

HEAD ASSEMBLY

6.1 GENERAL

Four head stack mounting positions are provided on the head base assembly; these are designated as positions 1, 2, 3, and 4, from left to right (as viewed from the front of the assembly). Head stacks may be mounted in all positions, or certain positions may not be used, depending on the particular equipment and its application.

Erase, record, and reproduce head stacks are available in three configurations. Each may contain one head for full track operation, two heads for two track or half track operation, or two heads for quarter track operation. Note that there is no half track head as such; equipment intended for half track operation is provided with a complete two track head assembly.

On 3-3/4 - 7-1/2 ips and 7-1/2 - 15 ips equipment, the standard head assemblies can be divided into two main categories -- the three stack assembly and the four stack assembly. The three stack assembly consists of erase, record, and reproduce head stacks mounted in positions 1, 3, and 4 (respectively) on the head base; each stack is of the same configuration (full track, two track, or quarter track). In the four stack assembly, a two track erase, a two track record, a quarter track reproduce, and a two track reproduce head

stack are mounted in positions 1, 2, 3, and 4 respectively. A switch, controlled by means of a lever which protrudes through the head base, provides selection of quarter track or two track reproduce operation.

Heads for 15/16 and 1-7/8 ips equipment are of the quarter track variety. Standard assemblies for these recorders do not include an erase head, a dummy post is mounted in its position. For two-channel record and reproduce, a quarter track record head stack, and a quarter track reproduce head stack, are mounted in positions 3, and 4 respectively. On four-channel record and reproduce equipment, two quarter track record head stacks (channels 1 and 3, and 2 and 4) are mounted in positions 1 and 2. Two quarter track reproduce head stacks (channels 1 and 3, and 2 and 4) are mounted in positions 3 and 4.

6.2 ROUTINE MAINTENANCE

6.2.1 Cleaning

Oxide from the magnetic tape will be deposited on the heads. If the heads are not cleaned at frequent intervals, head-to-tape contact will be affected and equipment operation will be degraded.

Heads, tape guides, and other components in the tape threading path should be cleaned after each eight hour operating period, or oftener if visual inspection so indicates.



Use only the recommended solvent to clean the heads, because other solvents may damage these precise assemblies. Do not let the solution drip or spray on plastic finishes or parts, or on the tire of the capstan idler. Also, do not use metal tools, which might scratch the head assembly.

Step 1: Open the head gate.

Step 2: Moisten a cotton-tipped applicator with Ampex Head Cleaner (Catalog No. 4010823 or 087-007). Clean each head.

Step 3: Clean the tape guiding elements, the capstan, and the capstan idler with iso-propyl alcohol. Do not use the head cleaner on these elements.

6.2.2 Demagnetizing

Heads occasionally acquire a degree of permanent magnetization which can result in increased noise and distortion, and the partial erasure of high frequency signals recorded on the tape. Demagnetize the heads after each eight hour operating period, or oftener if there is any suspicion that the procedure is required.

Demagnetization is easily accomplished with an Ampex Head Demagnetizer (Catalog No. 4010820).

Step 1: Remove any tape that is on, or near, the recorder. (The demagnetizer will partially erase any tape which is in close proximity.)

Step 2: If the tips of the demagnetizer are not covered with plastic material, place pressure sensitive tape over them. This is to prevent scratching the heads.

Step 3: Plug the demagnetizer into a source of 110 - 120 volt, a-c power.

Step 4: Bring the tips of the demagnetizer into very light contact with the heads, positioned so that the tips straddle the gap in the middle of the stack.

Step 5: With a slow, smooth motion, run the tips up and down the stack several times. Then slowly withdraw the demagnetizer (slow withdrawal is required for effective demagnetization).

Step 6: Repeat Steps 3, 4, and 5 at all head stacks.

Step 7: Withdraw the demagnetizer at least three feet from the recorder before unplugging it from the a-c power source.

6.3 ADJUSTMENT PROCEDURES

6.3.1 Head Azimuth

Record and reproduce head azimuth adjustments are described as part of the normal alignment procedures in Section 5, Electronic Maintenance.

6.3.2 Tape Guides

The only adjustment which can be made on the tape guides is azimuth alignment. If the guides become tilted, so that the edges of the tape contact diagonally opposite edges of the lips of the guides, flutter and wow will be affected.

Step 1: Thread tape on the transport. Place the equipment in the reproduce mode at the high tape speed.

Step 2: Open the head gate, and visually check the tape as it moves over the guides. It should be approximately centered on the guides, horizontally parallel to the upper and lower lips of each guide.

Step 3: If misalignment is noted in Step 2, loosen the cap screw (item 16, Fig. 7-12) which secures the guide. Rotate the guide in its mounting as required to correct the misalignment, and retighten the cap screw.

Step 4: If either guide is adjusted, always check whether that adjustment has affected tape tracking at the other guide (by repeating Steps 1 and 2). When necessary, adjust the second guide as described in Step 3.

Step 5: Repeat Steps 1 through 4 until the tape tracks properly over each guide.

6.3.3 Head Height

Head heights are precisely adjusted at the factory, and there should be no necessity for readjustment unless a head stack is changed. The procedure itself is comparatively simple, but it must be performed carefully and exactly.

6.3.3.1 Full Track and Two Track Heads

Step 1: Adjust head height and azimuth until both are approximately correct, by turning the height adjusting setscrew (item 19, Fig. 7-12) and the azimuth adjusting socket head screw (item 17).

Step 2: Thread tape on the transport, and place the equipment in the reproduce mode at the high speed.

Step 3: Turn the head height adjusting setscrew clockwise until the head laminations are barely visible at the bottom edge of the tape.

Step 4: Carefully counting the precise number of turns required, turn the head height adjusting setscrew counterclockwise until the head laminations are barely visible at the top edge of the tape.

Step 5: Turn the head height adjusting setscrew clockwise exactly half the number of turns noted in Step 4. This will center the head(s) on the tape.

Step 6: Adjust the head azimuth as described in Section 5, Electronic Maintenance. Note that some interaction between height and azimuth adjustments may be encountered.

6.3.3.2 Quarter Track Record/Reproduce Heads

Step 1: Perform Steps 1 and 2 of paragraph 6.3.3.1

Step 2: Adjust the head height adjusting setscrew so that the top of the mu-metal portion of the upper head in the stack is exactly even with the top edge of the tape. (If this is a 15/16 - 1-7/8 ips recorder, and if the head assembly contains two record or two reproduce head stacks, make this adjustment at the head stacks which correspond to tracks 1 and 3 on the tape.)

Step 3: Applicable only for 15/16 - 1-7/8 ips equipment with two record or two reproduce head stacks. On the head stacks corresponding to tracks 2 and 4 on the tape, adjust the head height adjusting setscrew so that the bottom edge of the mu-metal portion of the lower head in the stack is exactly even with the bottom edge of the tape.

Step 4: Adjust the head azimuth as described in Section 5, Electronic Maintenance.

6.3.3.3 Quarter Track Erase Head

Step 1: Repeat Steps 1 and 2, paragraph 6.3.3.1.

Step 2: Repeat Step 2, paragraph 6.3.3.2.

Step 3: Turn the head height adjusting setscrew $1/8$ turn (45°) in a counterclockwise direction, thus moving the top of the erase head slightly above the top edge of the tape. (This is required because the erase head is wider than the record/reproduce heads.)

6.3.4 Tape Wrap Across Heads

The heads must be positioned so that the tape wrap across each head will ensure good head-to-tape contact. There should be no need to make this adjustment unless head stacks are changed or repositioned.

Step 1: Thread tape on the tape transport.

Step 2: Open the head gate and move the tape lifter so that the tape is lifted from the heads.

Step 3: Check heads mounted in positions 2 or 3. They should be within .005 to .010 inch of the tape.

Step 4: If the head-to-tape clearance in Step 3 is incorrect, loosen the acorn nut (or the two mounting screws) which secures the head stack to the mounting. Move the head to achieve the quoted clearance, with the tape contact area centered over the gap, and retighten the acorn nut or screws.

CAUTION

To prevent damaging the head stack, tighten the nut or screws using not more than six inch-pounds of torque. This torque corresponds to two pounds of force applied to the end of an open end wrench which is three inches long.

Step 5: Retract the tape lifter. If the head stacks in positions 1 and 4 are properly positioned, the tape will clear the bottom of the tape guides by .001 to .005 inch. If adjustment is required, repeat Step 4 at the applicable head stack.

Step 6: If any adjustment is made, check the head azimuth as described in Section 5, Electronic Maintenance.

6.3.5 Checking Head Mounting

The head mounting is secured to the base by an elastic stop nut (Item 21, Fig. 7-12). This stop nut is tightened against a double coil washer (item 28) and a flat washer (item 23), to hold the head mounting in position.

From the bottom of the head base, the mounting floats on two springs (item 6, Fig. 7-12). These springs are compressed or relieved by the head height mounting setscrew and the head azimuth adjusting screw as required to achieve correct head height and azimuth. It is important, therefore, that the elastic stop nut not be tightened

to the point where the action of the springs is defeated.

To check the mounting, grasp the head mounting (and stack if one is included in that position). It should be possible to pivot the mounting slightly clockwise (viewed from the front of the assembly) against the spring action. When the mounting is released, it should immediately return to the vertical position. It should not be possible to tilt the top or bottom of the mounting away from the base in a forward or sidewise direction.

If it is not possible to pivot the mounting, or if it does not return (or returns sluggishly) to the vertical position, the elastic stop nut is too tight. If the mounting tilts away from the base, the stop nut is too loose.

To adjust the stop nut to the correct force, first loosen the nut. Then run it in, checking the pivoting action of the head mounting as previously described, until the head will not return to the vertical position. Back the nut off from that setting just to the point where the head is free to pivot and return without binding.

6.4 REPLACEMENT OF HEADS

6.4.1 Changing Head Stacks

Step 1: Disconnect the applicable head cable(s) from the electronic assembly.

Step 2: Loosen the head assembly mounting screw (item 82, Fig. 7-9). It is not necessary to remove this screw.

Step 3: Loosen the acorn nut (or the two mounting screws) which secures the head stack to the head mounting. Slip the head stack from the mounting, and guide the head cable out through the hole in the top plate. The head stack and cable will then be free; remove the acorn nut and the washer (or mounting screws) and store the head stack in a location where it will not be damaged (if it is still in good condition).

Step 4: Install the acorn nut and the washer (or the two mounting screws) on the new head stack. Guide the head cable through the hole in the top plate and slide the new head stack on the mounting, being sure both the acorn nut and washer are above the mounting.

Step 5: Adjust the head position for proper tape wrap (refer to paragraph 6.3.4) and head height (refer to paragraph 6.3.3).

Step 6: Connect the head cable to the electronic assembly, and adjust head azimuth as explained in Section 5, Electronic Maintenance.

6.4.2 Repositioning Head Stacks

Head mountings are provided in all four positions. It is therefore possible to change the position of head stacks within the assembly to any desired sequence, and to add additional stacks for special applications. Follow the same procedure described in paragraph 6.4.1 to remove and reposition head stacks, or to install new head stacks.