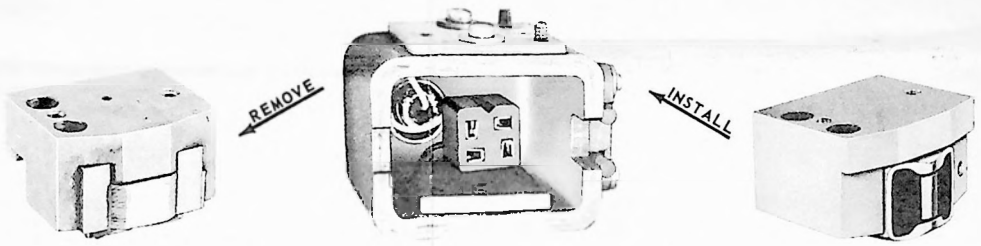
INSTRUCTIONS QK 76

Quik Kit by Nortronics 8101 - 10th. Ave. No. MPLS., MINN. 55427

HEAD MOUNTING ADAPTER FOR AMPEX RECORDERS



OLD AMPEX HEAD REMOVED FROM SHIELD CUP

AMPEX HEAD SHIELD CUP WITH NORTRONICS PLUG SOLDERED TO LEADS

QK-76 WITH NORTRONICS HEAD MOUNTED IN PLACE

FIGURE 1. INSTALLATION OF QK-76

1. DESCRIPTION

The NORTRONICS Quik-Kit 76 is an adapter mounting kit which permits the installation of replacement NORTRONICS professional series tape heads in Ampex recorders of the 300, 350, 351, 400, and 3200 series. (For specific head recommendations see Nortronics Form No. 7226.) The original individual Ampex heads are removed from their shield cups and replaced by the new NORTRONICS replacement head which is mounted in the cast aluminum adapter block of the QK-76. A single setscrew locks the head into its mounting block, simplifying future head replacements. Electrical connections to the head are made via a convenient plug.

2. MECHANICAL INSTALLATION

2-1. Remove head nest covers. Use an Allen socket-wrench to remove the two socket type flat head screws holding the main cover housing, then lift off the housing. Next, use a pair of pliers to pull out the pivot pins holding the head gate. Remove the two leaf-springs, carefully noting their orientation and position so that they may be correctly replaced later.

2-2. Remove the original head. *Remove screws.* (Item "A" of Fig. 2) These two fillister head screws on extreme right and left, and coil spring should be removed with a screwdriver. Do *not* turn or remove any of the other four screws on the top plate of the head cup. The *erase head* has only the two "A" screws holding it.

Remove head. Watch for and save the two coil springs when the old head is slid out of the cup. *Unsolder* and remove the two wire leads from the head terminals. Then clip off the excess wire on the lead ends, leaving about 1/16-inch of bare tinned ends beyond the insulation.

2-3. Mount new block. *Spacer plate.* An aluminum spacer plate is furnished with each head mounting block, and should be used against the top flat surface of the block with *all heads* except the following:

1. 4-track Stereo models, record, playback, and erase.
2. Mono 2-track models of the 8400 series which have only a partial track offset.

With the above heads the spacer plate is deleted during installation, thereby shifting the head block assembly upward toward the top of the cup to enable the head tracks to be properly positioned with respect to the tape.

Insert block. (Erase Heads) Place block over finger with flat surface up, and front of block facing palm. Spacer plate (if used) should be on top of block, against the original thick spacer plate. Slide the head block into the cup and fasten with the two original fillister head screws. Track height adjustments will be discussed in section 4-3.

Insert block. (Record and Play Heads) Place block on finger with flat surface up and front of block facing palm. Spacer plate (if used) should be on top of block, and the two coil springs should be inserted into the locating holes. Slide the head block into the cup and start the two fillister head screws, making certain that the short coil spring is on the right hand screw and the heavy nut is on the left screw.

Adjust screws. First run the two nuts up tightly against the heads of the screws, using a screwdriver and a pair of pliers. This will allow the adjustments to be made with a screwdriver only. Turn down the right hand screw until its spring is almost fully compressed. Then adjust the left hand (azimuth) screw until the top surface of the head block is parallel with the upper edge of the head cup. Further adjustments of height and azimuth will be made later.

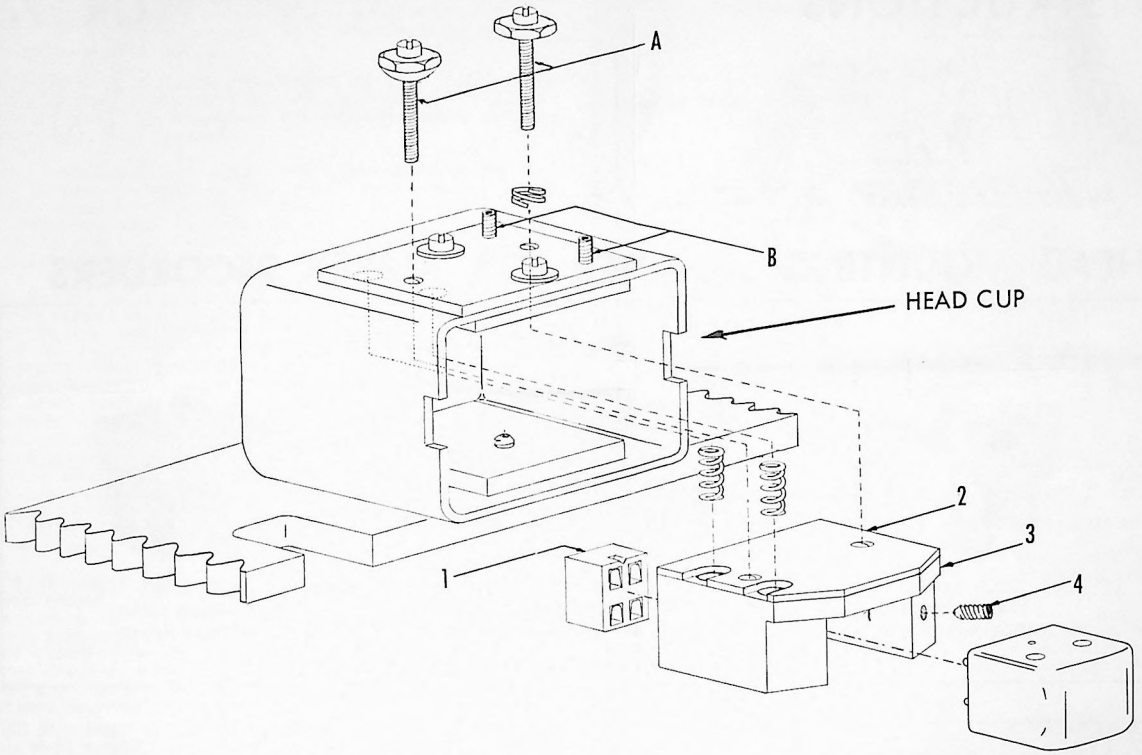
Set screw. Use the .050 Allen socket-wrench furnished with the kit to thread the #4-40 head locking setscrew (Item 4) partially into the hole in the front of the head block.

2-4. Solder connector plug. *Install head.* The head is to be temporarily installed in the mounting block to hold the plug while leads are being soldered. Slip head into block with pins *facing out* and lock it in place with the set screw.

Solder the plug. There are two plugs furnished with the QK-76. Choose the one (See Fig. 3) which matches the replacement head pins and place the plug on the pins of the head in the block. With a pencil-type soldering iron, carefully and lightly, tin the terminal lugs of the plug and then tack the wire leads to the plug terminals.

3. ERASE HEAD ADJUSTMENTS

3-1. Precautions. It is important to make certain that the correct erase voltage is applied to the erase head. Too high a voltage will cause overheating and possible burnout. Low voltage will cause incomplete erasure of strong signals. Form No. 7222 gives the recommended voltage range for the erase heads, and adjustments should be made *prior* to record head bias adjustments as changing the erase voltage affects the bias cur-



ITEM	QUANTITY	PART NUMBER	DESCRIPTION
A			ORIGINAL EQUIPMENT
B	2	119-077	4-40 X 3/8 SET SCREW
1	1	105-18 or 105-20	CONNECTOR PLUG (2 STYLES FURNISHED)
2	1	123-050	PLATE
3	1	109-129	BLOCK CASTING
4	1	119-076	4-40 X 3/16 SET SCREW

FIGURE 2. EXPLODED VIEW & PARTS LIST

rent. *Before* turning on the power to the recorder, first screw the erase trimmer capacitor all the way in (clockwise) for minimum capacity and *minimum voltage*. This trimmer screw was probably locked with Glyptal cement which can be softened with a drop of lacquer solvent or a hot soldering iron. It may be necessary to tip up the amplifier chassis to allow access to the heavier screw on the other side of the trimmer. Turn this screw *counter*-clockwise for minimum capacity.

3-2. Measure erase voltage. Connect a VTVM (not a multimeter) between the deck ground and the hot terminal of the erase head plug while the plug is on the erase head pins and the head is mounted in the QK-76 block with the pins facing out. With the amplifier switched on and in the "record" position, measure the erase voltage with the VTVM range set at about 100 volts rms full scale.

Turn the erase trimmer capacitor until the erase voltage reaches the middle of the range recommended for the particular head as shown in the table of Form No. 7222. Be careful to not exceed the maximum rated voltage.

Certain machines, such as the Model 300, may have a fixed shunt capacitor of .002 or .003 mfd. connected across the terminals of the adjustable erase trimmer capacitor. This results in a limitation of the voltage range adjustment with the Nortronics erase head. To increase the adjustment range replace the original fixed capacitor with one of .001 mfd. or smaller in value.

3-3. Erase current. It is not essential to measure the erase current if the voltage has been properly set. However, if desired, the erase current may be determined by measuring the voltage drop across a 10-ohm carbon or metallized resistor connected in series with the *ground* lead of the head. A meter reading of 0.5 volts indicates a current of 50 ma.

3-4. Erase meter calibration. The NORTRONICS erase heads require much less current than the original Ampex erase heads. Therefore, in the "Erase Test" switch position the VU meter reading will be -10 to -7 for the NORTRONICS erase heads. This reading can be marked with a crayon on the meter glass for reference. If it is desired that the meter read "zero" for "Erase Test" a 50-ohm wire wound potentiometer may be connected in series with the 7 or 8.2 ohm resistor connected from the secondary of the oscillator transformer to ground. This will permit the meter to be calibrated to "zero" for any normal value of erase current.

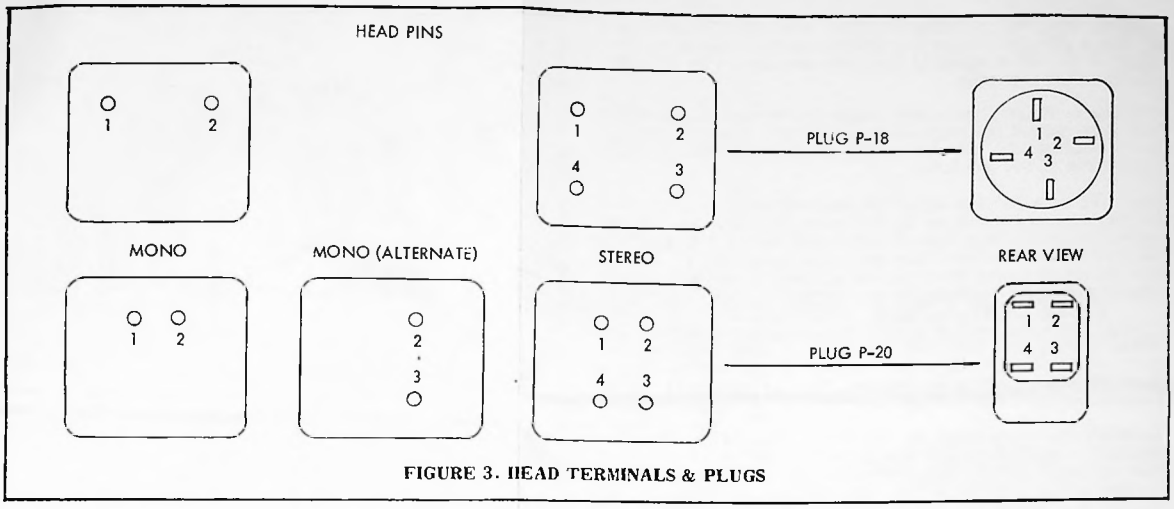


FIGURE 3. HEAD TERMINALS & PLUGS

4. HEAD ALIGNMENT

4-1. Reverse the heads. After it has been ascertained that the erase head is receiving the proper operating voltage the head may be turned around so its face is to the front. Do not slide the erase head back to the stops of the head block, but position the face of the head so that it is *flush* or even with the front edges of the head cup. When tightening the lock-screw press the head up into the block with a screwdriver to ensure that it is fully seated.

4-2. Tape Wrap. Adequate tape wrap is important to ensure good high frequency response; for this the tape should drop back a minimum of five degrees on either side of the nose of the head. Difficulty is likely to be experienced in obtaining a sufficient amount of wrap on the left side of the playback head, while there is more than enough on the right side. To balance the wrap on the playback head first loosen the two middle fillister head screws holding the top plate to the head cup. Then rotate, in a *counter-clockwise* direction, the plate and the head assembly fastened to it, which will result in the edge of the plate being at an angle with respect to the edge of the head cup. Tighten the two mounting screws.

The record and playback heads are next turned around and locked in place in a similar fashion, except that they may be slid back against their stops in the mounting blocks. The center (record) head will project out slightly (about 1/32") beyond the front edge of the head cup. The right (playback) head face will be about even with or slightly behind the edge of the cup.

4-3. Track height. The QK-76 mount was designed to fit into the head cups with the same resultant position of the new head track as on the original heads, so that it is likely no adjustment of head height will have to be made. To check track location place a reel of tape on the machine and thread it past the heads in normal fashion. Tracks of full-track and 2-track stereo heads should be centered on the tape. The uppermost track edge of the half-track mono and the 4-track stereo heads should be just even with the top edge of the tape. The poles of the erase head should overlap the record tracks slightly.

The face of the head should be parallel to the edge of a card placed vertically across the upper and lower edges of the head cup. This face tilt may be controlled by turning one or the other of the two brass socket setscrews "B" on top of the head cup. To soften the Glyptal cement apply a drop of lacquer solvent or touch the screw with a hot soldering iron.

Minor height adjustments can be made by turning both of the "B" screws the same amount. An extra pair of set screws is supplied with the QK-76 in the event that the original screws are damaged. *Erase head* height is determined by the thickness of the spacer plate and can be changed by adding additional shims of paper or shimstock between the head cup and the spacer plate. Cut 5/8" x 3/4" pieces and place them between the mounting screws.

5. PLAYBACK ADJUSTMENTS

5-1. Playback azimuth. First, demagnetize heads and guides. Then play a standard alignment tape on the recorder with the VU meter across the output. With the 7.5 kc. or 15 kc. frequency, use a screwdriver to adjust the left hand azimuth screw for a maximum reading on the meter. If several peaks are obtained use the strongest peak. Check track height again after the azimuth adjustment, then readjust azimuth.

5-2. Playback equalization. The new NORTRONICS playback head probably has a finer gap than the original head, necessitating a recalibration of the high frequency playback equalization. Follow the instructions in the Ampex service manual to adjust the playback equalization potentiometer for flat response through the higher audio frequencies while playing the standard alignment test tape. It is suggested that a good VTVM be used at the output of the playback amplifier, properly loaded with a 600-ohm resistor, as the VU meter may not be perfectly accurate at the high frequencies.

6. RECORD ADJUSTMENTS

6-1. Record azimuth. This adjustment must be made *after* the playback head has been azimuthed as described previously. It is *not* necessary to first adjust the record bias current or to calibrate the VU meter for recording levels before making the "record azimuth" adjustment. The procedure is to feed an audio oscillator at 5-15 kc. to the recording amplifier (using a blank tape) and to monitor the playback output simultaneously with the VU meter or VTVM. The azimuth screw on the *record* head is then adjusted for maximum meter reading from the playback head. Again, select the strongest peak.

6-2. Record head bias. Record a 700 cps signal from an audio oscillator while monitoring the playback output with a meter. Adjust the bias current with the bias control potentiometer or trimmer capacitor to peak up the playback signal as described in the instruction manual. Some machines which have the 10K instead of the 40K bias control potentiometer may not have enough range of adjustment. If necessary, replace the 10K bias control with a 20K or 25K linear-taper unit of the Ohmite type "AB" or else a wire wound control.

6-3. Bias calibration. (Model 350) In the "Bias Test" switch position the VU meter reads the bias voltage across a 500-ohm 10-watt adjustable resistor (R459) which is connected in series with the record head ground lead. The slider on the resistor may be adjusted to give a zero VU meter reading at peak bias setting. At full resistance a bias current of approximately 1.6 ma. will give a zero reading, and at less resistance proportionately higher bias currents will be required.

If the new recording head requires less than 1.6 ma. of bias current so that a zero reading is impossible to obtain, the 500-ohm bias resistor may be replaced with a good quality 1000 ohm wire wound bias calibration potentiometer as is found on the newer Model 351 machines, offering ample calibration range for all heads.

6-4. Audio record current calibration. It is important to calibrate the recording level meter to ensure that the maximum level signal is recorded on the tape without excessive distortion. The "zero level reference signal" on the test tape is used to initially calibrate the playback amplifier for a zero VU meter

reading. Then the recording amplifier level meter is calibrated so that a zero level recording produces a zero reading on playback, or records a signal of the same strength as the reference signal on the test tape.

Procedure. While playing the standard reference signal on the test tape, adjust the playback level control to give a zero VU meter reading. Do *not* change this playback setting until the completion of the procedure.

Next, record a 700 cps signal (or whatever frequency was used for the reference signal on the test tape) on a fresh reel of tape while monitoring the *playback* output with the VU meter. Adjust the *Record Level* control until the meter reads zero VU. We are now recording a zero level reference signal on the tape. Do not change this level setting.

Change the meter switch to the "Record Level" position. The meter reading will then shift to a reading other than zero. Adjust the "Record Calibration" control on the chassis until a zero VU meter reading is obtained. This completes the record current calibration procedure.

In some recorders such as the Model 300 the "record-calibration" control does not vary the sensitivity of the VU meter, but instead controls only the audio current drive to the recording head. Here the record level reading should be initially set on zero during the recording of the reference signal. Then the meter is switched to "playback" and the calibration screwdriver adjustment varied to give a zero VU playback reading, or the same strength signal as originally derived from the reference signal on the alignment test tape.

6-5. Recording equalization. The playback amplifier has now been properly equalized with aid of the alignment test tape to produce a flat frequency response, and the record head has been azimuthed and peaked up for bias. In order to ensure that the combined record/playback response will also be within specifications, trimmer capacitors are provided on the recording amplifier to adjust the degree of high frequency pre-emphasis. Separate sets of trimmers are used for each tape speed.

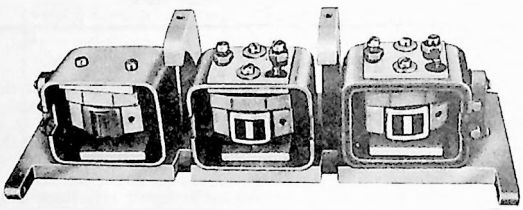


FIGURE 4. AMPEX 3-HEAD NEST ASSEMBLY SHOWN WITH THREE NORTRONICS QK-76'S AND FULL TRACK HEADS MOUNTED IN PLACE

Connect an audio oscillator to the recorder input and a VTVM (loaded with a 600-ohm resistor) across the output of the playback amplifier. Recordings should be made at a level of -10 VU. Follow the instructions in the Ampex manual to adjust the trimmers so that the output at 10kc. and 15kc. is the same as at 1 kc.

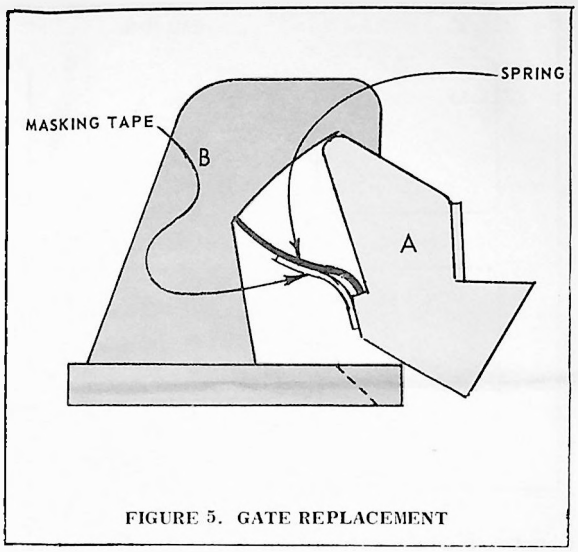


FIGURE 5. GATE REPLACEMENT

6-6. Tape tension. The new hyperbolic heads require less tape tension than the cylindrical models. To reduce wear it is advisable to decrease the drag or brake on the supply reel. Use just enough tension to give uniform output on playback at the higher frequencies. A good test is to place a finger against the supply reel when playing back a 10 kc. signal from an align-tape. The output should not increase more than 1 db. with the added tension.

7. CONCLUSION

7-1. Replace face-gate. This potentially time consuming task can be eased if the following installation tips are observed. The secret is to fasten the leaf springs to the gate before attempting to replace it. First, cut out two 3/16" x 1" pieces of masking tape and stick them to the lower outer ends of the springs. Then seat the lower spring ends into the notched corners of the movable gate stops, "A", using the tape to hold the springs in place. While the gate is being maneuvered into its final position use a piece of stiff wire to guide the upper spring ends to their notched corners in the fixed arms, "B". Then replace the two pins which hold the gate. The main head cover can also be replaced now.

7-2. This concludes the installation and adjustment instructions for the QK-76 adapter mounts and the NORTRONICS tape heads. If the directions have been carefully followed you may expect fully professional performance in every respect from the new heads.

Place these instructions in your Ampex service manual for future reference.

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