Dysan®

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Dysan 350A & 350/2A Alignment Instructions

Dysan Alignment Diskettes 350A and 350/2A can be used to align most one-sided 3-½" drives (300 RPM or 600 RPM) with a track density of 135 tpi. The 350/2A is a two-sided version of the 350A that can be used to align both one and two-sided drives. Dysan Alignment Diskette 350A is physically compatible with the one-sided 3-½" Dysan Data Diskette. Dysan Alignment Diskette 350/2A is physically compatible with the two-sided 3-½" Dysan Data Diskette.

The alignment operations that can be performed with these Alignment Diskettes are listed on the next page. Having index timing, azimuth rotation and radial alignment patterns on a single track makes simultaneous monitoring and adjustment of all three parameters possible without needing to reposition the head. Some of the operations listed do not apply to certain drives. Refer to the drive manufacturer's manual to see which operations are applicable to your drive.

Track Number	Signal	Operation
00	"1F" (See Note)	Track 00 Detector Adjustment
02	Index Burst	Index Timing Adjustment
40	Index Burst	Index Timing Adjustment
40	Azimuth Burst Set	Head Azimuth Adjustment
40	"Catseye" lobes	Read/Write Head Radial Adjustment
69	Index Burst	Index Timing Adjustment
75	"1F" (See Note)	Read Resolution Check
77	"2F" (See Note)	Read Resolution Check
79	Index Burst	Index Timing Adjustment

Note: "1F" is 62.5 kHz at 300 RPM (or 125 kHz at 600 RPM)
"2F" is 125 kHz at 300 RPM (or 250 kHz at 600 RPM)

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 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 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 Alignment Diskettes are shipped write protected.
- YOUR SETUP 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.
- On one-sided drives check the head load pad and replace if necessary.
- After turning the drive on, GROUND ALL OSCILLOSCOPE PROBES to the drive's printed circuit board (PCB).

- Insert the Alignment Diskette at this time.
- 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 40.
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 for 300 RPM (or 10 msec/division for 600 RPM).
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.

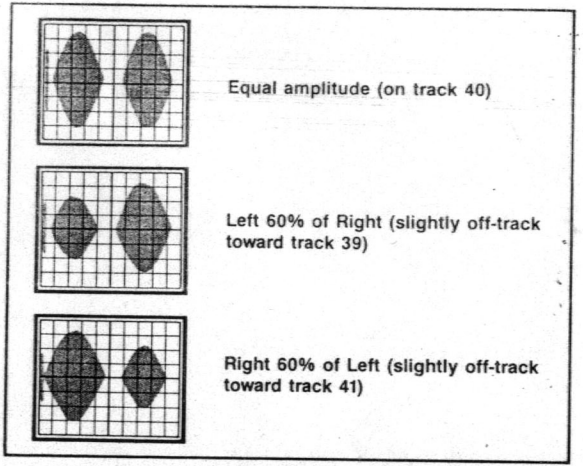

Figure 1. No Head Radial Alignment Necessary

5. The lobes displayed should be within 60% 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 specification (as in Figure 2, for example), continue to step 6.

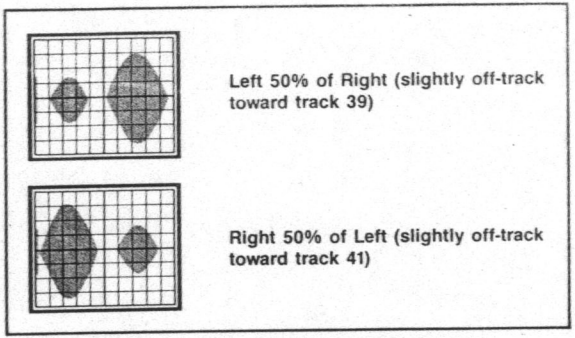

Figure 2. Head Radial Alignment Necessary

6. Loosen the screws that allow radial adjustment of the head carriage. (The stepper motor or servo system should be electrically detented while you are 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-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 60% of each other.
8. Tighten the screws that you loosened in step 6.
9. Check the adjustment by stepping off track 40 and returning. Check in both directions. If the head is still out of alignment, repeat this operation from step 6.

Head Azimuth Adjustment

1. Attach a probe from the external trigger input on the oscilloscope to the "Index" signal on the drive's PCB.
2. Set the time base to 1 msec/division for 300 RPM (or 0.5 msec/division for 600 RPM).
3. 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.

4. You should see a burst pattern on the oscilloscope, as in Figure 3. The azimuth specification is normally ±30 minutes of azimuth angle.

5. Compare the waveform displayed with those in Figure 4. If you are aligning a two-sided drive, check both heads. If the displayed waveform indicates a head azimuth that 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.

6. When azimuth has been adjusted, index timing and head radial alignment must be checked and readjusted if necessary.

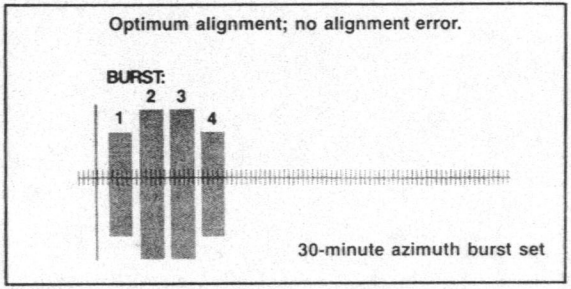

Figure 3. Azimuth Pattern Display

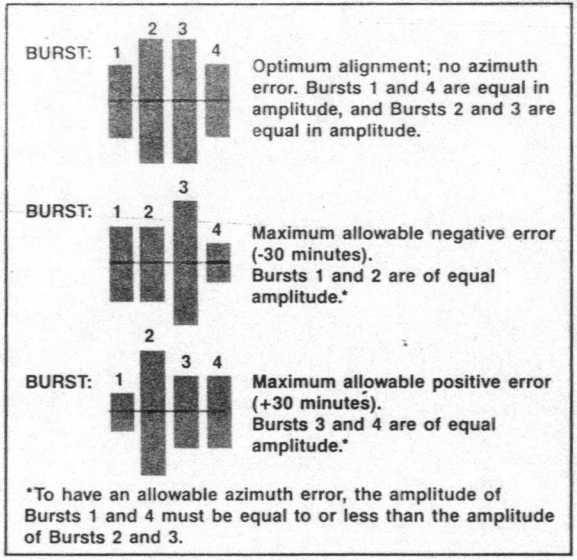

Figure 4. Azimuth Burst Pattern

Index 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. 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 100 usec/division for 300 RPM (or 50 usec/division for 600 RPM).
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. Observe the timing between the start of the sweep and the first peak of the timing burst. This time should be 400 usec ±200 usec at 300 RPM (or 200 usec ±100 usec at 600 RPM). If you are aligning a two-sided drive, check both heads. If the timing is not within this tolerance, continue to step 6. If it is within this tolerance, skip to step 7.

6. Observe the timing. Adjust the index timing in accordance with the drive manufacturer's instructions until the following time increment is obtained: 400 usec ±100 usec at 300 RPM (or 200 usec ±50 usec at 600 RPM).
7. Seek to track 02 and then seek to track 79* to verify that the timing is 400 usec ±200 usec at 300 RPM (or 200 usec ±100 usec at 600 RPM). (*Use track 69 if you are testing a drive that has only 70 tracks.)

Track 00 Detector Adjustment

1. The Track 00 Detector adjustment must be performed following a radial alignment operation.
2. Step the head carriage to track 00.
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 20 msec/division for 300 RPM (or 10 msec/division for 600 RPM).
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. The signal displayed should be a full revolution of a "1F" data pattern. You can easily identify track 00 by observing this signal.
7. Observe the track 00 detection signal, and adjust the Track 00 Detector in accordance with the drive manufacturer's instructions.
8. 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.

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 75.
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 for 300 RPM (or 10 msec/division for 600 RPM).
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 77 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 the drive manufacturer's acceptable limit, refer to the manufacturer's service manual for instructions.

Maximum Track Location

1. Step the head carriage to track 79. (Use track 69 if you are testing a drive that has only 70 tracks.)
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 100 usec/division for 300 RPM (or 50 usec/division for 600 RPM).
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 an Index Burst. You can easily identify track 79 (or 69) by observing this signal.
6. Refer to the drive manufacturer's instructions to adjust the "last track stop." (This may not be adjustable on some drives.)

Notes: _____

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