Apple Computer System and Peripheral Repair Information

1982

LEVEL I TRAINING
PROFILE & APPLE ///

MODULE DD5

REVISION JANUARY 1982

Disk Drive Calibration

Objective

GIVEN: Golden Disk Drive
Alps And Shugart Disk Drives To Be Adjusted
An Apple II
Disk Interface Card
Tektronix Model T922 Oscilloscope
Disk Alignment Aid Diskette (Apple P/N 652-0199)
Alignment Diskette (Apple P/N 652-0150)
Small Flat Blade Screwdriver
Medium Flat Blade Screwdriver
Small Phillips Screwdriver
Medium Phillips Screwdriver

ACTION: Set up and adjust oscilloscope, check head radial adjustment and adjust stepper motor on both Alps and Shugart drives, check the azimuth and amplitude measurements, check the comparator offset and adjust potentiometers R21 (or 33) and R28.

CRITERION: Adjustments must be made within tolerances.

CRITERION TEST DESCRIPTION: Have your course manager check the oscilloscope setup and calibration, head radial adjustment for both Alps and Shugart drives, the azimuth and amplitude test procedures, and the comparator offset adjustment. He will make sure that the setups and tests have been performed properly and that the adjustments are made within the proper tolerances.

HERE'S WHAT TO DO:

1. Obtain the oscilloscope and necessary disk drive(s) from your course manager.
2. Read through Module DD5.
3. Go to videotape DD5 where directed.
4. Practice the procedures in this module.
5. Demonstrate the skills to your course manager.

GO TO VIDEOTAPE DD5 AND VIEW SEGMENT ONE.

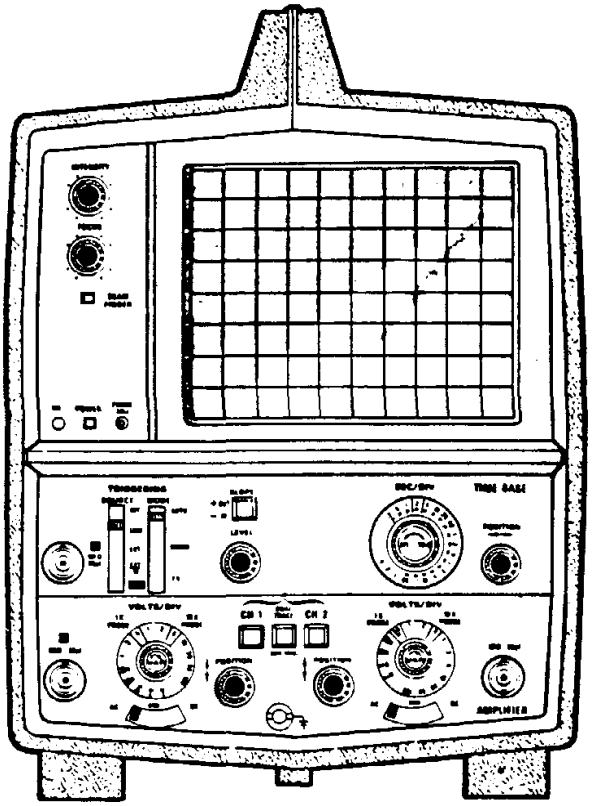


FIGURE 1

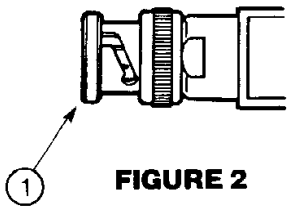


FIGURE 2

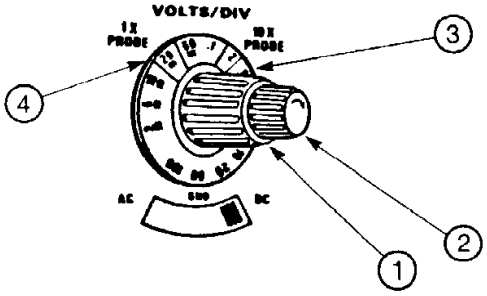


FIGURE 1A

Setting Up The Apple And The Disk Drives

1. Power down the Apple.
2. Remove the lid of the Apple.
3. Remove the cover of the target disk drive.
4. Free the cable from the cable holder mounted on the inside back plate of the target disk drive.
5. Turn the target disk drive over and remove the four Phillips head screws on the base. Set the screws aside. Lift off the base.
6. Check to see that the power on the Apple is off. Unplug the disk interface card, connect the ribbon cable from the target drive to the Drive 2 position on the disk interface card.
7. Connect the ribbon cable from the "golden" drive to the Drive 1 position on the disk interface card.
8. Make sure the power light on the Apple is off, then plug in the interface card into slot 6 of the Apple.

Setting Up The Oscilloscope

9. Turn the oscilloscope power on. (Figure 1, #1).
10. Plug the BNC connector probe (Figure 2, #1) into channel 2 of the Oscilloscope. (Figure 1, #2).
11. Put the mode switch on "AUTO". (Figure 1, #3).
12. Set the display signal source for the input channel being used, in this case channel 2. (Figure 1, #4).
13. Set the Voltage/Division dial (Figure 1, #5) to .2 volts by turning the back section of the dial (Figure 1A, #1).

CAUTION: Do not turn the front section of the dial (Figure 1A, #2) as this will cause the scope to go out of calibration.

NOTE: Use the 10X positions (Figure 1A, #3) on the dial if the connector probe is 10X (10 to 1 attenuation). Use the 1X position (Figure 1A, #4) if the connector probe is 1X (no attenuation).

If a connector probe is 10X, it will be indicated either on the end of the probe that is inserted into the input channel or on the probe tip which is on the opposite end.

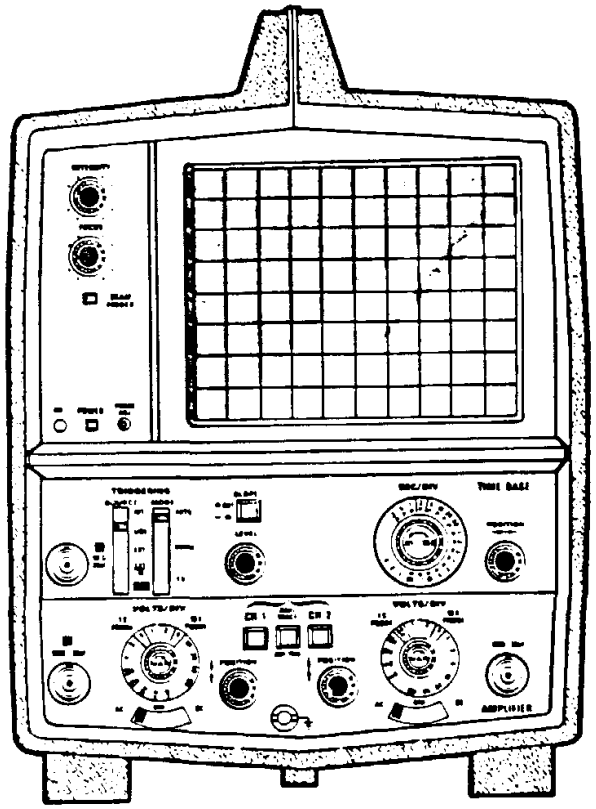


FIGURE 3

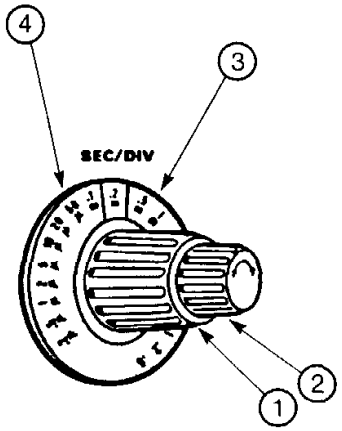


FIGURE 3A

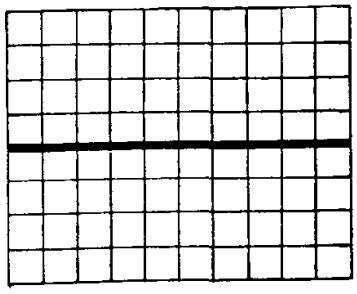


FIGURE 4

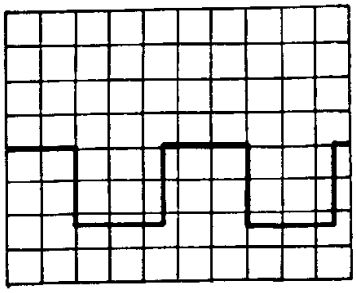


FIGURE 5

14. Set the Sec/Division dial (Figure 3, #6) to .2 MSec/Div (2/10 of a millisecond/div) by turning the back section of the dial (Figure 3A, #1).

CAUTION: Do not turn the front section of the Sec/Div dial as this will cause the scope to go out of calibration. (Figure 3A, #2).

NOTE: The millisecond (M) settings are on the one side of the dial, the microsecond (u) settings are on the other side. (Figure 3A, #'s 3 and 4).

15. Set the INT/EXT triggering source switch for "INT". (Figure 3, #7).
16. Set the reference switch to DC. (Figure 3, #8). Use the vertical position dial (#9) to center the pulse on the center line of the scope display. (Figure 4).
17. Remove the rocket cover from the probe tip. Connect the probe tip to the "probe adj." slot on the oscilloscope. (Figure 3, #10).

NOTE: At this point, the scope will display a trace like the one shown in Figure 5.

18. Turn the vertical position dial to center the trace on the scope display. (Figure 3, #9).
19. Adjust the focus (Figure 3, #11), the beam intensity (#12), and the level (#13) dials if necessary in order to get a clear display.

GO TO VIDEOTAPE DD5 AND VIEW THE SECOND SEGMENT.

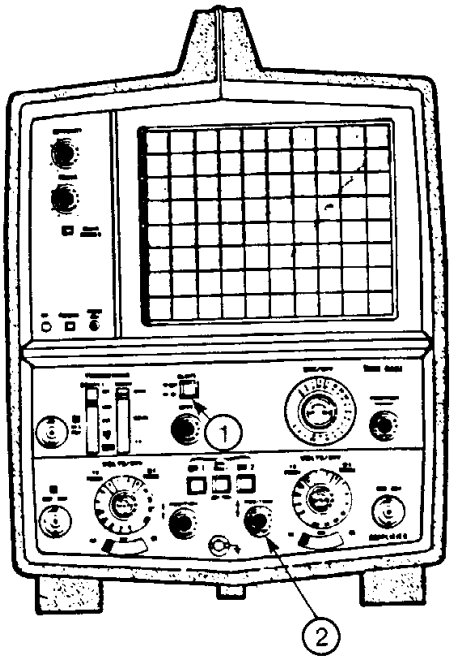


FIGURE 6

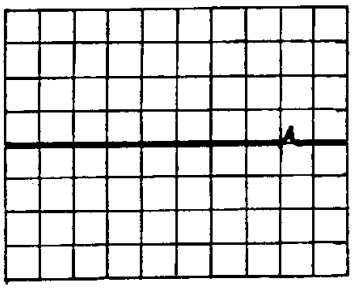


FIGURE 8

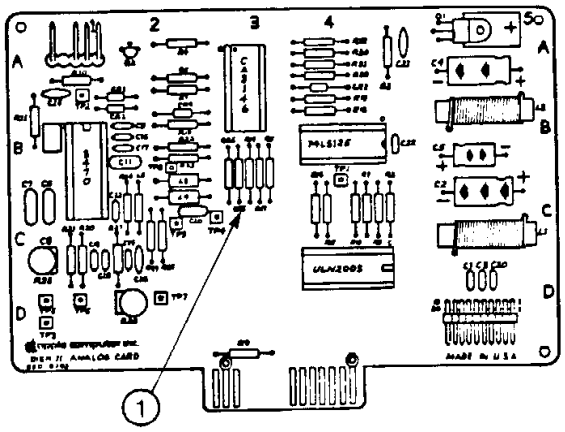


FIGURE 7

Checking The Head Radial Adjustment

Set Up Requirements:

1. Remove the probe tip from the "Probe Adj." slot on the oscilloscope. Replace the rocket cover on the probe tip and set aside.
2. Set oscilloscope as follows:

   Sec/Div: 20 MSec/Div
   Volts/Div: 5 volts/Div
   INT/EXT: "INT"
   POS/NEG: "POS" (Figure 6, #1)
   Reference switch: DC
   Mode: "AUTO"
3. Insert the Disk Drive Alignment Diskette (P/N 652-0150) into the target drive. Boot the Disk Alignment Aid Diskette (P/N 652-0199) in the "golden" drive.
4. When the menu comes up, SET TARGET DISK will be highlighted. Accept it by pressing A.
5. Set the target for slot 6, drive 2, by pressing S,A,A. Press ESC.
6. Select and accept SEEK by pressing S,S,S,S,A. The target disk should recalibrate and spin.
7. Hook the ground clip to TP4 (Test Point 4) on the Disk Analog Card (Figure 7, #1) and the oscilloscope probe to the front side of R11 (Resistor 11) on the Disk Analog Card (Figure 7, #2).
8. Turn the vertical position dial to center the pulse if necessary. (Figure 6, #2). If the scope reading is 0 volts (the pulse remains on the center line —Figure 8), go to step 9. If the reading is not 0 volts, DON'T CONTINUE WITH TEST!

NOTE: If reading is not 0 volts, the write current switch is bad. The diskette will be erased if you continue! (To repair this fault, the analog card would be changed).

9. Set oscilloscope as follows:

   Sec/Div: 20 MSec/Div
   Volts/Div: 50 MV/Div
   Int/Ext: "INT"
   Pos/Neg: "POS"
   Reference switch: AC
   Mode: "NORM"

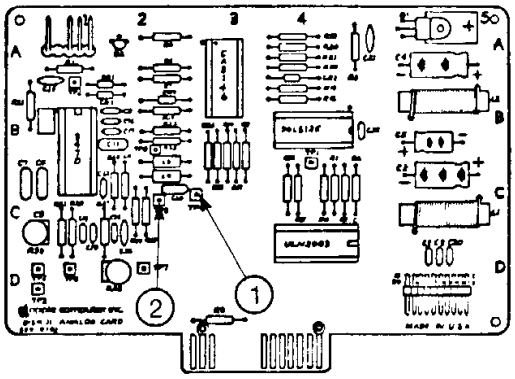


FIGURE 9

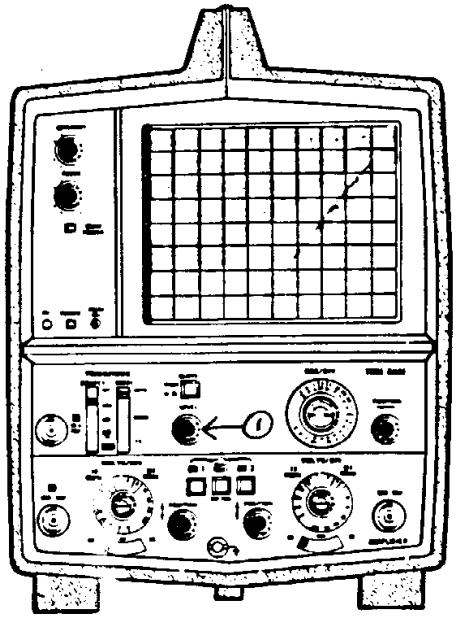


FIGURE 10

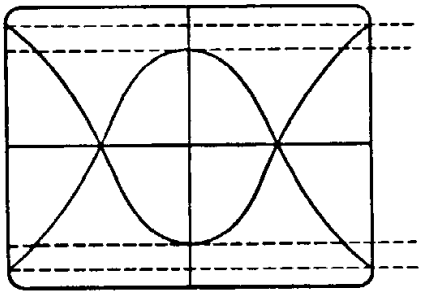


FIGURE 11

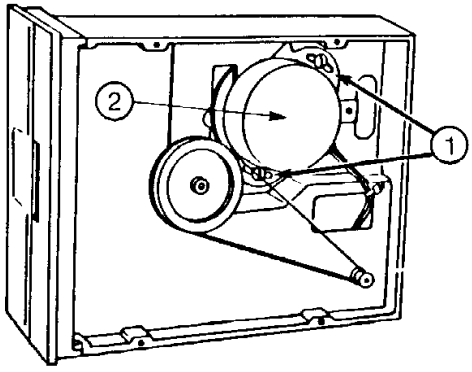


FIGURE 12

Completing The Test

NOTE: The procedures for checking the head radial adjustment depend upon the type of drive being checked—Alps or Shugart. The type of drive can be determined by the label on the bottom of the mechanical assembly. If the drive is labeled "APPLE COMPUTER INC.", the drive is an Alps drive and procedure A (below) must be followed. If the drive is labeled "Shugart Associates", it is a Shugart drive and procedure B (below) must be followed.

10. Determine which type of drive you are currently working on. If you have an Alps drive, go to Procedure A. If you have a Shugart drive, go to Procedure B.

Procedure A—Alps Drive

11. Connect the ground clip to TP4 and the scope probe to TP9 on the Disk Analog Card. (Figure 9, #'s 1 and 2).
12. Press S three times to select the "Seek Track 0 Through 34" option. Press A to accept this option.
13. Type 16 and press RETURN. Turn the level dial (Figure 10, #1) on the oscilloscope all the way to the left and then back to the right until a "lobe" pattern first appears. (Figure 11). For this test you will be comparing adjacent lobes (Figure 11). You will adjust the lobes so that their relative sizes are as close to the same size as can be adjusted.
14. Turn the target drive on its side.
15. Slightly loosen the two mounting screws holding the stepper motor to the casting (Figure 12, #1) by turning the screws counterclockwise just until the motor is slightly loosened.

NOTE: If the motor is very loose, the adjustment will be difficult to make.

16. Rotate the stepper motor just slightly to adjust the relative sizes of the lobes. (Figure 12, #2).
17. When the lobes are as close to the same size as can be adjusted, hold the stepper motor in place by pushing in with your thumb and tighten down the mounting screws by turning them clockwise.

18. Recalibrate the drive by pressing S, then A. Skip down to the "Seek Track 0 Through 34" option. Press A, type 16, then press RETURN. Check the adjustment by looking at the lobe pattern on the scope. If the lobes are not within 80% of each other (within about one half a grid section of each other), repeat steps 15-18.
19. Press A. Type 34 and press RETURN. Press A, type 16 and press RETURN. Look at the scope to see if the lobes are still properly adjusted. If not, go back and repeat steps 15-19.
20. Place the target drive in operating position. Repeat steps 18 and 19.

NOTE: Normally there would be three attempts to make the head radial adjustment. If the adjustment cannot be made, then the mechanical assembly would be returned to a Level II Service Center.

CAUTION: If a drive is found to be out of adjustment to an extreme, previously saved media on any diskettes should be tested on a known good drive to see if the media can be read. If the media cannot be read, then all media saved on the drive in question should be saved from it to a known good drive. After all media is saved, the drive can then be adjusted.

21. If you have now completed the Shugart Drive Head Radial Adjustments as well as the Alps Drive adjustments, GO BACK TO THE VIDEOTAPE DD5 AND VIEW SEGMENT THREE. If you have only completed the Alps Drive adjustment at this point, it will be necessary for you to do the following:
    A. Power down the Apple
    B. Remove the disk interface card from the Apple and disconnect the Alps Drive.
    C. Connect a Shugart Disk Drive cable to the disk interface card and reinstall the interface card in the Apple.
    D. Repeat the Set Up Requirements for checking the Head Radial Adjustment and then go to Procedure B.

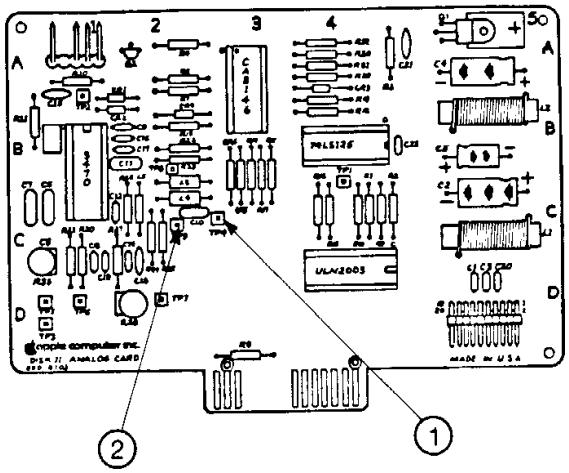


FIGURE 13

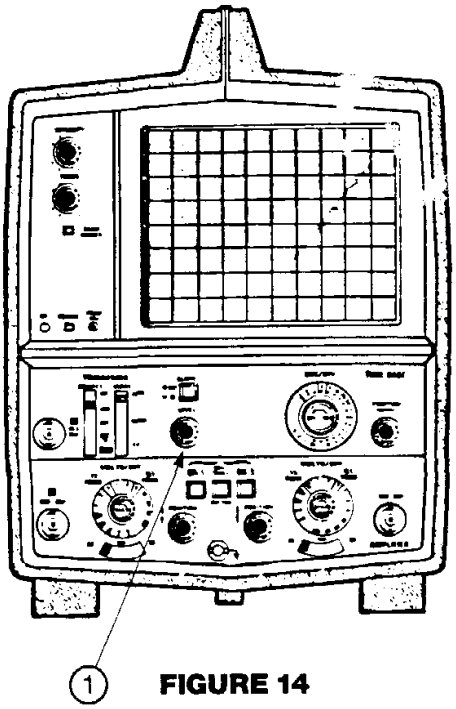


FIGURE 14

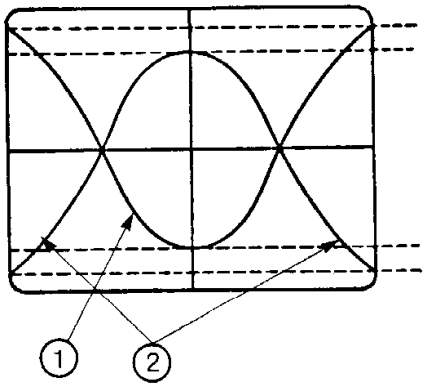


FIGURE 15

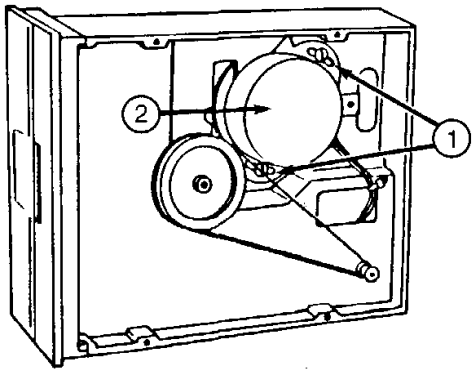


FIGURE 16

Procedure B—Shugart Drive

11. Connect the ground clip to TP4 and the scope probe to TP9. (Figure 13, #'s 1 and 2).
12. Press S three times to select the "Seek Track 0 Through 34" option. Accept it by pressing A.
13. Type 16 and press RETURN to select Track 16. Turn the level dial (Figure 14, #1) on the oscilloscope all the way to the left and then back to the right until a "lobe" pattern first appears. For this test you will be comparing adjacent lobes (Figure 15). Adjacent lobes must have an amplitude within 80% of each other. (Figure 15, #'s 1 and 2).
14. Turn the target drive on its side.
15. Slightly loosen the two mounting screws holding the stepper motor to the casting (Figure 16, #'s 1 and 2) by turning the screws counterclockwise just until the motor is barely loosened.

NOTE: If the motor is very loose, the adjustment will be difficult to make.

16. Rotate the stepper motor slowly counterclockwise until the adjacent lobes are considerably out of adjustment (within 50% of each other).
17. Rotate the motor slowly clockwise until the adjacent lobes are within 80% of each other. (Figure 15, #'s 1 and 2).
18. When the adjacent lobes are as close to 80% amplitude of each other as can be adjusted, hold the stepper motor in place by pushing in with your thumb and tighten down the mounting screws by turning them clockwise.
19. Recalibrate by pressing S, then A. Skip down to the "SeekTrack 0 Through 34" option. Press A, type 16, and press RETURN.
20. Look at the scope display to see that the adjacent lobes are still within 80% of each other. (Figure 15, #'s 1 and 2). If they are not, loosen the mounting screws by turning them counterclockwise and rotate the stepper motor just slightly in the clockwise direction. Don't forget to tighten down the screws again by turning them clockwise when the adjacent lobes are within 80% of each other.

21. Press A, type 34, and press RETURN. Then press A, type 16, and press RETURN.
22. Look at the scope to see if adjacent lobes are still within 80% of each other. If not, rotate the stepper motor again just slightly in the clockwise direction. When the lobes are within 80% of each other, tighten down the screws again. Then reclibrate, seek tracks 16, 34 and 16 again to check the adjustment.
23. Place the target drive in operating position. Repeat steps 19-22.

NOTE: Normally there would be three attempts to make the head radial adjustment. The initial adjustment involves rotating the stepper motor counterclockwise and then clockwise. In subsequent attempts, the stepper motor is turned slightly in the clockwise direction. If the adjustment cannot be made, the mechanical assembly would be returned to a Level II Service Center.

CAUTION: If a drive is found to be out of adjustment to an extreme, previously saved media on any diskettes should be tested on a known good drive to see if the media can be read. If the media cannot be read, then all media saved on the drive in question should be saved from it to a known good drive. After all media is saved, the drive can be adjusted.

24. If you have completed both the Alps and Shugart Drive Head Radial adjustments at this point, GO BACK TO THE VIDEOTAPE DD5 AND VIEW SEGMENT THREE. If you have only completed the Shugart Drive adjustments at this point, it will be necessary for you to do the following:
    A. Power down the Apple.
    B. Remove the disk interface card from the Apple and disconnect the Shugart Disk Drive.
    C. Connect an Alps Disk Drive cable to the interface card and reinstall the interface card in the Apple.
    D. Repeat the Set Up requirements for checking the Head Radial Adjustments and to to Procedure A.

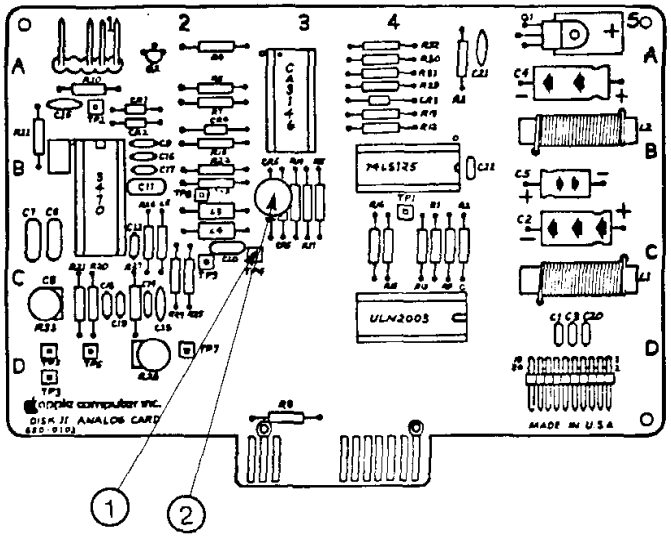


FIGURE 17

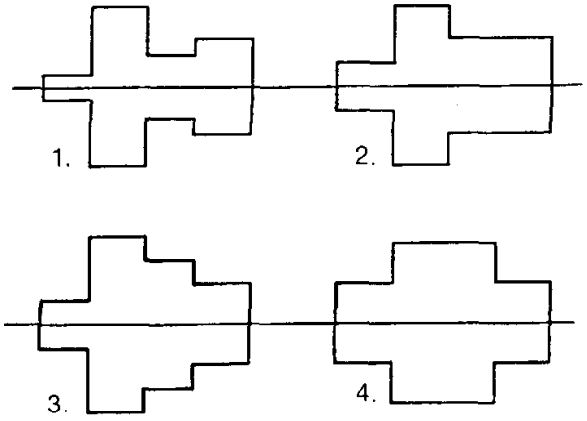


FIGURE 18

DD5-17

The Azimuth Test

Apple Set Up Requirements:

1. The power is on.
2. The "golden" drive disk cable is connected to Drive 1 of the disk interface card and the target disk drive cable is connected to Drive 2.
3. The disk interface card is in slot 6 of the Apple.
4. The Disk Alignment Aid Diskette is in the "golden" drive. The Alignment Diskette is in the target drive.

Oscilloscope Set Up Requirements:

5. Sec/Div: 0.5 MSec/Div
6. Volts/Div: 50 MV/Div
7. INT/EXT: "INT"
8. POS/NEG: "POS"
9. Reference switch: AC
10. Mode: "NORM"

Completing The Test

11. On the Menu, select and accept SEEK. The target disk drive should recalibrate and spin.
12. Skip to "Seek Track Number 0 Through 34" by pressing S three times. Press A to accept this option. Then type 34 and press RETURN.
13. Hook ground clip to TP4 and the scope probe to TP8 on the target disk analog card. (Figure 17, #'s 1 and 2).
14. Turn the trigger level dial all the way to the left and then back to the right so that you can see the display clearly. At this point, the scope will display a pattern of bursts of a certain amplitude. (Figure 18).

NOTE: The rule you should remember when checking the azimuth measurement is as follows: the inside bars (bursts) must be equal to or greater than their respective outside bars. Figure 18 shows examples of four patterns that you might see. Number 1 is ideal (zero azimuth error), errors 2 and 3 are acceptable. An error such as number 4 requires a new read/write head.

15. Press A, type 1, and press RETURN to select Track 1. Look at the scope to check the azimuth pattern. It should be the same as the pattern found on Track 34. Press A, type 34 and press RETURN.

NOTE: Normally if the patterns found on either or both tracks are not acceptable, the mechanical assembly is replaced and the defective one is returned to the Level II Service Center.

GO TO VIDEOTAPE DD5 AND VIEW SEGMENT FOUR.

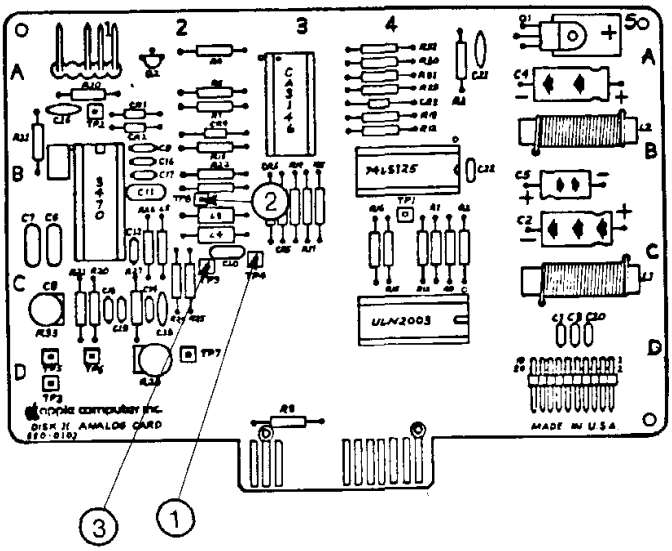


FIGURE 19

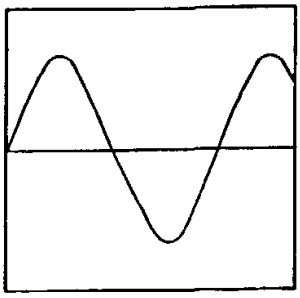


FIGURE 20

The Amplitude Test

Apple Set Up Requirements:

1. Power is on.
2. The "golden" drive is connected to the Drive 1 position of the disk interface card and the target drive is connected to the Drive 2 position.
3. The disk interface card is in slot 6 of the Apple.
4. The Disk Alignment Aid Diskette is in the "golden" drive.

Oscilloscope Set Up Requirements:

5. Time/Div: 1 uSec/Div
6. Volts/Div: 50 MV/Div
7. INT/EXT: "INT"
8. POS/NEG: "POS"
9. Reference switch: AC
10. Mode: Auto

Completing The Test

11. Remove the Alignment Diskette from the target drive.
12. On the Menu, Select and accept AMPLITUDE.
13. A warning will be displayed on the screen that the test will write on any diskette in the target drive.
14. Put a scratch diskette into the target drive and close the door. Press A. A signal will be written on the scratch diskette.
15. The ground is already on TP4 and the scope probe is on TP8. (Figure 19, #'s 1 and 2). Adjust the level dial for a stable display. Also adjust the intensity dial so that you see only one trace.

NOTE: The scope will display a trace as shown in Figure 20. The trace must display a minimum of 150 MV.

16. Place the scope probe on TP9 (Figure 19, #3). Look at the scope display for the same amplitude.

NOTE: Normally if the amplitude is found to be unacceptable (a trace less than 150 MV), the mechanical assembly is replaced and the defective one is returned to the Level II Service Center.

GO TO VIDEOTAPE DD5 AND VIEW SEGMENT FIVE.

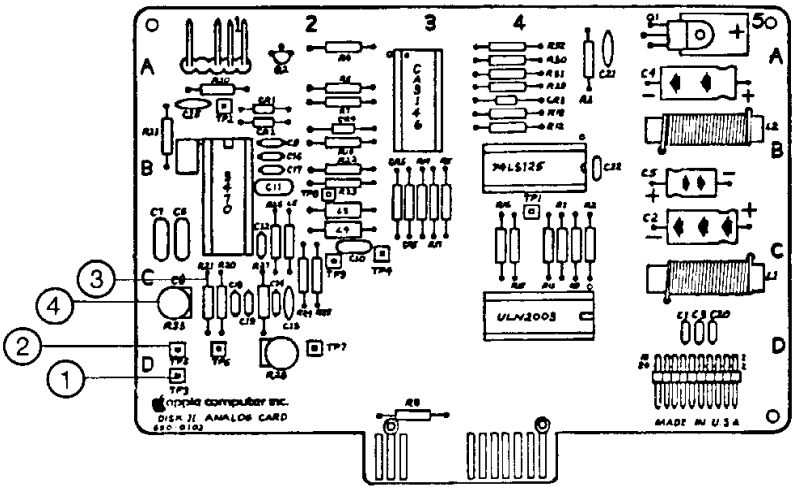


FIGURE 21

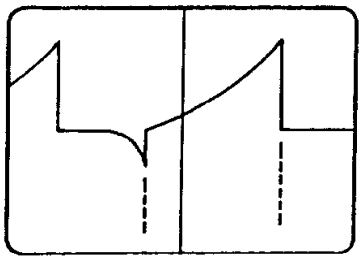


FIGURE 22

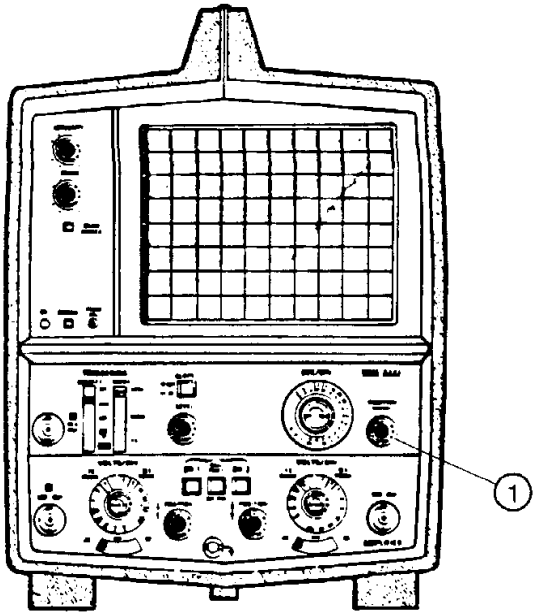


FIGURE 23

Comparator Offset Adjustment

Apple Set Up Requirements:

1. Power is on.
2. The "golden" disk drive cable is connected to Drive 1 of the disk interface card. The target disk drive cable is connected to Drive 2 of the interface card.
3. The interface card is in slot 6 of the Apple.
4. The Disk Alignment Aid Diskette is in the "golden" drive. A scratch diskette is in the target drive.

Oscilloscope Set Up Requirements:

5. Time/Div: 0.5 uSec
6. Volts/Div: 1 V/Div
7. INT/EXT: "INT"
8. POS/NEG: "NEG"
9. Reference switch: AC
10. Mode: "Auto"

Completing The Test

11. On the Menu, select and accept AMPLITUDE.
12. A warning will be displayed on the screen that the test will write on any diskette in the target drive. Make sure a scratch diskette is in the target drive. Press A. A signal will be written on the scratch diskette.
13. Clip the ground to TP3 and the scope probe to TP5. (Figure 21, #'s 1 and 2). At this point, the scope will display a negative-going pulse as shown in Figure 22. Adjust the trigger level dial for a stable display. Move the horizontal position dial (Figure 23, #1) if necessary to position the pulse in the center of the scope display. This pulse should be between 2.5 and 3.0 microseconds in width. This means the pulse width should be between 5 and 6 horizontal divisions of the grid. If the pulse width is less than 2.5 microseconds or greater than 3.0 microseconds, poteniometer R21 or R33 must be adjusted.

NOTE: On some analog boards R21 is a potentiometer and can be adjusted. On other analog boards R21 is a fixed resistor and potentiometer R33 is used for the adjustment (Figure 21, #'s 3 and 4). There are also certain analog boards that contain no potentiometers that can be adjusted. If an adjustment on the disk drive is necessary in this case, the board must be sent to a Level II Service Center for repair.

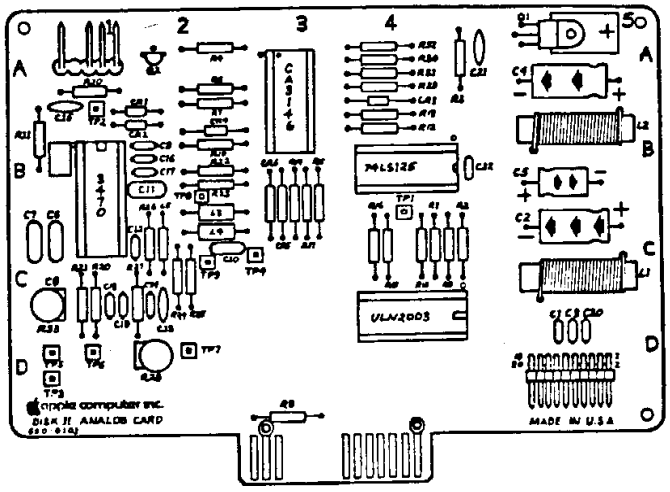


FIGURE 24

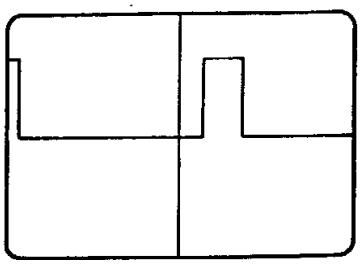


FIGURE 25

14. Adjust potentiometer R21 or R33 with a small flat blade screwdriver until the pulse width is correct.
15. Move the scope probe to TP7. (Figure 24, #1). You will now see a second pulse (Figure 25). This pulse must be a single, clean pulse—with no dual images on the rising and falling edges. Adjust the trigger level dial if necessary to get a clear display.
16. If this second pulse needs adjustment, use a small flat blade screwdriver to adjust potentiometer R28 on the analog card. (Figure 24, #2). Adjust R28 until there is a single clean image on the scope.

NOTE: Normally if either pulse cannot be adjusted properly, the analog board is replaced and the defective one is returned to the Level II Service Center.

CAUTION: If a drive is found to be out of adjustment to an extreme, previously saved media on any diskettes should be tested on a known good drive to see if the media can be read. If the media cannot be read, then all media saved on the drive in question should be saved from it to a known good drive. After all media is saved, the drive can then be adjusted.

PRACTICE

Now you need to get comfortable with the disk calibration procedures. Practice the scope setup, head radial adjustment, azimuth and amplitude tests, and comparator offset adjustments until you can perform them for your course manager smoothly and within the tolerances specified.

THIS IS THE END OF MODULE DD5.

MODULE A///-0

REVISION JANUARY 1982

Meet Your Apple ///

Objective

GIVEN: An APPLE ///
Video monitor with cable
"MEET YOUR APPLE ///" diskette
"SYSTEM UTILITIES" diskette
Blank diskette

ACTION: Set up a working system, format and copy a diskette. Display the catalog of a diskette. Enter and run a BASIC program from the keyboard. Save a BASIC program to diskette and then run the program from the diskette.

CRITERION: Successfully, using proper procedures.

CRITERION TEST DESCRIPTION: Demonstrate the indicated skills to your course manager.

HERE'S WHAT TO DO:

1. Obtain the required materials from your course manager.
2. Go through Module A///-0, doing the exercises.
3. Call your course manager to check your skills in the Criterion Test.

Conventions:

In order to prevent possible confusion, and the frustration it can cause when something doesn't work as expected, a couple of standard formats have been used in this module.

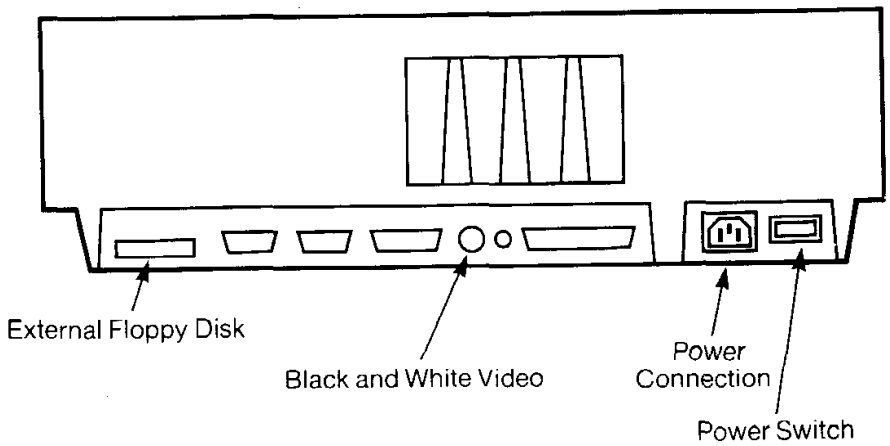
1. If the name of any key on the keyboard contains more than one character, that name will be capitalized and enclosed by less-than and greater-than signs. For example, the <CONTROL> key at the left end of the keyboard.
2. Whenever you are asked to type more than one character, the text that must be entered will be enclosed in curly-brackets. Type everything, including puntuation, that is inside the curly-brackets; but don't type the curly-brackets themselves. If a long key-name (mentioned in the preceding paragraph) is part of the text, it will still be enclosed by < > and counts as one keystroke. Commands may be entered in upper or lower case.
3. When a step calls for you to "enter" something, press the <RETURN> key after typing the indicated text (unless the step says not to). In all other cases, we have tried to tell you each time that the <RETURN> key must be used. If the system seems to not be doing anything for too long a time, however, try pressing <RETURN>.

TURN PAGE

Setting Up Exercises:

1. Make sure that the power switch on the rear of the APPLE /// is in the "0" (off) position. See figure 1. (The "0" side of the switch should be pushed in.)
2. Connect the video cable between the B/W VIDEO OUT jack on the rear of the APPLE /// and the VIDEO IN jack on the rear of the monitor. If you have a color monitor and want a color display, see appendix C in the OWNER'S GUIDE for connection instructions.
3. If you have a second (external) disk drive, connect the ribbon cable from the drive to the FLOPPY DISKS connector on the rear of the APPLE ///. The small raised square on the plug must be on top for proper connection (a third drive would be plugged into the rear of the second drive, and a fourth would be plugged into the rear of the third).
4. Connect the power cord to the connector on the rear of the APPLE /// and plug it into a wall socket (115 VAC).

This completes the set-up of the APPLE /// system.



(Rear view of Apple ///)

FIGURE 1

Diskettes:

All APPLE /// programs are stored on 5¼ inch mini-floppy diskettes. These are flexible plastic disks, coated with a magnetic recording material, contained in a sealed black protective envelope. THE DISKETTE ITSELF SHOULD NOT BE TOUCHED OR REMOVED FROM ITS ENVELOPE. The data are written and read through the oblong hole in the envelope.

And On With The Show:

1. Find the diskette marked "MEET YOUR APPLE ///" and remove it from its dust cover.
2. Open the door on the built-in disk drive (gently pull the bottom out and up).
3. Hold the diskette with the label facing up and on the edge nearest you.
4. Insert the opposite edge of the diskette into the drive slot, and gently push it in until it stops.
5. Turn on the monitor and the APPLE ///. The light below the drive door will come on, and the drive will chatter for a few seconds.
6. After the clatter stops, close the drive door. The drive will run for about thirty seconds.
7. When given the choice between the system and the tutorial, choose the tutorial by pressing the <RETURN> key.

The tutorial will refer you back to this module for some exercises to perform.

Now just follow along with the instructions on the screen.

TURN PAGE

Console Tutorial:

The keyboard has a standard typewriter layout, plus some extra symbols not usually found on office typewriters. It is slightly curved to provide a comfortable reach. For touch typers, there are small bumps on the D and K keys to allow positive positioning.

A separate numeric keypad is provided for easy data entry. There is a locating bump on the 5 key there. The keys act the same as the ones on the regular keyboard (the <ENTER> key corresponds to the <RETURN> key).

1. If you haven't already done so, press <RETURN> to clear the last page of introductory material from the screen.
2. Look at the screen. The right parenthesis in the top-left corner is the BASIC "prompt" that says that the APPLE *III* is waiting for input.

   The white rectangle next to it is the "cursor" that shows where the next character will go.
3. Type a letter. If you got an upper-case letter, press the <ALPHA-LOCK> key. Hold either <SHIFT> key down and type the same letter.
4. Type a number. Hold the <SHIFT> key down and type the same number.
5. Type a lowercase o and a lowercase j. See how the tail of the j descends below the bottom of the o? The APPLE *III* display has true descenders on q, y, p, g, and j.

So far there have been no surprises; the keyboard acts just like a normal typewriter.

6. Press the <ALPHA-LOCK> key. It will stay down.
7. Type a letter. It works like a typewriter with the Shift-lock on.
8. Type a number. Hold the <SHIFT> key down and type the number again. See how it works? It works the same way for all the symbol keys. The <ALPHA-LOCK> only applies to letters.
9. Press the <ALPHA-LOCK> key again. This time it will stay up.

10. Press a letter key and hold it down.
11. After a couple of seconds, press and hold the <SOLID-APPLE> key (still holding the letter key down).
12. Let it repeat past the end of the line, then release both keys. The automatic jump to the next line is called "wraparound".

NOTE: If you try to enter more than 256 characters (about 3½ lines) without pressing <RETURN>, a backslash will be printed and the input to that point will be lost. This will not affect your use of the APPLE /// though; because you will probably never enter a program line nearly that long, and any user programs will be written to save the input before it gets too long.

13. Type an uppercase O, then a zero. See the difference?
14. Type a lowercase L, then a one. There's a difference there too.

The APPLE /// can also tell the difference, so typists will need to get out of the habit of using letters for those numbers. We won't try here to explain the use of the <ESCAPE>, <TAB>, <OPEN-APPLE>, and <CONTROL> keys. Their use can be defined by the programmer and may vary from one program to another.

15. Press <RETURN> to end the current line. This tells the APPLE /// that your input is ready to be used. The cursor will jump to the start of the next line, and wait for more input. Until you press <RETURN>, you can change your mind or correct errors with no effect on the system.

TURN PAGE

Error Correction:

1. Without pressing <RETURN>, type {Now is the tyme for}. You may have noticed that there was an error in that line. Let's correct it.
2. Press the <LEFT-ARROW> key. The cursor will back up one character.
3. Use the <LEFT-ARROW> to place the cursor over the "y" in "tyme". Notice that the characters you passed over are still there. This is called a non-destructive backspace.
4. Type {i} and the "y" will be replaced.
5. Use the <RIGHT-ARROW> to move the cursor to the space after "time".
6. Press <RETURN>. Note that the rest of the line disappears. In order to keep the entire line, you would have had to "re-enter" the rest of the line by passing over it using the right arrow.
7. Hold down the <OPEN-APPLE> key and press <ESCAPE>, then press <RETURN>.

The APPLE /// will now demonstrate its typeahead feature.

Diskettes (continued):

Before any diskette can be used for storing information, it must be formatted. This gives it a name so the system can tell one diskette from another, sets up an empty catalog (or directory), and checks it for flaws. A program is provided on the SYSTEM UTILITIES diskette to do this. We suggest that you format any blank diskettes that you have before you start to do any programming or use any application software. We would hate for you to spend your valuable time at the keyboard and not have a formatted diskette to save your work on.

NOTE: Some diskettes are protected against being written to. This is to prevent loss of the information on them. The APPLE /// can only write to a diskette that has a notch in the protective envelope, to the right of the label. Compare the SYSTEM UTILITIES diskette, which is write-protected, to one of your blank diskettes.

Formatting:

1. Insert the SYSTEM UTILITIES diskette into the built-in drive and close the door.
2. While holding the <CONTROL> key down, press the <RESET> button located behind the top edge of the keyboard. This is a "CONTROL-RESET", or "CTRL-RESET", and will cause the system to "boot" from the diskette in the built-in drive.
3. When the main menu appears, select the Device Handling Commands by typing {D}.
4. Select the Formatter from the Device Handling Commands menu by typing {F}.
5. A prompt will appear near the bottom of the screen—

   Format the medium of the volume:
   [.D2]

   Select the built-in drive by entering {.d1}.
6. Remove the SYSTEM UTILITIES diskette, insert the blank diskette, and close the door.

7. A second prompt will have appeared after step 5—

   With the new volume name: [BLANK##]

   where ## is a random number from 00 to 99. You may accept that name by pressing <RETURN>, or you may enter any name that you wish to give the diskette. A name can be any combination of up to 15 letters, numbers, or periods; and it must begin with a letter (e.g., MYDISK.1).

After you accept the name or enter your own, the drive will now come on. If the diskette was already formatted, you will be asked if you wish to destroy the old data. This gives you the option of changing your mind if you grabbed the wrong diskette. If you type {N}, you will be back to step 5 above. Typing {Y} will cause the drive to run for about thirty seconds (this is where you would be if the diskette had been unformatted).

8. After the diskette has been formatted, the message "formatting successful" will appear on the screen. Remove the formatted diskette.
9. Repeat steps 5 through 8 for each diskette to be formatted. After all your blank diskettes are formatted, just press <ESCAPE> after step 8 to get back to the Device Handling Commands menu.

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Copying:

It is a good idea to have a "backup" (duplicate) of any diskette that contains important data. The SYSTEM UTILITIES diskette contains a program to copy the data from one diskette to another. The following procedure has instructions for single-drive and two-drive copying.

Let's try it out by making a copy of the MEET YOUR APPLE *III* diskette.

If you haven't already done so, boot the SYSTEM UTILITIES diskette and select the Device Handling Commands option from the main menu by typing {D}; then remove the SYSTEM UTILITIES diskette.

Single-Drive Copying:

1. Make sure that the original diskette and the one you are going to copy onto are labeled so that you can tell them apart.
2. Select the Copier from the Device Handling Commands menu by typing {C}.
3. Insert the diskette to be copied into the built-in drive and close the door.
4. A prompt will be displayed near the bottom of the screen

   Copy the volume:
   [.D2]

   Select the built-in drive by entering {.D1}. The drive will come on briefly.
5. Another prompt will appear—

   To the volume:
   [.D2]

   Select the built-in drive again by entering {.D1}.
6. A third prompt will appear—

   With the new volume name:
   [MEETYOURAPPLE.3]

   You may accept the name of the original diskette by pressing <RETURN>, or you may enter any new volume name that you wish. A volume name is any combination of up to 15 letters, numbers, and periods; and it must begin with a letter.
7. After you accept the original name or enter a new one, the drive will come on again briefly. You will then be prompted to insert the destination diskette (the blank one to be copied onto). Remove the original, insert the blank, close the door, and press the <SPACEBAR>.

8. If you used a pre-formatted diskette, the APPLE /// will ask if you wish to destroy the old data (another safety feature). Typing {N} will put you back to step 4 above. If you type {Y}, the diskette will be reformatted with the name from step 7.

   If you used an un-formatted diskette, the APPLE /// will ask you to put the SYSTEM UTILITIES (UTILFILER) diskette back into the drive. Do so, then press the <SPACEBAR>. After the drive runs for a few seconds you will be asked to re-insert the blank diskette. Do so, and press the <SPACEBAR>. The diskette will be formatted with the name from step 7.

9. When prompted to do so, put the source diskette (the one being copied) back into the drive, close the door, and press the <SPACEBAR>.
10. Swap the source and destination diskettes whenever prompted to do so. Press the <SPACEBAR> after you have put the requested diskette in the drive and closed the door. Make sure that you don't put the wrong one in.
11. After the diskette has been copied, the message "copy successful" will appear. Remove the copy.

Repeat steps 3 through 11 for each diskette to be copied.

It is a good idea to cover the write-protect notch of each backup with one of the silver tabs that are provided with blank diskettes. Peel a tab from its backing sheet and fold it over the edge of the diskette, covering the notch. This will give you an added safety margin against accidental loss of your data. (Don't bother with this for the exercise diskette.)

TURN PAGE

Two-Drive Copying:

1. Make sure that the original diskette and the one you are going to copy onto are labeled so that you can tell them apart.
2. Select the Copier from the Device Handling Commands menu by typing {C}.
3. Insert the diskette to be copied into the built-in drive, and close the door.
4. Put the blank diskette into the first external drive and close the door.
5. A prompt will be displayed near the bottom of the screen

   Copy the volume:
   [.d2]

   Select the built-in drive by entering {.D1}. The drive will come on briefly.
6. Another prompt will appear—

   To the volume:
   [.D2]

   Accept the choice of the first external drive by pressing <RETURN>.
7. A third prompt will appear—

   With the new volume name:
   [MEETYOURAPPLE.3]

   You may accept the name of the original diskette by pressing <RETURN>, or you may enter any new volume name that you wish. A volume name is any combination of up to 15 letters, numbers, and periods; and it must begin with a letter.
8. If you used a pre-formatted diskette, the APPLE /// will ask if you wish to destroy the old data (another safety feature). Typing {N} will put you back to step 5 above. If you type {Y}, the diskette will be reformatted with the name from step 7.

   If you used an un-formatted diskette, the APPLE /// will ask that you put the SYSTEM UTILITIES (UTILFILER) diskette back into the drive. Do so, then press the <SPACEBAR>. After the drive runs for a few seconds you will be asked to re-insert the blank diskette. Do so, and press the <SPACEBAR>. The diskette will be formatted with the name from step 7.

9. After the diskette has been copied, the message "copy successful" will appear. Remove the copy.

Repeat steps 5 through 9 for each diskette to be copied.

It is a good idea to cover the write-protect notch of each backup with one of the silver tabs that are provided with blank diskettes. Peel a tab from its backing sheet and fold it over the edge of the diskette, covering the notch. This will give you an added safety margin against accidental loss of your data. (Don't bother with this for the exercise diskette.)

TURN PAGE

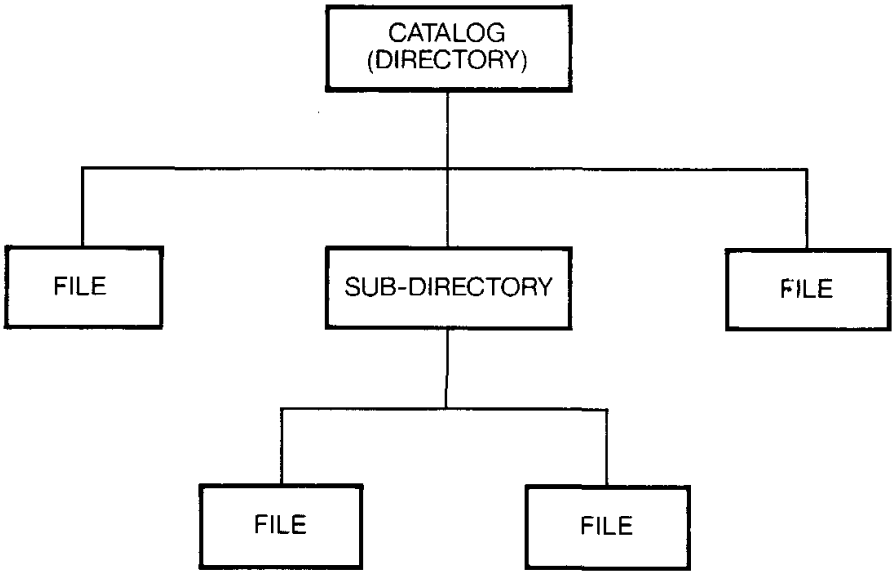


FIGURE 2
(FILE ORGANIZATION)

TURN PAGE

Catalogs:

Information on APPLE /// formatted diskettes is contained in files. The files are arranged in a tree structure as shown in figure 2. A catalog is like a table of contents for a branch of that tree. The main catalog can be referred to by the approprate device name or volume name. A device is a piece of hardware (e.g., a disk drive or a printer), its name starts with a period (e.g., .D1 or .PRINTER). A volume is the diskette in a drive (e.g., UTILITY or MEETYOURAPPLE.3).

We will now verify the copy of the MEET YOUR APPLE /// diskette that you just made.

1. Boot the original copy of the "MEET YOUR APPLE ///" diskette.
2. When given the choice between the tutorial and the system, hold the <OPEN-APPLE> down and press <ESCAPE>. This will put you into the BASIC operating system.
3. Enter {CAT .D1} (CAT is short for catalog).

After the diskette is scanned, the name of each file on it will be listed along with its size in bytes (EOF) and in disk block (BLKS), creation date, date last modified, and file type. The volume name (MEETYOURAPPLE.3) is at the top of the screen.

4. Remove the original diskette.
5. Insert the copy diskette.
6. Enter {CAT /MEETYOURAPPLE.3/} (the slashes tell the APPLE /// where the volume name starts and ends).

The catalog that appears on the screen should be identical to the one that you got in step 5. Notice that in step 5 you used the device name to specify which directory to read, and in step 9 you used the volume name; the two are equivalent. For that matter, the APPLE /// remembers the name of the diskette that was booted, and uses it as a "default" if nothing else is specified. Entering {CAT} will read the catalog of the diskette you booted (if it is still in the system).

Programming:

There are packaged application programs available on diskettes for the APPLE ///, but sooner or later you will probably want to write some of your own. This text will not attempt to teach you how to write a program since there are already many schools and books with that intent. What we will do is show you how to enter a program, save it on a diskette, and run it.

1. Note the name of the last file shown on the diskette catalog.
2. Enter {NEW}. This will clear the program memory, though there is no visible indication that it has.
3. Enter the following program: Remember to press <RETURN> after each line. You can use lower case for everything, but putting the BASIC instructions in upper case and data or remarks in lower case makes the programs more readable.

```
{10 HOME
 20 FOR i = 1 TO 9
 30 PRINT i
 40 NEXT i
 50 END
}
```

4. Enter {LIST}. The program will be displayed. This allows you to see what you have in memory and check it for errors. Any lines that have mistakes can be re-typed.

Notice how lines 30 and 40 are indented. Whenever you do a listing, the APPLE /// automatically indents "FOR - NEXT loops" (groups of instructions that will be repeated a number of times). This makes it easier to see how the program is structured.

5. Enter {RUN}. The numbers 1 through 9 will be printed on the screen. If this didn't happen, go back to step 4.

Now we'll modify the program.

Escape Mode:

This mode allows you to move the cursor anywhere on the screen to do editing. You enter it by pressing the <ESCAPE> key (hence the clever name).

1. Press <ESCAPE>. Note that the cursor now has a "+" in it.
2. Press <UP-ARROW>. No surprises there.

All four <-ARROW> keys have a built-in two-speed repeat. If you hold the key down for about a half-second, the cursor will keep moving. If you push down harder, the repetition rate will be about three times as fast.

3. Move the cursor around the screen using the four <-ARROW> keys until you have a feel for controlling it. Finish up where you started, just to the right of the prompt.

If the cursor hits the top or bottom of the screen, the text will scroll down or up to keep the cursor on the display. Text that has scrolled from the screen is only lost to the display; entered programs, data, or text are still in memory. If the cursor hits the right edge, it will jump to the beginning of the next line; if it hits the left edge, it will jump to the end of the previous line.

4. Exit Escape Mode by pressing <ESCAPE>. The cursor will lose its "+".
5. Enter {LIST} to display the program again.
6. Enter Escape Mode and move the cursor up to the beginning of line 20. Make sure that the cursor is overlaying the "2".
7. Exit Escape mode.
8. Move the cursor to the "9".
9. Type {50 <RETURN>}. This changes line 20 on the screen and in memory.
10. Enter {RUN}. This time the numbers 1 through 50 will print.
11. Enter {LIST} to display the program again.
12. Use Escape mode to move the cursor to the beginning of line 30.
13. Exit Escape mode and "re-enter" the line number and the word PRINT by passing the cursor over them using the <RIGHT-ARROW> key.
14. Enter Escape mode and move the cursor to a blank area.
15. Exit Escape mode.
16. Type {"The number is";}, don't press <RETURN>.

17. Using Escape mode, move back to the point where you left line 30 (the space after "PRINT").
18. Exit Escape mode.
19. Use the <RIGHT-ARROW> to re-enter the rest of the line (it's OK to over-shoot), then press <RETURN>.
20. Enter {RUN}.
21. LIST the program to see what you did.

This is an easy way to make insertions or corrections, to collect words or phrases from various parts of the screen, or to repeat something without actually re-typing it. Note that you must enter (or "re-enter") the number of the line when editing a BASIC program.

TURN PAGE

Saving Programs:

Unless you plan to retype your programs each time you want to use one of them, you will have to save them on a diskette. The program memory of the APPLE /// is volatile, the contents are lost when the power is turned off.

1. Enter {SAVE COUNT}. The drive will come on, and your program will be written onto the diskette.
2. Display the catalog of the diskette again. You will see that a new file named COUNT has been added. That file is the saved program.
3. Enter {NEW}.
4. Enter {LIST} or {RUN} to satisfy yourself that the program is gone.
5. Enter {RUN COUNT}. The program will be loaded from the diskette and will execute.

Other Goodies:

The APPLE /// has seven display modes and a sound generator. A program has been provided which demonstrates all of them.

1. Enter {RUN DEMO} to see the demonstration.

A listing of the DEMO program may be useful to you when you want to use these features.

The APPLE /// can also pretend that it is an APPLE II. Instructions on using that ability are in Appendix D of the APPLE /// OWNERS GUIDE. Details on how to use all the capabilities of the APPLE /// can be found in the manuals that came with your system.

We hope that you have enjoyed this tutorial, and that we have answered most of your questions about the APPLE ///. We're sure that you will find it to be a very useful tool.

PRACTICE

If you are not yet ready for the criterion test, you may review the "MEET YOUR APPLE ///" module until you feel that you can demonstrate your skills with the Apple /// to your course manager.

THIS IS THE END OF MODULE A///-0.

MODULE A///-1

REVISION JANUARY 1982

Apple /// Disassembly/Assembly

Objective

GIVEN: An Apple ///
Flat Blade Screwdriver
Phillips Screwdriver
Pencil

ACTION: Remove cover, remove and replace peripheral cards or dummy peripheral cards, the analog board, and the disk assembly.

CRITERION: No damage. Items replaced correctly.

CRITERION TEST DESCRIPTION: Have your course manager check your Apple /// to see that the disk assembly, the analog board, and the peripheral cards have all been replaced correctly. After your course manager has approved your system, replace the cover.

HERE'S WHAT TO DO:

1. Read through Module A///-1.
2. Go to Videotape A///-1 when directed.
3. Practice the procedures in this module.
4. When you are ready, ask your course manager for the criterion test.

Introduction

The Apple /// is a sophisticated, powerful tool, yet it's easy to service. This module will give you practice in removing and replacing the cover, peripheral cards, the analog board and the disk assembly.

A videotape has been prepared to show you each operation. Watch each segment, stop the tape, and, if others need the VTR, remove it without rewinding, and then do the operation on your own machine until you can do it smoothly and confidently. Step-by-step procedures are available for each operation and you are always free to refer to them. If you have any questions or problems, do not hesitate to go to your course manager.

GO TO VIDEOTAPE A///-1 AND VIEW SEGMENT ONE

TURN PAGE

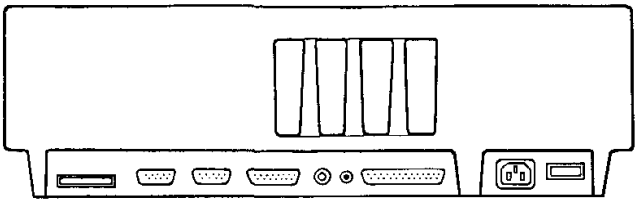


FIGURE 1

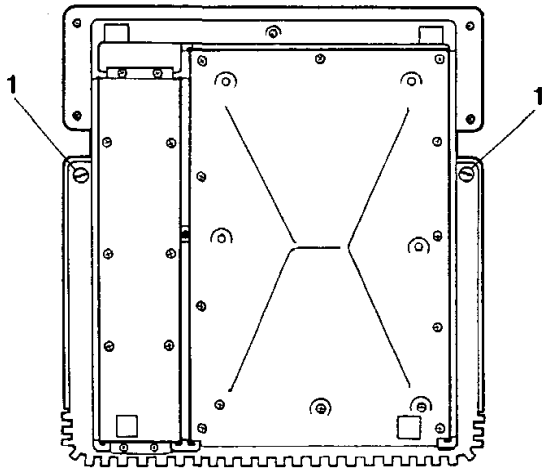


FIGURE 2

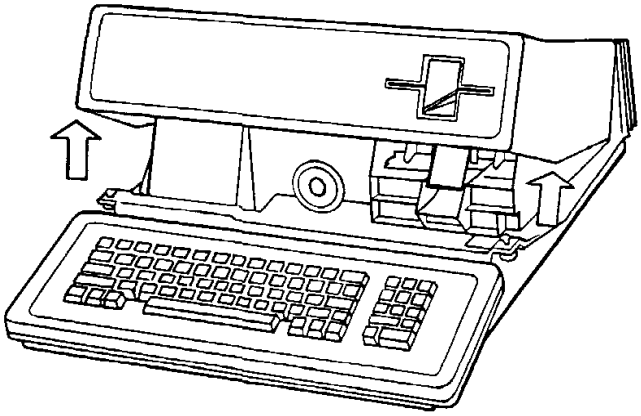


FIGURE 3

Removing The Cover

1. Power down and disconnect the AC power cord from the source and then from the back of the Apple ///.
2. Disconnect all other external cables. (See Figure 1).
3. Lift up the front edge of the Apple and tip it up so it rests on the back of the casing.
4. Use a flat blade screwdriver to turn the locking screws, one on each side of the Apple ///, 1/4 turn counterclockwise. (See Figure 2, Item 1).

   DO NOT REMOVE THESE SCREWS—they are self-capturing and are supposed to stay in.
5. Lower the Apple /// to the operating position and with a hand on each side, lift the cover up and pull it forward to remove it. (See Figure 3).

   With the cover off you can see the slots that contain peripheral cards.

NOTE: In the Apple ///, all of the slots have to be filled either with a peripheral card or a dummy card, to maintain RF shielding. In this module you may practice removing and replacing only dummy cards. At the service centers you will see Apple ///'s containing both peripheral cards and dummy cards.

TURN PAGE

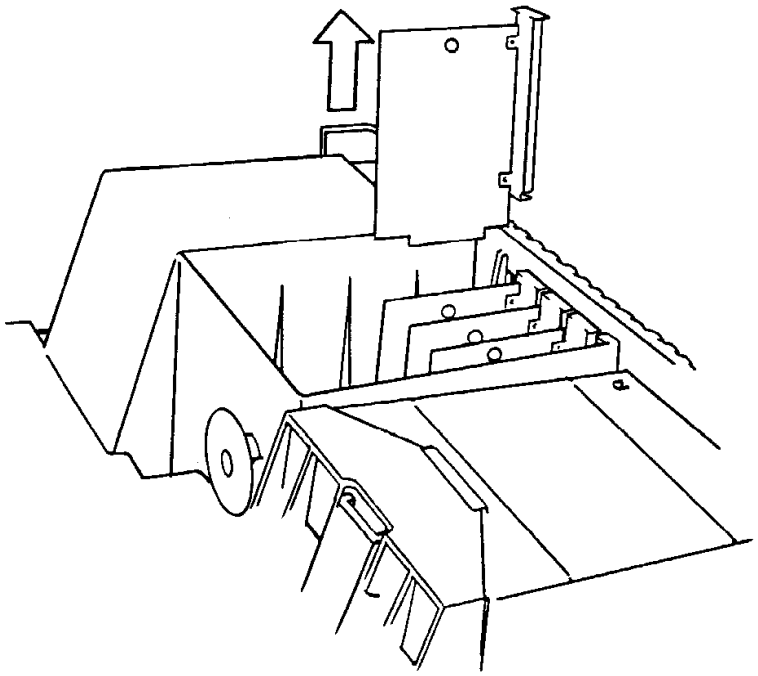


FIGURE 4

Removing The Dummy Cards

6. Grasp the card firmly with the thumbs and forefingers of both hands.
7. Gently pull straight up on the card and slide it out of the slot. (See Figure 4).

NOTE: If you have trouble pulling a card out, you can use a metal hook through the hole near the top of the card to get a better grip.

Replacing The Dummy Card

8. Slide the card straight down into the slot.
9. Seat it in the slot firmly.
10. Press the RF Shield firmly into place.

GO TO VIDEOTAPE A*III*-1 AND VIEW SEGMENT TWO.

TURN PAGE

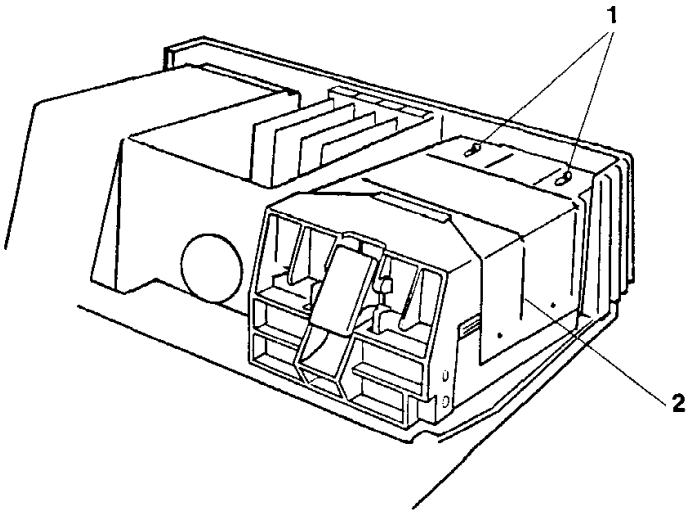


FIGURE 5

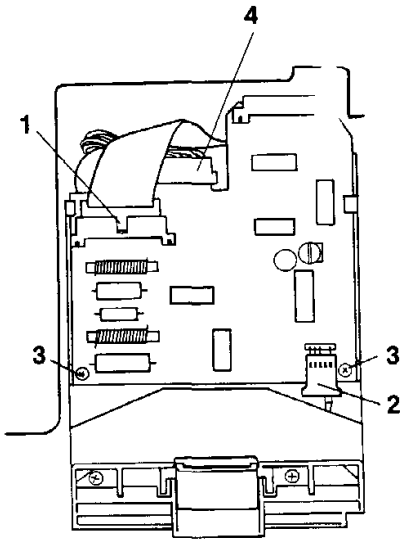


FIGURE 6

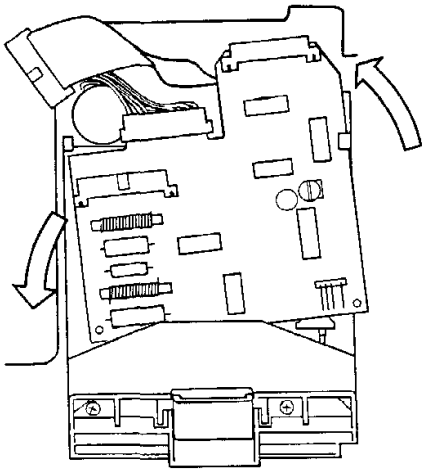


FIGURE 7

Removing The Analog Board

1. To get to the analog board you must first remove the disk assembly shield. To do this, use a flat blade screwdriver to slide the two Tinnerman retaining clips on the disk assembly shield forward. (See Figure 5, Item 1).

NOTE: The clips should come off easily. However, they sometimes fly so you should keep a finger on them.

2. Remove the disk assembly shield by flexing the side out (See Figure 5, Item 2) and lifting up on the shield.

   The shield is only retained by the spring tension of the sides and four dimples which fit into depressions of the disk casting.

3. Disconnect the disk ribbon cable. If it is hard to remove, work it off by pushing on the center tab or the sides of the plug with a small screwdriver. DO NOT PULL IT OUT BY THE CABLE! (See Figure 6, Item 1).

4. Disconnect the read/write head cable. (See Figure 6, Item 2).

NOTE: Do not try to remove the motor control cable yet. (See Figure 6, Item 4).

5. Remove the two small Phillips head mounting screws which hold the analog board at the front of the casting. (See Figure 6, Item 3).

6. Remove the analog board by gently twisting it counterclockwise and moving it forward until it clears the guide on the left. Unhook it from the guide on the right. (See Figure 7).

7. Remove the motor control plug (Figure 6, Item 4) by disengaging the four nylon locking pawls which engage the two holes in the board from both top and bottom. Lift the pawls free and disconnect the motor control cable.

GO TO VIDEOTAPE A*III*-1 AND VIEW SEGMENT THREE

TURN PAGE

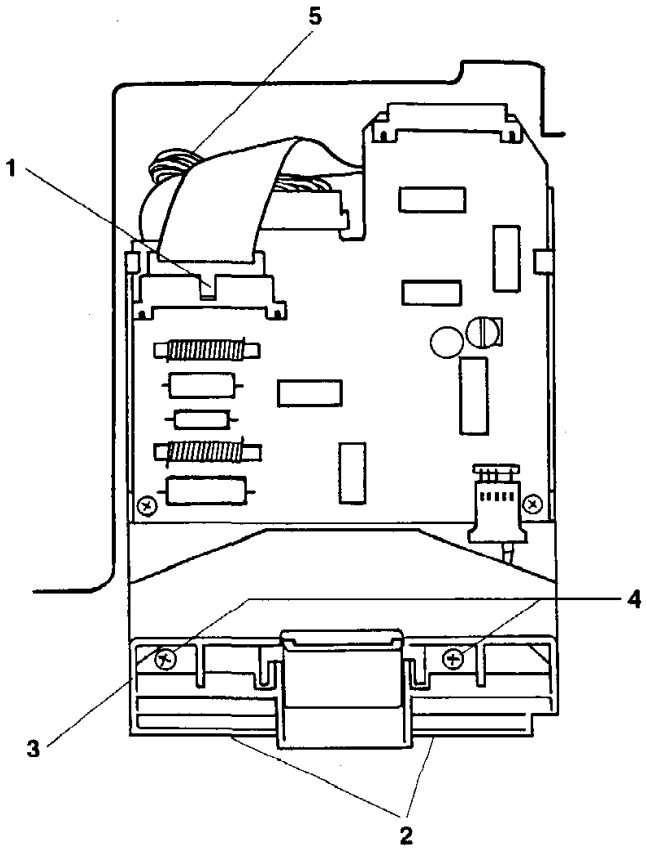


FIGURE 8

Removing The Disk Assembly

1. Draw a pencil line on the Apple /// chassis along the front (See Figure 8, Item 2) and left side (Figure 8, Item 3) of the disk assembly bezel. This will serve as a location reference when the disk assembly is re-inserted.
2. Loosen completely (but don't remove yet) the two Phillips head screws that mount the disk assembly to the Apple /// chassis. They can be seen by looking down through the front diskette guide and door assembly. (See Figure 8, Item 4).
3. Loosen but don't remove the screw in the double retaining clip that secures the back of the disk assembly. (See Figure 8, Item 5).
4. Remove the assembly by sliding it forward until it clears the retaining clip. Lift it from the chassis.
5. Recover the two front screws from the disk assembly.

Replacing The Disk Assembly

6. Slip the disk assembly under the double retaining clip so that the front is in line with the pencil line you drew earlier.
7. Replace the two front screws.
8. Tighten the retaining clip screw in the back.

GO TO VIDEOTAPE A///-1 AND VIEW SEGMENT FOUR.

TURN PAGE

Putting The Apple /// Back Together

Replace the analog board:

1. Connect the motor plug. Make sure the nylon pawls are engaged in the holes.
2. Turn the board slightly counterclockwise and hook the board under the right retainer and then the left retainer.
3. Replace the two screws in front.
4. Replace the disk ribbon cable.
5. Replace the read/write head cable.

NOTE: At this point, ask your course manager to check to see that the disk assembly is in place and the analog board is properly installed.

6. Replace the disk assembly shield.
7. Replace the Tinnerman clips by putting them over the posts and sliding them back. Use a screwdriver to press down firmly on the sides of the clips to secure them.

Replace the Apple /// cover:

8. With the Apple /// in operating position, place the cover on making sure that it is seated properly all the way around. Be sure that the four tabs on the back of the cover fit into the four slots in the back of the Apple.
9. Tip up the front edge of the Apple and tighten the two locking screws by turning them 1/4 turn clockwise.

PRACTICE

Review the disassembly and assembly procedures in this module until you can demonstrate these skills easily for your course manager.

THIS IS THE END OF MODULE A///-1.

MODULE A*III*-2

REVISION JANUARY 1982

Apple /// Module Swapping

Objective

GIVEN: An Apple ///
A Nutdriver
Phillips Screwdriver
Small Screwdriver
Wire Ties
Pad
Small Wire Cutters
Apple /// Diagnostic Diskette (Apple P/N 652-0327)

ACTION: Remove the replace the keyboard, the power supply, and the logic assembly.

CRITERION: No damage, items replaced correctly.

CRITERION TEST DESCRIPTION: Before replacing the logic assembly access panel, call your course managaer to check your skills. After your course manager has approved your work, replace the access panel and tighten down the screws.

HERE'S WHAT TO DO:

1. Read through Module A///-2.
2. Go to Videotape A///-2 where directed.
3. Practice the procedures taught in this module.
4. Ask your course manager for the criterion test.

GO TO VIDEOTAPE A///-2 AND VIEW SEGMENT ONE

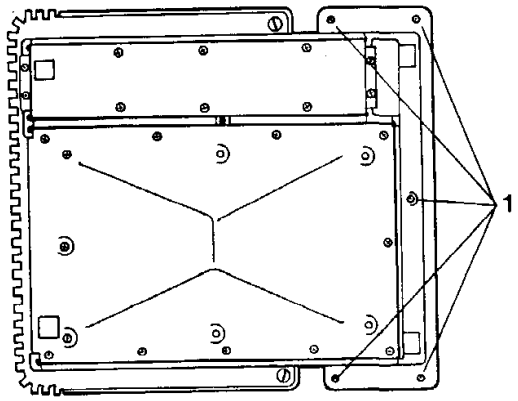


FIGURE 1

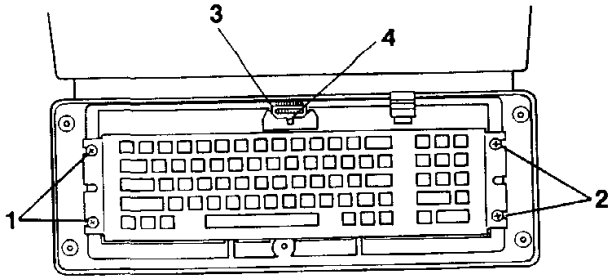


FIGURE 2

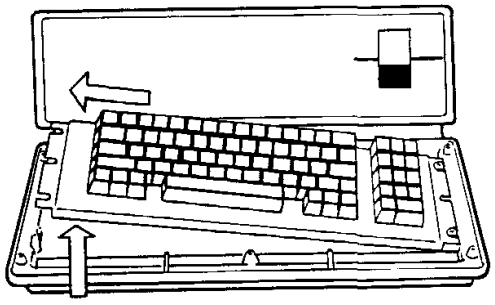


FIGURE 3

Removing The Keyboard

1. Check to see that the power is off on the Apple *III* and that the AC power cord is disconnected.
2. Turn the Apple completely over.
3. Remove the five keyboard cover mounting screws. (See Fiture 1, Item 1).
4. Remove the keyboard cover.
5. Turn the Apple right-side up again.
6. Remove the two retaining screws on the left end of the keyboard. (See Figure 2, Item 1).
7. Loosen but don't remove the two retaining screws on the right. (See Figure 2, Item 2).
8. Remove the keyboard by lifting the left end and sliding the right end from under the loosened screws. (See Figure 3).
9. Disconnect the keyboard cable (See Figure 2, Item 3) by using a screwdriver to push on the tab or sides of the cable connector (See Figure 2, Item 4).

CAUTION: Do not pull on the cable!

Replacing The Keyboard

10. Replace the keyboard cable. Make sure it wraps tightly around the printed circuit board and does not stick out.
11. Replace the keyboard.
12. Replace the two retaining screws on the left end of the keyboard.
13. Tighten down the two screws on the right side of the keyboard.
14. Replace the keyboard cover.
15. Tip the Apple *III* up, keeping one hand on the loose keyboard cover.
16. Carefully replace the five keyboard cover mounting screws. Don't overtighten them because they are just threaded into the plastic of the cover and will strip very easily.

GO TO VIDEOTAPE A*III*-2 AND VIEW SEGMENT TWO

TURN PAGE

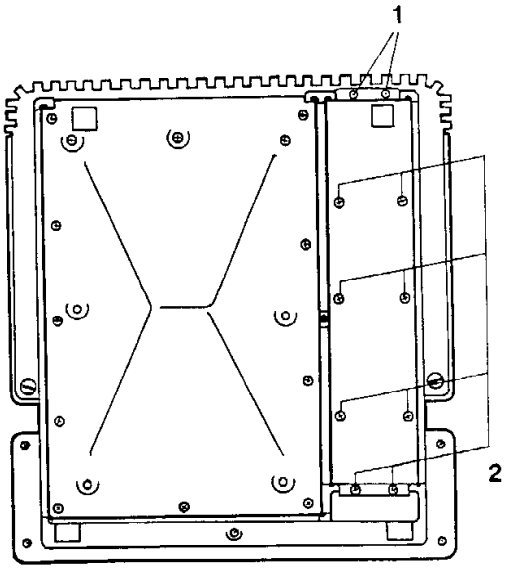


FIGURE 5

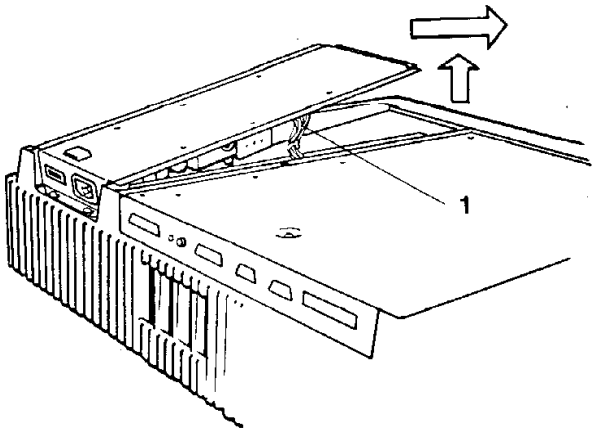


FIGURE 6

Changing The Power Supply

1. Make sure that the power is off on the Apple *III* and that the AC power and all other external cabales are disconnected.
2. Turn the Apple upside down with the back facing you, putting it on a soft pad.
3. Loosen but don't remove the two Phillips head screws located on the rear edge of the power supply bottom cover, near the on/off switch and power supply receptacle. (See Fiture 5, Item 1).
4. Completely loosen the eight screws that secure the power supply to the chassis. Do not try to take them out (See Figure 5, Item 2).
5. Lift up the edge of the power supply and slide it until it clears the two rear mounting screws. Lift the power supply out. (See Figure 6).
6. Turn the power supply over.
7. Disconnect the power supply connector by squeezing in on the tabs and gently (with a rocking motion) pull the connector out. (See Fiture 6, Item 1).
8. If there is a wire tie holding the cable, clip it.

Replacing The Power Supply

9. Place a new wire tie on the cable.
10. Plug in the cable connector.
11. Replace the power supply. Slide the cover under the two rear screws and lower the power supply into place.
12. Tighten down all the screws. BE CAREFUL! DON'T FORCE THE SCREWS! If excessive force is applied, the screws will strip out the chassis. Make sure the screws are not crossthreaded. If one doesn't go in easily, back it out and try again.

GO TO VIDEOTAPE A*III*-2 AND VIEW SEGMENT THREE

TURN PAGE

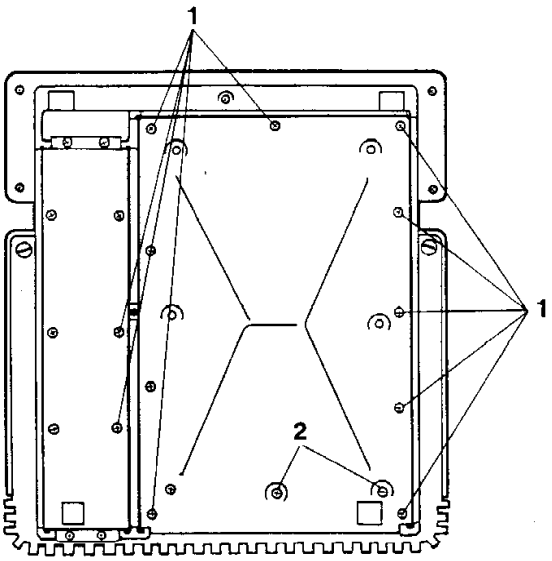


FIGURE 7

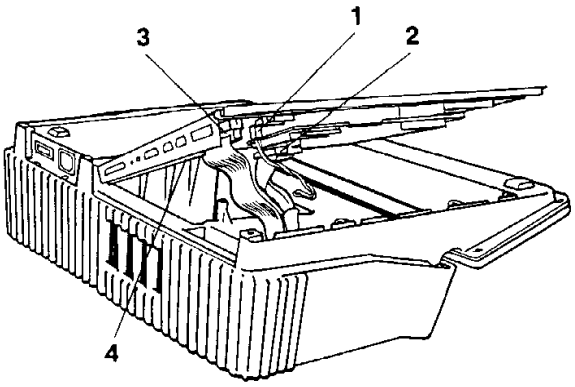


FIGURE 8

Removing The Logic Assembly

1. Make sure that the power on the Apple is off and that all external cables are disconnected.
2. Tip up the Apple *III*.
3. Remove the two locking screws that hold the top on.
4. Remove the top.
5. Take out the peripheral cards or dummy cards.
6. Put the Apple top back on to protect the disk bezel.
7. Place the Apple upside down and put it on a pad with the rear facing you.
8. Completely loosen (but don't remove) the ten Phillips screws around the edge of the logic access panel. (See Figure 7, Item 1).
9. Completely loosen (but don't remove) the two additional recessed screws that are about one and a half inches in from the rear edge of the panel. (See Figure 7, Item 2).
10. Lift up the logic board carefully from the right side. Allow the panel to remain resting on its edge nearest the power supply. (See Figure 8).
11. While holding the logic board on the underside, disconnect the speaker cable (See Figure 8, Item 1), the keyboard cable (Figure 8, Item 2), and the disk drive cable (Figure 8, Item 3). Note which plug goes where.
12. Lift the assembly so that you can unplug the power supply plug. (Figure 8, Item 4).
13. Lift out the logic assembly.

TURN PAGE

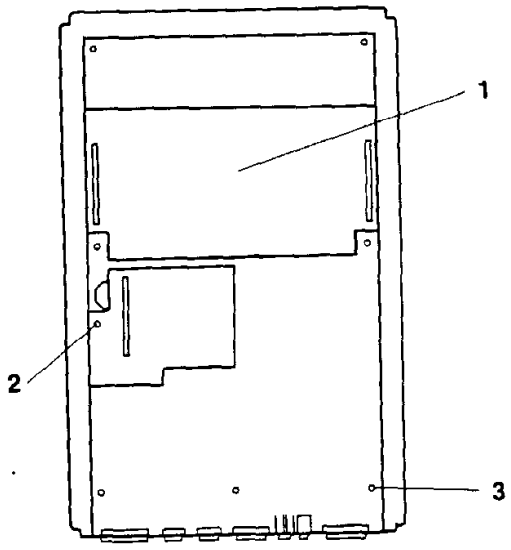


FIGURE 9

14. Lift up and remove the encoder board from its connector. (See Figure 9, Item 2). You may also have to lift it off a standoff that is on the main logic board of some Apple *III*'s.
15. Place the logic assembly flat on the work surface, use both hands to lift off the memory board (See Figure 9, Item 1) from the main logic board (Motherboard).

NOTE: Lift the memory board straight up so that the male connector pins mounted on the main logic board will not be bent or broken.

16. Remove the retaining nut or screw on the main logic board. (See Figure 9, Item 3).
17. Erase the plugs out of the back.
18. Slide out the board from the peripheral connector opening of the access panel.

GO TO VIDEOTAPE A*III*-2 AND VIEW SEGMENT FOUR

TURN PAGE

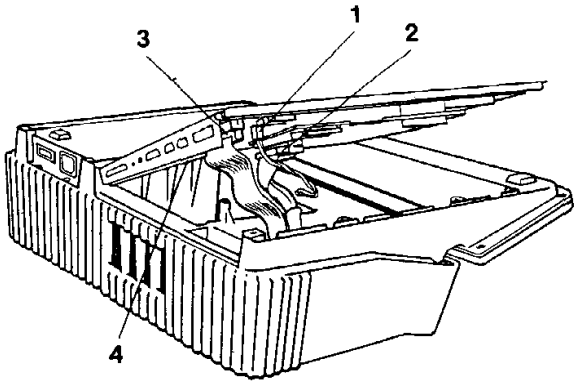


FIGURE 8

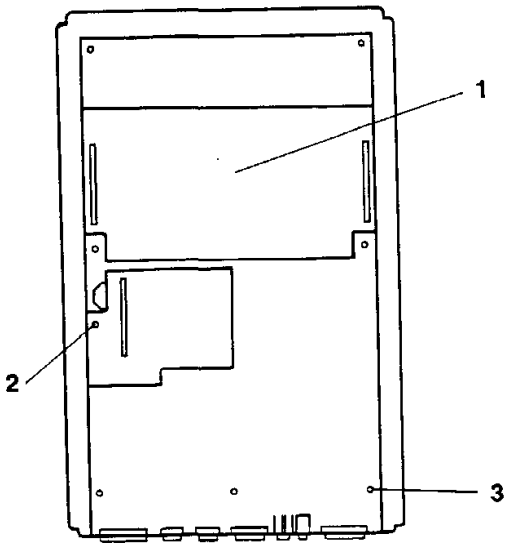


FIGURE 9

Putting It Back Together

1. Make sure the insulating shield is in place to keep the board from shorting on the access panel.
2. Replace the main logic board by slipping the peripheral connectors into their cutouts in the rear access panel, and replacing the retaining screw with the nutdriver (Figure 9, Item 3).
3. Replace the encoder board. (Figure 9, Item 2).
4. Replace the memory board. (Figure 9, Item 1). Make sure the memory board is properly oriented. The RAM chips on the memory board point in the opposite direction to the chips on the main logic board. The notches on the memory board IC's should be facing the ouptut connectors.

   Align the end pin in the end hole of the main memory board and then tip the board flat. When all pins are properly started, press it gently but firmly into place.
5. Rest the access panel on the power supply side and reach under and plug in the power supply. (Figure 8, Item 4).
6. Put in the disk cable. (Figure 8, Item 3).
7. Plug in the keyboard cable. (Figure 8, Item 2).
8. Plug in the speaker cable. (Figure 8, Item 1).

CAUTION: Before you go any further, have your course manager check to see that all connections are properly in place.

TURN PAGE

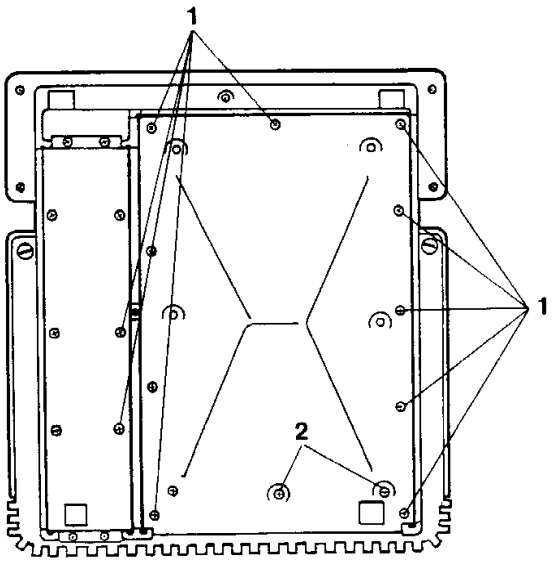


FIGURE 7

9. Put the entire logic assembly panel in place and tighten down the 12 Phillips scres on the logic assembly access panel. (See Figure 7, Items 1 and 2).
10. Turn the Apple /// right side up.
11. Remove the cover.
12. Replace the peripheral cards and/or dummy cards.
13. Replace the cover.

Now that you have reassembled your Apple /// continue on with this module by running the Apple /// Diagnostics.

TURN PAGE

Apple /// Service Diagnostics

Using the Apple /// diagnostic diskette, (P/N 652-0327), will allow you to diagnose Apple /// failure modes at the modular level (RAM failures may be diagnosed to the chip level).

CAUTION: The Apple /// keyboard has a repeat mode built in. While running the diagnostics you will be asked to press individual keys during certain tests. It is highly important that you use a QUICK touch so as not to activate the repeat mode, except in the Repeat Mode Test. Activating the repeat mode may cause the test to fail or to skip over a test.

Diagnostics Setup

1. Check to see if your Apple /// and all associated peripherals are all hooked up properly.
2. Insert the diagnostics diskette into the internal disk drive and boot the system.

Diagnostic Menu

1. After you have successfully booted the diagnostic program, you will see the menu below displayed on the monitor screen.

```
                    MAIN MENU

TEST ALL

VIDEO                    (NOT TESTED)
SOUND                    (NOT TESTED)
RAM MAP                  (NOT TESTED)
DISK                     (NOT TESTED)
KEYBOARD                 (NOT TESTED)
ROM                      (NOT TESTED)

RAM TEST
MAKE TEST DISKS

CHOOSE:

ESC(APE
  A(CCEPT S(KIP
```

NOTE: Because the Apple /// runs several internal diagnostics before booting, having come this far is a vote of confidence for correct system operation.

2. You will notice that TEST ALL is highlighted in inverse video. The inverse video indicates which test you have the option of skipping or accepting.
3. Pressing the "S" key (for Skip) will skip through the list of menu options one-by-one. Pressing "A" (for Accept) will accept and run the highlighted menu option. Pressing the ESCAPE key will escape the diagnostics program altogether.
4. Try using the skip option now just to get used to the way that it works.

TURN PAGE

Make Test Disks

First you need to make a test diskette that will be used later in this module.

1. Press "S" (for skip) until "MAKE TEST DISKS" is highlighted.
2. Accept this option by pressing the "A" key.
3. Remove the diagnostic diskette from the internal drive.
4. When asked for the drive number in which you will create your test diskette, type "1" (for internal drive) and press RETURN.
5. Insert a blank diskette into the internal drive. Close the door and press RETURN.
6. When the test diskette is complete, you will be asked if you want to make another test diskette. Only one test diskette is necessary for a single drive system. Type "N" (for no) and press RETURN.
7. Now reinsert the Dealer Diagnostic Diskette into the internal drive and reboot the system.

NOTE: The CONTROL-RESET method will not reboot your system at this point in the test. You will need to use the Cold Boot method to restart your system. This means turning the power off on your Apple *III* and then power on again.

8. Now you are ready to run the diagnostics on your Apple *III*.

Test All

1. Accepting this option will cause the following tests to be run one-by-one as if they were selected one at a time.

   VIDEO

   SOUND

   RAM MAP

   DISK

   KEYBOARD

   ROM

2. Skip through the tests until you have TEST ALL highlighted.
3. Accept this option by typing "A".
4. Now follow through the tests on the screen and in this module.

Video

The VIDEO diagnostic module tests all the various screen and color modes available on the Apple ///. You will be presented with 13 different video displays and be asked to make a subjective evaluation of each one. After each display is presented, press:

SPACE BAR ..... IF THE DISPLAY PASSES

RETURN KEY ..... IF THE DISPLAY FAILS

ESCAPE KEY ..... TO LEAVE THE VIDEO TESTS

LEFT ARROW KEY ..... TO RETRY THE TEST

NOTE: With a B & W monitor, different colors will be displayed as different shades of grey; some B & W monitors are not capable of displaying all the different shades with a single setting of the monitor controls.

You will find the chart describing your video display on the next page.

What You See

TEST DISPLAY	B & W MONITOR	COLOR MONITOR
1. HIRES MODE 1	B & W pattern only	no color
2. HIRES MODE 2	B & W pattern only	no color
3. 280 x 192 COLOR HIRES MODE 1	negative image	red and black
4. 280 x 192 COLOR HIRES MODE 2	B & W pattern	green & white/or yellow
5. SUPER HIRES TEST 1	B & W pattern only	no color
6. SUPER HIRES TEST 2	B & W pattern only	no color
7. AHIRES TEST 1	pattern divided into 4 different shades of grey—may be difficult to resolve.	from top to bottom, the pattern is colored; blue, green, & gold or orange.
8. AHIRES TEST 2	same pattern as 7).	same pattern as 7).
9. COLOR BAR & GREY SCALE TEST	16 shades of grey from white on left to black on right—may be difficult to resolve.	16 color shades, from left to right: white, aqua, yellow, green, pink, grey, orange, brown, light blue, medium blue, grey, dark green, light purple, dark blue, magenta, and black.

What You See

TEST DISPLAY	B & W MONITOR	COLOR MONITOR
10. APPLE II TEXT MODE 1	sentence and alphabet are displayed.	same as B & W
11. APPLE II TEXT MODE 2	large #2 is displayed.	same as B & W
12. APPLE /// 40 COLUMN TEXT MODE	16 blocks of different shades of grey, with color names printed in each box—shades may be hard to resolve.	16 different colored blocks with the color names printed in each box.
13. APPLE /// 80 COLUMN TEXT MODE	smaller characters across 80 columns	same as B & W

TURN PAGE

Sound

The SOUND diagnostic module has 3 parts: a soft bell, a hard bell, and a sound that gradually grows in amplitude. After each sound, press:

SPACEBAR ..... IF YOU HEAR THE SOUND

RETURN KEY ..... IF YOU DO NOT HEAR THE SOUND

RAM Map

The RAM MAP diagnostic module does a quick test of how much RAM is in the system, e.g., for a 128K system you would see: RAM MAP INDICATES A 128K SYSTEM. Press:

SPACEBAR ..... IF MESSAGE CORRESPONDS TO AMOUNT OF RAM DETERMINED BY INSPECTION

RETURN KEY ..... IF MESSAGE DOES NOT CORRESPOND TO AMOUNT OF RAM DETERMINED BY INSPECTION

Disk

1. Remove the dealer diagnostic diskette from the internal drive.
2. Insert the test disk that you created earlier in this module. Close the drive door and press RETURN.
3. You will now be asked for the number of external drives. Type "0" for no external drives. Press RETURN.
4. The test will now run automatically, ending with a disk test summary.
5. Remove the test diskette from the internal drive.
6. Reinsert the diagnostic diskette and press RETURN.

Keyboard

The keyboard test is divided into 3 parts:

A. Alphanumeric Keys

B. Special Function Keys

C. Numeric Keypad Keys.

A. Alphanumeric Keys:

1. Every alphanumeric keystroke possible will be displayed on the screen.
2. Press each key and verify that the corresponding letter or number on the screen is removed.
3. You will need to use the Control "A", Shift "2", and Shift "=" sequence to remove three of the letters from the screen.

B. Special Function Keys

1. After the special function keys appear depress the ALPHA LOCK key and note that its state changes on the display. Leave the key in the UP position.
2. Repeat Step 1, this time with the OPEN APPLE key. This key will not latch in the down position, you must hold it down to see the display change.
3. Depress any letter key and hold it down. Note its REPEAT SPEED. Anything from 5 to 15 / sec is acceptable.
4. While holding a key down depress the SOLID APPLE key. The REPEAT SPEED should approximately double.
5. Press one of the following keys to continue on with the test:

   SPACEBAR ..... IF THE KEYBOARD TEST PASSED

   RETURN ..... IF ANY OF THE KEYBOARD TESTS FAILED

TURN PAGE

6. The SOLID APPLE function test is next. You will be prompted to enter key stroke sequence.

CAUTION: The next steps in this section must be done exactly as instructed! When pressing and releasing the (A) key, do so quickly so that you do not activate the repeat mode. If the key is held down too long it will fail the keyboard test.

7. Press and release the "A" key (remember to use a quick touch).
8. Hold the SOLID APPLE key down while you press and release the "A" key.
9. Release the SOLID APPLE key.
10. Lightly press and release the "A" key.

C. Numeric Keypad Keys:

1. This test proceeds in the same manner as the Alphanumeric Key test, but for the keys on the numeric keypad.
2. After you have finished testing the numeric keys, press the appropriate key, SPACEBAR or RETURN to continue on.

Keyboard Interrupt Test

If the keyboard interrupt test comes up on the screen simply press any key to continue on with the test.

ROM

The system takes over and you will see one of two messages:

ROM PASSES . . . or ROM FAILS . . .

NOTE: If you selected the TEST ALL option from the main menu, you will be returned to the menu after the ROM test, the test results will be displayed to the right of each test option.

(PASSED) OR (FAILED)

Other Diagnostic Options

One other option on the main menu is RAM TEST. After it is completed, you must reboot the unit being tested.

RAM Test

1. Press the "S" key to skip to RAM TEST.
2. Accept this option by pressing "A".
3. You will see several full screen patterns followed by a beep and a diagnostic RAM MAP displayed in the upper left corner of the monitor. If the RAM in the system are OK, the map will look like this:

DIAGNOSTIC
RAM

. . . . . .
. . . . . .
. . . . . .
. . . . . .
. . . . . .
. . . . . .
. . . . . .
. . . . . .

If a RAM error is found, one or more of the dots (.) will have the number one (1) in its place. RAM chip failures may be tracked down by comparing the ones (1) found in the display matrix above against the RAM chip locater matrix below.

B9	B8	B7	B6	B5	B4	B3	B2	*
B17	B16	B15	B14	B13	B12	B11	B10	*
B9	B8	B7	B6	B5	B4	B3	B2	
B17	B16	B15	B14	B13	B12	B11	B10	
C17	C16	C15	C14	C13	C12	C11	C10	
D9	D8	D7	D6	D5	D4	D3	D2	
D17	D16	D15	D14	D13	D12	D11	D10	
C9	C8	C7	C6	C5	C4	C3	C2	

*Disregard these two rows on 96K systems, they will appear as 1s on the diagnostic RAM map.

NOTE: The RAM test will keep repeating until you power down or reboot the system.

TURN PAGE

PRACTICE

When you feel you are comfortable with removing and replacing the logic assembly, putting the Apple back together again, and running the Apple *III* Dealer Service Diagnostics ask your course manager to check your work.

THIS IS THE END OF MODULE A*III*—2

MODULE AIII-3

REVISION JANUARY 1982

Apple /// Troubleshooting

Objective

GIVEN: 48K Apple II plus with language card
Various descriptions of an Apple /// with a problem or problems
Computer-Aided Instruction Diskette (CAI)

ACTION: Use the flowchart and list of troubleshooting steps to describe what you would do to diagnose and eliminate the problem(s).

CRITERION: Four out of five troubleshooting solutions, or steps toward a solution, correct.

CRITERION TEST DESCRIPTION: When you have finished going through the exercises and feel competent with this module, demonstrate your Apple /// troubleshooting skills by correctly answering the five questions on the Criterion Test Sheet given to you by your course manager.

HERE'S WHAT TO DO:

1. Obtain the diskette with the Computer-Aided Instruction (CAI) exercises on it.
2. Read through Module A///-3.
3. Boot the CAI diskette on an Apple II and go through the exercises.
4. Ask your course manager for the Criterion Test.

Introduction

The two major components to troubleshooting are diagnosing, or finding, the problem and eliminating, or fixing, the problem.

You've already had practice at removing and replacing the various modules of the Apple ///. These skills are necessary in order to be able to fix a problem—once you know where the problem lies. For instance, if you knew an Apple /// had a bad disk drive connecting cable, and you had a spare cable, you would be able to fix the problem. But if all you knew is that the Apple /// would not boot, you would have to do a little detective work to track down the problem.

In this module we will concentrate on learning how to find out exactly what is wrong (at the modular level) with an Apple /// that is not working properly. Once you know how to diagnose a problem, you'll be able to fix it.

TURN PAGE

Using The Diagnostic Flowchart

Take a look at the Diagnostic Flowchart in this module. Accompanying it is a list of 11 troubleshooting steps. The flowchart itself is made up of numbered and lettered boxes. The numbered boxes contain directions for proceeding through the flowchart, based on the symptoms that show up on the Apple ///. The lettered boxes contain a list of numbers:

Each number refers to one of the 11 steps in the troubleshooting steps list. The order of the troubleshooting steps in each lettered box is based on two troubleshooting rules:

1. Check out the more likely causes of the problem before the less likely causes.
2. Make the checks that can be done quickly and easily before those that take more time and energy.

   Rule 1 is broken only when rule 2 applies.

Always begin troubleshooting at Box 1 of the flowchart, power on with the SOS System Demonstration diskette. Once the Apple ///'s symptoms lead you through the flowchart to a lettered box containing a list of trouble-shooting steps, follow the instructions below:

1. Turn the power off.
2. Carry out the designated troubleshooting step. (Start at the top of the list of numbered steps.)

   Once a troubleshooting step leads you to open the Apple ///, you should:

   A. Check to make sure all connecting cables are properly hooked up.

   B. Check all boards to make sure all IC chips are properly seated.

   C. Power on again to see if the problem still exists.

3. Power on to see if the problem is eliminated.

   If the problem IS NOT eliminated:

   A. Turn the power off.

   B. Replace whatever spare module you just put into the Apple *III* with original.

   C. Carry out the next troubleshooting step listed in the lettered box.

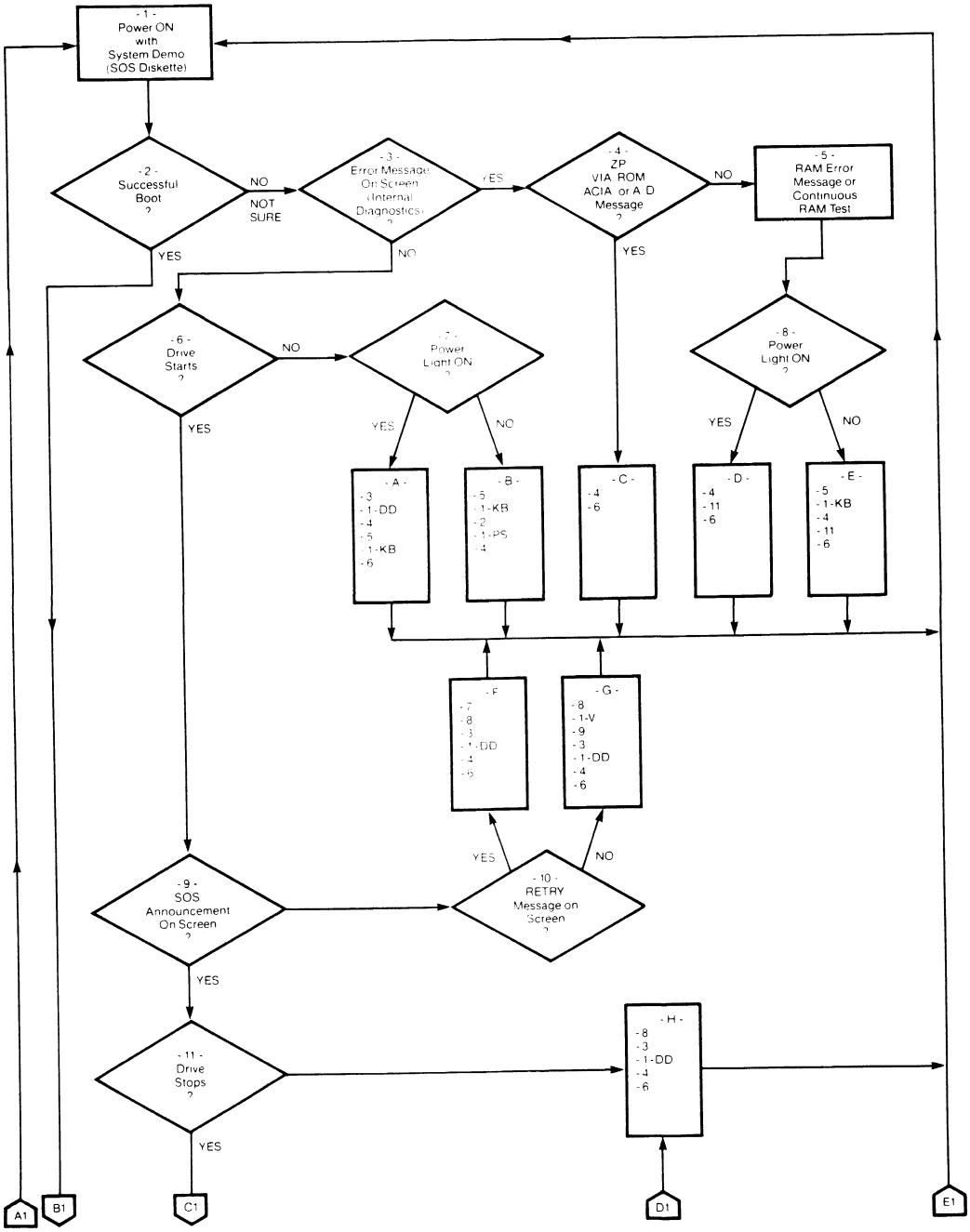
   D. Go back to Step 3 above.

   If the problem IS eliminated:

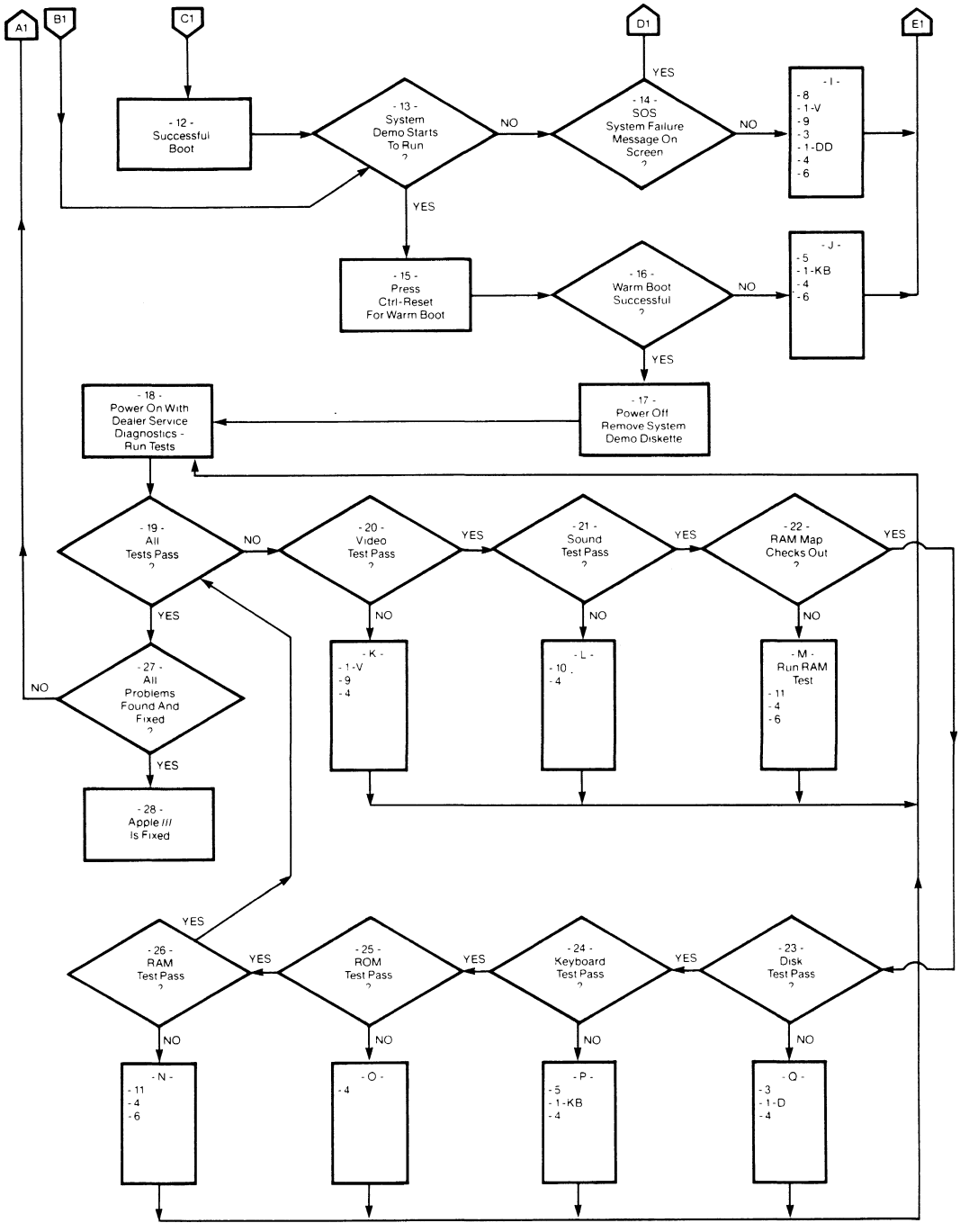
   E. Leave the swapped module in place and continue through the Diagnostic Flowchart.

   F. Take the "bad" module and prepare it for shipment to your Level II Service Center.

TURN PAGE


- 1 -
Power ON
with
System Demo
(SOS Diskette)
- 2 -
Successful
Boot
?
NO
NOT
SURE
YES
- 3 -
Error Message
On Screen
(Internal
Diagnostics)
?
YES
NO
- 4 -
ZP
VIA ROM
ACIA or A/D
Message
?
NO
YES
- 5 -
RAM Error
Message or
Continuous
RAM Test
- 6 -
Drive
Starts
?
NO
YES
- 7 -
Power
Light ON
?
YES
NO
- 8 -
Power
Light ON
?
YES
NO
- A -
- 3
- 1-DD
- 4
- 5
- 1-KB
- 6
- B -
- 5
- 1-KB
- 2
- 1-PS
- 4
- C -
- 4
- 6
- D -
- 4
- 11
- 6
- E -
- 5
- 1-KB
- 4
- 11
- 6
- F -
- 7
- 8
- 3
- 1-DD
- 4
- 6
- G -
- 8
- 1-V
- 9
- 3
- 1-DD
- 4
- 6
YES
NO
- 10 -
RETRY
Message on
Screen
?
- 9 -
SOS
Announcement
On Screen
?
YES
- 11 -
Drive
Stops
?
YES
- H -
- 8
- 3
- 1-DD
- 4
- 6
A1
B1
C1
D1
E1

AIII-3-6


A1
B1
C1
D1
E1
- 12 - Successful Boot
- 13 - System Demo Starts To Run ?
NO
YES
- 14 - SOS System Failure Message On Screen ?
NO
YES
- I - - 8 - 1-V - 9 - 3 - 1-DD - 4 - 6
- 15 - Press Ctrl-Reset For Warm Boot
- 16 - Warm Boot Successful ?
NO
YES
- J - - 5 - 1-KB - 4 - 6
- 17 - Power Off Remove System Demo Diskette
- 18 - Power On With Dealer Service Diagnostics - Run Tests
- 19 - All Tests Pass ?
NO
YES
- 20 - Video Test Pass ?
YES
NO
- 21 - Sound Test Pass ?
YES
NO
- 22 - RAM Map Checks Out ?
YES
NO
- K - - 1-V - 9 - 4
- L - - 10 - 4
- M - Run RAM Test - 11 - 4 - 6
- 27 - All Problems Found And Fixed ?
NO
YES
- 28 - Apple /// Is Fixed
- 23 - Disk Test Pass ?
YES
NO
- 24 - Keyboard Test Pass ?
YES
NO
- 25 - ROM Test Pass ?
YES
NO
- 26 - RAM Test Pass ?
YES
NO
- N - - 11 - 4 - 6
- O - - 4
- P - - 5 - 1-KB - 4
- Q - - 3 - 1-D - 4

Steps Referred To In The Lettered Boxes Of The Flowchart

The Diagnostic Flowchart is designed to test the basic Apple *III* system. Disconnect any peripheral devices and cards and troubleshoot them separately according to the procedures explained in the appropriate Level I Service Training module.

Each swap step listed below involves exchanging a known good part from your spares kit with the questionable part from the Apple *III*. When swapping, first just connect the cable(s) to the new module so you can see if the swap fixes things or not. Don't fully install the new module and screw everything down—if the new module doesn't solve the problem you'll just have to take it out again.

1. Swap the appropriate connecting cable.*
   V = Video cable (if available)
   PS = Power Supply cable
   DD = Disk Drive cable
   KB = Keyboard cable

*When entering this step as an answer in the CAI exercises, specify the cable you would swap, e.g., Swap video cable.

NOTE: The keyboard and disk drive cables are identical to each other. Your Spares Kit may only list the DD cable, but you can use it whenever you need to swap the KB cable.

2. Swap the power supply.
   a. Check the power supply fuse first; swap it if it's burned out.
3. Swap the drive.

   If the drive proves to be the problem, take the problem drive and further isolate the defective module down to the analog card or mechanical assembly:

   a. Swap the analog card.

      Take the analog card of the "bad drive", put it in the good drive, and power on again. If the drive does not work you know the problem with the "bad drive" is with the analog card. If the drive does work you know the problem with the "bad drive" is with the mechanical assembly.

      If the mechanical assembly proves to be the problem it may just be an adjustment problem. You can run the disk tests for the Apple II in emulation mode on the *III* and make any necessary adjustments to see if they eliminate the problem.

An Example

The following example will illustrate Apple *III* troubleshooting procedures using the Diagnostic Flowchart and the list of troubleshooting steps.

Let's say you have an Apple *III* that won't boot.

You begin at Box 1 by powering on with the SOS System Demonstration diskette. The boot is not sucessful: there was no error message on the screen (Box 3), and the disk drive started (Box 6), and you also noticed the SOS announcement on the screen (Box 9), but the disk drive did not stop (Box 11). This situation leads you to the lettered Box H.

The first troubleshooting step listed in Box H is Step 8. Step 8 from the list of 11 troubleshooting steps says try booting a different SOS diskette. So you power off, insert a different System Demonstration diskette, and power on again.

You still get the same problem—the disk drive won't stop spinning. So you turn the power off and carry out the next troubleshooting step listed in Box H: Step 3—Swap the drive. You power on again and still the disk drive does not stop spinning.

You turn the power off and replace the original drive. The next trouble-shooting step in Box H is 1-DD—Swap the disk drive cable. After doing so you power on again.

This time the disk drive does not keep spinning; the System Demonstration boots (Box 12) and the System Demonstration program begins to run (Box 13).

You would keep going through the flowchart, but this much of the example should serve to illustrate how to troubleshoot using the Diagnostic Flowchart.

TURN PAGE

Running The CAI Diskette

1. Boot the CAI diskette on a 48K Apple II Plus with a language card and go through the five interactive exercises. Each exercise presents a description of an Apple /// with a problem, and asks you what diagnosing and troubleshooting steps to take as you track down the problem. The exercises give you practice using the diagnostic flowchart and will help you sharpen your troubleshooting skills.
2. When you are through with the CAI exercises, ask your course manager for the criterion test: five questions similar to those presented in the CAI exercises. You may use the diagnostic flowchart and list of trouble-shooting steps in order to obtain your answers.
3. When you have written out your answers, have your course manager check them.

Practice

If you have a problem with more than one of the questions, find out from your course manager or a classmate what went wrong. (You may also go through the CAI exercises again if you like.) Tell the course manager when you are ready and you will receive another set of five questions.

THIS IS THE END OF MODULE A*///*-3

4. Swap the main logic board.

5. Swap the keyboard.

6. Swap the RAM memory board. (You may have to reload the new board with the RAM from the original board.)

7. Try booting again.

8. Try booting a different SOS diskette.

9. Swap the video monitor.

10. Swap the speaker.

11. Swap the designated RAM IC chips. (Consult the chip map in the Running Diagnostics Job Aid.)

MODULE P1

REVISION JANUARY 1982

Profile Hard Disk Disassembly And Assembly

Objective

GIVEN: ProFile Disk Drive
Diagonals/Tie Wraps
Small Phillips Screwdriver
Protective Pad
Small Flatblade Screwdriver

ACTION: Remove and replace the ProFile cover, the light emitting diode (LED), the controller board, the power supply, the Hard Disk Assembly (HDA) and the analog board.

CRITERION: All parts replaced correctly. No damage to the ProFile or the HDA.

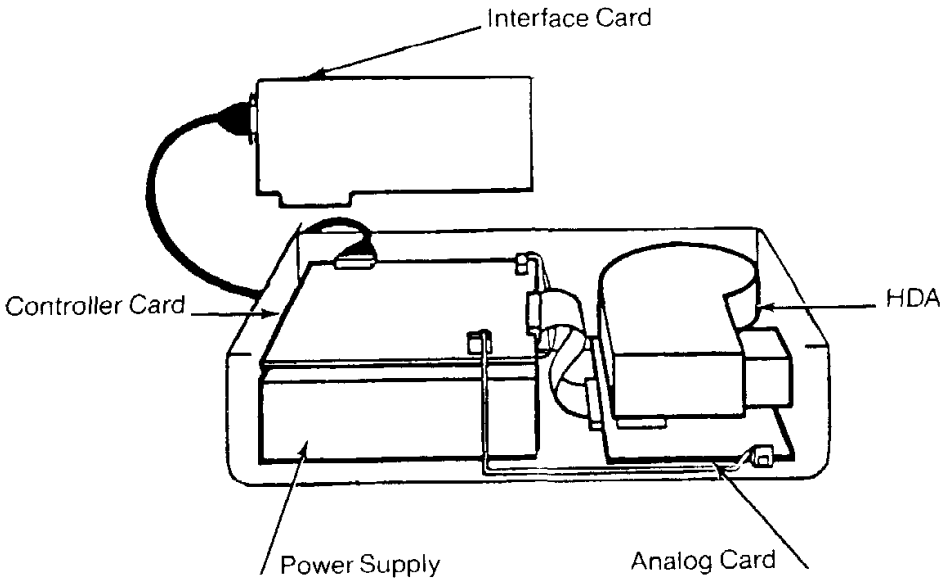
CRITERION TEST DESCRIPTION: Demonstrate your competency in removing and replacing the various parts of the ProFile unit to your course manager. Your course manager will check to see that all sections have been correctly reinstalled and that all connections are in place.

HERE'S WHAT TO DO:

1. Obtain the required materials from your course manager.
2. Read through Module P1.
3. Perform the required procedures.
4. Practice until you feel ready to demonstrate that you can correctly assemble and disassemble the ProFile.
5. Notify your course manager when you are ready for the Criterion Test.

TURN PAGE

ProFile Diagram



Introduction

As a service technician, you will need to know how to troubleshoot the ProFile by identifying the defective module. To do this, you will need to know the skills involved in removing and replacing the various parts of the ProFile. This module will give you an opportunity to practice removing and replacing the cover, the LED, the controller board, the power supply, the HDA and the analog board. (Refer to the ProFile Diagram for locations of the ProFile parts).

CAUTION: The ProFile Drive is a mechanical device with motors and moving parts. Rough handling such as dropping the drive, sharply jarring it or allowing heavy objects to fall on it can cause a malfunction. Whenever it is necessary to turn the ProFile over, be sure to rest it on a protective pad.

UNDER NO CIRCUMSTANCES SHOULD THE HDA BE ENTERED!

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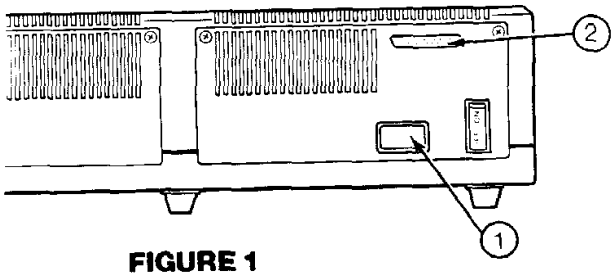

FIGURE 1

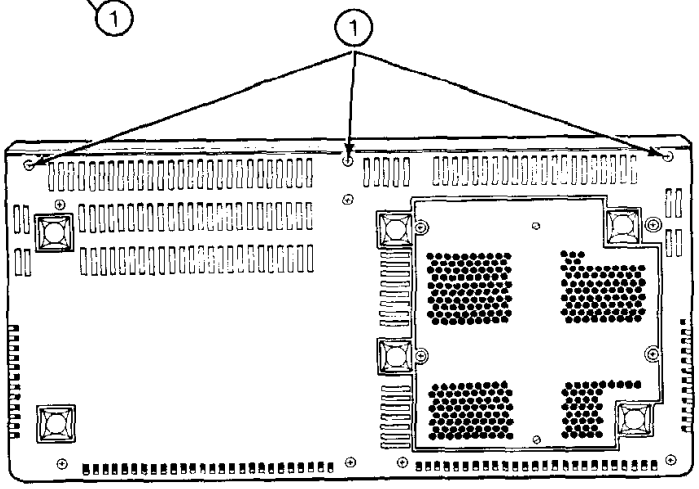

FIGURE 2

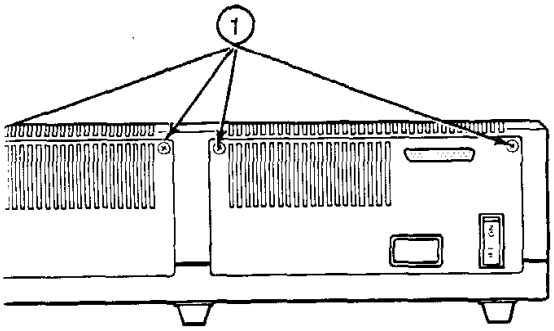

FIGURE 3

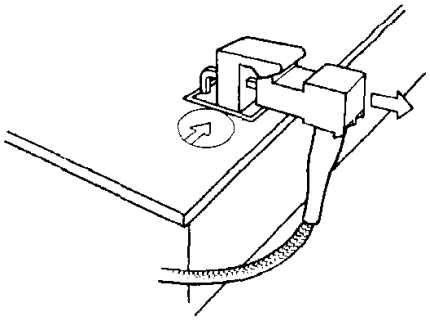

FIGURE 4

Removing The ProFile Cover

1. Make sure all power to the ProFile is off. Turn the ProFile around so that the back of the unit faces you. Remove the power plug and interface board cable from the connections in the back of the drive. (Figure 1, Items 1 and 2).
2. Turn the drive around so that the front faces you. Turn the ProFile all the way over and rest it on the pad.
3. Remove the three Phillips head screws on the front edge of the bottom of the drive. (Figure 2, Item 1).
4. Turn the ProFile right-side up.
5. Loosen but don't remove the four rear screws on the back of the unit. (Figure 3, Item 1). Turn the screws counterclockwise 3-4 turns.
6. Carefully lift the cover free of the loosened screws but don't attempt to remove the cover yet because the light emitting diode (LED) is attached to the controller board.
7. Carefully lift up the cover enough so that you can reach underneath and unplug the LED from the connector on the controller board. (Figure 4). (Loosen the back screws some more if necessary).

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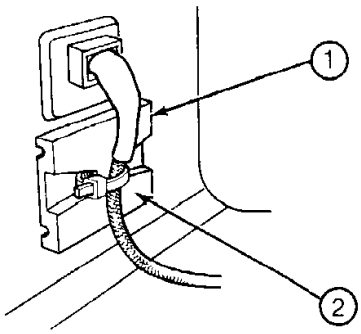

FIGURE 5

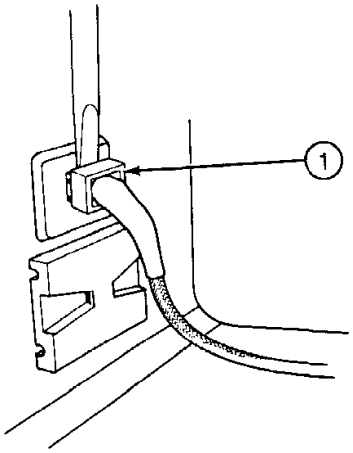

FIGURE 6

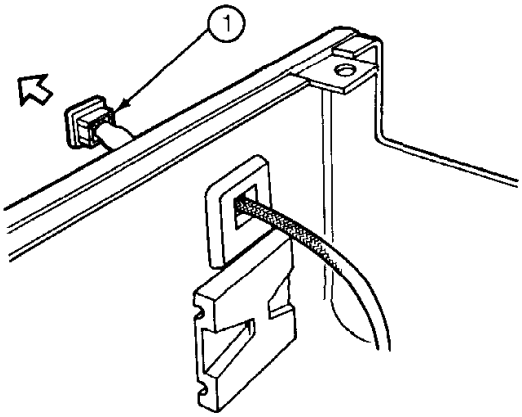

FIGURE 7A

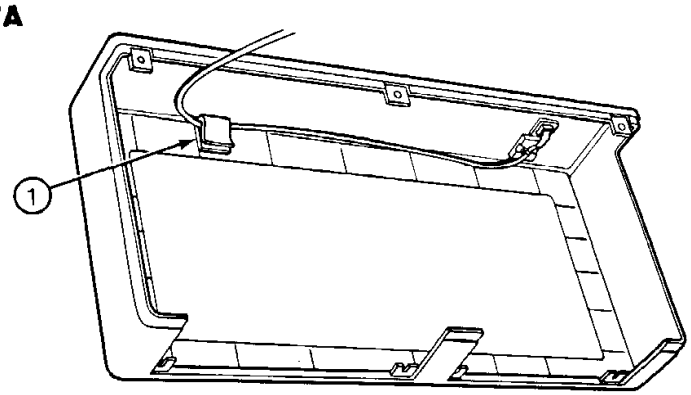

FIGURE 7B

Removing The LED From The Cover

8. With the LED plug free from the connector on the controller board, you can now remove the LED from the cover. First, remove the LED cable from the white holder (Figure 5, Item 1). Use the diagonals to cut the white plastic tie holding the cable just below where the LED is installed in the cover and remove the tie. (Figure 5, Item 2).
9. Next, remove the other end of the LED cable from the other holder in the cover. This holder may be a clamp like the one shown in Figure 7B, Item 1 or another holder like the one shown in Figures 5 and 6.
10. With a flathead screwdriver, pry the cable clamp off the connector (Figure 6, Item 1) and slide it back down out of the way. Gently push the connector cable out through the slot in the cover as shown in Figure 7A, Item 1. Push the cable out far enough that the LED is free of the slot.

NOTE: You may have to first remove the "ready" label around the LED opening on the cover.

11. Remove the connector cable completely from the LED. Push out the side flaps on the LED to help ease the cable out. Set the cable and the lid aside.

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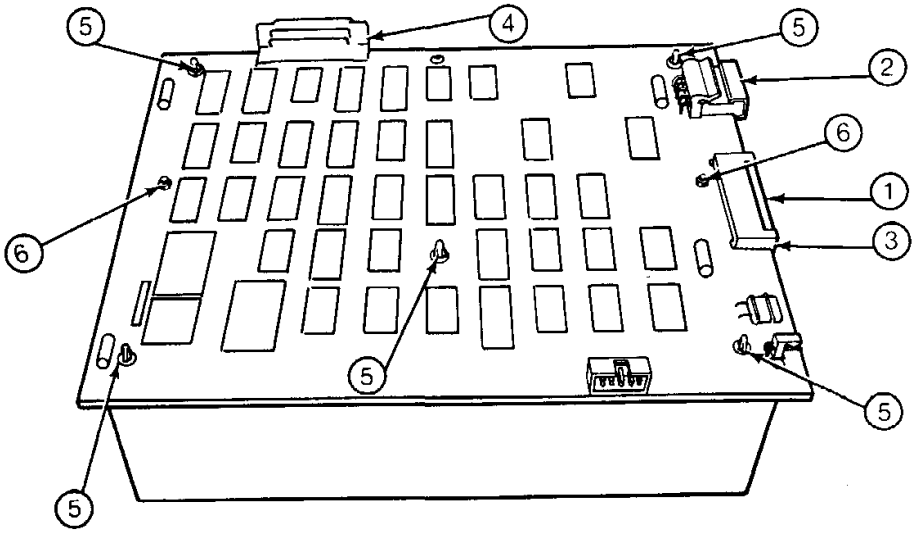

FIGURE 8

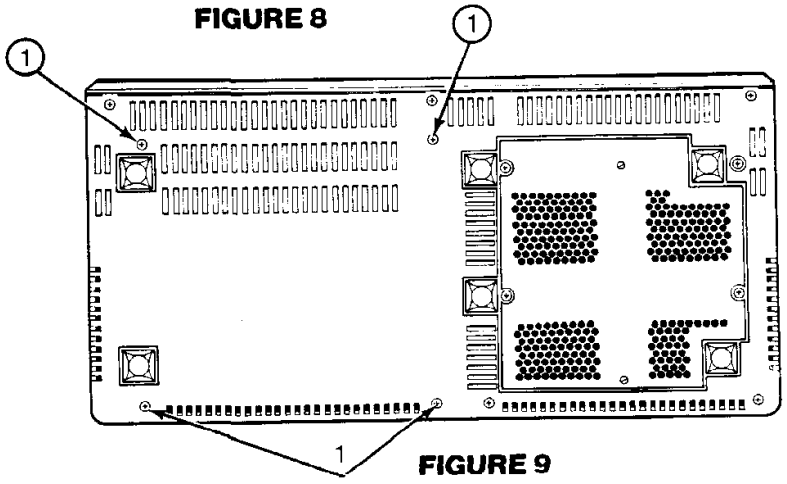

FIGURE 9

FIGURE 10A

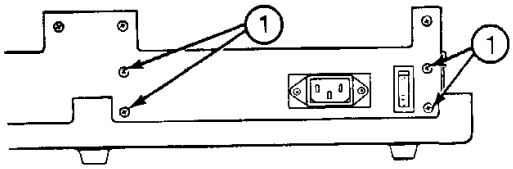

FIGURE 10B

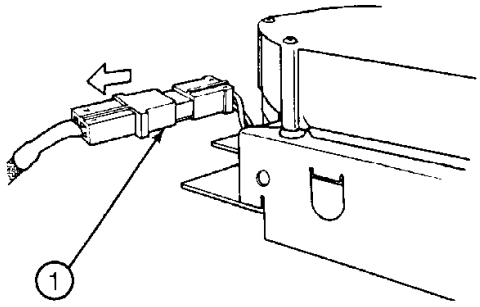

FIGURE 11

Removing The Controller Card

12. Disconnect the analog-to-controller and motor control cables from the board. (Figure 8, Items 1 and 2).

NOTE: Do not pull on the analog-to-controller ribbon cable to remove it. Gently ease out the controller end until the cable is free. (Figure 8, Item 3).

13. Remove the long middle screw at the rear of the controller card with a Phillips head screwdriver. (Figure 8, Item 4).
14. Use the needlenosed pliers to squeeze the sides of each of the plastic holders so that the board can be lifted up and off of them. (Figure 8, Item 5).

NOTE: Do not pull on the analog-to-controller ribbon cable to remove it. Gently ease out the connector end until the cable is free. (Figure 8, Item 3).

15. Lift the controller board off the power supply.

NOTE: When you lift off the controller board, you will see a loose metal spacer over the slot where you removed the long screw. Save this spacer because you will need it when the controller board is reinstalled.

Removing The Power Supply

16. Turn the ProFile completely over and rest it on a protective pad. Remove the four screws on the bottom of the power supply. (Figure 9, Item 1).
17. Hold the power supply in place as you turn the ProFile right side up. Position the ProFile so that the back faces you. Remove the two top cover mounting screws from the right rear. (Figure 10A, Item 1). Now you can remove the plate and gain access to the four power supply screws. Remove these screws. (Figure 10B, Item 1).
18. Position the ProFile so that the front faces you. Remove the power supply plug attached to the motor control plug (Figure 11, Item 1) and lift out the power supply.

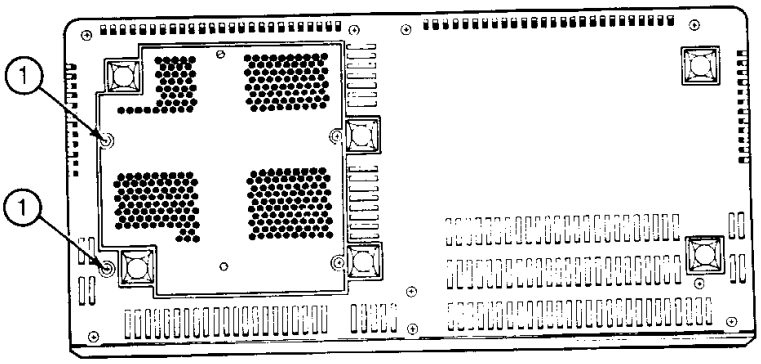

FIGURE 12

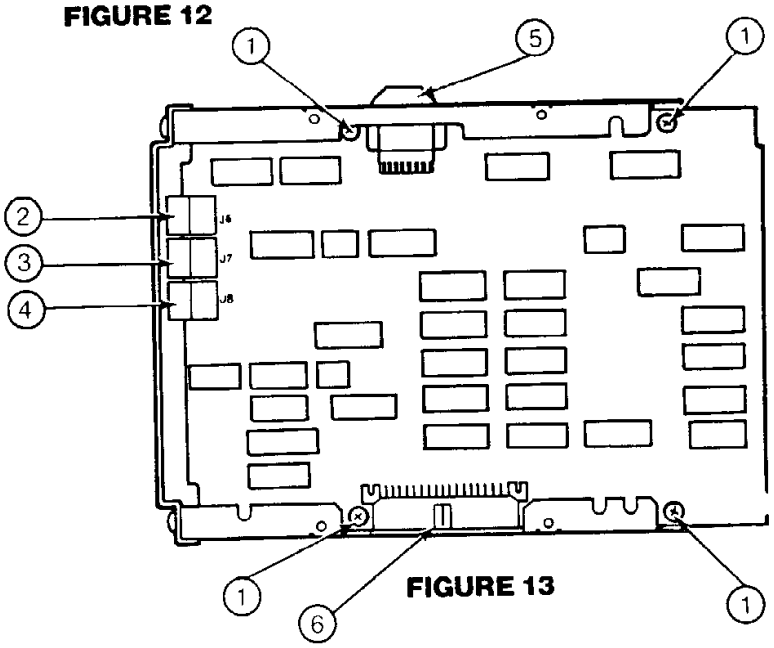

FIGURE 13

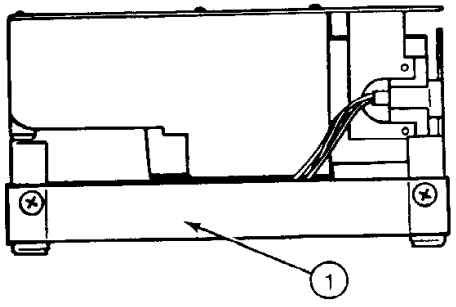

FIGURE 14

P1-11

Removing The HDA

19. Turn the ProFile over and rest the HDA on the protective pad. Loosen the four bottom screws that mount the HDA to the ProFile housing. (Figure 12, Item 1).
20. Carefully lift the bottom of the housing up and off. Keep the HDA on the protective pad.

Removing The Analog Board

21. Remove the four Phillips head analog card mounting screws. (Figure 13, Item 1).
22. Turn the HDA around. If therre is a metal bar across the front of the analog card as shown in Figure 14, Item 1 or over the top of the analog card, remove the large screw that holds this bar in place.

NOTE: This bar does not exist on later models.

23. Disconnect the index, stepper motor and track 0 cables. (Figure 13, Items 2, 3 and 4). Remove the analog-to-controller cable. (Figure 13, Item 6).
24. Remove the head cable (Figure 13, Item 5). Gently slide it down and away from the analog board. Gently squeeze out the rails and remove the board from the HDA.

Replacing The Analog Board On The HDA

25. Slide the analog board back under the rails. Be sure to line up the holes in the board with the screw holes on the rail.
26. Replace the index, stepper motor and track 0 cables. Be sure they are installed in the correct order. (Figure 13, Items 2, 3 and 4).
27. Replace the head cable. Press down on the connector head if necessary to help line it up. (Figure 13, Item 5). Replace the analog-to-controller cable. (Figure 13, Item 6).

NOTE: The controller cable exits down and away from the analog board.

28. Replace the four Phillips head mounting screws in the analog board. Be sure the ground strap is replaced.
29. Position the metal bar (if one exists) over the loosened rail and reinstall the metal screw.

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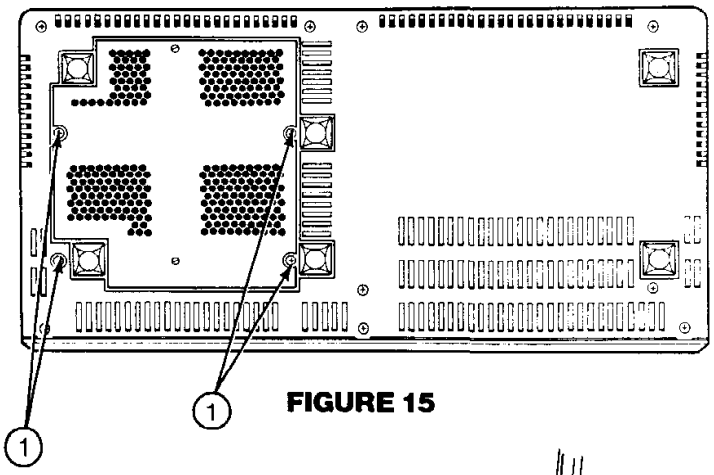

FIGURE 15

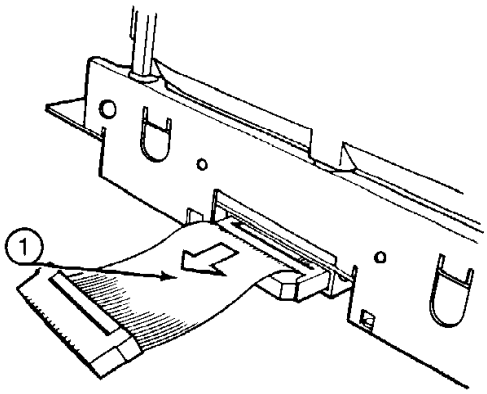

FIGURE 16

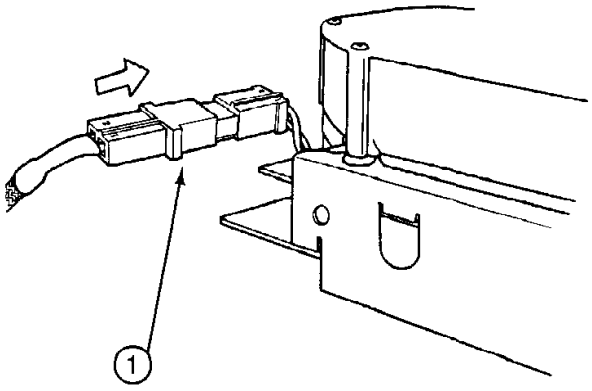

FIGURE 17

Reinstalling The HDA

30. Place the bottom of the ProFile over the analog card so that the screw holes in the bottom line up with the screw holes in the metal rails that hold the analog card. (Figure 15, Item 1).

NOTE: The analog board with the HDA should be on the left-hand side with the rounded part of the HDA facing away from you.

31. Reinstall the screws and turn the ProFile right-side up. Notice that the analog-to-controller cable now extends out from the bottom of the HDA. (Figure 16, Item 1).

Reinstalling The Power Supply

32. Line up the power supply cable with the motor control cable connector going into the motor control board. (Figure 17, Item 1). Connect the two cables.
33. Reposition the power supply unit in the ProFile frame so that the screw holes in the back of the power supply line up with the holes in the back of the frame. Replace the four screws in the back and replace the back plate. Insert the two top cover mounting screws that hold the plate in place but don't tighten the screws all the way down.
34. Carefully turn the ProFile over. Rest it on the pad. Replace the four bottom screws in the power supply. Turn the drive right side up.

Replacing The Controller Board

35. Place the controller board over the plastic retaining clips. Gently push the board down until the clips hold the board firmly in place.
36. Slide the metal spacer under the board so that it is underneath the rear, middle screw hole. Insert the long screw through the hole and tighten it down.
37. Plug the power supply and analog-to-controller cables back in.

TURN PAGE

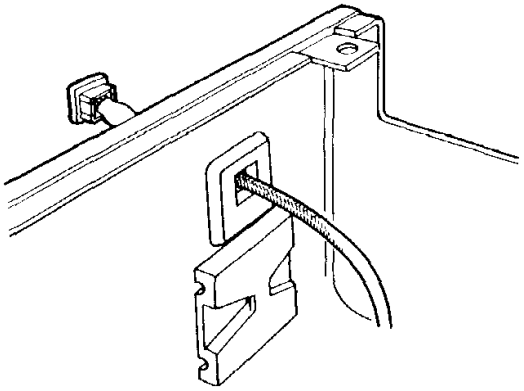

FIGURE 18

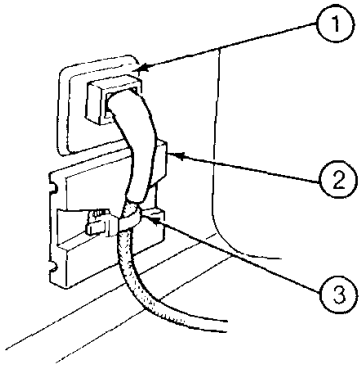

FIGURE 19

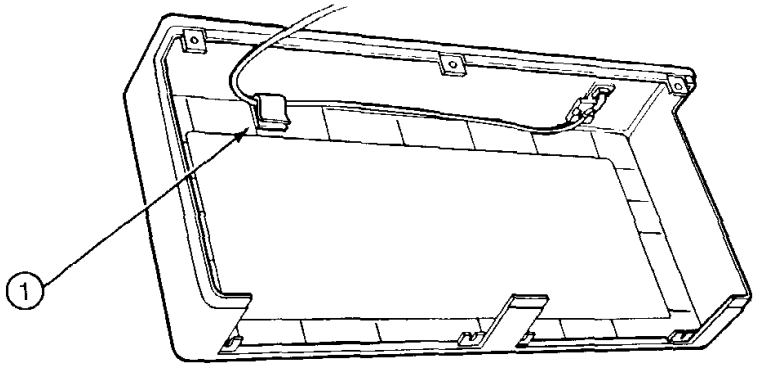

FIGURE 20

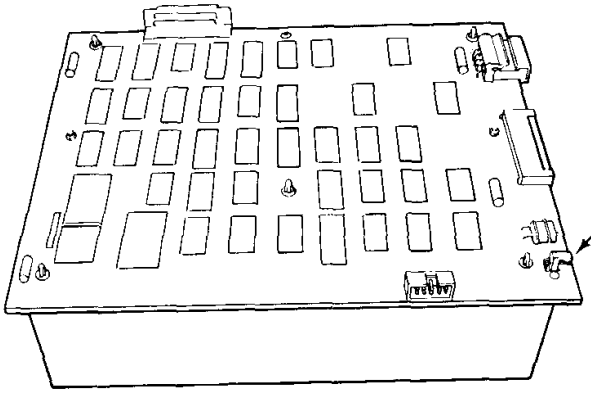

FIGURE 21

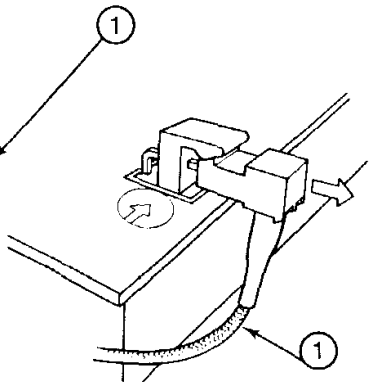

FIGURE 22

Replacing The LED

38. Place the cable clamp back onto the LED cable connector. Insert the end of the cable through the opening in the cover and reinsert it into the LED holder as shown in Figure 18. Pull the cable back through the opening until the LED fits in the slot. Replace the "ready" label.
39. Replace the LED cable clamp. (Figure 19, Item 1).
40. Place the LED cable in the white plastic holder and install a tie wrap. (Figure 19, Items 2 and 3).
41. Place the cable in the other holder. (Figure 20, Item 1). Install a tie wrap if necessary. Cut off excess tie wrap.

Replacing The Cover

42. Attach the LED to the connector on the controller board. (Figure 21, Item 1). Make sure the LED cable exits down and away from the board. (Figure 22, Item 1).
43. Reposition the slots on the back of the cover under the four loosened screws in the rear of the ProFile. Tighten down the screws.
44. Turn the ProFile over on its back and rest it on the pad. Replace the three screws on the front edge of the bottom of the drive.
45. Turn the ProFile right side up. Reinstall all external cables.

PRACTICE

Practice removing and replacing the ProFile modules until you feel comfortable with the procedures. Then, show the course manager the reassembled ProFile before you replace the cover. When you have properly reassembled the equipment, you will have completed Module P1.

THIS IS THE END OF MODULE P1

MODULE P2

REVISION JANUARY 1982

ProFile Hard Disk Setup

Objective

GIVEN: An Apple ///
ProFile Disk Drive with Interface Card
Power and Interface Cables
ProFile Driver Software Diskette
Demonstration Program Diskette
Business Basic Software Diskette—version 1.1
System Utilities Diskette (Apple ///)—version 1.1
Blank Diskettes
External Drive for the Apple ///

ACTION: Unpack the ProFile drive, install the interface card in the Apple ///, connect the interface and power cables, run the ProFile demonstration program, install the driver software on a copy of Business Basic, install the driver software on System Utilities diskette, configure a "basic" boot diskette that includes the ProFile driver, transfer files to ProFile, run a program from ProFile and delete files from ProFile.

CRITERION: No damage. The demo program must run when the ProFile is set up with the Apple ///. Software configured with the ProFile Driver must successfully boot up in the Apple /// and access the ProFile or appear on the device listing.

Must be able to run Fontdemo program from the ProFile and then delete files copied to the ProFile.

CRITERION TEST DESCRIPTION: Demonstrate your competency with working with the ProFile and the driver to your course manager. Your course manager will check to see if you have properly set up the ProFile and configured the software.

HERE'S WHAT TO DO:

1. Obtain the required materials from your course manager.
2. Read through Module P2.
3. Perform the required procedures.
4. Practice until ready for the Criterion Test.
5. Notify your course manager when ready for the Criterion Test.

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ProFile Diagram

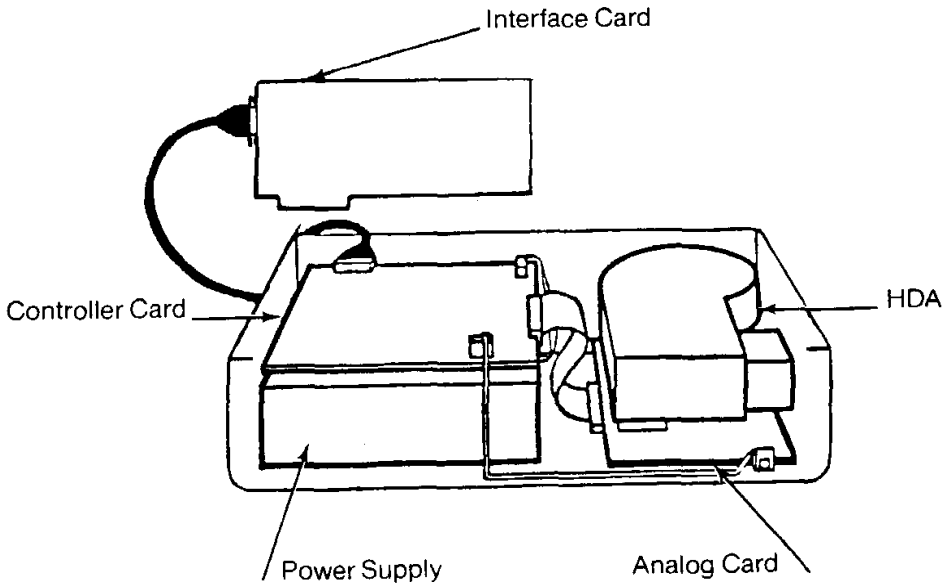

FIGURE 1

Introduction

The ProFile disk Storage System consists of a fixed-media, random-access, dual 5¼ inch disk drive and a disk controller card packaged together in a lightweight, compact cabinet. (Figure 1). ProFile is a Winchester type drive. This means that the read/write heads, the disks and the activator mechanism are all part of an assembly enclosed in a sealed, protective, nonremovable housing. The ProFile drive is completely portable and may be stacked on top of the Apple *III* or on a desktop close to the computer.

As a general rule, the ProFile should be placed on a hard surface where it is convenient to operate and air flow through the bottom is not restricted.

CAUTION: Never under any circumstances place the ProFile drive on a thick carpet or any other surface that might obstruct the air vents on the bottom of the unit.

ProFile differs from a "floppy" disk drive in that the ProFile media, consisting of rigid disks rather than flexible diskettes, cannot be interchanged. The main advantage ProFile has over a "floppy" drive is much greater data storage capacity (5 megabytes), higher reliability and improved performance.

ProFile is controlled by the Apple *III*'s Sophisticated Operating System, usually called "SOS". The SOS automatically keeps track of files, saves and retrieves information and does a multitude of other housekeeping tasks.

NOTE: Before beginning this module you should be aware of the "Type" command. When the instructions call for you to type instructions into the computer it will be enclosed in quotes (" "). Type only what is within the quotes and not the quotes themselves.

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Section A: Installing The ProFile Drive

Unpacking the Drive

NOTE: Be very careful when you remove the ProFile from the carton. Extensive damage may result if the unit is accidentally jarred, bumped or handled roughly.

1. To remove the drive from the shipping carton, first lift off the thick foam lid that protects the top of the drive. Notice that the drive is packaged in a cardboard container with hand cutouts on each side. Reach down with both hands, grasp the container by the hand cutouts and carefully pull it straight upward and out of the shipping carton.
2. Place the container on a flat surface in the area where you plan to operate the drive. Open the container and remove the entire assembly which consists of the drive and strapped on foam and caps. Place the assembly on the desk or surface where you intend to use it.
3. As an added precaution against possible damage, you should leave the foam end caps strapped to the drive until you have initially applied power and checked out the drive.
4. Place the drive near the Apple ///.

NOTE: The ProFile chassis sits on six feet which raise it sufficiently to allow cooling air to circulate through the bottom of the unit. Be careful not to set the drive on a thick carpet or any other surface which might obstruct air flow to the unit.

5. Check the switch on the left rear of the back to make sure the power on the Apple /// is off. Remove any peripheral connections in the back of the Apple.

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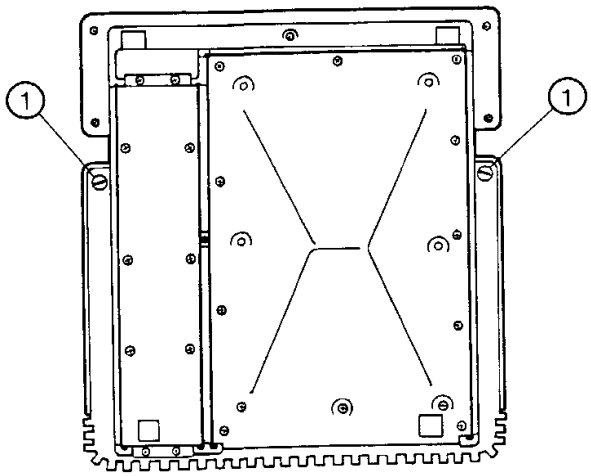

FIGURE 2

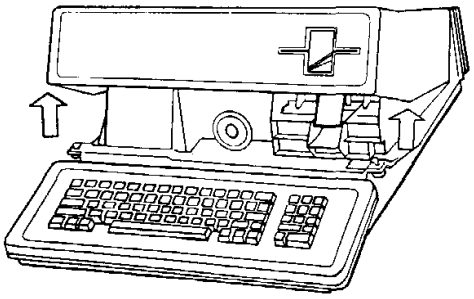

FIGURE 3

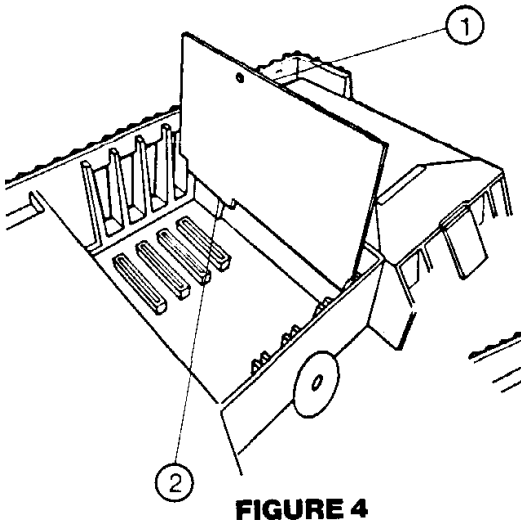

FIGURE 4

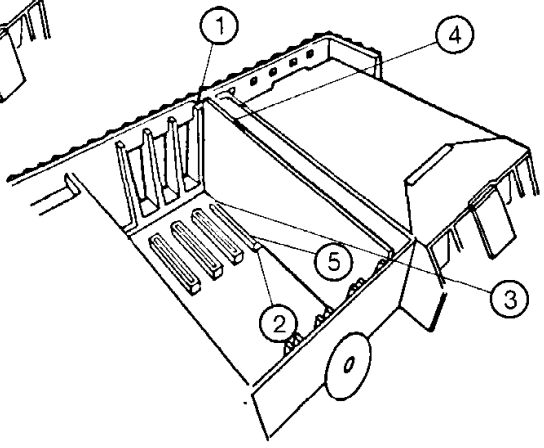

FIGURE 5

6. Lift the front of the computer and loosen the two captive screws located on the underside of the left and right corners of the face of the computer. (Figure 2, Item 1). Turn each screw about one quarter turn counterclockwise with a flat blade screwdriver.
7. Lower the Aple back down to the table. Tilt the cover forward and lift straight up to remove it. (Figure 3).
8. Remove any peripheral or dummy cards from slot 4 of the Apple. Rock the card slightly toward the keyboard, then pull it straight up and out of the well.
9. Grasp the ProFile interface card by the edge opposite the gold edge contacts. (Figure 4, Item 1).

NOTE: Never grasp the card by the gold fingers on the edge connector. (Figure 4, Item 2). The efficiency of the card decreases if it is dirty or scratched. Also, do not touch any of the components.

10. With the Apple *III* facing you, hold the interface card with its edge connector pointing down. The component side of the card should be facing to the right.
11. Slide the front of the edge connector into the card guide behind slot 4. (Figure 5, Item 1). Make sure the card enters the card guide straight up and down.
12. Slide the interface card into slot 4. (Figure 5, Item 2). Slide the card down until the edge connector begins to enter the connector slot. (Figure 5, Item 3).

NOTE: As you slide the card down into the slot, you will notice that the card may tighten up in the slot. At this point you may have to rock the card back and forth by gently pushing down on the end of the card next to the back of the Apple *III* (Figure 5, Item 4), then on the front again until the card is completely in the slot. You can tell the card is fully inserted when the top of the edge connector is flush with the top edge of the slot. (Figure 5, Item 5).

13. If the interface card doesn't seem to fit, remove it completely and try again. Make sure the card enters the guide straight up and down.

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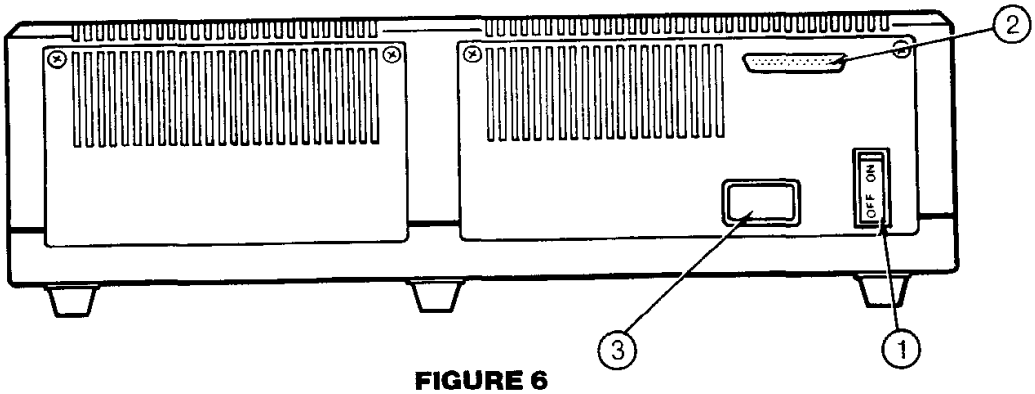

FIGURE 6

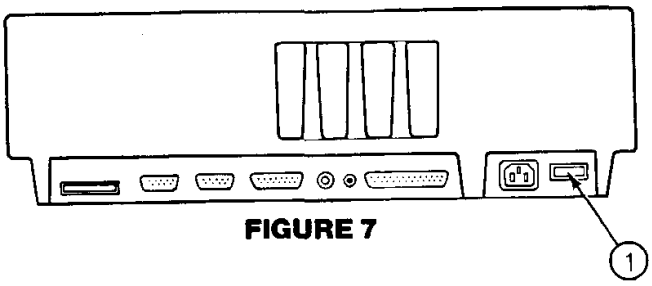

FIGURE 7

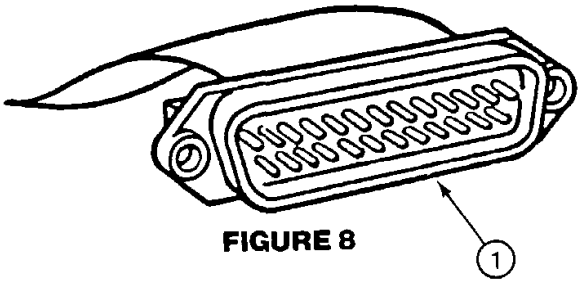

FIGURE 8

P2-10

Connecting the Power Cords:

14. Before connecting any cables, make sure that the power switch on the back of the ProFile is off. (Figure 6, Item 1). The power switch on the back of the Apple *///* should already be off. (Figure 7, Item 1).
15. Turn both the Apple and the ProFile around so their backs are facing you.
16. Hold the interface card down with one hand and push the "D"-type cable connector (Figure 8, Item 1) onto the 25-pin conenctor on the interface card.

NOTE: *Some ProFile drives may come with flat, ribbon type cables.* These cables have the same connector and pin configurations.

17. Attach the other end of the cable securely to the D-type mating connector on the back of the ProFile cabinet. (Figure 6, Item 2).
18. Connect the mating plug on the power cord onto the recessed 3-pin AC power connector on the back of the ProFile cabinet (the plug can go on in only one direction). (Figure 6, Item 3).

NOTE: Always connect the power cable to the ProFile drive before connecting it to the the power source.

19. Connect the other end of the power cord to the AC power receptacle. The ProFile is now completely connected and ready to be powered up.

    Also plug in the computer if this has not already been done.

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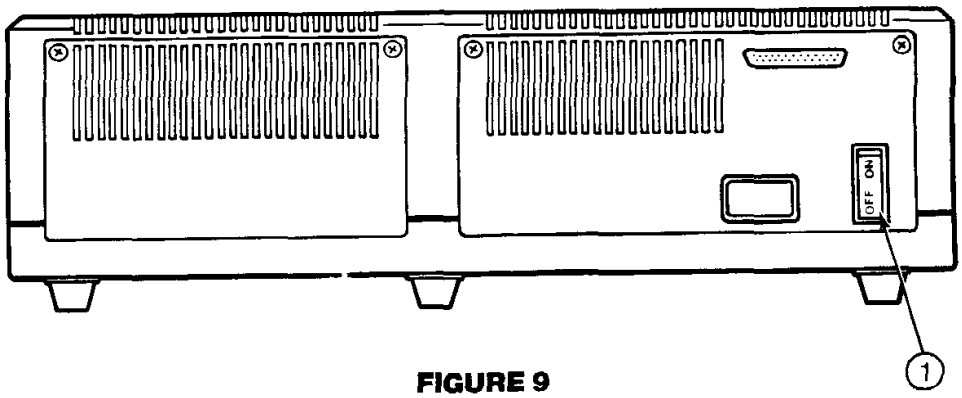

FIGURE 9

Running The ProFile Demonstration Program:

20. Turn the AC power switch on the ProFile to the "on" position. (Figure 9, Item 1). Do not turn the Apple *III* on before turning on the ProFile.

    When the ProFile is turned on, the following takes place:

    A. The LED comes on for about 2 seconds and then goes out for 20 seconds while the drive comes up to operating speed.

    B. The LED starts to flash while the drive performs a surface analysis of its disks.

    After approximately 40-60 seconds, the LED on the ProFile will come on and stay lit which indicates that the power up and surface analysis is complete and the drive is ready for operation. Failure of the LED to remain on indicates a possible hardware malfunction.

NOTE: Under certain circumstances, it could take the drive up to 3 minutes to complete its power up and surface analysis.

To minimize the possibility of equipment failure, do not turn off the drive unless you do not intend to use it for extended periods of time.

21. Insert the ProFile demo diskette into the built-in drive in the Apple *III* and gently close the drive's door.

22. Turn on the video monitor, then reach back behind the Apple and turn the power switch on to boot up the demo program in the Apple.

23. As the demo diskette boots up, the built-in drive's red light will come on and the drive will start to whir. The demo program will come up in a short time. Let the demo run through once.

IMPORTANT: If the ProFile LED has not stopped flickering before you attempt to access the drive by booting up your driver software, you will see an I/O error message on the monitor because you attempted to access the drive before it had completed its power up sequence.

When this happens, hold the CONTROL key down and press the RESET to reboot the software after the ProFile steady light indicates that it is fully powered up.

24. Turn off the Apple and remove the demonstration diskette from the built-in drive.

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Section B: Structuring The Software That Will Allow The ProFile To Operate With The Apple ///

Introduction:

At this point, you have set up the ProFile and have connected it to the Apple ///. Now the next step is to communicate through the Apple /// to the peripheral device ProFile. How is this done?

The Apple /// does not communicate with its peripheral devices in the same way the Apple II communicates with peripheral devices hooked up to it. When you insert a peripheral interface card into the Apple II and attach the required interface cables to the external device, your Apple II system is set up to communicate with the attached peripheral. We can say that the Apple II is "hardware configured".

How does the Apple /// communicate with its peripheral devices? Well, the Apple ///'s Sophisticated Operating System (SOS) uses special programs called "device drivers" to communicate with all peripheral devices. Whether a given device is built in or added later, SOS uses a device driver to exchange information. The Apple /// is "system configured".

Peripheral Devices and the Apple ///:

Peripheral devices such as ProFile, the keyboard, video scan, speaker and communications ports are the eyes and ears and other senses of the computer. Software called "device drivers" connect these senses to SOS. A device driver performs four necessary functions:

1. It processes data generated by your programs and sends it to the device as output.
2. It processes data generated by the device and sends it to your programs as input.
3. It enables your programs and SOS to control the operation of the device and of the driver itself.
4. It enables your programs and SOS to read the status of the device and of the driver itself.

NOTE: Not all drivers perform all of these functions. Some can process data in only one direction, such as the printer driver which only processes output.

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The ProFile Device Driver:

In this part of the module, Section B, the procedures are given for structuring (configuring) certain user programs to include the ProFile device driver software so that the Apple /// will be able to communicate with the ProFile. However, before you begin Section B, you should know some more about device drivers.

Programs such as Business Basic, Pascal, VisiCalc, The System Utilities, etc. that you want to use with the Apple /// and ProFile already contain a file named SOS.DRIVER when you receive them. In order for the program software to communicate with the ProFile through Apple ///, the specific driver software for ProFile itself (on a separate diskette) must be added to that SOS.DRIVER file already on the program diskette.

For example, the program Business Basic for Apple /// already contains the file SOS.DRIVER. However, it does not contain the specific driver for ProFile—the PROFILE.DRIVER. You must add PROFILE.DRIVER to the existing SOS.DRIVER file on the Business Basic diskette so that you can run that program on the Apple /// and access the ProFile as required.

Adding the ProFile Device Driver:

How do you go about adding a device driver? The information stored in the SOS.DRIVER file that already exists on a user program such as Business Basic is called its "system configuration"—configuration in this case means structure. This information can be modified by using a special-purpose editor on the Apple /// System Utilities diskette. This special-purpose editor is called the System Configuration Program or SCP and it is a tool used to create and modify SOS.DRIVER files. The SCP can be used to add, remove and modify device driver files so as to change the configuration of the operating system itself for each particular user program. You will need to do this any time you want to add or remove a peripheral device such as ProFile from a user program such as Business Basic.

Now, every user program diskette may already contain a different system configuration in its SOS.DRIVER file. Although the system parameters for your Apple /// will probably be the same in each one, the drivers are likely to be different. On each diskette supplied by Apple, there is a different set of drivers appropriate to your use of the programs on each diskette. The more drivers there are in a given configuration, the more disk space and memory the drivers will occupy. If you don't need some of these drivers, you may delete them to save space. Likewise, if you need a driver, you can add it to the system configuration on the particular program diskette in question.

Exactly how do you go about using the System Configuration Program on the System Utilities diskette to modify (reconfigure) an existing SOS.DRIVER file on a particular program? Specific steps required for configuring two user programs are outlined in the following procedures:

Procedure I: This details steps for configuring the user program Business Basic's existing SOS.DRIVER file to include the PROFILE.DRIVER software.

Procedure II: This procedure includes directions for configuring the System Utilities' SOS.DRIVER file to include the PROFILE.DRIVER software. In this procedure, no existing drivers will be deleted.

Procedure III: In Procedure III you will configure a "basic" boot diskette that contains the ProFile Driver and certain system utilities files. Next you will transfer certain Business Basic files to the ProFile. Then you will use the "basic" boot diskette to boot up the Apple ///, access ProFile, run the Fontdemo from the ProFile and then delete those files transferred to the ProFile earlier.

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Procedure I: Adding the ProFile Driver Software to Business Basic

A. Copying the Business Basic Diskette—the configuration of the program will be completed on this copy. You will use the System Utilities device handling option to copy the entire contents of the Business Basic diskette onto another.

Since you are going to use two drives in this procedure, go to step 12. If you had only the one internal drive with your Apple ///, then steps 1-11 would apply.

IMPORTANT: If you decide to copy Business Basic or any other program onto a diskette already containing a program rather than copying onto a blank diskette, make sure that the previously copied diskette was formatted on the Apple ///, not the Apple II.

If you attempt to copy onto an Apple II formatted diskette using the Apple ///, the copy will not reboot in the Apple ///.

1. Insert the System Utilities diskette into the built-in drive.
2. Boot the Apple ///—turn on the power or hold down the CONTROL key and press RESET if power is already on.
3. Type "D" to select Device Handling commands.
4. Type "C" to select Copy One Volume onto Another.
5. Remove the System Utilities diskette and insert the Business Basic (boot) diskette into the built-in drive.
6. Type ".D1" and press RETURN. This designates Drive 1 as the device in which the diskette is located.
7. Accept .D1 by pressing RETURN to indicate that you will copy to another volume in the internal drive 1.
8. Press RETURN.
9. Remove the Business Basic diskette from the built-in drive. To complete this procedure, you will need to use the destination (blank), System Utilities and source (Business Basic) diskettes as follows:
   a. Insert the destination (blank) diskette. Press the space bar.
   b. Remove the blank diskette and reinsert the System Utilities diskette. Press the space bar.
   c. Remove the System Utilities diskette and insert the blank. Press the space bar and the blank will be formatted.

10. When the monitor indicates that the format has been successful, you can now swap the destination (blank) and source (Business Basic) diskettes in the built-in drive until you see the message "Copy Successful" displayed on the monitor.
11. Remove the new copy of the Business Basic diskette from the built-in drive and lable it "Business Basic Copy".
12. If you have an external Apple *III* drive, the copy procedure would be as follows:
    a. Make sure the power on the Apple *III* is off. Install the external drive.
    b. Boot the System Utilities diskette in the Apple *III*.
    c. Type "D" for Device Handling commands.
    d. Type "C" for Copy a Volume.
    e. Remove the System Utilities diskette from the built-in drive. Insert the source (Business Basic) diskette.
    f. Press the right arrow key to move the cursor over to the 2. Type "1" and press RETURN. This selects the diskette in the internal drive (.D1) as the diskette that will be copied.
    g. Insert the destination (blank) diskette into the external drive.
    h. Press RETURN. You have selected the diskette in the external drive (drive 2 or .D2) as the diskette to be copied to.
    i. Press RETURN.
    j. At this point you will have to type "Y" to destroy any previous contents on the diskette you wish to copy to if it already contains a program.

NOTE: If the diskette you wish to copy to has already been formatted, the copy procedure will not start. However, if your diskette is blank (never has been formatted), you must do the following:

Remove the Business Basic diskette from the built-in drive and insert the System Utilities diskette as indicated on the monitor. Press the space bar to format the diskette.

Remove the System Utilities diskette from the built-in drive and reinsert the Business Basic diskette as the monitor indicates. Press the space bar to copy the diskette. When the copy is successful, the message "Copy successful" will appear on the monitor.

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k. When the copy procedure is complete, remove the Business Basic diskette from the external drive and lable it "Business Basic Copy". Remove the original copy of Business Basic from the internal drive.

NOTE: You will use this Business Basic copy for the rest of Procedure I. Set the original Business Basic with all its original files intact aside for the time being.

B. Determine the Blocks Required for the ProFile Driver and the Blocks Available on the Business Basic Diskette—this is the way for a user to find out how many blocks may currently be available on the Business Basic program that you want to add the ProFile driver software to. By finding out how many blocks are required for the ProFile driver and how many blocks are available on Business Basic, you can decide how many more blocks will have to be freed up so that the ProFile driver can be added.

Procedure:

1. At this time, the System Utilities diskette has already been booted up in the Apple *III*'s built-in drive. Insert the ProFile driver diskette into the built-in drive. Press ESCAPE twice to return to the main menu.
2. Type "F" to select the File Handling commands.
3. Type "L" to select List Files.
4. Move cursor over to the 2 and type in "1". Press RETURN.
5. Press RETURN to accept all directory levels. Press RETURN again to send listing of the files to the console. Note number of blocks required for the ProFile driver listed under the heading PHYS. (9 blocks).
6. Remove the ProFile Driver diskette from the built-in drive. Insert the copy of the Business Basic diskette you just made into the built-in drive.
7. Press ESCAPE to return to the File Handling menu.
8. Type "L" to List Files.
9. Move cursor over the 2, type in '1", press RETURN.
10. Press RETURN twice to display the directory of the files on the Basic diskette. Type "Y" to continue listing. Read the number of blocks available on the Business Basic diskette on the last line following the listing of files. (You will notice that only 2 blocks are still available).

In step 5 you determined that the ProFile driver requires 9 blocks. In step 10 you found out that only 2 blocks are currently available on the Business Basic diskette that you would like to add the driver to. Therefore, you will need to make more room on the Business Basic copy so you can add the ProFile driver. You will do this by deleting certain driver(s) as explained in the following procedures.

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C. Delete a Driver—in this section you will have a chance to practice deleting a driver from the existing SOS.DRIVER file on the Business Basic copy. You will first use the System Configuration Program on the System Utilities diskette to first read the SOS.DRIVER file on the Business Basic copy loaded into the system and then next delete and existing driver from its driver file.

Procedure:

1. Insert the System Utilities diskette into the built-in drive and press the ESCAPE key twice to get back to the main menu.
2. Type "S" for the Systems Configuration Program (SCP) option. You will see the SCP menu on the screen.
3. Select "R" for the Read a Driver File option. The Apple will tell you that no drivers are loaded.
4. Remove the System Utilities diskette and insert your copy of the Business Basic diskette. Press RETURN to select .D1/SOS.DRIVER. A listing of all drivers currently in the SOS.DRIVER file will appear on the screen.

NOTE: At this point, if you had determined in section B that your boot diskette had enough room for the ProFile Driver, you could now go to section D which gives the procedures for adding the ProFile Driver to the boot diskette. However, if you determined that your program diskette did not have enough room for the ProFile Driver (as is true in this example), then you will have to delete one or more drivers from SOS.DRIVER file of your boot diskette. These procedures are described below:

5. Press ESCAPE to display the SCP menu.
6. Remove your copy of the Business Basic diskette and insert the System Utilities diskette.
7. Type "D" to select a Delete a Driver.
8. Now you need to select the number of the file to be deleted. This time type 3—to select the file PRINTER. Press RETURN.
9. Type "Y" for yes. You will see that the file PRINTER is no longer listed.
10. Press ESCAPE to display the SCP menu.

D. To Add the ProFile Driver—in section D of Procedure I, you will return to the System Configuration Program, Read a Driver file, and then add the ProFile device driver software to the SOS.DRIVER file of the copy of Business Basic you loaded into the system earlier.

Procedure:

1. Type "R" for Read a Driver File. Remove the System Utilities diskette from the built-in drive and insert the ProFile device driver diskette.
2. Type ".D1/PROFILE.DRIVER" and press RETURN. Notice that the driver named .PROFILE has been added to the bottom of the current configuration list.
3. Remove the ProFile Driver diskette from the built-in drive.

TURN PAGE

E. Change System Parameters—using the System Configuration Program again, you will set the peripheral slot assignment for the Business Basic program.

Procedure:

1. Insert the System Utilities diskette in the built-in drive.
2. Press ESCAPE and the SCP menu will be displayed.
3. Type "C" to select the Change System Parameters option. The System Parameter Display will now be shown.
4. Select the option entitled "Peripheral Slot Assignments" by typing its option number. The screen will display a list of all presently installed device drivers and their current peripheral slot assignments. The ? mark following the .PROFILE driver indicates that a slot is not yet assigned to this driver.
5. Type the number appearing to the left of the .PROFILE driver and press RETURN. This selects ProFile as the driver that will be given a slot assignment. Next, you will be asked to enter the number of the slot you wish assigned to your driver.
6. Type "4" and press RETURN. (Slot 4 is the peripheral slot in the Apple *III* where you installed the ProFile interface card.)
7. The ? mark is now replaced by the peripheral slot number which you just assigned.
8. Press ESCAPE twice to display the SCP menu.

F. Generate a New System— using the Generating New System option on the System Configuration Program, you will attempt to generate the new Business Basic program that would now include the ProFile driver software.

NOTE: You will notice that your first effort will not be successful to due to the fact that the driver file on the program is too large. You will then delete an additional driver and then generate a new system.

Procedure:

1. Type "G" to select the Generate New System option.
2. Remove the System Utilities diskette and insert your copy of the Business Basic diskette.
3. Press the right arrow key to move the cursor over to the 2. Type in a "1". Press RETURN.
4. Type "Y" (for yes) indicating that you wish to delete the existing SOS.DRIVER file and generate a new one.
5. If the message "File is Write Protected" is displayed on the screen, type "Y" (for yes) indicating that you wish to delete the file anyway.

NOTE: At this point, if the message "System Generated" were to appear on the screen, you would now have successfully added the ProFile Driver to the boot diskette and you could proceed to section G. However, if the message "Driver File Too Large" or "No Room on Volume" appears on the screen (as in this example), then you must delete another driver file as described below.

CAUTION: Do not power down the Apple *III* at this point. If you do, all the information you have just entered into memory will be lost and you will have to start the procedures for deleting and adding the driver all over again. Go on to step 6 below and complete the steps until you see the message "System Generated" on the monitor. Then you can reboot the newly configured diskette.

6. Press ESCAPE to display the SCP menu.
7. Remove your copy of the Business Basic diskette and insert the System Utilities diskette.
8. Type "D" to select Delete a Driver.
9. Select the number of the file to be deleted. This time delete the file RS232. Press RETURN.
10. Type "Y" for yes. You will see that the file RS232 is no longer listed.

TURN PAGE

11. Press ESCAPE to display the SCP menu.
12. Type "G" to select the Generate New System option.
13. Remove the System Utilities diskette and insert your copy of Business Basic.
14. Move the cursor over to the 2 and type in a "1". Press RETURN.
15. Type "Y" (for yes) indicating you wish to delete the existing SOS.DRIVER file and generate a new one.
16. This time you should see the message "System Generated: .D1/SOS. DRIVER on the monitor. This means that you have successfully added the ProFile driver to your boot diskette.

G. Verify the Driver Software—you will reboot the newly configured Business Basic diskette in the Apple /// and access the ProFile. In this way you can be sure the ProFile driver software is present.

1. If the ProFile is not already powered up, turn it on and wait for it to completely warm up (the LED will remain on.)
2. Hold down the CONTROL key and press RESET to reboot the newly configured Business Basic diskette in the Apple ///'s internal drive.
3. When the diskette has booted, type "CAT .PROFILE" (make sure there is a space after the CAT). Press RETURN.
4. This command will display the directory of the ProFile drive.

NOTE: The command that will display the directory of the ProFile varies depending on the programming language being used.

5. Remove the Business Basic diskette from the drive.

GO ON TO PROCEDURE II.

Procedure II: Adding the ProFile Driver to the System Utilities

NOTE: At this point, you have successfully reconfigured or restructured a copy of the user program Business Basic to contain the ProFile driver software. Now, when you boot that diskette in the Apple *III*, the system will be able to communicate with the ProFile.

In this next section, you will again add the ProFile driver software to a program. In this case, it will be the System Utilities program. You have already used the System Utilities software when you made the copy of Business Basic and you used the System Configuration Program on the System Utilities diskette for the purpose of deleting and adding drivers, changing system parameters and generating a new system.

To install the driver software on the System Utilities without deleting any files, it is necessary to create a version of the Utilities diskette that has more available space by going to a two-stage boot. With a two-stage boot, some of the files you need to start the system are on a separate diskette that is used only for the first stage of the boot operation.

To make the two-stage boot, complete the following:

A. Format Two Blank Diskettes:

1. Insert the System Utilities diskette into the built-in drive. Put the blank diskette into the external drive.
2. Reboot the System Utilities diskette in the internal drive by pressing CONTROL RESET.
3. Type "D" for Device Handling commands.
4. Type "F" for Format a Volume.
5. Accept .D2 by pressing RETURN.
6. Type UTILITY1 and press RETURN. This will name the volume UTILITY1.

NOTE: If you are using a diskette that already contains a program rather than a totally blank diskette, you will see a message asking you if the contents can be destroyed before the copy procedure begins. If this happend, type Y to indicate yes.

7. When the message "Formatting Successful" appears on the monitor, remove the diskette from the external drive and label it UTILITY1.
8. Insert another blank diskette into the external drive, press RETURN.

9. Type "UTILITY2" and press RETURN to name this volume UTILITY2.
10. When the message "Formatting Successful" appears, remove the diskette and label it UTILITY2.
11. Press ESCAPE twice to display the main menu.

B. Copy Files to UTILITY1

NOTE: If you are using only one drive complete steps 1-15 below. If you are using an external drive, go to step 16.

1. Type "F" for File Handling commands.
2. Type "C" for Copy Files.
3. Insert the System Utilities diskette into the built-in drive.
4. Type ".D1/SOS.KERNEL" and press RETURN.
5. Type ".D1/SOS.KERNEL" and press RETURN.
6. Swap the destination (UTILITY1) and source (referred to as System Utilitaies or just Utilities) diskettes in the built-in drive as directed by the monitor screen until the file transfer is complete.
7. Remove the UTILITY1 diskette and reinsert the System Utilities diskette. The monitor will indicate when the transfer is complete.
8. Type ".D1/SOS.INTERP" and press RETURN.
9. Type ".D1/SOS.INTERP" and press RETURN.
10. Swap the destination (UTILITY1) and source (referred to as System Utilities or just Utilities) diskettes in the built-in drive as directed by the monitor screen until the file transfer is complete.
11. Remove the UTILITY1 diskette and reinsert the System Utilities diskette.
12. Type ".D1/SOS.DRIVER" and press RETURN.
13. Type ".D1/SOS.DRIVER" and press RETURN.
14. Swap the UTILITY1 and System Utilities diskettes in the built-in drive as directed until the file transfer is complete.
15. Remove the UTILITY1 diskette from the built-in drive and set it aside out of the way.

TURN PAGE

16. If you have an external drive set up with your Apple *III*, copy files onto the UTILITY 1 diskette as follows:
    a. The System Utilities diskette is already booted up in the built-in drive. Type "F" for File Handling commands.
    b. Type "C" for Copy Filed.
    c. Type ".D1" and press the up arrow key. All files on the System Utilities diskette will be shown on the upper right section of the monitor. You will also see a /= appear after the .D1 you just typed in. (You will not use the Wildcard program to copy certain files to a diskette in the external drive.
    d. Insert the UTILITY1 diskette into the external drive.
    e. Press the right arrow key. You will notice that a right arrow symbol has appeared to the left of SOS.KERNEL. This means that you have selected the file SOS.KERNEL to be copied.
    f. Press the down arrow key. Press the right arrow key. You will see the right arrow symbol beside SOS.DRIVER which means you have selected that file to be copied.
    g. Press the down arrow key, then press the right arrow key to select the file SOS.INTERP to be copied.

NOTE: In the Wildcard program, the up and down arrow keys move the cursor freely up and down. The right arrow key selects a specific file to be copied whereas the left arrow key will delete a selected file.

    h. Press RETURN. Press RETURN again to select .D2/= as the destination device.

NOTE: As files are copied, you will see that information displayed on the monitor.

    i. When all three files have been copied onto the UTILITY1 diskette in the external drive, remove the UTILITY1 diskette from the external drive and insert UTILITY2.
    j. Type ".D1" and press the up arrow key. Again, you will see the files listed in the upper right-hand corner.

CAUTION: Do not press return before you type in ".D1" and press the up arrow key. If you do, you will copy all the files on the System Utilities diskette.

k. Using the down and right arrow keys as before, select the following files: SYSTEM.PASCAL, SYSTEM.MISCINFO, and SYSTEM.STARTUP.

l. When you have selected the above three files, press RETURN. Press RETURN again to select .D2/= as the destination device. All three files you just selected will be copied to the diskette in the external drive.

m. When all three files have been copied, remove UTILITY2 from the external drive. Reinsert UTILITY1 into the external drive.

TURN PAGE

C. Add the ProFile driver to UTILITY1.

1. With the (original) System Utilities diskette still in the built-in drive, press ESCAPE twice and select the System Configuration Program from the main menu by typing "S".
2. Select "R" for the Read a Driver File option. The Apple will tell you that no drivers are loaded.
3. Move the cursor over the 1, type "2" and press RETURN. A listing of all drivers currently in the SOS.DRIVER file on the UTILITY1 diskette will be displayed on the screen.
4. Remove the UTILITY1 diskette from the external drive and insert the ProFile driver diskette.
5. Type ".D2/PROFILE.DRIVER" and press RETURN. Notice that the driver named .PROFILE has been added to the bottom of the current configuration list.
6. Remove the ProFile driver diskette from the external drive.
7. Insert the UTILITY1 diskette in the external drive.
8. Press ESCAPE and the SCP menu will be displayed.
9. Type "C" to select the Change System Parameters option. The System Parameter Display will now be shown.
10. Select the option entitled "Peripheral Slot Assignment" by typing its option number. The screen will display a list of all presently installed device drivers and their current peripheral slot assignments. The ? mark following the .PROFILE driver indicates that a slot is not yet assigned to this driver.
11. Type the number appearing to the left of the .PROFILE driver and press RETURN. You will now be asked to enter the number of the slot you wish assigned to your driver.
12. Type "4" and press RETURN. (Slot 4 is the peripheral slot in the Apple /// where you installed the ProFile interface card.)
13. The ? mark is now replaced by the peripheral slot number which you just assigned.
14. Press ESCAPE twice to display the SCP menu.
15. Type "G" to select the Generate New System option.

16. Accept .D2/SOS.DRIVER by pressing RETURN.
17. Type "Y" (for yes) indicating that you wish to delete the existing SOS.DRIVER file and generate a new one.
18. When the message "System Generated" appears on the screen, you will know that the ProFile driver has been successfully added to your UTILITY1 diskette.

D. Booting Up with UTILITY1 and UTILITY2

1. Remove the original System Utilities dikette from the built-in drive. Remove UTILITY1 diskette from the external drive. Boot up the UTILITY1 diskette in the built-in drive. (Press CONTROL RESET).
2. When the message "Put Pascal system disk in built-in drive. Press RETURN" appears on the monitor, remove the UTILITY1 diskette from the built-in drive and insert UTILITY2.
3. Press RETURN.
4. The boot process will continue until the display shows the System Utilities main menu.

E. Verify the Driver Software

1. With both UTILITY1 and UTILITY2 booted up in the Apple *III*, select Device Handling from the main menu by typing "D".
2. Type "L" to list files.
3. Press RETURN.

NOTE: If you have an external drive attached to the Apple *III*, you wil hear noises coming from the external drive due to the fact that the program is checking to see if any diskette is loaded there. This is a normal part of the procedure.

4. After a short time, a listing of the devices on the diskette will appear on the monitor. The ProFile driver will be listed.
5. .Remove the UTILITY2 diskette from the built-in drive. You will reboot these two diskettes at the beginning of the next procedure.

GO ON TO PROCEDURE III.

Procedure III: Making a Basic Boot Diskette Containing Three SOS Files and ProFile Driver Software, Transferring Certain Business Basic Files to ProFile, Running a Program from ProFile and Deleting Files from the ProFile.

1. Reboot UTILITY1 and UTILITY2 in the internal drive. (Press CONTROL RESET).
2. Place a blank diskette in the external drive.
3. Type "D".
4. Type "F".
5. Press RETURN. This will identify the external drive as the device (.D2) that contains the diskette to be formatted.
6. Type "BASIC.BOOT" and press RETURN. This names the diskette to be formatted BASIC.BOOT.
7. Type "Y" if you wish to delete an existing file on the diskette in the external drive if you didn't use a blank diskette.
8. The diskette in the external drive will now be formatted. When this process is completed, you will see FORMATTING successful appear on the monitor.
9. Press ESCAPE twice to return to the main menu.
10. Type "F". Type "C".
11. Remove UTILITY2 from the internal drive. Insert the original Business Basic diskette into the internal drive.
12. Type ".D1" and press the up arrow key. You will see the Business Basic files listed on the right side of the monitor.
13. Use the right and down arrow keys to select the following files: SOS.KERNEL, SOS.DRIVER and SOS.INTERP.
14. When all three files have been selected, press RETURN.
15. Press RETURN again to copy the three files to the diskette in the external drive.

16. The monitor will display the file names as they are copied.
17. When all three files have been copied, remove the original Business Basic diskette from the internal drive. Insert UTILITY2 back into the internal drive.
18. Press ESCAPE twice to return to the main menu.
19. Type "S". Type "R".
20. Remove the UTILITY2 diskette from the internal drive. Insert the ProFile driver diskette.
21. Move the cursor over to the 1. Type in a "2". Press RETURN. You will now read in the SOS.DRIVER file from the diskette now in the external drive. (You will see the current Driver Configuration appear on the monitor).
22. Type ".D1/PROFILE.DRIVER" and press RETURN. You will now read the PROFILE.DRIVER file from the internal drive. (You will see that .PROFILE has been added to the Current Driver Configuration shown on the monitor).
23. Press ESCAPE to return to the SCP menu.
24. Remove the ProFile driver diskette from the internal drive. Insert UTILITY2.
25. Type "C" to select "Change System Parameters".
26. Type the option number beside "Peripheral Slot Assignments".
27. Type the number appearing to the left of .PROFILE and press RETURN. You have selected .PROFILE as the driver whose peripheral slot assignment will be changed.
28. Type "4" and press RETURN. You have assigned slot 4 to .PROFILE.
29. Press ESCAPE twice to return to the SCP menu.
30. Type "G" to select "Generate a New System".
31. Press RETURN to accept .D2/SOS.DRIVER.
32. Type "Y" to delete existing SOS.DRIVER.
33. Type "Y" again to delete even though file is write protected.
34. The new system will now be generated.

TURN PAGE

35. When the process is complete, remove the diskette from the external drive. Label it BASIC.BOOT.

NOTE: This diskette now contains the files SOS.KERNEL, SOS.DRIVER and SOS.INTERP. The ProFile driver software has also been added.

36. Insert the original Business Basic diskette into the external drive. Press ESCAPE.
37. Type "Q", type "F" and then type "C".
38. Type ".D2" and press the up arrow key.
39. Select the following files: DOWNLOAD.INV, FONTDEMO, STANDARD, APPLE, BYTE and POMAN.
40. Press RETURN.
41. Type ".PROFILE" and press the up arrow.
42. Press return once to copy selected files to ProFile.
43. Remove the original Business Basic from the external drive. Remove UTILITY2 from the internal drive.
44. Reboot the new BASIC.BOOT in the internal drive. (Press CONTROL RESET).
45. Type "PREFIX$=.PROFILE" and press RETURN.
46. Type "CAT" and press RETURN. The contents of the ProFile will be displayed on the monitor.
47. Type "RUN FONTDEMO" and press RETURN. (Make sure there is a space between RUN and FONTDEMO). The FONTDEMO program will be run from the ProFile.
48. Remove the new BASIC.BOOT diskette from the internal drive. Reboot UTILITY1 and UTILITY2 in the internal drive. (Press CONTROL RESET).
49. Type "F" and then type "W".
50. Type ".PROFILE" and press the up arrow.
51. Select DOWNLOAD.INV, FONTDEMO, STANDARD, APPLE, BYTE and ROMAN.
52. Press RETURN.
53. Type "N".

54. Press ESCAPE.
55. Type "D" to select "Delete Files".
56. Press the up arrow. Select the same six files again.
57. Press RETURN.
58. Type "Y" to update the directory.
59. Press ESCAPE. Type "L" to "List Files".
60. Type ".PROFILE" and press RETURN.
61. Press RETURN twice more.
62. Type "Y" as many times as necessary to continue listing until you can see that the six files have been deleted from the ProFile.

PRACTICE

Before going to your course manager for the Criterion Test you may wish to review the ProFile skills taught in this module.

THIS IS THE END OF MODULE P2.

P 3

ProFile Diagnostics for Level I

Given: ProFile System
System Utilities Diskette (version 1.1) with ProFile Driver (Use UTILITY1 and UTILITY2 diskettes that you made in P2)
ProFile Assembly and Disassembly Instructions
An Apple ///
Monitor
ProFile Demonstration Diskette
Phillips Head Screwdriver
Voltmeter or Multimeter
Small Piece of Cardboard

Action: Complete functional diagnostic tests on the ProFile. Check the power supply voltages.

Criterion: Able to copy and delete a file to ProFile and verify that the delete was performed. No damage to the power supply.

In this module you will have a chance to complete all the functional diagnostics on a ProFile and check the power supply voltages.

Also included in the module are troubleshooting and module swapping procedures and flowcharts for ProFile Level 1 Diagnostics and Module Swapping.

GO ON TO THE NEXT PAGE. COMPLETE ALL PROFILE DIAGNOSTIC TESTS.

ProFile System

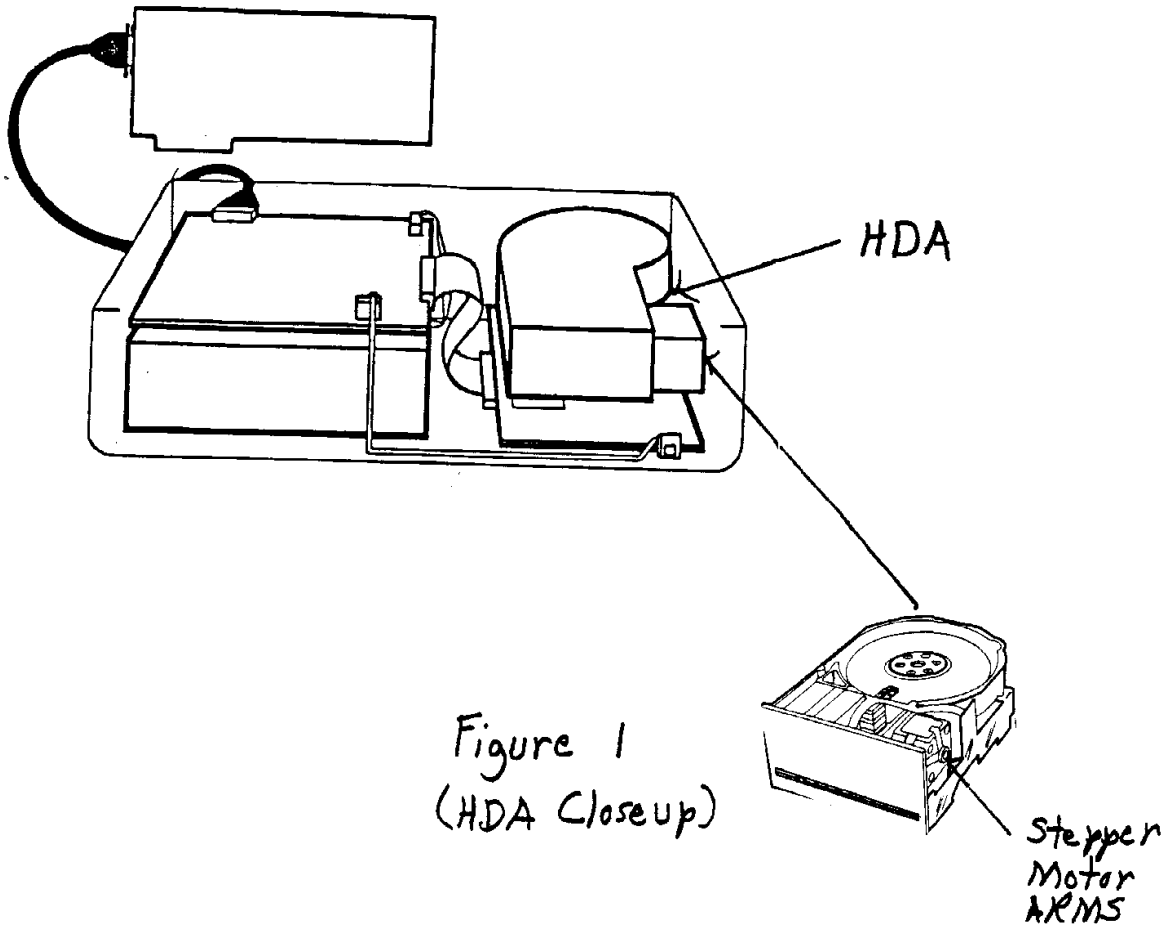


Figure 1
(HDA Closeup)

ProFile Functional Diagnostics

IMPORTANT: Ordinarily, before you would begin the diagnostic tests on a customer's ProFile, you would ask the customer to describe the kinds of problems that have occurred with the unit in question.

It is important to make sure that the customer has made backup copies of all data on the ProFile before you start trouble shooting. If this is not possible, you should inform the customer that the data on the disk may not be recoverable.

Start-Up Diagnostics

Note: If the lid is already off the ProFile and all interface cables are hooked up to the Apple and to the ProFile, you may skip to step 7. If the ProFile lid is still on, start with step 1.

1. Make sure the power is off on both the Apple /// and on the ProFile.

2. Disconnect any plugs attached to the ProFile.

3. Remove the three Phillips head screws on the front edge of the bottom of the drive. Loosen but don't remove the four rear screws on the back of the unit.

4. Carefully lift up the cover of the ProFile free from the loosened screws but don't disconnect the LED. Gently set the cover down by the ProFile so that it does not interfere with the operation of the drive. (By doing this you will be able to observe the LED and the movements of the stepper motor arm).

5. Move the cover to one side. Connect one end of the ProFile interface cable to the ProFile unit and the other end to the interface card installed in slot 4 of the Apple.

   Note: The ProFile interface card must be in slot 4 of the Apple /// in order to perform the diagnostic tests.

6. Connect the power cord to the ProFile.

7. Before you turn on the power, note the movements and responses you must observe on the drive as listed below:

   A. When the power is turned on, the LED should come on for about 2 seconds and go out for about 20 seconds while the drive comes up to operating speed.

   B. The stepper motor arm (Figure 1) should not move until the drive is up to speed.

   C. When the drive is up to speed, if the arm is not in the full clockwise

position, it will move to that position and start scanning the disk.

D. The arm will move one small step at a time as the LED blinks off and on. The arm will continue incrementing all the way around to the counter clockwise position.

Note: As the stepper motor arm completes its sweep, a sequential reading of each block is being performed. The arm may, on occasion, move to another position during this procedure and then continue with the seek routine. This is the built-in software performing the sparing function. If there is a bad block you will be able to find it when you use the Volume Verification Diagnostic test described in the next section.

E. When the surface analysis is complete (after about 40 seconds), the LED light should come on and remain lit.

Note: There is no formal reporting of errors at this time. However, you may detect certain errors as you observe the power up routine. These are:

--When you turn on the ProFile, the drive will fail to come on. If this happens, go to the trouble shooting procedures.

--The LED will not come on and then go out after approximately 2 seconds. Go to troubleshooting procedures if this happens.

--The LED comes on at first and never goes out. If this happens, check the power supply voltages as described in the Locating Problems section of this module. Then, repeat the power-up sequence.

--The stepper motor will not go through its power-up routine (scan the disk). If this happens, go to the troubleshooting procedures.

--The LED will not come on steady after a maximum of three minutes but you can hear the drive and see the arm going through its power up routine. When this happens you should change the LED and go through the power-up routine again.

--The LED still fails to come on steady after the LED has been replaced. If this happens, go to the troubleshooting procedures.

8. Turn the ProFile power switch to "on". Observe the ProFile power-up sequence as described in step 7.

9. When the LED light comes on and remains on, you will know that the ProFile has completed its start-up diagnostics.

Running the ProFile Demonstration Diskette

Note: You can use the ProFile Demonstration diskette to check the ProFile's functional workings if the drive has NOT been SOS formatted. If the drive has been SOS formatted, you should go on to the ProFile Verification procedure to begin the diagnostics.

10. Check to see that the ProFile has completed its start-up diagnostics--the LED light should have come on and remained on.

11. Boot the Demonstration diskette in the Apple ///. Allow the demo program to complete.

Note: If the demo program will not run, you will receive an error message such as "? FILE NOT FOUND ERROR IN 1020" or "I/O ERROR". This may be an indication that the read function is not working, the disk has been SOS formatted or that the drive was damaged in shipment.

If this happens, go on to the ProFile Verification diagnostic test described below.

12. When the demo program successfully runs on the ProFile, you will know that the read function is o.k. However, you will still have to run the Write Verify diagnostic test next to make sure the Write function is also o.k.

Completing the ProFile Verification Test

13. Power down the Apple ///. Remove the ProFile Demo diskette from the internal drive. Boot up UTILITY1 and UTILITY2 (that you made in P2) in the internal drive.

14. Type D.

15. Type L and press RETURN. A list of devices will be displayed on the screen. ProFile should have a directory listing.

Note: If there is no directory listing given, you should complete the Volume Verification procedures to check for a read function error. However, if the ProFile passes, you should still continue with the diagnostics by completing the Volume Verification test at this time.

Completing the Volume Verification Test

Note: The Volume Verification test is a read check that identifies both hard (damaged block) and soft (bad SOS read of a block) errors.

The verification procedure will take approximately three to four minutes. A good disk will have zero bad blocks when received from the factory. A ProFile that has been in use, however, could have some bad blocks but these could be soft errors which were created during a write of that block.

16. With the Utilities diskettes with ProFile driver software booted in the Apple ///, press ESCAPE once.

17. Type V.

18. Type .PROFILE and press RETURN twice. ProFile will then start reading all of the blocks sequentially. You will be able to watch the stepper motor arm as it increments while the blocks are being read.

19. This process may take between 3 and 4 minutes. If a bad block is found, it will be reported on the monitor screen.

Note: It is not unusual for a drive that has been in use for some time to have some bad blocks (soft errors). However, if there are more than 100, the message "Too many bad blocks" will be displayed on the monitor screen. This means that all of the spare blocks have been used which indicates a possible writing problem or a damaged disk. If this happens, go to the troubleshooting procedures. If ProFile passes, go on to the Write Verify test.

Completing the Write Verify Test

20. Press ESCAPE twice.

21. Type F.

22. Type C.

23. Insert the UTILITY1 diskette back into the internal drive. Type .D1/SOS.DRIVER and press RETURN.

24. Type .PROFILE/(your name) and press RETURN. This will transfer the SOS.DRIVER file as a file identified with your name to the ProFile drive.

Note: Upon completing the transfer, a message will be displayed indicating the transfer was successful. If the transfer was not successful, a warning message will appear on the monitor screen. When this happens, you should complete the module exchange procedures as outlined in the Locating Problems section.

25. Press the ESCAPE key. You will now check for the presence of the transferred file.

26. Type L.

27. Type .PROFILE and press RETURN three times. This will display the files that are on this ProFile. Your name should be listed as one of them. Type Y to continue listing as many times as necessary.

28. Type ESCAPE. You will now delete your file from the ProFile disk.

29. Type D.

30. Type .PROFILE/(your name) and press RETURN.

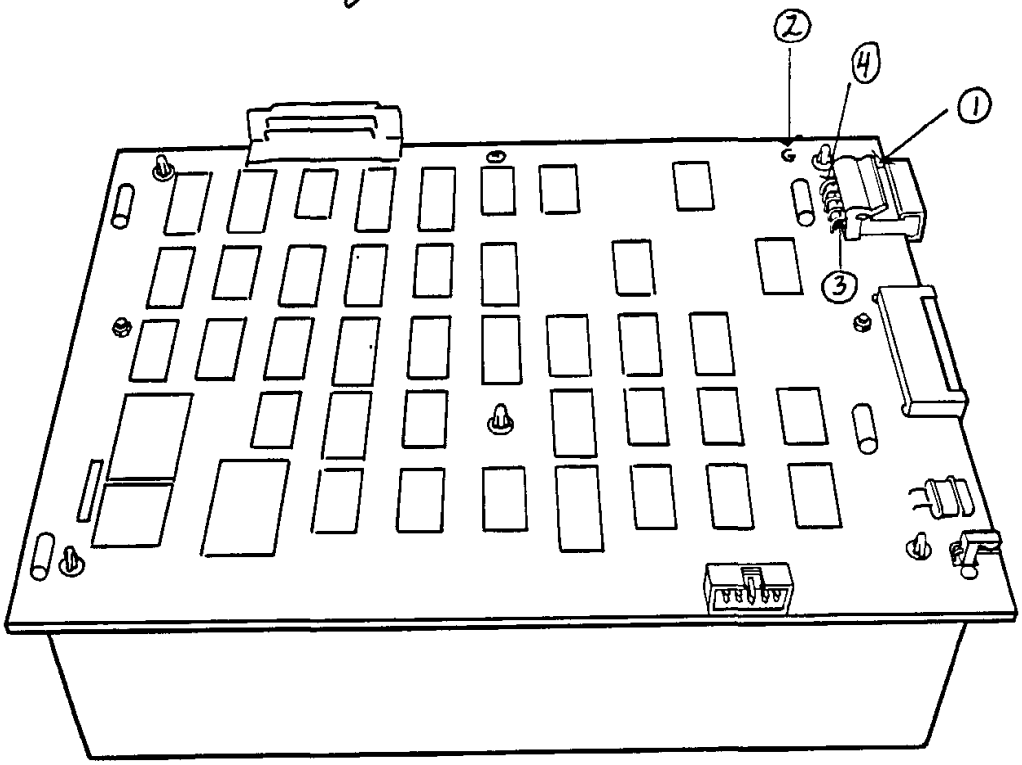
31. Type Y to update the directory.

Note: You have now completed the ProFile diagnostic tests. Ordinarily, if the ProFile successfully passes all of the diagnostic tests described above, the unit is functionally good.

However, if the unit does not test out o.k., you would complete the procedures for locating problems as described in the next section.

GO ON TO THE NEXT SECTION AND PRACTICE CHECKING THE POWER SUPPLY VOLTAGES.

Figure 2



Locating Problems on the ProFile
(Troubleshooting Procedures)

Checking Interconnections

1. Power down both the ProFile and the Apple ///. Check all interconnections to see if they are installed properly and securely.

2. Make necessary adjustments and repeat the diagnostic tests to verify that the unit is o.k.

Note: At this point, if the ProFile still did not pass the diagnostics, you would then check the power supply as detailed below.

Checking the Power Supply

3. Locate the pins on the power supply plug coming into the controller board at location P3. (Figure 2, Item 1).

4. Plug in the meter and turn the power on. Set the function for volts and the range for automatic or 20 volts. Plug in the meter probes.

   Clip the common (ground) of the meter to the pin marked "G" on the controller board just above P3. (Figure 2, Item 3).

CAUTION: To check the voltages on the power plug pins, it will be important for you to touch only the part of each pin at the point where it bends coming out of the board. (Figure 2, Item 3). If you place the probe in between two pins such that they short together, you may have to replace the entire power supply.

5. Place a small piece of cardboard between each pin you test and the pin next to it. This will help prevent you from shorting any two pins together.

6. Turn the power to the ProFile on. Place the meter probe's tip on one power plug pin at a time. Remember to place the piece of cardboard between the pin being checked and the one next to it.

   Note: Pin 1 is the power plug pin closest to pin "G" where you have clipped the common (ground) clamp. (Figure 2, Item 4).

7. The voltages should correspond to those shown in Figure 3 below.

Figure 3

Pin #	Voltage
1	+5 volts DC + or - 2%
2	+11.8 volts DC + or - 4%
3	+5 volts DC + or - 2%
4	-12.0 volts DC + or - 10%
5	0 volts

Note: Normally, at this point, if the voltages did not correspond to those on the chart in Figure 3, you would replace the power supply and repeat the diagnostic tests.

THIS IS THE END OF THE PRACTICE SECTION FOR P3. THE FOLLOWING SECTIONS INCLUDE THE PROFILE MODULE SWAPPING PROCEDURES AND FLOWCHARTS FOR LEVEL 1 DIAGNOSTICS AND MODULE SWAPPING.

Guide for Locating Problem Modules on the ProFile
(Module Swapping)

Note: If the power supply tests out o.k., you should continue on to the module swapping procedure described below. By following these procedures you will be able to isolate the problem to the defective module in the ProFile.

These procedures should be completed in the order given. After each step, the verification diagnostic tests should be repeated in order to verify that the problem has actually been fixed.

A. Power down the ProFile and the Apple ///. Replace the controller card. Repeat the verification tests to see if the unit now checks out o.k. If the ProFile now passes the tests, then you will know that the customer needs a new controller board.

B. If the unit still does not pass the verification tests, reinstall the customer's controller card and this time replace the analog card on the HDA. Rerun the tests.

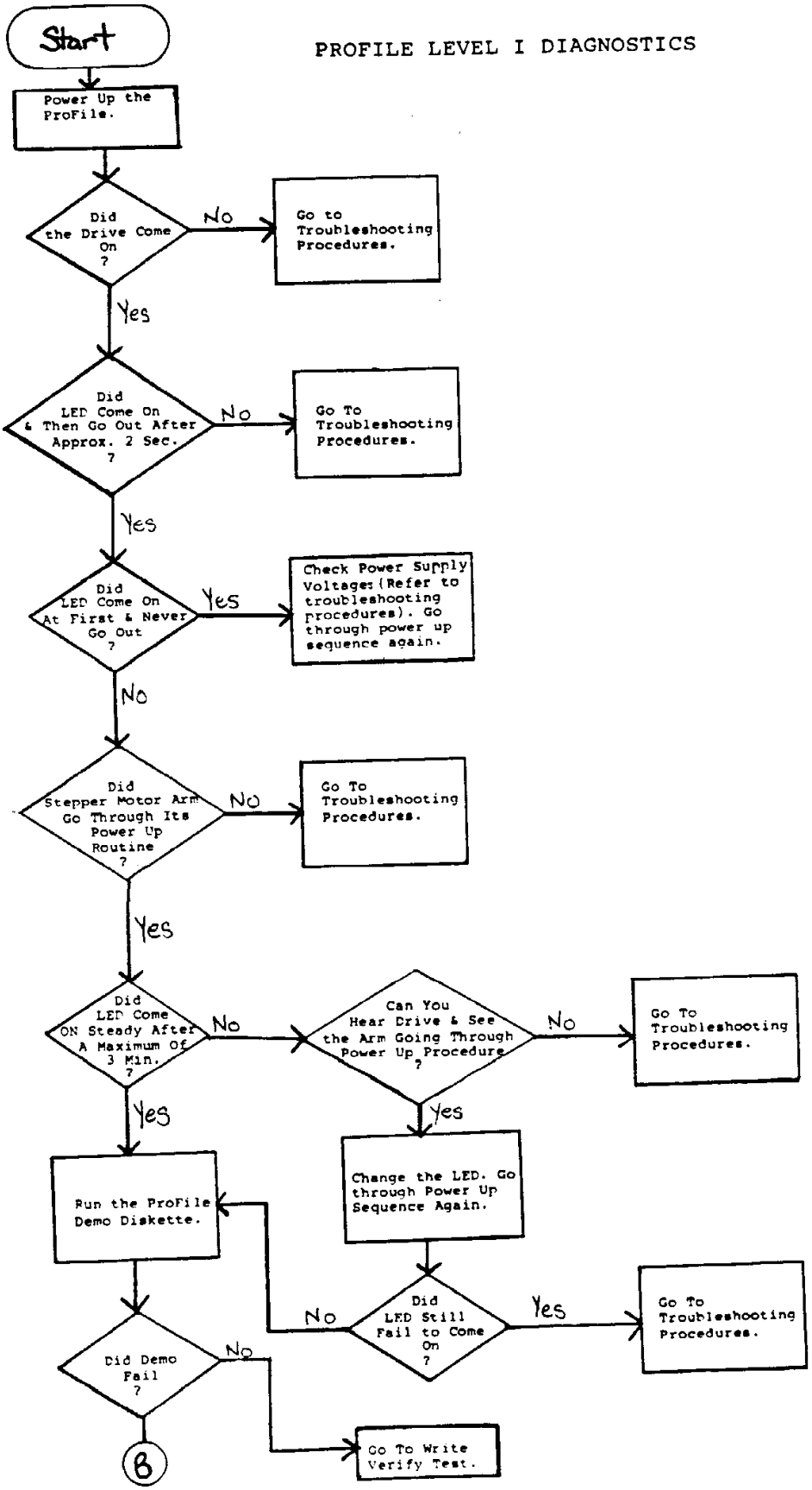
C. If the ProFile passes the test this time, you will know that the customer's analog card should be replaced.

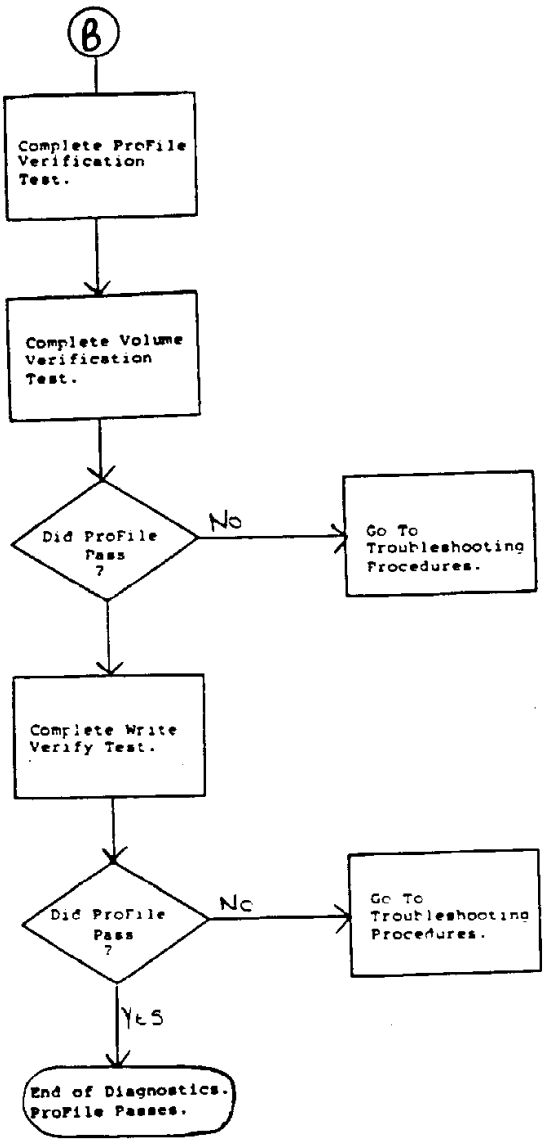
However, if the ProFile still does not check out o.k., reinstall the customer's analog card and replace the HDA itself. Rerun the tests.

D. If the ProFile passes the tests this time, then you will know that the HDA has to be replaced.

If the unit fails the tests again, change the power supply. (The power supply may be varying in such a way that it can not be seen on a meter).

PROFILE LEVEL I DIAGNOSTICS




B
Complete ProFile Verification Test.
Complete Volume Verification Test.
Did ProFile Pass ?
No
Go To Troubleshooting Procedures.
Complete Write Verify Test.
Did ProFile Pass ?
No
Go To Troubleshooting Procedures.
Yes
End of Diagnostics. ProFile Passes.