

# RA-1592-TYPE MIXER

TECHNICAL INFORMATION BULLETIN

*Westrex*

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## RA-1592-TYPE MIXER

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# Westrex Corporation

HOLLYWOOD DIVISION

## TECHNICAL INFORMATION BULLETIN OPERATING AND MAINTENANCE INSTRUCTION FOR RA-1592-TYPE MIXER

### 1.0 Use

The RA-1592-Type Mixers are intended primarily for use in the 1200-Series Recording Systems.

### 2.0 Illustrations

Figure 1. View of RA-1592-B Mixer with Optional Bar-type Handle.

Figure 2. Schematic Circuit of RA-1592-Type Mixer.

Figure 3. Wiring Diagram of RA-1592-Type Mixer.

Figure 4. Test Circuit for RA-1592-Type Mixer.

Figure 5. System Interconnection Diagram.

### 3.0 General Characteristics

#### 3.1 Electrical Characteristics

Power Requirements: 0.3 amperes at 115 volts a-c, 50 or 60 cycles.

Audio Input: 2 balanced inputs for operation from 30-ohm or 600-ohm microphones.

Audio Output: 600-ohm output at nominal +16-dbm level into 600-ohm recorder circuit (amplifier distortion 1% at +24 dbm).

Gain: 106 db.

Signal-to-Noise Ratio: Approximately 52 db at -70 dbm input.

Mixers: High impedance type, continuously variable controls; 60-db range followed by sharp taper to cut-off. (Mixer pots follow two-stage pre-amplifiers).

Dialogue Equalization: Separate dialogue equalization for each mixer, 0, 8 or 12 db at 100 cycles, selected by a switch.

Pre-equalization: Low-frequency; flat, Westrex (3 db) or ISO-SMPTE (6 db) pre-equalization characteristics, selected by soldered connection.

High-frequency: approximately 5-db rise at 10,000 cycles) normally supplemented by additional pre-equalization in recorder for flat over-all response using the ISO-SMPTE reproducing characteristic.

Talk-back or Slate: (Optional in RA-1592-A; furnished in RA-1592-B) Microphone on front panel with push-to-talk control.

Operates through output amplifier stage into recording circuit for slating or communication to boom monitor and recorder.



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### 3.0 General Characteristics (Continued)

Direct-Monitor Facilities:	Mixer; +2 dbm at normal record level into 50-ohm circuit; front panel volume control. Boom monitor; -6 dbm at normal record level into 50-ohm circuit (optional in RA-1592-A, furnished in RA-1592-B).
Volume Indicator:	Standard V.U. Meter (high-speed volume indicator available on special order). Output jack permits using meter for measurement of recorder bias current.  "REC-TEST" switch sets sensitivity for 0-db deflection at 100% film modulation for program or sine-wave signals respectively.

### 3.2 Mechanical Characteristics:

Dimensions:	16-5/8" wide x 10" high x 5-5/8" deep.
Weight:	22 lbs.
Case:	Plywood, gray plastic finish.

### 4.0 Description

The RA-1592-Type Mixer is a compact, lightweight portable unit which, when associated with an RA-1591-Type Recorder, forms the 1200-Series Magnetic Recording System. The mixer is provided with interconnection receptacles on the rear, and when mounting accessories are not supplied, it is intended to be operated with the panel in an upright position. An optional bar-type handle, which replaces the standard suit-case handle, provides means for supporting the mixer on a table surface with the panel in an inclined position. An optional tripod and tripod mount are also available. In the event it is intended to remove the mixer from its case and mount it in a standard equip-

ment cabinet, two L-94527 Adapter Bracket Assemblies are required. Figure 1 is a view of an RA-1592-B Mixer in the operating position supported by the bar-type handle. The front control panel is hinged along the bottom and is secured by two Camloc fasteners so that it may be opened readily for access to the mixer interior. Four additional Camloc fasteners permit removal of the complete mixer chassis assembly from the wooden enclosure.

There are two versions of the mixer. The RA-1592-A is intended primarily for use in the 1206 PerfoTape Magnetic Recording System. The RA-1592-B Mixer is intended for operation in the 1216 and 1217 Magnetic Recording Systems. The latter mixer contains additional facilities for talk-back and slating, and a boom-monitor output circuit. The former type mixer may be converted readily to the latter type by the addition of a small kit of parts.

### 4.1 Recording Circuit

Figure 2 shows a schematic circuit of the mixer. The talk-back circuit and the boom-monitor circuit, which are not furnished in the RA-1592-A Mixer, are shown in broken lines. The recording circuit contains provisions for operating from two low-impedance microphone inputs into separate two-stage pre-amplifiers, followed by separate dialogue equalizers and mixing potentiometers. If desired, the connections to the input transformers can be changed for operation from 600-ohm instead of 30-ohm microphones. Dialogue equalization of 0, 8 or 12 db at 100 cps in each circuit is provided by selector switches. The mixing potentiometers provide a continuously variable attenuation range of over 60 db. For the nominal input level of -70 dbm, the potentiometer is set to provide a useful gain range upward of 20 db and downward of 40 db, before tapering to complete cut-off. The combined output from the mixer potentiometers is sent to a two-stage gain amplifier which is followed by a phase-inverter push-pull output stage. A voltage feedback loop around these stages contains a high-frequency and a low-frequency pre-equalization rise. As shown in the circuit, R-29 and C-14 provide the standard 6-db low-frequency pre-



#### **4.0 Description (Continued)**

equalization characteristic complementary to the ISO-SMPTE reproducing characteristic. If the Westrex 3-db low-frequency rise is desired, an additional 750 mmf condenser should be connected in parallel across these two elements as indicated in the schematic circuit. If no low-frequency equalization is desired, a short-circuiting strap should be connected across R-29 or C-14. High-frequency pre-equalization of approximately 5-db at 10,000 cps is provided by resistor R-25 and condenser C-13. The remaining portion of the high-frequency pre-equalization to provide the appropriate recording characteristic is located in the recorder in the series circuit feeding the record head.

The 600-ohm output from the push-pull stage is capable of delivering a signal to the recorder which is 8-db above the nominal record level (+16 dbm) with not more than 1% distortion over the operating frequency range.

The entire amplifier circuitry of the mixer from the dual-pre-amplifier input through the recording amplifier output, with the exception of the front panel controls is assembled on one compact, etched-circuit board. This amplifier assembly is flexibly mounted in a vertical frame and is completely accessible for inspection or voltage measurements with the front panel in the open position.

#### **4.2 Metering**

The V.U. Meter Circuit is connected across the 600-ohm output circuit when the selector switch S-3 is set in the "REC" (record) position. Resistor R-39 adjusts the sensitivity to give a 0-db meter deflection for program material at the 3% distortion level on the magnetic medium. This adjustment takes into account an 8-db "lead" to accommodate the sharp peaks encountered in program material. With the selector switch in the "TEST" position, the sensitivity of the meter is decreased to provide a 0-db meter deflection for a sine-wave signal at this 3% distortion level, for test recording purposes.

Section B of the selector switch disables the monitor circuit when the switch is in the "TEST" position, so that the switch may not be left inadvertently in this incorrect position during a recording without drawing the attention of the mixer operator by the loss of monitor signal. In the 1206 PerfoTape Magnetic Recording System no bias meter is provided in the recorder. Bias current may be measured by connecting a short patch cord which is supplied with the system, between the recorder and the V.U.-meter jack in the mixer. Selector switch S-3 must be in the test position to measure bias current and a "0" db meter deflection indicates correct bias current.

#### **4.3 Monitoring Circuit**

A direct-monitor output is provided for the mixer operator. The circuit is taken from a tap on the output transformer and a nominal +2-dbm level is available for a 50-ohm high-quality dynamic headset. The monitor level may be adjusted to suit by a control on the front panel.

A separate 50-ohm monitor circuit goes to J-7 and provides a nominal level of -6 dbm for the boom monitor.

#### **4.4 Power Supply**

The power supply operates from a 115-volt, 50/60 cycle, a-c line, furnishing power for all the transmission equipment in the 1200-Series Magnetic Recording System. Silicon semi-conductor rectifiers are used in bridged circuits for both the low-voltage and high-voltage sections. The low-voltage section furnishes a nominal 24 volts d-c to operate the filaments of the vacuum tubes in the mixer and to operate the transistorized bias oscillator and monitor amplifier in the recorder.

The high-voltage section provides a nominal 300 volts d-c for the plate circuits of the tubes in the mixer.

#### **5.0 Installation and Operation**

Installation and operation are covered in Sections 7, 8 and 9 which describe the 1200-Series Magnetic Recording Systems.



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### **6.0 Maintenance**

Significant point-to-ground voltages are shown on the schematic circuit in Figure 2. The wiring diagram is shown in Figure 3.

The following routine tests may be made periodically as may be found desirable to insure that the transmission equipment is functioning properly. The mixer should be connected into the test circuit shown in Figure 4 for these tests.

### **6.1 Recording Channels**

#### **6.11 Gain (Channel 1 or Channel 2)**

Input: 30 ohms impedance  
Mixer Controls: On measured channel 20 db; on other channel maximum attenuation.  
Dialogue Controls: On "0"  
Meter Switch: "TEST" position  
Input to Mixer: 1 kc at -70 dbm.

Under these test conditions, the mixer output should be approximately +16 dbm (V.U. Meter at approximately 0 db).

#### **6.12 Noise Level (Channel 1 or Channel 2)**

Input: Measured channel terminated in 30 ohms at input receptacle; measured channel mixer set at 20 db; other channel mixer at maximum attenuation.  
Dialogue Controls: On "0"

Under these test conditions, the mixer output should be -34 dbm or less. If the noise level is above this value, it may be necessary to replace the input tube, V-1 for channel 1 or V-2 for channel 2.

#### **6.13 Monitor Level (Channel 1 or Channel 2)**

Input: 30 ohms impedance.

Mixer Controls: Adjust for +16 dbm output (V.U. Meter at approximately 0 db).

Dialogue Controls: On "0"

Meter Switch: "REC" position.

Monitor Level Control: Fully clockwise.

Under these test conditions, the nominal monitor output level should be +2 dbm in a 50-ohm circuit, or -9 dbm indicated on 600-ohm VTVM.

### **6.14 Talkback Microphone**

With the selector switch, S3, set at "REC", press the "Talk" button and speak at a normal level approximately one foot from the talkback microphone. The deflections on the V.U. Meter should indicate approximately 0 db.

### **6.2 Power Supply**

Periodic tests should be made to verify that the output voltages are in accordance with the nominal values shown on the schematic circuit in Figure 2.

## **7.0 1206 Magnetic Recording System**

The 1206 Magnetic Recording System records a 90-mil magnetic track on 1/4" PerfoTape. The principal units of the system are the RA-1592-A Mixer and the RA-1591-A Recorder. Two power cables, 2 microphone cables, an interconnection cable and a patch cord for measuring bias by means of the V.U. Meter are furnished in the lengths indicated on the interconnection diagram which is shown in Figure 5. One Permoflux HDA-50-SR 50-ohm headset is supplied for the mixer position and one Trimm S-35 600-ohm headset is supplied for the recorder in the 1206 Magnetic Recording System.

### **7.1 Preparation for Recording**

It is assumed the mixer has been adjusted in accordance with instructions given in this bulletin and that the recorder has been adjusted



## **7.0 1206 Magnetic Recording System (Continued)**

in accordance with instructions given in the bulletin for that unit.

(a) Connect the system in accordance with the interconnection diagram shown in Figure 5.

(b) Turn on the power switch on the mixer and permit the equipment to warm up for a few minutes.

(c) Set the selector switch on the mixer to the test position and verify that the value of bias current is correct by connecting the patch cord between the meter jack on the mixer and the bias jack on the recorder and noting that the V.U. Meter needle is at the "0" position. If necessary, adjust the bias current by the control on the recorder instrument panel. Then remove the patch cord and set the selector switch on the mixer to "RECORD".

(d) Set the dialogue equalization in each pre-amplifier circuit as desired.

(e) Thread the recorder with PerfoTape film and set the footage counter to "0". Set the motor direction switch to "FWD" and set the selector switch on the recorder to "REC" which will cause the record signal lamp to light.

### **7.2 Recording Operation**

The system is now ready for recording and the recorder is put in operation by turning on the motor switch. As soon as this is done, verify that the two triangular targets on the filter roller are in line under operating conditions and if they are not, adjust the slotted screw just above the target and then close the plastic door to reduce acoustic noise from the recorder.

### **7.3 Reproducing Operation**

(a) Thread the film in the reproducer, set the footage counter to zero and set the motor-direction lever to "FWD".

(b) Set the selector switch on the recorder to "REP" and observe that the record signal light goes out, indicating the recording circuit is disabled.

(c) Turn on the motor switch and observe that the triangular threading indicators are in alignment.

### **7.4 Rewind Operation**

(a) With the motor switch off, set the motor-direction lever to "REV".

(b) Turn on the motor switch.

## **8.0 1216 Magnetic Recording System**

The 1216 Magnetic Recording System records a 200-mil track on 16-mm magnetic film. The principal units of the system are the RA-1592-B Mixer and the RA-1591-B Recorder. The cables necessary for system operation are furnished in lengths indicated in the interconnection diagram in Figure 5. One Permoflux HDA-50-SR 50-ohm headset is supplied for the mixer position, and 1 Trim S-35 600-ohm headset is supplied for the recorder position. If a boom monitor headset is desired, one similar to the mixer headset must be ordered separately.

### **8.1 Preparation for Recording**

The preparation for recording is the same as that for the 1206 System except that a talkback microphone circuit and a boom-monitor circuit are provided. The bias current is read directly on the meter in the recorder rather than on the mixer V.U. Meter.

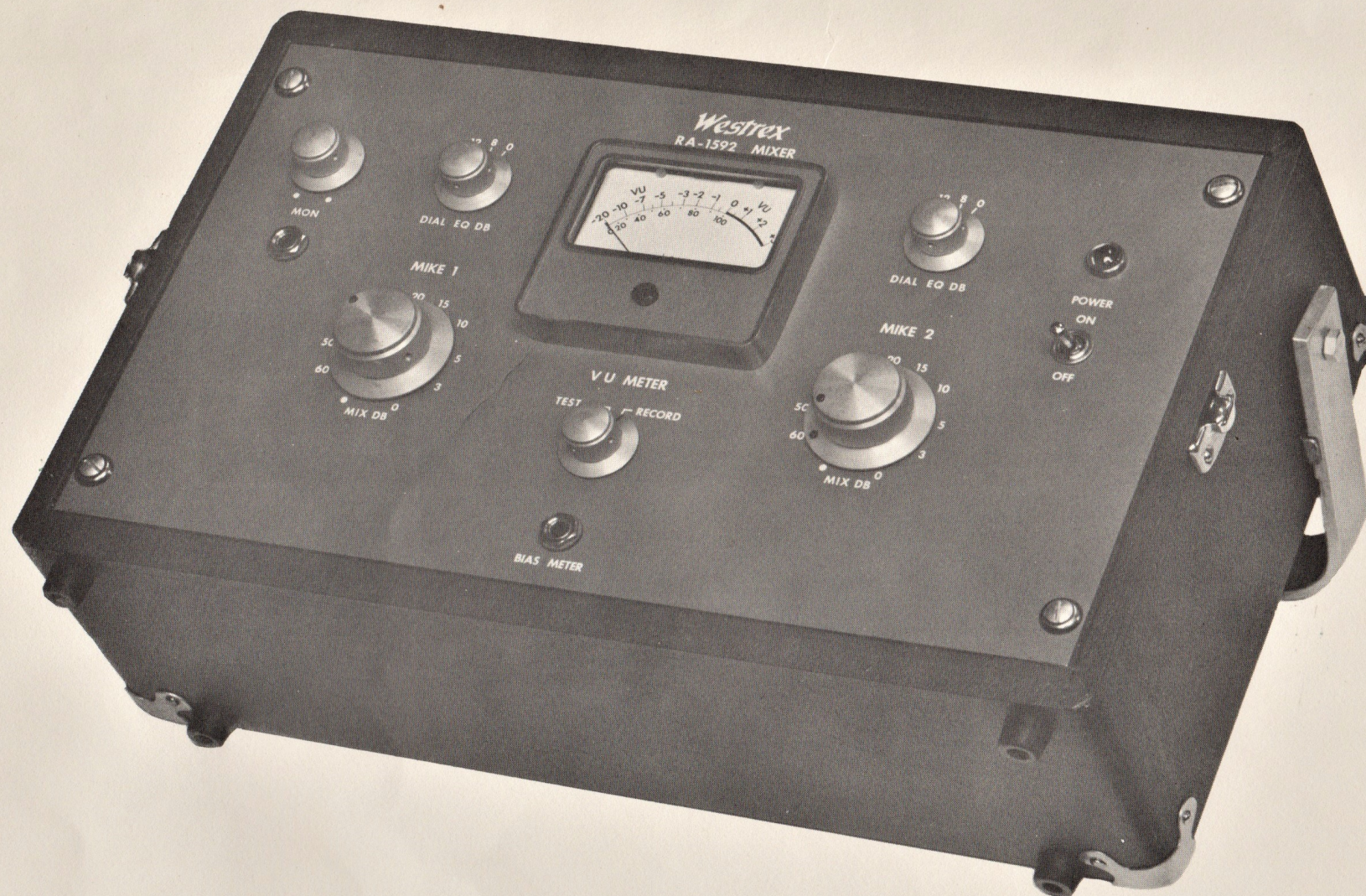
### **8.2 Operation**

The recording, reproducing and rewind operations are the same as those described for the 1206 System.

## **9.0 1217 Magnetic Recording System**

The 1217 Magnetic Recording System records a 200-mil track on 17-1/2-mm film. The principal units of the system are the RA-1592-B Mixer and the RA-1591-C Recorder. The facilities supplied, the preparation for recording and the recording, reproducing and rewind operations are the same as those described for the 1216 system.





**Figure 1. View of RA-1592-B Mixer with Optional Bar-type Handle**



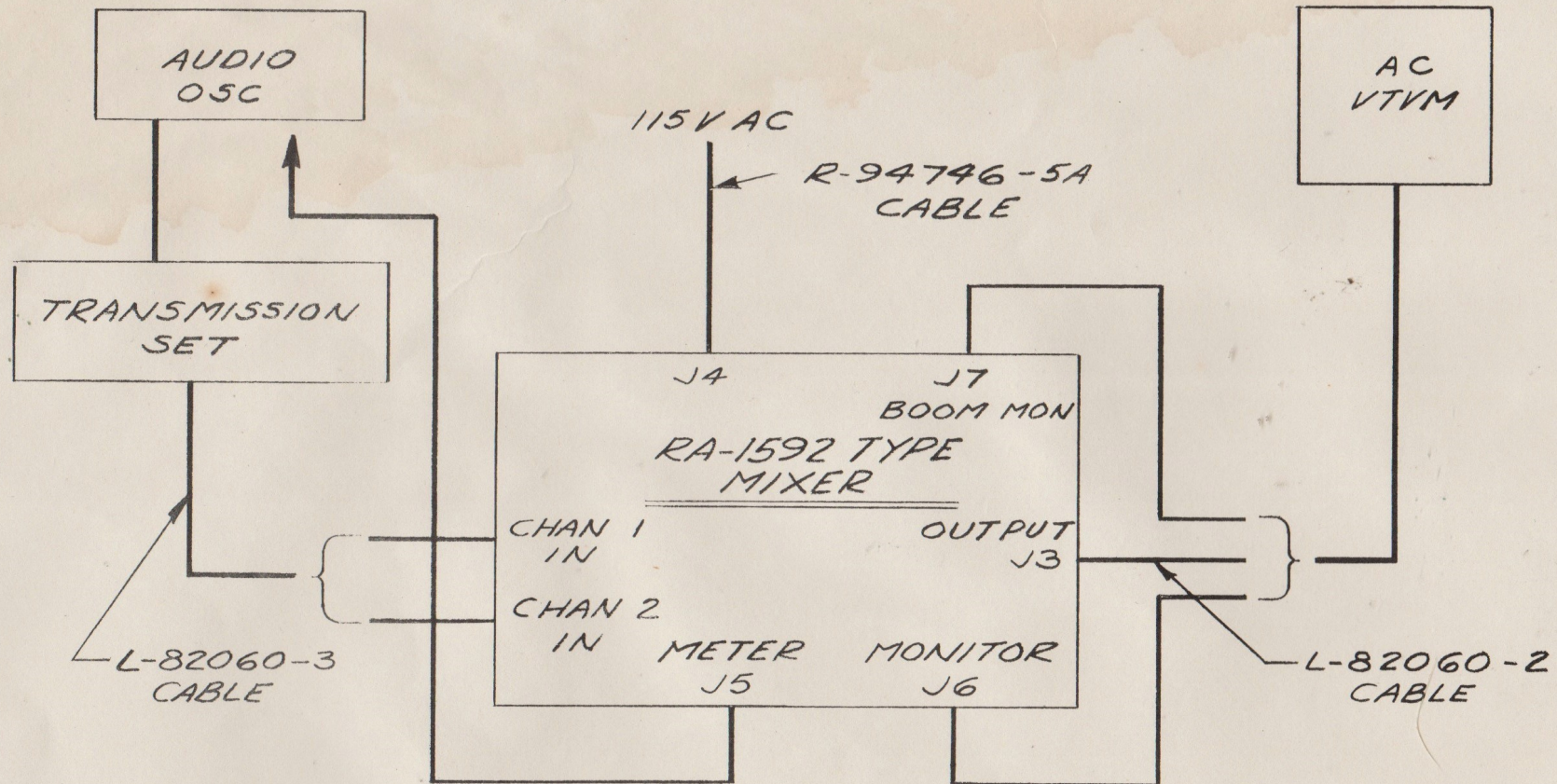


Figure 4. Test Circuit for RA-1592-Type Mixer



