can then refer to the appropriate sections to guide you through installing and using the Copy II PC Option Board.

A NOTE ABOUT UPDATES

While the Option Board includes some pretty impressive hardware capabilities, it is possible to come up with a protection scheme that the current SOFTWARE shipped with the board cannot handle. In fact, we have anticipated this and have therefore deliberately not included the capability to copy anything we can imagine. Instead, we include only enough "smarts" to duplicate software currently on the market. Why did we not include everything from the beginning? Simply because doing so would quickly accelerate the advance of copy-protection. When software protection firm X buys one of our boards and attempts to come up with a protection scheme to defeat it, we are able to ship you an update much sooner if what they come up with is something we have already anticipated (this has actually already happened several times). On the other hand, had we put everything we knew into the first release of the product, software protection companies would much sooner develop ever nastier schemes that keep you from making all-important backups.

In other words, we do not wish to encourage the creation of newer protection schemes that make using your computer more difficult. Rather, we will continue to respond to the current market, always giving you the capability to backup new software. In so doing, we will contribute as minimally as possible to the "software arms race".

Our updates are priced at \$15 and we will notify you of major improvements to the software (if you return the enclosed questionnaire/registration form). In the event that we ever come up with a new Option Board with even more capability, we will offer it to you at a greatly reduced price. We thank you for purchasing our products and want you to know you will not be forgotten.

USING AN INTEL "ABOVE BOARD"

If your computer is equipped with an Intel "Above Board" or other board compatible with the Lotus/Intel/Microsoft Extended Memory Standard, you must follow the instructions contained in the section of this manual titled "Using an Autoloader" to configure the "CONFIG.SYS" file. Failure to do this will result in bad copies as the Option Board will attempt to use the Above Board when it has not been set up correctly.

INSTALLING THE COPY II PC OPTION BOARD

IMPORTANT NOTICE: The Option Board has been designed to work with the IBM PC, IBM PC/XT, IBM PC/AT (units with at least one 360KB disk drive), Compaq portable and Deskpro computers, Zenith 150, Leading Edge Model D and M, Magnum PC, NCR PC 4, and HP Vectra. Note that it has not been tested with any other brand and while it may work with other computers, no installation instructions are provided and we cannot guarantee its use with other brands.

Also note that while installation into an IBM PC and PC/XT is straightforward, installation into the Compaq portable, IBM PC/AT, and most other compatibles is more involved and we recommend that you have your dealer do it for you unless you are very comfortable with opening your computer and moving boards and cables.

WARNING: Before going any further, turn off all power to the PC and disconnect any attached power cables. Installing the Copy II PC Option Board with the PC's power on could result in damage to the PC, Option Board, or you! Turn off the power and disconnect the AC power cord NOW.

OVERVIEW

This section describes installing the Option Board in your IBM PC or PC/XT. Here is a summary of the installation steps.:

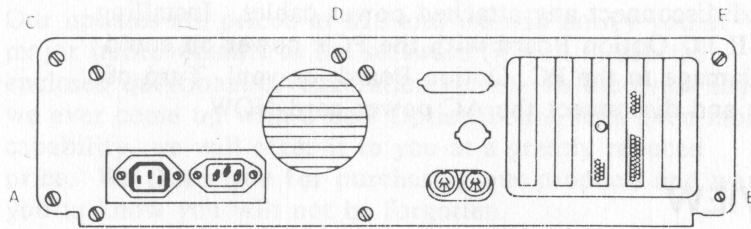
1. Remove the cover of the PC.
2. Disconnect the cable from the drives to the floppy disk controller (FDC).
3. Move the FDC one slot to the left.
4. Insert the Option Board into the slot previously occupied by the FDC.
5. Connect the cable from the drives to the Option Board.
6. Connect the Option Board's cable to the FDC.
7. Replace the PC's cover.

We recommend that you follow the installation steps as shown below rather than attempting to install the Option Board from the above overview.

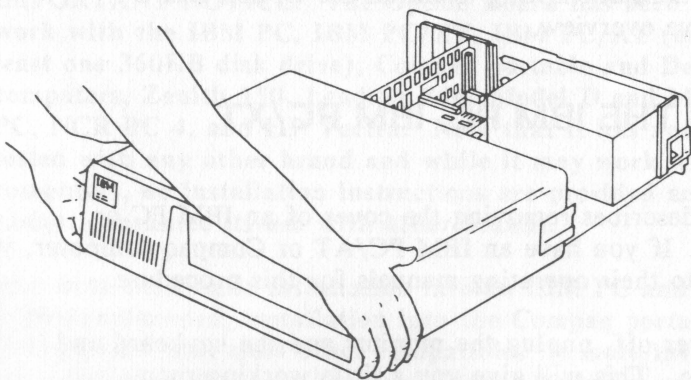
OPENING THE IBM PC, IBM PC/XT

This section describes removing the cover of an IBM PC or IBM PC/XT. If you have an IBM PC/AT or Compaq computer, you should refer to their operating manuals for this procedure.

With the power off, unplug the monitor and the keyboard and set them aside. This will give you a little working room. Next, position the computer or yourself so you can see the back panel as shown below.

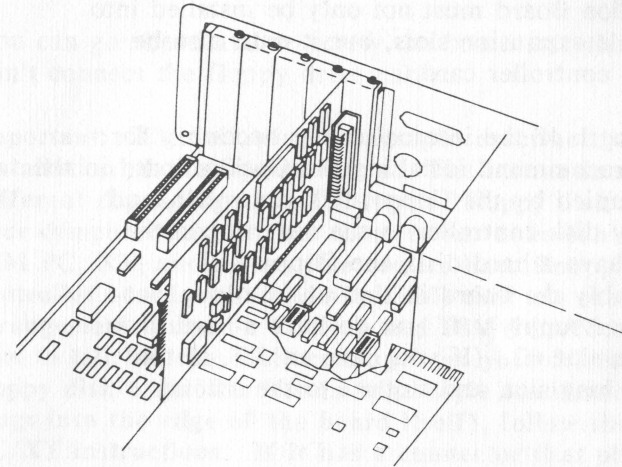


To open the computer, the cover will have to be removed from the chassis. This is done by removing several screws on the back panel of the PC. These screws are marked A - E above. With your screwdriver, remove these screws and put them aside for later. (Note: on older PC's, you will only need to remove the screws marked A and B.) Then, gently slide the cover of the computer toward the front until the inside circuitry is exposed. It is not necessary to totally remove the cover from the chassis, although doing so makes installation of the Option Board a little easier.



Now, if you look down into the computer, you will see the guts of the PC: the computer's main circuit board.

On the right will be either a silver or black box (the power supply); towards the front will be the disk drive assembly; and near the rear panel, on the left side of the board, will be five or eight connectors called expansion slots.



INSTALLATION IN AN IBM PC OR PC/XT

This section describes installing the Option Board into an IBM brand PC or PC/XT. If you have an AT or Compaq computer, please skip ahead to the appropriate installation section.

For location purposes, let's call the slot nearest the power supply slot #1, and the slot nearest the left side of the PC slot #5 (or slot #6 on newer PC's). This numbering scheme ignores the short slots on the PC/XT.

Depending upon the setup of your PC, these slots may already be occupied by other expansion boards. Whatever else you've got working in your PC, in all probability, at least two of these slots are taken up with 1) a video display card which sends information to your monitor, and 2) a disk controller

card which controls the operation of the IBM's floppy disk drives.

The Copy II PC Option Board will also be installed into one of these expansion slots. Were it not for a few physical limitations, any slot at all would accommodate the board. However, the Option Board must not only be installed into one of the available expansion slots, but it must also be cabled to the disk controller card.

Because of the length of the internal cables necessary for the hook-up, we recommend installing the Option Board in the slot currently occupied by the floppy disk controller, and moving the floppy disk controller to the next slot to the left. Unless you have a hard disk, the floppy disk controller is probably the board in slot #1 (the long slot closest to the power supply). If you do have a hard disk, it is most likely in slot #2. (If you have an XT, slot #1 refers to the first long slot, and slot #2 to the second long slot.)

Locate the floppy disk controller board now. It probably looks a lot like the Option Board you are about to install, and it has a cable coming from the end of the board that plugs into the floppy disk drives.

If the slot immediately to the left of the floppy disk controller is used, you will have to re-arrange some of the other boards in your computer so that this slot is available.

If it is already open (has nothing plugged into it), you can move the floppy disk controller into this slot now. First, you will probably have to remove the blank metal bracket from the chassis of the PC behind this empty slot. Use your screwdriver to remove the small screw at the top of the bracket and set both the bracket and screw aside for now. (Be careful not to drop the screw into the PC!)

Now carefully remove the cable connecting the floppy disk

drives to the controller (at the controller end). Next, use your screwdriver to remove the board from the chassis. The screw is located near the end of the card, on the top of the metal bracket mounting it in the PC. When the screw has been removed, carefully lift the board up, and re-insert it into the next slot to the left.

You can go ahead and re-screw the board into the PC, but don't connect the floppy drive cable.

Important: The following paragraphs describe the actual installation of the Option Board. The instructions are different depending upon the type of floppy disk controller your computer has. It has come to our attention that some IBM PC, XT, and compatible owners have floppy disk controller boards (not made by IBM) that use the connector arrangement found on Compaq and IBM PC/AT computers. Here's how to tell: If the cable coming from your drives to your floppy disk controller has an edge-style connector (that plugs into the edge of the board itself), follow the PC and PC/XT instructions. If it has a connector that plugs into two rows of metal pins on the board, follow the instructions for the IBM PC/AT computer.

Remove the Option Board from its box, being careful not to change the position of the cable folded around the board. You will notice that this cable wraps around underneath the Option Board and lays against the opposite side. Holding the cable against the board, insert it now into the slot where the floppy disk controller was.

Now you have just two connections left to make! First, locate the cable connected to the floppy disk drives. The other end of this cable used to plug into the floppy disk controller, but will now be connected to the Option Board. Plug it into the gold edge connector (J3) on the end of the Option Board. If this cable has a colored line on one side, it should be closest to the top of the Option Board.

Finally, connect the cable coming from the Option Board to

the floppy disk controller. This cable will plug into the gold edge connector of the floppy disk controller. The red line on the cable should be up, towards the top of the connector on the floppy disk controller.

When you are done, double check the connections. The cable coming from the floppy disk drives should connect to the Option Board. The Option Board's cable should connect to the floppy disk controller.

Now, screw the Option Board into the chassis using the screw you removed from the blank bracket. Double check that all the boards are firmly seated into their expansion slots! If they are not, you could damage them or the PC when it is turned on!

PUTTING THE PC BACK TOGETHER

The cover is replaced in the reverse order from which it was removed. Gently slip the cover back over the lower chassis grooves and slide it back towards the rear panel. It should fit comfortably around the chassis with the cover just overhanging the rear panel. Here you can use the screwdriver to insert and tighten the back-panel screws you removed in the beginning. Now reconnect the monitor and keyboard cables.

That's it! The Copy II PC Option Board is now installed in your system. And your computer can now use the extra capability of the version of Copy II PC that is included with the Option Board. Double check that everything has been correctly installed by turning on your computer and verifying that it functions normally. Try running your word processor, spreadsheet or whatever you ordinarily use. Your computer should operate no differently than it did before the Option Board was installed.

If it doesn't, quickly turn off the power! Remove the

cover, and verify that all the cables are installed correctly, and that the boards are seated tight into their expansion slots. If all looks OK, but you still can't get your computer to work, see the section titled: "What If The Board Doesn't Work" at the end of this manual.

INSTALLATION IN A COMPAQ PORTABLE

For location purposes, let's call the slot closest to the front of the computer (toward the keyboard) slot #1, and the slot nearest the back of the Compaq slot #5.

Depending upon the setup of your Compaq, these slots may already be occupied by other expansion boards. Whatever else you've got working in your computer, in all probability, at least two of these slots are taken up with 1) a video display card which sends information to your monitor, and 2) a disk controller card which controls the operation of the floppy disk drives. The floppy disk controller board is usually in slot #1, the one closest to the keyboard.

The Copy II PC Option Board will also be installed into one of these expansion slots. Were it not for a few physical limitations, any slot at all would accommodate the board. However, the Option Board must not only be installed into one of the available expansion slots, but it must also be cabled to the disk controller card.

Because of the length of the internal cables necessary for the hook-up, we recommend installing the Option Board in slot #2, the slot right behind the floppy disk controller card.

Locate the floppy disk controller board now. You should see a short cable coming from the top right hand corner of the board that plugs into the back of the floppy disk drives.

If the slot immediately behind the floppy disk controller is used, you may want to re-arrange some of the other boards in your computer so that this slot is available. If it is empty but there is a blank metal bracket covering the side of the slot on the case, go ahead and remove it now as the Option Board has its own metal bracket.

Before installing the Option Board, some jumpers must be moved and the Option Board cable must be reversed (it came to you configured for installation in an IBM PC or PC/XT). The modification is simple, however. Here's how to do it:

Remove the short cable from the connector labeled J2 on the Option Board. You will re-install it onto the J3 connector in a moment, but first, you need to change a jumper on the board.

Near the end of the board farthest away from the metal bracket you should see a row of small jumpers labeled "PC/XT" at one end and "AT/Compaq" at the other. This jumper block has several pins and plastic jumpers, each one connecting the top pin to the middle pin. This means the Option Board is currently configured to be installed into an IBM PC or PC/XT. You need to configure it now for your Compaq computer. To do this, carefully remove each of the plastic jumpers one at a time and connect them to the middle and bottom pins (closest to the AT/Compaq lettering on the board). Note that the plastic jumpers should be installed vertically across the pins, not horizontally. In other words, each of the plastic jumpers should connect one of the middle pins to one of the bottom pins.

Next, you need to reinstall the cable on the Option Board. Take the short cable you removed from the board earlier and plug it in to the end of the Option Board (the gold-plated connector labeled J3). The red line on the cable should be closest to the top of the Option Board. Note that this is different from the way the cable was installed on the board originally. This is necessary as the cable coming from your disk drives needs to plug into connector J2 on the Option

Board instead of J3.

Now install the Option Board into the computer. Insert it into the first free slot behind the floppy disk controller (slot #2).

Before you can make the final connections, you need to replace the short cable coming from the floppy disk drives that used to plug into the floppy disk controller as it will not be long enough to connect to the Option Board. Take a moment now to study how the current drive cable connects to the floppy disk drives. Notice that the Compaq drive cable supplied with the Option Board (in Compaq versions only) is identical to the cable already in your computer except that it is longer. Carefully remove the current drive cable and replace it now with the longer cable. Connect the other end of this cable to the 34 pin connector (J2) on the Option Board. The red line should be closest to the top of the Option Board. (You may want to momentarily remove the Option Board to plug the drive cable into the J2 connector as it is a fairly tight fit between the option board and the floppy disk controller board. When you have made this connection, go ahead and re-insert the Option Board into slot #2.)

Lastly, connect the cable coming from the Option Board to the floppy disk controller. The red line should be on the left, or the side farthest away from the metal bracket on the floppy disk controller.

When you are done, double check the connections. The cable coming from the floppy disk drives should connect to the Option Board. The Option Board's cable should connect to the floppy disk controller.

Make sure that all the boards are firmly seated into their expansion slots, if they are not, you could damage them or the PC when it is turned on. Now re-install the cover on the Compaq and connect the power cord and any printer, modem, or other cables you disconnected to install the

Option Board.

That's it! The Copy II PC Option Board is now installed in your system. And your computer can now use the extra capability of the version of Copy II PC that is included with the Option Board. Double check that everything has been correctly installed by turning on your computer and verifying that it functions normally. Try running your word processor, spreadsheet or whatever you ordinarily use. Your computer should operate no differently than it did before the Option Board was installed.

If it doesn't, quickly turn off the power! Remove the cover, and verify that all the cables are installed correctly, and that the boards are seated tight into their expansion slots. If all looks OK, but you still can't get your computer to work, see the section titled: "What If The Board Doesn't Work" at the end of this manual.

INSTALLATION IN AN IBM PC/AT

Note: While the Option Board can be installed into an IBM PC/AT, it will not work with (read from or write to) a high capacity (1.2 meg.) drive. Your AT must have at least one 360 KB floppy disk drive.

For location purposes, let's call the slot nearest the power supply slot #1, and the slot nearest the left side of the PC slot #8.

Depending upon the setup of your PC/AT, these slots may already be occupied by other expansion boards. Whatever else you've got working in your PC, in all probability, at least two of these slots are taken up with 1) a video display card which sends information to your monitor, and 2) a disk controller card which controls the operation of the IBM's floppy disk and hard disk drives.

The Copy II PC Option Board will also be installed into one of these expansion slots. Were it not for a few physical limitations, any slot at all would accommodate the board. However, the Option Board must not only be installed into one of the available expansion slots, but it must also be cabled to the disk controller card.

Because of the length of the internal cables necessary for the hook-up, we recommend installing the Option Board in the slot immediately to the left of the disk controller board (slot #2).

Locate the disk controller board now. It is a full-length board (usually in slot #1) with at least one set of cables plugged into the middle of the board. (If you have a hard disk, there will be several sets of cables, some going to the floppy drives, some going to the hard disk.) In either case, the floppy drive cable connects to the jumper labeled "J1" on the PC/AT disk drive controller.

If the slot immediately to the left of the disk controller is used, you will have to re-arrange some of the other boards in your computer so that this slot is available.

Before you can install the Option Board, you need to change some jumpers and reverse the Option Board cable (as it came to you, it was configured for installation in an IBM PC or PC/XT). Fortunately, the changes are simple. Here's how to do them:

First, remove the short cable from the connector labeled J2 on the Option Board. You will re-install it onto the J3 connector in a moment, but first, you need to change a jumper on the board.

Near the end of the board farthest away from the metal bracket you should see a row of small jumpers labeled "PC/XT" at one end and "AT/Compaq" at the other. This jumper block has several pins and plastic jumpers, each one connecting the top pin to the middle pin. This means the

Option Board is currently configured to be installed into an IBM PC or PC/XT. You need to configure it now for your IBM PC/AT computer. To do this, carefully remove each of the plastic jumpers one at a time and connect them to the middle and bottom pins (closest to the AT/Compaq lettering on the board). Note that the plastic jumpers should be installed vertically across the pins, not horizontally. In other words, each of the plastic jumpers should connect one of the middle pins to one of the bottom pins.

Next, you need to reinstall the cable on the Option Board. Take the short cable you just removed from the board and plug it into the end of the board (the gold-plated connector labeled J3). The red line on the cable should be closest to the top of the Option Board. Note that this is different from the way the cable was installed on the board originally. This is necessary as the cable coming from your disk drives needs to plug into connector J2 on the Option Board instead of J3.

Now you are ready to connect the Option Board to the floppy disk drives. This is done by plugging in the cable coming from the back of the floppy disk drives into the J2 connector on the Option Board. On the PC/AT, this cable is fairly short, being designed only to plug into the disk controller connector at J1. Now, however, we need to stretch it just a bit to go over the top of the disk controller and plug into the Option Board. To make it fit, it may be necessary to cut the plastic tape that holds the various cables together. The fit is tight, but by careful folding of the cable, you can plug it into the J2 connector on the Option Board and still have enough flexibility to plug the Option Board into slot #2 (immediately to the left of the Option Board).

After you have installed the Option Board into slot #2, you have just one connection left to make. The cable that leaves the end of the Option Board needs to plug into the disk controller board at J1 (which is where the floppy disk drive cable used to connect). The red line on the cable

should be up, towards the top of the connector on the disk controller board.

When you are done, double check the connections. The cable coming from the floppy disk drives should connect to the Option Board. The Option Board's cable should connect to the floppy disk controller.

Now, screw the Option Board into the chassis. Make sure that all the boards are firmly seated into their expansion slots, if they are not, you could damage them or the PC when it is turned on. Now re-install the cover on the computer and connect the power code and any printer, modem, or other cables you disconnected to install the Option Board.

That's it! The Copy II PC Option Board is now installed in your system. And your computer can now use the extra capability of the version of Copy II PC that is included with the Option Board. Double check that everything has been correctly installed by turning on your computer and verifying that it functions normally. Try running your word processor, spreadsheet or whatever you ordinarily use. Your computer should operate no differently than it did before the Option Board was installed.

If it doesn't, quickly turn off the power! Remove the cover, and verify that all the cables are installed correctly, and that the boards are seated tight into their expansion slots. If all looks OK, but you still can't get your computer to work, see the section titled: "What If The Board Doesn't Work" at the end of this manual.

INSTALLATION INTO OTHER COMPUTERS

The Copy II PC Option Board may be successfully installed into many other computers. Although we can't provide support for computers we don't have access to, here are a few "rules of thumb" to follow if you are attempting to install

the Option Board into a computer not listed in this manual.

1. If the floppy disk controller has an "edge" style connector (it has gold-edged fingers that the cable plugs onto), then follow the installation procedures for the IBM PC and PC/XT.
2. If the floppy disk controller has a "pin" style connector (a connector with a double row of metal pins), then follow the installation procedures for the IBM PC/AT.
3. It really doesn't matter what slot the Option Board is plugged into. We recommend slots that prove to be the easiest way to get all the cables to reach, but if you find a better way, go ahead and use it.
4. The Zenith 150 computer may require you to break off a pin on the J2 connector of the Option Board. It is O.K. to do this, as all the pins on left side of this connector are unused. (One is broken off already as needed by the IBM PC/AT.)
5. The HP Vectra has been tested by H.P. They tell us that you need to watch carefully how you remove the cables as the red line isn't always toward the top as it is in other computers. Also, you will need the Compaq portable cable as the existing cables are not quite long enough.

Here are some computers our customers have told us the Option Board will work with: Magnum PC, Leading Edge model D and M, Eagle XL Spirit Portable, NCR PC 4, Sanyo MBC 775, Tandy 1200 (older models with separate floppy disk controller card), Zenith 150, and the HP Vectra (may need the Compaq portable cable). We have had mixed reports on the AT&T 6300.

Here are some computers that do not work with the Option Board: Sanyo MBC 665 and 886, Tandy 1000, Tandy 1200 (newer models with the floppy disk controller on the motherboard) and the Televideo TPC II. (If you have one of these

computers, don't despair. We'll have a version of the OPTION BOARD available for them soon!

Here are some computers that will work, but require you to make (or have a dealer make for you) extra long cables: Columbia 1600, and Corona PC.

MAKING BACKUPS WITH THE OPTION BOARD

The disk supplied with the OPTION BOARD contains a special version of COPY II PC for use only with the OPTION BOARD. It is called "TC.COM". We gave it a different name so you could copy it onto your original COPY II PC diskette or hard disk without erasing the standard COPY II PC program. In case you are interested, the "TC" stands for "Transition Copier", which is a bit technical, but describes the nature of the COPY II PC OPTION BOARD. In general terms, it copies the magnetic transitions from one diskette to another without looking for anything in particular. As such, it is a simpler, but more powerful type of copying device, as it does not have to operate under the normal limitations of the standard disk circuitry.

The COPY II PC OPTION BOARD diskette is not self-booting. We suggest that you copy the files from this disk onto your COPY II PC diskette using the standard DOS copy command. For example, put your OPTION BOARD disk in drive A, and your standard COPY II PC disk in drive B, and type:

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COPY A:T?.COM B:
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You can also copy the files onto your hard disk (if you have one) and run them from there. Note: the above step will not transfer all the files onto your COPY II PC disk as there is not enough room. However, unless you have an Intel "Above Board" or diskette autoloader, you won't need (or want) them.

TC works just like the COPY II PC you are used to. It has a

few more options and a new menu mode, but for the most part you can ignore these and use it just as you have used COPY II PC in the past. The only requirement is that the OPTION BOARD must be installed in the computer when you use TC. It does not need to be in the computer that runs the copy, only in the computer that makes the copy.

Here is a description of the new features of TC:

TC d1: d2: /1 /Snn /Enn /Knn-nn /Wnn-nn /BW

All of the above parameters are optional. In fact, if you don't specify the drive parameters (d1: or d2:), TC will display a menu that will present you with all the above options (except color or b/w display). You can, however, enter them on the command line as shown above.

It should be noted that when using TC, you will almost never need to change parameters. You can duplicate in excess of 98 percent of all copy-protected software just using the default (standard) mode of TC - it's that simple.

Each of the optional parameters is described below:

Parameter	Description
d1	This is the source drive (the one containing the original diskette)
d2	This is the target drive (the one containing the blank diskette to be copied onto).
/1	Specifies a single-sided copy. It is not necessary to use the /1 parameter on a single sided disk, it just speeds up the backup process.
/Snn	Allows you to specify the start track (first track to copy). If you don't use this parameter, it will start with track 0 (the first track).
/Enn	Allows you to specify the end track (last track to copy). If you don't use this parameter, it will end with track 27 (in HEX) This is the last track that is usable on most IBM drives.
/Knn-nn	Tells TC to preserve the length of the track or tracks specified. If no tracks are specified after the /K, all track lengths will be preserved. Note: do not use this option unless required as it can affect the reliability of the backup disk.
/Wnn-nn	Tells TC to look for and re-produce "weak bits". These are bits that read back differently each time and are used in some protection schemes.
/bw	Tells TC to use black and white mode (no color).

Why does TC let you specify the Start and End tracks to copy? As a simple convenience only. In the event you get any errors while copying the disk (we'll explain these in a bit), you can select to copy only the tracks which had

problems. Actually, you will probably almost never need to do this, but in case you do...

Here are some examples of using TC with various parameters:

TC A: B: /1

This tells TC that the source diskette is single sided, and expects the original disk to be in drive A>, and the duplicate to be in drive B>.

TC A: /W07-09

This will do a single drive copy using drive A>, and will check for weak bits on tracks 7 to 9. It will prompt you to insert the original and duplicate diskettes as required.

TC B: A: /E29

This will expect the source disk (original disk) to be in drive B>, and the target disk (copy) to be in drive A>. It will also copy up to track 29 which is available on some IBM disk drives.

USING THE MENU MODE OF TC:

If you like, you can use the menu mode of TC to set the source and target drives, as well as specify a single drive copy or set the starting and ending tracks to copy. To do so, simply type TC. After displaying a short message on the copyright law, you will be asked to press return. Then you should see a menu that looks similar to this:

```

-----
                TRANSCOPY Vx.xx
(C) 1985 CENTRAL POINT SOFTWARE, INC.
-----

```

```

Source drive:   A
Target drive:  B

Starting track: 00
Ending track:  27

Track increment: 01

Number of sides: 2

Keep track length? N
Copy weak bits?   N
Verify write?     Y

```

```

-----
                MESSAGES
-----
Enter letter (A or B) of
drive that will contain the
source diskette.
-----

```

- INSERT DISKETTES -

```

SPACE to Begin      Q to Quit
ESC   to Restart    ENTER to Accept

```

(Note: Actually, you will see this menu any time you start TC without using the drive parameters. For example, TC /1 /bw will also present the menu, but with the number of sides set to 1 and in black and white mode.)

On the left side of the screen are prompts for each of the parameters described earlier. The MESSAGES box will display a short description of each option. You can press the ENTER

(sometimes called RETURN) key to move to the desired line and enter the change. For example, if you wanted to tell TC that the original is a single sided diskette, you would press the enter key 5 times to place it at the line that says "Number of sides: 2". The cursor will stop over the 2. Now simply type a 1. You could then press the SPACE bar to begin copying this disk. If you make a mistake, press ESC (ESCAPE) to restart. If you decide not to make a copy at this time, press Q (for Quit).

THE TC TRACK STATUS LINE:

On the bottom of the screen while making a backup you will see a track status display that looks like this:

```

HEX  000000000000000011111111111111222222222
TRACK 0123456789ABCDEF0123456789ABCDEF0123456789
-----
SIDE 0:
SIDE 1:

```

The tracks are numbered in hexadecimal. If you don't know what "hexadecimal" is, don't worry. You won't need to know to make backups.

As each track is read, you will see a 'R', then an 'A' appear briefly on the screen. The 'R' stands for reading, and the 'A' stands for analyzing. The more parameters you have selected, the longer the 'A' will stay on the screen for each track, as it has to do more work. It will read side 0 of each track first, then move to side 1 before stepping to the next track (unless you have told it you are making a single-sided copy).

As each track is written, you will see a 'W' then a 'V' (unless you have turned off the write VERIFY option from the menu mode of TC or selected the "Copy Weak Bits" option

which also turns off write verify), then a '.' when the track has been written. The 'W' stands for writing, and the 'V' stands for verifying. The '.' means the track has been written and optionally verified.

If the 'V' stays on the display for any track, it means that a write verify error occurred. This can indicate that the target diskette is bad. If you see some 'V's on the track display after the backup is done, we suggest you try the duplicate disk before deciding it is bad. Some computers tend to report more spurious 'V' errors than others. You might also occasionally see an 'L' error left on the screen. This is a warning only, and means that TC could not keep the track length exactly. This will only occur if you use the Keep Track Length option.

As each track is copied (using the menu mode), you will see the word "Length" and some numbers appear in the upper middle of the screen. This is the length (number of bytes) of each track. The numbers will usually start with "18" and understanding them isn't really necessary at all. We occasionally use them to help us figure out new protection schemes, etc.

MAKING BACKUPS OF NON-IBM DISKETTES

TC can be used to create backups of nearly all IBM PC compatible disks. It can also duplicate some other formats. Because TC simply copies magnetic transitions from one disk to another, it is not too concerned with how those transitions are created or ordered. Diskette formats can be grouped into three basic types:

MFM example: IBM PC, Kaypro
 FM example: Atari
 GCR example: Apple

The option board and TC can copy all of the above formats. (Standard Apple and Atari formats are copied readily. The

TC software may not be able to copy all protected Apple and Atari disks, however. It also can't copy the back side of "flippy" diskettes.) The only major format it can not handle is Commodore. This is due to the fact that the commodore "data rate" (similar to drive speed) varies significantly from an IBM disk. It should be noted that not all IBM drives are capable of reliably reading and writing GCR formats (Apple disks). The only way to know is to try.

WHAT IF THE BACKUPS DON'T WORK?

TC should make working backups of virtually all IBM PC protected diskettes.

If you can't make a backup, try it again. Since TC doesn't do any verification during disk reads, it might only be a glitch that caused the backup not to run. If this still doesn't work, try the following steps:

- 1) Try reversing drives (if you have two). For example, if you made the backup from drive A to drive B the first time, try it again using drive B as the source drive and drive A as the target. Some drives are better at reading or writing than others and this may do the trick.
- 2) Try making the backup again using a track end of 29. Most older IBM's have drives that could step out this far (two tracks beyond the normal end of the disk), and some protection schemes put the stuff they are looking for out there. We didn't make the default track end 29 as this can interfere with making single drive copies on newer drives that can't step beyond track 27.
- 3) Try making the copy using the "weak bit" parameter. You can do this by either answering "Y" at this question in the menu mode or using the /W parameter on the command line (e.g. TC A: B: /W).
- 4) Try making the copy using the "keep track length"

parameter. This will retain the number of bytes on the track and the timing from sector to sector. (Note: some drives may have trouble using this option, as it actually slightly varies the speed at which each byte of data is written.) You can use this option by either answering "Y" at this question in the menu mode or by using the /K parameter on the command line (e.g. TC A: B: /K).

If this still doesn't work, one of the following things may be happening:

- 1) The original diskette may use a protection scheme that "modifies" the diskette. As an example, it is possible to burn a small hole in the diskette, then check for the presence of the hole. The duplicate disk, of course, will not have the hole (as disk drives are not designed to put holes in diskettes), so the copy will not function. Unfortunately, the Option Board can not directly make backups of these disks as it can't burn holes in diskettes either.

Disks that use this protection scheme will frequently have a message on the label or in the documentation saying "DO NOT WRITE PROTECT THIS DISK" as they must write to the original as part of the verification process. Examples of programs that have used this type of protection in the past include DBASE /// Ver. 1.0 and Framework Ver. 1.0. The newer versions of these programs (Ver. 1.1) will copy easily with the Option Board.

In order to make a backup of programs protected by damaging the diskette itself, you will need to scratch a blank disk at approximately the same place. (Note: This process only works if there is a single hole burned on the disk. If you see more than one physical blemish as you spin the disk in its jacket, the following procedure will not work.)

If you are feel you have a steady hand and a few extra diskettes you don't mind wasting, you might be able to make a disk with the required hole. To do so requires that you

scratch the surface of a blank disk at approximately the same place that the defect occurs on the original disk. The defect is usually put on the back side (the side without a label) of the disk and becomes visible by rotating the disk in its jacket while looking at the magnetic surface through the finger-like hole in the disk jacket. If the option board can't copy a disk, you will probably see a small round spot on the disk that looks like a burn (it doesn't go all the way through).

If you decide to attempt to re-create the "hole" on a blank disk so it can be used as a backup of the original, note the approximate position of the hole in the finger-like opening in the disk jacket. Now, using a small pin, gently scrape a similar hole on the blank disk at as close to the same spot as you can. Be careful not to poke through the disk or damage the media on the other side. This really takes patience and a steady hand (and quite often a couple of "practice" disks to get it right). The scratch you make doesn't need to look like the original hole. In fact, it's better if it is just a thin line. It's probably OK if it's a little longer (parallel with the finger-like opening in the disk jacket) than the original hole. It's probably not OK if it is wider. It is definitely not OK if you bend or "dimple" the disk itself. Remember, you are only trying to scrape the magnetic coating.

When you think you have created the perfect "scratch", try making a backup of the original disk again, using your damaged diskette as the target. You will need to select the "Copy Weak Bits?" option (by typing a "Y" at this prompt or using the /W parameter).

TC will do it's best to line up your scratch with the bad spot it finds on the original disk. It will also try to avoid your scratch on adjacent tracks (assuming, of course, your scratch was less than perfect).

2) If none of the above methods help, we may need to adjust the TC program to handle a new protection scheme. Please drop us a quick note stating what program (and version number) you were trying to backup. We'll take a look into the problem, and probably come up with a new version of TC to handle it.

USING THE OPTION BOARD EDITOR

The Copy II PC Option Board includes a track editor called TE.COM. The 'TE' stands for 'Transition Editor'. It allows you to see the format of the original disk before it is (optionally) written.

TE.COM will not help you copy disks that TC.COM can't. It is not necessary to understand or use TE.COM to make backups. TE has been provided for people with experience working with disk drives and copy-protection schemes. Do not feel you have to understand it to use the Option Board effectively. It is simply provided for the curious...

TE.COM will let you do the following:

- 1) Look at the data on any track in both HEX and ASCII.
- 2) Modify the data on any track. If data is changed within a sector, the corresponding CRC bytes will also be recalculated so the sector can be read without an error.
- 3) "Inspect" a track. This will list on the PC's screen all sector IDs found on that track. They will be displayed regardless of any errors in the ID or data fields, and will show all ID information including CRC errors and data address marks.
- 4) Look at both data and clock bits. Any byte with invalid clocks will be shown highlighted for easier reading.

To use TE.COM, type:

TE d: /bw

The d: is the drive which contains the disk to be edited or viewed, and is optional. If not specified, TE.COM will use drive B. The /bw parameter is also optional and instructs the editor not to use color mode. The only time you will need to use /bw is if you use the IBM color display adapter with a non-color monitor.

Once TE.COM has been started, you should see a screen similar to the one below:

```

Using drive b      Track 00h (0)      Side 0      View Data.
Track Start: 0000  Track End: 186A      Track Length = 186B      Index: 186A

0000  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
0010  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
0020  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
0030  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
0040  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
0050  4E 4E 4E 4E 4E 00 00 00 00 00 00 00 00 00  NNNNN.....
0060  00 C2 C2 C2 FC 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  .000.NNNNNNNNNNNN
0070  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
0080  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
0090  4E 4E 4E 4E 4E 4E 4E 00 00 00 00 00 00 00 00  NNNNNNN.....
00A0  00 00 00 A1 A1 A1 FE 00 00 01 02 CA 6F 4E 4E 4E  ...AAA....00NNN
00B0  4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E  NNNNNNNNNNNNNNNN
00C0  4E 4E 4E 00 00 00 00 00 00 00 00 00 00 00 A1  NNN.....A
00D0  A1 A1 FB EB 2C 90 49 42 4D 20 20 32 2E 30 00 02  AA.S,.IBM 2.0..
00E0  02 01 00 02 70 00 D0 02  FD 02 00 09 00 02 00 00  ....P.A.....
00F0  00 00 00 0A DF 02 25 02  09 2A FF 50 F6 00 02 CD  ....0....* P...e
      Pointer = 0040

```

F1=help 2=drive 3/4=data/clock 5/6=start/end 7/8=set start/end 9=edit

This is the main display. The numbers on the left are the offset into the track buffer (in hex). The second and third groups of numbers from the left are the actual track bytes. (You won't see anything but zeros here until you read data from a track - see the "R" command below.) The last group of characters on the right are the ASCII representations of the track data.

On the bottom of the screen are listed the function key commands. Pressing the F1 key will print a complete list of commands as shown below:

TRANSEEDIT HELP SCREEN

- F1 display this help screen
- F2 Select drive number
- F3 Display Data bytes
- F4 Display Clock bytes
- F5 Move pointer to track start
- F6 Move pointer to track end
- F7 Set track start to current pointer position
- F8 Set track end to current pointer position
- F9 Toggle between Edit and View modes
- F10 Exit to DOS

- R Read track
- W Write track
- I Inspect track
- ^B Move pointer to beginning of buffer
- ^E Move pointer to end of buffer

Press ENTER to continue...

The arrow keys on the numeric keypad will move the current pointer position. Page up and Page down, Home and End all perform their normal cursor movement functions.

The "R" command (read) is what gets the editor going. When you press "R", TE will ask you what track and side you want to look at (see the next section, Format of IBM PC disks).

You may see the letters "s", "e", and "i" between the Hex and ASCII display areas. "s" means this is the start of the track. "e" means this is the end of the track. "i" means this is where the physical index hole was detected.

TE does both a read and an analyze when you tell it to read a track. It will separate the data from the clock bits and set the start and end of the track. You can do more than just look. Pressing the F9 function key will put you into edit mode. Pressing it again will take you back to the view mode. If you want, you can use the "W" (write) command to re-write the track with your changes.

You can also specify which drive to work with by pressing the F2 key while you are in the editor. This allows you to read from one disk, edit the track, and write it to another disk if you like.

If you use the editor to change data in a sector, make sure you press the F9 key again to leave edit mode before writing the track. This will cause the editor to recalculate the sector's CRC. If you don't do this, the sector will be unreadable by DOS or any other program.

If you plan to use the editor, we suggest you read the next section which will give you an introduction to the format of IBM PC disks.

Note: At this time, TE cannot read Apple or Atari format disks.

FORMAT OF IBM PC DISKETTES

An IBM PC disk is divided into 40 tracks, numbered 0 to 27 (in hex). Each track normally has either 8 or 9 sectors, depending upon which DOS was used to create it. Each sector contains 512 bytes of data (although this can be changed and often is with protection schemes). Any disk can also use either 1 or both sides, resulting in up to 80 tracks of data. Because the disk controller needs to be able to find any given sector of data very quickly, each sector is given a unique ID containing all the above information.

On an even lower level, the floppy disk controller needs to be able to distinguish ID's from data. For example, you might have a pattern of data in a sector that could also be interpreted as a sector ID. Special kinds of bytes are therefore needed to eliminate this potential confusion. These are called "sync bytes". There are actually two kinds of sync bytes that you can see when you look at a track; a sequence of 00 bytes followed by three A1's. The A1's are a special kind of byte that have what is called "missing clocks". All this means is that they violate the normal recording rules. The editor will highlight these bytes to make them easier to find.

(Note: you may see other highlighted bytes, especially right after sector ID's and data fields. These are normal and are the "splice points" caused by writing a data field. Because these splice points produce a few bytes of unreliable data it is likely that they, too, will violate the normal recording rules and will therefore be highlighted by the editor.)

Whenever you see the three highlighted A1's in a row, you know one of two things is next: the sector ID or the sector Data. If it is an ID, the next byte, often referred to as an "address mark" will be a FE. If it is the data portion of a sector, it will be a FB.

If you take a look at a standard disk with the editor, you

will see an equal number of both ID's and Data fields on the disk. In fact, they come in pairs, with the short ID field preceding each sector's data.

You should also see one last type of byte on the disk. Like sync bytes, they come grouped together, but serve a different purpose. They are called "gap" bytes and are usually 4E's. As their name suggests, they form a gap or buffer around the ID and Data portions of a sector. They are needed to provide just a little bit of extra space in case something is written at not quite the right time. For example, your drive may be spinning slightly faster or slower than the drive that originally formatted the disk. Without gap bytes to take up the difference, one sector could partially overwrite another, making at least one of them unreadable.

In summary then, a standard sector looks something like this:

```
GAP BYTES      4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E
SYNC BYTES     00 00 00 00 00 00 00 00 00 A1 A1 A1
SECTOR ID      FE 00 01 08 02 DB B9 4E 4E 4E 4E 4E
GAP BYTES      4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E 4E
SYNC BYTES     00 00 00 00 00 00 00 00 00 A1 A1 A1
SECTOR DATA   FB . . .
```

After the FB would be the 512 (200 hex) data bytes stored in the sector. If the track contains a text file filled with ASCII characters, you can see them on the right side of the display in the editor. You should be able to recognize some of the data you have stored.

After both the ID and Data are a couple of bytes called "CRC"s. These special bytes form a type of check on the data that verifies that it is OK. Whenever you see the ominous message "Error Reading Drive n" from DOS, it is actually telling you that the CRC bytes didn't match what it expected for that sector. Both ID's and Data fields have CRC bytes. The editor will automatically recalculate them

for you if you change any of the data in a data field.

Here's how to read the sector ID information: Immediately following the FE are 4 bytes. These store the Track, Side, Sector, and Size information described earlier. In the above example, these bytes are 00 01 08 02. This means that it is the sector ID for sector eight on track 0, side 1. The last byte also tells us that it is a normal 512 bytes sector. Here's a simple table you can use to determine the size from the size byte in the ID field:

SIZE	ID	BYTE	ACTUAL SIZE
	00		128
	01		256
	02		512
	03		1,024
	04		2,048
	05		4,096
	06		8,192

Actually, only slightly more than 6,000 bytes can fit on a track, so a size of 06 is impossible, although it is used in the ID's on some protected diskettes. Sometimes, the sector ID will say the sector is one size when in reality it is another. This is done only to allow the standard disk controller to read special data that might be imbedded in gaps (as part of a protection scheme).

You can use the editor's "Inspect" command to do a lot of the work of decoding sector ID's for you. It will look through the entire track in memory, finding and decoding all the sector ID's it finds. It will even tell you if there are any errors in the ID or Data fields, usually a dead giveaway of either a protection scheme or damaged disk.

While this overview has been short, it should at least get you started using the editor. If you are curious enough to want to use it, the best way to start is to try it out on a standard disk. If your experimentations will include writing to a disk, make sure it is not one with important

data or programs!

WHAT IF THE BOARD DOESN'T WORK?

If you experience problems during or after installation of the OPTION BOARD, give us a call at (503) 244-5782 (our hours are 8:30 to 5:30 West Coast time). We have technical support people on staff who can often walk you through a confusing part of the installation and help you get everything running. Before you call, please double check your installation to see if it is something simple. For example, the most common installation problem is plugging in the cables upside down. The symptom of this is drives that run all the time and the computer not booting anything. If this happens, check that the cables are installed properly.

USING AN AUTOLOADER

Note: This section is for software publishers or software duplication firms who wish to use the Option Board in a production environment. It is fairly technical in nature and requires additional hardware.

If you are the owner of a software program or are authorized to duplicate a software program for another, you may take advantage of the diskette autoloader support provided by this package. There are several versions of the TC diskette duplication program on the supplied disk. These are for the Mountain 3200 and Texor DiskCopy autoloaders (TCMTN.COM and TCTXR.COM respectively). There is also a version for users who do not have an autoloader, but wish to make multiple copies of a program without re-reading the master each time (TCMAN.COM).

To use any of these versions of the TC.COM program effectively, you will need two additional pieces of hardware. 1) a supported diskette autoloader, and 2) an Intel Above Board (or equivalent) with 2 megabytes of memory

installed. The extra memory is required as the OPTION BOARD cannot fit even a single sided disk into a 640K IBM PC. If it must re-read the master each time, the duplication process will be much slower and less reliable than need be.

You may also need a cable to connect the PC to the autoloader. The drive in the autoloader must be configured as the PC's "B" drive. You will need a cable that connects from the drive B connector inside the PC to the autoloader. Mountain Computer makes such a cable for use in using a Compaq portable computer with their autoloader. If you do not already have this cable, you will need to order it from Mountain.

The Mountain 3200 autoloader should have it's internal switch set as follows: Switches 1, 5, and 6 should be open, all others closed. (Open means pressed down nearest the side that says "open").

The Texor DiskCopy should be run at 1200 baud (consult your operator's manual for instructions on setting the baud rate).

Next, you must configure your DOS to support the Intel Above Board. Run the program SETUPAB as described in the Above Board manual. Then you must make a small change to the CONFIG.SYS program it creates for you. It should look like this before you make the change:

```
DEVICE=EMM.SYS Mx I5
```

Where the "x" above is probably a "0". You need to change it to either a "3" or "7" (this tells the driver to put the bank-switched memory on a 64K page boundary which is required by our software). You can make this change by typing the following from the keyboard after booting the disk you just made with the SETUPAB program:


```
COPY CON: CONFIG.SYS
DEVICE=EMM.SYS M3 I5
<F6>
```

Where the <F6> above means "press the F6 function key". Now each time you boot this disk, TCxxx will be able to use the Above Board's memory.

When run, the TCxxx program will first check that the autoloader is present then read the entire master disk into the Above Board's memory. It will then write the first duplicate disk and put it into the good bin if it verified identical to the original, or the bad bin otherwise. It will continue this process until an error occurs or the autoloader runs out of disks. All error messages are displayed in the message box and it will keep a count of the good and bad diskettes it has processed.

Important note: Remember that the TC software does not do any read verification as the master is loaded into memory. This means that if there is a marginal spot on the master disk that sometimes reads in incorrectly, TC will not detect it and all copies made may contain this error (except that it won't be marginal anymore, it will always be bad). Therefore, it is absolutely necessary to check the first copy made against the master to make sure no read errors occurred. This can be done by running the DOS program "DISKCOMP" to verify that all standard sectors are identical. Any non-standard tracks can be verified by booting the copy and making sure it runs. All copies made will be identical to the first copy as the TC program does do write verification. It will not be necessary to hand-check subsequent copies unless the copy process is stopped and TC reloads the master into memory.

REPAIR OF THE COPY II PC OPTION BOARD:

The OPTION BOARD is warrantied for a period of 90 days from date of purchase against manufacturing defects. This warranty does not include damage due to accidents, misuse, or improper installation (including attempting to install the board into a non-supported computer).

If you feel the board might be defective, give us a call before returning it. The problem might be something simple that our technical support department can help you with over the phone. If they can't get it working for you, they'll give you an RMA (Returned Merchandise Authorization) number and instructions for returning the board for repair or replacement at that time.

If you need to return the Option Board to us, please package it in its original box (or suitable container) and ship it prepaid (and insured!) to:

CENTRAL POINT SOFTWARE, INC.
REPAIR DEPARTMENT
RMA # (write your RMA number here)
9700 SW CAPITOL HWY, SUITE 100
PORTLAND, OR 97219

Please include \$40 to cover the cost of repairing the board if it is out of warranty. Also include a short description of the problem. We'll repair or replace the board and return it to you.

Notes

REPAIR OF THE COPY UNIT OPTION BOARD

The OPTION BOARD is warranted for a period of 90 days from date of purchase against manufacturing defect. The warranty does not include damage due to accidental mishandling, misuse or improper installation (including attempting to install the board into a non-supported computer).

If you find the board might be defective, you should first try to determine if the problem might be something other than the board. If you can't determine the problem, please call the phone. If you can't determine the problem, please call the phone and give you an RMA (Return Merchandise Authorization) number and instructions for returning the board for repair. Such an RMA is not required if the board is returned to the manufacturer.

If you need to return the Optionboard to the manufacturer, you should place it in its original box (or suitable container) and ship it prepaid (and insured) to the address below.

CENTRAL POINT SYSTEMS INC. 10000 15th Street N.E. Portland, OR 97220
RMA # (write your RMA number here) also include the box to 9100 SW CAPITOL HWY, PORTLAND, OR 97220

Please include this information when returning the board. If it is out of warranty, please include a statement describing the problem. We'll return the board and you'll receive a refund if you return it. If you return the board and you'll receive a refund if you return it. If you return the board and you'll receive a refund if you return it.

Notes