TOLERANCES
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.

DECIMALS   .X ± _____
           .XX ± _____
           .XXX ± _____
ANGLES   XX.X ± _____
FRACTIONS   ± _____
DIMENSIONS IN PARENTHESIS
ARE IN MILLIMETERS.

DRAWN BY E. Guthrie   DATE 8/82
CHECKED BY V. Garcia   DATE 8/82
APPROVED BY DCCo / A.J. Adams   DATE 8-11-82
RELEASED BY RM Gardner   DATE 9/82

 apple computer inc.

TITLE
FINAL FUNCTIONAL TEST PROCEDURE
APPLE //e

MATERIAL: _____

SIZE	DRAWING NUMBER
A	063-0132-B

NEXT ASSY.   FINISH: _____

1.0 TITLE

FINAL FUCTIONAL TEST PROCEDURE - APPLE IIe SYSTEM

2.0 TEST EQUIPMENT AND SUPPLIES

2.1 P/N 889-0026   Functional test diskette
2.2 P/N 821-0190   Functional test card with cables

2.2.1 Functional test card to be modified and calibrated as described in appendix A

.2.3 P/N 821-0189   Slot tester card

2.3.1 Slot tester card to be modified as described in appendix A

2.4 Amdek or equivalent, Color Monitor
2.5 P/N 890-5015   Modified video cable for color monitor
2.6 Monitor III or equivalent, black and white monitor with cable
2.7 Phillips 6661 or equivalent, frequency counter with cable
2.8 P/N A2M003   APPLE disk II
2.9 P/N 650-4105   Disk II interface card
2.10 P/N 607-0102   APPLE IIe 1K 80 column card

3.0 ALIVE TESTS

3.1 Plug the power supply cable into the computer.

3.2 Connect the monitor cable to the video connector located at the right rear of the board.

3.3 Connect the modified video cable to the MODULATOR connector (J13) located near the right rear of the logic board.

3.4 Turn on the power supply switch.

3.5 The following should happen immediately:

The "POWER ON" LED should light.

The "POWER ON" indicator on the keyboard should light.

The speaker should beep once.

The monitor should display "Apple II" at the center top of the screen.

The Applesoft prompt, "]", and a blinking cursor should appear on the left side of the display one line below Apple II.

3.6 If any of the things listed in section 3.5 didn't happen, mark
     the traveler according to this list:

     No beep and no "Apple II" --- NO RESET
     "Apple II" and no beep   --- SPEAKER
     LED not on   --- CR1 BAD

     If any other things happen besides what is listed in 3.5, mark
     the traveler "POWERUP FAIL" and send the system to rework.

3.7 Press the CONTROL and RESET keys at the same time. When you
     let go of the keys you should hear a beep and the Applesoft
     prompt and a blinking cursor should appear at the lower left
     of the monitor. If this doesn't happen, label the traveler
     "MANUAL RESET" and send the system to rework.

3.8 Press the RETURN key and hold it down. After about one
     second you should see a column of "]" characters appearing
     down the left side of the screen. If these characters don't
     appear then label the traveler "REPEAT FAIL" and send the
     system to rework.

3.9 Press the CONTROL, RESET and CLOSED APPLE keys all at the same
     time. Release the RESET key first and the board will run a self
     test that will take about 10 seconds to finish. If any message
     other than "KERNEL OK" is displayed, write the message on the
     traveler and send the system to rework.

3.10 TURN THE POWER SUPPLY OFF.

4.0 SLOT TESTING

4.1 Insert the functional test card into slot four (4) and connect
     the frequency counter cable to the counter.

4.2 Insert the slot tester card into slot seven (7).

4.3 Turn the power supply switch on.

4.4 The monitor should display "TESTING SLOT #7" immediately.
     If the monitor displays the message CAN'T FIND A SLOT CHECKER
     then turn the power off, reseat the slot checker and power on
     again. The test will take about one second to finish and then
     the message "SLOT OK" should be displayed. If any other message
     is displayed, copy that message onto the traveler and send the
     system to rework.

4.5 TURN THE POWER OFF.

     CAUTION: DO NOT REMOVE CARDS WITH POWER ON!

4.6 Remove the slot checker card from slot seven (7) and insert it into slot six (6).

4.7 Turn the power supply switch on.

4.8 The monitor should display the messages like in section 4.4 except the slot number will be six (6).

4.9 Repeat the slot check sequence:

TURN THE POWER OFF

INSERT THE SLOT CHECKER INTO THE NEXT SLOT

TURN THE POWER ON

For slots five (5), three (3), two (2), and one (1). If on all the slots the message "SLOT OK" was displayed, the slot test section has passed. If a slot fails label the traveler with the failure message and send the system to rework.

4.10 Check the system frequency displayed on the frequency counter. If the frequency is not within the following limits, label the traveler "7M BAD" and send the system to rework.

Frequency range: 7.158840 - 7.159340 MHz

4.11 TURN THE POWER SUPPLY OFF.

4.12 Remove the slot checker card from slot one (1).

5.0 BOOT DISK DRIVE TEST

5.1 Connect the cassette cables from the final test card to the cassette jacks on the right rear of the logic board. (Functional test card IN to logic board IN, and OUT to OUT.)

5.2 Connect the functional test card DB9 connector to the DB9 connector at the right rear of the logic board.

5.3 Connect the remaining cable, the DIP I/O, to the game paddle socket at the right rear of the logic board.

5.4 Insert the 80 column card into the Aux slot at the left front of the board.

5.5 Insert the disk interface card, which should be connected to the drive, into slot six (6).

5.6 Insert the functional test diskette into the disk drive and close the door.

5.7 TURN THE POWER ON.

5.8 The following should happen immediately:

The system should beep.

The message "Apple II" should be displayed on the monitor.

The disk drive "IN USE" light should light.

5.9 If after 7 seconds the message "EXECUTING I/O TESTS" or the first video test screen does not appear, label the traveler "NO BOOT" and send the system to rework.

6.0 CASSETTE AND GAME I/O TESTS

If a failure happens here, the monitor will print "ERROR" and then a code. Write the code on the traveler and send the system to rework.

7.0 VIDEO TESTS

7.1 The first video test is a color test. Make sure that the colors on the color monitor are the same as the names.

This test fails if any of these things happen. (Mark the traveler VIDEO FAIL.)

One of the colors on the monitor is not right.

The colors are washed out.

The color names aren't there.

There are lines moving through the display.

7.2 Press the space bar to display the next test. This test is a pattern of colors. This test fails if any of these things happen. (Mark the traveler VIDEO FAIL.)

You can't get the pattern to appear.

The pattern doesn't go all the way to the bottom of the screen.

There are lines moving through the display.

7.3 Press the space bar to display the character generator test. Look at the black and white monitor during this test. This test fails if anything except the little box is flashing. (Mark the traveler VIDEO FAIL.)

7.4 Press the space bar to display the next test. This test will display five colored lines. Fail this test if any of these things happen. (Mark the traveler VIDEO FAIL.) You should look at the color monitor during this test.

The colors are wrong or washed out. The colors should be in the following order from top to bottom.

GREEN
PURPLE
WHITE
RED
CYAN BLUE

NOTE: Cyan is a greenish blue.
There is anything besides the five lines on the screen.

7.5 Press the space bar to display the next test. Fail this test if any of these things happen. (Mark the traveler 8Ø COL FAIL.) Look at the black and white monitor.

There are only forty columns displayed.

There are spaces between the numbers on the number lines.

The numbers read Ø2468 or 13579 and not 12345.

The letters are blurred, not crisp at the edges.

7.6 Press the space bar to go to the keyboard test.

8.Ø KEYBOARD/KEYBOARD ENCODER TEST

8.1 Make sure the CAPS LOCK key is in the DOWN position.

8.2 You should see letters and numbers on the display now arranged like they are on the keyboard. To do this test you must press each key on the keyboard and make sure that the same key on the display is erased.

There are several error messages you will find during this test.

ONE BEEP ... Means that key has been pushed before.
The one beep message may mean that you have made a mistake OR it may mean that you pushed a key and the computer thought it was a different key.

FOUR BEEPS . Means that a key was pressed that isn't in this test. This message could mean that you made a mistake and pressed the wrong key OR the computer

thought you pressed a different key.

BOUNCE ..... This message will be printed on the monitor at
the bottom of the display in inverse video.
(black on white) It will say:

BOUNCE DETECTED ON <the key>

The best way to do this test is to look at the keyboard and
press all of the keys until you are done or hear a beep or
beeps. While you are doing characters that require the shift
key to be pressed make sure that you have used both shift keys
at least once. If you get through all of the keys without
hearing beeps then look at the display and make sure all of
the keys were erased. If they are and there isn't a bounce
message then press the space bar and go to the next test.

If you hear the single beep message then press the key again
and look at the current key display at the top of the screen.
If the display is the same as the key you just pressed then
continue as that key has been accidently been pressed twice.
If the key is different that the display then mark the
traveler BAD DECODE <the key> and send the system to rework.

If you hear the four beep message and you are pressing a key
that is on the display then label the traveler BAD DECODE
<the key> and send the system to rework.

If you got all the way through the keyboard without messages
but you can't get a key to disappear from the screen then
mark the travel. NO DECODE <the key> and send the system
to rework.

If you see the bounce message on the monitor then label the
traveler BOUNCE ON <the key> and send the system to rework.

8.3 You should now be at the lower case test. Make sure that the
     CAPS LOCK key is in the UP position. This test works just
     like the last test except you will be typing in lower case
     letters. Also use the same messages on the traveler. Press
     the spacebar to go to the next test if there were no errors.

8.4 You should now be at the control character test. This test
     will display the keys in inverse video. (black on white)
     Again this test works just like the first test EXCEPT:

     For the first line of keys (Q through P) hold down the CONTROL
     key while pressing the keys.

     For the second row of keys (A through L) hold down both the
     CONTROL and left SHIFT keys.

To do the third row of keys (Z through M) push the CAPS LOCK
key to the down position and then hold the CONTROL key down
while pressing the keys.

Use the same messages as in 8.2 for errors. Press the spacebar
to go to the next test if there were no errors.

8.5   You should now see the miscellaneous keys test on the display.
      This test will display words on the screen. Press the key
      described by the word to make the word disappear. Use the same
      messages that are described in section 8.2. If there were no
      errors then press the spacebar to go to the next test.

8.6   The display should now say PRESS OPEN APPLE. The open apple key
      is the key just to the left of the spacebar. When you press the
      open apple key you should immediately see PRESS CLOSED APPLE
      appear on the next line. If this message does not appear on the
      display then mark the traveler OPEN APPLE and send the system to
      rework. If the message PRESS CLOSED APPLE appears then press the
      key to the right of the spacebar. If the message TEST COMPLETE
      does not appear then label the traveler CLOSED APPLE and send the
      system to rework.

9.0   YOU'RE DONE

      The message TEST COMPLETE should be displayed on the monitor now.
      TURN THE POWER OFF and disconnect the test equipment.

Appendex A

1.∅ SLOT TESTER CARD MODIFICATIONS

The following edge connector fingers should be removed from the Slot Tester Card:

Connector pin   Signal name

    19 ....CLKEN*
    21 .... RDY
    22 .... DMA*
    23 .... INT OUT
    24 .... DMA OUT
    27 .... DMA IN
    28 .... INT IN
    32 .... INH*
    33 .... -12C
    34 .... -5C
    35 .... ENKBD*
    36 .... 7M
    39 .... UPSYNC
    5∅ .... +12C

In addition, The following LEDs should be removed:
CR2, CR3, CR4

2.∅ FUNCTIONAL TEST CARD MODIFICATIONS

The following edge connector fingers should be removed from the Functional Test Card:

Connector pin   Signal name

    19 ....CLKEN*
    21 .... RDY
    23 .... INT OUT
    24 .... DMA OUT
    27 .... DMA IN
    28 .... INT IN
    32 .... INH*
    33 .... -12C
    35 .... ENKBD*
    37 .... Q3
    39 .... UPSYNC
    5∅ .... +12C

In addition, The following LEDs should be removed:
CR3, CR4

3.Ø FUNCTIONAL TEST CARD CALIBRATION

The Functional Test Card Calibration Procedure consists of the following two steps only:

3.1 With the test card installed in slot four and the cassette cables disconnected, adjust POT P1 for zero Volts plus or minus 1Ø mV observed at U18 pin 6.

3.2 Lock the pot P1 into place using a compound made for that purpose.