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SERVICE MANUAL

4-CHANNEL
AM/FM STEREO RECEIVER
WITH FULL LOGIC SQ DECODER

MODEL LR-4000

(No. 99-02941W)

SERVICE BULLETIN

LR-4000
99-02941W

HM #154
April, 1973

To: All Store Managers, Branch Service Men, Associate Store Service Men.

Subject: Replacement of "STEREO" Indicator Lamp.

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1. Make sure LR-4000 AC "POWER" push-button is in the released [OFF] position.
2. Place the receiver right side up on a flat surface.
3. Remove the four Phillips head screws and washers [two on each side of unit] fastening the top cover, then remove cover.
4. Remove the three Phillips head screws holding the Input Selector Switch Cover [located on the left front side of unit], then remove cover.
5. Remove the four Phillips head screws and two mounting brackets [as shown in Figure] holding the Input Selector Switch Board, then lift board.

CAUTION: Lift up the Input Selector Switch Board carefully, making sure not to damage any of the push-button switch assemblies and not to pierce any of the harness wiring.

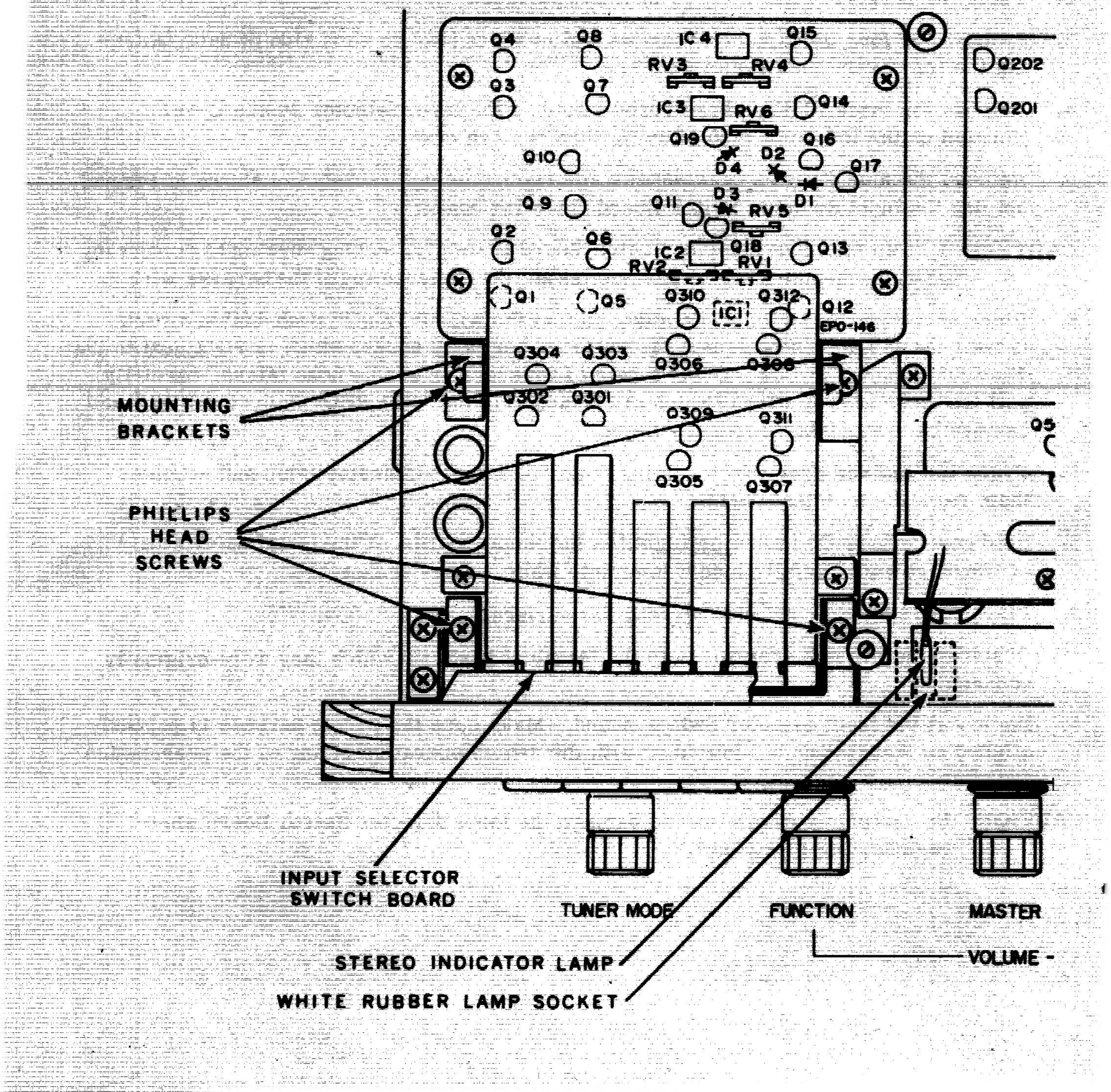
6. Place receiver vertically on its side, so that the AC "POWER" push-button switch is near the table. Then, locate the white rubber lamp socket which is right next to the Function Selector switch. Using a pair of tweezers or needle nose pliers, carefully pull the red and grey wires [which are attached to the "STEREO" Indicator Light] and remove bad "STEREO" Indicator Light.
7. Trace the red and grey wires coming from "STEREO" Indicator lamp and unsolder them from the terminal posts.
8. Hold new "STEREO" Indicator Light [on the metal portion of the lamp] using a pair of tweezers and carefully insert lamp into white rubber socket.
9. Place the receiver right side up on a flat surface.
10. Resolder the red and grey wires to the terminal posts [to which they were originally connected].
11. Re-insert the Input Selector Switch Board. Make sure the wiring harness is properly aligned so that it does not interfere with the switch operation of any of the push-button switches.

CAUTION: Be extremely careful not to damage the Input Selector Switch Board when re-inserting it into unit.

12. Attach the two brackets to the chassis using the Phillips head screws previously removed. The edge protruding on each side of board should be inserted thru the slotted portion of each bracket, with the longer bracket being on the right side of board with front of receiver facing you, then tighten both screws securely. Tighten the remaining two Phillips head screws securely to hold front of board to chassis.

13. Attach the Input Selector Switch Cover to the unit by tightening securely the three Phillips head screws removed previously.

14. Attach the top cover to the receiver by tightening the four Phillips head screws (two on each side of unit) securely.



SERVICE BULLETIN

LR-4000
99-02941W

HM #153
March, 1973

To: All Store Managers, Branch Service Men, Associate Store Service Men.

Subject: To prevent AC Hum from occuring when the "MONO-STEREO" push-button is placed in the "MONO" [depressed] position.

To correct the above problem, perform the following steps:

1. Remove the four Phillips head screws [two on each side of unit] fastening the top chassis cover, then remove cover.

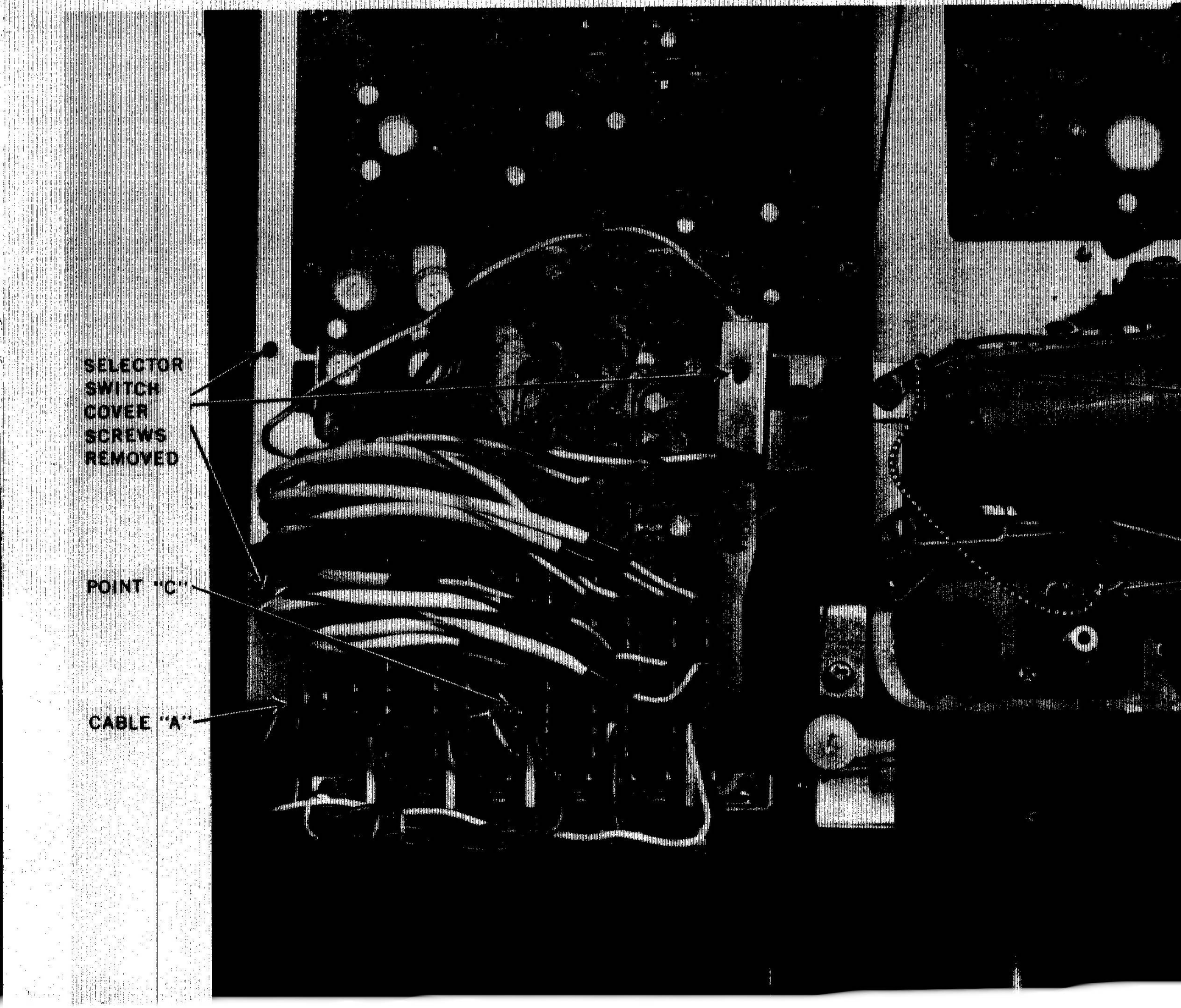
2. Remove the two screws fastening the lamp cover plate [see figure], then remove lamp cover plate.

3. Remove the three Phillips head screws holding the selector switch cover [see figure], then remove cover.

4. Unsolder black wire connecting Points "A" and "B" [as indicated by dotted line on figure].

5. Strip back the outer insulation from Cable "A" to expose the shield lead [presently unconnected]. Then connect the shield lead to Point "C" as shown on figure.

6. Perform steps 1 thru 3 in the reverse order.


SELECTOR
SWITCH
COVER
SCREWS
REMOVED
POINT "C"
CABLE "A"



360-WATT
4-CHANNEL
AM/FM STEREO RECEIVER
With
Full Logic SQ Decoder

Model LR-4000

99-02941

SERVICE MANUAL

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1. SPECIFICATIONS

AMPLIFIER SECTION

POWER OUTPUT ± 1dB	435 watts (total) 4 ohms.
	280 watts (total) at 8 ohms.
MUSIC POWER [IHF]	348 watts (total) at 4 ohms.
	224 watts (total) at 8 ohms.
RMS POWER*	256 watts (64 x 4) at 4 ohms.
	188 watts (47 x 4) at 8 ohms.
	All power ratings above at 1 KHz, 1% THD.
TOTAL HARMONIC DISTORTION [1 KHz]	0.07% at 1 watt.
	1% at rated output.
POWER BANDWIDTH	15 – 70,000 Hz.
FREQUENCY RESPONSE	20 – 20,000 Hz at 1 watt.
TONE CONTROL RANGE	BASS: 12 dB boost or cut [50 Hz].
	TREBLE: 10 dB boost or cut [10 KHz].
	MID: 10 dB boost or cut [1 KHz].
LOUDNESS SWITCH	+11 dB at 50 Hz.
	+3 dB at 10 KHz.
HIGH FREQUENCY FILTER	–9 dB at 10 KHz.
INPUT SENSITIVITY	AUX 1: 225 mV.
[at 1 KHz, for rated output]	AUX 2: 225 mV.
	MAG: 4 mV.
	CER: 140 mV.
	4 CH TAPE PLAY: 500 mV.
	2 CH TAPE PLAY: 500 mV.
	MIC: 6 mV [at 50KΩ].
MAX PRE-AMP INPUT	AUX 1: 5V.
	AUX 2: 5V.
	MAG: 90 mV.
	CER: 3V.
	4 CH TAPE PLAY: 10V.
	2 CH TAPE PLAY: 10V.
	MIC: 150 mV.
HUM and NOISE	AUX 1: –75 dB.
	AUX 2: –75 dB.
	MAG: –65 dB.
	CER: –60 dB.
	4 CH TAPE PLAY: –83 dB.
	2 CH TAPE PLAY: –83 dB.
	MIC: –70 dB.
TAPE OUTPUT VOLTAGE	450 mV [for rated input].
[2 and 4 CH]	10 V maximum.
CHANNEL SEPARATION	65 dB [50 dB or better from 50 – 10,000 Hz].

*When making tests for maximum RMS power output with all 4 channels driven, temporarily use a 3 ampere AC line fuse.

FM TUNER SECTION

TUNING RANGE	88 – 108 MHz.
IF FREQUENCY	10.7 MHz.
USABLE SENSITIVITY [IHF]	1.65 μV.
SIGNAL TO NOISE RATIO	70 dB.
HARMONIC DISTORTION	0.1%.
CAPTURE RATIO	1.5 dB.
IMAGE REJECTION	75 dB.
CROSS MODULATION INDEX	90 dB.
STEREO SEPARATION	40 dB [400 Hz].
ALTERNATE CHANNEL SELECTIVITY	60 dB.
FM ANTENNA	Built-in, plus 300 ohm balanced input for external antenna.

AM TUNER SECTION

TUNING RANGE	525 – 1605 KHz.
IF FREQUENCY	455 KHz.
ANT TERMINAL SENSITIVITY	16 μV [1 MHz].
SIGNAL TO NOISE RATIO	45 dB.
IMAGE REJECTION	68 dB [1 MHz].
ALTERNATE CHANNEL SELECTIVITY	50 dB.
AM FREQUENCY RESPONSE	Up to 4,500 Hz ± 6 dB.
AM ANTENNA	Built-in, plus input for external system.

DECODER SECTION

DECODER CIRCUITS	1. SQ Matrix decoder with full 4-channel logic.
	2. COMPOSER A: 4-channel Matrix decoder circuit.
	3. COMPOSER B: 4-channel Matrix decoder circuit.

SQ DECODER SPECIFICATIONS

Electronic Logic Circuits	[1] Front/Back Logic.
	[2] Wavematching Logic.
Matrix Phase Shift Characteristic	90° ± 10° from 50 – 20,000 Hz.
AGC Characteristic [Logic Circuits]	±3 dB for 35 dB input level change [at 2 KHz].
Decoder Channel Separation [at 2 KHz]	LF to RF: 22 dB.
	LF to LB: 20 dB.
	RF to RB: 20 dB.
	LF to RB: 20 dB.
	RF to LB: 20 dB.
	CF to CB: 15 dB.
	LB to RB: 16 dB.

GENERAL

SEMI CONDUCTOR COMPLEMENT [including Full Logic SQ Decoder]	1 Dual-Gate MOSFET
	10 FET'S
	8 IC'S
	89 Transistors
AC POWER REQUIREMENT	105 – 120 volts, 50/60 Hz AC.
DIMENSIONS	21" wide, 5 ¼" high [inc. legs], 15 ¾" deep [inc. knobs and rear protrusions].
NET WEIGHT	30 lbs.

2. FOREWORD

This service manual has been carefully, prepared to aid you in servicing the LAFAYETTE LR-4000 AM/FM Stereo Receiver. It contains, Alignment Procedure, Exploded View, Electrical Parts Locations, Complete Parts List, Block Diagram and Schematic Diagram.

Before servicing this unit read the LR-4000 Installation and Operating Manual, as it will help you to understand the correct operation of the receiver's controls and their functions.

CAUTION: Only a qualified technician having enough knowledge and experience in repair of solid state equipment should attempt to service this receiver, or damage to the unit may results.

Please follow the procedures outlined – do not attempt short-cuts.

* Always remove the AC power cord plug from the outlet when soldering or making repairs to the unit. Wait until the power supply filters have dissipated their charge.
* Do not use an ohmmeter to test transistors. In some instances the voltage across the test probes of an ohmmeter may exceed the base to emitter break-down voltage. Therefore, do not use an ohmmeter for testing transistors unless you are certain of the transistor's capability.
* Do not replace a defective output transistor, until you have determined the cause of its failure.
* When installing a power transistor, make sure that the bottom of its mounting flange, surface of the heat sink and the insulator between them are free of dust and dirt particles. Failure to observe this precaution will prevent proper heat transfer and may even puncture the insulator, causing a short circuit to ground. Also, for proper heat transfer, both sides of the insulator should be coated with silicone grease.
* To prevent damage to the printed circuit boards and components, use the correct soldering iron; small diameter tip for single connection, large areas and special de-soldering tip for multiple connection component removal.
* All voltage measurements should be made with the AC line adjusted to 117V. VTVM DC measurements are made to ground, with no signal input unless specified otherwise. Measurements may vary plus or minus 20 %.