

AMPEX

Multilock System Synchronizer

*For maintaining perfect synchronous
operation of two or more
videotape and/or audio recorders ...
to a synchronization accuracy
between "master" and "slave"
of 200 microseconds or less.*



The Ampex Multilock System Synchronizer permits recording and reproduction of video information simultaneously with multiple "separate system audio" in a manner that maintains synchronous playback throughout the duration of the recording. It also allows frame by frame synchronous playback of two or more videotape recorders and other audio or video devices as long as proper synchronizing information can be recorded and reproduced. In addition, it can be used to maintain synchronous operation of several recorders to a master reference source.

Operation

In recording modes, the synchronizing information is recorded on a separate channel of the recordings to be reproduced synchronously. The start is marked by a cue pulse that is generated when the Multilock CUE pulse button is depressed. This pulse will be present on all of the recordings and is used as a reference to obtain synchronism on playback. When synchronized playback is required, the master and slave tapes are threaded on their respective recorders and cued up at a point prior to the occurrence of the cue pulse. The recorders are interlocked by the system so that when

the Multilock START control is initiated, the master and slave recorders start together, but are not precisely synchronized. By comparison of the synchronizing information on the separate tapes, precise synchronism is achieved within eight seconds and is maintained throughout the recording.

Description

The Multilock System consists of three chassis:

- (1) Multilock controls and all digital, servo and logic circuits (illustrated)
- (2) Regulated $\pm 12V$ power supply
- (3) Capstan drive amplifier

Chassis (1) and (2) are required to lock together two videotape recorders. Chassis (1), (2) and (3) are required to lock together one videotape recorder and one audio recorder. To expand a system to include more VTR's, an additional Multilock system, comprised of chassis (1) and (2), is required for each slave VTR. Similarly, for each slave audio recorder added, an additional Multilock system, comprised of chassis (1), (2) and (3) is required.

Complete systems for closed-circuit and broadcast television

Specifications

Locking Range:

infinite; system synchronization can always be attained as long as the two systems have proper synchronizing information

Memory Capacity:

handles recordings of over 9 hours duration (function of counter time range)

Inputs:

Master: 60Hz timing information
30Hz timing information

Slave: 60Hz timing information
30Hz "A" timing information
30Hz "B" timing information

Output:

60Hz sine wave, 2V p-p, to capstan drive amplifier; two 30Hz control track signals

Power Required:

±12V at 1.5 amps

Size:

5¼" high, width to fit standard 19" rack

Components:

1. Multilock control: 5¼" high, fits standard 19" rack
2. Regulated power supply 3½" high, fits standard 19" rack
3. (a) 40 watt capstan drive amplifier 3½" high, fits standard 19" rack
(b) 80 watt capstan drive amplifier 5¼" high, fits standard 19" rack

(Power requirements of slave audio recorder determine whether 3A or 3B is specified)

Front Panel Controls

MODE:	has OFF, AUTO/RESET, MANUAL/RESET
STOP:	combined STOP function of master and slave units
PLAY:	combined PLAY function of master and slave units
RECORD:	combined RECORD function of master and slave units
SEARCH:	initiates synchronism search of slave to master unit
FAST FORWARD:	initiates FAST FORWARD functions of master unit
REWIND:	initiates REWIND function of master unit
CUE:	records CUE PULSE on master and slave control tracks during RECORD mode
RETARD:*	retards slave unit with reference to master unit by one reference pulse with each depression
ADVANCE:*	advances slave unit with reference to master unit by one reference pulse with each depression

* Greater than one reference pulse separation from synchronization is possible when depressed simultaneously with CUE button

TIMING

INDICATORS: A green center light indicates when master and slave units are locked together; amber lights on either side indicate the relative position of the slave unit; (fast or slow) red lights on either extreme indicate approach of memory capacity limits

Internal Controls

MASTER REFERENCE SELECTOR:	selects OFF, LINE, 60Hz, 30Hz Test
SLAVE REFERENCE SELECTOR:	selects OFF, LINE, 60Hz, 30Hz Test
TEST OSCILLATOR SWITCH:	ON/OFF

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