

**OSBORNE COMPUTER CORPORATION
DOUBLE DENSITY DISK DRIVE OPTION
INSTALLATION PROCEDURE
FOR THE OCC 1/1A COMPUTER
SBXNES031**

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INTRODUCTION TO THE DOUBLE DENSITY DISK DRIVE OPTION

PURPOSE:

The purpose of this document is to provide you with the procedures necessary to upgrade the OSBORNE COMPUTER CORPORATION (OCC) 1/1A COMPUTER to the double density disk drive option.

REQUIRED TOOLS:

- _____ Tool kit.
- _____ Oscilloscope (60HZ TEKTRONIC or equivalent with 2 X10 probes).
- _____ OSBORNE DISK EXERCISER PROGRAM
- _____ DYSAN 224 Alignment Diskette
- _____ Blank Double Density Disk
- _____ LOCTITE (SM) (XEROX part no. 63P83)
- _____ 1 MONITOR ROM Rev. 1.43
- _____ Shim Stock Kit (XEROX part no. 600T24)

DOUBLE DENSITY KITS COMPONENTS INCLUDE:

- _____ 1 Double Density PWB
- _____ 1 10-wire Ribbon Cable
- _____ 1 2732 Monitor ROM Revision 1.44
- _____ 3 Double Density PWB Stand-Offs
- _____ 1 Double Density Users Manual with Extended Utility Disk

The Logic PWB in the computer must be revision G or higher for installation of the double density disk drive option. Return earlier revision PWBs to OCC for upgrading. Return all parts to OCC for upgrade or replacement until further notice.

The Disk Drive PWBs in the computer must be revision J or higher. Return earlier revision PWBs to OCC for upgrading.

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DOUBLE DENSITY DISK DRIVE OPTION INSTALLATION PROCEDURE

- 1.0** Before starting the installation of the option, inspect the computer being upgraded as follows.
- A.** Check the case, handle, and AC power panel for damage.
 - B.** Check that all keys are in place on the keyboard.
 - C.** Detach the keyboard from the unit. Check the keyboard cable and connector for damage.
 - D.** Check the keyboard connector on the front bezel for bent or broken pins.
 - E.** Check the video monitor and video contrast/brightness knobs for damage.
- 2.0** After completing the visual inspection, turn the computer on.
- 3.0** Verify computer operation in all modes of operation.
- A.** Ensure the computer will FORMAT, COPY, SYSGEN, and PIP correctly.
 - B.** Clean the read/write head and replace the load pad if required.
 - C.** Load the OSBORNE Disk Exerciser program and select the SEEK TRACK function. Step to track 16.
 - D.** Select the DRIVE TIMER. The reading should be 199.80 to 200.20.
 - E.** Inform the customer of any problems found.

NOTE:

The possibility exists that an upgraded double density computer won't read single density disks previously created. This could be due to misalignment in the computer before the upgrade was installed. The customer should be informed of this possibility before the option is installed.

Determine if there is a problem by attempting to read several of the customer's single density disks in a correctly aligned double density computer. If the disks are readable, proceed with the double density option installation. If the disks are not readable, the following procedure should be used.

1. Align drive **B** of the computer being upgraded to specification (Refer to the alignment procedures starting at step 4.0).
2. Copy the single density disks from drive **A** to drive **B**.
3. Verify the disks will read in a correctly aligned double density computer.
4. If the copies are readable, align drive **A** of the computer being upgraded to specification.

NOTE:

Refer to the OSBORNE Field Service Manual for the removal and replacement procedures listed in the following steps.

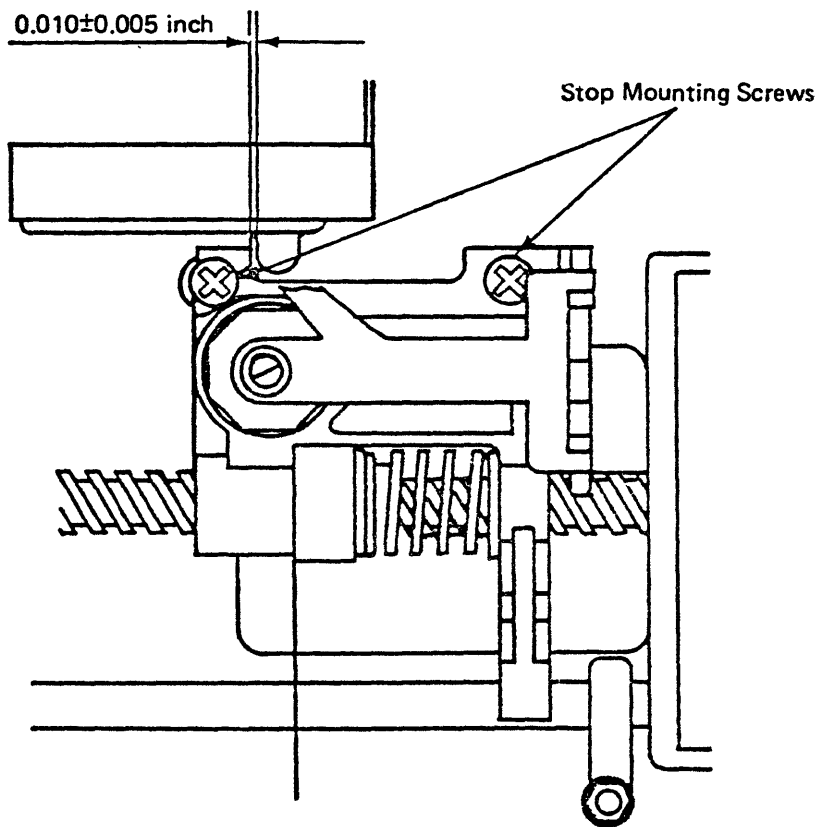
- 4.0 Perform the alignment procedures in the steps listed. The procedures are applicable for the SIEMENS DISK DRIVE. Refer to the alignment procedures in this manual (step 9.0) for the MPI DISK DRIVES.

NOTE:

The Monitor ROM (location D12 of the Logic PWB) must be revision 1.43 for the alignment procedures to function correctly. Temporarily replace the ROM with a 1.43 revision ROM. If the DRIVE TIMER was not within specification, (step 3 of the previous page) adjust R23 on the drive PWB until the correct reading is attained (199.80 to 200.20).

- 5.0 The following steps will verify the TRACK 00/39 Stop Adjustment.
- A. With the computer powered-off, remove the covers from the computer and the disk drives.
 - B. Remove the (4) screws holding the drive PWB to the disk drive (use caution not to lose the plastic washers under the (2) screws at the rear of the PWB).
 - C. Turn the power on and load the OSBORNE Disk Exerciser Diskette into the drive being aligned.
 - D. Select the SEEK TRACK function and step to track 0.
 - E. Adjust the track 00 stop until the clearance between the stop and the post on the frame is 0.010 \pm 0.005 inches (Use a plastic shim cut approximately $\frac{1}{4}$ inch wide). (Refer to Figure 1)
 - F. Step to track 39 and verify the clearance is 0.010 \pm 0.005 inches (Refer to figure 1).
 - G. Remove the disk from the drive and power off the computer.

- H.** Using the plastic washers and the (4) screws, install the PWB onto the disk drive (Repeat the procedure for both drives).



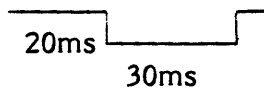
TRACK 00/39 STOP ADJUSTMENT

FIGURE 1

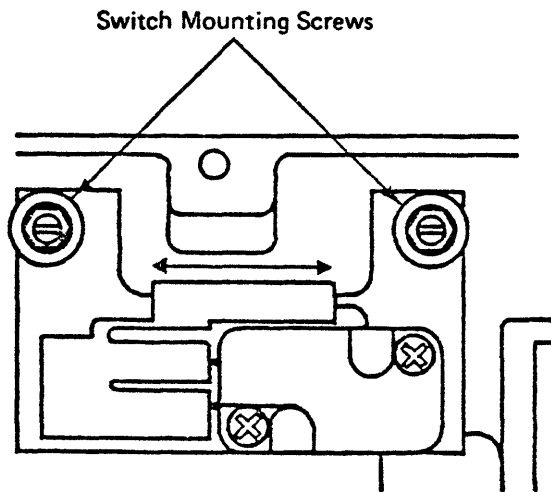
- 6.0** The following steps will verify the TRACK 00 SWITCH adjustment.
- A.** Place the disk drives on their sides so the PWBs are facing the video assembly.
 - B.** Ground the oscilloscope test probes to pin 6 of the TP1 connection on the drive PWB being aligned (Pin 2 is missing).
 - C.** Connect the channel 1 probe to pin 8 and the channel 2 probe to pin 4 of the TP1 connection on the drive PWB.
 - D.** Set the oscilloscope as follows:
 - 1.** CH 1 VOLTS/DIV (10X PROBE) - 1V/DIV, AC
 - 2.** CH 2 VOLTS/DIV (10X PROBE) - 5V/DIV, AC
 - 3.** A and B SEC/DIV - 5 ms/DIV
 - 4.** VERTICAL MODE - Channel 2
 - 5.** A TRIGGER SECTION settings
MODE - NORMAL
SLOPE - +
A and B INT - CH 2
A SOURCE - INT
A EXT COUPLING - AC
 - E.** Power the computer on and load the OSBORNE DISK EXERCISER program into the drive being aligned.
 - F.** Select the ALT TRACK function between tracks 0 and 1. Remove the disk and close the door. Press the return key.
 - G.** Adjust the oscilloscope LEVEL until a waveform is displayed.
 - H.** The following square wave should be visible (you may not be able to see the complete portion of the waveform for the 4 squares; adjust for the 6 square portion of the waveform).

30ms (6 squares) on the negative slope (bottom) ± 10 ms.

20ms (4 squares) on the positive slope (top) ± 10 msec.



- I.** If the square wave is not within specification, scribe the position and then loosen the track 00 switch mounting screws on the underside of the drive. Slowly move the switch until the waveform is within tolerance (Refer to Figure 2).
- J.** To verify the adjustment, change the oscilloscope setting from A SOURCE - INT to A SOURCE - LINE.
- K.** Select the SEEK TRACK function and seek to track 1.
- L.** Select the ALT TRACK function of the DISK EXERCISER program and alternate between tracks 1 and 2.
- M.** If the adjustment is correct, the waveform will be a flat line with no pulses present.
- N.** If the adjustment is within specification tighten the mounting bracket on the switch. Verify the waveform has not changed after tightening the bracket. If the waveform is still correct perform the procedure on the other drive. If the waveform is not as specified, repeat the adjustment.
- O.** Power off the computer.



TRACK 00 SWITCH ADJUSTMENT

FIGURE 2

7.0 The following procedure will verify the INDEX SENSOR TIMING ADJUSTMENT.

- A.** Ground the oscilloscope test probes to pin 6 of the TP1 connection on the drive A PWB (Pin 2 is missing).
- B.** Connect the channel 1 probe to pin 8 and the channel 2 probe to pin 5 of the TP1 connection on the drive PWB.
- C.** Set the oscilloscope as follows:
 - 1.** CH 1 VOLTS/DIV (10X PROBE) - .2V/DIV, AC
 - 2.** CH 2 VOLTS/DIV (10X PROBE) - 5V/DIV, AC
 - 3.** A and B SEC/DIV - 50 us/DIV
 - 4.** VERTICAL MODE - Channel 1
 - 5.** A TRIGGER SECTION settings
MODE - NORMAL
SLOPE - +
A and B INT - CH 2
A SOURCE - INT
A EXT COUPLING - AC
- D.** Power the computer on and load the OSBORNE DISK EXERCISER.
- E.** Select the SEEK TRACK function and step to track 1.
- F.** Press the RETURN KEY and wait until the disk drive selected light (red LED on the front of the disk drives) goes out.
- G.** Remove the DISK EXERCISER DISK and load the DYSAN 224 ALIGNMENT DISK. Press the RETURN KEY. Adjust the oscilloscope level to display the waveform.
- H.** Observe the timing between the start of sweep and the first data pulse on the oscilloscope (Refer to Figure 3).
- I.** The timing should be 200 \pm 50 microseconds.
- J.** If the timing is incorrect, scribe the position then loosen the mounting screw on the underside on the disk and adjust the sensor for the correct reading.
- K.** Open and close the drive door. Verify the timing.
- L.** Tighten the mounting screw.
- M.** Verify the timing to ensure the index sensor did not move when the screw was tightened. If the timing is incorrect, repeat the procedure.
- N.** Select the drive which does not contain the DYSAN disk and then remove the disk.

- O. Power the computer off. Repeat the procedure for the other disk drive.

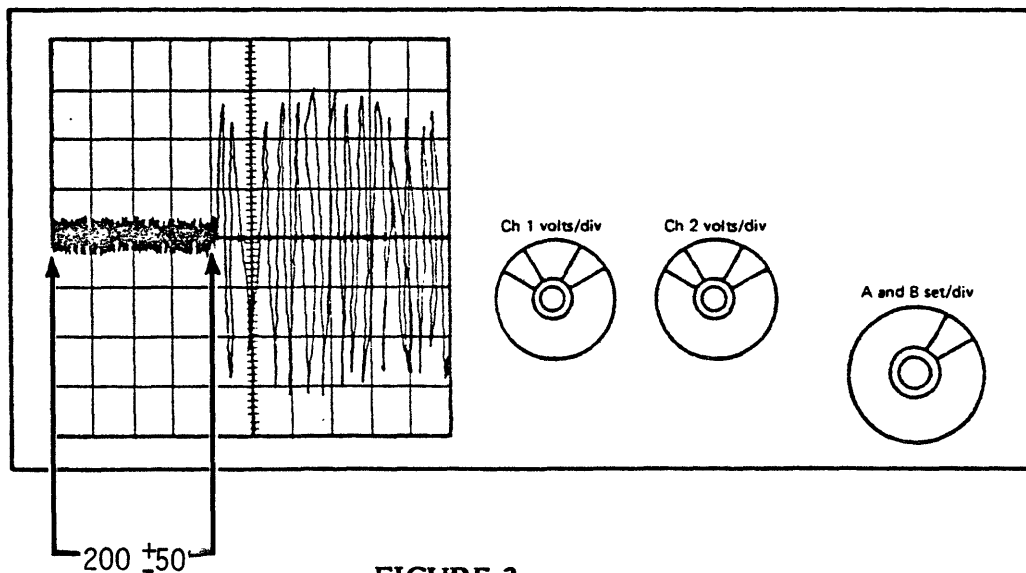
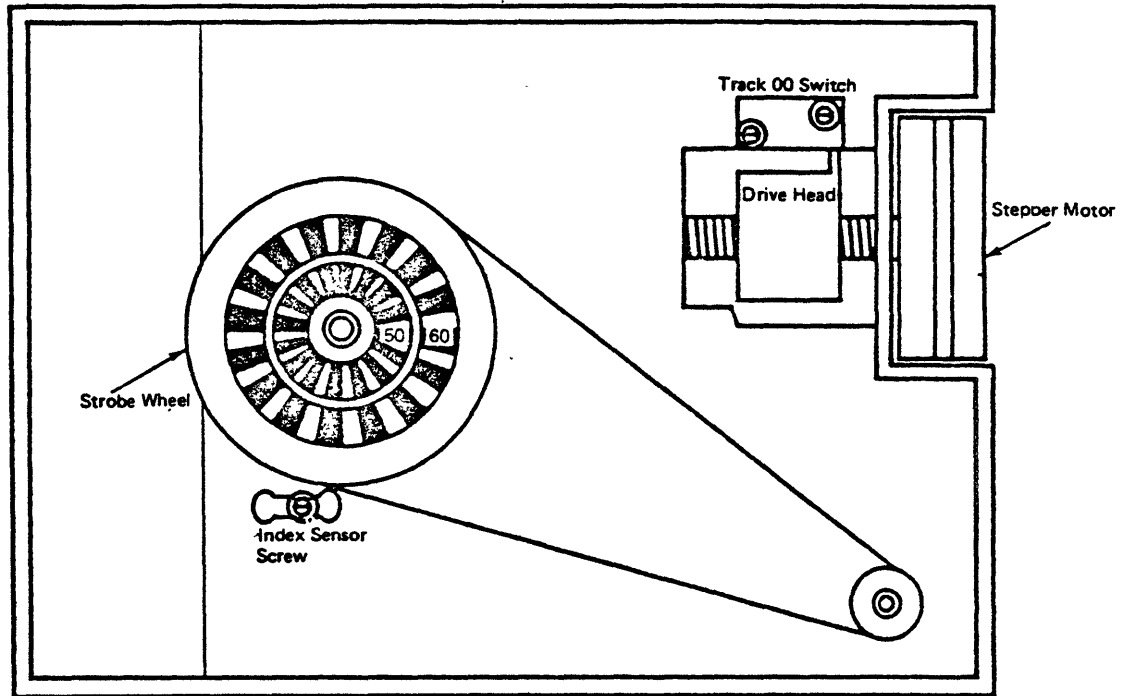


FIGURE 3

- 8.0** The following procedure will verify the RADIAL HEAD ADJUSTMENT.
- A.** Ground the oscilloscope test probes to pin 6 of the TP1 connection on the drive A PWB (Pin 2 is missing).
 - B.** Connect the channel 1 probe to pin 8 and the channel 2 probe to pin 5 of the TP1 connection on the drive PWB.
 - C.** Set the oscilloscope as follows:
 - 1.** CH 1 VOLTS/DIV (10X PROBE) - .2V/DIV, AC
 - 2.** CH 2 VOLTS/DIV (10X PROBE) - 5V/DIV, AC
 - 3.** A and B SEC/DIV - 5 us/DIV
 - 4.** VERTICAL MODE - Channel 1
 - 5.** A TRIGGER SECTION settings
MODE - NORMAL
SLOPE +
A and B INT - CH 1
A SOURCE - INT
A EXT COUPLING - AC
 - D.** Power the computer on and load the OSBORNE DISK EXERCISER program. Select the SEEK TRACK function and step to track 16.
 - E.** Press the RETURN KEY and wait until the disk drive selected light (red LED on the front of the disk drives) goes out.
 - F.** Remove the DISK EXERCISER DISK and load the DYSAN 224 ALIGNMENT DISK. Press the RETURN KEY. Adjust the oscilloscope level to display the waveform.
 - G.** Observe the waveform displayed on the oscilloscope. It should appear similar to the display in Figure 4.

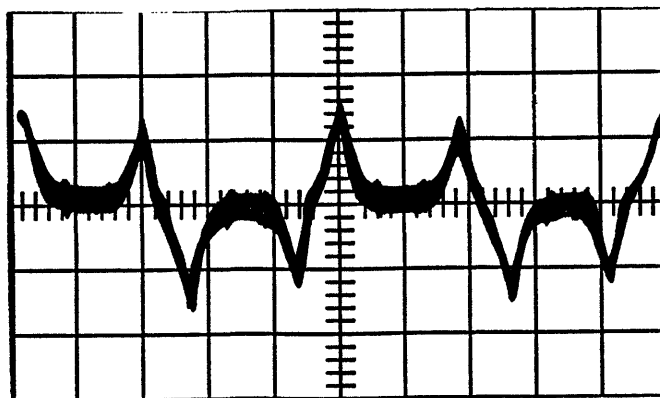


FIGURE 4

- H.** If it is not the same, scribe the position then loosen the (2) screws holding the stepper motor to the rear of the drive frame.
- I.** Slowly rotate the stepper motor to move the head radially in and out while observing the waveform on the oscilloscope.
- J.** Adjust until the positive and negative peaks are at their highest levels and the smaller of the peaks is at least 80% of the larger (in most cases this should require only minor adjustment).
- K.** Tighten the screws being careful not to move the motor.
- L.** Verify the adjustment by stepping off several tracks in each direction and then returning to track 16.
- M.** Readjust if necessary until the waveform is as specified.

NOTE: It is possible to move the stepper motor far enough so that you will see the waveform on tracks 15 or 17 rather than track 16. To ensure this did not occur, select the alternate track test, and alternate from track 16 to 0. Watch the CRT while the drive is alternating. You should see the numbers change from 16 to 0. If the alignment is incorrect, the numbers will alternate from track 15 or 17 to 0. If this occurs, repeat the alignment procedure by first positioning the stepper motor on the scribe marks. Again verify the drive will alternate from track 16 to 0. If this is correct, continue with the procedure.

- N.** Press the RETURN key and wait for the drive select LED to go out, then remove the DYSAN disk.
- O.** Power off the computer and repeat the procedure for the other drive.
- P.** After completing the RADIAL HEAD ADJUSTMENT, verify the DRIVE TIMER, TRACK 00 SWITCH, and INDEX SENSOR TIMING adjustments. Adjust if necessary.

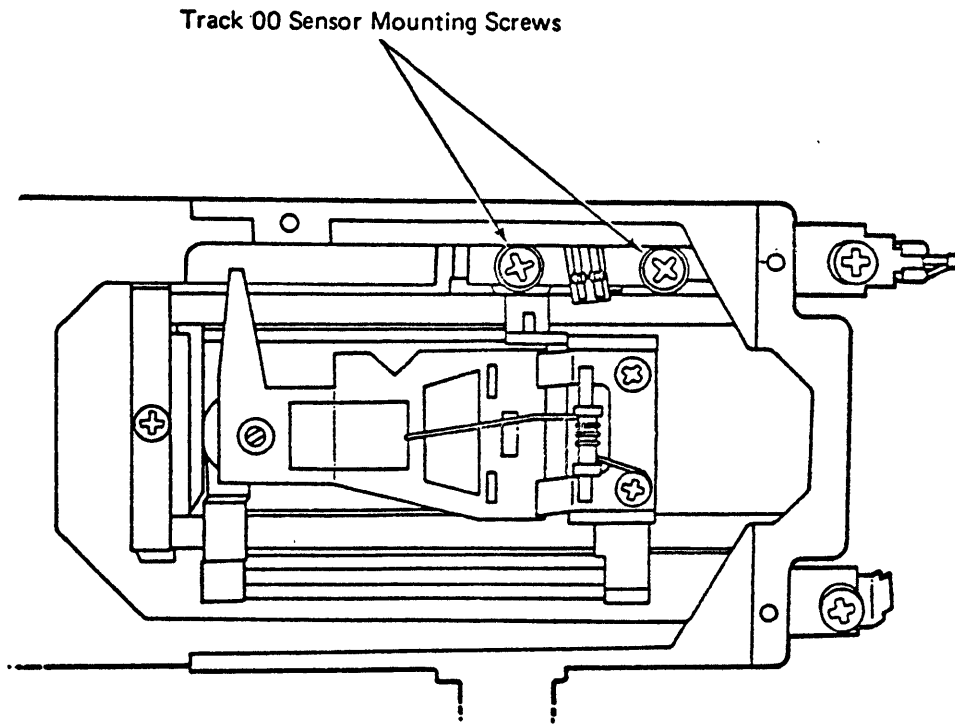


FIGURE 5

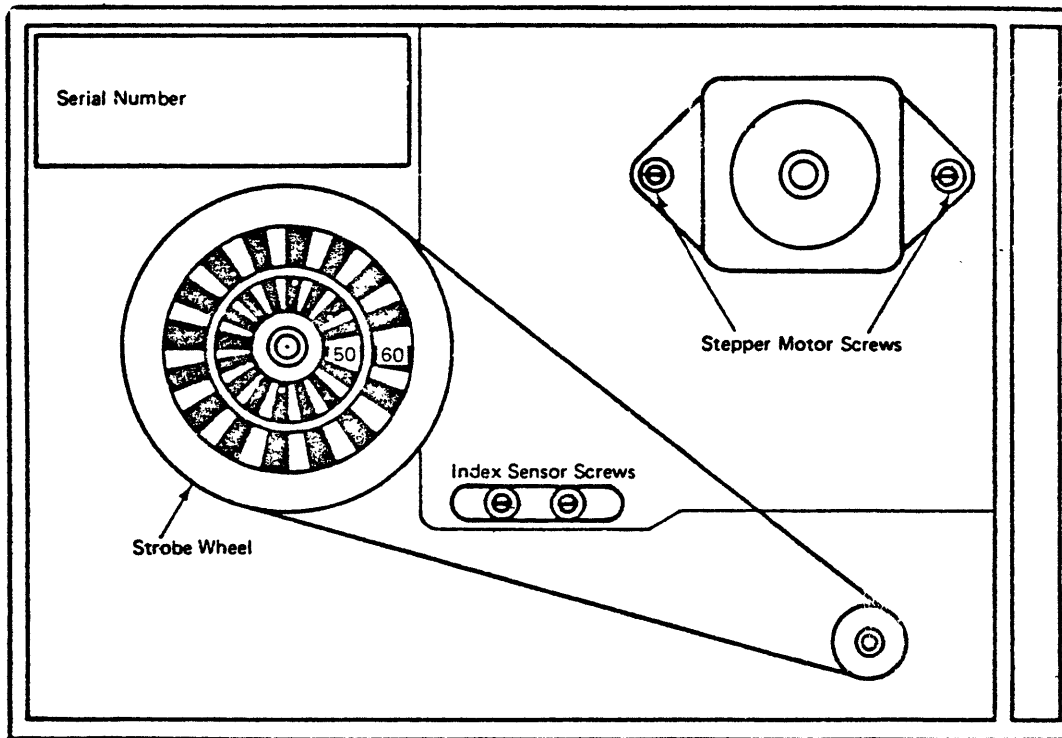
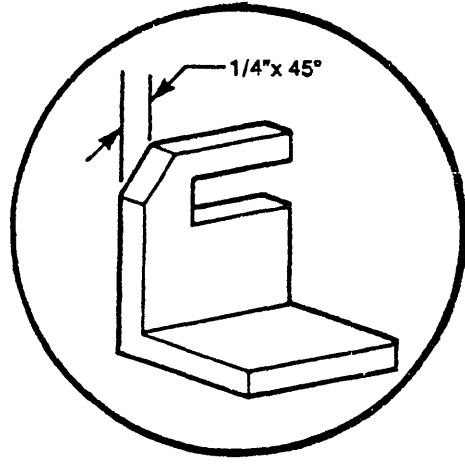


FIGURE 6

- 9.0** The following alignment procedures apply to the MPI DISK DRIVES.
- A.** The DRIVE TIMER adjustment procedure is the same as the SIEMENS DISK DRIVE (Refer to step **3.0**).
 - B.** The TRACK 00 SENSOR adjustment has the same waveform specifications and oscilloscope settings as the SIEMENS drive (Refer to step **5.0**). If the adjustment is not within specification loosen the (2) track 00 sensor mounting screws (under the drive PWB towards the rear of the drive) and move the sensor until the waveform is within specification (Refer to Figure 5).
 - C.** The INDEX SENSOR TIMING adjustment has the same waveform and oscilloscope setting as the SIEMENS DISK DRIVE (Refer to step **7.0**). If the adjustment is not within specification, loosen the (2) INDEX SENSOR mounting screws located in the slot on the underside of the disk drive and adjust the sensor until the waveform is correct (Refer to Figure 6).
 - D.** The RADIAL HEAD ALIGNMENT is identical to the procedure and oscilloscope settings used for the SIEMENS DISK DRIVE (Refer to step **8.0**).
- 10.0** Once the alignment procedures on the drives has been completed, the DOUBLE DENSITY OPTION can be installed.
- 11.0** Remove the Logic PWB from the chassis and place it on a soft work surface with the video shafts towards you.
- 12.0** Remove the jumpers from positions J4 and J5. Install one of the jumpers on position J3.
- 13.0** Hold the double density PWB component side up, with the 34-pin connector away from you. Plug the Logic PWB disk connector P8 onto the 34-pin socket of the logic PWB.
- 14.0** Remove the double density PWB stand-offs from the kit. The stand-offs will be mounted to the Logic PWB and hold the double density PWB away from the surface of the Logic PWB.

- A.** Trim the edge of the stand-off as shown in Figure 7. This will aid in the installation of the SCREEN-PAC OPTION if it needs to be installed.



DOUBLE-DENSITY SUPPORT

FIGURE 7

- B.** Slide the (3) standoffs onto the Logic PWB and position them as shown on Figure 8.

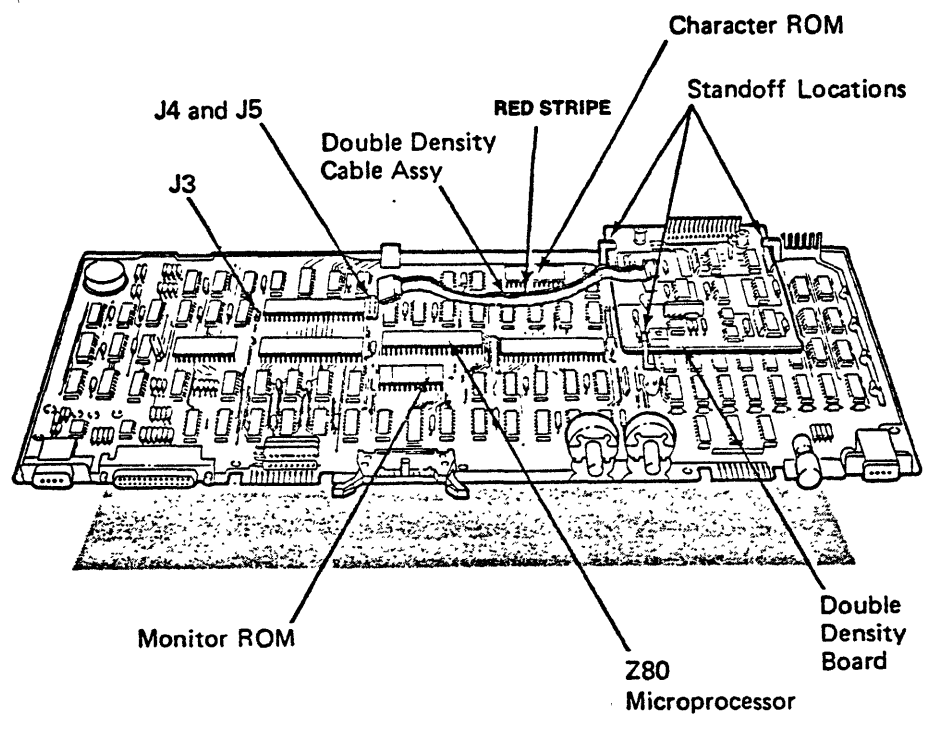


FIGURE 8

- 15.0** Using LOCTITE (SM), glue the standoffs to the PWB.
- 16.0** Remove the 10-wire ribbon cable from the kit. Notice that pin 10 on each end of the connector is plugged to act as a key.
- A.** Connect one end of the ribbon cable to connectors J4 and J5 on the Logic PWB. Pin 10, the plugged pin, and pin 9 are not used on this side of the connection.
- B.** Plug the other end of the ribbon cable onto connector P3 of the double density PWB.
- 17.0** Replace the Logic PWB in the chassis. The disk harness connects to the 34-pin connector on the double-density PWB with the red stripe to the right.
- 18.0** To verify correct operation of the double density option, format a blank disk in the double density format. "PIP" a file from a single density formatted disk to the double density formatted disk. Once "PIP" has completed, read the file from the double density disk to insure the option is working correctly. (NOTE: There may not be a "PIP" file on the extended utility diskette. "PIP" the "PIP" file from a single density diskette to a copy of the extended utility diskette. The extended utility can be copied from the diskette supplied with the option kit.)
- 19.0** If testing completes with no errors, remove the 1.43 ROM and replace it with the 1.44 ROM from the kit. Reassemble the computer and verify correct operation.
- 20.0** If any errors are found, refer to the DOUBLE DENSITY TROUBLESHOOTING GUIDE in this manual for assistance.

DOUBLE DENSITY TROUBLESHOOTING GUIDE

<u>PROBLEM</u>	<u>ACTION</u>
System doesn't power-up	Check double density installation Replace double density PWB Replace ribbon cable
Reduced screen display	Check double density installation Replace double density PWB Replace ribbon cable
Drive not ready	Check double density installation Replace double density PWB Replace ribbon cable
Wavy or blank screen	Check double density installation Replace double density installation Replace ribbon cable
Gaps in sign-on message	Replace version 1.44 Monitor ROM
Continuous beep on power-up	Replace version 1.44 Monitor ROM
Boot errors	Check double density installation Check power supply voltages Check drive alignment Replace double density PWB Replace ribbon cable
BDOS errors	Check double density installation Check power supply voltages Check drive alignment Replace double density PWB Replace ribbon cable

DOUBLE DENSITY TROUBLESHOOTING GUIDE

<u>PROBLEM</u>	<u>ACTION</u>
Drive errors during Confidence Test	Check power supply voltages Check drive alignment Replace double density PWB Replace ribbon cable

