Dysan CORPORATION

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Dysan 224/2A Alignment Instructions

This Dysan Alignment Diskette can be used for alignment operations on most flexible diskette units. It can be used to align most single and/or two-headed drives with a track density of 48 tpi. It is physically compatible with the 5.25'' two-sided Dysan Data Diskette 104/2.

Alignment operations that can be performed with the Alignment Diskette are listed on the next page. 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.

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

For maximum accuracy of the 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

- NEVER RECORD ON THE ALIGNMENT DISKETTE. It will be ruined for alignment if you record on it. Dysan Alignment Diskettes come from the factory already write-protected.
- 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 the Dysan PAT-1 hand-held Tester (Model 450).
- Make sure the diskette drive is clean.
- Check the Head Load Pad and replace it if necessary.
- Check other components of the drive, such as the drive spindle belt, and repair or replace them if necessary.
- Turn the drive on, and insert the Alignment Diskette.
- Ground all oscilloscope probes to the drive's printed circuit board (PCB).
- 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. 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 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-headed drive, check both heads. If the lobes do not fall within this specification (as in Figure 2, for example), continue to step 6.
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.)
7. Adjust the Head Carriage in or out as necessary to get the lobes equal in amplitude. If you are aligning a two-headed drive, switch to the second head and check it. On a two-headed drive, you may need to compromise on the adjustment to get the amplitudes within at least 70% of each other.

Figure 1. No Head Radial Alignment Necessary

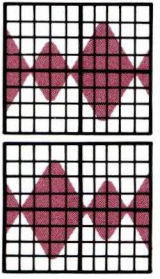

Figure 2. Head Radial Alignment Necessary

8. Tighten the screws which were loosened in step 6.
9. Check the adjustment by stepping off track 16 and returning. Check in both directions. Check both heads on two-headed drives. If the heads are still out of alignment, repeat this operation from step 6.
10. Whenever 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 all "1's" data pattern. 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 adjust the index pulse-width duration.
2. Step the Head Carriage to track 01.
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 μsec/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 μsec ±100 μsec. (If you are aligning a two-headed 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 μsec ±100 μsec 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 34 to verify that the timing is 200 μsec ±100 μsec.

Head Azimuth Adjustment

> 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.

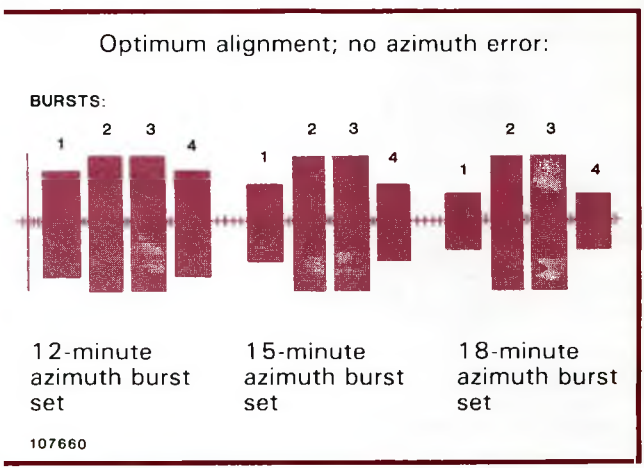

Figure 3. Azimuth Burst Patterns

6. Compare the waveform displayed to those in Figure 4. If you are aligning a two-headed 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.

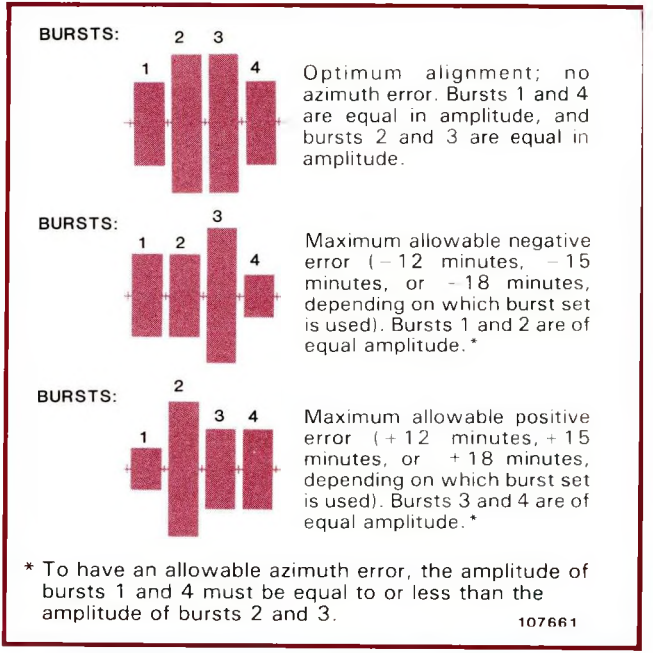

Figure 4. Azimuth Pattern Display

7. Whenever 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 manufacturer's instructions.

Read Resolution Check (Optional)

> 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.

6. 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.

7. 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:

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

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

Maximum Track Location

1. Step the Head Carriage to track 39.
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 all "1's" data pattern. Thus, you can easily identify track 39 by observing this signal.
6. Refer to the drive manufacturer's instructions to adjust to the "last track stop".

Notes:

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