

Sherwood

MODEL SEL-200 ALL-SILICON SOLID-STATE FM STEREO RECEIVER SERVICE MANUAL

MODEL SEL-200 225 WATTS
Serial No. Z91001 & UP



MODEL SEL-200 STEREO RECEIVER SPECIFICATIONS

amplifier

POWER OUTPUT:

- 4 OHMS: music power 275 watts ± 1 db
I.H.F. music power 225 watts
R.M.S. power per channel 85 watts
- 8 OHMS: music power 175 watts ± 1 db
I.H.F. music power 140 watts
R.M.S. power per channel 60 watts
R.M.S. power, both channels driven simultaneously 20-20,000 hertz, 40 w + 40 w @ 0.3% T.H.D.

HARMONIC DISTORTION: 0.2% @ 60 w rated output,
0.10% @ 30 watts.

INTERMODULATION DISTORTION: 0.3% @ rated output,
0.10% @ 30 watts.

STEREO & MONO SPEAKER OUTPUT IMPEDANCE
4, 8 or 16 ohms.

STEREO HEADPHONE OUTPUT: high or low impedance.

STEREO RECORDING OUTPUT: 500mv, 2K Ω .

POWER BANDWIDTH: 7-35 KHz @ 1% Dist.

FREQUENCY RESPONSE: Aux. 20-20 KHz ± 1 db.

Phono: RIAA Std. ± 1.5 db.

DAMPING FACTOR: 40:1 @ 8 ohms.

BASS CONTROL: ± 15 db @ 40 Hz.

TREBLE CONTROL: ± 15 db @ 15 KHz.

HIGH FILTER: -23 db @ 20 KHz, -3 db @ 5 KHz.

INPUT SENSITIVITY (for rated output)

Phono, 1.6 mv. variable to 7.2 mv.

Tape Monitor and Aux. 200 mv.

INPUT CAPABILITY for 1% dist.

Phono, 100 mv. Aux. 2.5 v.

HUM AND NOISE (IHF): Phono -65 db.

Aux. -80 db. Vol. Control Min. -90 db.

CROSSTALK: -50 db @ 1 KHz.

SPECIAL FEATURES: Main/Remote/Mono Speaker switches—
controls 3 independent systems.

Transistorized instant overload protection.

Thermal-relay overload protection.

Tone control flat response extends ± 5 degrees.

Front-panel tape dubbing jack.

amplifier continued:

Front-panel tape monitoring jack.

Stereo/mono, phono/auxiliary pilot lights

Adjustable panel illumination.

tuner (FM)

FM SENSITIVITY (IHF): 1.5 μ v (-30 db noise & dist.)

FM QUIETING: 0.9 μ v for -20 db, 3.0 μ v for -50 db.

SIGNAL-TO-NOISE RATIO: -70 db.

CAPTURE RATIO: 1.7 db.

SUPPRESSION OF AM: -65 db.

TUNING RANGE: 87.5 to 108.5 MHz.

DISTORTION: 0.15% @ 100% Mod. (Mono.)

SPURIOUS RESPONSE REJECTION: -100 db.

STABILITY: ± 15 KHz ($\pm .015\%$)

IMAGE REJECTION: -110 db.

IF REJECTION: -110 db.

ALTERNATE-CHANNEL SELECTIVITY: 70 db.

STEREO SEPARATION: 40 db @ 1 KHz.

FREQUENCY RESPONSE: Mono, 20-20 KHz ± 1 db.

Stereo, 20-15 KHz ± 1 db.

ANTENNA: 300-ohm balanced or 75-ohm coax.

SPECIAL FEATURES:

9-pole "Legendre" Toroid FM IF filter.

4-gang, 3 FET rf tuning circuitry.

Microcircuit IF & Synchrophase FM Limiter/Det.

Flywheel-assisted velvet tuning.

Dial scale 7 $\frac{3}{4}$ inches long, 0.2 MHz calibrations.

FET Interchannel hush with front-panel switch.

Zero-center tuning meter.

FM signal-strength meter.

Noise-protected automatic FM stereo/mono switching @ 5 μ v.

FM mono reject circuitry.

general

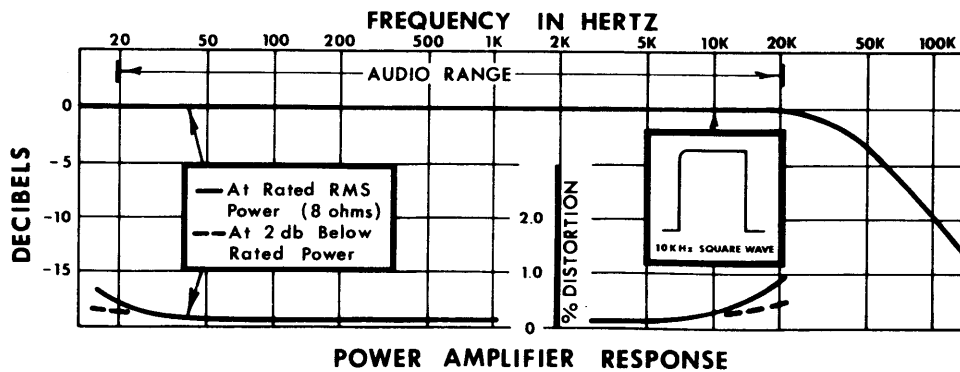
POWER REQUIREMENTS: 115-125v, 60 Hz., 30 to 300
watts fused.

AC OUTLETS: (1) 300W. switched, (1) 300W. unswitched

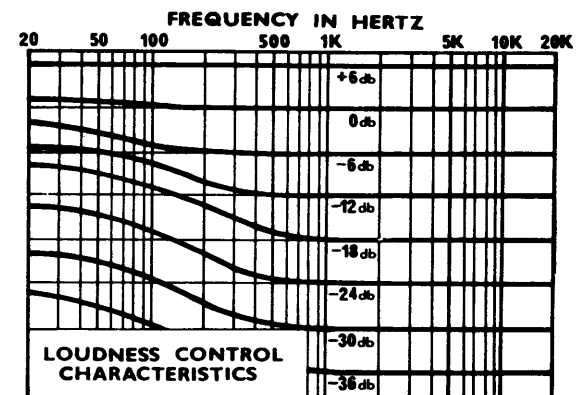
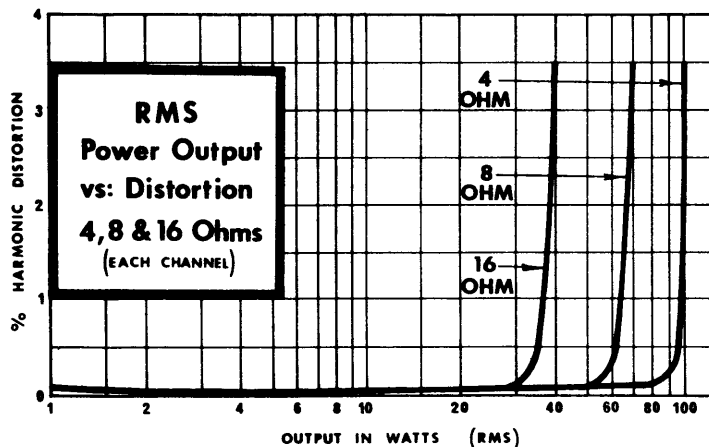
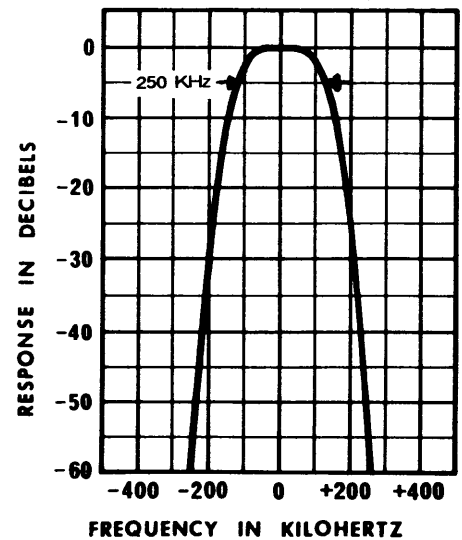
CABINET (included) oiled-walnut.

SIZE (H, W, D): 6-1/4 x 19-1/8 x 14 in.

SHIPPING WEIGHT: 35 lbs.



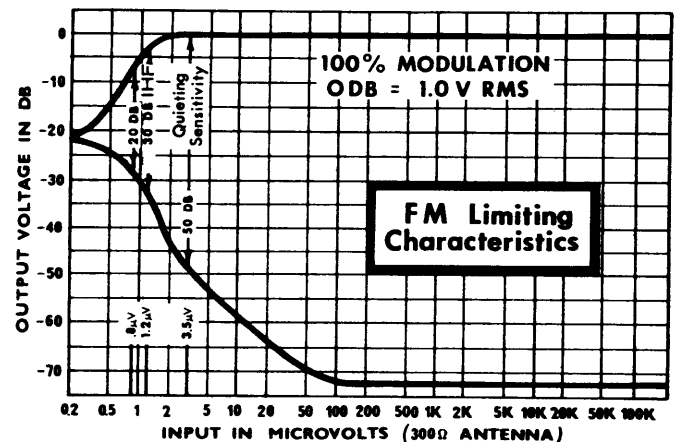
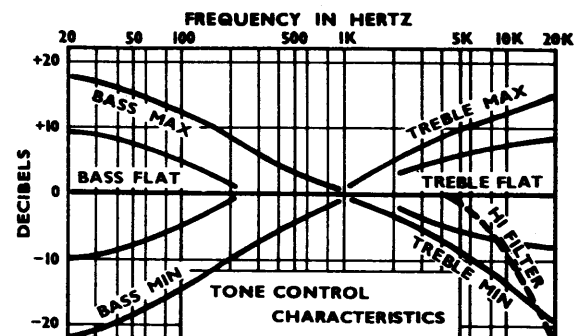
FM Selectivity Characteristic



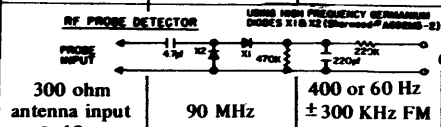
REALIGNMENT: To check alignment, refer to page 3. Do not attempt realignment unless adequate test equipment is available.

Optimum FM alignment, similar to the original factory alignment, consists of feeding a property-terminated FM signal into the antenna terminals. To simulate a balanced 300-ohm input with the typical low-impedance single-ended generator, connect a standard impedance matching network between the low impedance generator and the 300-ohm FM antenna input terminals. While observing the IF response curve through the permanently tuned and sealed IF filter using an RF probe and oscilloscope carefully adjust the FM front end coils, capacitors and output transformer as indicated in steps 1 through 4 of page 3. With 100% FM modulation and the band pass centered on the oscilloscope repeat steps 5 through 7 for detector zero and linearity.

All Sherwood tuners are also adjusted and checked to see that they meet 0.15% IM distortion at 100% FM. To adjust, feed 60 Hz: 7KHz at 4:1 ratio into a low-distortion FM generator. With FM generator rf signal at 100% FM, feeding into antenna terminals, read 1M distortion at record output with receiver tuned for zero volts. Adjust primary of T6 for minimum distortion.



ALIGNMENT CHART

		switch position	signal generator input			dial setting	indicating instrument	adjust	indication
			coupling	frequency	modulation				
FM ALIGNMENT	1	Selector FM mode, mono	none	none	none	Point of no interference	C.R.O.		
	2	"				C.R.O.	Probe at Q7 Pin 1. Horiz. Same as sig. Gen. Modulation.	L1, T2, T3, T4 & T5	IF response for max. deflection and symmetry.
	3	"	"	106 MHz	"	106 MHz	"	C2, C11, C21 & C46	"
	4	Repeat steps 2 & 3 until no further improvement.							
	5	"	300 ohm antenna input ≈ 1 K μ v	90 MHz	400 or 60 Hz ± 75 KHz FM centered on IF	90 MHz	DC VTVM across C73 100 pf.	T6 Top	OV DC
	6	"	"	"	"	"	CRO at record output	T6 Bottom	Adjust for max. deflection and linearity
	7	"	"	"	"	"	"	T6 Bottom	* Fine adj. for linearity (recheck for OV D.C. of step 5)
HUSH THRESHOLD & BANDWIDTH	1	Selector FM mode, mono Hush on	300 ohm antenna input 4 μ v	"	"	"	CRO at record output	R99, rear panel hush control	Min. setting to quiet audio (attenuation > 40 db)
	2	Adjust signal generator output from 0 through 5 μ v, Hush should switch out at approx. 5 μ v input level.							
	3	Repeat 1 and 2 until desired hush threshold is achieved.							
	4	"	300 ohm antenna input 1 K μ v	"	"	"	"	R112 - Hush bandwidth control	Adjust for hush bandwidth of ± 125 KHz (equal to approx. ± 1 division of zero center tuning meter deflection)
STEREO THRESHOLD	1	Selector FM mode, stereo	300 ohm antenna input 5 μ v	90 MHz	± 75 KHz stereo composite	90 MHz	CRO record output left channel	R92 Stereo Threshold	Min. setting for Stereo Lite
	2	Adjust signal generator output from 0 thru 5 μ v, Stereo Lite should switch on approx. 5 μ v level							
MX ALIGNMENT	1	Disconnect FM detector from Point A (Short Q20 emitter-base junction) Hush off.							
	2	Selector FM Mode: Stereo	10K source impedance	60MV RMS 19KHz into point A	none	point of no interference	CRO &/or AC voltmeter base of Q19	T7, detune top slug out. Tune bottom slug for -3 db, tuning through max, Tune top max.	
	3	"	"	"	"	"	CRO &/or AC voltmeter @ T8, pin 1	T8 Top & Bottom	Maximum deflection
	4	"	"	1.0V RMS 67 KHz into point A	"	"	"	L3	null
	5	"	"	feed composite MX sig. left CH modulation 1.7V p-p or 0.3 V RMS 400 Hz into point A	"	"	CRO &/or AC voltmeter across R162	none	Note: Approx. 0.5 V Audio at left ch. output
	6	"	"	"	"	"	CRO &/or AC voltmeter across R163	T7 Top	null at unmodulated channel output (approx. -10db from left)
	7	"	"	switch off stereo generator audio modulator	"	"	CRO &/or AC voltmeter across R162 & R163	none	residual 19KHz & 38KHz to be approx. -45db below 100% audio
	8	Reconnect FM detector to point A (Remove Q13 emitter-base short)							
	9	"	300 balanced input to FM ant. input	96 MHz 100 μ v	± 75 KHz composite stereo sig. left CH modulation only	96MHz	CRO &/or AC voltmeter across R163	fine adjust T7 Bottom	null at unmodulated channel output
	10	"	"	"	"	"	CRO &/or AC VTVM at record output (rt channel)	Adjust separation R232	Adjust for null separation (to be more than -30db)

*If distortion analyzer is available, null T6 bottom for minimum distortion with 75KHz modulation.

PARTS LIST

TRANSISTORS (ALL ARE SILICON)	PART NO.	PRICE
Audio, Low signal, No dot (Hi-beta), (Q12, 18)	SPS41	.81
Audio, Low signal, No dot (Hi-beta), (Q9, 10, 13, 14, 20, 201, 204, 205, 208, 301, 304, 305, 308)	SPS817	.65
Audio, Low signal, Green dot (Low noise), (Q202, 302)	SPS817N	.65
Audio, Low signal, Green dot (Low noise), (Q203, 303)	SPS41N	.91
Audio, Low signal, White dot (40V), (Q206, 306)	SPS817V	.68
Audio, PNP, (Q11, 19)	SPS42	.50
	S4248	.77
Audio, NPN, (Q8)	SPS40	.90
Audio, NPN, (Q17, 21, 209, 309)	S2104	.92
Pre-driver, NPN, (Q207, 307)	SPS4199	.95
Pre-driver, PNP, (Q210, 310)	S437	3.16
Driver, NPN, (Q211, 212, 311, 312)	S409F	2.16
Output, NPN, (Q213, 214, 313, 314)	S200	10.35
Power, NPN, (Q15)	37649	1.80
Power, NPN, (Q16)	MJE521	2.57
Hush Attn., FET, (Q22, 23)	SFE145	6.08
RF Amp, FET, (Q1, 2)	2SK19	3.00
	MPF106	2.12
RF Converter, FET, (Q3)	MPF107	2.21
RF Mixer, PNP, (Q4)	MPS6580	.99
Integrated Circuit, (Q5)	CA3028A	4.01
Integrated Circuit, (Q6, 7)	U5B771739	5.40

You will note that all transistors used in the SEL-200 are color-coded with a dot or mark of some color prominently located on the top of their case. (Some transistors have no mark, but this also is identification.) When ordering replacement transistors, it is imperative that you indicate not only its part no., but the color dot on the transistor body: red, yellow, none, (1, -2, - or -3). This is particularly important when replacing output transistors.

DESCRIPTION	PART NO.	PRICE
500-500 μ f, 45V, (C191A, B)	A120J9-2	3.11
3000 μ f, 45V, (C281, 381)	A120R14-2	3.42
6000 μ f, 85V, (C190)	A120R15-2	11.50
1 μ f, 25V, (Coupling quality), (C211, 311)	B120X7-1	2.70
1 μ f, 40V, (Coupling quality), (C270, 370)	B120X76-1	.59
5 μ f, 20V, (Coupling quality), (C130, 250, 251, 350, 351)	B120X6-1	.59
8 μ f, 40V, (Coupling quality), (C100, 110, 141, 241, 243, 341, 343)	B120X8-1	3.38
20 μ f, 5V, (Coupling quality), (C260, 261, 360, 361)	B120X12-1	.59
20 μ f, 50V, (C271, 371)	B120B14-1	.68
100 μ f, 3V, (Coupling quality), (C200, 203, 300, 303)	B120X24-1	.45
125 μ f, 16V, (C40, 111)	B120B26-1	.45
250 μ f, 15V, (C175)	B120B74-1	.59
250 μ f, 35V, (C174)	B120B33-1	.95
500 μ f, 25V, (C173, 192)	B120B31-1	.99
500 μ f, 40V, (C172)	B120B29-1	1.80
1000 μ f, 25V, (Coupling quality), (C180)	B120X78-2	2.21
1.0 μ f, 25V, (Tantalum), (C101, 103)	CT1A2105M	1.08
0.22 μ f, 35V, (Tantalum), (C252, 352)	CT1A3224M	1.08
Insulator, Mica (T0-3)	A021F1-0	.05
Fm Antenna	B105R2-0	1.53
Choke, Rf, (L2)	A150R2	.20
Phase Linar Toroidal Filter	B161R1-1	31.50
Dial Pointer	A201R5-0	.10
Dial Cord	203AD1-2	.10
Fuse, 4 amp, 3AG	312004	.15
Dial Glass	B322R10-0	1.26
Knob, Small	A467X6-2	1.62
Knobs, Medium, (w/indicator)	B469X3-3	1.17ea.
Knobs, Large (w/indicator)	B469X1-2	1.23ea.
Knob, Large (wo/indicator)	B469X2-2	1.13ea.
Meter, Zero Center	B550R2-1	6.30
Meter, Peak	B550R3-1	6.30
Light Bulb, Pilot, #53	630B53	.16
Control, Bass, 100K Ω , Dual, (R235A, B)	A670R29-0	1.74

DESCRIPTION	PART NO.	PRICE
Control, Treble, 100K Ω , Dual, (R241A, B)	A670R29-0	1.74
Control, Balance, 100K Ω , (R257)	A670R30-0	.95
Control, light Dimmer, 1.5K Ω , (R182)	A670R31-0	1.74
Control, Loudness, 50K Ω , Dual w/Ac sw., (R256A, B, S12)	A671R5-1	4.50
Pot, P. C., 500 Ω , (R283, 382)	A675T1-0A	.45
Pot., P. C., 5K Ω , (R92)	A675T5-0A	.45
Pot., P. C., Wirewound, 5K Ω , (R99)	A678K1-1	5.63
Diode, Germanium, (X7, 8, 9, 10, 11, 12, 13)	A691M5-2	.36
Diode, Silicon, (X14, 15, 16, 17, 18, 19)	A692X13-4	1.22
Rectifier, Silicon, (X1, 2)	A692T5-0	.48
Rectifier, Silicon, (X3, 4, 5, 6, 20, 21)	A692X16-0	1.71
Diode, Zener, Silicon, 13V, 5%, (Z1)	A694X1-0A	1.21
Thermostat	A701R1-1	1.26
Socket, Driver Transistor, (T0-5)	A790T4M-1	.27
Socket, Output Transistor, (T0-3)	A790T7-0	.27
Stereo Headphone Jack	A795R3-0	.95
Fuse Post	A796X2-1A	.23
Pilot Light Assembly, Amber Lens	A798R7A-0	2.52
Pilot Light Assembly, Red Lens	A798R7R-0	2.52
Switch, Selector, 3 Pos., (S1-1, -2, -3)	A860R12-3	4.10
Switch, Function, 4 Pos., (S2)	A860R13-3	2.97
Switch, Slide, DPTT, (S3A, B)	A864R1-3	.68
Transformer, Domestic, 50/60Hz, Power, (T1)	B922R5-5	26.10
Transformer, Export, 220 Volt, 50-60Hz, Power, (T1 Alternate)	2B922R5-5X	26.55
Fm tuning Assembly, Rf Tuner	D950R1-2	33.84
Transformer, Fm Antenna, (T2)	154185	.36
Transformer, Fm Detector, (T6)	68-253C	5.36
Transformer, Fm Converter, (T5)	153022-16	.14
Transformer, 38KHz, (T8)	65-290B	1.52
Mixer—Trimmer 1st & 2nd RF, (C2, C11, C20)	TT100SH50	.36
Transformer, 19KHz, (T7)	67-158B	2.45
Coil, Interstage, (T3, 4)	154188	.36
Coil, 67KHz, (L3)	68-332	1.70
Coil, Oscillator, (L1)	154193	.36
Toroid, 5uh	68-334	1.14
Osc. Trimmer (C46)	TT050CH50	.36
Switch, Push Button, 8 Buttons, (S4, 5, 6, 7, 8, 9, 10, 11)	B866R4-1	8.20
Locking Bar Clip		.25
Switch Body		1.15
Black Push Button Knob		.50
Nylon Plunger		.37
Plunger Spring		.37
Slide Contacts		.60 pr.
Indexing Pin		.37
Indexing Leaf Spring		.37
Switch Mounting Washer-Rectangular		.37

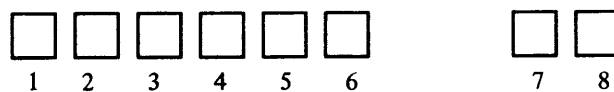
REMOVAL OF BROKEN PUSH BUTTON. REPAIR PROCEDURE

- depress and lock buttons 1, 2, 3, 4, 6, 7, & 8 (depress completely to lock)
- with thumb of left hand depress button #5 approx. 3/16" to 1/4" and hold in that position. With long nose pliers grasp flange of locking key. (located on right hand side of pushbutton #5) Pull key forward enough to clear tab on left side of switch and slide locking key as far to the right as it will go and release locking key from pliers. Then slide key to the left and slowly release the tension on push button #5.
- Each button may now be individually removed by depressing and then releasing the button slowly.

REINSERTION OF BUTTONS

- depress and lock buttons 1, 2, 3, 4, 6, 7, & 8.
- Slide locking key as far to the right as it will go. With thumb of right hand depress push button #5 approx. 1/4" to 3/8". With small screwdriver in left hand slide small tab (located just to left of push button #5) as far to the right as it will go.

B866R4-1 PUSH BUTTON SWITCH



Slowly release push button #5. It should return to its normal position and stop.

- With long nose pliers grasp locking key flange and pull it forward enough to clear small tab on left hand side of #5 push button. Then slide locking key to the left until small tab is visible through hole in locking key. Slowly allow locking key to return to a flush position against switch mounting plate, making sure small tab is encompassed by locking key.

(d) Using a pliers or screwdriver slide locking key flange gently to the right until lite snap is heard.

- All push buttons are now locked and may be returned to their normal position by depressing and releasing each button.
- NOTE: If push button #5 binds, pin on right hand side of locking key has been caught by spring.

1. PROTECTIVE CIRCUITRY (10P) & SPEAKER SYSTEM

CHECK: The Model SEL-200 incorporates special protective circuitry, (Instamatic Overload Protection), which turns off the drive to the power amplifiers when danger to the receiver output circuitry exists. If the receiver turns itself off, check the speaker connections for shorted wires. Speaker line resistance should not measure below 3 ohms.

A. Thermal-Relay-Overload Protection: This thermostat will turn all power off if the operating temperature of the output transistors is exceeded. Allow 5 to 10 minutes for thermostat to turn power back on.

2. AMPLIFIER/PREAMP STAGE ISOLATION: Evaluate whether both channels are inoperative. If thus, B+ supply should be suspected for malfunction. If one channel only, evaluate with test signal whether signal feeds properly through phono preamp, auxiliary highlevel input, or into volume control at high side (this isolates power amplifier section from tone amplifier section).

3. FAULT ISOLATED TO POWER AMPLIFIER: With DC voltmeter, verify accuracy of all power supply voltages, collector, emitter, and base voltages of transistors on the driver-circuit boards and of output transistors in the faulty power amplifier channel. The voltages should be verified against those shown on the schematic for 120V power line and also against those in the 2nd channel (assumed to be operating correctly). Note that output electrolytic coupling capacitor DC voltage (on transistor feed side) should read approx. 1/2 of B+ supply voltage. Note in most cases of a defective driver or output transistor, the fuse will open and prevent the taking of a usable center-point voltage reading. Therefore, it is valuable to operate the amplifier with a variable voltage power line (Variat) equipped with a line wattmeter (or ammeter) to identify abnormal power consumption.

With the Variac, reduce the power line voltage to zero, replace fuse, and slowly increase power line voltage upward while observing wattmeter. (The power consumption should not exceed 10–30 watts as the voltage is increased up to rated 120 volts. If power consumption reading begins to exceed 15 watts, starting from zero voltage, do not increase power line voltage further.) Now verify center-point voltage for half-voltage reading.

If center-point voltage reads extremely low, suspect defective output or driver transistors (or phase-inverting pre-driver on SEL-200) on low side (schematic shows these as bottom devices in each channel). If center-point voltage reads extremely high, suspect defective high-side output or driver transistors.

Remove both driver transistors from their sockets. If power consumption drops considerably, then faulty driver transistors should be suspected. If power consumption remains unusually high, then faulty output transistors should be suspected. If not,

suspect pre-driver or bias-regulator transistor or associated components.

If all above seems not to be at fault, then verify that output coupling electrolytic capacitor is not shorted, other capacitors are not shorted, circuit board contains no solder or etching shorts, open resistors, or poor solder connections. (Note: a small error voltage at pre-driver base and/or emitter will disrupt grossly the operation of the driver and output transistors.

If center-point voltage reads approximately 1/2 voltage in accordance with above check, apply audio signal to channel being investigated and measure distortion as per service instruction manual. Distortion which exceeds amplifier ratings might be due to one of the following:

1. Output transistor not matched beta.
2. Output bias requires readjustment.
3. Driver transistor has low beta.

4. FACULTY ISOLATED TO TONE CONTROL AMPLIFIER: Check DC voltages at transistor collector, emitter, and base on tone circuit board and compare with schematic and with good channel. Feed 1 KC audio signal to input connection to tone circuit board. Compare output voltage to input voltage which should have a gain ratio of about 10db (3X).

Isolate inoperative stage by checking signal at input of treble control (Record Output jack on SEL-200). Compare this voltage to input voltage which should result in 1st stage gain—approximately 10db (3X).

Evaluate distortion in conjunction with power amplifier. Verify bass and treble frequency response with bass and treble boost and cut characteristic curves shown in service manual.

5. FAULT ISOLATED TO PREAMP: Check DC voltages at transistor collector, emitter, and base on preamp. circuit board and compare with schematic and with good channel. Feed 1KC audio signal to phono input jack. Compare output voltage at input of tone circuit board to input voltage. The resulting calculated gain ratio should be approximately 40db (100X) with preamp gain (phono level) control at maximum gain. Isolate the inoperative stage by checking signal voltage at collector of 1st stage.

6. FAULT ISOLATED TO POWER SUPPLY: Check DC voltage at input, mid-point, and output filter capacitor sections and compare with those shown on schematic. If a voltage measures low, remove leads to amplifier or receiver loads to isolate possibility of leaky or shorted electrolytic capacitor section. Proper operation of zener diode regulating tuner section is—12 volt $\pm 5\%$. Higher voltage indicates open zener diode.

TROUBLE SHOOTING CHART

SYMPTOM	POSSIBLE CAUSES AND SOLUTIONS
NO SOUND & DIAL IS NOT LIGHTED.	The main fuse is blown, (Replace it with a 3AG 4-amp fuse—do not use a slo-blo type.)
NO SOUND, BUT DIAL IS LIGHTED.	The speaker switches are in the OFF position. (Switch them ON.) The TAPE MONTR switch is depressed. (Switch it to its normal position.) or: The internal protective circuitry of the receiver has been triggered. Turn the Loudness Control to the power OFF position. Wait 10 seconds and then turn the receiver on. If the protective circuitry continues to trigger, review the ELECTRICAL CONNECTIONS section of the manual and double-check all speaker connections for shorted wires. If receiver is excessively warm, allow 15 minutes cooling to reset output-transistor thermostat. If a fault is not found contact your nearest Sherwood Authorized Service Station or the Sherwood Factory Service Department.
RECEIVER OPERATES IN PHONO MODE ONLY. NO FM RECEPTION.	The Hush level control is improperly set. Reread the section titled FM INTERCHANNEL HUSH in the Operation section of the manual. The FM antenna has become disconnected. Reread the ELECTRICAL CONNECTIONS Section of the manual, and re-install the antenna.
DISTORTED SOUND ON FM	If changing the position of the antenna result in a change in the sound, a better antenna is called for. FM Multipath reception might be suspected. See your local dealer for suggestions.
HUM ON PHONO BUZZ ON PHONO	The phono cables are not connected properly. Check for loose shield connections or a disconnected phono chassis ground wire. Move the tone arm on its pivot. If the hum changes, the phono cartridge is not properly shielded, or should be moved farther away from the receiver power transformer.
THE DIAL POINTER DOES NOT ACCURATELY LOG THE STATIONS.	The dial pointer may be moved in either direction on its cable to correct for minor logging error.

DIAL DRIVE SLIPPAGE: To remedy, remove the chassis from its cabinet. Ascertain that no oil has reached the drive shaft string notch. If this has occurred, it will be necessary to remove the dial string and clean the notch with carbon tetrachloride. Replace string as per chassis diagram.

If dial pulleys and shaft appear to be dry or "Squeak" apply one small drop of LUBRIPLATE to their bearings, being careful that no lubricant reaches the dial shaft string notch. If the dial string shows evidence of oil, it may be necessary to replace the string.

CLEANING ESCUTCHEON FACE PLATE: To clean metal surfaces, wipe with a chamois or dampened cloth. Do not use abrasive scouring powder. Clean black painted surfaces with a soft clean, dry brush.

INDICATOR LIGHTS: To replace the indicator lights you must remove the receiver case and escutcheon.

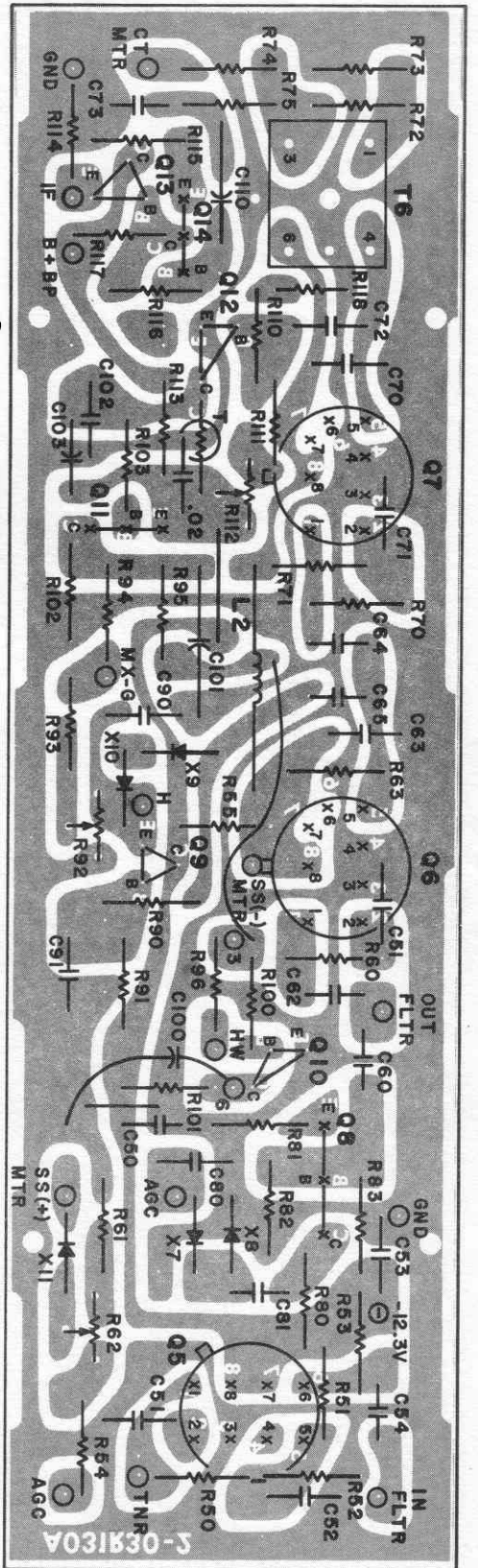
FM DISTORTION: Sherwood receivers have been designed with the correct value of FM audio deemphasis feeding the audio system. Since this amount of deemphasis permits the overall FM audio response to be flat to 20KHz any distortion generated at the FM station will be heard without moderation by the receiver. With a good high-fidelity speaker system, your ear will be acutely aware of any distortion generated in the system. If you suspect distortion in your FM reception, check several other FM stations to ascertain the degree of distortion originating in the program. Sherwood FM receivers have been carefully tested to meet intermodulation distortion specifications before leaving the factory. Each FM program probably has not had a similar check.

Sherwood

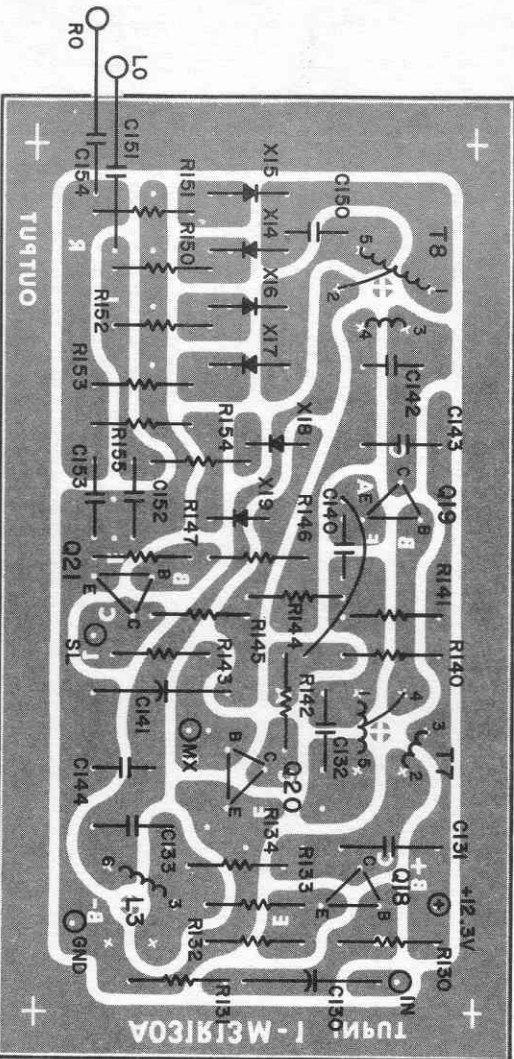
ELECTRONIC LABORATORIES, INC.

4300 NORTH CALIFORNIA AVENUE, CHICAGO, ILLINOIS 60618 IRVING 8-7300

LITHO 3-70 IN U.S.A.

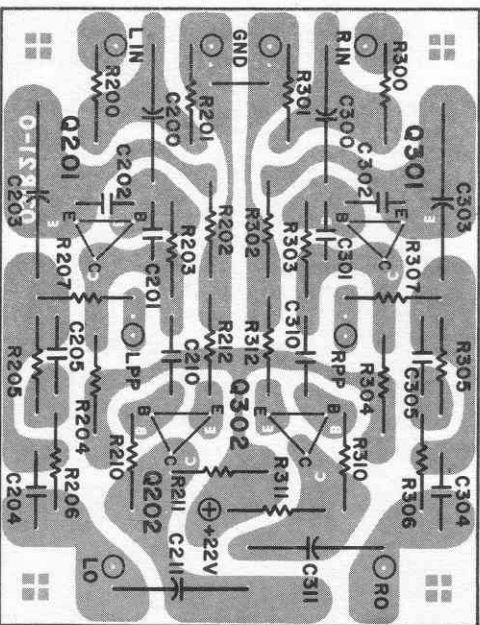


IF BOARD A03IR30-2



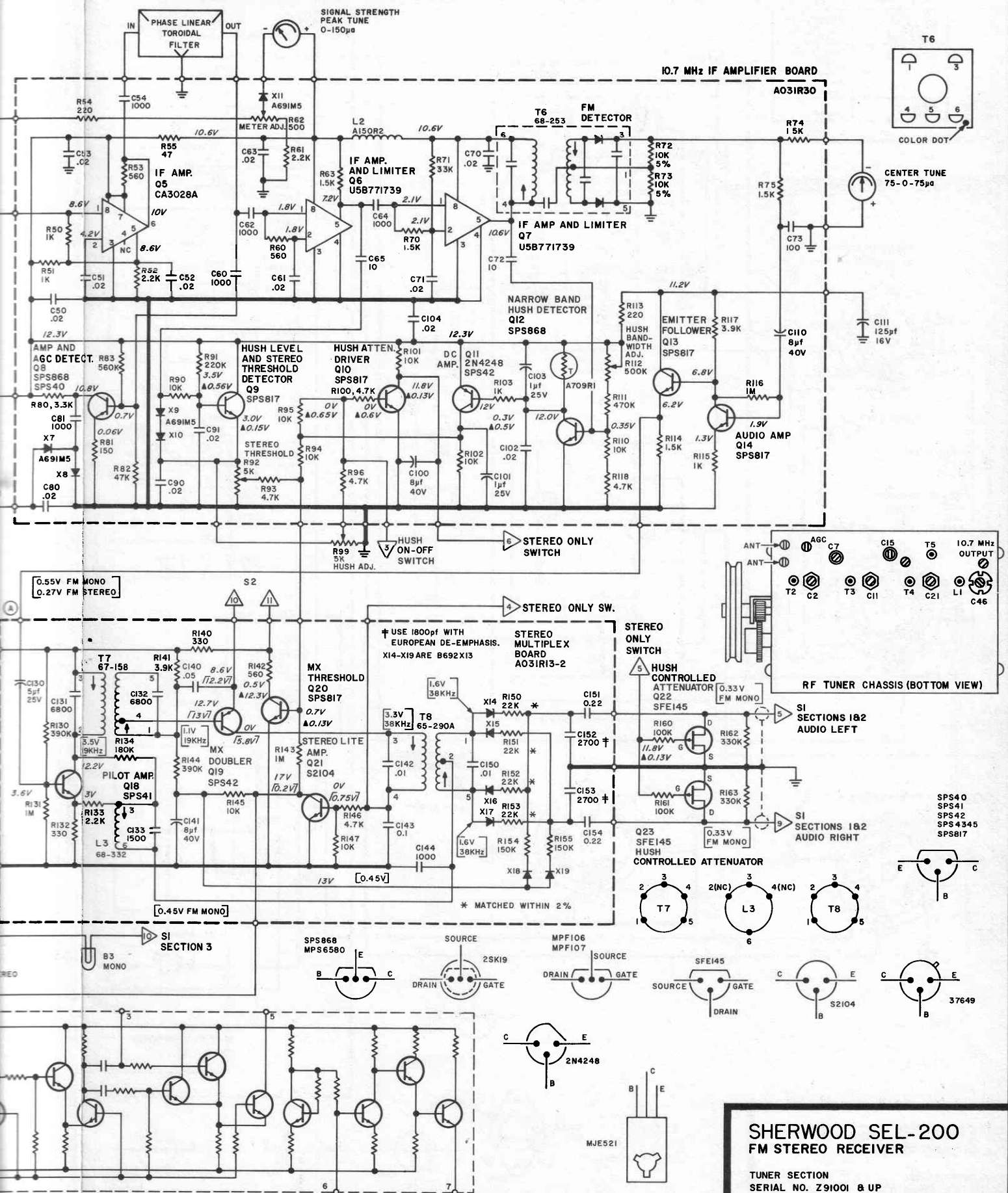
MULTIPLEX A03IR13M-1

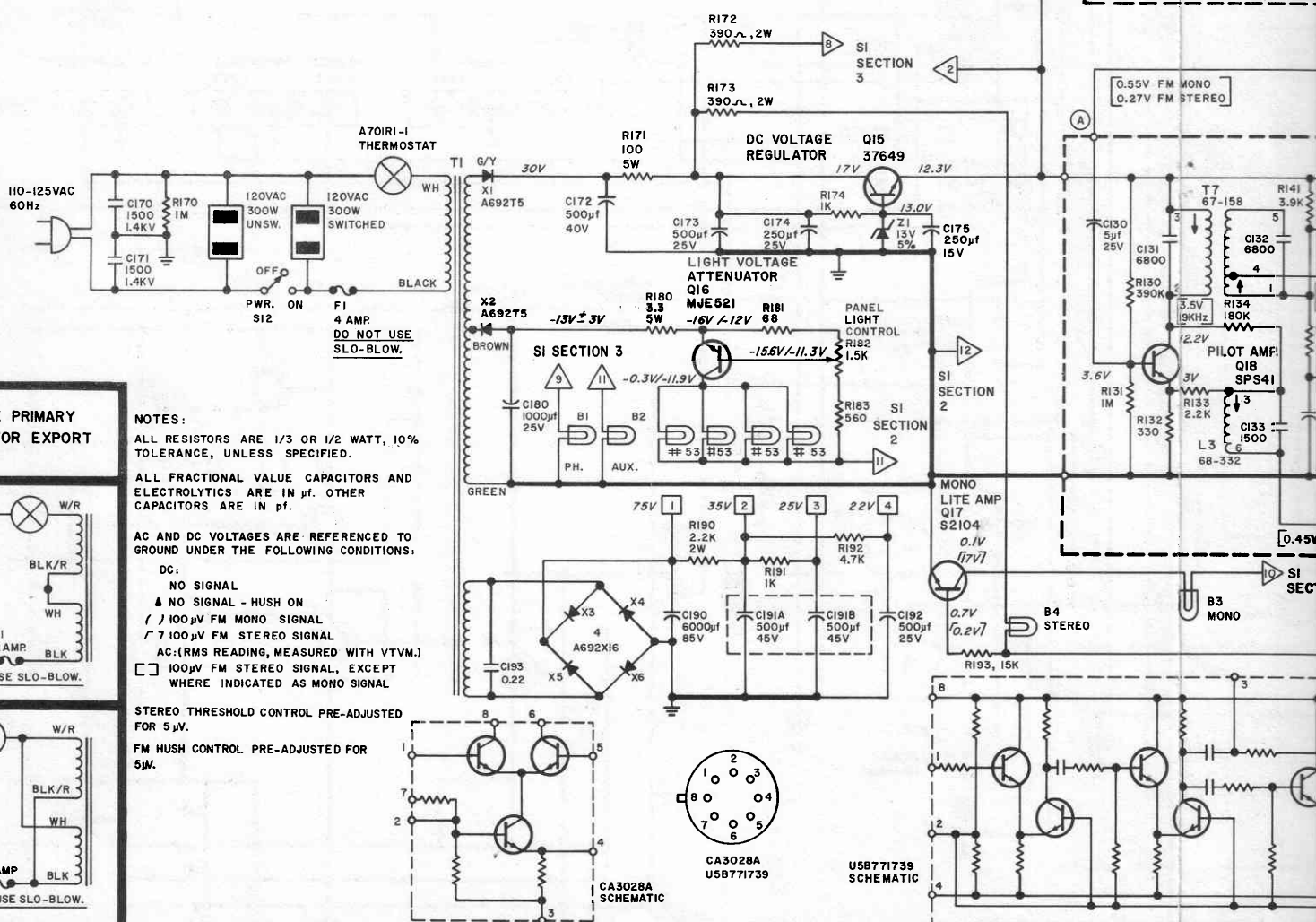
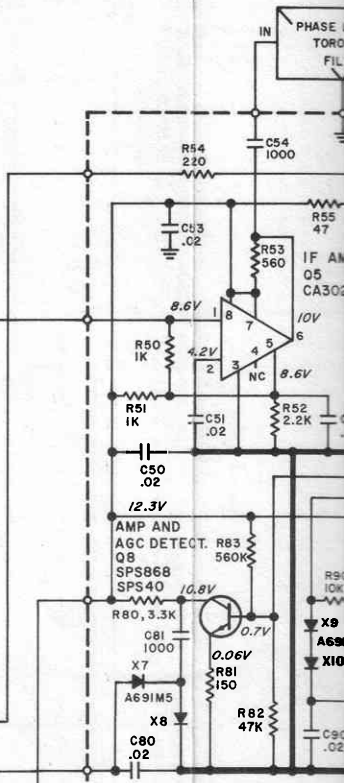
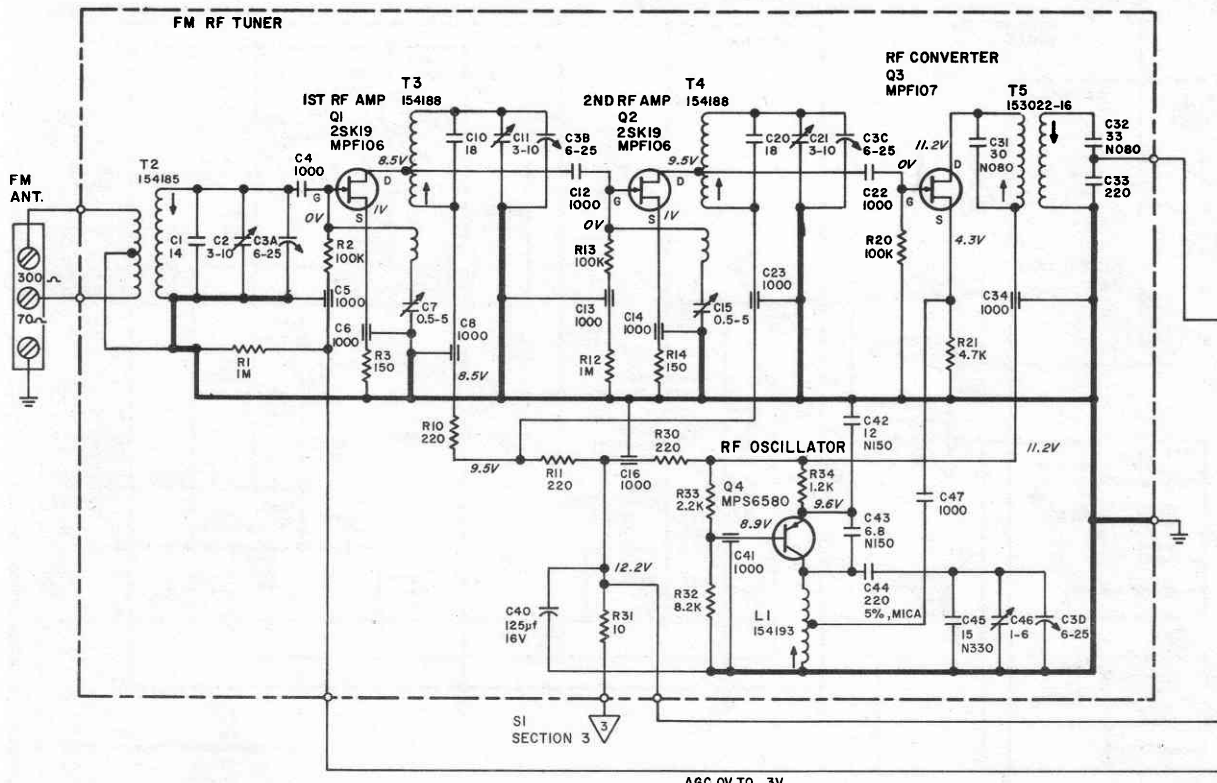
- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT
- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD



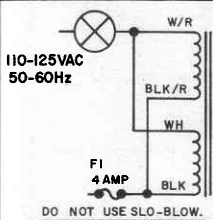
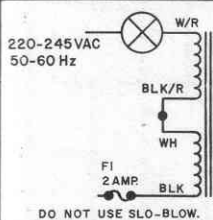
PRE-AMP A03IR21-0B

- LIN- LEFT INPUT
- LO- LEFT OUTPUT
- RIN- RIGHT INPUT
- RO- RIGHT OUTPUT
- LPP- LEFT PHONO
- RPP- RIGHT PHONO
- LEVEL





ALTERNATE PRIMARY CIRCUITS FOR EXPORT MODELS



NOTES:

ALL RESISTORS ARE 1/3 OR 1/2 WATT, 10% TOLERANCE, UNLESS SPECIFIED.

ALL FRACTIONAL VALUE CAPACITORS AND ELECTROLYTICS ARE IN μF. OTHER CAPACITORS ARE IN pF.

AC AND DC VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITIONS:

DC:

▲ NO SIGNAL - HUSH ON

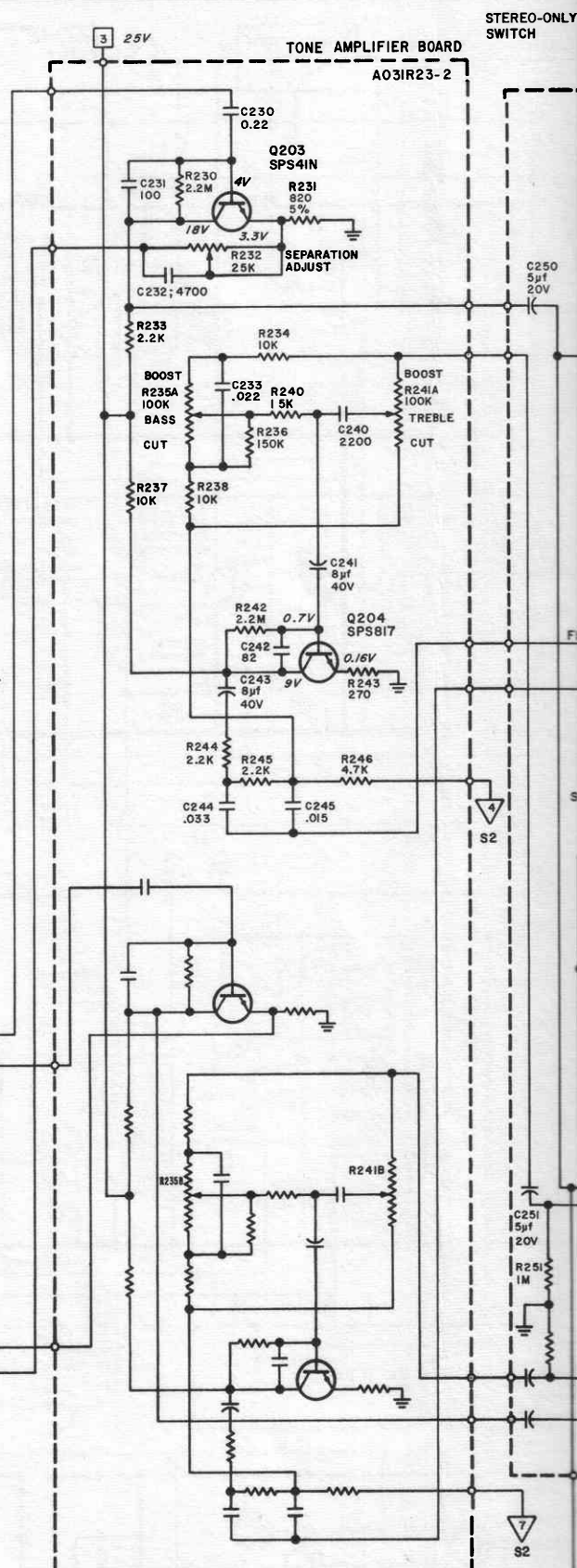
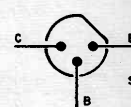
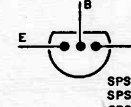
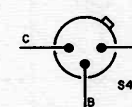
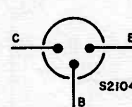
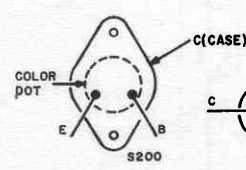
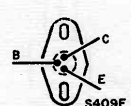
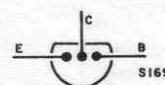
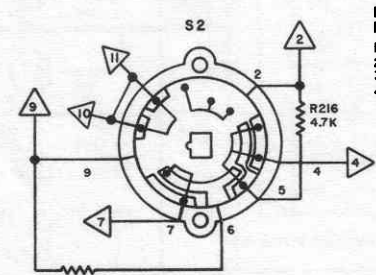
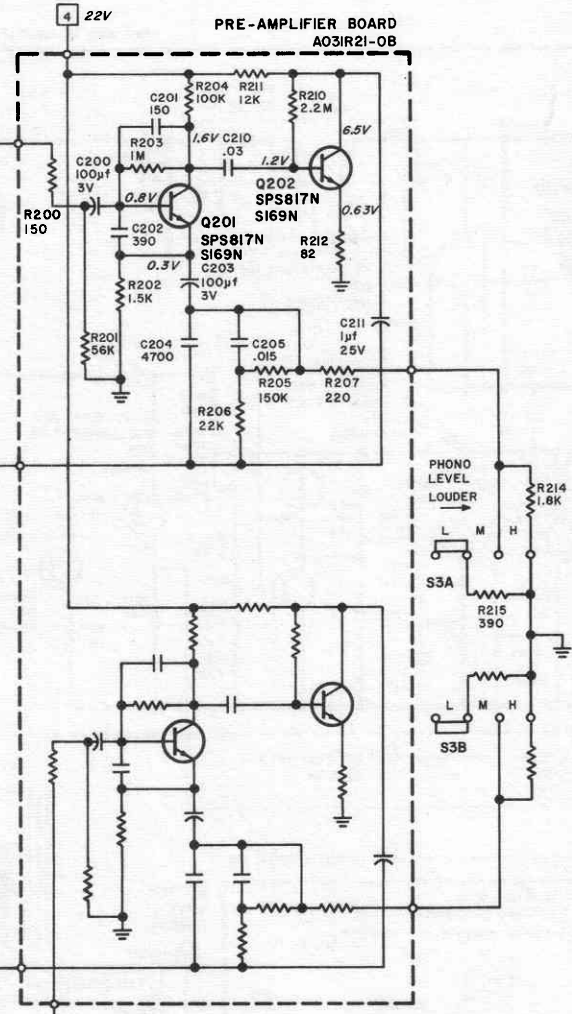
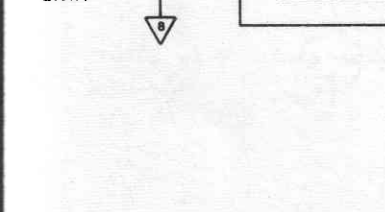
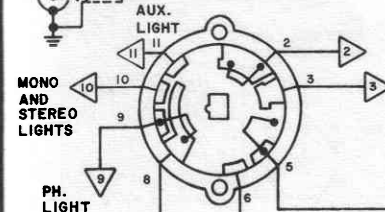
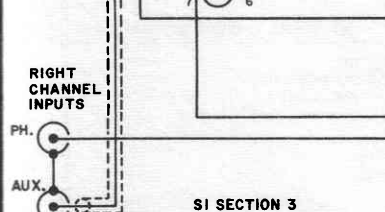
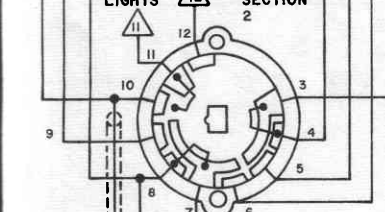
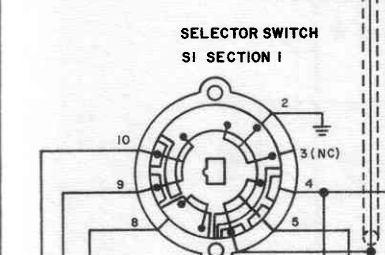
() 100μV FM MONO SIGNAL

/ 7 100μV FM STEREO SIGNAL

AC (RMS READING, MEASURED WITH VTVM.)

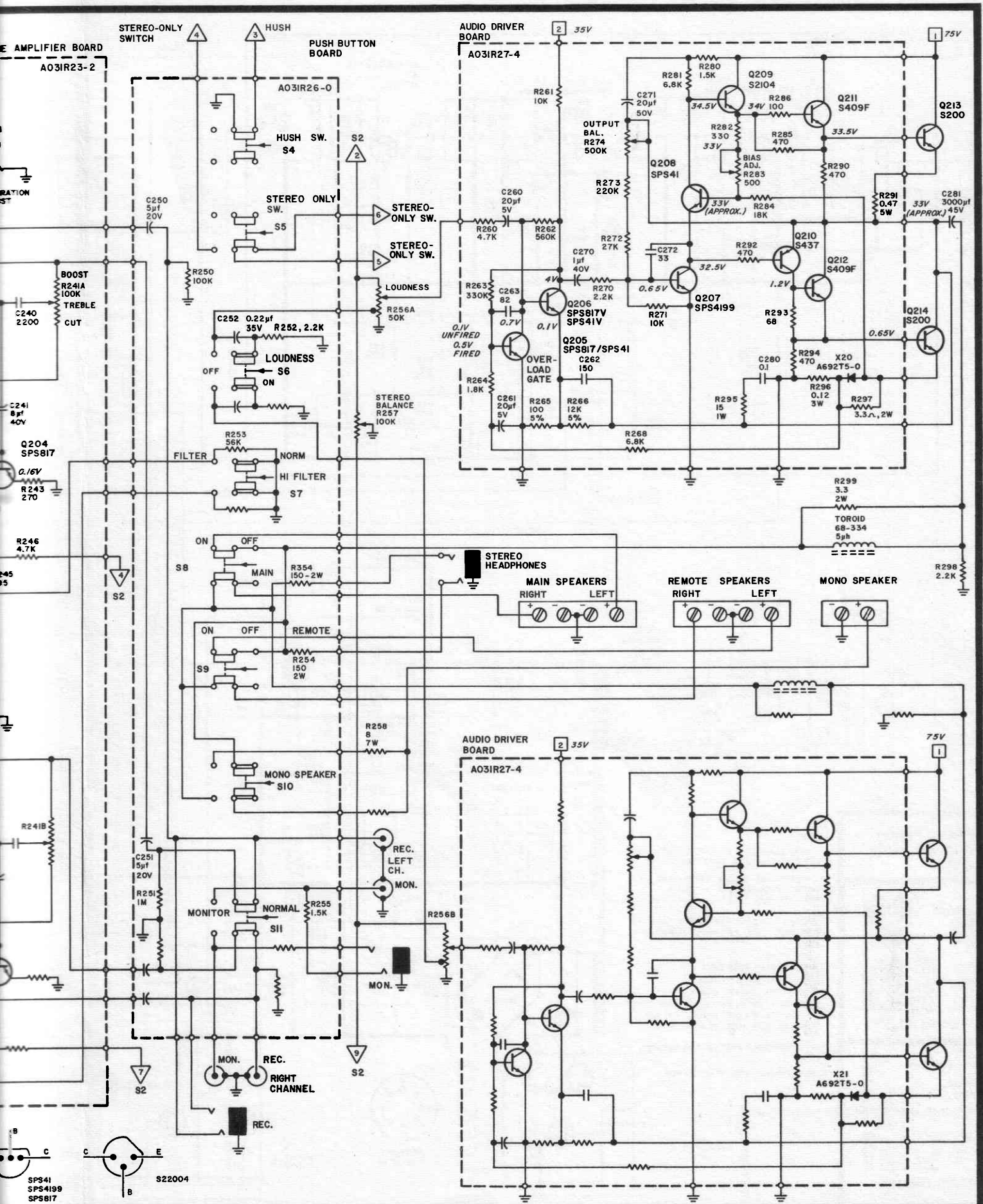
□ 100μV FM STEREO SIGNAL, EXCEPT WHERE INDICATED AS MONO SIGNAL

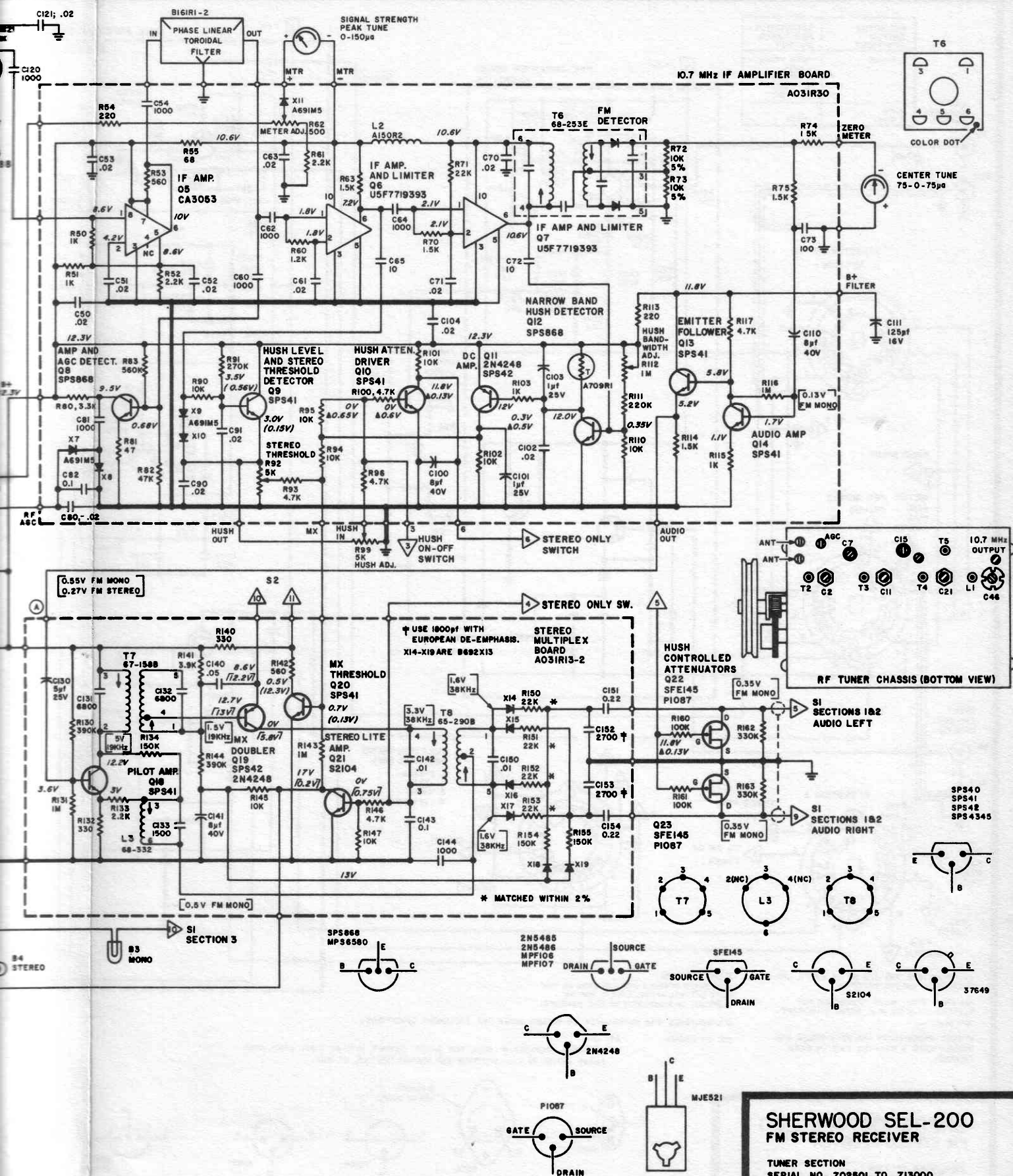
Diagram of the left channel inputs. The 'PH.' input is connected to a line labeled 'H-1.5 MV'. The 'AUX.' input is connected to a line labeled '2.FM' and '3. AUX.'. Both lines are connected to a common ground point.



AMPLIFIER SECTION
SERIAL NO. Z91001 & UP

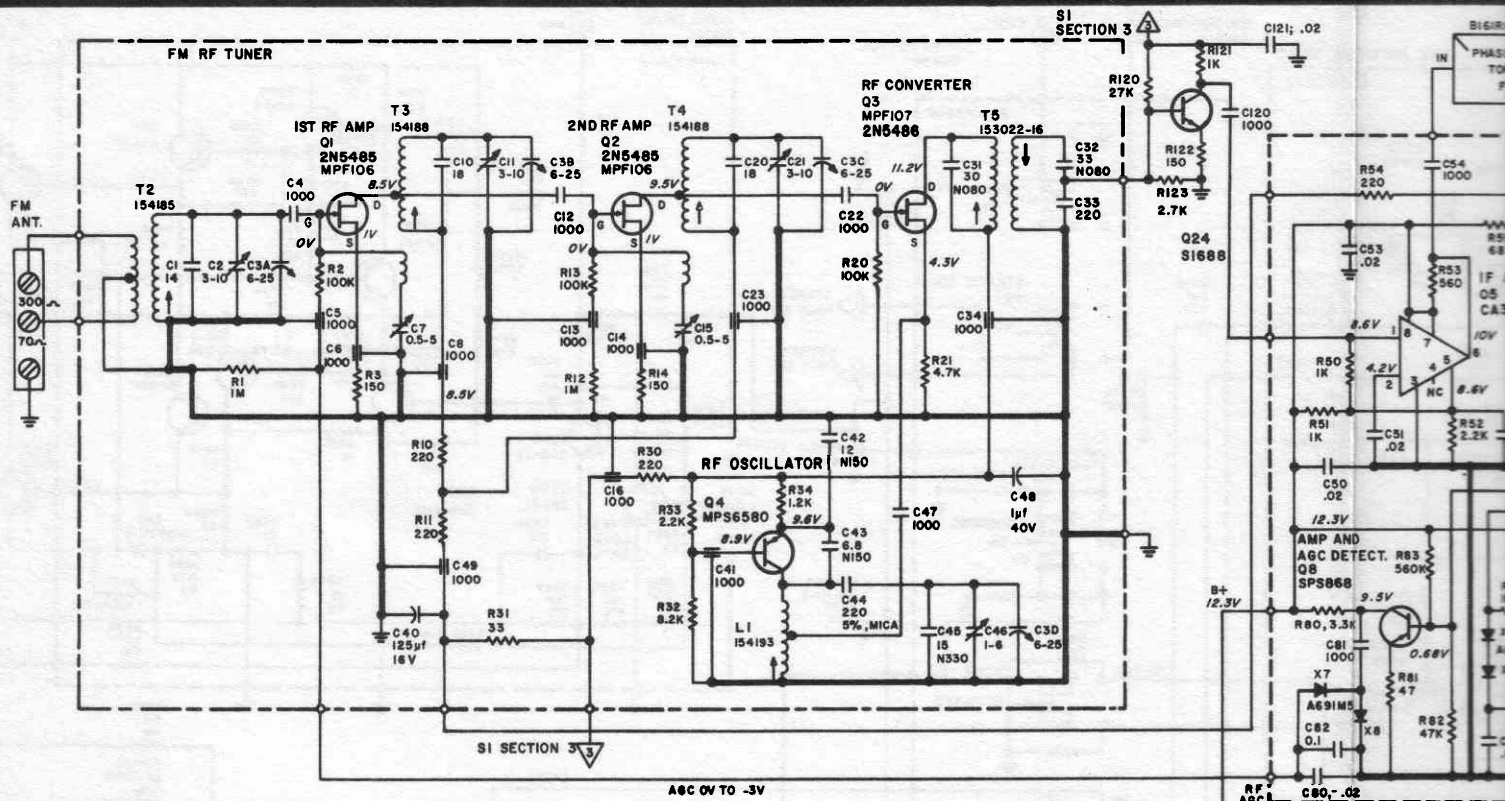
AMPLIFIER SECTION
SERIAL NO. Z91001 & UP



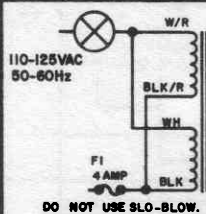
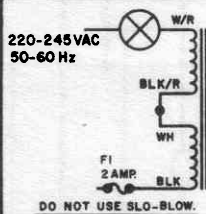


SEL 200

SEL 200



ALTERNATE PRIMARY CIRCUITS FOR EXPORT MODELS



NOTES:

ALL RESISTORS ARE 1/3 OR 1/2 WATT, 10% TOLERANCE, UNLESS SPECIFIED.

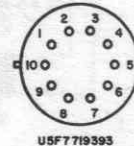
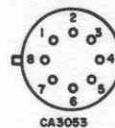
ALL FRACTIONAL VALUE CAPACITORS AND ELECTROLYTICS ARE IN μ F. OTHER CAPACITORS ARE IN pF.

AC AND DC VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITIONS:

- DC:
- NO SIGNAL
 - NO SIGNAL - HUSH ON
 - 100 μ V FM MONO SIGNAL, 100% MODULATION.
 - 100 μ V FM STEREO SIGNAL, 100% MOD.
 - AC: RMS READING
 - 100 μ V, 100% MOD. FM STEREO SIGNAL, EXCEPT WHERE INDICATED.

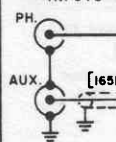
STEREO THRESHOLD CONTROL PRE-ADJUSTED FOR 5 μ V.

FM HUSH CONTROL PRE-ADJUSTED FOR 9 μ V.

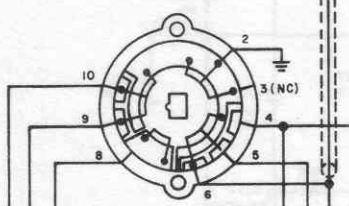


SELECTOR SWITCH POSITIONS	SENSITIVITY FOR RATED OUTPUT
1. PHONO	WITH PHONO LEVEL L-8.2MV M-3.6MV H-1.7MV
2. FM 3. AUX.	165MV

LEFT CHANNEL INPUTS



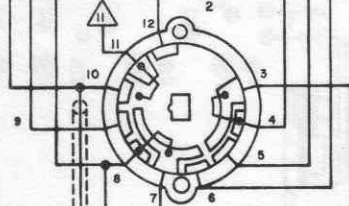
SELECTOR SWITCH
S1 SECTION 1



AUDIO LEFT

AUDIO RIGHT

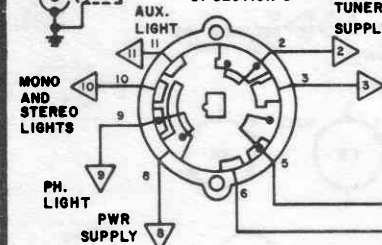
METER AND DIAL LIGHTS
PWR. SUPPLY GROUND
S1 SECTION 2



RIGHT CHANNEL INPUTS

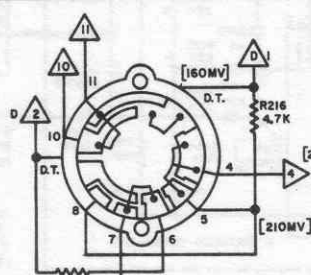


S1 SECTION 3



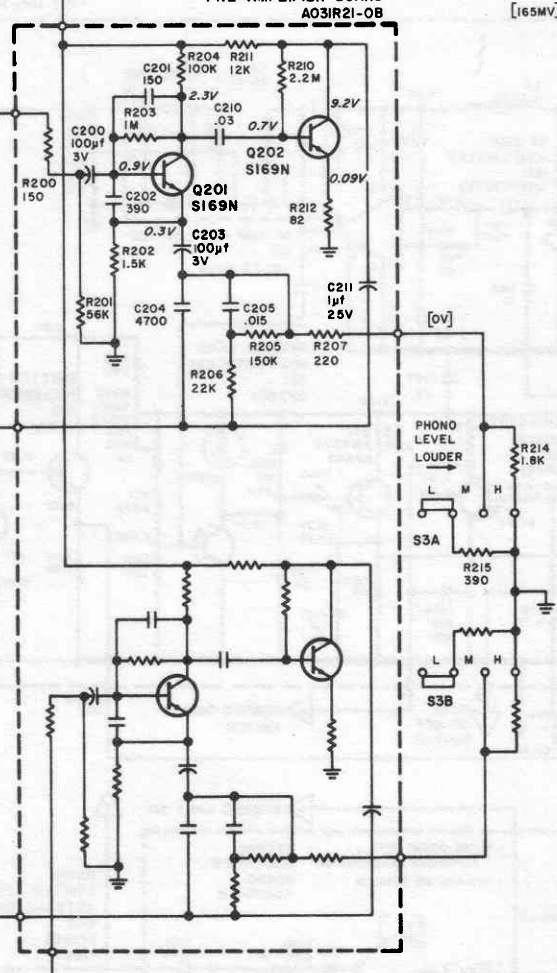
TUNER PWR. SUPPLY

TO FM RF TUNER

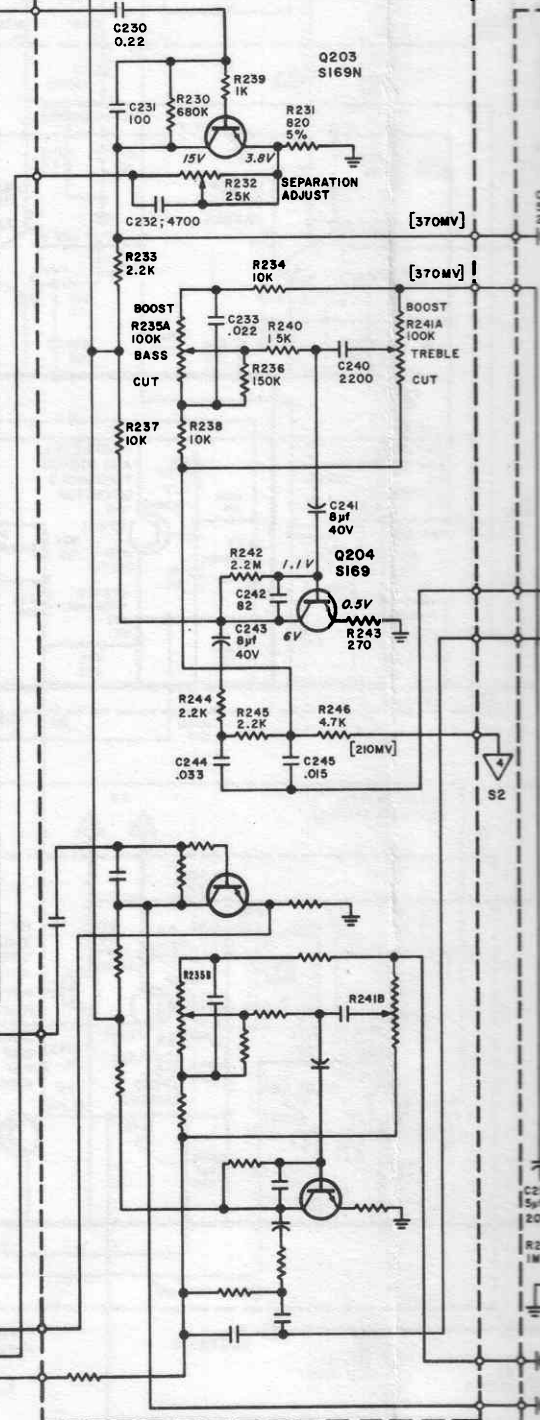


FUNCTION SWITCH POSITIONS (S2)
1. STEREO
2. LEFT
3. RIGHT
4. LEFT & RIGHT

PRE-AMPLIFIER BOARD
A03IR21-0B



TONE AMPLIFIER BOARD
A03IR23-2



ALL RESISTORS ARE 1/3 OR 1/2 WATTS, 10% TOLERANCE, UNLESS SPECIFIED.

ALL FRACTIONAL VALUE CAPACITORS AND ELECTROLYTICS ARE IN μ F. OTHER CAPACITORS ARE IN pF.

OUTPUT TRANSISTORS ARE BETA CODED AND SHOULD HAVE A MATCHED PAIR IN EACH CHANNEL.

RIGHT CHANNEL: COMPONENT SYMBOLS ARE THE SAME AS THE LEFT CHANNEL ABOVE, EXCEPT FOR AN INCREASE IN NUMBERING BY ONE HUNDRED.

ALL VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITIONS:

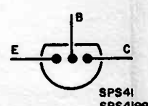
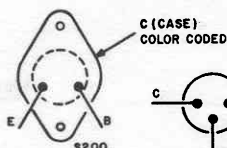
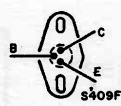
DC: NO SIGNAL.

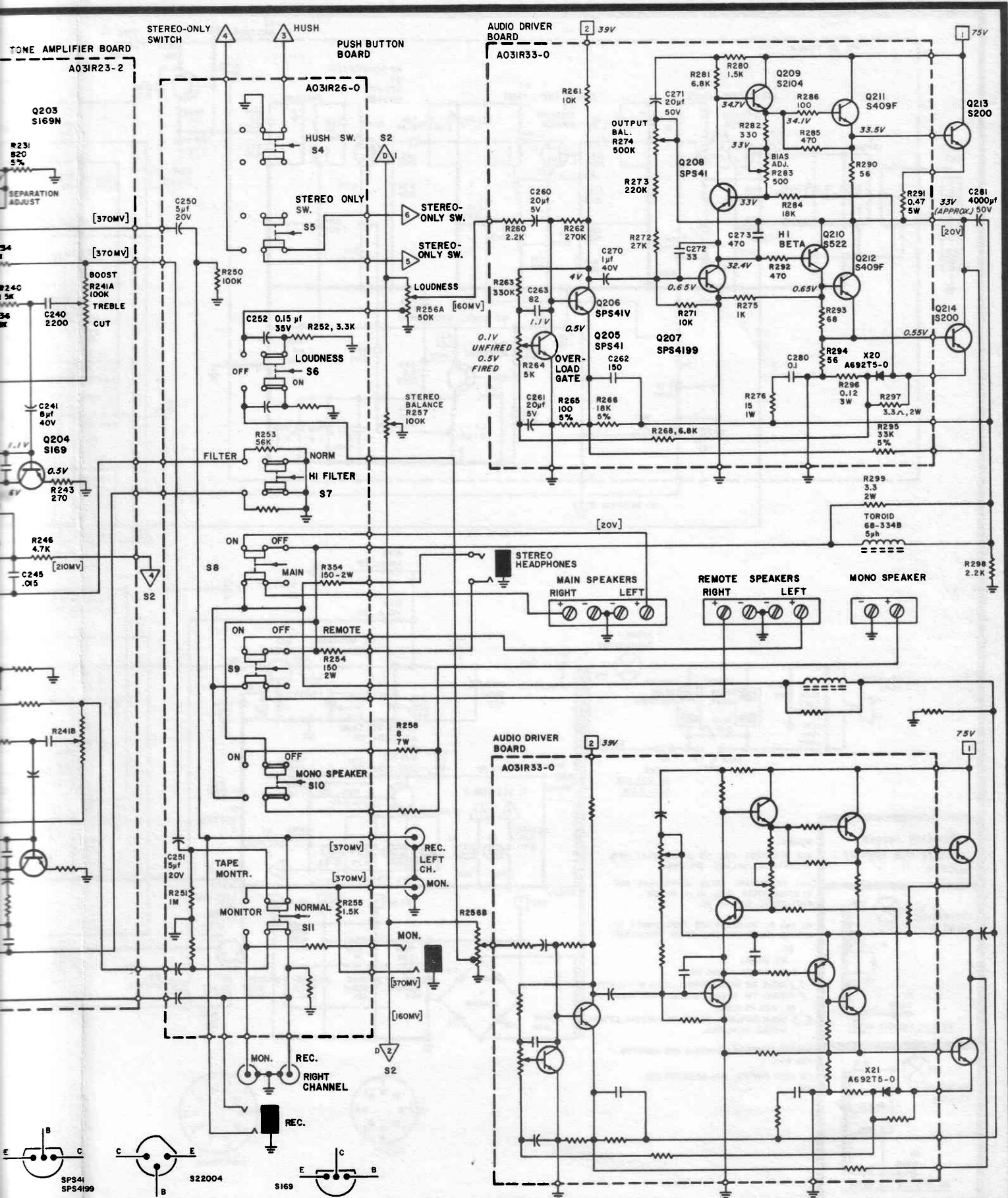
AC: C J

AC SIGNAL VOLTAGES AT 1KHz, FOR RATED OUTPUT, WITH AN 8 OHM LOAD, WITH PHONO SWITCH IN HIGH POSITION AND VOLUME CONTROL AT MAX.

SHERWOOD SEL-200 FM STEREO RECEIVER

AMPLIFIER SECTION
SERIAL NO. Z02501 TO Z13000





SHERWOOD

MODEL SEL-200 SERVICE MANUAL

ADDITION FOR

Serial No. Z91501 & UP

Serial No. Z02001 & UP

PARTS LIST

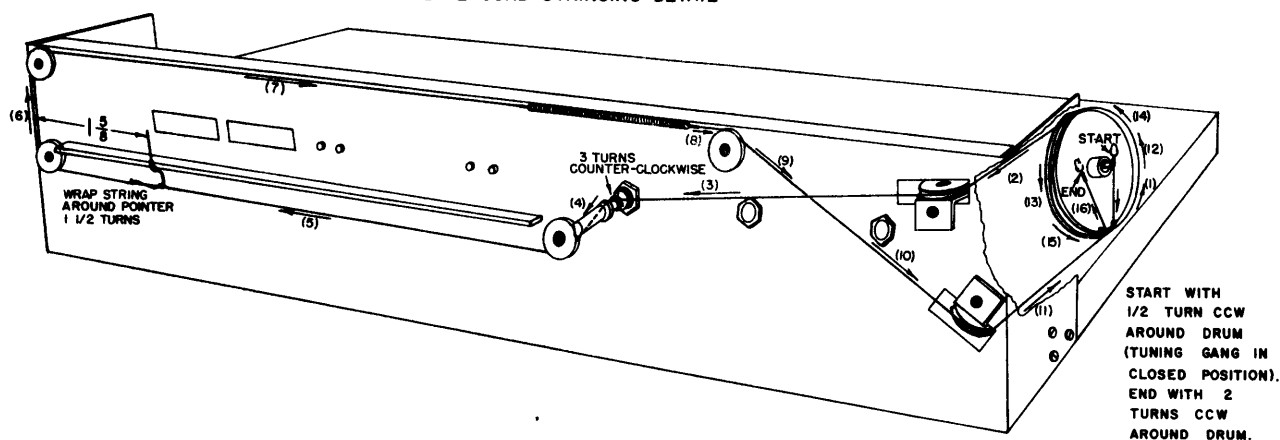
TRANSISTORS (ALL ARE SILICON)	PART NO.	PRICE
Audio, Low signal, Green dot (Low noise), (Q201, 202, 203, 301, 302, 303)	S169N (BC169)	.78
Hush Attn., FET, (Q22, 23)	P1087	3.80
Integrated Circuit, (Q5)	CA3053	2.12

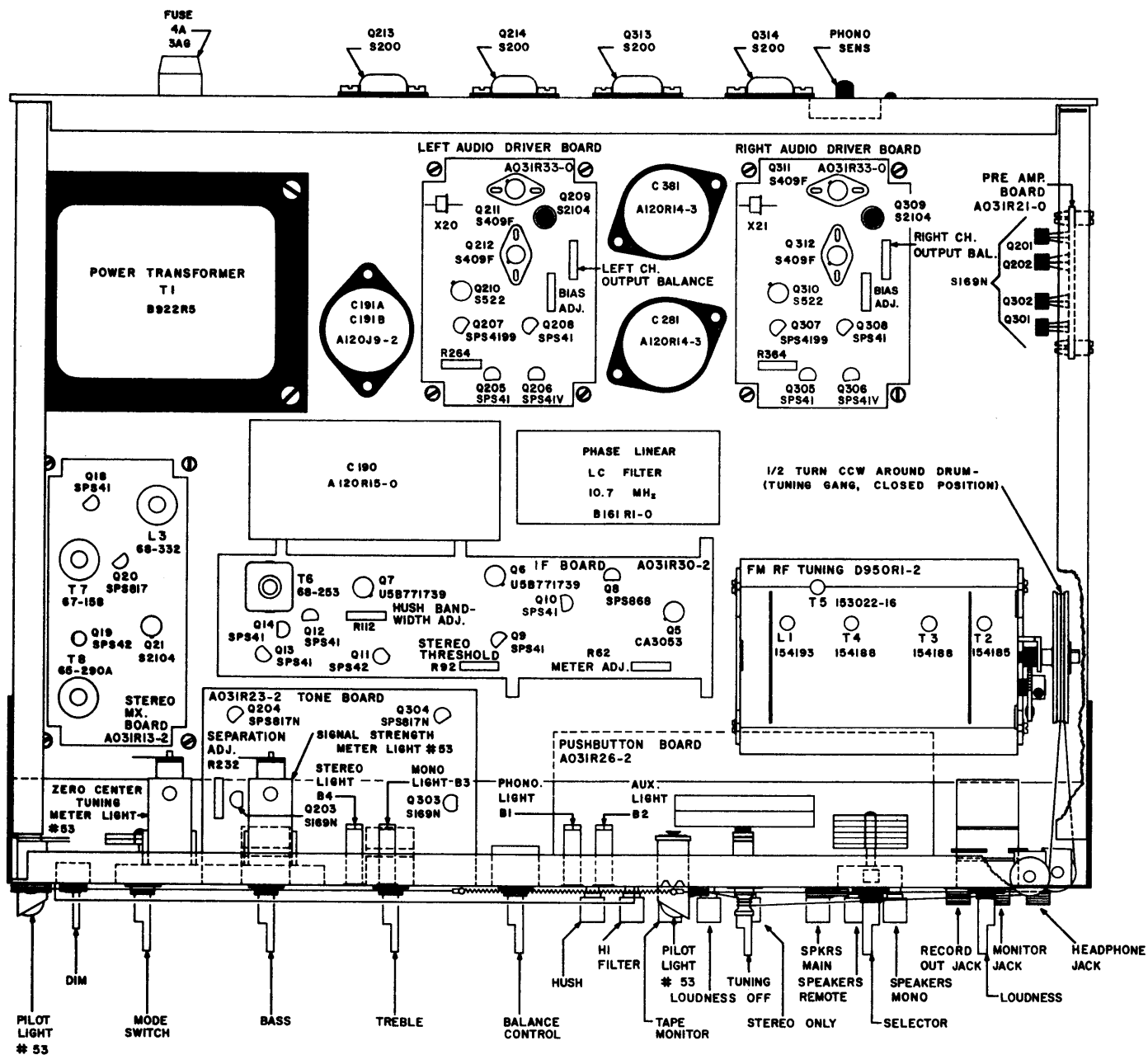
You will note that all transistors used in the SEL-200 are color-coded with a dot or mark of some color prominently located on the top of their case. (Some transistors have no mark, but this also is identification.) When ordering replacement transistors, it is imperative that you indicate not only its part no., but the color dot on the transistor body: red, yellow, none, (1, -2, - or -3). This is particularly important when replacing output transistors.

DESCRIPTION	PART NO.	PRICE
Dial Glass	B322R10-1	1.31
Pot, P.C., $5K\Omega$ (R92, R264, R364)	A675T5-0A	.45
Thermister	A709R1-0	.77
Switch, Function, 4 Pos., (S2)	A860R13-4	3.29
Switch, Function, 4 Pos., (S2)*	A860R21-0	3.29

*Serial No. Z02001 & UP

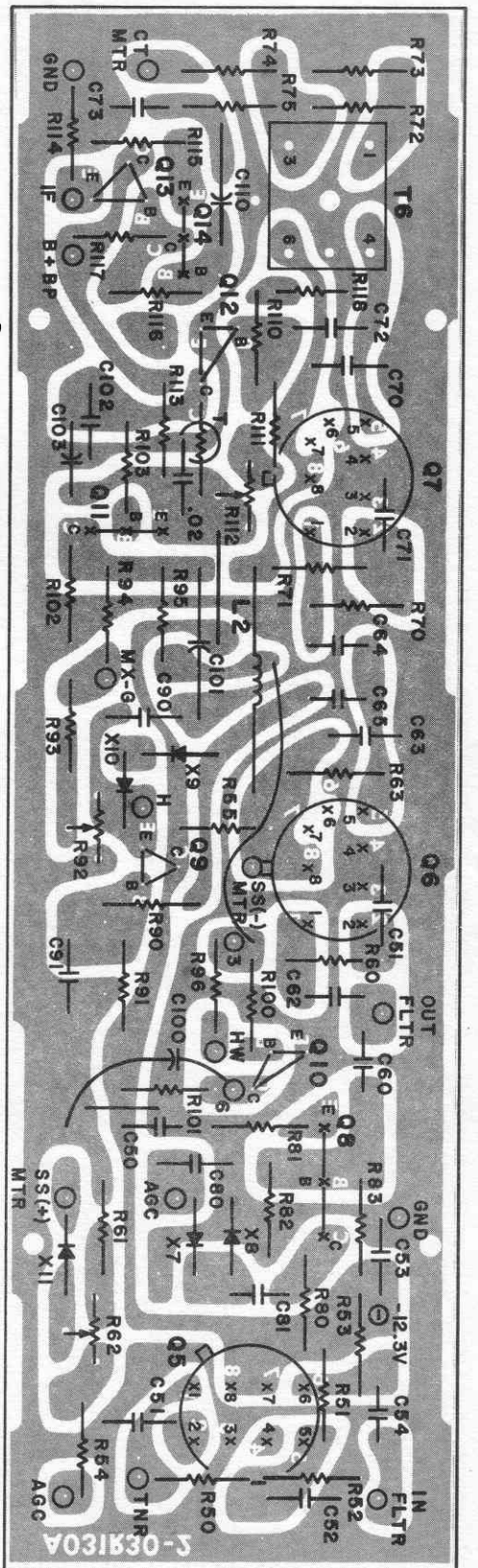
DIAL CORD STRINGING DETAIL



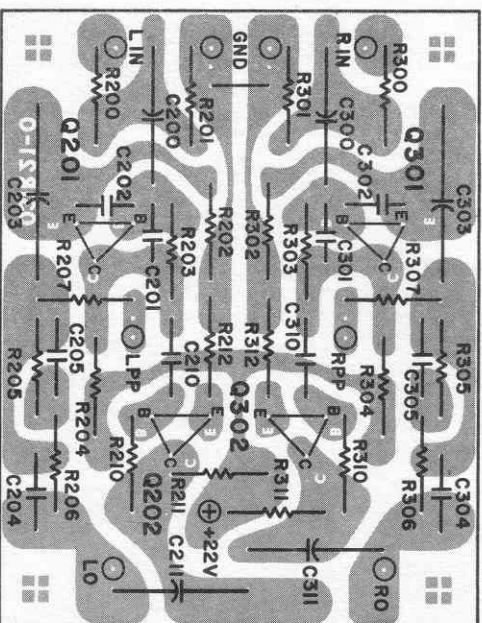
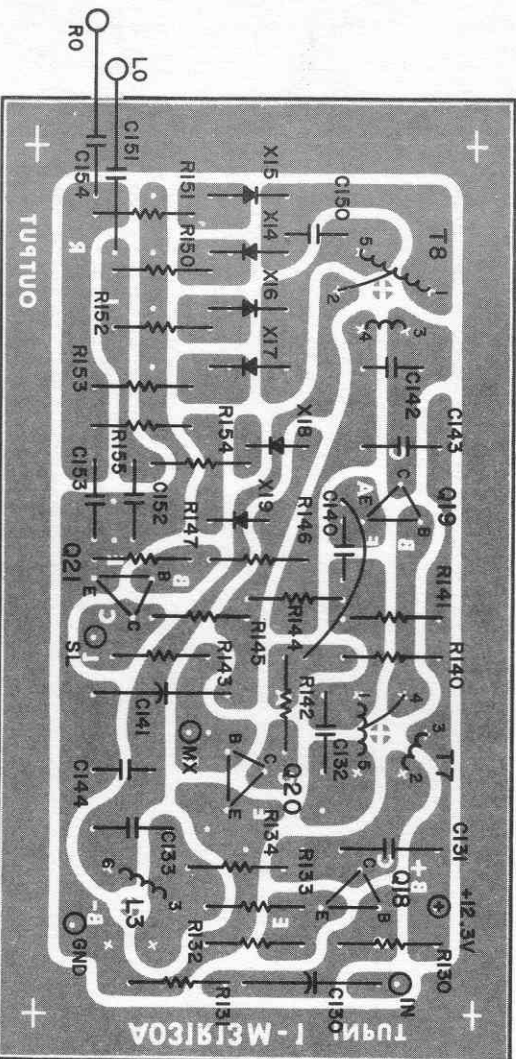


SHERWOOD

ELECTRONIC LABORATORIES, INC.,
4300 North California Avenue, Chicago, Illinois 60618
312-478-7300

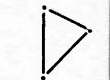


IF BOARD A03IR30-2



MULTIPLEX A03IR13M-1

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT
- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD



- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

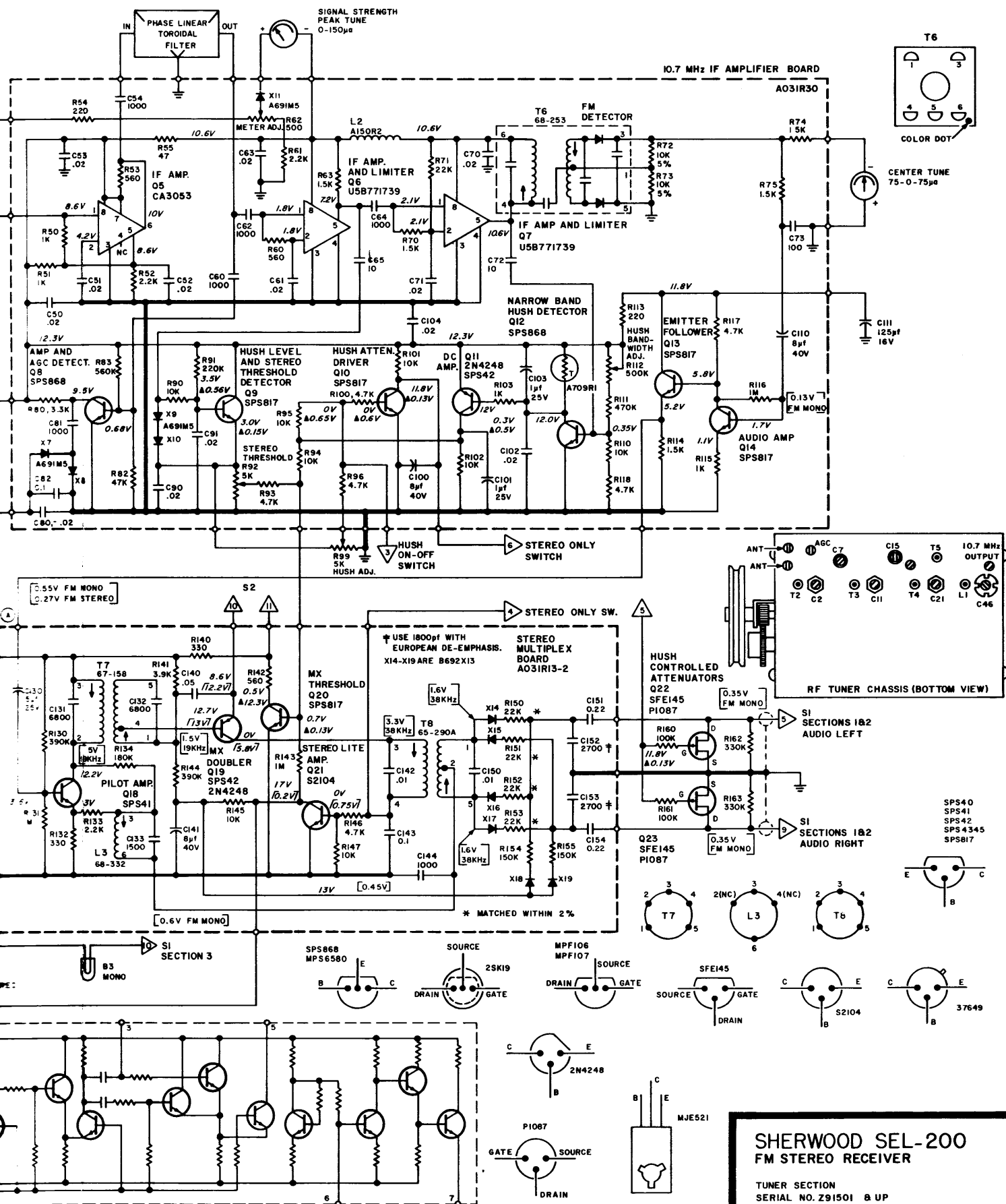
- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

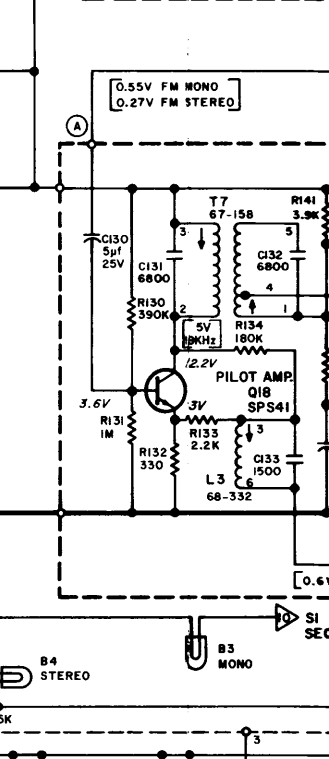
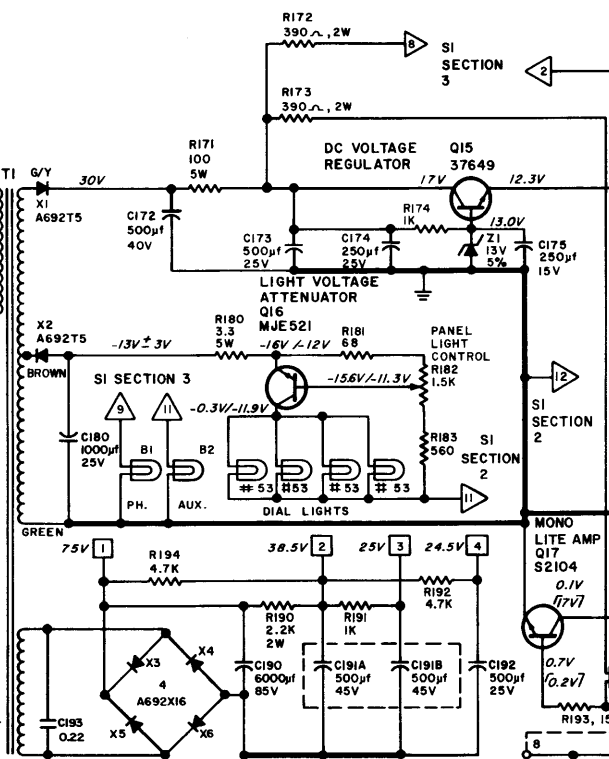
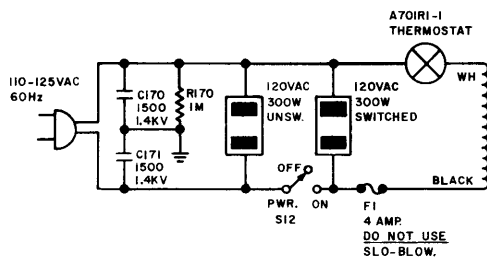
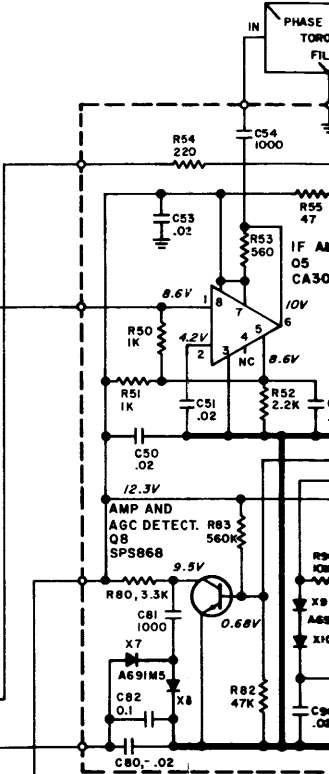
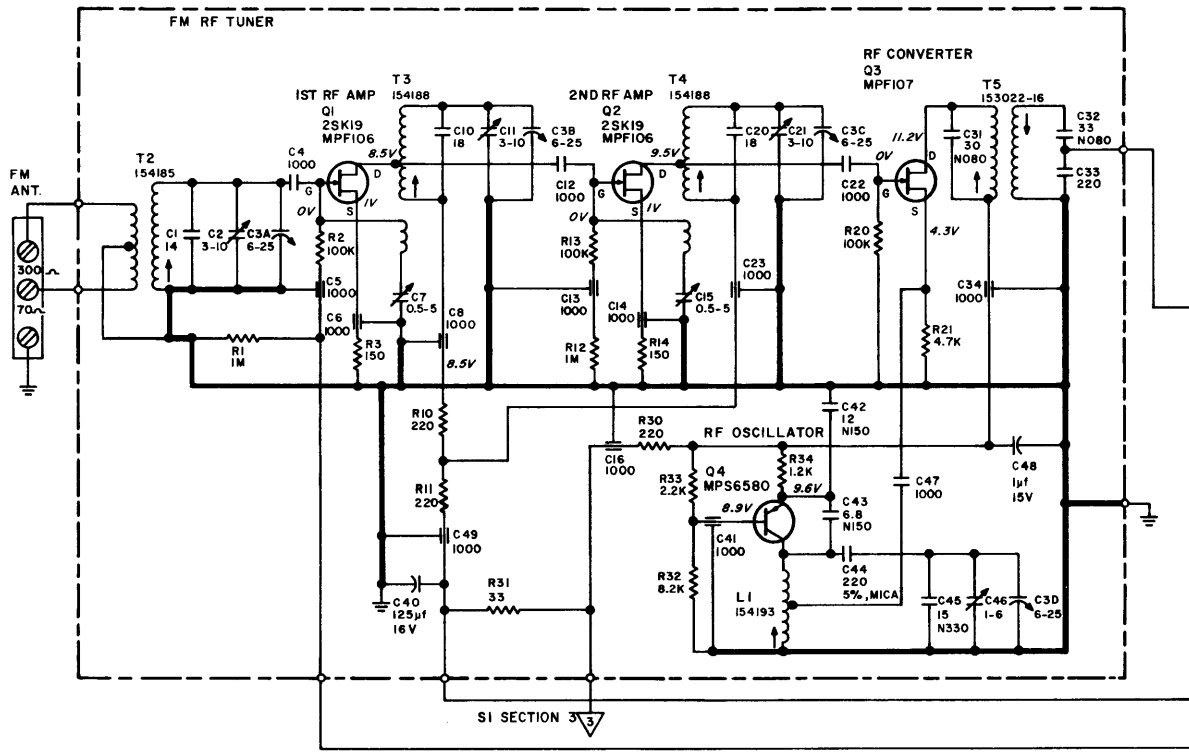
- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD

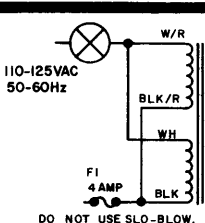
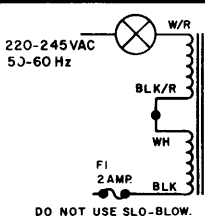
- RO- RIGHT OUTPUT
- LO- LEFT OUTPUT
- IN- INPUT

- SL- TO STEREO LIGHT
- MX- MX DRIVER FROM I.F. BOARD





ALTERNATE PRIMARY CIRCUITS FOR EXPORT MODELS



NOTES:

ALL RESISTORS ARE 1/3 OR 1/2 WATT, 10% TOLERANCE, UNLESS SPECIFIED.

ALL FRACTIONAL VALUE CAPACITORS AND ELECTROLYTICS ARE IN μ F. OTHER CAPACITORS ARE IN pF.

AC AND DC VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITIONS:

DC:

NO SIGNAL

NO SIGNAL - HUSH ON

100 μ V FM MONO SIGNAL, 100% MODULATION

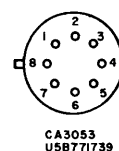
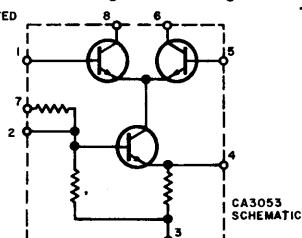
7100 μ V FM STEREO SIGNAL, 100% MOD.

AC: RMS READING

100 μ V, 100% MOD. FM STEREO SIGNAL, EXCEPT WHERE INDICATED.

STEREO THRESHOLD CONTROL PRE-ADJUSTED FOR 5 μ V.

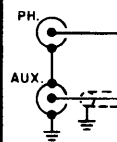
FM HUSH CONTROL PRE-ADJUSTED FOR 5 μ V.



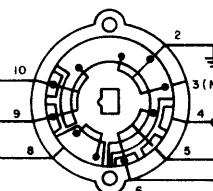
U58771739 SCHEMATIC

SELECTOR SWITCH POSITIONS	SENSITIVITY FOR RATED OUTPUT
1. PHONO	WITH PHONO LEVEL L - 6.0MV M - 3.0MV H - 1.5MV
2. FM	
3. AUX.	150MV

LEFT CHANNEL INPUTS



SELECTOR SWITCH
S1 SECTION 1



AUDIO LEFT

AUDIO RIGHT

METER PWR. SUPPLY
AND DIAL
LIGHTS

GROUND

S1 SECTION 2

11 12

10 9

8 7

6 5

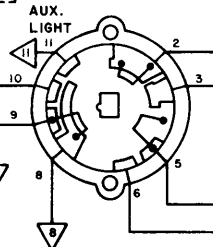
4 3

2 1

RIGHT CHANNEL INPUTS



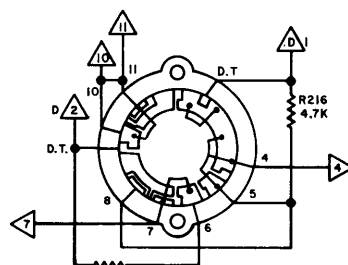
S1 SECTION 3



AUX. LIGHT

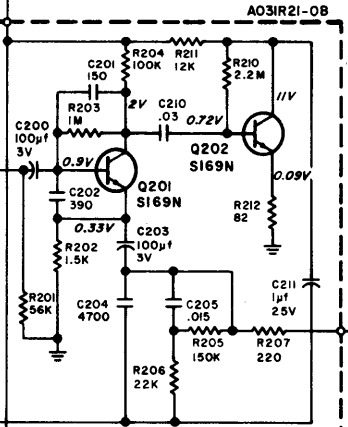
MONO AND STEREO LIGHTS

PH. LIGHT



FUNCTION SWITCH POSITIONS (S2)
1. STEREO
2. LEFT
3. RIGHT
4. LEFT & RIGHT

PRE-AMPLIFIER BOARD
A03IR21-0B



PHONO LEVEL LOUDER

S3A

R214 1.8K

R215 390

S3B

R216 4.7K

R217 1.8K

R218 1.8K

R219 1.8K

R220 1.8K

R221 1.8K

R222 1.8K

R223 1.8K

R224 1.8K

R225 1.8K

R226 1.8K

R227 1.8K

R228 1.8K

R229 1.8K

R230 1.8K

R231 1.8K

R232 1.8K

R233 1.8K

R234 1.8K

R235 1.8K

R236 1.8K

R237 1.8K

R238 1.8K

R239 1.8K

R240 1.8K

R241 1.8K

R242 1.8K

R243 1.8K

R244 1.8K

R245 1.8K

R246 1.8K

R247 1.8K

R248 1.8K

R249 1.8K

R250 1.8K

R251 1.8K

R252 1.8K

R253 1.8K

R254 1.8K

R255 1.8K

R256 1.8K

R257 1.8K

R258 1.8K

R259 1.8K

R260 1.8K

R261 1.8K

R262 1.8K

R263 1.8K

R264 1.8K

R265 1.8K

R266 1.8K

R267 1.8K

R268 1.8K

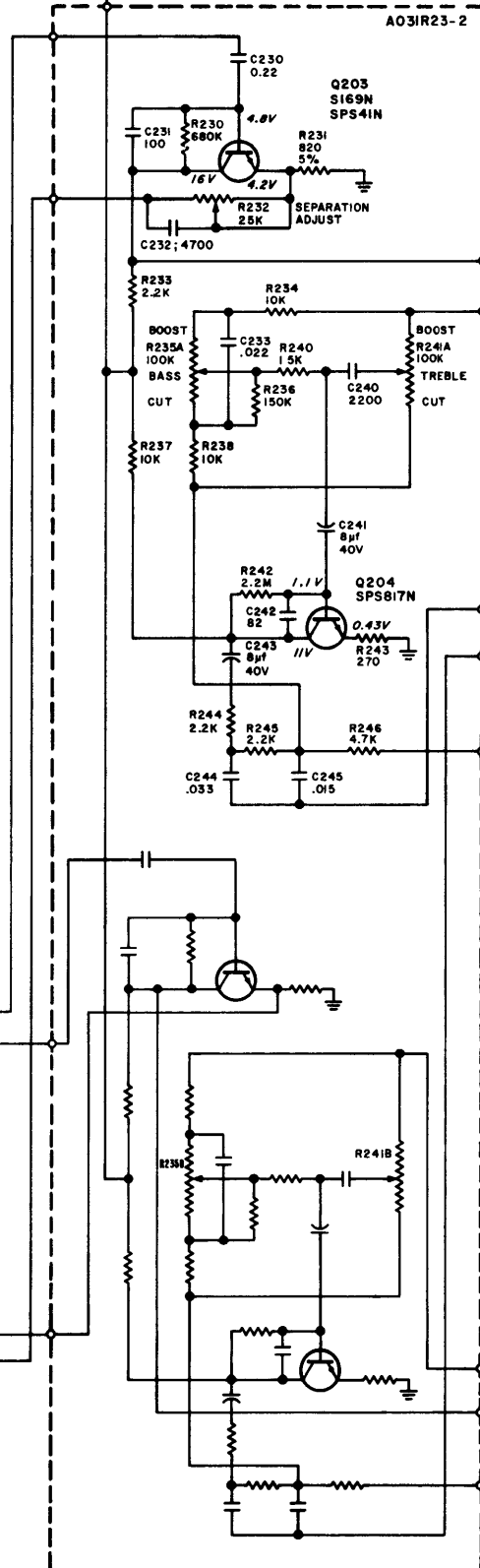
R269 1.8K

R270 1.8K

R271 1.8K

R272 1.8K

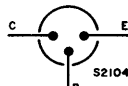
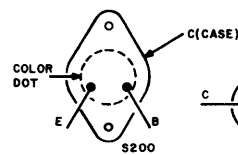
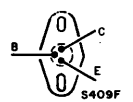
TONE AMPLIFIER BOARD
A03IR23-2



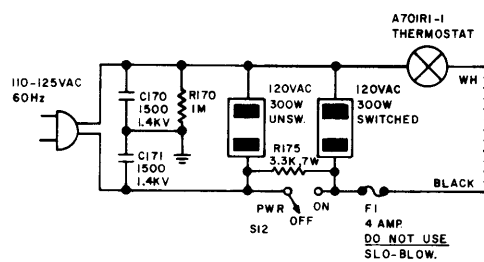
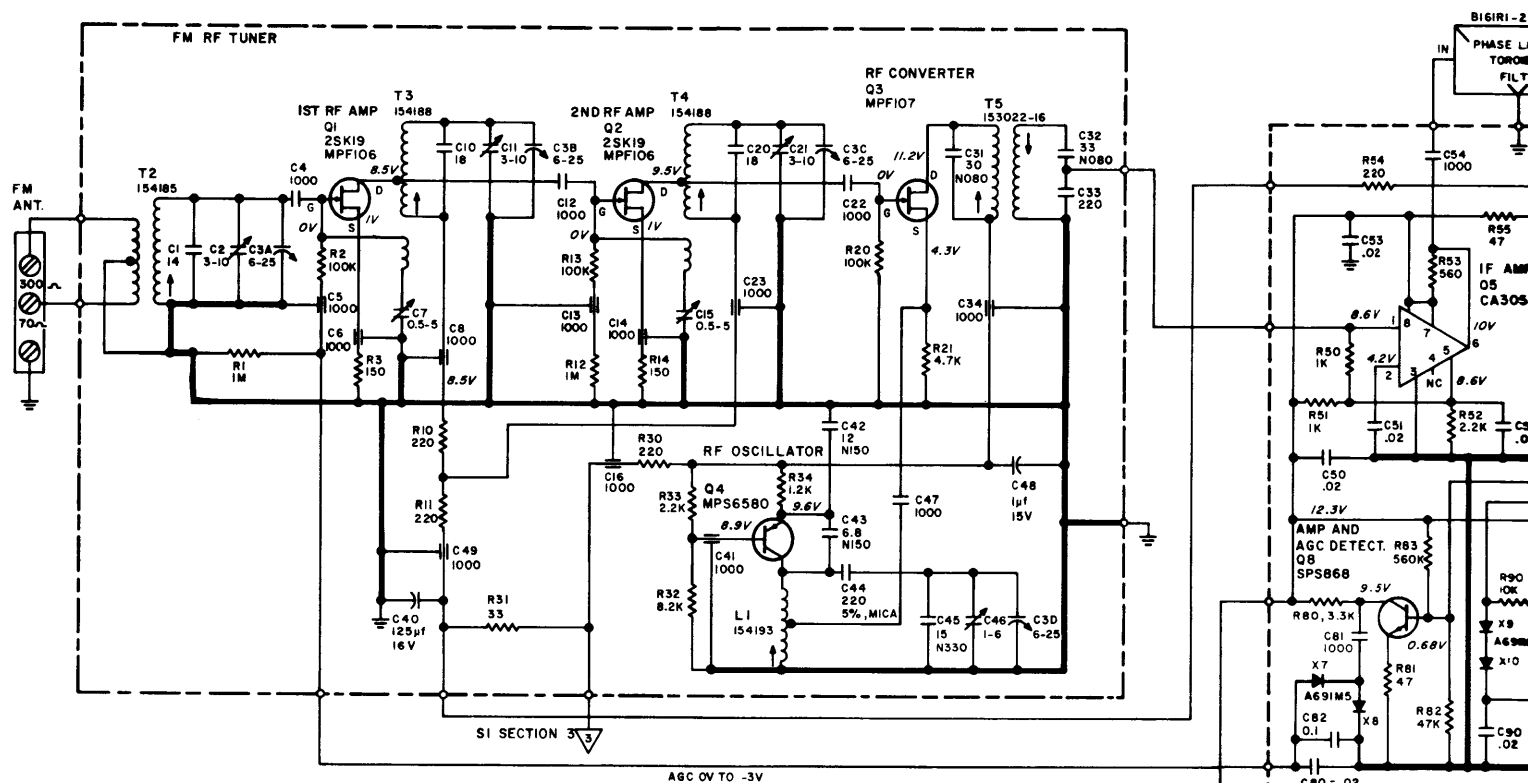
STEREO-ONLY SWITCH

SHERWOOD SEL-200
FM STEREO RECEIVER

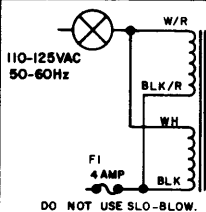
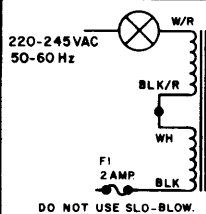
AMPLIFIER SECTION
SERIAL NO. Z91501 & UP







ALTERNATE PRIMARY CIRCUITS FOR EXPORT MODELS



NOTES:

ALL RESISTORS ARE 1/3 OR 1/2 WATT, 10% TOLERANCE, UNLESS SPECIFIED.

ALL FRACTIONAL VALUE CAPACITORS AND ELECTROLYTICS ARE IN μ f. OTHER CAPACITORS ARE IN pf.

AC AND DC VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITIONS:

DC:

NO SIGNAL

▲ NO SIGNAL - HUSH ON

() 100 μ V FM MONO SIGNAL, 100% MODULATION.
 / 7 100 μ V FM STEREO SIGNAL, 100% MOD.

AC: RMS READING

☐ 100 μ V, 100% MOD. FM STEREO SIGNAL, EXCEPT WHERE INDICATED.

STEREO THRESHOLD CONTROL PRE-ADJUSTED
FOR 5 μ V.

FM HUSH CONTROL PRE-ADJUSTED FOR
5W.

