SECTION 4

TAPE TRANSPORT MECHANISM

NOTE: The Tape Transport Mechanism described in this section is used in machines of two basic types; those designed for both recording and playback, and those designed for playback only. References to the Record Head and the Record mode should be ignored by owners of machines designed for playback only. All other particular differences between the two types are specially noted as the need arises.

4.1 THE MAJOR ASSEMBLIES

The Tape Transport Mechanism consists of the following major assemblies:

A. **Capstan Drive Motor (B501)** - This is an hysterisis synchronous motor whose extended shaft forms the Tape Drive Capstan. The motor has two windings to provide the two tape speeds selected by the Tape Speed Switch, (S503). The Capstan Drive Motor starts operating as soon as the tape is properly threaded.

B. **Takeup and Rewind Assemblies** - Each of these assemblies consists of an induction motor (B502 and B503), a turntable mounted directly on the motor shaft, a brake housing assembly, and a flange for mounting the entire unit. These units are not interchangeable, the brake housing on one being the reverse of that on the other. The brakes are solenoid-operated, and are released when the Brake Solenoids (K505 and K506) are energized.

C. **Capstan Idler Assembly** - This assembly consists of a swivel-mounted arm and a rubber-tired idler wheel. The action of the Capstan Idler Arm is controlled by the Capstan Solenoid (K501). When the Capstan Solenoid is energized, (it is energized in the Play or Record modes only) the movement of the arm forces the idler wheel against the Capstan, which then drives the tape at a constant speed.

D. **Reel Idler Assembly** - This assembly consists of a pulley, a spring-pivot-mounted arm, a tape guide, and a flywheel. The reel idler assembly serves to smooth out transient speed variations in the tape system.

E. **Takeup Tension Arm Assembly** - This assembly consists of a spring-pivot-mounted arm, a tape guide, and a tape guide hook. A Drivelock pin in the arm shaft actuates the Safety Switch (S501) which stops the machine if the tape breaks or runs off either reel.

F. **Head Assembly** - This assembly consists of three heads (Erase, Record and Playback from left to right when facing the machine) in a die-cast aluminum housing. NOTE: In machines designed for playback only, dummy posts are substituted for the Erase and Record Heads. The front shields for the Record and Playback heads are mounted on the Head Gate. When the gate is opened (during Fast Forward or Rewind operation) a set of Tape Lifting Fingers raises the tape off the head faces to reduce head wear.

G. **Control Circuit Box** - The Control Circuit Box houses most of the control circuit, including all relays and tension adjusting resistors. All receptacles for interconnecting cables between the Tape Transport Mechanism and any accessory units with which it may be used are mounted on the front panel of the Control Circuit Box.

H. **Control Circuit Switch Assembly** - The switches included in this assembly are as follows: four pushbuttons, for Rewind, Fast Forward, Stop, and Play; two toggle switches, Reel Size and Tape Speed; the Safety Switch, a micro-switch mounted under the top plate near the Takeup Tension Arm shaft. These switches control the operation of the Tape Transport Mechanism in all modes.

4.2 THE TAPE TENSION SYSTEM

The purpose of the Tape Tension System is to provide proper tape tension in all modes of operation. The principles of the system can best be understood by studying the operation of the takeup and rewind motor assemblies.

The Takeup and Rewind Motors are so connected that when power is applied with no tape threaded, the turntables, fixed to their shafts, will rotate in opposite directions.

The Tape Supply Turntable, fixed to the Rewind Motor Shaft, will rotate clockwise. The Tape Takeup Turntable, fixed to the Takeup Motor Shaft, will rotate counterclockwise.

The torque of the motors in the Play and Record modes is adjusted to equality by resistors R503 and R505, the tension adjusting resistors in series with each motor. In Fast Forward, the torque of the Rewind Motor is greatly reduced by insertion of additional resistance (R504) in series with it. In Rewind, R504 is inserted in series with the Takeup Motor. The basic operation of the tape tension system is illustrated in Figures A, B, and C on the following page.

In the Fast Forward mode (Figure A), the Takeup Motor operates at full torque, the Rewind Motor at reduced torque, and the tape is simply pulled from the Tape Supply Reel. Since the torque of the Tape Supply Turntable motor (i.e., the Rewind Motor) is applied in the opposite direction to the table's rotation, the tape is held under continuous tension as it is pulled from the reel.

In the Rewind mode, the operation just described is exactly reversed, as shown in Figure B.

In the Play or Record modes, both motors operate at reduced torque and are effectively isolated from each other by the Tape Drive Capstan and the Capstan Idler between which the tape is clamped, (Figure C). From the point of view of the Tape Supply Turntable, the capstan and idler action exerts sufficient pull on the tape to overcome the opposing torque of the Rewind Motor, which constitutes the hold back tension. From the point of view of the Tape Takeup Turntable, the capstan and idler action is feeding the tape to it. The tape is held under tension here, simply by virtue of the fact that the takeup rate exceeds the feed rate. (A tape loop will be thrown on the right side of the Capstan whenever any malfunction causes the feed rate to exceed the takeup rate.)

In the event that such a tape loop is thrown, or the tape breaks, the Takeup Tension Arm will actuate the Safety Switch (S501) and stop the machine. The Takeup Tension Arm is not, strictly speaking, a part of the tape tension system. Its primary function is to operate the Safety Switch.

The Reel Idler Assembly functions to smooth out any transients in the tension system. For example, in starting the tape in the Play mode, the momentary strain transmitted through the tape to the Tape Supply Turntable when the Capstan Idler forces the tape against the Capstan is extremely high. This impulse could, under some circumstances, stretch or break the tape, or cause the Tape Supply Turntable to overshoot in starting. If the turntable did overshoot in this way, the momentary decrease in hold back tension would be sufficient to start a transient oscillation in the tape tension system. This oscillation would be felt in the Head Assembly where it would cause a periodic variation in the distance of the tape from the heads. This variation would be of sufficient magnitude to appear as an undesirable fluctuation in the signal level at the start of recording or reproduction. The Reel Idler Arm serves to absorb most of the starting strain, and effectively prevents or minimizes the type of oscillation just described. The Reel Idler Pulley and Flywheel provide additional stability to the tape tension system by smoothing out transients in the torque of the Rewind Motor.

4.2.1 BRAKE OPERATION

Smooth brake operation is of primary importance in maintaining proper tape tension while stopping the tape. Since the hold-back tension, supplied by the trailing turntable motor torque, is lost as soon as the Stop button is pressed, the maintenance of tape tension then becomes a function of brake operation. The fundamental design consideration in the brake system is that the braking force acting on the turntable from which the tape is being pulled (the trailing turntable) in any of the modes of operation must always exceed the braking force acting on the turntable taking up the tape (the leading turntable) in order to prevent the throwing of tape loops.

Refer to the Takeup Brake Assembly as shown in Figure 12. One end of the brake band is fixed to the brake housing. The other end is linked to the brake lever and is free to move. When the brake solenoid is de-energized, the brake tension spring acting on the brake lever draws the brake band against the brake drum.

If the brake drum is rotating clockwise (as viewed in Figure 12) when the brake band is applied, the frictional force will cause the band to wrap itself more tightly around the brake drum, the linked end of the band moving to the left. Braking force will be increased (i.e., the brake is self-energizing). If the drum is rotating counterclockwise, the process is the reverse. There will be a tendency for the band to pull away from the drum, decreasing the braking force (i.e.,

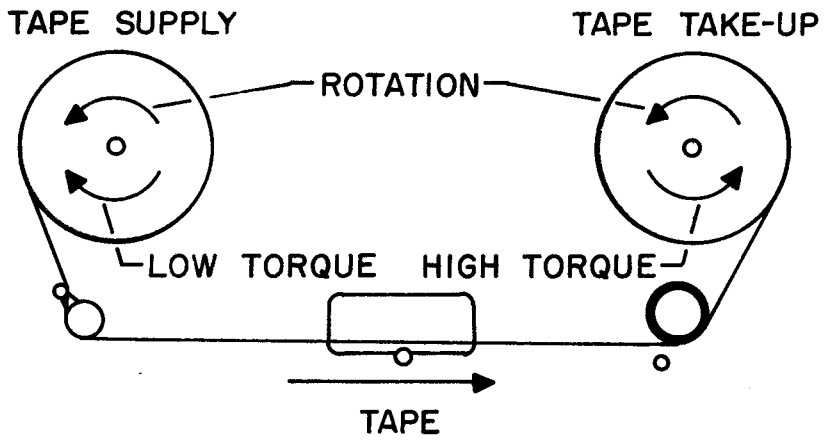

FIGURE A - FAST FORWARD

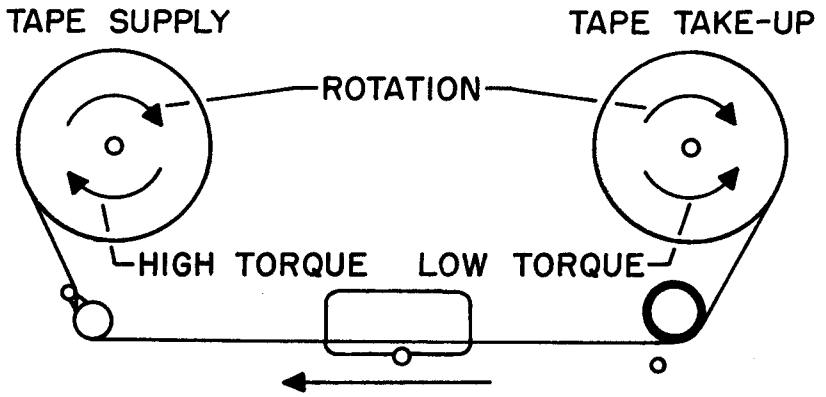

FIGURE B - REWIND

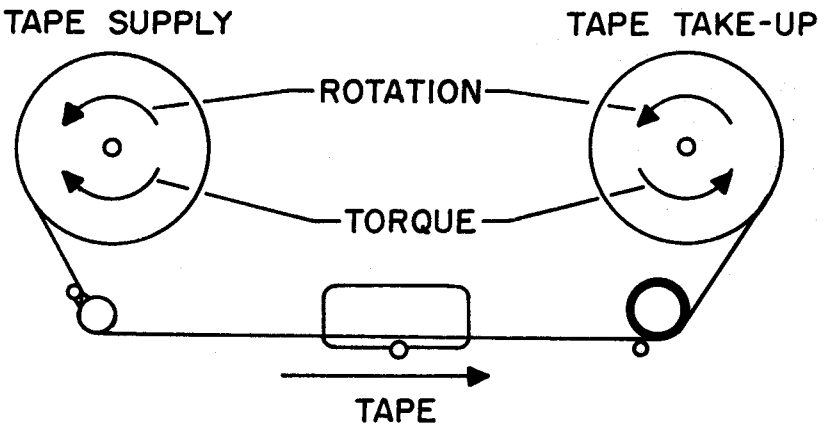

FIGURE C - PLAY OR RECORD

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TAPE TENSION SYSTEM

the brake is self-relieved). The ratio of the braking force in one direction to the braking force in the other is called the brake differential. The brake differential on this machine is approximately two to one.

The action of the braking system in the various modes of operation is illustrated in Figures D and E, opposite. In terms of the discussion above, note that in all modes, the greater braking force always acts on the trailing turntable. A portion of this increased braking force is exerted on the leading turntable through the tape. Thus the tape remains under tension as the system is brought to a stop.

4.2.2 REEL SIZE SWITCH

Holdback tension is not a constant in any mode of operation. It varies directly as a function of the torque of the trailing turntable motor, and inversely as a function of the effective hub diameter (i.e., hub diameter including the tape wound on the hub) of the trailing reel. That is, for a given torque on the trailing motor, the holdback tension will increase as the effective hub diameter of the trailing reel decreases. Reducing the torque on the trailing turntable motor will decrease the holdback tension.

The holdback tension resistors which adjust the torque of the Takeup and Rewind motors are factory-set for NARTB 10-1/2 inch reels. If the smaller RMA reels are used, the overall increase in the holdback tension must be compensated for in order to prevent tape stretch. This is done by inserting resistor R502 in series with the Takeup and Rewind motors thus reducing the torque of both motors when the RMA reels are used. Insertion is accomplished by the Reel Size Switch, a SPST switch placed across the resistor R502.

4.3 RELAY OPERATION

The operation of the control circuit relays in the various modes can best be understood by referring to the schematic of the mechanical assembly control circuits, Figure 3, while following this discussion. NOTE: All relay contacts in Figure 3 are drawn in their de-energized positions. For convenience in circuit tracing, references to relay contacts in the following description are preceded by the letter D (de-energized) or E (energized), to indicate the position of the contacts in the mode being considered. Each relay sequence described below begins with the tape at a dead stop unless otherwise specified.

4.3.1 PLAY

When the Play button (S505) is pressed, both the Play Relay (K502) and the Capstan Solenoid (K501) are energized. They are held energized through relay contacts EK502-1, DK503-1, DK504-3, and the normally closed Stop button (S502). The Capstan Idler is forced against the Tape Drive Capstan, and power is applied to the Brake Solenoids (K505 and K506) through contact EK502-3, and to the turntable motors through the contact EK502-2, thus releasing the brakes and starting the turntables. The recorder is now operating in the Play mode at the speed selected by the Tape Speed Switch (S503).

4.3.2 REWIND

When the Rewind button (S507) is pressed, the Rewind Relay, (K504) is energized. This relay is held energized through relay contact EK504-1, DK503-3, and the normally closed Stop button (S502). The Brake Solenoids are held energized through contact EK504-3. Full power is applied to the Rewind Motor through contact EK504-2, and the torque of the Takeup Motor is reduced sufficiently through resistor R504 to provide proper holdback tension. The machine is now in the Rewind mode.

4.3.3 FAST FORWARD

When the Fast Forward button (S506) is pressed, the Fast Forward Relay (K503) is energized, and the Brake Solenoids are energized through contact EK503-3. The Fast Forward Relay is held energized through contacts EK503-1, DK504-3, and the normally closed Stop button (S502). Full power is applied to the Takeup Motor through EK503-2, and the Rewind Motor torque is reduced through R504 to provide proper hold back tension. The machine is now in the Fast Forward mode.

4.3.4 STOP

When the tape is in motion in any mode and the Stop button (S502) is pressed, the Brake Solenoids and all relays are de-energized. The brakes are applied to both turntable motors. The Capstan Drive Motor will continue to operate so long as the tape remains threaded.

4.3.5 SAFETY INTERLOCKS

When the tape is moving in either of the high speed modes (Fast Forward or Rewind) it is not possible to switch to the Play mode without first pushing the Stop button. In Fast Forward, contact EK503-1 interlocks the Play Relay and Capstan Solenoid. In Rewind, EK504-3 is the interlock. CAUTION: If the Stop and Play buttons are pressed in

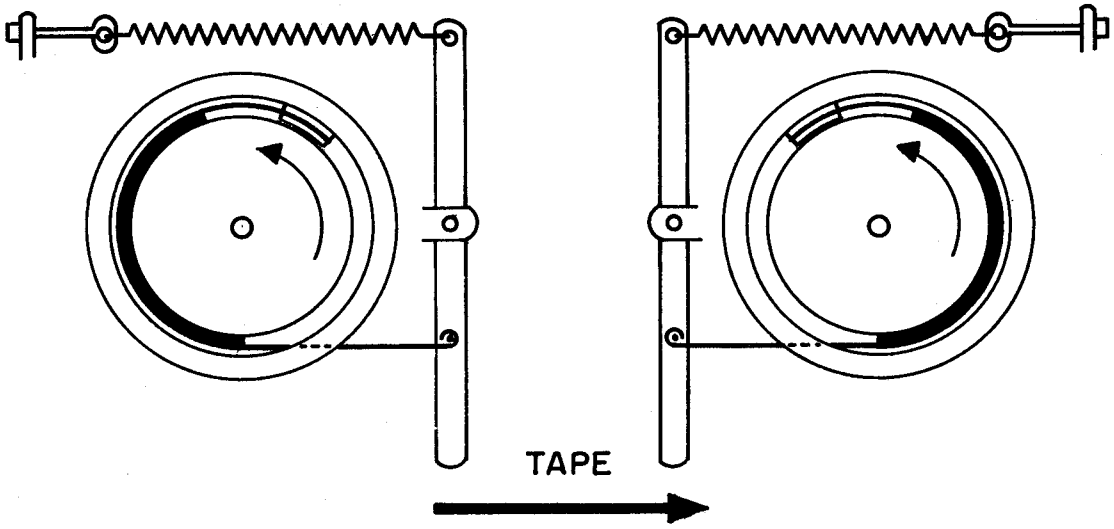

FIGURE D - FAST FORWARD, PLAY & RECORD

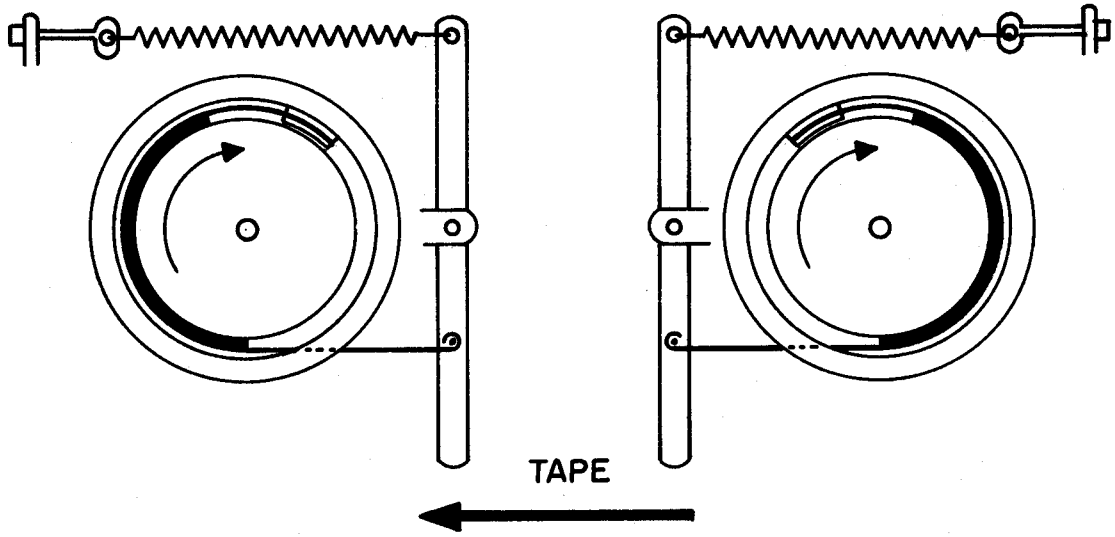

FIGURE E - REWIND

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BRAKE OPERATION

rapid sequence when the tape is in either high speed mode it will almost invariably be broken. Always allow time for the tape to stop completely when switching from the fast modes to Play.

4.4 ROUTINE MAINTENANCE

The routine maintenance program outlined below should be carefully followed if proper performance is expected of the machine at all times. It is recommended that an Operation and Maintenance Log be kept.

4.4.1 CLEANING

The Capstan, the head faces and tape guides should be cleaned daily with ethyl alcohol applied with a soft cloth. WARNING: DO NOT USE CARBON TETRACHLORIDE TO CLEAN HEADS. IT ACTS AS A SOLVENT ON THE PLIOBOND WHICH BINDS THE LAMINATIONS TOGETHER.

The capstan idler wheel should be cleaned weekly with ethyl alcohol applied with a soft cloth. Great care must be taken to see that oil does not reach the rubber tire. Avoid, as much as possible, touching the tire with the fingers.

The tire will gradually pick up the lubricant with which most tape manufacturers impregnate their tapes. This condition is unavoidable. The lubricant plays an important part in reducing flutter, head wear and tape squeak. It also permits more uniform head contact, and therefore reduces high frequency amplitude variation.

In general, failure to keep the idler wheel tire free of tape lubricant or any other oil by weekly cleaning will eventually result in loss of positive drive at the Capstan - particularly toward the end of a reel when holdback tension is highest.

4.4.2 LUBRICATION

The following parts of the Tape Transport Mechanism require lubrication every three months, or after every thousand hours of operation, whichever occurs first.

A. **Capstan Drive Motor.** The upper sleeve bearing of the Capstan Drive Motor should be lubricated with one of the following recommended oils or its equivalent:

Gulf Oil & Refining Company - (Gulfcrest A)
Standard Oil Co. of Indiana - (Stanoil #18 or #25)
Socony Vacuum Oil Co. - Gargoyle DTE Light

For proper lubrication, the Drive Motor should be removed. To dismount the motor, remove the four screws that hold it to the top plate and unplug the motor connector (P504P) from its socket (J504S). (One of the motor mounting screws is below the Capstan Idler. For access, hold the idler back.) The oil hole will be found in either the top or the side of the motor end bell, depending upon the motor manufacturer. Lubricate with ten drops of one of the recommended lubricants and replace motor. After replacement, check the capstan idler pressure and if necessary readjust as indicated in 4.5.3.

B. **Capstan Idler.** Remove the dust cap on the wheel hub by prying up gently. Lubricate by saturating the felt washer with no more than 6 drops of SAE 20 oil. WARNING: Do not over-lubricate or the wheel will throw oil in operation. Should oil spill on the rubber tire, clean immediately with ethyl alcohol.

NOTE: The Reel Idler Assembly, the Takeup Tension Arm Assembly and the Takeup and Rewind Motors contain ball bearings, and require no lubrication.

4.4.3 HEAD DEMAGNETIZATION

Occasionally, the heads may become permanently magnetized through an electrical fault in the amplifiers, improper use of the machine, or by coming in contact with a magnetized object. Magnetized heads will cause an increase of 5 to 10 db in noise level, and may ruin good tapes by partially erasing high frequencies. The full dynamic range of the machine cannot be realized if the heads are magnetized.

Any phenomena that tend to put a large unbalanced pulse through the record head will magnetize it. If the following precautions are observed, no difficulty should be experienced.

A. Do not remove any tube from the record amplifier while the machine is recording.

B. Do not connect or disconnect input leads or head leads while recording.

C. When putting the machine in the Record mode, wait a half second between the pushing of the Play and the Record but-

tons to allow motor and solenoid switching transients to die out before the Record Head is connected, in order to prevent permanent magnetization of the head.

D. Do not saturate the record amplifier with abnormally high input signals. Such signals would be 10 db greater than tape saturation or approximately 30 db greater than normal operating level.

E. Do not test continuity of the heads with an ohm meter.

Should the heads become magnetized, they can be demagnetized readily with an AMPEX Head Demagnetizer (Catalog 704). The following demagnetization procedure should be performed: Throw the Power switch OFF. Plug the Demagnetizer into a 117 volt AC source. Bring the tips of the demagnetizer in close proximity to, but preferably not in contact with, the head core stack. Run the tips of the demagnetizer up and down the entire length of the core stack (the tips should straddle the gap) three or four times. Remove the demagnetizer very slowly allowing the influence of its AC field to die off gradually. This operation need be performed only on the Record and Playback heads, as the Erase head will demagnetize itself. In the event demagnetization is not effected, repeat the process several times.

Should the Capstan or tape guides come magnetized through contact with some magnetized object, a few passes up and down their length with the head demagnetizer and then slow withdrawal should suffice to demagnetize them.

4.5 ADJUSTMENTS

The mechanical assembly is shipped from the factory with all adjustments set for correct performance. It should not be necessary to change any adjustment before putting the machine into service, unless shipping damage has occurred. In the course of wear in normal service, or in the event of component failure, and replacement of parts, some readjustments may be necessary. The recommended procedures for making such adjustments are detailed below. The locations of all adjustment points are shown in the figures at the rear of this book.

4.5.1 TAKEUP AND REWIND TENSION

Takeup and rewind tensions are adjusted by the slides on resistors R503 and R505. The torque of both the rewind and takeup motors must be adjusted to six ounces at NARTB Reel hub diameter. This is done as follows:

A. Place an empty 10-1/2 inch NARTB reel on the Tape Supply Turntable.

B. Take a piece of string about thirty inches long, and tie a small loop at each end.

C. Attach one loop to the tape anchor on the reel hub, and the other loop to a spring scale (0 to 18 oz. preferred).

D. Hold the Safety Switch closed by taping the Takeup Tension Arm in the switch-on position with a piece of scotch tape or masking tape.

E. Press the Play button and read the pull as the string is wound onto the hub. It is advisable to "follow" the string in slowly, taking the reading while the turntable is in steady motion. (The static pull of the turntable may produce a reading slightly higher than the steady motion reading.) NOTE: Most spring scales, when held horizontally, will show a zero reading different from the normal scale zero. Allowance for this error should be made when taking readings.

F. Adjust R505 for a six ounce scale reading.

G. Repeat the entire procedure on the Takeup Turntable, adjusting R503 for six ounces.

4.5.2 BRAKE TENSION

Brake tension is adjusted with no power applied to the machine. Adjustments are made at the two points shown in Figure 12. The procedure is as follows:

A. Place an empty 10-1/2 inch NARTB reel on the tape Supply Turntable.

B. Tie a loop at each end of a piece of string about thirty inches long.

C. Attach one loop to the tape anchor on the reel hub. Wind the string on by turning the reel clockwise by hand.

D. Attach the loop in the free end of the string to a spring scale, and pull. (The turntable will rotate counterclockwise.) Take a reading only when the turntable is in steady motion, as the force required to overcome the static friction will produce an excessively high initial reading.

E. Adjust the rewind motor brake for a reading of approximately 14 ounces.

F. Now wind the string on the hub by rotating the reel counterclockwise; pull, and take a reading. (The turntable will rotate clockwise.) The reading should be approximately 7 ounces.

G. Repeat the entire process on the takeup turntable, this time adjusting for approximately 14 ounces when the table is rotating clockwise and approximately 7 ounces counterclockwise.

NOTE: After long usage, the graphited-felt linings of the brakes will begin to glaze, and the brakes may exhibit some tendency to grab. This condition may be relieved by periodic readjustment of brake tensions, but eventually the brake linings will have to be reconditioned or replaced, as described in the Section 4.6.2.

4.5.3 CAPSTAN IDLER PRESSURE

The Capstan Idler is forced against the Capstan by the action of the Capstan Solenoid (K501). Idler pressure is supplied by the Capstan Idler Pressure Spring, and is adjusted by a lock nut on the Capstan Solenoid spade bolt. (See Figure 12.) Little or no pressure is supplied by the spring if the Capstan Solenoid is not bottomed. Tightening the lock nut increases idler pressure until a point is reached where the solenoid will not bottom. At this point, idler pressure drops to a value which is inadequate to permit the Capstan to drive the tape, and slippage will occur unless the nut is backed off. Excessive pressure should also be avoided as it throws an unnecessary load on the upper sleeve bearing of the Drive Motor. The recommended procedure for adjusting idler pressure is as follows:

A. Hold the safety switch on by taping the Takeup Tension Arm in the switch-on position with a piece of scotch tape or masking tape.

B. Press the Play button, and check to see that the Capstan Solenoid is bottomed. (The Capstan Idler can be pushed off the Capstan easily by pushing on the idler arm, if the solenoid is not bottomed.) If necessary, back off the lock nut until the solenoid does bottom. (See NOTE below.)

C. Readjust the lock nut until the Capstan Idler is just touching the Capstan when the solenoid is bottomed (the point at which one finger held lightly on the capstan idler hub will keep it from rotating).

D. Tighten the lock nut 2-1/4 turns.

E. Press the Stop button, then press the Play button and check to be sure that the solenoid will bottom after the last adjustment. If not, then either the solenoid or linkage is defective.

If properly adjusted as outlined above, sufficient capstan idler pressure exists under all operating conditions to prevent tape slippage, unless the idler or the Capstan should become contaminated with oil or foreign matter.

NOTE: In the course of normal operation in the play or record modes, the temperature of the Capstan Solenoid will rise, and its DC resistance will increase. Therefore, the minimum line voltage required to bottom the solenoid when it is hot will be greater than that required when it is cold. If the machine is operating on unusually low line voltage, sometimes encountered in areas where regulation is poor, the solenoid may fail to bottom after it has reached normal operating temperature. It is advisable, therefore, to allow the machine to operate in the Play mode for about half an hour before making any necessary solenoid adjustments. This will allow the widest margin of safety with respect to line voltage variations. (The solenoid is factory-adjusted to bottom at 90 line volts cold and 105 line volts hot.)

4.6 REPLACEMENT OF PARTS

All sub-assemblies of the Tape Transport Mechanism can be easily dismounted with the use of a screwdriver and a few small socket-head screw keys. CAUTION: IT IS INADVISABLE TO ATTEMPT COMPLETE DISASSEMBLY OF ANY OF THE SUB-ASSEMBLIES. THE LIST OF INDIVIDUALLY REPLACEABLE PARTS UNDER EACH ASSEMBLY LISTING IN THE PARTS LIST SHOULD BE USED AS A GUIDE TO DISASSEMBLY LIMITS. REPLACEMENT OF PARTS OTHER THAN THOSE LISTED CALLS

FOR PRECISION WORK WHICH SHOULD NOT BE ATTEMPTED IN THE FIELD. ASSEMBLIES WITH DEFECTS IN PARTS OTHER THAN THOSE LISTED AS REPLACEABLE SHOULD BE RETURNED TO THE FACTORY FOR REPAIR OR REPLACEMENT.

4.6.1 PACKING PRECAUTIONS FOR MOTORS

In packing motors for return to the factory, particular care should be taken in order to avoid the bending of their shafts in transit. When packing a Capstan Drivemotor, always remove the fan and flywheel from the motor shaft. Retain the fan and send the flywheel with the motor.

4.6.2 BRAKE RECONDITIONING AND REPLACEMENT

Brake linings may be reconditioned in place by the following procedure: Mix one level tablespoon of graphite with 8 ounces of carbon tetrachloride. Apply to the brake linings with an oil can. (Be sure the can is free of all traces of oil.) After re-graphiting, the turntable motors should be run for ten minutes with the brakes on in order to wear in the graphite. This can be accomplished either by disconnecting the brake solenoids temporarily, or by removing one of the clevis pins in the brake linkage to prevent the brakes from being released when the solenoids are energized.

If the brake linings are too badly worn to respond to this reconditioning procedure, the brake band assemblies should be replaced as follows, referring to Figure 12:

A. Dismount the Brake Housing Assembly by removing the screws that hold it to the motor, taking care not to drop or lose the spacers under the housing.

B. Unhook the Brake Tension Spring. Loosen, but do not remove, the two socket-head screws in the Brake Band Link by inserting a socket-head screw key (i.e., an Allen wrench) between the two Brake Solenoid Links.

C. Pull the Solenoid Plunger out of the Solenoid, and the Brake Band will come free of the Link. Note that this end of the band is slotted.

D. Remove the two screws that hold the other end of the Brake Band to the housing. Note that three clamping elements are involved: the clamp, and two spring-steel leaves, and that the assembly order, from the housing wall out is brake band, long leaf, short leaf, clamp.

E. Immediately before installing the new brake band assembly, it should be pressed flat between two boards in a vise in order to compress the felt lining. If this is not done the lining will be too thick to permit free rotation of the brake drum after installation, and will result in dragging brakes and improper brake differential. Once the band is installed, the felt will no longer swell, as it does relatively quickly when the bands are not bent in their normal curve.

F. To install the new brake, insert it through the hole in the housing, making sure the lining faces in toward the center, and secure it to the housing.

G. Insert the Solenoid Plunger and slip the slotted end of the Brake Band back between the Brake Band Link and Clamp. DO NOT TIGHTEN THE SCREWS IN THE LINK.

H. Re-mount the Brake Housing Assembly on the motor. (Be sure to install the spacers.)

I. Push the Solenoid Plunger down until it bottoms. Adjust the depth of insertion of the Brake Band between the Link and Clamp so that the Brake Drum rotates freely with no drag; then, tighten the screws. CAUTION: If the band is set too far forward in the link, it will buckle slightly when the Solenoid Plunger is bottomed by hand. If this condition exists the plunger may not bottom when the solenoid is energized.

J. Re-install the Brake Tension Spring.

K. Run the brakes in for ten minutes as described in the reconditioning procedure above, and then adjust the brake tension as described in Section 4.5.2.