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YOUR LOCAL DEALER

TECHNICAL DATA BULLETIN

ATC & COLLINS CARTRIDGE RECORDERS

A. ATC & COLLINS

Earlier models of the ATC and also the COLLINS units made by ATC were designed around a solid core program R/P head, and did not have enough range in the bias adjustment to fully bias the newer premium Nortronics laminated 400-mhy. R/P head during recording. Also, certain machines did not include a bias adjustment control.

Following is a description of the circuit changes required in the record amplifiers for the two basic machine types:

1. **A-190 and A-150 recording amplifiers.** (See Fig. 1) This type is recognizable by the push-pull bias oscillator circuit. Perform the following steps:

(a) Incorporate adjustable bias by replacing the fixed 1K resistor, R417, with a 250K potentiometer (preferably with linear taper). It may be mounted on the chassis of the recording amplifier in place of the oscillator balance control, R420, which is completely unnecessary. This will save drilling a hole. Connect the clockwise lug of the new control to C409 so that clockwise rotation of the shaft will increase the bias current. Connect the 270 pf. C410 to the wiper. Ground the grid resistors R418 and R419.

(b) Increase the bias voltage by deleting the 8.2K load resistor, R416.

(c) Reduce the high-frequency pre-emphasis on recording by deleting the 470 pf. capacitor, C406, which shunts R412. The original circuit boosts the 10kc. recording current by as much as 17 db. over the 1 kc. current, while the laminated heads only require about 10 kc. of boost for correct frequency response. If the ability to adjust the high-frequency record pre-emphasis is desired, then the 25 pf. C403 may be replaced with an adjustable mica trimmer capacitor of around 5-80 pf.

(d) Refer to Section B. following for instructions on bias adjustment and frequency response.

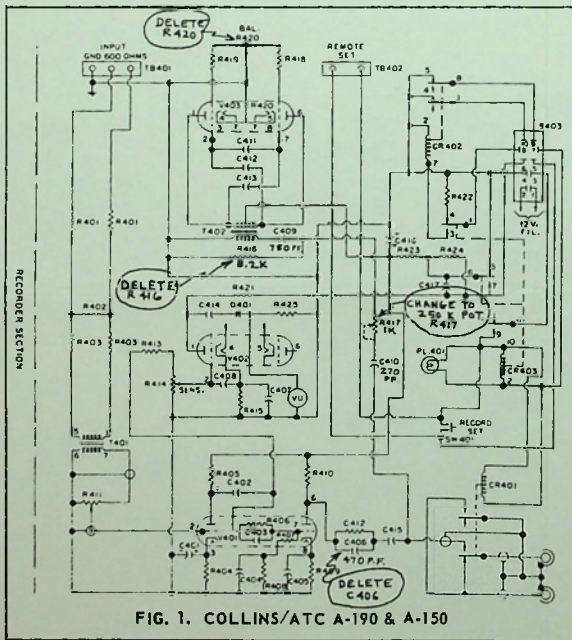


FIG. 1. COLLINS/ATC A-190 & A-150

2. **A-150, A-190, P-190 cue channel triggering.** (See Fig. 2) Additional circuit modification is necessary with these amplifiers, if the cue channel does not trigger with the NORTRONICS #3000, 3001, 3200, or 3201 head.

When using the 800 mhy head (#3000 or 3200) replace the cue head coupling capacitor (C-105, 0.5 mfd) with a 0.03 mfd capacitor. With the 400 mhy head (#3001 or 3201) replace C-105 with a 0.05 mfd capacitor. The capacitor goes between the cue head jack (J-101) and pin #11 of S-101.

The cue head is connected through C-105 to the cathode of V-301A. V-301A serves as a two stage preamplifier on playback, with the grid of V-301A grounded, and the signal from the cue head fed to the cathode. By changing C-105 to a value which resonates with the head at the 1000 cps cue tone, the overall sensitivity of the head is greatly improved, because the low impedance cathode is being driven with a series resonant circuit.

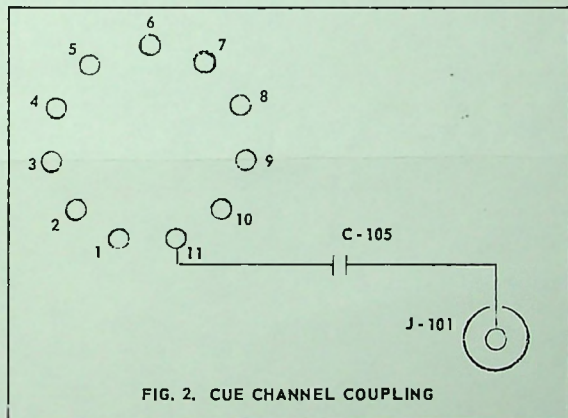


FIG. 2. CUE CHANNEL COUPLING

3. **PB/PC-150 & 190.** (See Fig. 3) The record amplifiers have a single-ended bias oscillator driving a separate bias amplifier. This circuit already includes a bias adjustment potentiometer (R131) but there is insufficient voltage to fully bias the Nortronics premium 3201 and 3251 program Record/Play heads. However, it will work perfectly as is when the 3205 or 3255 200-mhy. Record Only head is used in the program record position in conjunction with a 2000 or 2050 dual-channel head for program playback and cue Record/Play. This system permits monitoring of the program channel during recording and vastly simplifies the setting of bias current and recording equalization.

To increase the bias voltage for the 3201 R/P head the following circuit changes must be made:

(a) Remove the original bias potentiometer, R131, and install in its place a 250K linear taper control, connected in the same fashion as the original, with the clockwise terminal to the red lead of T103.

(b) Replace R152 12K resistor with a 470 pf. disc ceramic or mica capacitor.

(c) Refer to Section B. for instructions on bias adjustment and frequency response checks.

4. **COLLINS 642-A1 & 642-A2 transports.** Mechanical installation of Rear Mount heads. The later model decks include a special shoulder washer on the mounting stud of the R/P heads. This washer has projections which match the square

head shoulder of the MM head, but do not fit the hex. shoulder of the Nortronics head. It is necessary to file or grind away the projections on the shoulder washers to prevent interference with the new Nortronics Rear Mount heads. The bracket holding the phono jacks must be removed to free the washers for modification. Then replace the modified washers and install the new heads.

5. **COLLINS 642-A1 & 642-A2 transports.** Quik-Kit installation. A footnote in the instruction sheet, Form #7194, describes how the Cartridge Mount Quik-Kits are installed on the Collins deck which have the special shield box around the heads. However, it is possible to simplify installation and eliminate the chore of cutting out a portion of the shield box to clear the Quik-Kit. Merely remove completely the large deck shield panel and also the phono jack bracket. Only the large top cover needs to be retained, as it includes the cartridge hold-down spring and the right hand cartridge guide. The hold-down spring on the Quik-Kit may be removed as it is no longer needed.

B. ADJUSTMENTS AND CALIBRATION (All types of machines)

After the new Nortronics heads are installed the following adjustments should be made, first in playback and then during recording:

1. Azimuth adjust the program playback head for optimum high frequency response using an alignment test tape.

1a. Use a good quality A.C. VTVM to check frequency response and level across the output of the program playback amplifier. (Ballantine, H.P. 400D, etc.) The alignment test tape is the standard NAB frequency response tape such as supplied by RCA. Use the 15 kc. signal to check azimuth.

2. Azimuth the cue head (if separate from the program playback head) in the same fashion, first connecting it to the program playback channel.

3. If machine has a separate program record head, plug it into the program playback channel and adjust its azimuth for maximum high frequency response. Use 8 kc. tone for wide gap record heads.

4. Adjust the program playback equalization to give a flat response between 400 cps and 12 kc. from test tape.

5. Adjust the bias current on the program record head to give maximum playback output when recording a 1 kc. tone.

5a. If the recorder does not have separate program record and playback heads the cue head may be used to monitor the program channel during bias adjustment. Temporarily turn over the cue head and plug it into the program amplifier while recording the 1 kc. signal with the program R/P head. Adjust the bias current until a peak is obtained for the playback. Then turn the cue head to its normal position (on lower channel) and re-adjust its azimuth as described in 2. (This method will not work for RCA units of the -RT-7 type where the cue head precedes, instead of following the program head.)

6. After all above adjustments are made set the record equalization to give a flat record/playback response between 400 cps and 12 kc.

6a. Record/playback frequency response should be run at a record level of -10 VU to prevent saturation at the higher frequencies. If machine has separate record and playback heads first make a recording at 400 cps and note the resultant playback reading. Then, while recording with the same input signal at 12 kc. adjust the record equalization so that the 12 kc. playback signal is of the same strength.

If the program head is a combination record/playback model, then trial and error recordings will have to be made until the 400 cps and 12 kc. playback is the same.

7. Adjust the recorder VU-meter calibration so that a zero VU reading during the recording of a 400 cps signal produces a playback level the same strength as the reference level signal from the playback test tape.

7a. First play the alignment tape and note the meter reading across the program output during the 400 cps reference. Then make 400 cps recordings and adjust the VU-meter calibration to give the same playback level.

