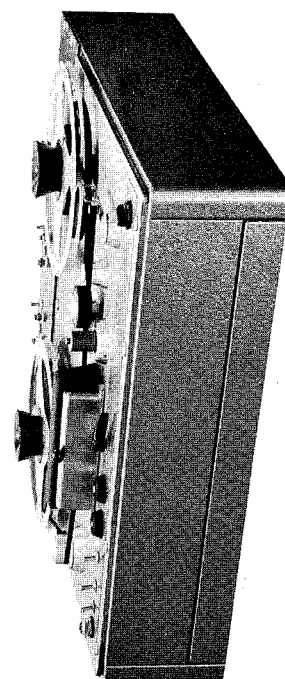
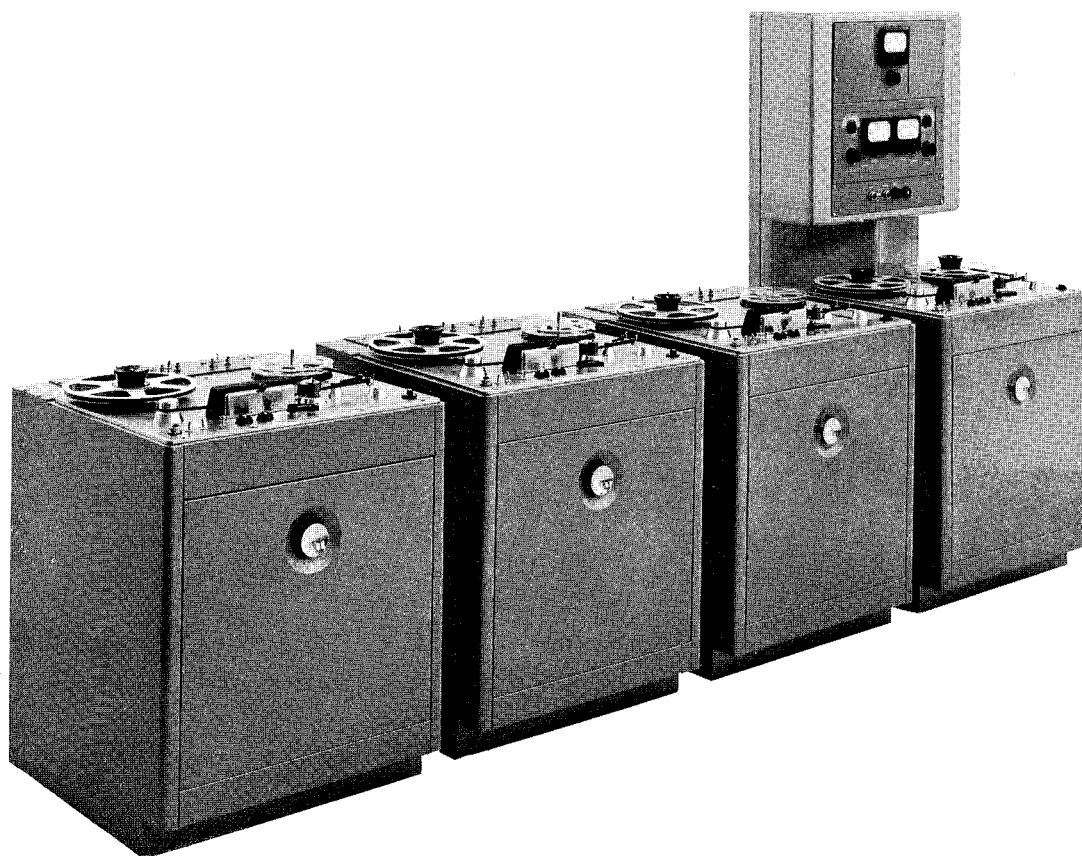


# MODEL 3200D

July 1960  
TM-2008

## TAPE DUPLICATOR SYSTEM



## OPERATION AND MAINTENANCE MANUAL

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# Section 1

## Description and Performance Characteristics

### GENERAL

The Ampex Series S-3200D Tape Duplicator Systems provide the finest and latest techniques for high speed, mass duplication of previously recorded magnetic tapes.

The S-3200D Master Reproduce unit feeds an output to Slave duplicators in any desired number to a maximum of ten Slaves. Convenient central control is accomplished through a Master Control panel above which are mounted a Master Record Electronic assembly and a Master Bias Oscillator. The latest designs in electronic components have been introduced through the system.

The duplication process takes place at either 60 or 30 ips. Any audio recording made on 1/4-inch tape at speeds of 7-1/2, 3-3/4, 30 or 15 ips can be duplicated including full track, half track and two-channel stereophonic. From master recordings, duplicate copies can be made that will reproduce at the original speed of the master tape -- a one-to-one ratio; or, with the exception of stereophonic tapes\* which must be duplicated at a 1:1 ratio, the duplication process can be accomplished at a two-to-one ratio (for example, a 7-1/2 ips duplicate can be made from a 15 ips master). Masters originally recorded at 7-1/2 ips can be duplicated so that the tapes copies will reproduce at 3-3/4 ips; and 15 ips master tapes, can be made into 7-1/2 ips copies. Both tracks of a dual track tape can be duplicated simultaneously or individually as either upper or lower track, or as full track recordings. If more than one Slave Duplicator is used, it is possible to produce simultaneously from one master tape, a set of tapes with differing track arrangements.

The S-3200D will produce as many as

ten copies at one time, depending upon the number of slaves in the system. When ten slaves are used, ten copies of a half hour 7-1/2 ips master tape can be made in less than four minutes. Such a duplicator installation is capable of producing approximately 120 half hour copies per hour, a production speed-up ratio of more than 60:1 compared to a conventional dubbing arrangement.

### PERFORMANCE CHARACTERISTICS

	Master	Slave
<u>Tape Speed (ips)</u>	60-30	60-30
	Master	Slave
<u>Tape Width (inches)</u>	1/4	1/4
<u>Frequency Response (cps)</u>	Duplicating Master to Copy	
±2 db, 50 to 5,000		
±4 db, 50 to 7,500	3-3/4 ips to 3-3/4 ips	
±2 db, 50 to 5,000		
±4 db, 50 to 7,500	7-1/2 ips to 3-3/4 ips	
±2 db, 50 to 10,000		
±4 db, 50 to 15,000	7-1/2 ips to 7-1/2 ips	
±2 db, 70 to 10,000		
±4 db, 50 to 15,000	15 ips to 7-1/2 ips	
±2 db, 70 to 10,000		
±4 db, 50 to 15,000	15 ips to 15 ips	
±2 db, 100 to 30,000		
±4 db, 50 to 60,000	30 ips to 30 ips	
<u>Signal-to-Noise Ratio</u>		

Exceeds 55 db in 7-1/2 or 3-3/4 duplicates made at either 60 or 30 ips duplicating on a 1:1 basis; or 50 db if made on a 2:1

\* If it is desired to use a 15 ips master to make 2:1 7-1/2 ips copies, in-line heads, available on special order through Ampex Contract Engineering, must be used.

basis, as referred to peak record level. (Peak record level is defined as that level at which the total rms harmonic distortion is 3 percent when measured on a 400 cycle tone reproduced from the tape at normal playing speed.)

Flutter and Wow

Will not introduce more than 0.2 percent rms in duplicates measuring all components up to 300 cps at any duplicating speed.

Stable Tape Motion Time

Using 10-1/2 inch NAB reels, or 60 ips, the tape attains stable tape motion in approximately 2-1/2 seconds (12-15 foot leader), in fast start mode.

Duplicating Time

NAB (in.)	At 30 ips	At 60 ips
7 (1200 ft)	8 min	4 min
10-1/2 (2400 ft)	16 min	8 min
14 (4800 ft)	32 min	16 min

Stopping Time

Reel Size	Duplicating Speed (ips)	Tape passing through head housing after STOP button is pressed (in.)
7" EIA	60	15
10-1/2" NAB	60	18
14" NAB	30	15

Rewind Time Master Tape

Reel Size	Time (sec)
7" EIA (1200 ft)	54
10-1/2" NAB (2400 ft)	55
14" NAB (4800 ft)	100

Power Requirements 117 volts, 50 or 60 cycle, as ordered

Master Tape Transport 5 amp  
 7870-01 transport with two 30637-01 or 30637-03 Reproduce Amplifiers, one 30639-01 Record Amplifier and one 30638-01 Bias Oscillator

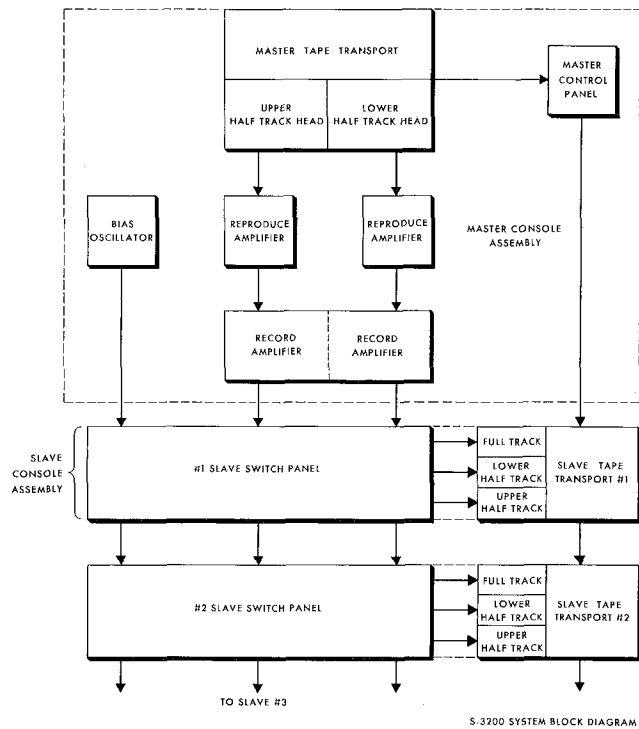
Each slave tape transport 1.5 amp

SYSTEM COMPONENTS

The only differences among the ten systems in the series are in the number of slave duplicators, and the number of inter-connecting cables required. In console systems, a cooling fan is supplied with the console containing the master reproduce unit. The list below covers the components for the basic system.

Component	Rack Space Required (in.) (19" wide)	Ampex Catalog No.	Schematic No.
Master Reproduce and Slave Tape Transports (Rack mounting is optional)	24-1/2	7870-01 (60 cps power) 7870-02 (50 cps power)	
Master Reproduce Head Assembly (Staggered heads)	-----	475-26	
Slave Record Head Assembly	-----	475-28	
Master Reproduce Electronics (Two supplied)	5-1/4	30637-01	30640
Master Record Electronics	8-1/2	30639-01	30657
Master Bias Oscillator	8-1/2	30638-01	30641
Master Control Panel	3-1/2	5993-00	30923
Slave Switch Panel	5-1/4	5997-00	5997
Master Reproduce Console (optional)	-----	565-07	
Slave Duplicator Console (optional)	-----	565-06	
Cabinet Rack for Duplicator Electronics	-----	17731-101	





**Fig. 1-1 SYSTEM BLOCK DIAGRAM**  
DESCRIPTION

The system employs 7-inch, 10-1/2-inch, or 14-inch reels; tape tension can be adjusted permitting simultaneous use of different sized reels on any tape transport in the system. A pair of toggle switches on each tape transport is used to adjust the torque of the takeup and rewind motors to provide holdback tape tension appropriate to the diameter of the reels used on each turntable.

All tape transports in the system are of identical construction. Hysteresis synchronous motors are used for capstan drive, and induction motors for the turntables. All tape transports operate at either 30 or 60 ips, and are controlled by a two-position selector switch. The speed switch on the master reproduce tape transport controls a relay, which changes the equalization in the master reproduce electronic assembly appropriate for the tape speed selected.

The operating modes of all tape trans-

ports -- PLAY, REWIND, and FAST FORWARD, are determined by a three-position selector switch. Two pushbuttons, START, and STOP, control tape motion. The start and stop functions for all the tape transports in the system are carried on a control buss to the master control panel; but any single tape transport in the system can be controlled individually with its own controls; or all can be controlled simultaneously from the master control panel.

The master reproduce tape transport is equipped with two half-track reproduce heads; one for an upper, and one for a lower track. The upper half track head is adjusted to reproduce properly a full track tape, and is used interchangeably to reproduce either the upper half track of a double track (dual track) or full track tape. Each of these two heads feeds an individual reproduce amplifier. These amplifiers are equalized to afford uniform reproduction from a constant flux tape when reproduced at 60 ips or 30 ips, thus insuring copies which have the same flux versus frequency characteristics as the original recording.

The output of each master reproduce amplifier is fed to the master record amplifier, consisting of two power amplifiers and a power supply. A four-position selector switch on each input section of the master record amplifier is used to provide proper pre-emphasis (equalization) appropriate to the speeds at which the master and slave tape transports will be run.

The signal from the upper half track head in the master reproduce unit feeds AUDIO No. 1 buss and the signal from the lower half track reproduce head feeds AUDIO No. 2 buss. Each slave has three heads: full track, lower half track and upper half track, from left to right facing the machine. The two audio busses are connected to the record heads of each slave duplicator through the individual slave head switch panels. These switches, on each

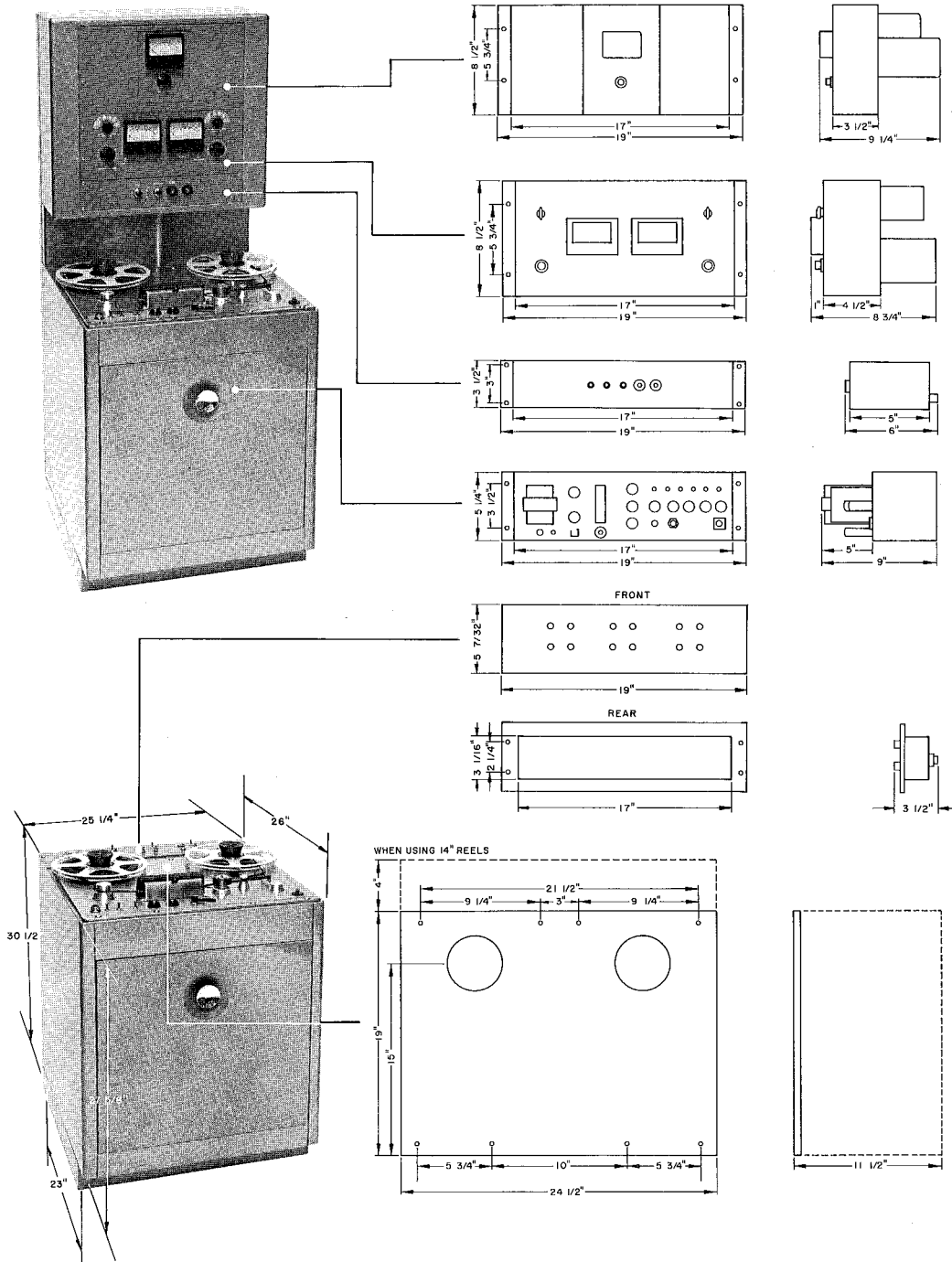
slave recorder, are used to select the appropriate head configuration to record the desired type of copy: full track, half track, double track (dual track) or two track stereophonic.

Another buss carries the bias signal from the master bias oscillator to the slave duplicator record heads. The bias signal is controlled by the START-RECORD pushbutton on the master control panel. The bias oscillator will supply the bias required for twenty

record heads.

**NOTE**

There are no erase heads in the system. All tapes upon which duplicates are to be made, must be bulk degaussed before using; but make certain that the master tapes are not degaussed before the duplicating process.



**Figure 1-2 SYSTEM COMPONENTS AND DIMENSIONS**