6.0.0 Required Tools and Equipment

The following tools are required for Disassembly, Reassembly, Disk Drive Alignment and Video Monitor Adjustment.

6.0.1 Keyboard

a) No. 2 Phillips Screw Driver, 9in. - 12in. length

6.0.2 Major Sub-Assemblies Within Main Case

a) No. 2 Phillips Screw Driver, 9in. - 12in. length
b) 1/20 inch Allen Wrench
c) Needle-nose pliers

6.0.3 Disk Drive Alignments

a) No. 2 Phillips Screw Driver, 9in. - 12in. length
b) 1/20 inch Allen Wrench
c) 6 inch Standard Screw Driver
d) 3/32 inch Allen Wrench
e) Oscilloscope
    1) Dual Channel
    2) External Trigger
    3) Minimum Frequency 50Mhz
    4) Sensitivity: 200 Millivolts
    5) Sweep Speed: 200 Milliseconds
    6) Three 10 x 1 Probes with ground clips
f) Alignment Diskette
    1) Dysan 224 or equivalent
g) Osborne Alignment Program Diskette (P/N 2D 01003-00)
h) Drive head cleaning kit

6.0.4 Video Monitor

a) No. 2 Phillips Screw Driver, 9in. - 12in. length
b) 1/20 inch Allen Wrench
c) Broad-end, non-metallic adjustment tool
d) Osborne Alignment Program Diskette (P/N 2D 01003-00)

6.1.0 KEYBOARD DISASSEMBLY

CAUTION: Identify connector orientations before detaching any cable.

6.1.0.1 Disconnect computer from power source.

6.1.0.2 Disconnect the Keyboard cable from the front Bezel by spreading the latches of the Keyboard connector.

6.1.0.3 Using a pad or soft material to protect the keyboard, turn the keyboard assembly over so the keys face down.

6.1.0.4 Remove the 6/32 Phillips screw located at each latch end of the keyboard case.

6.1.0.5 Lift the Keyboard case from the Keyboard and bezel assembly.

6.1.0.6 Carefully remove the Keyboard harness from the double back tape located on the Keyboard Bezel and Keyboard.

6.1.0.7 Carefully remove the Keyboard harness from the Keyboard connector.

NOTE

The Keyboard harness is aligned with Pin 1 of the Keyboard connector. Looking at the underside of the Keyboard with the numeric row of keys to the top, Pin 1 is the upper right Pin.

6.1.0.8 Remove four 8/32 Phillips screws which secure the Keyboard to the bezel standoffs.

6.1.0.9 Remove the Keyswitch array from the Keyboard Bezel.

See Section 6.2.7 to reassemble the keyboard.

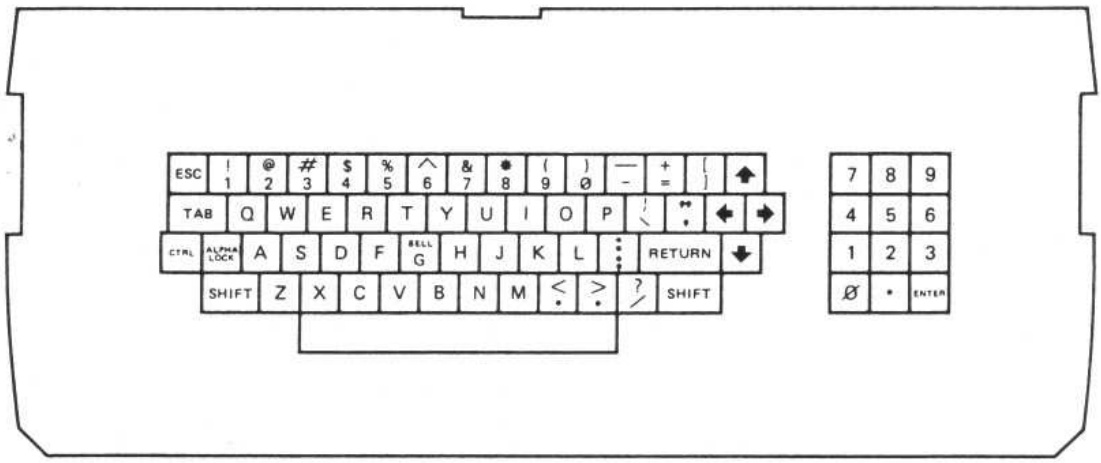


FIGURE 6-1. KEYBOARD TOP VIEW

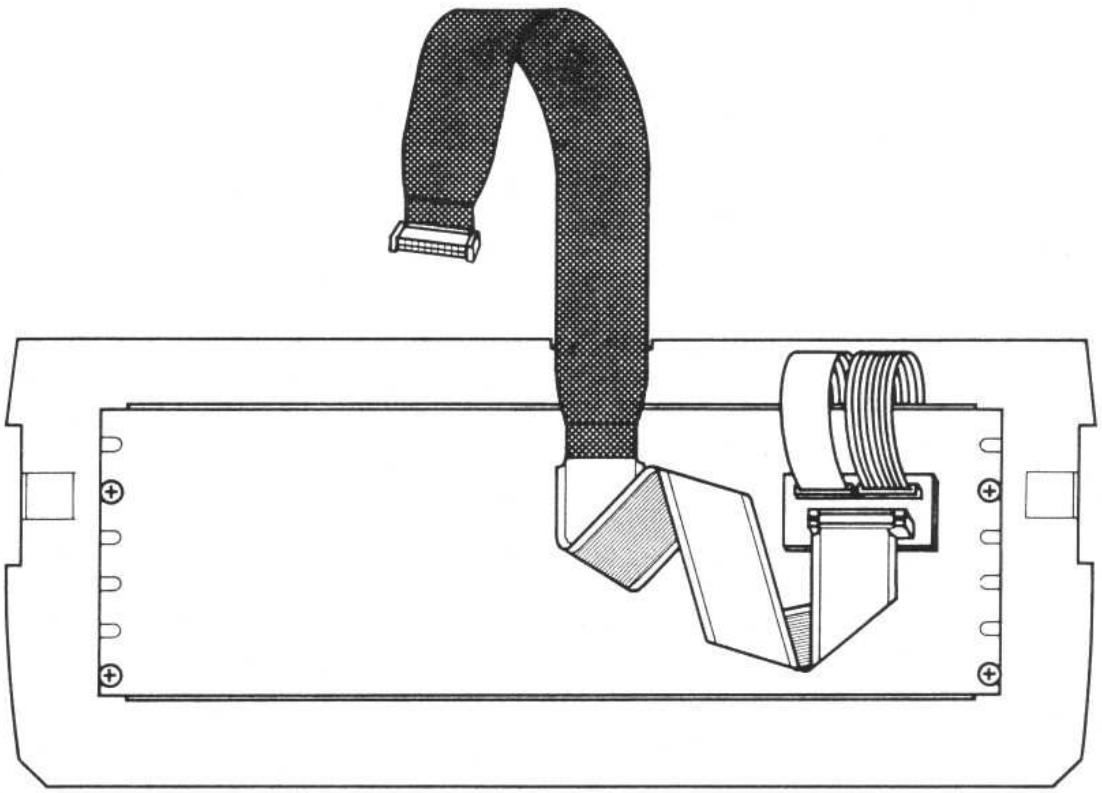


FIGURE 6-2. KEYBOARD AND BEZEL ASSEMBLY—UNDERSIDE

6.1.1 Bezel and Chassis Disassembly

6.1.1.1 Disconnect computer from power source.

6.1.1.2 Disconnect the Keyboard cable from the front Bezel by spreading the latches on the Keyboard connector.

6.1.1.3 Remove all external cables (ie. RS-232, Modem, External Video, etc.).

6.1.1.4 Using a 1/20 inch Allen wrench, remove the video knobs.

6.1.1.5 Remove the 6/32 x 1/4 inch Phillips screws surrounding the Bezel.

6.1.1.6 Placing thumbs below CRT screen and fingers in the Disk storage pockets, apply a slight pressure inward with thumbs and pull Bezel straight forward.

6.1.1.7 With the Osborne resting flat on its rubber feet, turn it so the A/C Power Panel faces technician.

6.1.1.8 Remove two 6/32 x 1/4 inch Phillips screws from above and below the handle. Label these screws FOR HANDLE and set aside.

NOTE

Using an incorrect screw in reassembly may puncture the Disk harness running behind the handle.

6.1.1.9 Remove six 6/32 Phillips screws securing the A/C Power Panel to the case. The two upper screws have washers. Label these screws FOR A/C POWER PANEL and set aside. Using incorrect screws in reassembly may puncture the drive harness!

6.1.1.10 With the Osborne resting flat on its rubber feet, turn it so the CRT screen faces technician.

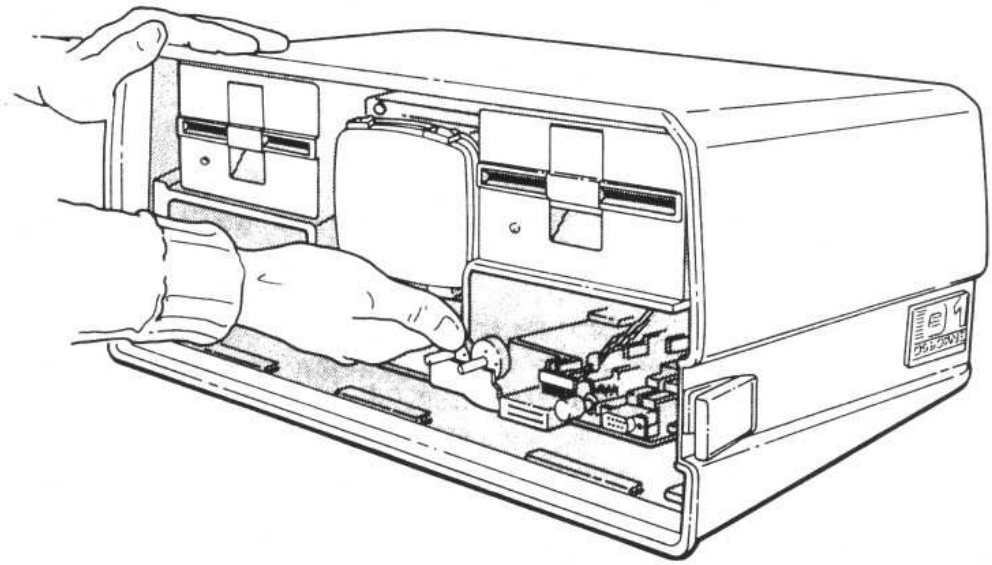


FIGURE 6-3. CHASSIS REMOVAL

6.1.1.11 Remove the 8/32 x 1/2 inch Phillips screws holding the chassis to the case. There are either two or four of these screws located on the left and right inside forward edges of the chassis.

6.1.1.12 Grasp the Chassis assembly between the CRT and the Logic Board. Lift the assembly slightly and pull it straight forward. Be careful when removing the chassis from the case. The A/C power panel will be dragging behind the chassis by wires only.

6.1.1.13 Pull remaining Power cord through case.

See Section 6.2.6 to reassemble the bezel and chassis.

6.1.2 Logic Board Disassembly

6.1.2.1 Disassemble the Osborne-1 following the instructions in Section 6.1.1.

6.1.2.2 Position the Chassis assembly with the Logic Board facing up and CRT screen facing Technician.

6.1.2.3 Remove the 6/32 Phillips screw at each corner of the Logic Board. The screw in the right front corner of some Logic Boards has a nylon insulation washer.

6.1.2.4 Lift the Logic Board by the front edge and hold it perpendicular to the chassis, video control shafts pointing straight up. Note all connector orientations while still attached.

6.1.2.5 Remove the DC harness connector located in the extreme left lower corner of the Logic Board.

NOTE

The DC harness connector is not keyed. The RED wire on the harness must go to the left.

6.1.2.6 Remove the Disk harness connector located in the lower left corner of the logic board at the right of the DC harness connector. Grip the connector and CAREFULLY detach it, being sure not to bend any pins.

NOTE

The Disk Drive harness connector is not keyed. The RED stripe on the harness must go to the right.

6.1.2.7 Remove the Video harness connector located in the upper left corner of the Logic Board to the right of the reset button.

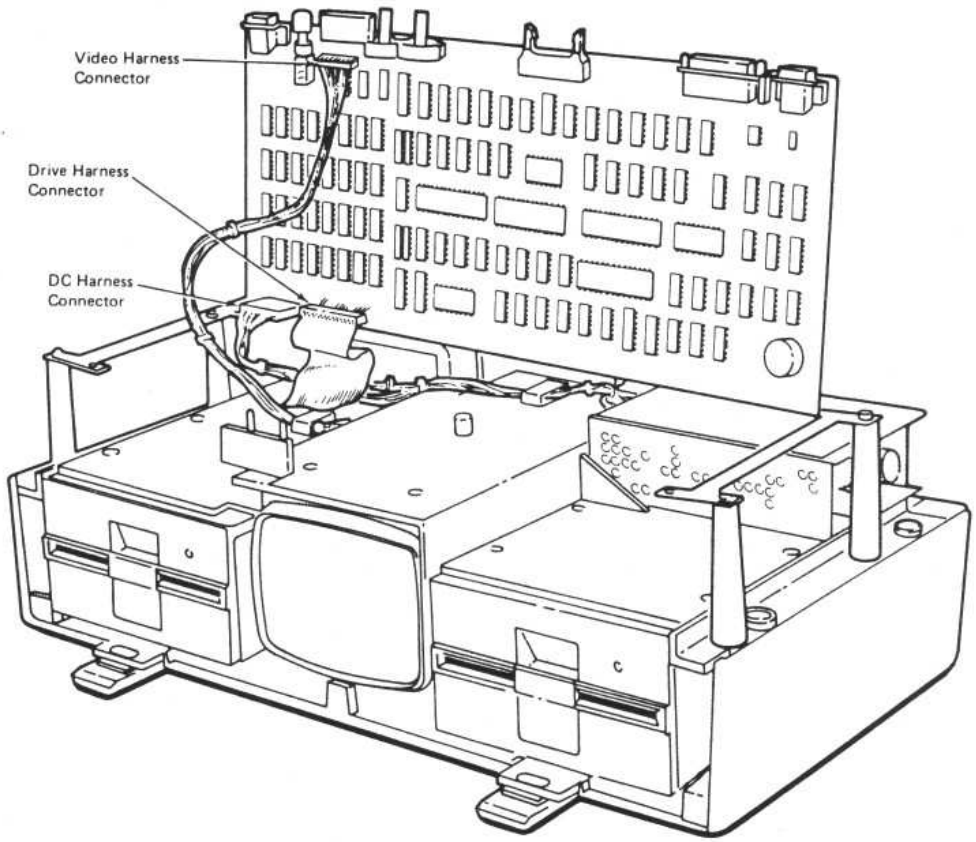


FIGURE 6-4. LOGIC BOARD REMOVAL

NOTE

The Video harness connector is not keyed. The RED wire on the harness must go to the left.

6.1.2.8 Remove External Video plug located on the front edge of the logic board between the reset button and video contrast shaft.

6.1.2.9 Remove the Logic Board.

See Section 6.2.5 to reassemble the logic board.

6.1.3 Video Monitor Disassembly

6.1.3.1 Disassemble the Osborne-1 following the instructions in Sections 6.1.1 and 6.1.2.

6.1.3.2 Position the chassis assembly Logic-Board-side-up and CRT screen facing Technician.

6.1.3.3 Remove four 6/32 Phillips screws securing the Monitor to the Chassis.

6.1.3.4 Grasp the left and right sides of the Chassis assembly and carefully lift it clear of the video monitor.

6.1.3.5 Remove the video harness connector located at the top rear of the video PC board. This is a keyed connector.

6.1.3.6 Remove the transparent face plate from the monitor screen.

See Section 6.2.4 to reassemble the video monitor.

6.1.4 Power Supply Disassembly

CAUTION: Working with Power Supplies is DANGEROUS. Power Supplies can hold an electrical charge for long periods of time. Be careful not to touch any components unnecessarily!

6.1.4.1 Disassemble the Osborne-1 following the instructions in Sections 6.1.1 and 6.1.2.

6.1.4.2 Position the Chassis assembly Logic-Board-side-up and CRT screen facing away from Technician.

6.1.4.3 Remove the 6/32 Phillips screw from each corner of the Power Supply unit.

NOTE

Three of these screws have nylon washers. The screw in the upper right corner has a metal grounding washer.

6.1.4.4 With the wires still attached, carefully lift the Power Supply out of the chassis.

6.1.4.5 Turn the Power Supply over left-to-right so the components face the Technician and the five large capacitors are in the lower left corner.

6.1.4.6 Remove the DC output connector from the Power Supply. This keyed connector is attached to one of the three identical male connections on the left side of the Power Supply.

6.1.4.7 Remove the ground wire connector from the Power Supply. This is a slip-on connector located in the upper left corner of the power supply.

6.1.4.8 Remove the AC input connector from the Power Supply. This is a keyed connector located left of the fuse on the upper side of the Power Supply.

See Section 6.2.3 to reassemble the power supply.

6.1.5 Disk Drive "A" Disassembly

NOTE

The A drive has an 8 pin 150 OHM Terminator resistor pack. B DRIVE DOES NOT.

6.1.5.1 Disassemble the Osborne-1 following the instructions in Sections 6.1.1 and 6.1.2 .

6.1.5.2 Position the Chassis assembly Logic-Board-side-up and handle facing away from Technician.

6.1.5.3 Remove four 6/32 Phillips screws holding the "A" Drive to the Chassis assembly.

NOTE

Disk Drive A is the Drive closest to the Power Supply.

6.1.5.4 With the wires still connected, pivot the shielded Drive horizontally to the right 90 degrees from its original position.

6.1.5.5 Remove two 6/32 Phillips screws which hold the shield to the Drive. These screws are located on the left and right sides of the Drive.

6.1.5.6 Hold the Drive shield down and lift the Drive enough to access the rear of the Drive.

6.1.5.7 Remove the disk harness connector and the ground connector from Drive. The disk harness connector is at the rear of the Drive PC board. The slip-on Ground connector is located at the rear of the Drive either on the Drive frame or shield.

NOTE

The Disk Drive harness is not keyed. Facing the back of the Drive with strobe wheel side up, the harness is always connected RED STRIPE to the RIGHT

6.1.5.8 Remove Drive from shield.

6.1.5.9 If the Drive is being replaced with another, remove the 8 pin Terminator from the Drive PC board and KEEP IT for installation on the new Drive (See Section 6.2.2) . The Terminator is located at position RN3 on the right rear corner of the PC board.

See Section 6.2.2 to reassemble the "A" drive.

6.1.6 Disk Drive "B" Disassembly

NOTE

The A drive has an 8 pin 150 OHM Terminator resistor pack. "B" DRIVE DOES NOT.

6.1.6.1 Disassemble the Osborne-1 following the instructions in Sections 6.1.1 and 6.1.2.

6.1.6.2 Position the Chassis assembly Logic-Board-side-up and handle facing away from Technician.

6.1.6.3 Remove four 6/32 Phillips screws securing the "B" Drive to the Chassis assembly.

NOTE

Disk Drive B is the Drive furthest from the Power Supply.

6.1.6.4 With the wires still connected, pivot the shielded Drive horizontally to the left 90 degrees from its original position.

6.1.6.5 Remove two 6/32 Phillips screws which hold the shield to the Drive. These screws are located on the left and right sides of the Drive.

6.1.6.6 Hold the Drive shield down and lift the Drive enough to access the rear of the Drive.

6.1.6.7 Remove the disk harness connector and the ground connector from drive. The disk harness connector is at the rear of the Drive PC board. The slip-on Ground connector is located at the rear of the Drive either on the Drive frame or shield.

NOTE

The Disk Drive harness is not keyed. Facing the back of the Drive with strobe wheel side up, the harness is always connected RED STRIPE to the RIGHT.

6.1.6.7 Remove Drive from shield.

See Section 6.2.1 to reassemble the "B" drive.

6.1.7 Power Panel Disassembly

6.1.7.1 Disconnect computer from power source.

6.1.7.2 Disassemble the Osborne 1 following the instructions in Section 6.1.1.

6.1.7.3 Position the AC power panel with connections facing technician, circuit breaker assembly in lower left corner.

6.1.7.4 Disconnect the five-wire DC harness ground from the *upper* power panel connector to the right of the switch assembly.

6.1.7.5 Detach the power harness AC output connector from the *upper right* connection on the switch assembly.

6.1.7.6 Disconnect the power harness thermal cutout lead from the rightmost connection on the circuit breaker assembly.

See Section 6.2.0 to reassemble the power panel.

6.2.0 POWER PANEL ASSEMBLY

6.2.0.1 See Figures 6-5 and 6-6 to identify the various DC harness connectors.

NOTE

If the DC harness matches Figure 6-5, refer to Section 6.8.0 for power panel assembly.

6.2.0.2 Position the AC power panel with connectors facing technician, circuit breaker assembly in lower left corner.

6.2.0.3 Connect the power harness thermal cutout lead to the rightmost connection on the circuit breaker assembly.

6.2.0.4 Connect the power harness AC output lead to the *upper right* connection on the switch assembly.

6.2.0.5 Connect the five-wire DC harness ground to the *upper* power panel connection at the right of the switch assembly.

6.2.0.6 Reassemble the Osborne 1 following the instructions in Section 6.2.6.

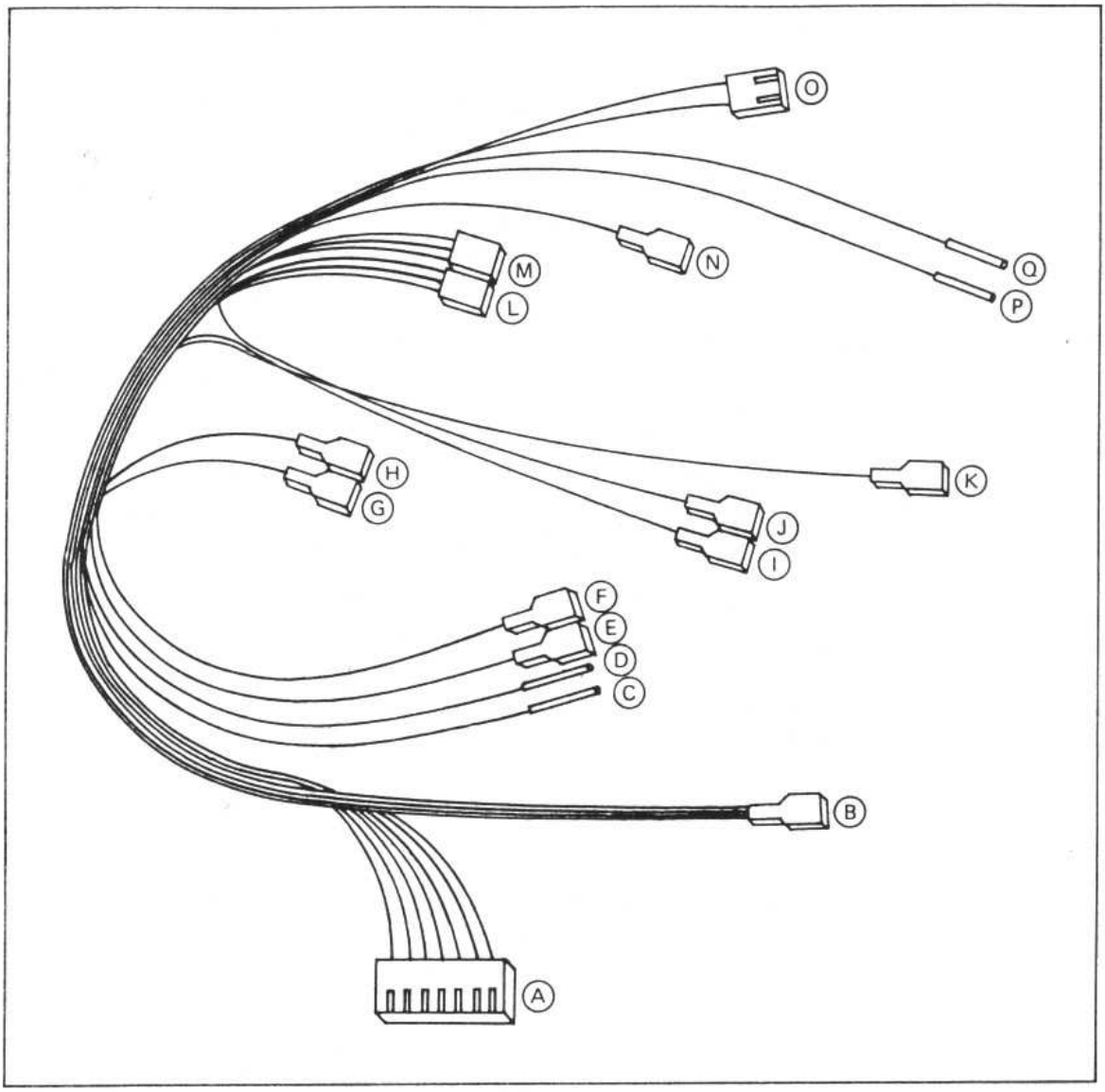
6.2.1 Disk Drive "B" Assembly

NOTE

The A drive has an 8 pin 150 OHM Terminator resistor pack. "B" DRIVE DOES NOT.

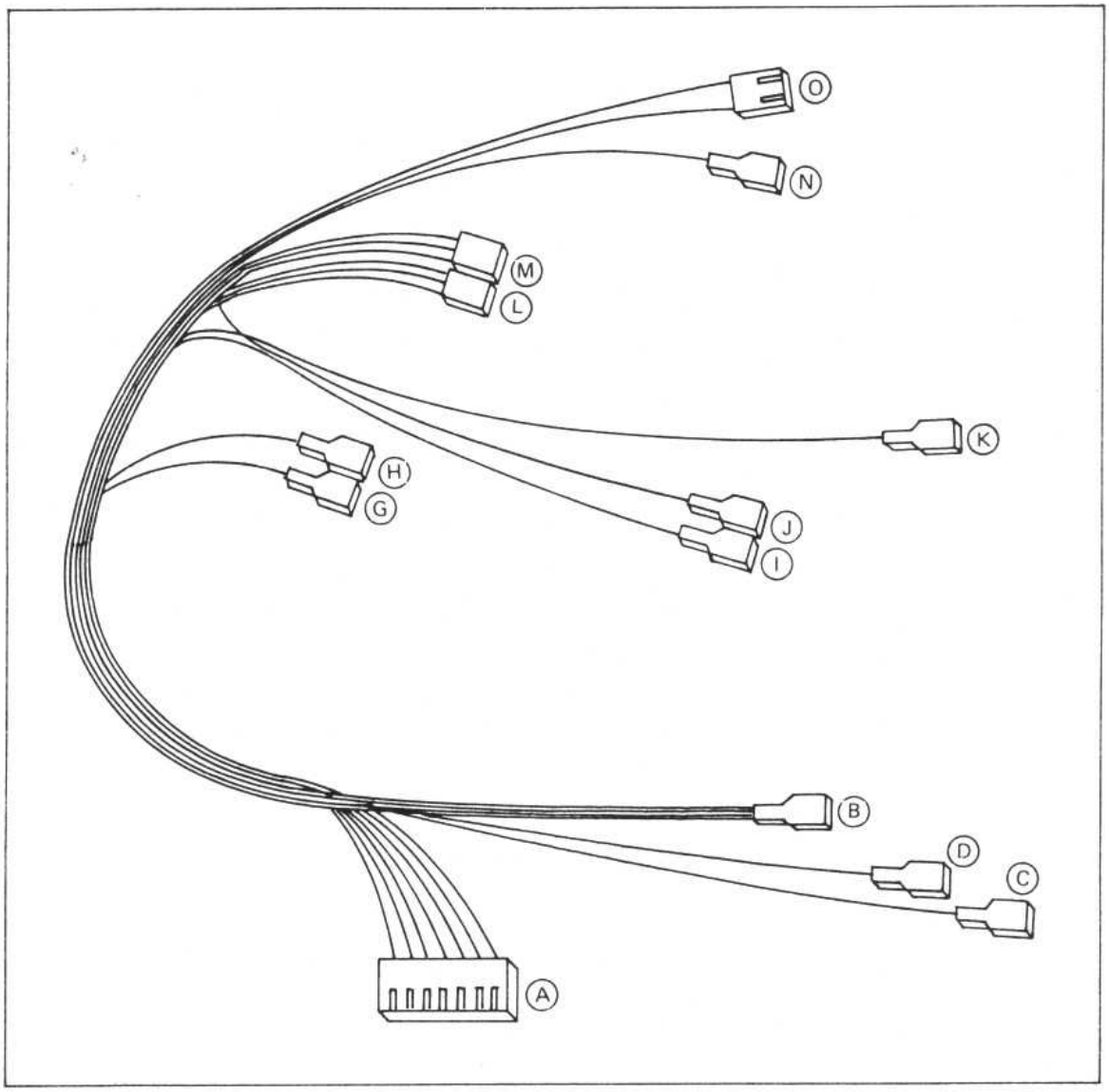
6.2.1.1 Place Drive in shield with PC board facing down.

6.2.1.2 Position the Chassis assembly Logic-Board-side-up and handle facing away from Technician.



(A)	Logic Board DC Input
(B)	AC Power Panel Ground (5 wire)
(C) and (D)	Interchangeable 115V and 230V Pin Connectors toAC Panel
(E) and (F)	Power Panel AC Outputs
(G)	"B" Drive Ground
(H)	Video Monitor Ground
(I) and (J)	Interchangeable Thermal Cutout Connectors
(K)	"A" Drive Ground
(L) and (M)	Interchangeable DC Output Connectors from Power Supply
(N)	DC Power Supply Ground
(O)	AC Input Connector
(P) and (Q)	Interchangeable 115V and 230V Pin Connectors to Power Supply

FIGURE 6-5. DC POWER HARNESS



(A) Logic Board DC Input
(B) AC Power Panel Ground (5 Wires)
(C) Fuse Box Connector
(D) Switch Assembly AC Output
(G) "B" Drive Ground
(H) Video Monitor Ground
(I) and (J) Thermal Cutout Connectors
(L) and (M) Interchangeable DC Output Connectors from Power Supply
(K) "A" Drive Ground
(N) DC Power Supply Ground
(O) AC Input Connector

FIGURE 6-6. DC POWER HARNESS

NOTE

Disk Drive B is the Drive furthest from the Power Supply.

6.2.1.3 Place shielded Drive to the left of Chassis assembly, strobe wheel facing up, Drive door facing away from Chassis.

6.2.1.4 Hold the Drive shield down and move the Drive enough to access the rear of the Drive.

6.2.1.5 Pull the narrow Logic Board connector on the end of the Drive harness up through the rectangular slot on the rear of the Drive shield. RED STRIPE on the harness edge is furthest away from Technician.

6.2.1.6 Connect the broad Drive connector located mid-way down Drive harness to the rear of the Drive PC board. RED STRIPE on the harness edge is furthest from Technician.

6.2.1.7 Connect the slip-on ground connector to the ground tab at the rear of the drive either on the drive frame or shield.

6.2.1.8 Align Drive with screw holes in the Drive shield. Install one 6/32 Phillips screw with star washer in each side of the Drive.

6.2.1.9 Slide Drive under Chassis assembly with Drive door facing Technician. Install four 6/32 Phillips screws to secure the "B" Drive to the Chassis.

6.2.2 Disk Drive "A" Assembly

NOTE

The "A" Drive has an 8 OHM Terminator resistor pack. "B" DRIVE DOES NOT. To locate the Terminator, position the Drive with the door facing Technician and PC board on top. The Terminator is at position RN3 in the right rear corner of the PC board. Pin 1 is the pin closest to Technician.

6.2.2.1 Install Terminator resistor pack at position RN3 of PC board.

6.2.2.2 Place Drive in shield with PC board facing down.

6.2.2.3 Position the Chassis assembly Logic-Board-side-up and handle facing away from Technician.

NOTE

Disk Drive A is the Drive closest to the Power Supply.

6.2.2.4 Place shielded Drive to the right of Chassis assembly, strobe wheel facing up, Drive door facing away from Chassis.

6.2.2.5 Hold the Drive shield down and move the Drive enough to access the rear of the Drive.

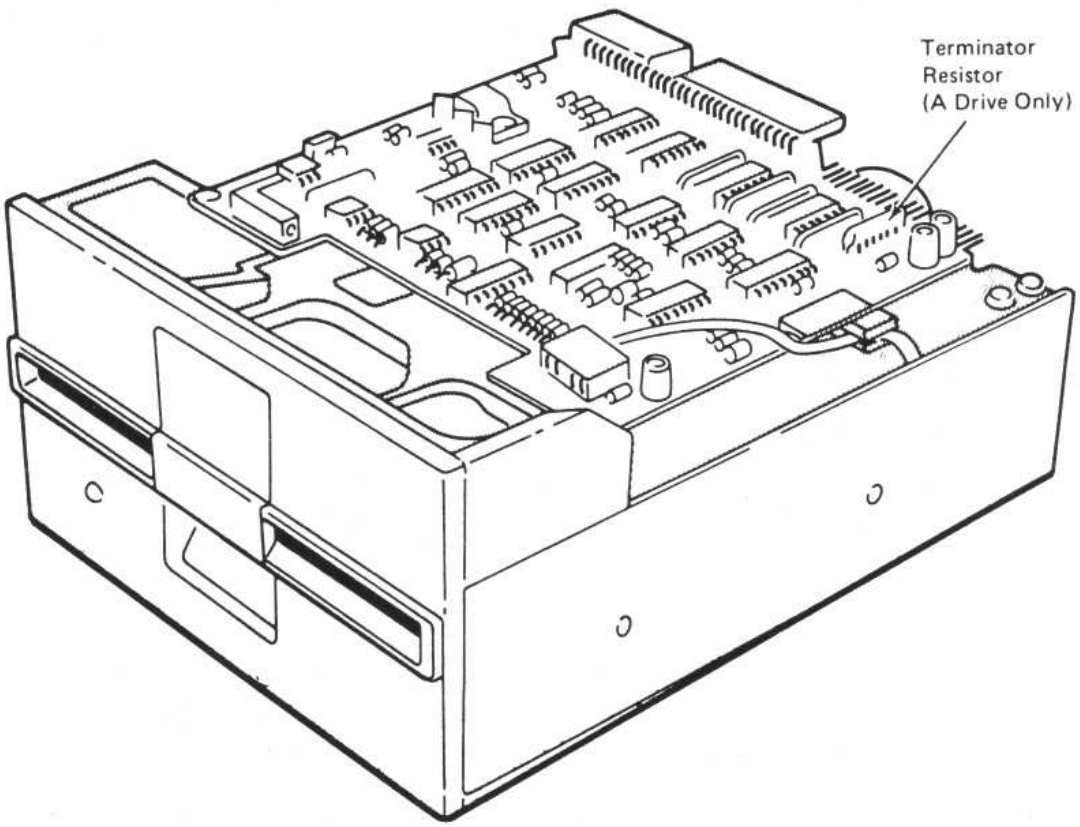


FIGURE 6-7. DISK DRIVE A

6.2.2.6 Insert the broad Drive connector on the end of the Drive harness through the rectangular slot at the rear of the Drive shield. Connect the Drive connector to the rear of the PC board, RED STRIPE on harness edge closest to Technician.

6.2.2.7 Connect the narrow slip-on ground connector to the ground tab at the rear of the drive either on the drive frame or shield.

6.2.2.8 Align Drive with screw holes in the Drive shield. Install one 6/32 Phillips screw with star washer in each side of the Drive.

6.2.2.9 Slide Drive under Chassis assembly with Drive door facing Technician. Install four 6/32 Phillips screws to secure the "A" Drive to the Chassis.

6.2.3 Power Supply Assembly

CAUTION: Working with Power Supplies is DANGEROUS. Power Supplies can hold an electrical charge for long periods of time. Be careful not to touch any components unnecessarily!

NOTE

Power Supply procedures are with DC harness installed in Chassis.

6.2.3.1 Position the Chassis assembly Logic-Board-side-up and handle facing Technician.

6.2.3.2 Turn the Power Supply so the components face Technician and five large capacitors are in the lower left corner.

NOTE

If the DC harness matches Figure 6-5, refer to Section 6.8.3 for power supply assembly.

6.2.3.3 Attach the AC input connector to the keyed connection left of the fuse on the Power Supply. (See Figures 6-5 and 6-6 for DC harness key.)

6.2.3.4 Attach the slip-on ground wire connector to the ground connection in the upper left corner of the power supply.

6.2.3.5 Attach the keyed DC output connector to one of the three identical male connections on the left side of the Power Supply.

6.2.3.6 With the wires attached, turn the Power Supply over right-to-left so the DC connector is to the right. Carefully insert the Power Supply into Chassis.

6.2.3.7 Align the screw holes on the Power Supply PC board with the Chassis assembly standoffs.

6.2.3.8 Install a 6/32 Phillips screw and washer in each corner of the Power Supply. Use a metal star washer in the upper right corner. Use nylon washers in the other three corners.

NOTE

Be sure there is a 1 in. length of double-backed tape covering the "Y" pattern on the soldered-side of the Power Supply.

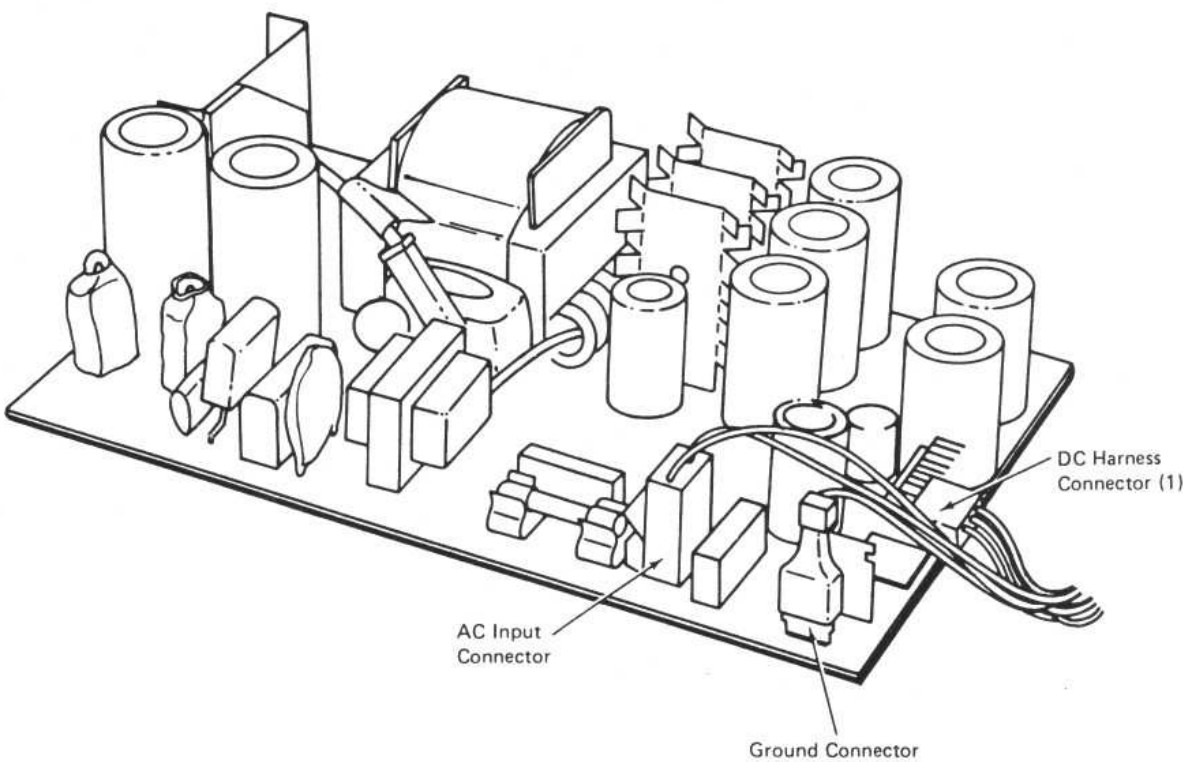


FIGURE 6-8. POWER SUPPLY

6.2.4 Video Monitor Assembly

6.2.4.1 Position the Chassis assembly vertically with handle on work bench and Drive shields facing Technician.

6.2.4.2 If the Video harness has been removed, insert the small end-connector of the harness through the left rear slot of the Video shield from the inside.

6.2.4.3 Place the Video Monitor in front of Chassis assembly, CRT screen facing Technician and keyed PC board connection at top rear.

6.2.4.4 Connect the keyed large end-connector of the Video harness to the rear of the Monitor PC board.

6.2.4.5 Grasp the left and right sides of the Chassis aseembly. Lift the Chassis and carefully lower it onto the Video Monitor.

6.2.4.6 Align the Monitor with the four screw holes in the Chassis. Install four 6/32 Phillips screws to secure the Monitor to the Chassis.

6.2.5 Logic Board Assembly

6.2.5.1 Position the Chassis assembly Logic-Board-side-up and CRT screen facing Technician.

6.2.5.2 Hold the Logic Board perpendicular to the chassis, component-side facing Technician, video control shafts pointing straight up.

6.2.5.3 Connect the External Video plug to the connection on the edge of the Logic Board between the reset button and video contrast shaft.

6.2.5.4 With the Video harness running below the Logic Board, attach the Video harness connector to the 10 Pin connection on the Logic Board between reset button and contrast shaft, RED WIRE TO THE LEFT.

6.2.5.5 With the DC harness running below the Logic Board, attach the DC harness connector to the 7 Pin connection in the extreme left lower corner of the Logic Board, RED WIRE TO THE LEFT.

6.2.5.6 With the Disk harness running below the Logic Board, attach the Disk harness connector to the 34 Pin connection at the lower left of the Logic Board to the right of the DC harness, RED STRIPE TO THE RIGHT.

6.2.5.7 Lower the Logic Board onto its Chassis mounting blocks.

6.2.5.8 Install a 6/32 Phillips screw with star washer at each corner of the Logic Board. The screw in the right front corner of some older Logic Boards has a nylon insulation washer to protect the trace.

6.2.6 Bezel and Chassis Assembly

6.2.6.1 Position the Chassis assembly with Disk Drives on top, CRT screen facing Technician.

6.2.6.2 Place the case behind Chassis assembly, AC power panel recess to the rear right.

6.2.6.3 Pull Power cord through case until DC harness is taut or AC power panel is at case recess.

6.2.6.4 Grasp the Chassis assembly between the CRT and the Logic Board. Lift the assembly slightly and push it straight back into case. Be sure the AC Power panel is positioned correctly in its case recess.

NOTE

When installing Chassis into case be sure not to pinch, trap or rip harness assemblies.

6.2.6.5 Install either two or four 8/32 x 1/2 inch Phillips screws on the left and right inside front edges of the Chassis to secure it to the case.

6.2.6.6 Keeping the Osborne flat on its rubber feet, turn it so the A/C Power Panel faces technician.

6.2.6.7 Install six 6/32 Phillips screws to secure the A/C Power Panel to the case.

NOTE

The two upper screws MUST be 6/32 x 1/4 inch with washers. These were labelled FOR A/C POWER PANEL in Section 6.1.1.9. An incorrect upper screw may puncture the Drive harness.

6.2.6.8 Install a 6/32 x 1/4 inch Phillips screw above and below the handle. These screws were labelled FOR HANDLE in Section 6.1.1.8. Using an incorrect screw may puncture the Disk harness behind the handle assembly.

6.2.6.9 Keeping the Osborne flat on its rubber feet, turn it so the CRT screen faces Technician.

6.2.6.10 Grasping Bezel with thumbs below CRT screen cutout and fingers in the Disk storage pockets, slide Bezel completely into case. Be sure keyboard connector latches are in closed position.

6.2.6.11 Install the 6/32 Phillips screws surrounding the Bezel to secure it to the case.

6.2.6.12 Using a 1/20 inch Allen wrench, install the brightness and contrast knobs onto their shafts.

6.2.6.13 With the Keyboard assembly in front of the Osborne, connect the Keyboard cable to the Keyboard connector below the CRT screen.

6.2.7 Keyboard Assembly

6.2.7.1 Place the Keyboard Bezel onto a Pad or Soft material (to protect the Keyboard), standoffs facing up.

6.2.7.2 Align the Keyswitch array face down with cutouts on Keyboard Bezel.

6.2.7.3 Install four 8/32 Phillips screws to secure the keyboard to the bezel standoffs.

6.2.7.4 Locate the notch on the long edge of the Keyboard Bezel furthest from the "space" bar. There should be a 1 1/2-2 inch length of double-backed tape on the underside of the Bezel at this notch. Affix tape if necessary.

6.2.7.5 Check that there is also a 1 1/2 - 2 inch length of double-backed tape near the Keyboard connector on the underside of the Keyboard. Affix tape if necessary.

6.2.7.6 Connect Pin 1 (black stripe) on the Keyboard harness to Pin 1 of the Keyboard connector on the underside of the Keyboard.

NOTE

To locate Pin 1 of the Keyboard connector, position the Keyboard with the numeric row of keys to the top. Facing the underside of the Keyboard, Pin 1 is in the upper right corner of the Keyboard connector. On the Keyboard Harness, Pin 1 is identified by a black stripe.

6.2.7.7 Position the Keyboard harness in the notch on the long edge of the Keyboard Bezel and press it flat against both lengths of tape.

6.2.7.8 Lower the Keyboard case onto the Keyboard and Keyboard Bezel assembly so the Case and Bezel are flush.

6.2.7.9 Install a 6/32 Phillips screw at each latch end of the Keyboard case to secure it to the Keyboard assembly.

6.2.7.10 Turn Keyboard face up and connect the Keyboard cable to the Keyboard connector below the CRT screen.

6.3.0 SIEMENS DISK DRIVE ALIGNMENTS

NOTE

Before starting the alignment always make a visual inspection of the disk drive and PCB. Check for missing or broken connectors, faulty solder connections, and incorrect components.

6.3.0.1 The Osborne Alignment Program diskette or similar device is needed to step the drive head between tracks during alignments. See Section 6.5.0.

6.3.0.2 Drive alignments are sensitive to temperature and humidity. Drives and testing media should be stabilized at room temperature before alignments are made.

6.3.1 Drive Cable and Test Lead Hookup

6.3.1.1 Position Drive unit with PC board on top and door facing Technician.

6.3.1.2 Check the P4-1, P4-2, and P4-3 connectors at the P2 connection on the rear of the PCB. The black wire on the P4-1 connector should be attached to the first pin on the right of P2. There should be FOUR PINS between the P4-1 and P4-2 connectors. The brown wire on the P4-2 connector should be second from the right. The yellow wire on the P4-3 connector should be to the right. (See Figure 6-9.)

6.3.1.3 Connect the drive cable to the P1 connection in the right rear corner of the PC board. The red stripe on the drive cable must be to technician's right. (See Figure 6-9.)

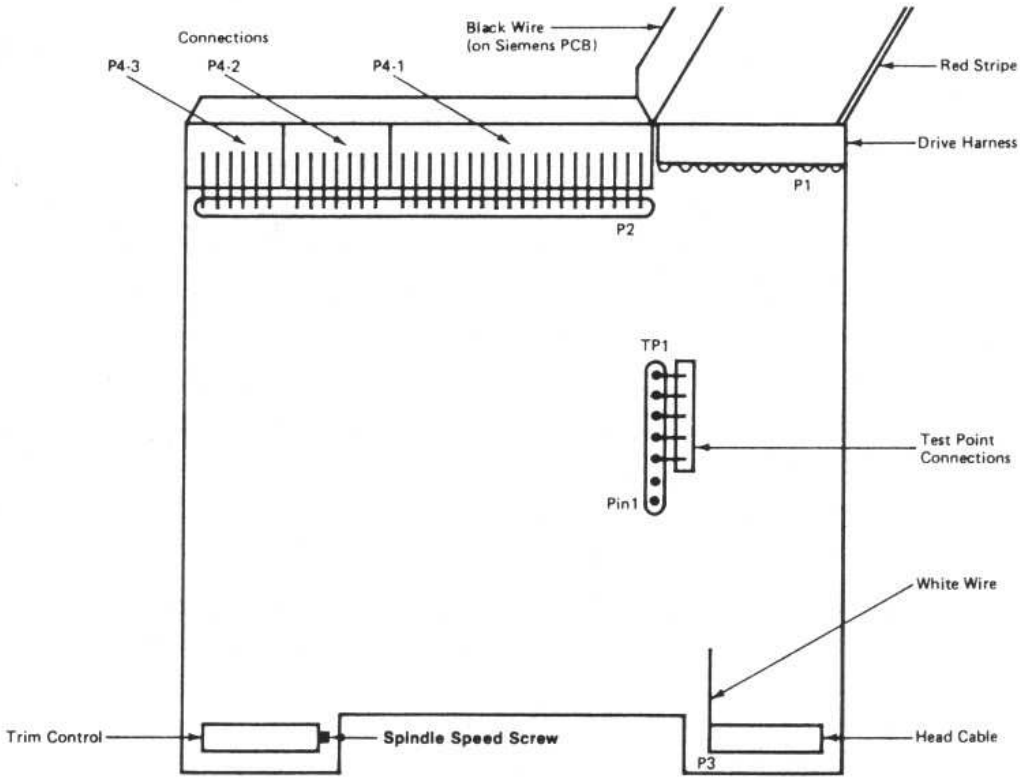


FIGURE 6-9. DISK DRIVE PCB

6.3.2 Spindle Speed Adjustment

Using the Drive Alignment Program:

6.3.2.1 Follow instructions 6.3.1.1 through 6.3.1.3 to connect the drive.

6.3.2.2 Insert an Alignment Program diskette into the drive.

6.3.2.3 Locate the trim control at position R23 on the drive PC board. (See Figure 6-9.) The small gold screw on the trim control is the spindle speed adjustment screw.

6.3.2.4 Boot the drive and select the DRIVE TIMER function on the Drive Alignment Program. (See Section 6.5.0.)

6.3.2.5 Note the time indicated in milliseconds by the DRIVE TIMER test. Correct time per revolution is 200 milliseconds ±5%.

6.3.2.6 Slowly turn the spindle speed adjustment screw until timing is within tolerance.

To adjust spindle speed *without* the Drive Alignment Program:

6.3.2.7 Follow instructions 6.3.1.1 through 6.3.1.3 to connect the drive.

6.3.2.8 Insert a blank diskette into the drive.

6.3.2.9 Turn the drive unit so strobe wheel faces Technician. The strobe wheel has a black and white pattern as shown in Figure 6-12. The following adjustment must be made under fluorescent lighting. With 50 cycle lighting, use the inner strobe wheel pattern.

6.3.2.10 Power up the drive and step to track 16.

6.3.2.11 Locate the trim control at position R23 on the PC board. (See Figure 6-9.) The small gold screw on the trim control is the spindle speed adjustment screw.

6.3.2.12 Watch the strobe wheel and slowly turn the spindle speed screw until the strobe effect stops.

6.3.2.13 Watch the strobe wheel and turn the spindle speed screw in or out until any one strobe line rotates *clockwise* 90 degrees in a five-second interval.

6.3.3 Track 00/39 Stop Adjustment

6.3.3.1 Follow instructions 6.3.1.1 through 6.3.1.3 to connect drive.

6.3.3.2 Remove the Head Cable Connector from position P-3 on the Drive PCB. (See Figure 6-9.) Leave all other connectors attached.

6.3.3.3 Remove four 4/40 × 0.25 Phillips screws holding drive PCB to drive frame.

6.3.3.4 Lift front of drive PCB enough to access the stop adjustment screws. (See Figure 6-10.)

6.3.3.5 Select the SEEK TRACK function on the Drive Alignment Program.

6.3.3.6 Adjust track 00 stop until clearance between track 00 stop and post on frame is 0.010 ± .005 in.

6.3.3.7 Step to track 39 and verify the clearance between track 39 stop and post on frame.

6.3.3.8 Place drive PCB on frame.

6.3.3.9 Install four 4/40 × 0.25 Phillips screws to secure the PCB to the drive frame.

6.3.3.10 Attach the Head Cable Connector to position P-3 on PCB. (See Figure 6-9.)

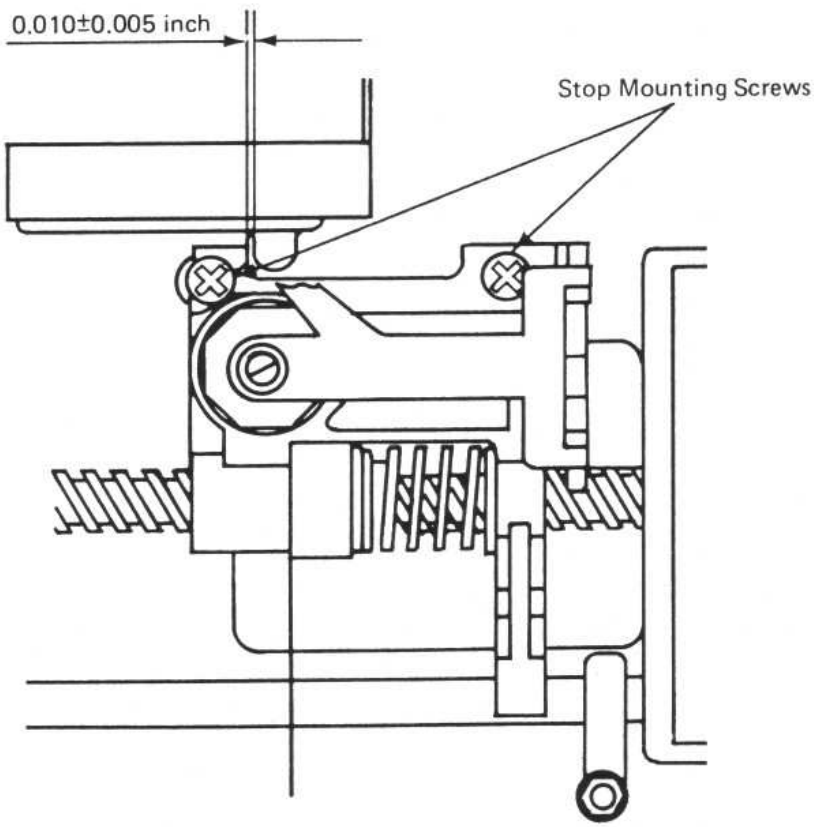


FIGURE 6-10. TRACK 00/39 STOP ADJUSTMENT

6.3.4 Track 00 Switch Adjustment

6.3.4.1 Check the P4-1, P4-2, and P4-3 connectors at the P2 connection on the rear of the drive PC board. See Figure 6-9 for connector order.

6.3.4.2 Connect the drive cable to the P1 connection in the right rear corner of the PC board. The red stripe on the drive cable must be to technician's right. (See Figure 6-9.)

CAUTION: Be careful not to short circuit the drive PC board when making the following connections and adjustments

6.3.4.3 Ground the oscilloscope test probe to pin 6 of the TP1 connection on the drive PC board. Pin 2 of this connection is missing.

6.3.4.4 Connect oscilloscope channel A to pin 4 and channel B to pin 8 of the TP1 connection.

6.3.4.5 Set the oscilloscope as follows:

Channel B - 1V/div (approximately 1V output)
Channel A - 5V/div (" 5V ")

Trigger A - internal source, positive slope, normal mode

Time base - 5 milliseconds/division

Chopped vertical mode, both channels displayed.

6.3.4.6 Insert and boot an Alignment Program diskette in the drive. (Type DISK after the A> on the screen, then press RETURN).

6.3.4.7 Select the ALT TRACK function on the Drive Alignment program.

6.3.4.8 Alternate the drive head between tracks 0 and 1.

6.3.4.9 Observe the square-wave signal on the oscilloscope for these tolerances:

Channel A: positive portion: 20 ±5 milliseconds
negative portion: 30 ±5 milliseconds

6.3.4.10 Switch oscilloscope to line trigger, then alternate the head between tracks 1 and 2. No signal should be displayed on the oscilloscope.

6.3.4.11 If the drive does not satisfy test conditions 6.3.4.9 and 6.3.4.10, loosen the track 00 switch mounting screws on the underside of the drive. (See Figure 6-11.)

6.3.4.12 Change to internal trigger. Alternate the head between tracks 0 and 1 and slide the track 00 switch until signal is within tolerance.

6.3.4.13 Switch oscilloscope to line trigger, then alternate between tracks 1 and 2 to confirm "no signal".

6.3.4.14 Change to internal trigger and alternate between tracks 0 and 1 to verify channel A signal.

6.3.4.15 Tighten mounting bracket screws on track 00 switch being careful not to move the switch.

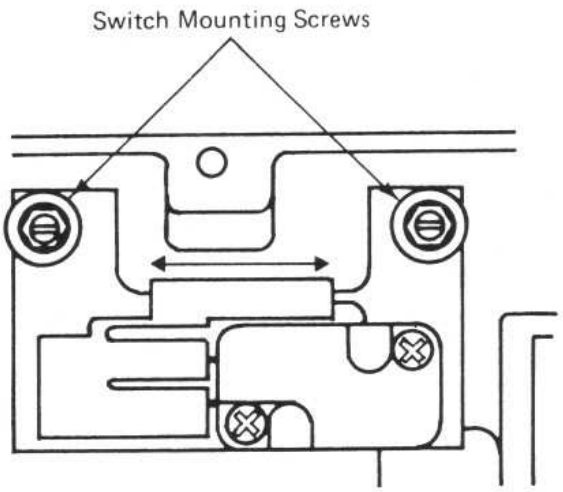


FIGURE 6-11. TRACK 00 SWITCH ADJUSTMENT

6.3.5 Index Sensor Timing Adjustment

6.3.5.1 Follow steps 6.3.1.1 through 6.3.1.3 to connect disk drive.

6.3.5.2 Ground the oscilloscope to pin 6 of the TP1 connection on the drive PC board. Pin 2 of this connection is missing.

6.3.5.3 Connect oscilloscope channel A to pin 8 and channel B to pin 5 of the TP1 connection. Set channel B to internal trigger.

6.3.5.4 Insert an Alignment Program Diskette and power up the drive.

6.3.5.5 Set oscilloscope inputs to A/C, vertical deflection to 500 millivolts and timing base to 50 microseconds. (Settings may vary with oscilloscope.)

6.3.5.6 Select the SEEK TRACK function on the Drive Alignment Program and step to track 1.

6.3.5.7 Observe timing between start of sweep and first Data Pulse on Oscilloscope. (See Figure 6-13.) Timing should be 200 ± 50 microseconds. If timing is not within tolerance, continue adjustment.

6.3.5.8 Loosen the mounting screw in the Index sensor mounting block on the underside of disk drive. (See Figure 6-12.)

6.3.5.9 Observe timing and adjust the index sensor until timing is 200 ± 50 microseconds.

6.3.5.10 Open and close drive door. Then recheck timing. Repeat several times.

6.3.5.11 Slowly tighten mounting screw. Do Not Overtighten.

6.3.5.12 Recheck timing to ensure index sensor did not move when mounting screw was tightened.

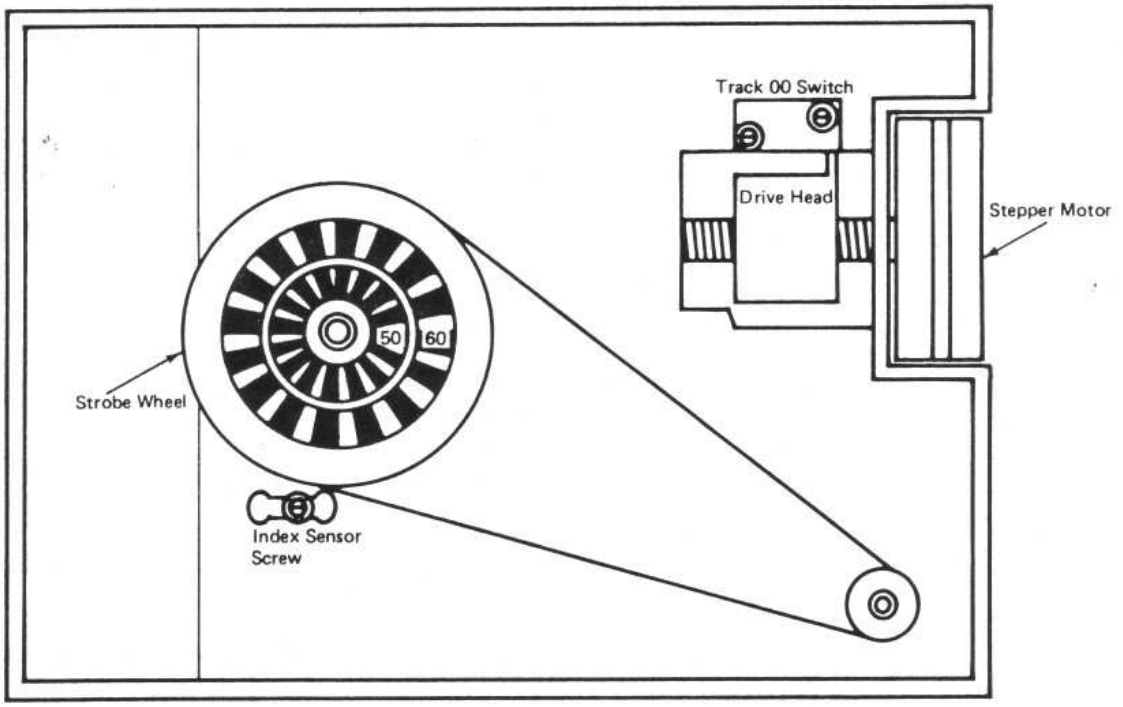


FIGURE 6-12. SIEMENS DISK DRIVE

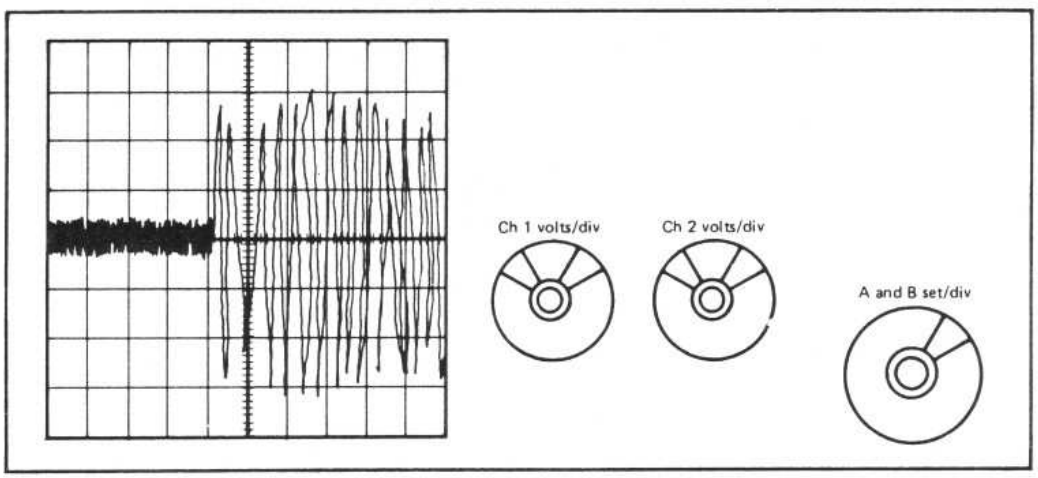


FIGURE 6-13. OSCILLOSCOPE PATTERN FOR INDEX SENSOR TIMING

6.3.6 Radial Head Alignment

6.3.6.1 Follow steps 6.3.1.1 through 6.3.1.3 to connect Drive.

6.3.6.2 Ground the Oscilloscope to pin 6 of the TP1 connection on the drive PC board. Pin 2 of this connection is missing.

6.3.6.3 Connect Oscilloscope channel A to pin 8 and channel B to pin 5 of the TP1 connection. Set channel B to internal trigger.

6.3.6.4 Insert an Alignment Program Diskette and power up the drive.

6.3.6.5 Set Oscilloscope inputs to A/C, Vertical deflection to 100 millivolts, Time base to 20 milliseconds, channels A and B added.

6.3.6.6 Select the SEEK TRACK function on the Drive Alignment Program and step to track 16.

6.3.6.7 Loosen two 3/32 Allen screws holding Stepper Motor to rear of Drive frame.

6.3.6.8 Rotate Stepper Motor to move head radially in and out while observing Cat Eye pattern on Oscilloscope. (See Figure 6-14.) Adjust until Cat Eye Lobes are equal.

6.3.6.9 Tighten both stepper motor mounting screws being careful not to move motor.

6.3.6.10 Check adjustment by stepping off several tracks in each direction from track 16 and returning to it. Readjust if necessary until the Cat Eye lobes have the same shape and amplitude.

6.3.6.11 After completing radial head alignment, check the Track 00 switch and Track 00/39 stop. Readjust as necessary. (See Sections 6.3.3 and 6.3.4.)

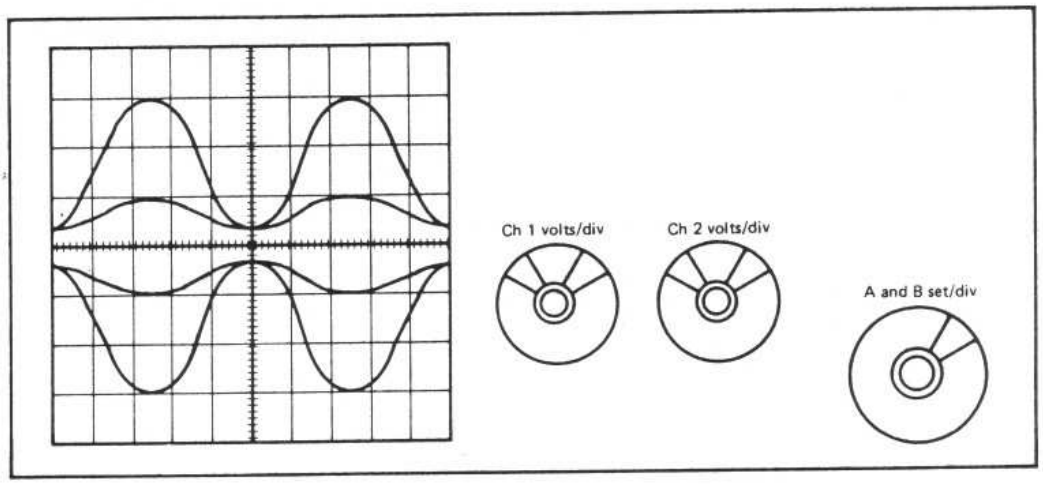


FIGURE 6-14. OSCILLOSCOPE CAT-EYE PATTERN FOR RADIAL HEAD ADJUSTMENT

6.4.0 MPI DISK DRIVE ALIGNMENTS

NOTE

Before starting the alignment always make a visual inspection of the disk drive and PCB. Check for missing or broken connectors, faulty solder connections, and incorrect components.

6.4.0.1 The Osborne Alignment Program diskette or similar device is needed to step the drive head between tracks during alignments. See Section 6.5.0.

6.4.0.2 Drive alignments are sensitive to temperature and humidity. Drives and testing media should be stabilized at room temperature before alignments are made.

6.4.1 Drive Cable and Test Lead Hookup (MPI)

6.4.1.1 Position Drive unit with PC board on top and door facing Technician.

6.4.1.2 Check the P4-1, P4-2, and P4-3 connectors at the P2 connection on the rear of the PCB. See Figure 6-15 for connector order.

6.4.1.3 Connect the drive cable to the P1 connection in the right rear corner of the PC board. The red stripe on the drive cable must be to technician's right. (See Figure 6-15.)

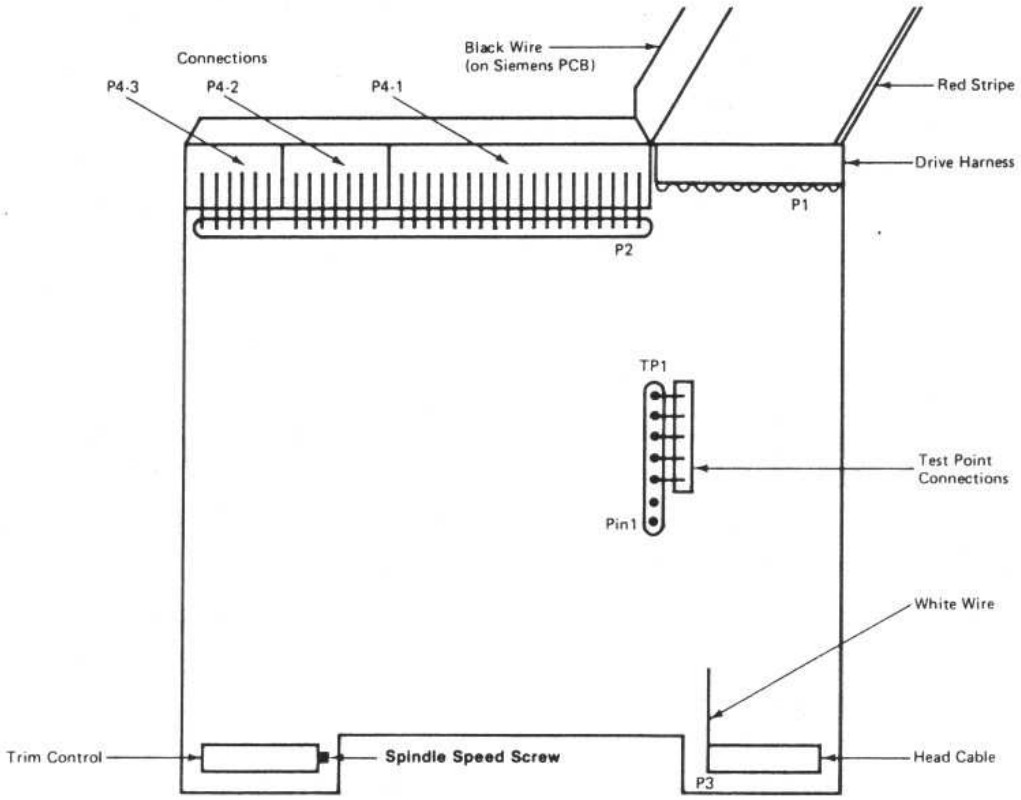


FIGURE 6-15. DISK DRIVE PCB

6.4.2 Spindle Speed Adjustment (MPI)

Using the Drive Alignment Program:

6.4.2.1 Follow instructions 6.4.1.1 through 6.4.1.3 to connect the drive.

6.4.2.2 Insert an Alignment Program diskette into the drive.

6.4.2.3 Locate the trim control at position R23 on the drive PC board. (See Figure 6-15.) The small gold screw on the trim control is the spindle speed adjustment screw.

6.4.2.4 Boot the drive and select the DRIVE TIMER function on the Drive Alignment Program. (See Section 6.5.0.)

6.4.2.5 Note the time indicated in milliseconds by the DRIVE TIMER test. Correct time per revolution is 200 milliseconds ± 5%.

6.4.2.6 Slowly turn the spindle speed adjustment screw until timing is within tolerance.

To adjust spindle speed *without* the Drive Alignment Program:

6.4.2.7 Follow instructions 6.4.1.1 through 6.4.1.3 to connect the drive.

6.4.2.8 Insert a blank diskette into the drive.

6.4.2.9 Turn the drive unit so strobe wheel faces Technician. The strobe wheel has a black and white pattern as shown in Figure 6-16. The following adjustment must be made under fluorescent lighting. With 50 cycle lighting, use the inner strobe wheel pattern.

6.4.2.10 Power up the drive and step to track 16.

6.4.2.11 Locate the trim control at position R23 on the PC board. (See Figure 6-15.) The small gold screw on the trim control is the spindle speed adjustment screw.

6.4.2.12 Watch the strobe wheel and slowly turn the spindle speed screw until the strobe effect stops.

6.4.2.13 Watch the strobe wheel and turn the spindle speed screw in or out until any one strobe line rotates *clockwise* 90 degrees in a five-second interval.

6.4.3 Radial Track Alignment (MPI)

6.4.3.1 Follow instructions 6.4.1.1 through 6.4.1.3 to connect the drive.

6.4.3.2 Ground the oscilloscope to pin 6 of the TP1 connection on the drive PC board. Pin 2 of this connection is missing.

6.4.3.3 Connect oscilloscope channel A to pin 8 and channel B to pin 5 of the TP1 connection. Set channel B to internal trigger.

6.4.3.4 Insert an Alignment Program Diskette and power up the drive.

6.4.3.5 Set oscilloscope inputs to AC, vertical deflection to 100 millivolts, time base to 20 milliseconds, channels A and B added.

6.4.3.6 Select the SEEK TRACK function on the Drive Alignment Program and step to track 16.

6.4.3.7 With the drive on its side and strobe wheel facing Technician, loosen both stepper motor mounting screws on the underside of the drive. (See Figure 6-16.)

6.4.3.8 Rotate the stepper motor until the lobes of the cat-eye pattern on the oscilloscope are equal. (See Figure 6-17.)

6.4.3.9 Tighten both stepper motor mounting screws being careful not to move the motor.

6.4.3.10 Check alignment by stepping off several tracks in both directions from track 16 and then returning to it. Readjust if necessary.

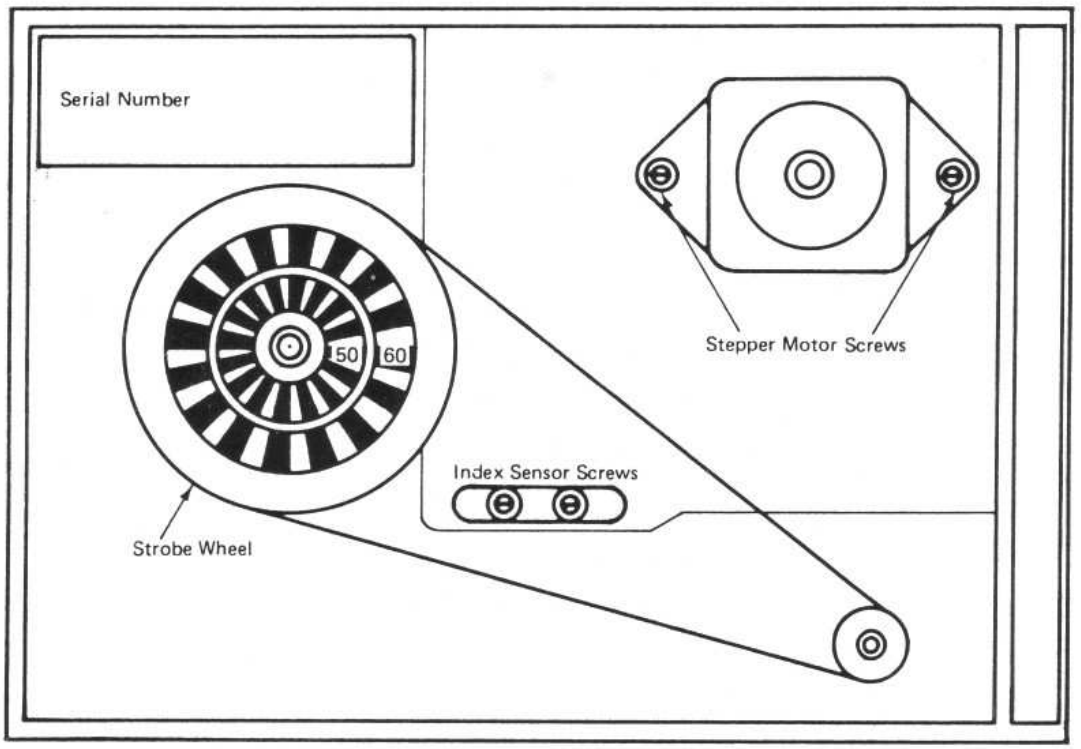


FIGURE 6-16. MPI DISK DRIVE

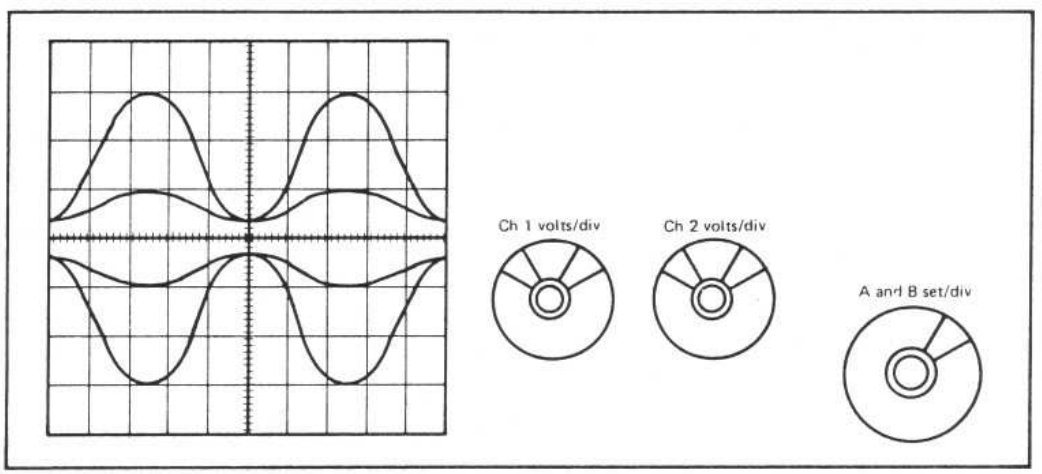


FIGURE 6-17. OSCILLOSCOPE CAT-EYE PATTERN FOR RADIAL HEAD ADJUSTMENT

6.4.4 Index Sensor Adjustment (MPI)

NOTE

Before making this adjustment be sure the Radial track alignment is correct. See Section 6.4.3.

6.4.4.1 Follow instructions 6.4.1.1 through 6.4.1.3 to connect the Drive.

6.4.4.2 Ground the oscilloscope to pin 6 of the TP1 connection on the drive PC board. Pin 2 of this connection is missing.

6.4.4.3 Connect oscilloscope channel A to pin 8 and channel B to pin 5 of the TP1 connection. Set channel B to internal trigger.

6.4.4.4 Insert an Alignment Program Diskette and power up the drive.

6.4.4.5 Select the SEEK TRACK function on the Drive Alignment Program and step to track 1.

6.4.4.6 Set oscilloscope inputs to A/C, vertical deflection to 500 millivolts, time base to 50 microseconds. (Settings may vary with Oscilloscope.)

6.4.4.7 Observe timing between start of sweep and first data burst on oscilloscope. (See Figure 6-13.) Timing should be 200 ± 50 microseconds. If timing is not within tolerance, continue adjustment.

6.4.4.8 Loosen two index sensor mounting screws located in the slot on the underside of the Disk Drive. (See Figure 6-16.)

6.4.4.9 Observe timing and adjust the index sensor until timing is 200 ± 50 microseconds.

6.4.4.10 Open and close the Drive door. Then recheck timing. Repeat several times.

6.4.4.11 Slowly tighten the mounting screws, being careful not to move the index sensor. DO NOT OVERTIGHTEN.

6.4.4.12 Recheck timing to ensure index sensor did not move when mounting screws were tightened.

6.4.5 Track 00 Sensor Adjustment (MPI)

NOTE

Before making this adjustment be sure the Radial track alignment is correct. See Section 6.4.3

6.4.5.1 Check the P4-1, P4-2, and P4-3 connectors at the P2 connection on the rear of the drive PC board. See Figure 6-15 for connector order.

6.4.5.2 Connect the drive cable to the P1 connection in the right rear corner of the PC board. The red stripe on the drive cable must be to technician's right.

CAUTION: Be careful not to short circuit the drive PC board when making the following connections and adjustments.

6.4.5.3 Ground the oscilloscope test probe to pin 6 of the TP1 connection on the drive PC board. Pin 2 of this connection is missing.

6.4.5.4 Connect oscilloscope channel A to pin 4 and channel B to pin 8 of the TP1 connection.

6.4.5.5 Set the oscilloscope as follows:

Channel B - 1V/div (approximately 1V output)
Channel A - 5V/div (" 5V ")

Trigger A - internal source, positive slope, normal mode

Time base - 5 milliseconds/division

Chopped vertical mode, both channels displayed.

6.4.5.6 Insert and boot an Alignment Program diskette in the drive. (Type DISK after the A> on the screen, then press RETURN).

6.4.5.7 Select the ALT TRACK function on the Drive Alignment Program.

6.4.5.8 Alternate the drive head between tracks 0 and 1.

6.4.5.9 Observe the square-wave signal on the oscilloscope for these tolerances:

Channel A: positive portion: 20 ±5 milliseconds
negative portion: 30 ±5 milliseconds

6.4.5.10 Switch oscilloscope to line trigger, the alternate the head between tracks 1 and 2. No signal should be displayed on the oscilloscope.

6.4.5.11 If the drive does not satisfy test conditions 6.4.5.9 and 6.4.5.10, remove two 4/40 x 0.25 Phillips screws holding the drive PC board to the drive frame.

6.4.5.12 Lift the PC board enough to access the track 00 sensor mounting screws at the rear left of the drive. (See Figure 6-18.)

NOTE

Be sure to reconnect the head cable to the PC board after detaching it to lift the board.

6.4.5.13 Loosen both mounting screws.

6.4.5.14 Change to internal trigger. Alternate the head between tracks 0 and 1 and slide the sensor until signal is within tolerance.

6.4.5.15 Switch oscilloscope to line trigger, then alternate between tracks 1 and 2 to confirm "no signal".

6.4.5.16 Change to internal trigger and alternate between tracks 0 and 1 to verify channel A signal.

6.4.5.17 Tighten both track 00 sensor mounting screws being careful not to move the sensor.

6.4.5.18 Replace drive PC board onto drive frame and install two 4/40 x 0.25 Phillips screws to secure it. Be sure the head cable connector is attached to the PC board.

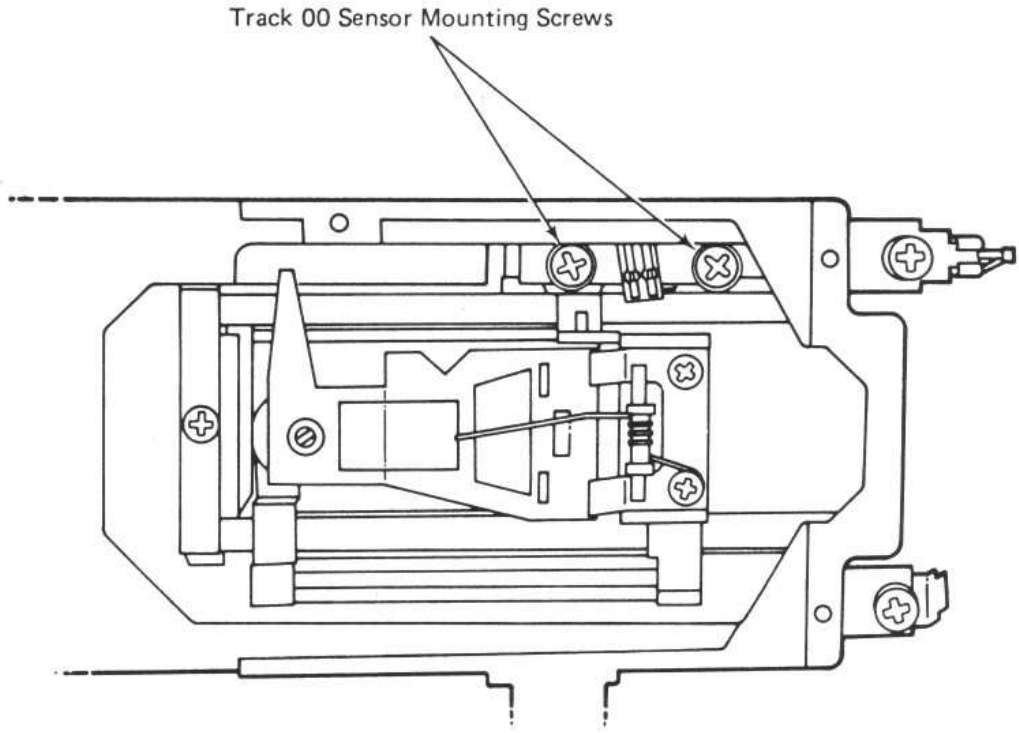


FIGURE 6-18. TRACK 00 ASSEMBLY (MPI)

6.5.0 OSBORNE DISK DRIVE ALIGNMENT PROGRAM

6.5.0.1 With this Program you can perform all drive head movements needed for disk alignments. Use the following instructions to become familiar with this program before making alignments.

6.5.0.2 Before proceeding, make a **copy** of the master diskette. Use the **copy** to make alignments. Store the master diskette in a safe place.

6.5.1 Insert "Osborne Alignment Program" Diskette in Drive A, press Reset button, then press RETURN to boot system.

6.5.2 Type DISK after the A> on the CRT screen, then press RETURN.

6.5.2.1 The CRT screen will now display:

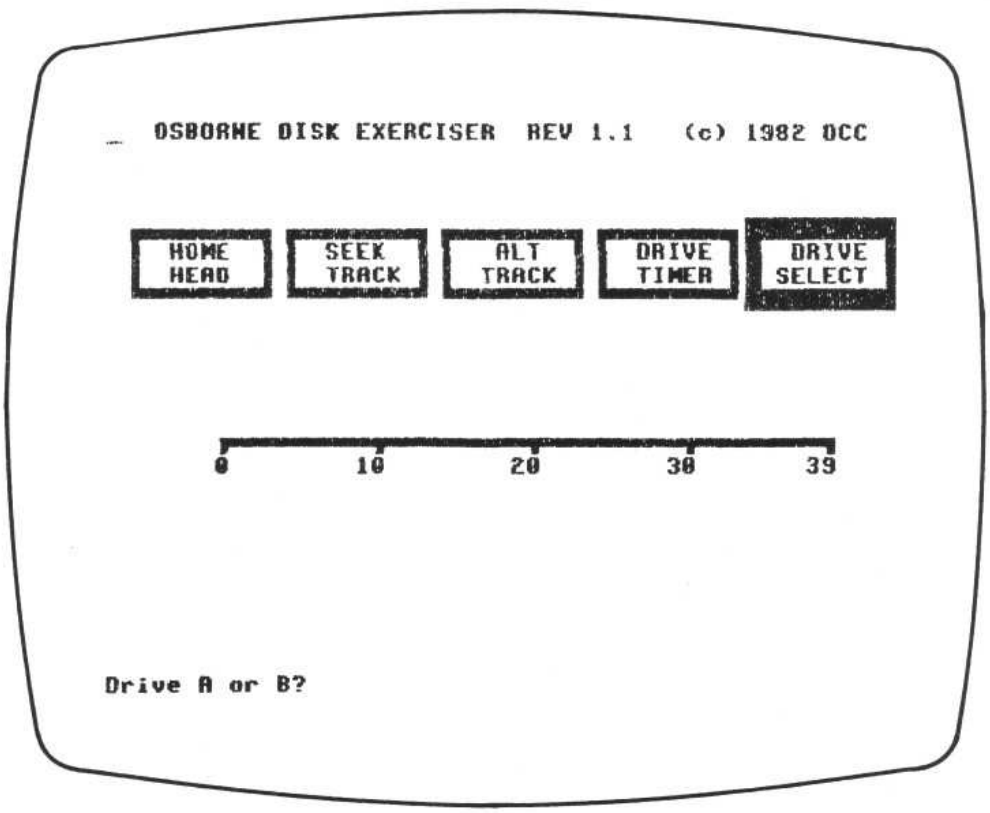


FIGURE 6-19. VIDEO MONITOR SCREEN

6.5.2.2 This display means that the Program is loaded in memory and waiting for your response. Each box on the screen indicates a test function which you can select. These tests are:

1. HOME HEAD
2. SEEK TRACK
3. ALT TRACK
4. DRIVE TIMER
5. DRIVE SELECT

6.5.2.3 Notice that the DRIVE SELECT box has a thicker border than the others. This is a moveable border which identifies the test function you select.

6.5.2.4 Below the function boxes is a line running from 0 to 39. This line identifies each of the 40 tracks at which the disk drive head may be positioned.

6.5.2.5 The message "Drive A or B?" appears at the lower left of the screen. This asks which Drive you wish to select as the test Drive.

6.5.3 Press A or B to select the Drive you wish to test first. If you also wish to test the other Drive, you must repeat the test procedure for it after completing testing on your first selection.

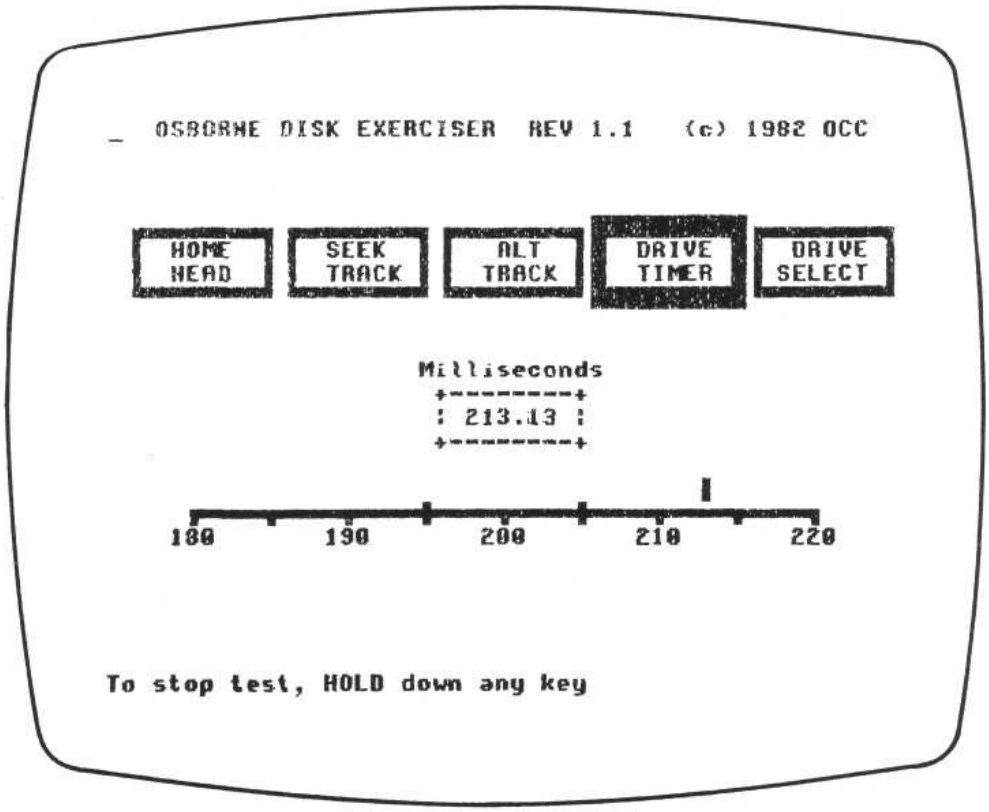
6.5.4 After you select the Drive to be tested, note these changes on the display:

1. An indicator block is now positioned over the 0 point on the line marked from 0 to 39. This indicates that the drive head is positioned over track 0.
2. The selected Drive is identified directly below the 0 point on the display line.
3. The track position is also identified directly below point 39 on the display line.
4. The message at the bottom of the screen reads: For Menu Pick, Use Left/Right Arrows, Then Hit Return

6.5.5 Press the arrow key to select DRIVE TIMER.

6.5.6 Press RETURN to initiate action.

6.5.7 The menu has now changed to one of two displays depending on whether there was a diskette in the Drive selected. The displays are explained in steps 6.5.8 and 6.5.9.



6.5.8. If there was a diskette in the Drive selected (step 6.5.3), the display will appear as follows:

6.5.8.1 This display indicates that you are testing the Drive spindle speed. The speed is shown in two ways:

1. In the "Milliseconds" box on the screen;
2. By an indicator positioned above the line marked from 180 to 220.

6.5.8.2 The correct time per revolution on either the Siemens or MPI Drives used in the Osborne is 200 milliseconds ± 5%.

6.5.9 If there was no diskette in the Drive selected in step 6.5.3 you will hear a "Beep" sound. The screen display will be the same as in step 6.5.8 *except* that:

1. The "Milliseconds" box will be blank;
2. There will be no indicator positioned above the line marked from 180 to 220.
3. The message at the bottom of the screen reads: Put Diskette in Drive, press any key to start timer.

6.5.9.1 If you wish to terminate this test, press CTRL. This will display the test function you had selected.

6.5.10 To terminate *any* test in progress, press any key and hold it down until the system responds.

6.5.10.1 If you terminate a test, the system responds by displaying the menu in step 6.5.2, which allows you to again select a test function.

6.5.11 Press the left arrow key to select the SEEK TRACK test function.

6.5.12 Press RETURN.

6.5.13 Select the track where you wish to position the drive head by entering any number from 0 to 39. For example, type 39.

6.5.14 Press RETURN. The drive head is now positioned over track 39 and the displayed indicator is over point 39 on the line marked fron 0 to 39.

6.5.15 Press RETURN again to seek to another track in this test function. You can also select another test function by continuing as follows.

6.5.16 Press RETURN

6.5.17 Press the right arrow key to select ALT TRACKS, for example.

6.5.18 Press RETURN. Note that two messages are displayed: "This Test Will Recycle the Disk Head Between the Current Track and a New Track" and "Enter New Track Number (0-39)."

6.5.19 Type 0 and press RETURN. The drive head is now alternately seeking track 0 and track 39.

6.5.20 Press RETURN to terminate the test. Note that the drive head is now positioned over track 0 or the track number entered in step 6.5.19.

6.5.21 Press RETURN.

6.5.22 Type 1, then press RETURN. The drive head is now alternately seeking track 0 and track 1.

6.5.23 Press RETURN to terminate this test function.

6.5.24 Press the arrow key to select SEEK TRACK, then press RETURN.

6.5.25 Type 10, then press RETURN. The drive head is now positioned over track 10.

6.5.26 Press the arrow key to select HOME HEAD, then press RETURN. The drive head is now homed (positioned) over track 0.

6.5.27 Press CTRL C to exit from the program.

You have now performed all the functions of the Disk Drive Alignment Program.

6.6.0 VIDEO MONITOR ADJUSTMENTS

6.6.0.1 The Osborne Alignment Program diskette is needed for video monitor adjustments.

PRECAUTIONS

Note the following precautions before making any adjustments to the Video Monitor.

1. Allow five minutes warm-up before starting any adjustments.
2. Use a NON-METALLIC tool to make adjustments.
3. Use EXTREME CARE when handling the Video Monitor. Rough handling may cause it to implode.
4. Some Video Monitor components carry high voltage (transformer etc.). USE EXTREME CAUTION.

NOTE

All Video Monitor alignments are made with Video assembly out of Chassis and connector attached. Before removing front bezel ***lightly*** *trace its outline on the video screen shield with a felt-tip pen.*

6.6.1 Brightness/Contrast Adjustment

6.6.1.1 Power up the OCC-1.

6.6.1.2 Insert and boot Osborne Alignment Program diskette in either drive. (Type CRT after the A > on the screen, then press RETURN).

6.6.1.3 Rotate contrast control, R-48 on Logic Board, counterclockwise to minimum.

6.6.1.4 Rotate brightness control, R108 on monitor PC board, counterclockwise to minimum.

6.6.1.5 Rotate brightness control, R47 on Logic Board, clockwise to maximum.

6.6.1.6 Rotate R108 to raster threshold.

6.6.1.7 Rotate R48 control for desired video contrast.

6.6.1.8 Rotate R47 control for desired video brightness.

6.6.2 Vertical Size/Linearity Adjustment

6.6.2.1 Power up the OCC-1.

6.6.2.2 Insert and boot Osborne Alignment Program diskette in either drive.

6.6.2.3 Rotate vertical size control, R208 on Monitor PC Board, until desired display size is obtained.

6.6.2.4 See Figure 6-19. Adjust the vertical linearity control, R211 on Monitor PC board, until the extreme top and bottom characters ("A" and "B" in Figure 6-19) are the same height as the center characters ("C").

6.6.2.5 Readjust R208 until desired display size is obtained.

6.6.3 Focus Adjustment

6.6.3.1 Power up the OCC-1.

6.6.3.2 Insert and boot Osborne Alignment Program diskette in either drive.

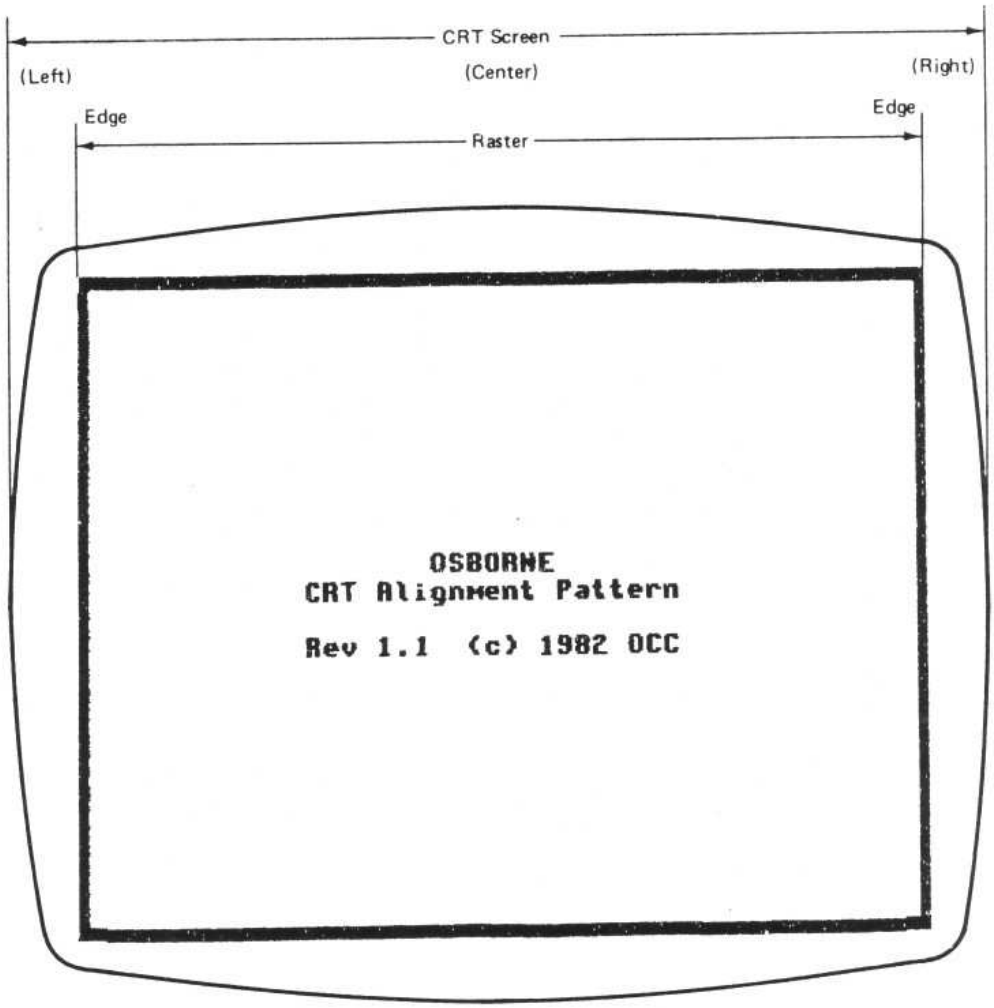
6.6.3.3 Rotate focus control, R315 on Monitor PC board, to obtain best focus at a point near the center of the screen horizontally and 1/3 down from the top.

6.6.4 Raster Adjustment

NOTE

In adjustments 6.6.4.4 through 6.6.4.6 there is a danger of monitor implosion. These adjustments ***are not recommended*** *and should be made in the field* ***only in the most urgent cases****. USE EXTREME CARE.*

6.6.4.1 Power up the OCC-1.



6.6.4.2 Insert and boot Osborne Alignment Program diskette in either drive. (Type CRT after the A > on the screen, then press RETURN).

6.6.4.3 If the screen display is tilted, read the NOTE above before proceeding. If the tilt adjustment is not being done, proceed to instruction 6.6.4.7.

6.6.4.4 Use a hot air gun to loosen the glue around the video monitor yoke.

6.6.4.5 Using a broad-end, NON-METALLIC tool, firmly push down on the yoke collar tabs (marked with red and blue dot) until the display is no longer tilted.

6.6.4.6 Reapply hot glue around Monitor yoke.

6.6.4.7 If the video raster is not centered on the screen (between felt-tip pen lines), move the two ring tabs at the rear of the monitor yoke in opposite directions until raster centers.

6.7.0 OSBORNE 1A KEYBOARD DISASSEMBLY

CAUTION: Identify connector orientations before detaching any cable.

6.7.0.1 Disconnect computer from power source.

6.7.0.2 Disconnect the keyboard cable from the front bezel by spreading the latches of the keyboard connector. Note that, facing the CRT screen, the keyboard cable is connected to the unit from the left.

6.7.0.3 Using a pad or soft material to protect the keyboard, turn the keyboard case over so the keys face down.

6.7.0.4 Remove four 6/32 Phillips screws located on the underside of the keyboard case.

6.7.0.5 Lift the keyboard case from the keyboard and keyboard bezel assembly.

6.7.0.6 Carefully remove the keyboard harness from the keyboard connector. The thickest wire in the harness is the grounding wire.

NOTE

The keyboard harness is aligned with Pin 1 of the keyboard connector. Looking at the underside of the keyboard with the numeric row of keys to the top, Pin 1 is the upper right Pin. Pin 1 may also have an orange dot next to it.

6.7.0.7 Remove four 8/32 Phillips screws which secure the keyboard to the bezel standoffs.

6.7.0.8 Lift the keyswitch array from the keyboard bezel.

See Section 6.8.7 to reassemble the keyboard.

6.7.1 OCC 1A Bezel and Chassis Disassembly

CAUTION: The interior of the case is coated with a special metallic paint. Avoid scratching this coating.

6.7.1.1 Disconnect computer from power source.

6.7.1.2 Disconnect the keyboard cable from the front bezel by spreading the latches on the keyboard connector.

6.7.1.3 Remove all external cables (RS-232, modem, external video, etc.).

6.7.1.4 Pull the video contrast and brightness knobs off their shafts.

6.7.1.5 Remove the 6/32 x 1/4 inch Phillips screws surrounding the bezel.

6.7.1.6 Placing thumbs below CRT screen and fingers in the disk storage pockets, apply a slight pressure inward with thumbs to loosen the bezel.

6.7.1.7 Grasp the bezel near the carrying-case latches and carefully pull it straight forward until it is free.

6.7.1.8 Remove the AC power cord from the power cord compartment.

6.7.1.9 Carefully turn the unit over so ventilation slots are on the bottom, video screen facing technician.

6.7.1.10 Remove five 6/32 x 3/4-inch Phillips screws holding the two halves of the carrying case together.

6.7.1.11 Hold down the carrying handle plate and the power cord compartment and lift the upper half of the case free of the unit.

NOTE

The logic board and the power supply unit can be replaced at this point without further disassembly of the chassis. See Sections 6.7.2 and 6.7.4; 6.8.3 and 6.8.5.

To further dismantle the unit, proceed as follows.

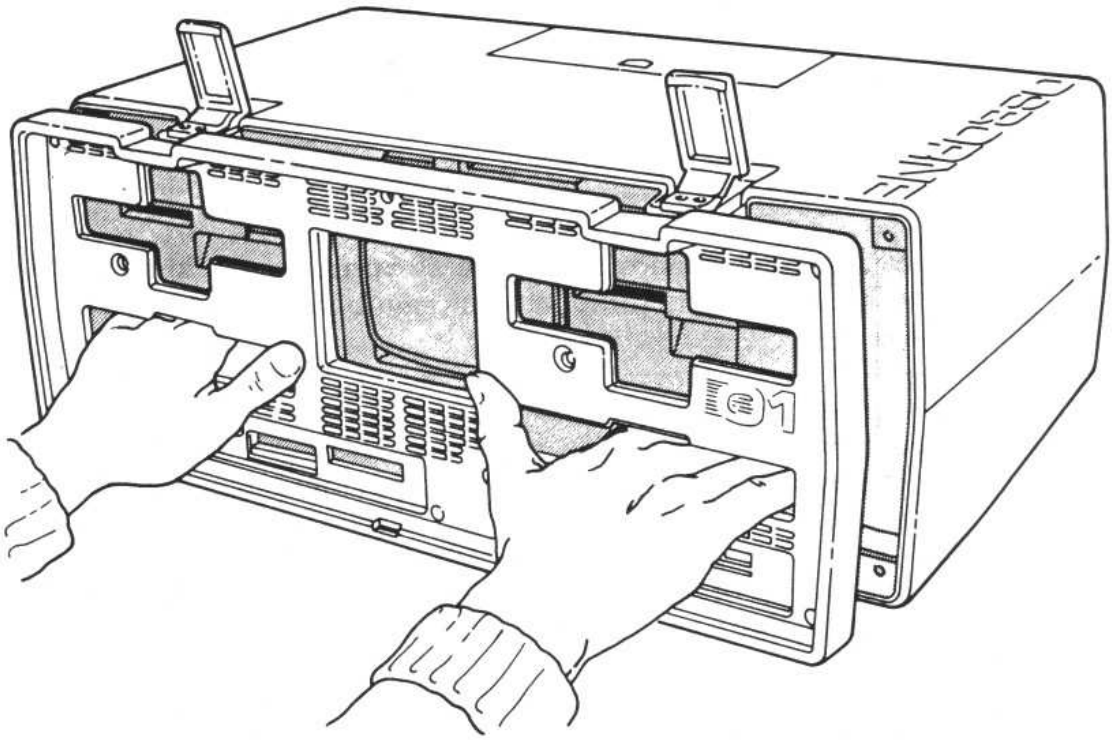


FIGURE 6-20. BEZEL REMOVAL

6.7.1.12 Slide the carrying handle plate out of the lower part of the case. Note that the broad area of the plate is *below* the handle at this point.

6.7.1.13 Lift the power cord compartment slightly and detach the door.

6.7.1.14 Place the power cord compartment face down on the logic board.

6.7.1.15 Place one hand under the front of the video monitor and the other at the back of the monitor and lift the chassis out of the case. Be sure the AC power cord compartment lifts freely with the chassis.

See Section 6.8.6 to reassemble the bezel and chassis.

6.7.2 OCC 1A Logic Board Disassembly

6.7.2.1 Disassemble the Osborne 1A following the instructions in Section 6.7.1.

6.7.2.2 Position the chassis assembly with logic board facing up and CRT screen facing technician.

6.7.2.3 Remove the 6/32 Phillips screw at each corner of the logic board. The screw in the right front corner of some logic boards has a nylon insulation washer.

6.7.2.4 Lift the logic board by the front edge and hold it perpendicular to the chassis, video control shafts pointing straight up. Note all connector orientations while still attached. Be sure no cables are snared as you lift the board.

6.7.2.5 Remove the DC harness connector and mylar insulator located in the extreme left lower corner of the logic board.

6.7.2.6 Remove the disk harness connector located in the lower left corner of the logic board at the right of the DC harness connector. Grip the connector and CAREFULLY detach it, being sure not to bend any pins.

NOTE

The disk drive harness connector is not keyed. The RED stripe on the harness must go to the right.

6.7.2.7 Remove the video harness connector located in the upper left corner of the logic board to the right of the reset button.

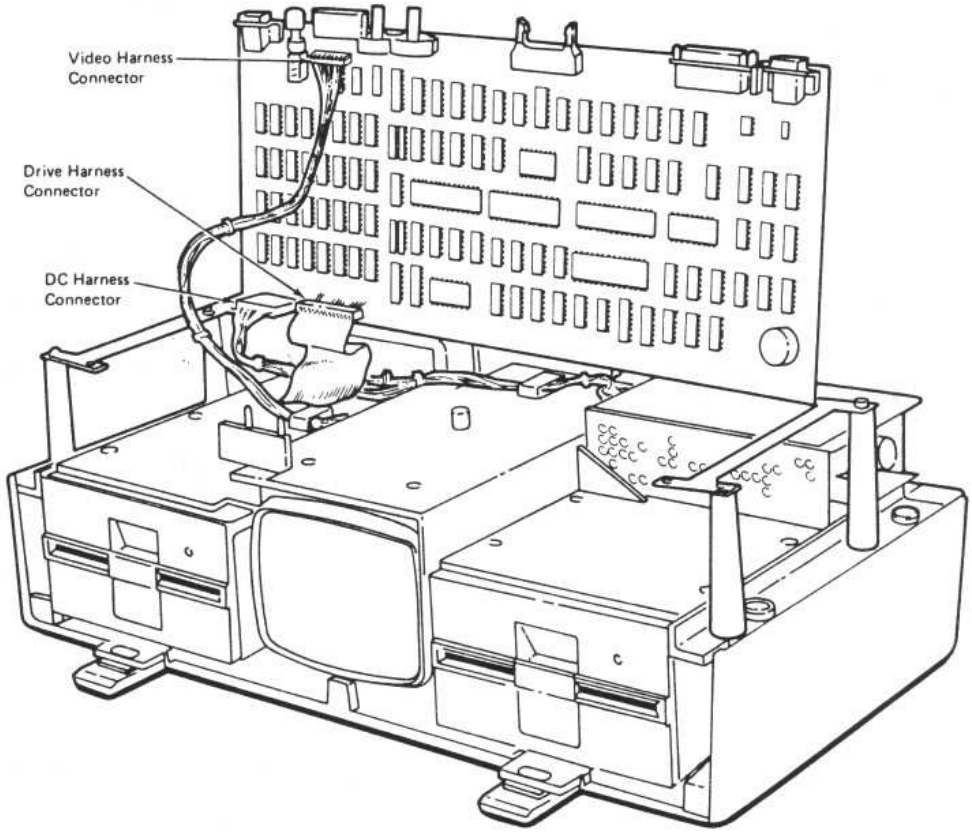


FIGURE 6-21. LOGIC BOARD REMOVAL

NOTE

The video harness connector is not keyed. The RED wire on the harness must go to the left.

6.7.2.8 Remove the external video plug located between the reset button and the contrast control on the front edge of the logic board.

6.7.2.9 Remove the logic board from the chassis.

See Section 6.8.5 to reassemble the logic board.

6.7.3 OCC 1A Video Monitor Disassembly

6.7.3.1 Disassemble the Osborne 1A following the instructions in Sections 6.7.1 and 6.7.2.

6.7.3.2 Position the chassis assembly logic-board-side-up and CRT screen facing technician.

6.7.3.3 Slip the video harness cable from its tab on the chassis.

6.7.3.4 Disconnect the slip-on ground wire from its connection at the back of the video monitor shield.

6.7.3.5 Remove the disk drive harness from the four fasteners holding it to the back of the video shield.

6.7.3.6 Remove four 6/32 X 1/4 inch Phillips screws which secure the video monitor to the chassis. Label these screws FOR VIDEO MONITOR and set them aside.

NOTE

Using an incorrect screw to reattach the video monitor to the chassis may short circuit the video PC board.

6.7.3.7 Slide video monitor forward and out of chassis while guiding the monitor cable.

6.7.3.8 Remove video monitor from its shield.

6.7.3.9 Detach the video harness connector from the top rear of the video PC board. This is a keyed connector.

6.7.3.10 Remove the transparent face plate from the monitor screen.

See Section 6.8.4 to reassemble the video monitor.

6.7.4 OCC 1A Power Supply Disassembly

CAUTION: Working with power supplies is DANGEROUS! Power supply units can hold an electrical charge for long periods of time. Do not touch any components unnecessarily.

6.7.4.1 Disassemble the Osborne 1A following the instructions in Sections 6.7.1 and 6.7.2.

6.7.4.2 Position the chassis assembly logic-board-side-up and CRT screen facing away from technician.

6.7.4.3 Remove two 6/32 Phillips screws and the mylar insulator from the underside of the power supply.

6.7.4.4 Remove remaining two 6/32 Phillips screws securing the power supply to the chassis standoffs.

NOTE

All four power supply screws have metal star washers.

6.7.4.5 With wires still attached and clear of their tab on the chassis, carefully lift the power supply out of the chassis.

6.7.4.6 Turn the power supply over left-to-right so the components face technician and five large capacitors are in the lower left corner.

6.7.4.7 Remove both DC output connectors from the left side of the power supply. These keyed connectors are attached to two of the three identical male connections on the left side of the power supply.

6.7.4.8 Remove the ground wire connector from the power supply. This is a slip-on connector located in the upper left corner of the power supply.

6.7.4.9 Remove the AC input connector from the power supply. This is a keyed connector located left of the fuse on the upper side of the power supply.

6.7.4.10 Remove both interchangeable pin connectors from the 115V and 230V pins on the power supply.

See Section 6.8.3 to reassemble the power supply.

6.7.5 OCC 1A Disk Drive "A" Disassembly

NOTE

The A drive has an 8 pin, 150 ohm, terminator resistor pack. B DRIVE DOES NOT.

6.7.5.1 Disassemble the Osborne 1A following the instructions in Sections 6.7.1 and 6.7.2.

6.7.5.2 Position the chassis assembly logic-board-side-up and drive door facing technician.

6.7.5.3 Remove four 6/32 Phillips screws holding the "A" drive to the chassis assembly.

NOTE

Disk drive A is the drive closest to the power supply.

6.7.5.4 Pivot the shielded drive horizontally to the right 90 degrees from its original position.

6.7.5.5 Detach the disk harness connector and the ground connector from the drive. The disk harness connector is at the rear of the drive PC board. The slip-on ground connector is located at the rear of the drive either on the drive frame or shield.

6.7.5.6 Remove four 6/32 Phillips screws which hold the shield to the drive. These screws are located on the left and right sides of the drive.

6.7.5.7 Remove the drive from its shield.

6.7.5.8 If the drive is being replaced with another, remove the 8 Pin terminator resistor from the drive PC board and KEEP IT for installation on the new drive. (See Section 6.8.2.) The terminator resistor is located at position RN3 on the right rear corner of the PC board.

See Section 6.8.2 to reassemble drive "A".

6.7.6 OCC 1A Disk Drive "B" Disassembly

NOTE

The A drive has an 8 pin, 150 ohm terminator resistor pack. B DRIVE DOES NOT.

6.7.6.1 Disassemble the Osborne 1A following the instructions in Sections 6.7.1 and 6.7.2.

6.7.6.2 Position the chassis assembly logic-board-side-up and drive doors facing technician.

6.7.6.3 Remove four 6/32 Phillips screws securing the "B" drive to the chassis assembly.

6.7.6.4 Pivot the shielded drive horizontally to the left 90 degrees from its original position.

6.7.6.5 Detach the disk harness connector and the ground connector from drive. The disk harness connector is at the rear of the drive PC board. The slip-on ground connector is located at the rear of the drive either on the drive frame or shield.

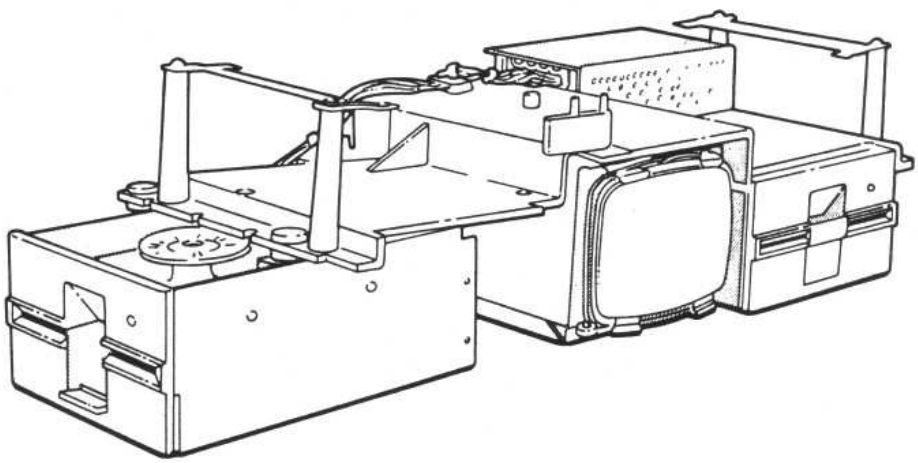


FIGURE 6-22. "B" DRIVE DISASSEMBLY

NOTE

The disk drive harness is not keyed. Facing the back of the drive, strobe wheel side up, the harness connects RED STRIPE to the RIGHT.

6.7.6.6 Remove four 6/32 Phillips screws which hold the shield to the drive. These screws are located on the left and right sides of the drive.

6.7.6.7 Remove the drive from its shield.

See Section 6.8.1 to reassemble the "B" drive.

6.7.7 OCC 1A Power Panel Disassembly

6.7.7.1 Disassemble the Osborne 1A following the instructions in Sections 6.7.1 and 6.7.2.

6.7.7.2 Detach the ground wire to the video monitor shield.

6.7.7.3 Detach the ground wire from each disk drive shield.

6.7.7.4 Remove the thermal cutout from its clip on the chassis. The AC power panel should now be completely disconnected from the chassis.

6.7.7.5 Remove the mylar insulator sheet which covers the back of the power panel. The folded part of this insulator is closest to the power panel connections.

6.7.7.6 Remove four 6/32 x 1/4 inch Phillips screws which hold the AC power panel to the power panel compartment.

6.7.7.7 Position the AC power panel with connections facing the technician, switch assembly in lower left corner, ground wires in lower right corner.

6.7.7.8 Disconnect the five-wire slip-on ground connector from the lower right corner of the power panel.

6.7.7.9 Disconnect both interchangeable pin connectors from pins "C" and "D" of the power panel.

6.7.7.10 Disconnect both *lower* wires from the switch assembly in the lower left corner of the power panel. Do not disconnect the upper wires.

6.7.7.11 Detach the thermal cutout from the wire harness.

See Section 6.8.0 to reassemble the power panel.

6.8.0 OCC 1A POWER PANEL ASSEMBLY

6.8.0.1 Refer to Figure 6-23 to identify the various DC harness connectors as follows.

A	Logic board DC input
B	AC power panel ground (5 wire)
C and D	Interchangeable 115V and 230V pin connectors to AC power panel
E and F	Power panel AC outputs. E runs to the keyed AC input connector O. F runs to the thermal cutout.
G	"B" drive ground. G runs to B.
H	Video monitor ground. H runs to B.
I and J	Interchangeable thermal cutout connectors.
K	"A" drive ground
L and M	Interchangeable DC output connectors from power supply.
N	DC power supply ground.
O	AC input connector.
P and Q	Interchangeable 115V and 230V pin connectors to power supply.

6.8.0.2 Connect two slip-on connectors I and J to the thermal cutout.

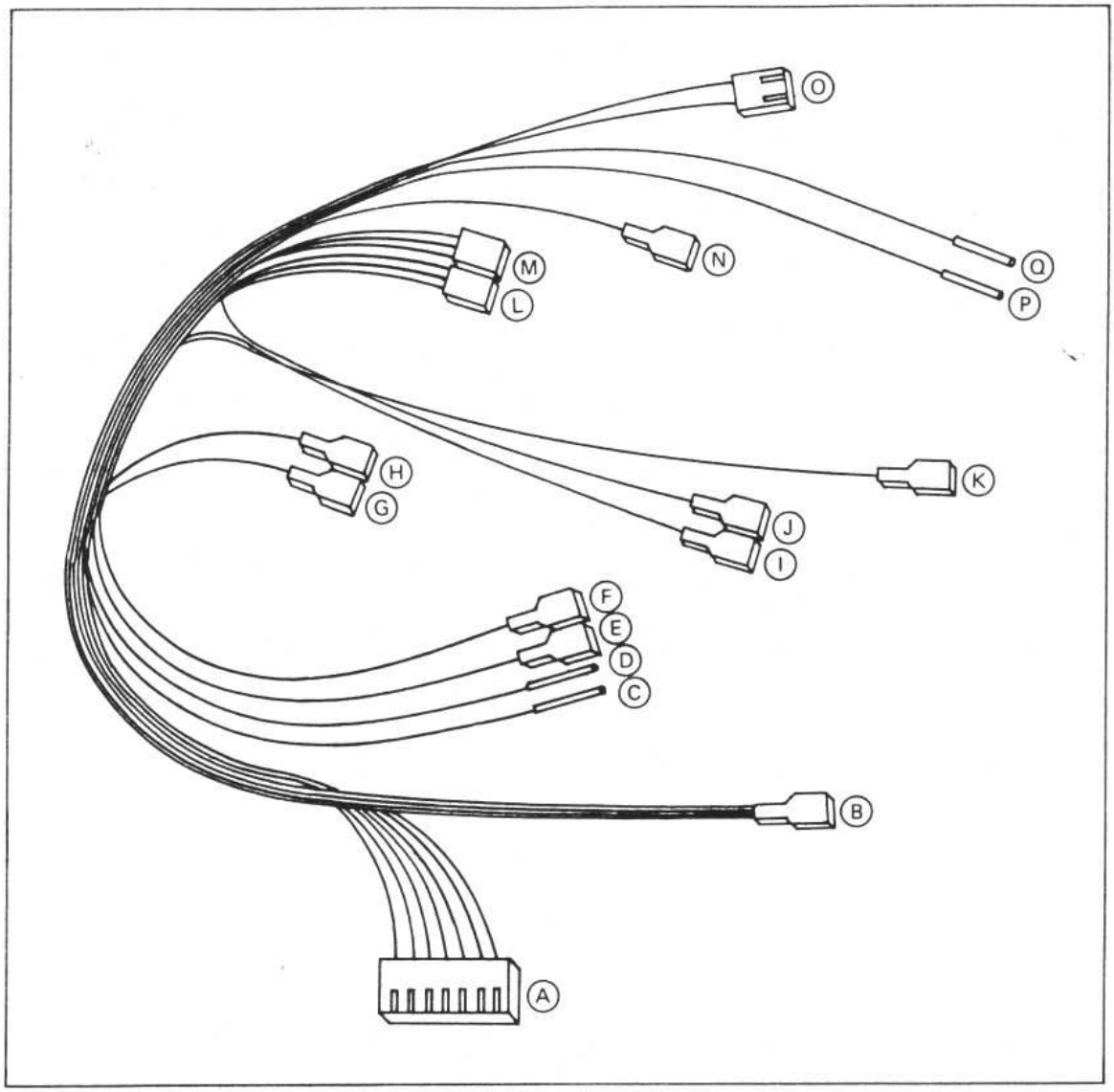
6.8.0.3 Position the AC power panel with connectors facing technician, switch assembly in lower left corner, and ground wire connection at lower right (See Figure 6-24).

6.8.0.4 Connect the five-wire ground cable B to the connector in the lower right corner of the power panel.

6.8.0.5 Connect the AC output wires E and F to the lower connectors on the power panel switch assembly. Connect F, which runs to the thermal cutout, to the right of E

6.8.0.6 Connect two interchangeable pin connectors C and D to pins "C" and "D" of the power panel.

6.8.0.7 Align the power panel with the screw holes on the rear of the power panel compartment. Position the fuse box furthest from the door hinge cutouts on the power panel compartment.



(A)	Logic Board DC Input
(B)	AC Power Panel Ground (5 wire)
(C) and (D)	Interchangeable 115V and 230V Pin Connectors toAC Panel
(E) and (F)	Power Panel AC Outputs
(G)	"B" Drive Ground
(H)	Video Monitor Ground
(I) and (J)	Interchangeable Thermal Cutout Connectors
(K)	"A" Drive Ground
(L) and (M)	Interchangeable DC Output Connectors from Power Supply
(N)	DC Power Supply Ground
(O)	AC Input Connector
(P) and (Q)	Interchangeable 115V and 230V Pin Connectors to Power Supply

FIGURE 6-23. DC POWER HARNESS

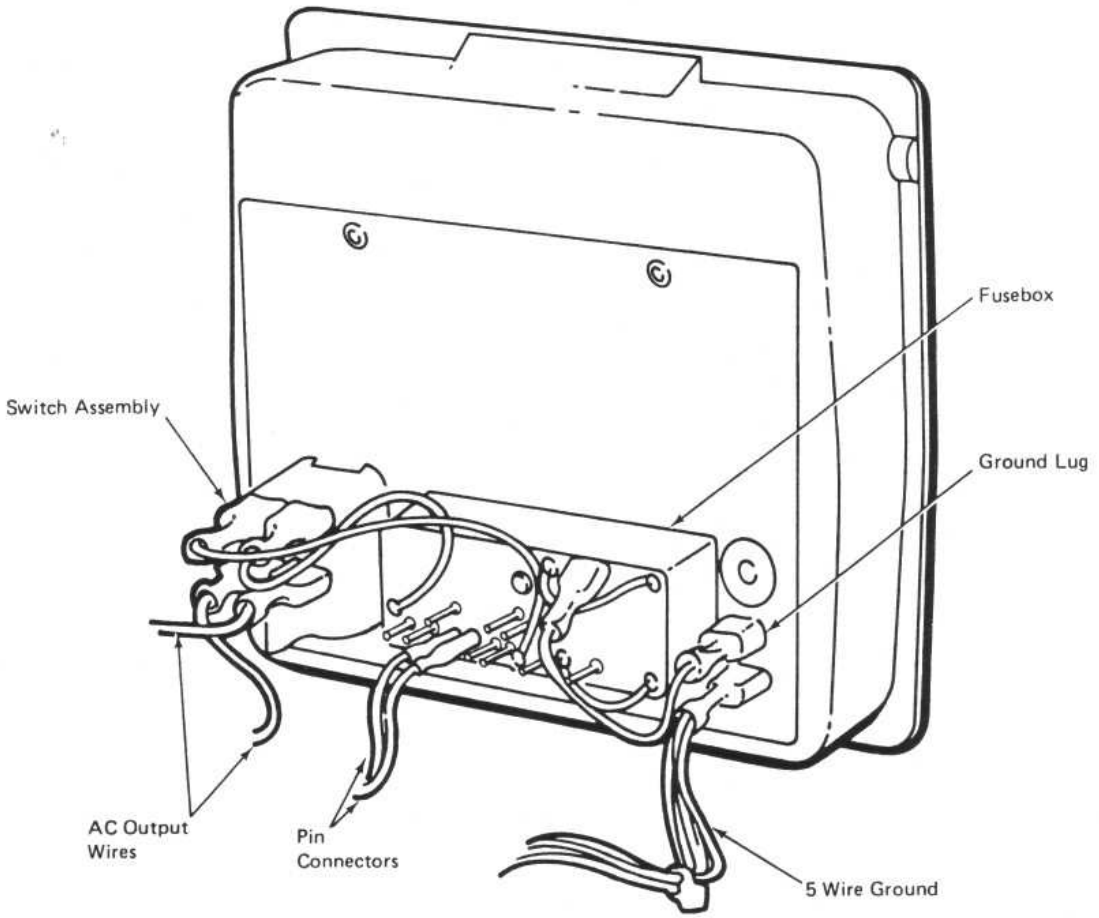


FIGURE 6-24. AC POWER PANEL

6.8.0.8 Install four 6/32 X 1/4 inch Phillips screws to secure the power panel to the back of the power panel compartment.

6.8.0.9 Place the mylar insulator sheet over the power panel connections. Position the folded part of this sheet closest to the connections and slip it onto the Phillips screws in each corner of the panel.

6.8.0.10 To secure the insulator in place, press a rubber cap onto the shaft of each Phillips screw holding the power panel to the panel compartment.

6.8.0.11 Fasten the thermal cutout to its chassis mounting clip beneath the power supply.

6.8.0.12 Place the thermal cutout wires I and J in their notch on the chassis. This prevents pinching of the wires between chassis and case.

6.8.1 OCC 1A Disk Drive "B" Assembly

NOTE

The "A" drive has an 8 pin, 150 ohm terminator resistor pack (see Section 6.2.2). "B" DRIVE DOES NOT.

6.8.1.1 Place drive in shield with PC board facing down.

6.8.1.2 Align drive with screw holes in the drive shield and install two 6/32 Phillips screws with star washers in each side of the drive.

6.8.1.3 Position the chassis assembly logic-board-side-up and power supply mounting closest to technician.

NOTE

Drive B is the drive furthest from the power supply unit.

6.8.1.4 Slide drive under chassis assembly with drive door facing away from technician.

6.8.1.5 Install four 6/32 Phillips screws which secure the "B" drive to the chassis.

6.8.1.6 Connect the slip-on ground connector located mid-way down the DC power harness to the ground tab at the rear of the drive shield.

6.8.1.7 Connect the broad drive connector located mid-way down the drive harness to the connection at the rear of the drive PC board. RED STRIPE on the harness edge is to the right.

6.8.2 OCC 1A Disk Drive "A" Assembly

NOTE

The "A" drive has an 8 ohm terminator resistor pack. "B" DRIVE DOES NOT. To locate the terminator, position the drive with door facing technician and PC board on top. The terminator is at position RN3 in the right rear corner of the PC board. Pin 1 is the pin closest to technician.

6.8.2.1 Install terminator resistor pack at position RN3 of the drive PC board.

6.8.2.2 Place drive in shield with PC board facing down.

6.8.2.3 Align drive with screw holes in the drive shield and install two 6/32 Phillips screws with star washers in each side of the drive.

6.8.2.4 Position the chassis assembly logic-board-side-up and power supply mounting closest to technician.

NOTE

Disk drive A is the drive closest to the power supply.

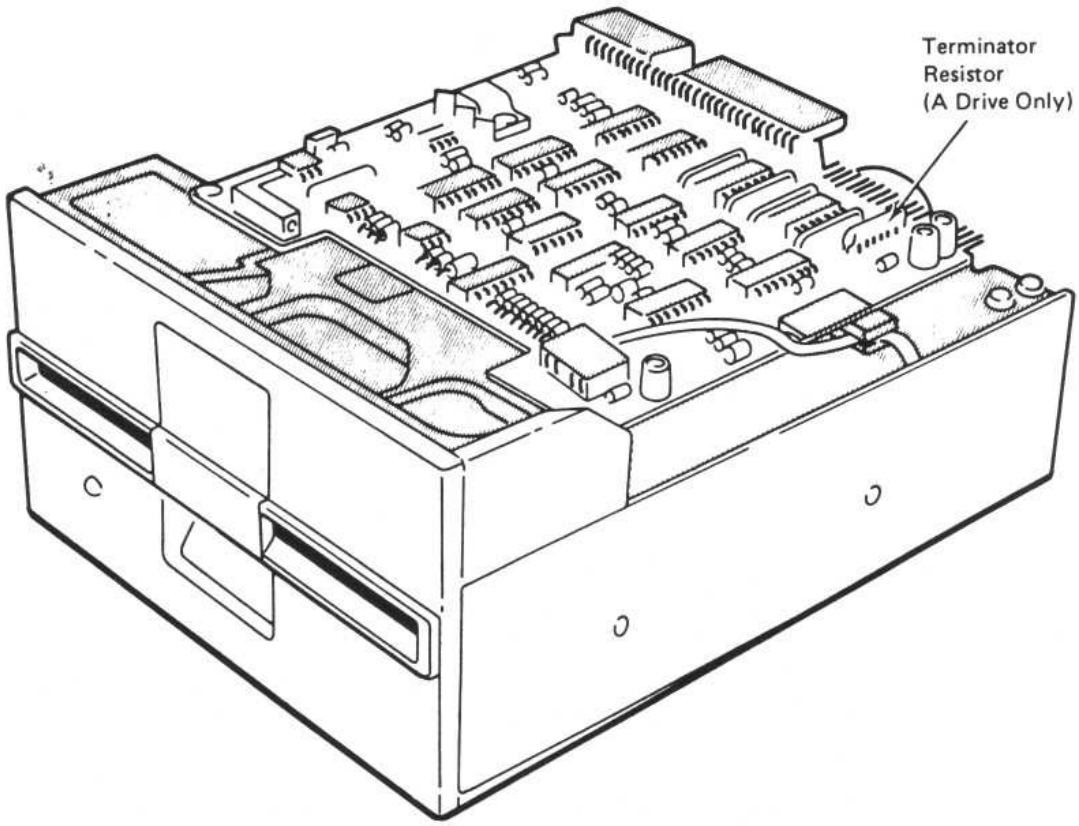


FIGURE 6-25. DISK DRIVE A

6.8.2.5 Place shielded drive to the left of chassis assembly, strobe wheel facing up, drive door facing away from chassis.

6.8.2.6 Connect the narrow slip-on ground connector to the ground tab at the rear of the drive shield.

6.8.2.7 Slide drive under chassis assembly with drive door facing away from technician.

6.8.2.8 Install four 6/32 Phillips screws to secure the "A" drive to the chassis.

6.8.2.9 Insert the broad drive connector on the end of the drive harness through the rectangular slot at the rear of the drive shield. Connect the drive connector to the rear of the PC board, RED STRIPE on harness edge to the right.

6.8.2.10 Attach the thermal cutout to its chassis mounting clip beneath the power supply.

6.8.2.11 Place the thermal cutout wires and the "A" drive ground wire in their notch on the chassis. This prevents pinching of the wires between chassis and case.

6.8.3 OCC 1A Power Supply Assembly

CAUTION: Working with power supplies is DANGEROUS! Power supply units can hold an electrical charge for long periods of time. Do not touch any components unnecessarily.

NOTE

Power supply procedures are with DC harness installed in chassis.

6.8.3.1 Position the chassis assembly logic-board-side-up and power supply mounting closest to technician.

6.8.3.2 Place power supply on the chassis so components face technician and the five large capacitors are in the lower left corner.

NOTE

Refer to Figure 6-23 to identify the various DC harness connectors.

6.8.3.3 Attach the AC input connector to the keyed connection left of the fuse on the power supply.

6.8.3.4 Attach the slip-on ground connector to the ground connection in the upper left corner of the power supply.

6.8.3.5 Attach the keyed DC output connectors to two of the three identical male connections on the left side of the power supply.

6.8.3.6 Connect two interchangeable pin connectors to the 115V and 230V pins on the power supply. *Be sure these are securely connected.*

6.8.3.7 With wires attached, turn the power supply over from right-to-left so the DC output connectors are to the right. Insert the power supply into the chassis *being careful not to snag any wires.*

6.8.3.8 Align the screw holes on the power supply PC board with the chassis standoffs.

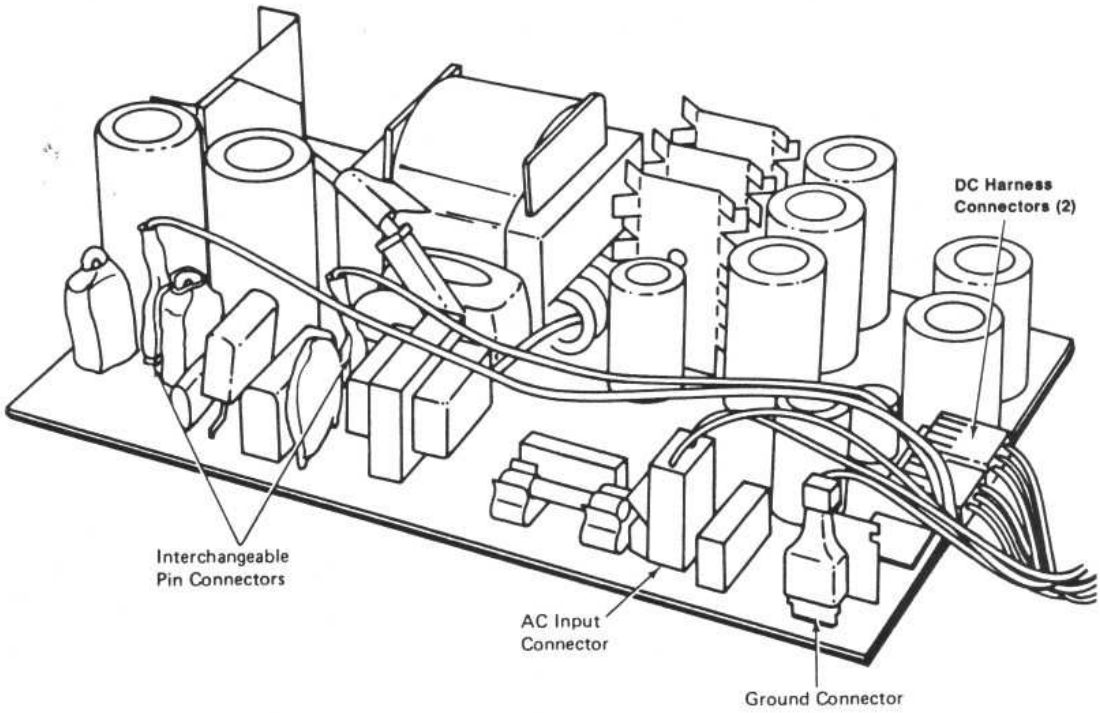


FIGURE 6-26. POWER SUPPLY

6.8.3.9 Install a 6/32 x 1/4-inch Phillips screw and star washer in the upper right and lower left corners of the power supply. Do not overtighten these screws!

6.8.3.10 Align the holes on the mylar insulator with the remaining two chassis standoffs.

NOTE

The rectangular insulator **MUST BE** *installed against the underside of the power supply. THIS IS A SAFETY REQUIREMENT!*

6.8.3.11 Install a 6/32 x 1/4-inch Phillips screw and star washer through each hole in the insulator and into the chassis standoffs. Do not overtighten these screws!

6.8.3.12 Slip the power supply harness into its tab on the chassis.

6.8.4 OCC 1A Video Monitor Assembly

6.8.4.1 Position the video monitor in front of the chassis assembly, CRT screen facing technician and keyed video PC board connection at top rear.

6.8.4.2 Lower the video monitor shield onto the monitor and align the monitor and monitor shield screw holes.

6.8.4.3 Connect the keyed large end-connector of the video harness to the rear of the monitor PC board.

6.8.4.4 Slide the video monitor into place in the chassis while guiding the video cable through its chassis access hole.

6.8.4.5 Align the monitor with the four screw holes in the chassis. Install four 6/32 X 1/4 inch Phillips screws to secure the monitor to the chassis. These are the screws labelled FOR VIDEO MONITOR in section 6.7.3.

NOTE

Using incorrect screws to reattach the video monitor to the chassis may short circuit the video PC board.

6.8.4.6 Attach the slip-on ground connector to the connection at the rear of the video monitor shield.

6.8.4.7 Slip the disk drive harness into the four fasteners on the back of the video monitor shield.

6.8.4.8 Replace the transparent face plate onto the monitor screen.

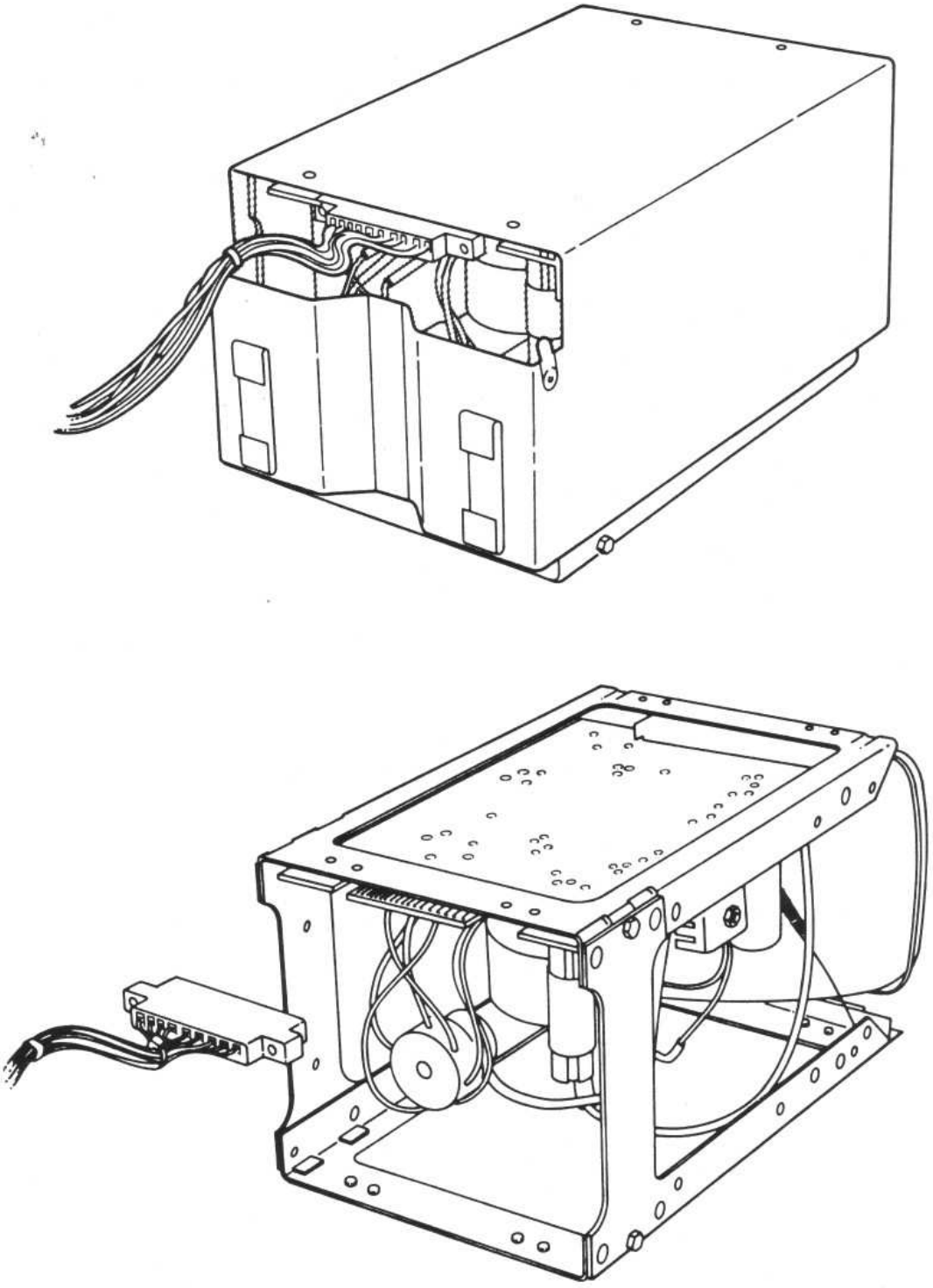


FIGURE 6-27. VIDEO MONITOR ASSEMBLY

6.8.5 OCC 1A Logic Board Assembly

6.8.5.1 Position the chassis assembly logic-board-side-up and CRT screen facing technician.

6.8.5.2 Hold the logic board perpendicular to the chassis, component side facing technician, video control shafts pointing straight up. (See Fig. 6-21.)

6.8.5.3 Connect the external video plug to the connection on the edge of the logic board between the reset button and video contrast shaft.

6.8.5.4 With video harness running below the logic board, attach the video harness connector to the 10 Pin connection on the logic board between the reset button and the contrast control, RED WIRE TO THE LEFT.

6.8.5.5 Insert the 7 hole mylar insulator onto the DC harness connection in the extreme left lower corner of the logic board. Fold the long part of the insulator flat against the underside of the logic board.

NOTE

The insulator **MUST BE** *installed onto the DC harness connection to avoid burn hazard. THIS IS A SAFETY REQUIREMENT!*

6.8.5.6 With the DC harness running below the logic board, attach the DC harness connector to the 7 Pin connection in the extreme left lower corner of the logic board.

6.8.5.7 With the disk harness running below the logic board, attach the disk harness connector to the 34 Pin connection at the lower left of the logic board to the right of the DC harness, RED STRIPE TO THE RIGHT.

6.8.5.8 Lower the logic board onto its chassis mounting brackets.

NOTE

The chassis mounting brackets are angled inward and slightly down. There should be two grommets on the inward side of each mounting bracket, facing downward away from the logic board.

6.8.5.9 Install a 6/32 Phillips screw with star washer at each corner of the logic board. The screw in the right front corner of some logic boards has a nylon insulation washer to protect the trace. Do not overtighten these screws!

6.8.6 OCC 1A Bezel and Chassis Assembly

CAUTION: The interior of the case is coated with a special metallic paint. Avoid scratching this coating.

6.8.6.1 Position the chassis assembly logic-board-side-up, CRT screen facing technician.

6.8.6.2 Place the top half of the carrying case (the part with the ventilation slots) upside down on the work surface, latches closest to the technician.

6.8.6.3 Place power panel compartment face down on the logic board.

6.8.6.4 Place one hand under the front of the video monitor and the other at the back of the monitor and lift the chassis into the top half of the carrying case.

NOTE

When installing the chassis into the case, be careful not to pinch, trap, or rip harness assemblies.

6.8.6.5 Align screw holes in the chassis with the five mounting standoffs in the case.

6.8.6.6 Position the power supply harness in the chassis tab over the video monitor.

6.8.6.7 Slide the power panel compartment into the case, fuse at the top and facing out.

6.8.6.8 Slide the carrying handle plate into the case. The broad area of the plate is *below* the handle at this point.

6.8.6.9 Place the lower half of the case onto the chassis assembly. Be sure that the AC power compartment, carrying handle plate, and upper/lower halves of the case align properly.

6.8.6.10 Slide the hinges of the power compartment door into their cutouts on the power panel compartment.

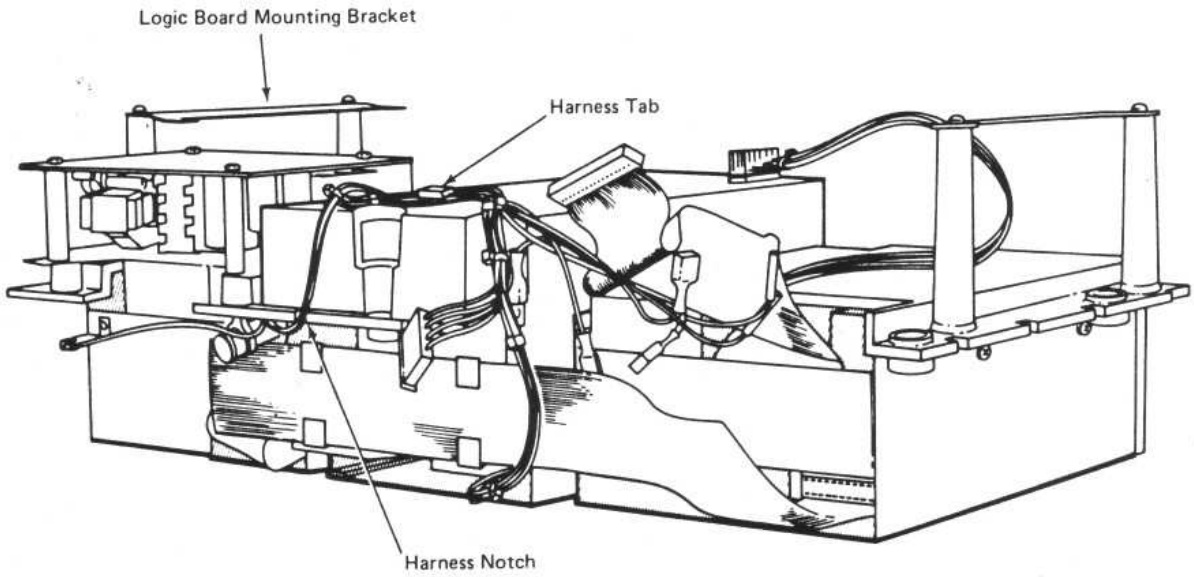


FIGURE 6-28. CHASSIS ASSEMBLY—REAR VIEW

6.8.6.11 Install five 6/32 x 3/4-inch Phillips screws which hold both halves of the case together. Tighten these screws until they are snug. **Do not overtighten!**

6.8.6.12 Turn the unit over so the ventilation slots are on top and CRT screen faces technician.

6.8.6.13 Placing thumbs below CRT screen cutout and fingers in the disk storage pockets, slide the bezel into the chassis. Be sure keyboard connector latches are in closed position.

6.8.6.14 Install the 6/32 Phillips screws which secure the bezel to the front of the chassis. **Do not overtighten these screws!**

6.8.6.15 Carefully push the video control knobs onto their shafts.

6.8.6.16 With the keyboard assembly in front of the unit, connect the keyboard cable to the keyboard connector below the CRT screen. Facing the screen, the cable connects from the left.

6.8.7 OCC 1A Keyboard Assembly

6.8.7.1 Place the keyboard bezel onto a pad or soft material (to protect the keyboard), standoffs facing up.

6.8.7.2 Align the keyswitch array face down with the cutouts on the keyboard bezel.

6.8.7.3 Install four 8/32 Phillips screws to secure the keyboard to the bezel standoffs.

6.8.7.4 Connect Pin 1 (the thick ground wire) on the keyboard harness to Pin 1 of the keyboard connector on the underside of the keyboard.

NOTE

To locate Pin 1 of the keyboard connection, position the keyboard with the numeric row of keys to the top. Facing the underside of the keyboard, Pin 1 is in the upper right corner of the keyboard connection. Pin 1 may also have an orange dot next to it.

6.8.7.5 Position the keyboard harness in the notch on the long edge of the keyboard bezel.

6.8.7.6 Lower the keyboard case onto the keyboard and keyboard bezel assembly so the case and bezel are flush.

6.8.7.7 Install four 6/32 x 1/4-inch Phillips screws to secure the keyboard case to the keyboard assembly.

6.8.7.8 Turn keyboard face up and connect the keyboard cable to the keyboard connection below the CRT screen. Facing the screen, the cable connects from the left.

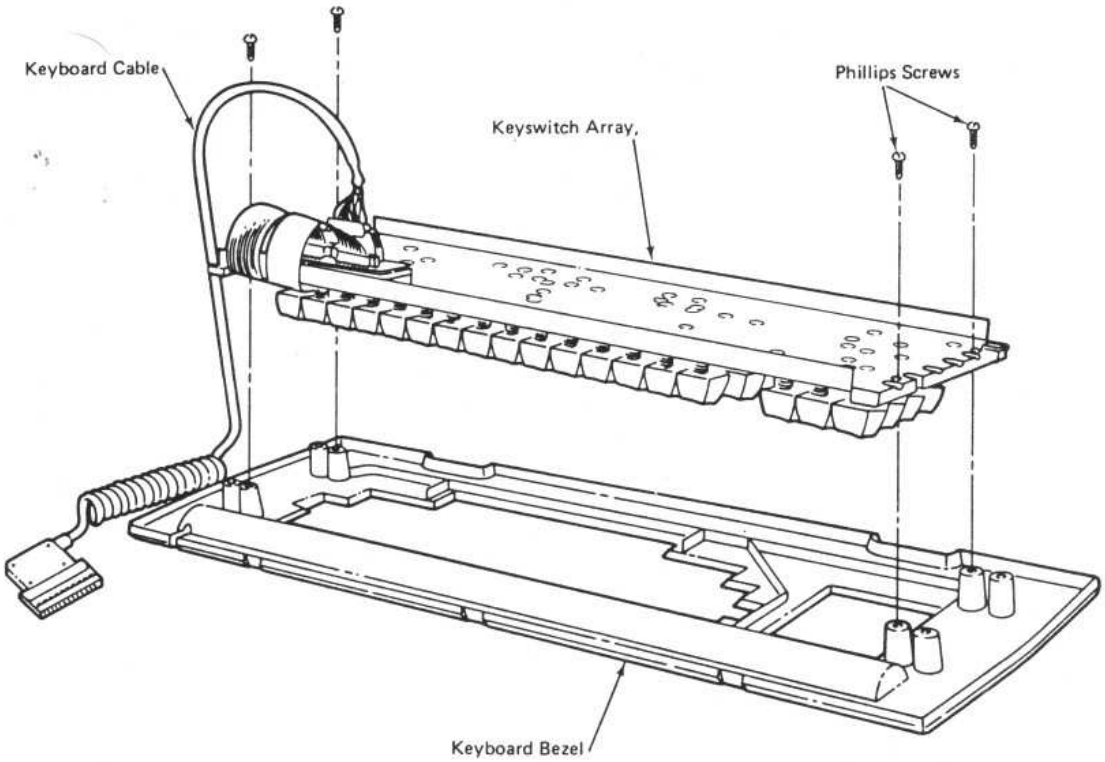


FIGURE 6-29. KEYBOARD ASSEMBLY—OCC1A

6.9.0 OCC 1A OPERATING VOLTAGE MODIFICATION

6.9.0.1 The Osborne 1A can operate on either 120V or 220V. Adapting the system for one of these voltages requires that the correct fuse and fuse card be used.

6.9.0.2 Disconnect the AC power cord from the power panel.

6.9.0.3 Slide open the transparent fuse box door in the AC power panel. Flip the fuse pull to remove the fuse.

6.9.0.4 The fuse card is located underneath the fuse mounting. The current AC voltage setting of the system is visible as a number printed on the card (120 or 220).

6.9.0.5 To change the indicated voltage setting, pull the fuse card from the fuse box. Do this CAREFULLY so as not to damage the fuse card.

6.9.0.6 Turn the card and replace it in the fuse box so the desired voltage rating is the only number visible. Use the 120 rating for 110V operation and 220 rating for 220V.

6.9.0.7 Use a 1 amp, slow-blow, 250V fuse (3AG) for either 120V or 220V operation.

6.9.0.8 Replace the fuse and close the fuse box cover.

6.9.0.9 Reconnect the AC power cord to the power panel.

6.10.0 BATTERY PACK

6.10.1 An optional battery pack is available for powering the Osborne 1 and Osborne 1A computers. The pack includes:

1. A 12-volt battery enclosed in a carrying case with shoulder strap.
2. A DC/DC inverter unit for connecting the computer and the battery.
3. A battery charger which plugs into any standard 120V AC outlet. (U.S. models)
4. A 6" connector cable for computers with non-detachable AC power cords.

BATTERY OPERATION

Units with detachable power cord:

6.10.2 Turn power to the computer "OFF" and disconnect it from the power source.

6.10.3 Detach the power cord from the AC power panel on the back of the computer.

6.10.4 Connect the three-hole plug on one of the inverter cables to the power cord connection on the back of the computer.

6.10.5 Insert the *cigarette-type connector* on the other inverter cable into the hole on the side of the battery pack. Push the connector in until it fits snugly. (This connector also fits the standard automobile cigarette lighter socket.)

NOTE

The inverter unit has a switch built into its top surface. Switch position 0 is power "Off". Position 1 is power "On".

6.10.6 Press the inverter switch to position 1 (On). The light on the inverter unit should go on.

6.10.7 Press the computer power switch "ON".

Units without detachable power cord:

6.10.8 Turn power to the computer "OFF" and disconnect it from the power source.

6.10.9 Plug the AC power cord into the 6" connector cable.

6.10.10 Plug the 6" connector cable into the three-hole plug on one of the inverter cables.

6.10.11 Follow steps 6.10.5 through 6.10.7.

6.10.12 The battery will power the computer for approximately one hour of normal use. When battery power becomes too low for further operation, the inverter unit will "beep".

6.10.13 Before disconnecting the battery from the computer, press the power switch on the computer and the switch on the inverter "OFF" (position 0).

BATTERY CHARGING

WARNING: *Never connect or disconnect the charger cord to the battery while the charger is plugged into an electrical outlet! Always disconnect the charger from the power source first.*

6.10.14 Insert the cigarette-type connector running from the battery charger into the hole on the side of the battery pack. Push the connector in until it fits snugly.

6.10.15 Plug the two-pronged battery charger into a 120V AC outlet.

6.10.16 Charge the battery at room temperature for a period of 12 to 48 hours. TO AVOID DANGER OF EXPLOSION, DO NOT OVERCHARGE THE BATTERY.

6.10.17 When disconnecting the battery charger, ALWAYS detach it from the AC power outlet BEFORE detaching the round connector from the battery.

NOTE

When operating an external video monitor with a battery-powered Osborne, all voltages must be compatible.

Troubleshooting and Preventive Maintenance

QUICK TROUBLESHOOTING GUIDE

Problem	See
System doesn't power up Reduced screen display/ Slow-running disk Drive errors during applications	Power Problems (7.1.0)
Boot read error Drive not ready BDOS errors	Drive Problems (7.2.0)
Wavy screen Screen not centered Blank screen Sign-on message gaps Flashing sign-on message	CRT Malfunctions (7.3.0)
Individual key malfunction Complete keyboard failure Displayed character/key struck do not correspond	Keyboard Malfunctions (7.4.0)
Continuous beep on power up Scattered video display Memory error during diagnostics	Logic Board Problems (7.5.0)
No output to printer Printer drops characters Scrambled printout	Port Problems (7.6.0)

7.0.0 Troubleshooting Technique

7.0.0.1 The first step in troubleshooting the Osborne system is to determine whether the problem is with an OCC component or external to the system. Disconnect such devices as printer, external monitor, modem, etc., and test the Osborne to see if the problem still occurs. If it does, use Osborne-supplied diagnostics and this troubleshooting guide to identify and correct the problem. See Chapter Six of the Field Service Manual for detailed instructions about module assembly, disassembly and replacement.

7.0.0.2 If there is no problem with external device(s) disconnected, test the external device(s) and the Osborne/external device interface (RS232 port, mondapt, etc.).

7.0.0.3 Make a thorough visual inspection of all modules suspected of malfunctioning.

7.0.1 Precautions

7.0.1.1 Unless otherwise indicated, DO NOT remove or install any component or connect/disconnect any plug or cable while power is "On".

7.0.1.2 Use extreme caution for any procedure which does require power to be "On".

7.0.1.3 Identify all cable orientations before making any disconnections.

7.1.0 POWER PROBLEMS

Symptoms: 1. System does not power up
2. Reduced screen display/slow-running disk
3. Disk drive errors during applications

7.1.1 System Does Not Power Up

7.1.1.1 Be sure the power switch is turned "On". Switch it "Off" and then "On" again. If the unit "beeps", the drive activity lights flash, but the video screen remains blank, see Section 7.3.0.

7.1.1.2 Test the power source for correct voltages: 120V or 220V as applicable.

7.1.1.3 Switch power "Off". Test the AC power fuse or the circuit breaker as applicable. Replace the fuse or AC power panel if necessary. See Sections 6.1.7 and 6.2.0 or 6.7.7 and 6.8.0.

7.1.1.4 Check all cables for breaks, faulty connections, etc.

7.1.1.5 Check the AC thermal cutout with an ohm-meter. The meter should indicate a short circuit if the thermal cutout is functioning.

WARNING: THE FOLLOWING TESTS NEED AC POWER "ON". USE EXTREME CAUTION!

7.1.1.6 Check the DC connections at the power supply. Each connector is keyed to attach only one way.

7.1.1.7 Disconnect DC input connector from the logic board. Check the following connector wires for voltages indicated:

Wire	Output	Min	Max	Ripple
Pins 1 and 7 (Red)	+12V	+11.40	+12.60	150mV p-p
Pins 2 and 6 (Yellow)	+5V	+4.75	+5.25	50mV p-p
Pins 3 and 5 (Orange)	common			
Pin 4 (Green)	0 voltage			

Test Pins 1 and 7 to 3 and 5, and Pins 2 and 6 to 3 and 5.

1. If voltages are within above limits, the AC and DC power systems are operating correctly.

2. Both voltages are missing.
   REPLACE the AC power fuse.

3. One of the voltages is missing or out of tolerance.
   REPLACE the power supply (see Sections 6.1.4 and 6.2.3 or 6.7.4 and 6.8.3). Recheck power supply voltages.

7.1.2 Reduced Screen Display/Slow-Running Disk

7.1.2.1 Follow instruction 7.1.1.7 to check the DC voltages to the logic board.

1. Voltages are out of tolerance.
   REPLACE the power supply (see Sections 6.1.4 and 6.2.3 or 6.7.4 and 6.8.3). Recheck power supply voltages.

2. Voltages are within tolerance.
   REPLACE the video monitor. See Sections 6.1.3 and 6.2.4 or 6.7.3 and 6.8.4.

3. New monitor installed. Voltages within tolerance.
   REPLACE the logic board. See Sections 6.1.2 and 6.2.5 or 6.7.2 and 6.8.5.

7.1.3 Disk Drive Errors During Applications

7.1.3.1 Follow instruction 7.1.1.7 to check DC voltages to the logic board.

1. Voltages are out of tolerance.
   REPLACE the power supply. See Sections 6.1.4 and 6.2.3 or 6.7.4 and 6.8.3.

2. Voltages are within tolerance.
   See Section 7.2.0 (Disk Drive Problems).

7.2.0 DISK DRIVE PROBLEMS

Symptoms: 1. Boot read error
2. Drive not ready
3. BDOS errors

7.2.0.1 Run the Drive Alignment Program (DRIVE TIMER, ALT TRACK 0 and 1, and HOME HEAD) as the first step in troubleshooting disk drive problems.

7.2.1 Boot Read Error

7.2.1.1 Be sure system software and hardware are compatible, all connectors are correctly in place, and cables/harnesses are undamaged.

7.2.1.2 Clean the drive head involved. BE CAREFUL NOT TO DISTURB DRIVE ALIGNMENT OR POSITION. Use a head cleaning diskette, 97% isopropyl alcohol, or head cleaning fluid only.

7.2.1.3 If one drive doesn't boot the system, try the other drive. Then follow the sequence below.

1. Second drive boots correctly, both drive activity lights are on.
   CHECK that the terminator resistor is correctly installed on "A" drive only.

2. Second drive boots correctly.
   DISCONNECT internal video monitor and connect external one. Boot the drive. If drive boots, replace the internal monitor.

3. Internal monitor disconnected, drive does not boot.
   SWITCH position of the drives ("A" to "B" and "B" to "A"). Be sure terminator resistor is in "A" drive only.

4. Error switches with the drive.
   REPLACE or ALIGN drive with the boot error.

5. Boot read error doesn't switch.
   REPLACE the drive harness. If error continues, replace the logic board.

7.2.1.4 If neither drive boots, check keyboard and keyboard cable (see Section 7.4.2). Then follow the sequence below.

1. Neither drive boots.
   BOOT each drive with another diskette.

2. One drive boots.
   SEE Section 7.2.1.3.

3. Neither drive boots.
   DISCONNECT internal monitor and boot with an external one.

4. One drive boots with external monitor.
   REPLACE internal monitor and see Section 7.2.1.3.

5. Both drives boot.
   REPLACE internal monitor.

6. Neither drive boots with external monitor.
   REPLACE drive harness.

7. Neither drive boots.
   REPLACE logic board.

8. Neither drive boots.
   REPLACE or ALIGN both drives.

7.2.2 Drive Not Ready

7.2.2.1 Clean the drive head involved. BE CAREFUL NOT TO DISTURB DRIVE ALIGNMENT OR POSITION. Use a head cleaning diskette, 97% isopropyl alcohol, or head cleaning fluid only.

7.2.2.2 Be sure all connectors are correctly in place.

7.2.2.3 If one drive doesn't boot the system, try the other drive. Then follow the sequence below.

1. Second drive boots.
   SWITCH position of the drives.

2. Error doesn't switch with the drive.
   REPLACE drive harness.

3. Error switches with drive.
   REPLACE the logic board.

7.2.3 BDOS Errors

7.2.3.1 Be sure system software and hardware are compatible, all connectors are correctly in place, and cables/harnesses are undamaged.

7.2.3.2 Clean the drive head involved. BE CAREFUL NOT TO DISTURB DRIVE ALIGNMENT OR POSITION. Use a head cleaning diskette, 97% isopropyl alcohol, or head cleaning fluid only.

7.2.3.3 If one drive has BDOS error(s), try the other drive. Then follow this sequence.

1. Second drive has no BDOS errors.
   DISCONNECT internal video monitor and connect an external one. Boot the drive. If no BDOS errors, replace the internal monitor.

2. BDOS error continues.
   SWITCH position of the drives and the terminator resistor. If error switches, replace or align drive with BDOS error.

3. BDOS error doesn't switch with drive.
   REPLACE the disk harness. If error continues, replace the logic board.

7.2.3.4 If both drives have BDOS errors, try another diskette. Then follow this sequence.

1. BDOS errors continue.
   DISCONNECT internal monitor and boot with an external one. If one drive is error free, replace internal monitor and see Section 7.2.1.3.

2. Both drives error free.
   REPLACE internal video monitor.

3. Both drives have BDOS errors.
   REPLACE disk harness.

4. Both drives have BDOS errors.
   REPLACE logic board.

5. Both drives have BDOS errors.
   REPLACE or ALIGN both drives.

7.3.0 CRT MALFUNCTIONS

Symptoms:
1. Wavy screen
2. Screen not centered
3. Blank screen
4. Gaps in the sign-on message
5. Flashing sign-on message

7.3.1 Wavy Screen

7.3.1.1 Follow instruction 7.1.1.7 to check power supply +12V.

1. Voltage is out of tolerance.
   REPLACE the power supply. See Sections 6.1.4 and 6.2.3 or 6.7.4 and 6.8.3.

2. Wavy video display during drive applications.
   REPLACE drive involved. See Chapter Six.

3. Voltage is within tolerance. Drives operate correctly.
   REPLACE the video monitor. See Sections 6.1.3 and 6.2.4 or 6.7.3 and 6.8.4.

7.3.2 Screen Not Centered

7.3.2.1 Adjust the video raster. See Section 6.6.4.

7.3.2.2 If the video display is tilted, replace the monitor. See Sections 6.1.3 and 6.2.4 or 6.7.3 and 6.8.4.

7.3.3 Blank Screen

7.3.3.1 Turn brightness and contrast controls completely clockwise.

7.3.3.2 Check video harness connectors at the monitor and logic board.

7.3.3.3 Turn power to the system "Off". Check that the external video plug is connected properly.

7.3.3.4 Turn power to the system "Off". With the logic board video connector attached, replace the video plug.

7.3.3.5 Follow instruction 7.1.1.7 to check power supply +12V. If out of tolerance, replace power supply. Then follow the sequence below.

1. Screen remains blank.
   REPLACE video harness.

2. Screen remains blank.
   REPLACE video monitor.

3. Screen remains blank.
   REPLACE logic board.

See Chapter Six for these replacement procedures.

7.3.4 Gaps in the Sign-On Message

7.3.4.1 Follow instruction 7.1.1.7 to check power supply +12V. If out of tolerance, replace the power supply. See Sections 6.1.4 and 6.2.3 or 6.7.4 and 6.8.3.

7.3.4.2 If gap problem continues, replace the logic board. See Sections 6.2.5 and 6.8.5.

7.3.5 Flashing Sign-On Message

NOTE

Don't confuse a flashing sign-on message with a video vertical-hold malfunction.

7.3.5.1 Check the keyboard for a stuck alphanumeric key and replace if necessary. See Sections 6.1.0 and 6.2.7 or 6.7.0 and 6.8.7.

7.3.5.2 Replace the keyboard cable. See Sections 6.1.0 and 6.2.7 or 6.7.0 and 6.8.7.

7.3.5.3 If flashing continues, replace the keyboard. See Sections 6.1.0 and 6.2.7 or 6.7.0 and 6.8.7.

7.4.0 KEYBOARD MALFUNCTIONS

Symptoms:
1. Individual key malfunction
2. Complete keyboard failure
3. Displayed character and key struck do not correspond

7.4.1 Individual Key Malfunction

7.4.1.1 Run a keyboard test (Supersoft Diagnostics) to verify the problem.

7.4.1.2 Disconnect the keyboard cable from the unit, reconnect it and retest.

7.4.1.3 Check the keyboard connector on the logic board for bent or broken pins. Then follow this sequence.

1. Malfunction continues.
   REPLACE keyboard cable.

2. Malfunction continues.
   REPLACE keyboard.

3. Malfunction continues.
   REPLACE the logic board.

See Chapter Six for these replacement procedures.

7.4.2 Complete Keyboard Failure

7.4.2.1 Replace keyboard cable.

1. Failure continues.
   REPLACE keyboard.

2. Failure continues.
   REPLACE logic board.

See Chapter Six for these procedures.

7.4.3 Displayed Character and Key Struck Do Not Correspond

7.4.3.1 Replace keyboard cable.

1. Malfunction continues.
   REPLACE keyboard.

2. Malfunction continues.
   REPLACE logic board.

See Chapter Six for these procedures.

7.5.0 LOGIC BOARD PROBLEMS

Symptoms:
1. Continuous beep on power up
2. Scattered video display
3. Memory error during diagnostics run

7.5.1 Continuous Beep on Power Up

7.5.1.1 Disconnect keyboard. If beep continues, replace logic board. See Sections 6.2.5 and 6.8.5.

7.5.1.2 Disconnect keyboard. If beep stops, replace the keyboard cable.

1. New cable installed. Beep continues.
   REPLACE keyboard.

7.5.2 Scattered Video Display

7.5.2.1 Check power supply voltages. See Section 7.1.1.7.

1. Voltages within tolerance.
   REPLACE external video plug.

2. Voltages within tolerance, problem continues.
   REPLACE the logic board. See Sections 6.2.5 and 6.8.5.

7.5.3 Memory Error During Diagnostics Run

7.5.3.1 Check power supply voltages. See Section 7.1.1.7.

1. Voltages within tolerance.
   REPLACE the logic board. See Sections 6.2.5 and 6.8.5.

7.6.0 RS-232 AND IEEE-488 PORT PROBLEMS

Symptoms:
1. No output to printer
2. Printer drops characters
3. Scrambled printout

7.6.1 No Output To Printer

Follow this sequence.

1. Check Setup configuration of diskette.
2. Check Install (Wordstar only).
3. Check connectors and interface wiring.
4. Use known good software.
5. Use different printer.
6. Verify printer operates.
7. Replace logic board.

7.6.2 Printer Drops Characters

Follow this sequence.

1. Check Setup configuration of diskette.
2. Check Install (Wordstar only).
3. Check connectors and interface wiring.
4. Replace logic board.

7.6.3 Scrambled Printout

Follow this sequence.

1. Check Setup configuration of diskette.
2. Check Install (Wordstar only).
3. Check connectors and interface wiring.
4. Use known good software.
5. Use different printer.
6. Verify printer operates.
7. Replace logic board.

7.7.0 PREVENTIVE MAINTENANCE

7.7.0.1 The Osborne 1 and 1A do not require scheduled preventive maintenance. OCC does recommend that disk drive heads be cleaned regularly. The conditions in which the system is used will determine the frequency of this service.

Caution: When cleaning disk drive heads be very careful not to disturb drive alignment or position. Use a head cleaning diskette, 97% isopropyl alcohol, or head cleaning fluid only.

7.7.0.2 Use a mild soap and water solution to clean the exterior of the Osborne case.