



Xidex Corporation
CE Division
5440 Patrick Henry Dr.
Santa Clara, CA 95050
(408) 988-3472

Dysan 224A and 224/2A Alignment Instructions

These Dysan Alignment Diskettes can be used to align most one-sided drives with a track density of 48 tpi. Dysan Alignment Diskette 224/2A can also be used to align most two-sided drives with a track density of 48 tpi. Dysan Alignment Diskette 224A is physically compatible with the 5-1/4" one-sided Dysan Data Diskette 104/1; Dysan Alignment Diskette 224/2A is physically compatible with the 5-1/4" two-sided Dysan Data Diskette 104/2.

Alignment operations that can be performed with the Alignment Diskettes are listed below. Some of these operations are not applicable to certain drives. Check the drive manufacturer's manual to see which of these operations are applicable to your drive.

This document is a publication of Xidex Corporation. Any reproduction without prior written consent of Xidex Corporation CE Division is prohibited.

© Copyright 1985 Xidex Corporation; all rights reserved.

Dysan is a registered trademark of Xidex Corporation.
Analog Alignment Diskette (AAD) and PAT are trademarks of Xidex Corporation.

Track Number	Signal	Operation
00	2F (125 kHz)	Track 00 Detector Adjustment
01	Index Burst	Index/Sector Photo-Detector Timing Adjustment
16	"Catseye" lobes	Read/Write Head Radial Alignment
32	1F (62.5 kHz)	Read Resolution Check
33	2F (125 kHz)	Read Resolution Check
34	Index Burst	Index/Sector Photo-Detector Timing Adjustment
34	Azimuth Burst Sets	Head Azimuth Adjustment
39	2F (125 kHz)	Maximum Track Location

For maximum accuracy of head radial alignment, let the Alignment Diskette acclimate to room temperature. It may take up to 24 hours to reach optimum accuracy.

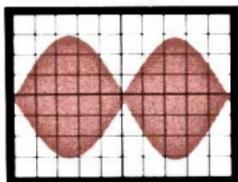
Before You Start

- **WARNING!** An Analog Alignment Diskette (AAD) can easily be ruined for alignment purposes if it is used in a drive that has mechanical or electrical problems. Therefore, test unknown drives using a read/write diskette, until you are certain that the drive will not damage your test media.
- **DAMAGE TO THE DISKETTE MAY OCCUR** if the diskette is clamped inside the drive when you turn the power on or off. This is also true when signal cables are connected or disconnected.
- **NEVER RECORD ON THE ANALOG ALIGNMENT DISKETTE!** It will be ruined for alignment purposes. Dysan Analog Alignment Diskettes have no write-control notch in the diskette jacket thus protecting them from accidental recording.
- Your **SET-UP FOR THE ALIGNMENT OPERATIONS** described in this booklet should include the following:
 1. A dual-trace oscilloscope with external trigger.
 2. A method of stepping to the specified track and keeping the head loaded, using a host computer or an external drive exerciser such as a Dysan PAT-series hand-held tester.
- Check the drive for cleanliness.
- Check the head load pad and replace if necessary.

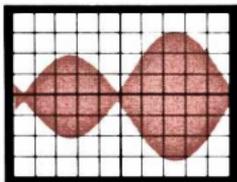
- Check other components of the drive, such as the drive spindle belt, and repair or replace if necessary.
- After turning the drive on, GROUND ALL OSCILLOSCOPE PROBES to the drive's printed circuit board (PCB).
- Insert the Alignment Diskette.
- Dysan recommends that you perform the following operations in the sequence shown.
- If the instructions in the following operations conflict with corresponding instructions in the drive manufacturer's manual, the drive manufacturer's manual should prevail.

Read/Write Head Radial Alignment

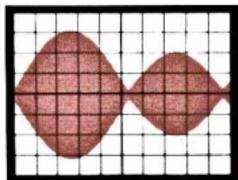
1. Step the head carriage to track 16.
2. If the drive has an index output, attach a probe from the external trigger input on the oscilloscope to the "Index" signal on the drive's PCB.
3. Set the time base to 20 msec/division.
4. Attach two oscilloscope probes (from channels 1 and 2) to display the read signal at the output of the differential amplifier on the driver's PCB. The oscilloscope should be set up as follows:



Equal amplitude (on track 16)



Left 70% of right (slightly off-track toward 15)



Right 70% of left (slightly off-track toward 17)

107635

Figure 1. No Head Radial Alignment Necessary

- a. Both channels set to "AC" input, "ADD" mode.
 - b. Channel 2 "INVERTED"
 - c. Vertical deflection controls (volts/DIV) on both channels set equal and to a position that displays a full-scale signal.
5. The lobes displayed should be within 70% amplitude of each other (see Figure 1). If they are, skip to step 9. If you are aligning a two-sided drive, check both heads. If the lobes do not fall within this specification (as in Figure 2, for example) continue to step 6.

- Loosen the screws that allow radial adjustment of the head carriage. (The stepper motor or servo system should be electrically detented while making this adjustment.)
- Adjust the head carriage in or out as necessary to get the lobes equal in amplitude. If you are aligning a two-sided drive, switch to the second head and check it. On a two-sided drive, you may need to compromise on the adjustment to get the amplitudes within at least 70% of each other.

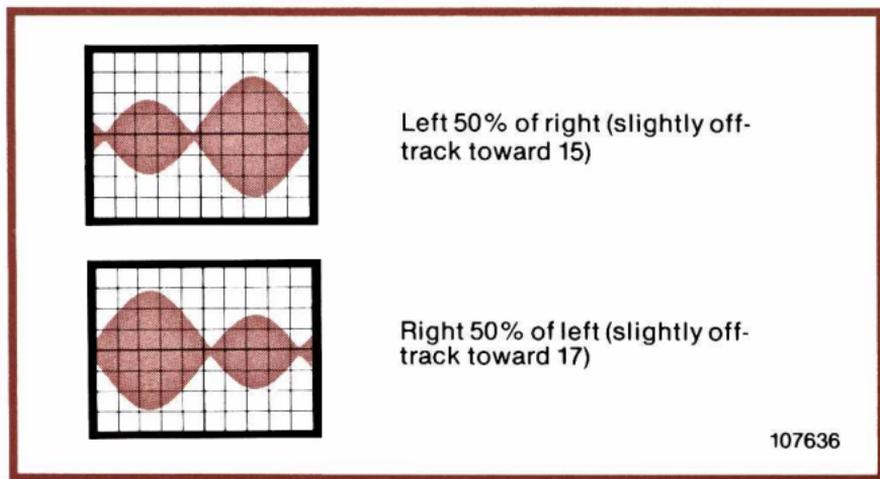


Figure 2. Head Radial Alignment Necessary

- Tighten the screws which were loosened in step 6.
- Check the adjustment by stepping off track 16 and returning. Check in both directions. Check both heads on two-sided drives. If the heads are still out of alignment, repeat this operation from step 6.

10. When the radial alignment has been adjusted, you must perform the track 00 Detector adjustment operation next.

Track 00 Detector Adjustment

1. Step the head carriage to track 00.
2. Attach a probe from the external trigger input on the oscilloscope to the "Index" signal on the drive's PCB.
3. Set the time base to 20 msec/division.
4. Attach two oscilloscope probes (from channels 1 and 2) to display the read signal at the output of the differential amplifier on the drive's PCB. The oscilloscope should be set up as follows:
 - a. Both channels set to "AC" input, "ADD" mode.
 - b. Channel 2 "INVERTED".
 - c. Vertical deflection controls (volts/DIV) on both channels set equal and to a position that displays a full-scale signal.
5. The signal displayed should be a full revolution of a data pattern filled with "1's". Thus, you can easily identify track 00 by observing this signal.

6. Observe the track 00 detection signal, and adjust the Track 00 Detector in accordance with the drive manufacturer's instructions.
7. If the drive is equipped with a Track 00 Travel Limiter, check the clearance of the limiter, and adjust it as necessary, in accordance with the drive manufacturer's instructions.

Index/Sector Photo-detector Timing Adjustment

1. Verify the index pulse-width. If there is a threshold adjustment on the drive, check it, and adjust as necessary, in accordance with the drive manufacturer's instructions. A threshold adjustment will alter the index pulse-width.
2. Step the head carriage to track 34.
3. Attach a probe from the external trigger input on the oscilloscope to the "Index" signal on the drive's PCB.
4. Set the time base to 50 μ sec/division.
5. Attach two oscilloscope probes (from channels 1 and 2) to display the read signal at the output of the differential amplifier on the drive's PCB. The oscilloscope should be set up as follows:

- a. Both channels set to "AC" input, "ADD" mode.
 - b. Channel 2 "INVERTED".
 - c. Vertical deflection controls (volts/DIV) on both channels set equal and to a position that displays a full-scale signal.
6. Observe the timing between the start of the sweep and the first peak of the timing burst. This time should be $200 \mu\text{sec} \pm 100 \mu\text{sec}$. (If you are aligning a two-sided drive, check both heads.) If the timing is not within this tolerance, continue to step 7. If it is within this tolerance, skip to step 8.
 7. Observe the timing, and adjust the Transducer in accordance with the drive manufacturer's instructions until a $200 \mu\text{sec} \pm 50 \mu\text{sec}$ time increment is obtained. On two-headed drives, the heads are usually not adjustable. Therefore, some compromising may be necessary during adjustment, to get an optimum setting.
 8. Seek to track 01 to verify that the timing is $200 \mu\text{sec} \pm 100 \mu\text{sec}$.

Head Azimuth Adjustment

NOTE:

Azimuth is particularly critical in double-density recording applications. It should be checked and adjusted if the drive's stepper motor or head assembly is replaced.

1. Step the head carriage to track 34.
2. Attach a probe from the external trigger input on the oscilloscope to the "Index" signal on the drive's PCB.
3. Set the time base to 1 msec/division.
4. Attach two oscilloscope probes (from channels 1 and 2) to display the read signal at the output of the differential amplifier on the drive's PCB. The oscilloscope should be set up as follows:
 - a. Both channels set to "AC" input, "ADD" mode.
 - b. Channel 2 "INVERTED".
 - c. Vertical deflection controls (volts/DIV) on both channels set equal and to a position that displays a full-scale signal.
5. You should see burst patterns in three sets on the oscilloscope, as in Figure 3. Use the burst set that matches the azimuth specified in the drive manufacturer's manual. This specification is normally ± 18 minutes of azimuth.

6. Compare the waveform displayed to those in Figure 4. If you are aligning a two-sided drive, check both heads. If the displayed waveform indicates a head azimuth which is not within specification, adjust the azimuth in accordance with the drive manufacturer's instructions. Since head azimuth is not adjustable on some drives, head replacement may be required to correct azimuth error.
7. When azimuth has been adjusted, the Index/Sector Photo-detector alignment and head radial alignment must be checked and readjusted if necessary.
8. If you are aligning a 35-track drive, and if the drive is equipped with a Track 34 Travel Limiter, check the clearance of the limiter and adjust as necessary in accordance with the drive manufacturer's instructions.

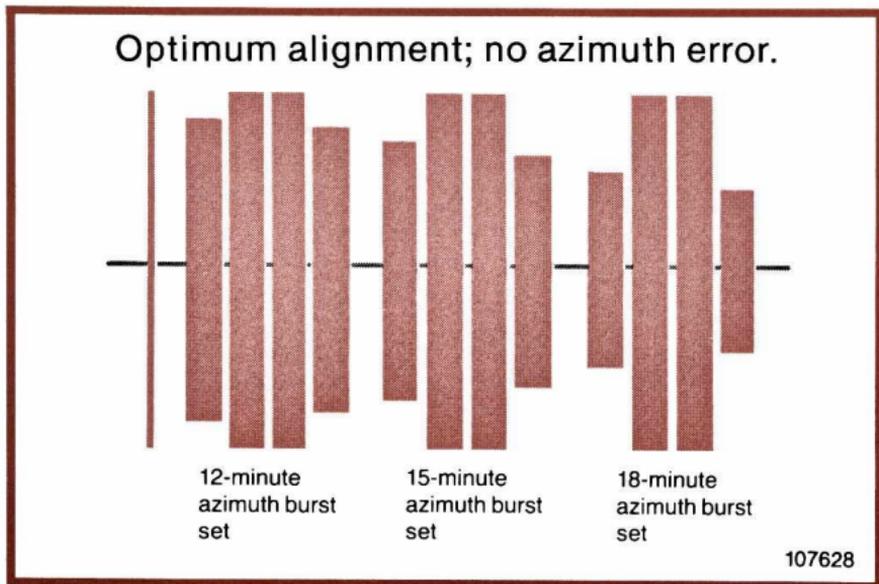
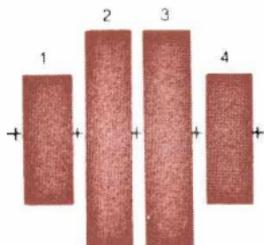
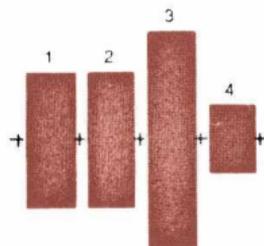


Figure 3. Azimuth Pattern Display

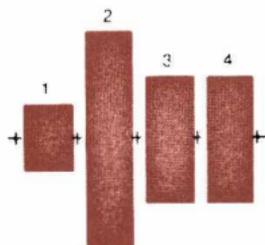
BURSTS:



Optimum alignment; no azimuth error. Bursts 1 and 4 are equal in amplitude, and bursts 2 and 3 are equal in amplitude.



Maximum allowable negative error (-12 minute, -15 minute, or -18 minute, depending on which burst set is used). Bursts 1 and 2 are of equal amplitude.*



Maximum allowable positive error (+12 minute, +15 minute, or +18 minute, depending on which burst set is used). Burst 3 and 4 are of equal amplitude.*

*To have an allowable azimuth error, the amplitude of bursts 1 and 4 must be equal to or less than the amplitude of bursts 2 and 3.

107629

Figure 4. Azimuth Burst Pattern

Read Resolution Check (Optional)

NOTE:

Two tracks are available to perform this operation; however, it is not normally required for field service applications.

1. Step the head carriage to track 32.
2. Attach a probe from the external trigger input on the oscilloscope to the "Index" signal on the drive's PCB.
3. Set the time base to 20 msec/division.
4. Attach two oscilloscope probes (from channels 1 and 2) to display the read signal at the output of the differential amplifier on the drive's PCB. The oscilloscope should be set up as follows:
 - a. Both channels set to "AC" input, "ADD" mode.
 - b. Channel 2 "INVERTED".
 - c. Vertical deflection controls (volts/DIV) on both channels set equal and to a position that displays a full-scale signal.
5. Measure the amplitude of the 1F signal.

- Step the head carriage to track 33 and measure the amplitude of the 2F signal. While measuring these amplitudes, make any necessary Head Load Pad adjustments on those drives that allow it, in accordance with the drive manufacturer's instructions.
- Calculate an approximate head read resolution by comparing the 1F and 2F amplitude readings. Use the following formula as a guide in making this comparison:

$$\% \text{ resolution} = \frac{\text{2F amplitude}}{\text{1F amplitude}} \times 100$$

- If the resolution is not within an acceptable limit, refer to the drive manufacturer's instructions for further checking.

Maximum Track Location

- Step the head carriage to track 39.
- Attach a probe from the external trigger input on the oscilloscope to the "Index" signal on the drive's PCB.
- Set the time base to 20 msec/division.

4. Attach two oscilloscope probes (from channels 1 and 2) to display the read signal at the output of the differential amplifier on the drive's PCB. The oscilloscope should be set up as follows:
 - a. Both channels set to "AC" input, "ADD" mode.
 - b. Channel 2 "INVERTED".
 - c. Vertical deflection controls (volts/DIV) on both channels set equal and to a position that displays a full-scale signal.
5. The signal displayed should be a full revolution of a data pattern filled with "1's". Thus, you can easily identify track 39 by observing this signal.
6. Refer to the drive manufacturer's instructions to adjust the "last track stop".

Notes: _____

950436 (2/87)