Section 3

Operation

GENERAL

The equipment is intended for making 7-1/2 ips (NAB) or 3-3/4 ips duplicate copies, using a 15 ips or 7-1/2 ips master tape. The response curve of the master tape will be closely approximated by the response recorded on the duplicate copies. If the reproduce amplifiers are on the curve (see the appropriate curve applicable on the equipment), the reproduce head is normal and in correct adjustment, the record amplifiers are on the proper curve, and the recording to be duplicated is acceptable, the only variable will be the type of tape chosen. Record bias may be adjusted for differing tape characteristics.

In tape, a number of factors can differ such as the magnetic properties of the oxide, the manner of it's milling, processing of binders and coating, and tolerances imposed for specifications. Recognizing that these variations in tape exist, the Ampex system permits the achievement of a uniform end product.

When the master tape is deemed satisfactory from the standpoint of good signal-to-noise ratio, uniform frequency response, low distortion -- which imply that the recording was made at a proper level -- the system can be adjusted for the characteristics of the tape chosen.

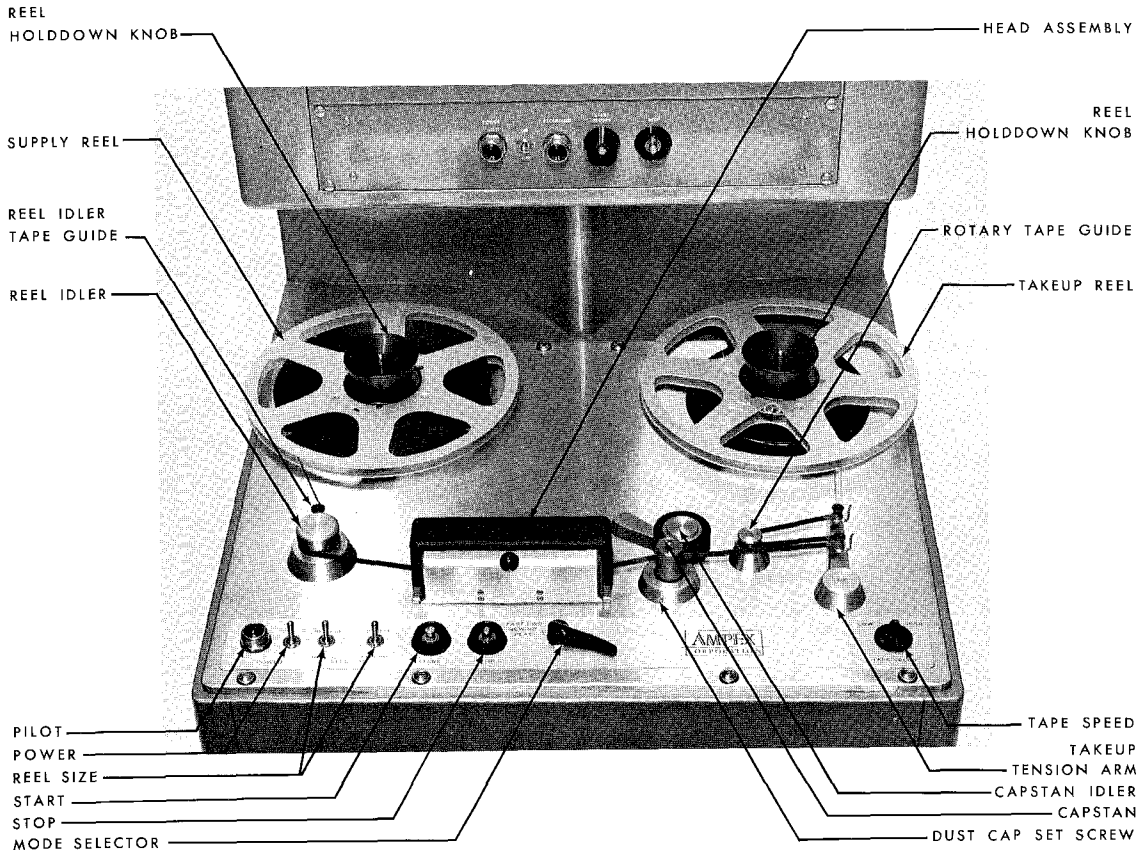
Pre-operational procedures are described immediately following this general discussion. There are two ways to make duplicates: the master tape can be run forward or it can be run backward. The operators requirements will determine how he wishes to make his copies. A number of advantages present themselves in using reverse duplication. If a master tape has been wound to run backwards, and placed on the supply reel of the master tape transport, the duplicates do not have to be rewound, and can be lifted from the machines ready for reproduction. Obviously, time is saved for filing or packaging. Routine lifting of finished copies can be done while the master is being rewound. When the tapes are copied backwards, the transient response from steep wave fronts is less; therefore distortion is slightly decreased. The speed of the duplication is a matter to be determined by the requirements of the master speed and the usage of the copy. Another factor to be considered is choosing the correct tape speeds for the tape being utilized. Delicate tapes may require slower speed operation. Because there are no erase heads and since a residual signal may exist on even new tape, it is important to bulk erase all tape before recording.

NOTE

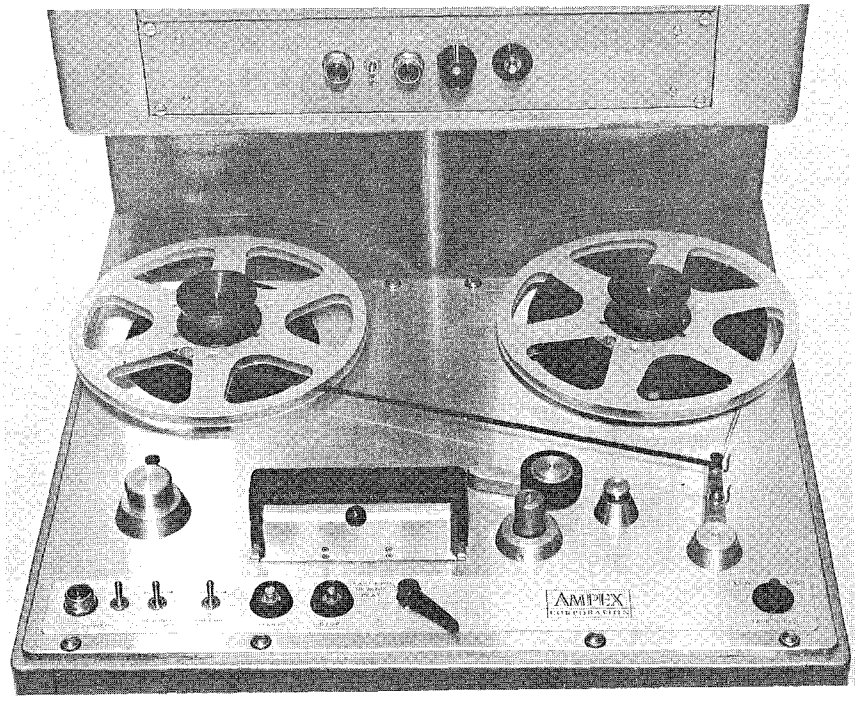
When duplicating stereophonic tapes a 1:1 ratio speed combination must be utilized because of the configuration of the head assemblies.

TAPE THREADING

Tape threading is shown in the tape threading illustrations (Figs. 3-1 and 3-2). For fast forward or rewind the tape should be threaded in such a matter that the takeup arm is in the operating position and the tape does not contact the heads.

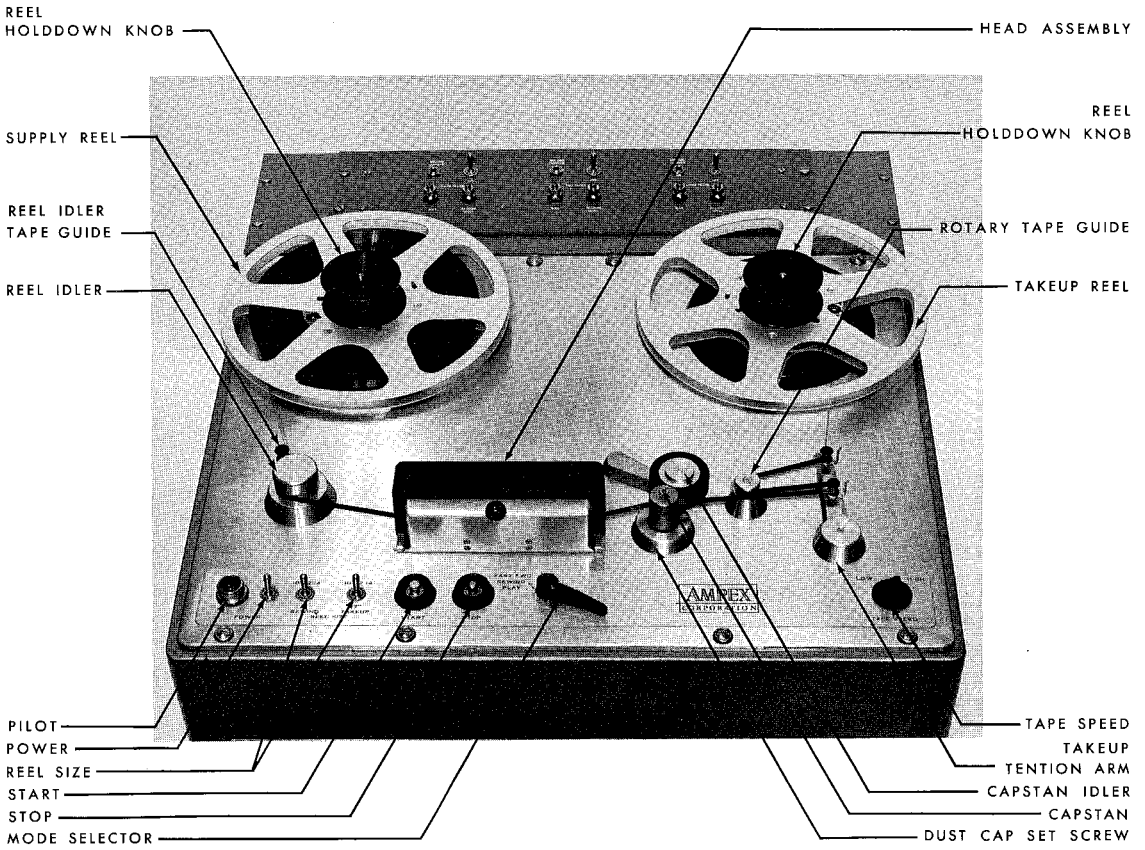


PLAY

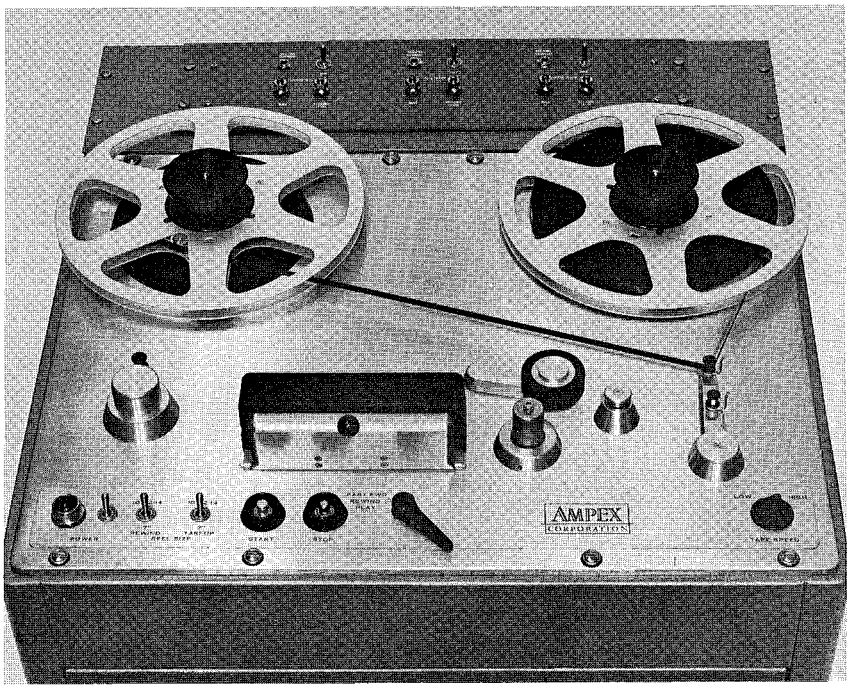


FAST FORWARD OR REWIND

Figure 3-1 TAPE THREADING PATH (MASTER)



PLAY



FAST FORWARD OR REWIND

Figure 3-2 TAPE THREADING PATH (SLAVE)

CONTROLS

a. Fast Start Switch

The FAST START switch is located on the power panel mounted on the underneath side of the tape transport. This switch should be placed and left in the FAST START position at all times except when operating with delicate tapes.

b. Speed Selector

The TAPE SPEED selector on the slave transport determines the speed of the capstan drive motor. With the capstan bushing in place, the HIGH speed position provides 60 ips speed and the LOW speed position provides 30 ips speed. Removing the capstan bushing halves the tape speed so that HIGH speed position gives 30 ips speed and LOW speed position gives 15 ips speed.

c. Mode Selector

The three-position mode selector should be set in the desired mode before pressing the START button. This selector can be switched back and forth between FAST FWD and REWIND, permitting direction changes without stopping the tape. When the machine is in either of these modes, placing the selector in PLAY position will automatically stop the tape, making it necessary to press the START button again. This safety feature prevents tape breakage. The START button should not be pressed until the tape has come to a complete stop.

d. Reel Size Selectors

These selectors are on all the tape transports, located to the left of the START and STOP buttons. Make certain these toggle switches are in the appropriate positions. The 7 inch position should be used for EIA hub reels; the 10-1/2 inch position should be used for NAB hub reels (10-1/2 or 14 inch).

e. Power Switch

There are two POWER switches associated with the Master, one on the tape transport, another on the master control panel.

Each slave has its own tape transport POWER switch.

f. Gain Controls

Two step attenuator controls are located on the master record panel. The master record panel GAIN, on the left as the user faces the equipment, should be so connected that it serves track 1 (upper and fulltrack) and the right hand control GAIN should serve track 2 (lower).

Normal program level peaks should not exceed zero v-u.

Attenuator controls are usually set at calibration 28 for normal levels. These adjustments should not be changed unless the level of the master recording is low or high. Normally, all record channels should be set for the same level (zero v-u on their respective meters), while duplicating or reproducing a full track tape having a tone at normal program level using 250-1000 cycles.

g. Bias Level Setting

On the master control assembly, the BIAS control provides an adjustment for bias current to all slaves in the system. The output meter indicates bias voltage, and is calibrated to read zero v-u while supplying the proper bias to the slave head switch panels. The scale readings are arbitrary, a v-u meter was used to simplify spare parts procurement.

Assuming bias of each slave has been properly adjusted with a median tape (a tape having average coercive characteristics), variation in tape bias characteristics can be

compensated for by varying the BIAS control on the control panel. Increasing bias will result in decreased high-frequency response; conversely decreasing bias will accentuate high-frequency response. It is desirable to set up the system for optimum response with the type of tape to be used on the equipment.

SLAVE EQUIPMENT

a. Head Switches and Track Characteristics

Three double pole single throw toggle switches, one for each head, provide a means to disconnect bias and record current to any head. Individual screw driver adjustment controls for bias and record currents are available for each of the three heads.

b. Record Level Setting

On the slave switch panel there are three RECORD LEVEL vernier controls, one for each head. A phone jack is provided to afford means for measuring record current or bias at each head.

OPERATING PROCEDURE

IMPORTANT

BECAUSE THERE ARE NO ERASE HEADS IN DUPLICATOR SYSTEMS, PREVIOUSLY USED TAPE MUST BE ERASED WITH A BULK TAPE DEGAUSSER.

Step 1: Thread bulk erased blank tape into each slave duplicator. Place the head switches on the slave head switching panel to the ON position for the tracks to be duplicated.

Step 2: Place the MODE SELECTOR for the master and each slave in PLAY position.

Step 3: Set the TAPE SPEED table above the RECORD EQUALIZATION knob on the front panel indicates LOW-HIGH speed setting for the required duplication .

Step 4: Make certain that FAST START switches, located on the connector panels mounted under the tape transports, are in the proper positions on master and slaves.

Step 5: Place all POWER switches on the master control panel, and tape transports to the ON position.

Step 6: Thread the master tape to be duplicated on the master reproduce tape transport.

Step 7: Set the RECORD level control to the proper setting; normally 28. (See RECORD LEVEL SETTING.)

Step 8: Press the START-RECORD button on the master control panel. This is the only switch on the entire equipment that will start the complete system.

Step 9: Set the BIAS level control on the master bias oscillator to a reading of zero on the v-u meter (or to suit the characteristics of tape being used).

Step 10: When recording has been completed press the STOP button on the master control panel. Rewind the master tape.

Duplication may be stopped at any time by pressing the STOP button on the master control panel.

REMOTE CONTROL

A suggested remote control wiring diagram may be found on the Master Control Panel Schematic (Figure 4-13).

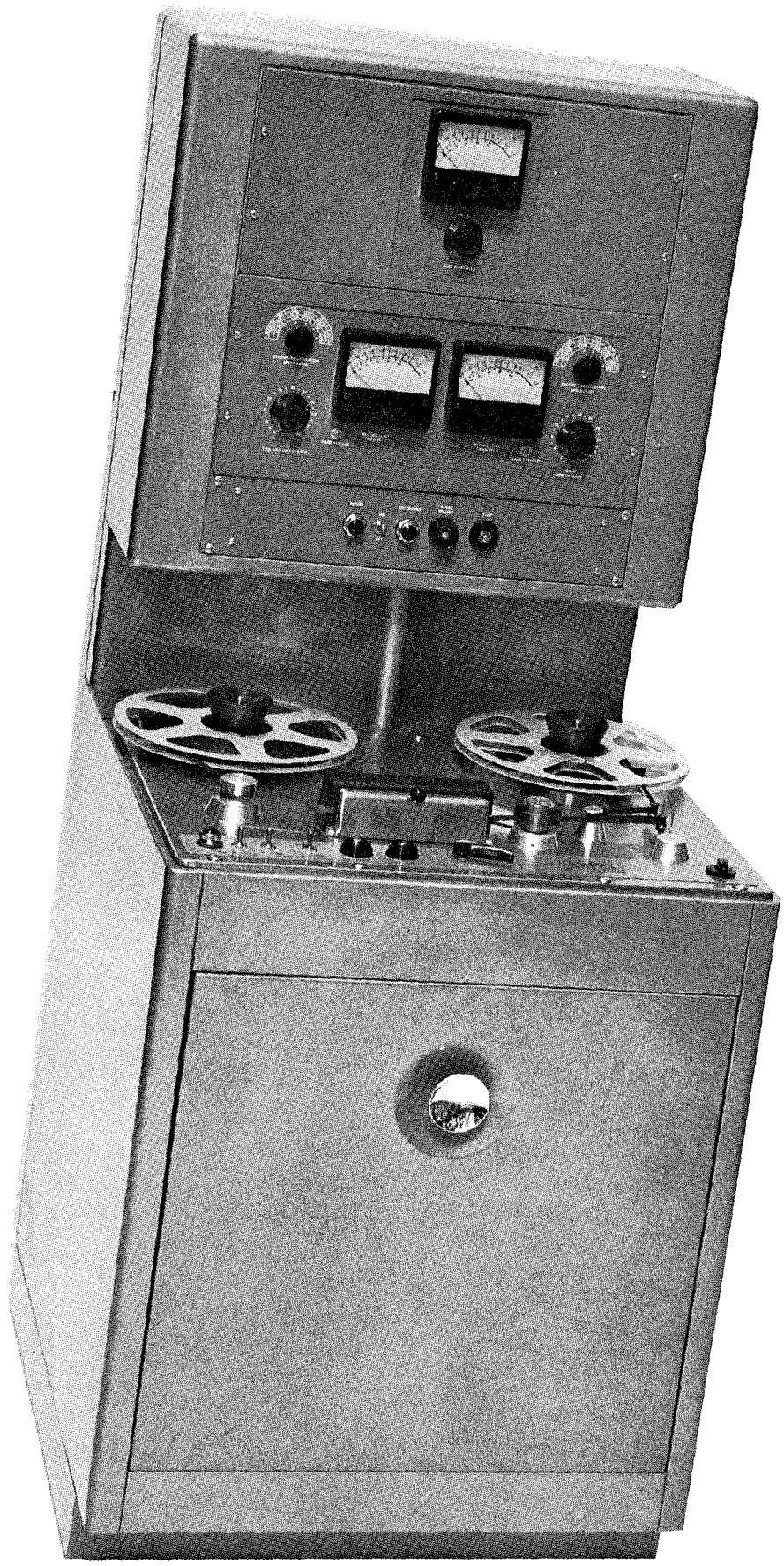


Figure 3-3 MASTER DUPLICATOR CONSOLE