Price $7.50

SHURE®

AUDIOMASTER®

Model 1200 Powermixer

SERVICE MANUAL

ISSUE NO. 1

Manufactured by

SHURE BROTHERS INC.

222 Hartrey Avenue

Evanston, Illinois 60202-3696

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Printed in U.S.A.

SPECIFICATIONS

Type
Mono Powermixer

Frequency Response
Flat +1, -3 dB, 40 Hz to 20 kHz (any input to any output)

Inputs
Six input channels: six unbalanced high- and/or balanced low-impedance inputs; channels 1 and 2 high-impedance inputs switchable to Aux level; available expansion modules* each contain 2 high- and 2 low-impedance microphone inputs; two modules (4 channels) can be added to each 1200

Power Output (1 kHz, 120 Vac, 1% THD)
200 watts minimum with 4 ohm speaker
120 watts minimum with 8 ohm speaker

Distortion
THD typically less than 0.15% at 1 kHz, 0.35% at 70 Hz and 20 kHz (180 watts to 4 ohms, measured from low-impedance input, Input Attenuation, individual channel and Master Volume controls at typical user settings)
IM distortion typically less than 0.4% (116 watts to 4 ohms, Input Attenuation, individual channel and Master Volume controls at typical user settings)

Low- and High-Frequency Equalization (Individual channel and Monitor)
±10 dB at 100 Hz and 10 kHz

Input OVERLOAD Indicators
Illuminate 3 dB before clipping of input preamplifier or equalizer stage

Power Amp Limiter
Threshold: 1.5 dB below speaker output clipping level
Input signal range: 15 dB beyond limiting threshold

Output PEAK/LIMIT Indicator
With Limiter Out: Lights 2 dB before clipping at speaker outputs
With Limiter In: Lights 0.5 dB before onset of Limiter action

Output NORMAL Indicator
Lights when speaker output level is greater than 1.4 Vrms (0.5 W into 4 ohms)

Input Sensitivity (full power output)
BAL LO Z: -66 dBV (0.5 mV)
HI Z: -44 dBV (6.3 mV)
AUX: -26 dBV (50 mV)
PA INPUT: 0 dBV (1.0 V)

Input Clipping Level

INPUT	CLIPPING LEVEL	ATTENUATION
BAL LO Z	-33 to -3 dBV (22 to 707 mV)	0 to -30
HI Z	-11 to +18 dBV (281 mV to 8.41 V)	0 to -30
AUX	+6 to +36 dBV 2 to 63 V	0 to -30
PA INPUT	-1 dBV (891 mV)	- -

Voltage Gain (at 1 kHz)

INPUT	OUTPUT				
	SPEAKER	PGM MIX	MONITOR	PHONES	TAPE
LO Z	95 dB	65 dB	71 dB	82 dB	51 dB
HI Z	73 dB	43 dB	49 dB	60 dB	29 dB
AUX	55 dB	25 dB	31 dB	42 dB	11 dB
PA	29 dB	-	-	16 dB	-

Output Clipping Level

OUTPUT	MINIMUM CLIPPING LEVEL
SPEAKER	+29 dBV (28 V)
MONITOR	+18 dBV (7.9 V)
PROGRAM MIX	+18 dBV (7.9 V)
PHONES	+16 dBV (6.3 V)
TAPE	+18 dBV (7.9 V)

Impedance

INPUTS	ACTUAL	FOR USE WITH
LO Z MIC	1 kΩ	75 to 600 Ω
HI Z MIC	130 kΩ	100 kΩ or less
AUX	50 kΩ	10 kΩ or less
PA	50 kΩ	10 kΩ or less
OUTPUTS		
MONITOR	2.4 kΩ	2 kΩ or more
PROGRAM MIX	2.4 kΩ	2 kΩ or more
TAPE	2.4 kΩ	2 kΩ or more
PHONES	430 Ω	4 Ω or more
SPEAKER	-	4 Ω or more

Hum and Noise
Less than -126 dBV equivalent input hum and noise (20 Hz to 20 kHz, LO Z input to SPEAKER output)

Noise
Less than -127 dBV equivalent input noise (300 Hz to 20 kHz, LO Z input to SPEAKER output)

Signal-to-Noise Ratio
Greater than 80 dB (below full output) at typical control settings

Phantom Power
24 Vdc ± 10% open circuit, 1.8 k series resistance

Power Requirements
120 Vac ± 10%, 50/60 Hz, 420 watts typical with no ac receptacle load

AC Convenience Receptacle
120 Vac, 100 watts maximum

Certifications
Listed by Underwriters Laboratories Inc. and by Canadian Standards Association as certified

Environmental Conditions
Operating Temperature: -7 to 43°C (20 to 110°F)
Storage Temperature: -40 to 74°C (-40 to 165°F)
Relative Humidity (Operating and Storage): 0 to 95%

Overall Dimensions
191 mm H x 483 mm W x 343 mm D (7-½ x 19 x 13-½ in.)

Weight
12.3 kg (27 lb)
18.2 kg (40 lb) in A1200C Carrying Case

RECOMMENDED LOUDSPEAKERS
AUDIOMASTER Model 3200, 100 W, 8 Ω, vented two-way speakers

OPTIONAL ACCESSORIES
Carrying Case. A1200C
Input Expansion Module*
(2 channels, 2 each HI Z and LO Z inputs). . A1200MX
Speaker Cable, 15 m (50 ft) with phone plugs A50SC
Line Matching Transformer (LO Z to HI Z) A95UF
240-V Conversion Kit* RKC209
Phono Preamp M64A

*For installation by qualified service personnel only.

MODEL 1200 SERVICE MANUAL

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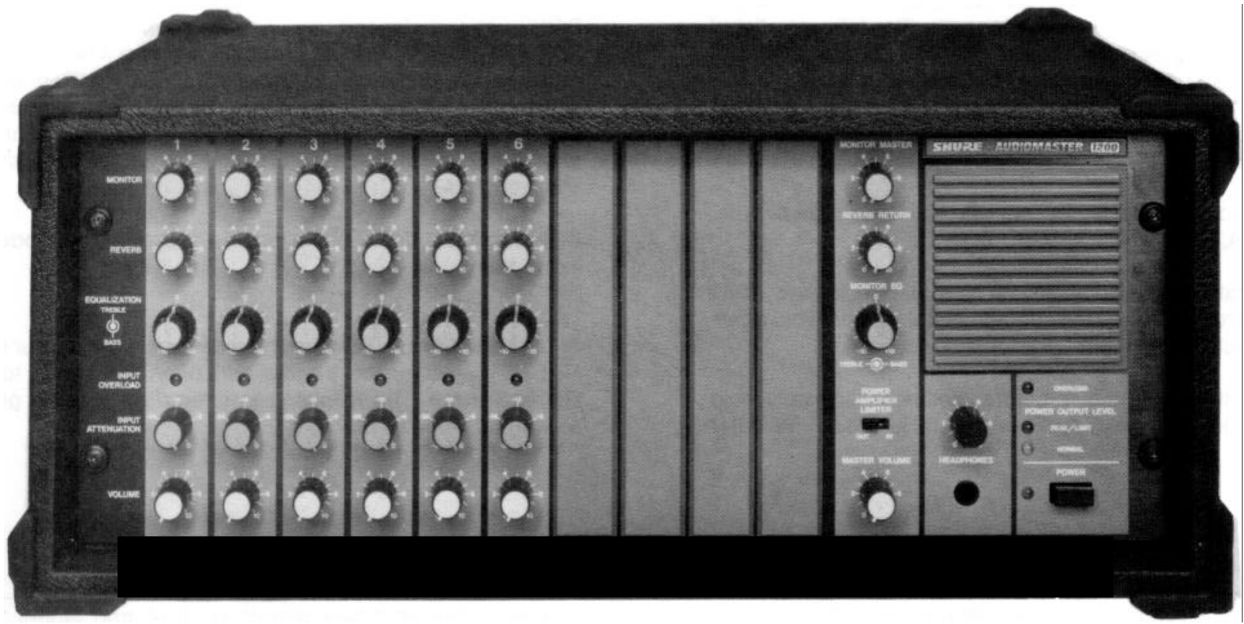


DESCRIPTION

The Shure Model 1200 AUDIOMASTER® Powermixer is a compact, flexible microphone mixer with six inputs for high- or low-impedance sources and a 200-watt power amplifier. The 1200 is human-engineered for ease of setup and operation. Connection of microphones, speakers and other equipment (tape recorder, equalizer, effects device, remote amp, etc.) is fast and convenient.

The 1200 is rack-mountable or portable. Its 6 inputs are expandable to 8 or 10 inputs through the use of A1200MX Expansion Kits. Inputs accept both high- and low-impedance microphones (dynamic, ribbon or condenser), as well as amplified instruments or other high-level sources. Individual channel input attenuators with overload indicators permit precise gain control to prevent input overload. The 1200 has built-in reverberation with individual channel and overall level adjustments. Other effects devices or an equalizer can be connected through a post-master control program loop. An integral power amp limiter prevents overload distortion over a wide signal input range. Pre-volume monitor send controls and pre-master volume tape output provide maximum versatility in stage or recording applications. The control panel has color-coded knobs for ease of adjustments, while LED indicators give instant notice of operating status.

In addition to the A1200MX Expansion Module, the following accessories are available for the 1200: A1200C Carrying Case, A95UF Line Matching Transformer, RKC209 240 V Conversion Kit, and M64A Phono Preamplifier.

The 1200 is Listed by Underwriters Laboratories, Inc., and listed by Canadian Standards Association as certified.

FOR YEARS OF DEPENDABLE OPERATION...

The AUDIOMASTER® System is exceptionally well designed, with all components of the highest quality, operating well within their respective ratings to assure long life. The following list of Do's and Don'ts describes minimal operating precautions and maintenance to provide years of dependable service.

DO use a 16 AWG or larger, heavy-duty, 3-conductor extension cord when additional line cord length is needed.

DON'T replace the rear-panel fuse with a different size or type. Use only 5 A, 250 V, Type 3AG.

DON'T operate the Powermixer with its air vents blocked; don't place it on a radiator or heat-producing equipment. Avoid operation in direct, hot sunlight.

DO unplug the Powermixer before cleaning. Use only mild detergent and a damp (never wet) cloth to clean the outer surfaces; Don't use strong solvents or cleaning fluids.

DON't use **unbalanced** low-impedance microphones with the PHANTOM 24V switch on; turn off the switch if not required for powering condenser microphones. If phantom power is in use, connect unbalanced low-impedance microphones through a line matching transformer (Shure A95UF) to a HI Z input. Phantom power will not affect **balanced** low-impedance dynamic microphones.

DON'T risk fire or shock hazard by operating the Model 1200 in the rain.

TROUBLESHOOTING

Should any difficulty be encountered in operation of your AUDIOMASTER System, the trouble can often be traced to some simple source. The following is offered as a basic guide to solving this kind of problem.

SYMPTOM	PROBABLE CAUSE AND CORRECTION
Powermixer is "dead" (no output, POWER LED off)	1. Check that ac power source is "live" and Model 1200 is plugged in. 2. Check that POWER switch is on. 3. Check that rear panel fuse (5 A, 250 V) is good. 4. If the 1200 has turned off due to excessive internal temperatures, allow at least an hour for cooling, and reactivate unit. If difficulty persists, refer to General Service Procedure in this manual.
OVERLOAD LED illuminates, either A. Flickering with program material, indicating abnormal speaker load	1. Check total speaker load (must be no lower than 4 ohms) and for possible shorted speaker cable.
B. Continuously to indicate power amplifier shutdown	1. Check air vents for blockage. 2. Check that internal fan is operating (fan located on rear panel). 3. Turn MASTER volume control down for several minutes to allow proper cooling. If difficulty persists, refer to General Service Procedure.
No signal at speaker (all other functions appear normal), either A. NORMAL LED illuminated, or	1. Check for defective or improperly connected speaker cables.
B. NORMAL LED not illuminated	1. Check settings of channel VOLUME and MASTER VOLUME controls. 2. Check connections to EXTERNAL DEVICE LOOP
Fuse blown	1. Replace with identical fuse (5 A, 250 V, 3AG). 2. If second fuse blows, refer to General Service Procedure.
One of two inputs on same channel not working properly (both 1/4-inch and 3-pin jacks in use)	1. Make sure similar microphones are used on both inputs, and microphone impedances match the inputs used. 2. Make sure a low-impedance microphone is not used with aux level equipment on other input. 3. Make sure MIC/AUX switch is in MIC position (Ch. 1 and 2 only). 4. Make sure microphone switches are on; check microphone cables.

SYMPTOM	PROBABLE CAUSE AND CORRECTION
INPUT OVERLOAD LED flashing NOTE: Occasional flashing is acceptable	1. Adjust INPUT ATTENUATION counterclockwise to reduce channel input level. 2. Reduce input signal level at source.
Loud clicks when certain microphones or cables are used	1. Make sure PHANTOM 24V switch is not on (when not needed). 2. Make sure unbalanced low-impedance microphone or cable is not used when PHANTOM switch is on. 3. Check for defective microphone cables.
No MONITOR output (program output normal)	1. Make sure channel MONITOR and MONITOR MASTER controls are turned up. 2. Make sure controls on external equipment connected to Monitor output jack are turned up. 3. Check for defective cable from MONITOR output jack.
Sound quality poor (weak or thin)	1. Check for excessive treble boost or bass cut on equalization controls. 2. Check PROGRAM and MONITOR output jacks for signal quality (if acceptable, problem is in power amplifier section). 3. Check for defective cables. 4. Check impedance match (high- or low-impedance mics) at input.

SERVICE INSTRUCTIONS

EXTERNAL PARTS

The knobs and feet can be replaced without disassembling the 1200. All knobs are of the pull-off type, and are color-coded by function. The Equalization knobs are dual concentric types; all other knobs are single.

DIAGNOSIS

A simple method of localizing problems without opening the 1200 is as follows. Turn off the Power switch. Do not connect a speaker or headphone load. Set all controls of the channel under test *only* to full clockwise (other channel volume and monitor controls full counterclockwise), except: Reverb Return full counterclockwise, and Eq controls centered. Turn the unit on and apply a 0.5 mV, 1 kHz test signal across pins 2 and 3 of one of the Bal Lo Z input connectors. Normal voltmeter readings taken at each output connector are given in Table 1. Similarly, a 5 mV signal inserted in a HI Z input, 50 mV in an AUX input, or 891 mV in the Power Amp and Monitor Inputs will yield similar output voltages. This method is useful for saving time in localizing problem areas. Internal servicing should be performed only by qualified service personnel.

TABLE 1. NOMINAL TEST VOLTAGES

	OUTPUTS					
INPUT	Input	Spkr	Prgm Mix	Mon	Phones	Tape
LO z	0.5 mV	28 V	890 mV	1.78 V	6.31 V	178 mV
HI Z	5 mV	22 V	708 mV	1.41 V	5.01 V	141 mV
AUX	50 mV	28 V	890 mV	1.78 V	6.31 V	178 mV
PA	891 mV	25 V	---	---	5.62 V	---

WARNING

Voltages in this equipment are hazardous to life. Refer servicing to qualified service personnel.

EXTERNAL FUSE REPLACEMENT

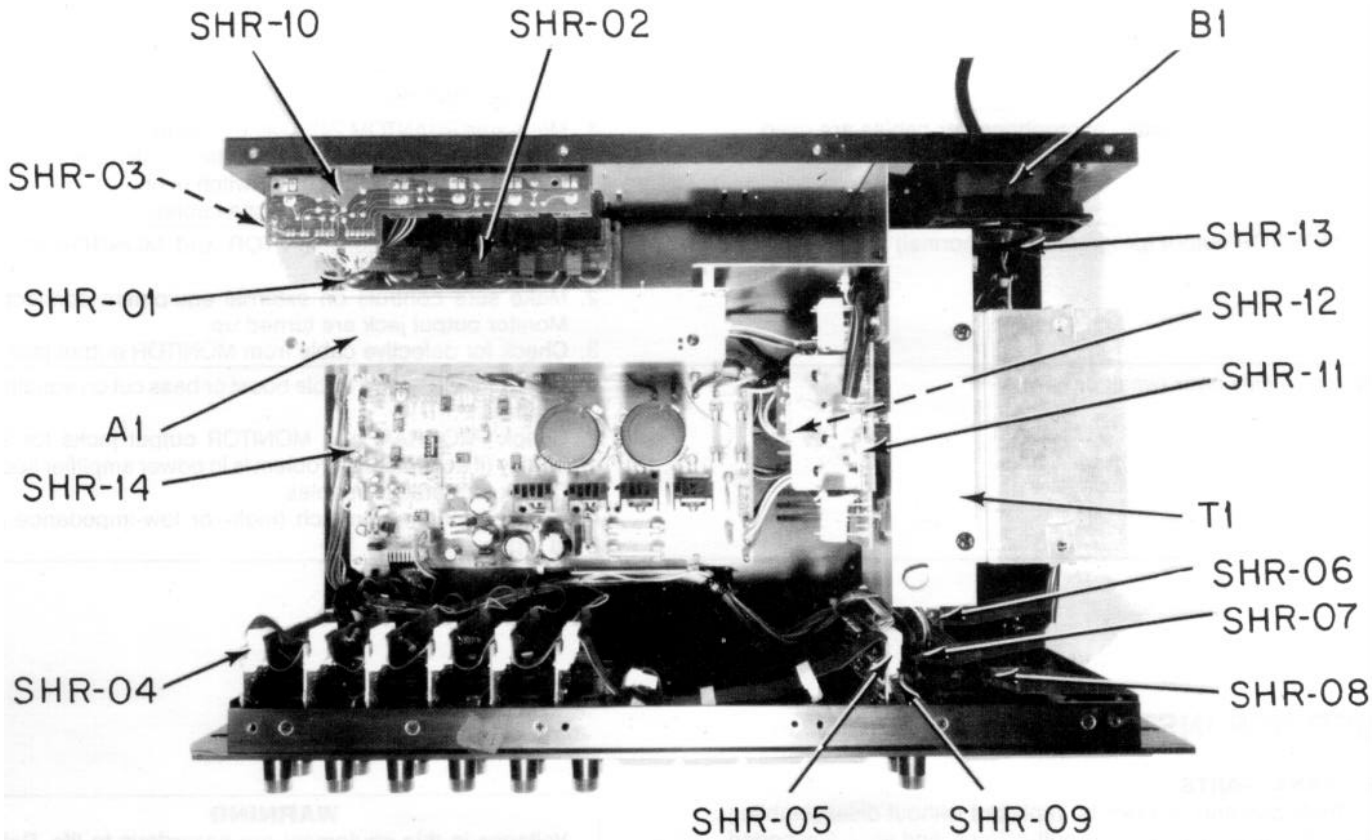
To replace line fuse F1 (with no apparent problems in the Powermixer), disconnect the line cord from the ac source and remove the rear panel fuseholder cap by pushing it in and turning it counterclockwise (either a screwdriver or fingertip may be used.) Replace the defective fuse only with a 5A 250V Normal Blow type.

CAUTION

If trouble symptoms (overheating, erratic operation, etc.) were apparent before the fuse blew, or if the replacement fuse blows, a qualified service person should troubleshoot the Powermixer carefully to find the source of the problem. Do not continue to replace fuses; have the trouble corrected.

SERVICE ACCESS

Disconnect the 1200 from its power source. To open the unit for servicing, remove ten screws and lockwashers from the top and five from each side of the cover. The cover can then be lifted off exposing the internal parts (see Figure 1).



PRINTED CIRCUIT BOARD AND PARTS LOCATION
FIGURE 1

WARNING
After replacing high-voltage parts such as the fan, power cord, rear panel convenience receptacle, or printed wiring assemblies SHR-11, SHR-12, or SHR-14 (or their components), make certain that a dielectric voltage breakdown test is performed before connecting the unit to a power supply. With the unit disconnected from the ac source, turn the unit on and measure the resistance between the ground contact of the power plug and each of the other two prongs. This resistance should measure infinite. Then measure the resistance between the plug ground and exposed metal parts of the chassis, screws, connectors, fan grille, etc. This resistance should be zero ohms. If any measurements are recorded outside the specified limits, a shock hazard exists. The unit must be repaired and rechecked before it is returned to operation.

IMPORTANT: When removing any printed wiring board, be sure the wires and connectors detached from the board are identified for proper reconnection. This may be done by affixing a piece of masking tape marked with the reference designation (connectors) or terminal letter or color (wires).

NOTE: Any cable ties that were loosened or removed must be tightened or replaced after servicing.

CAUTION
Similar wire colors and connectors with the same number of pins are used in different circuits; make sure proper reconnections are made. Push-on connectors must be removed by pulling straight out. The side of a small screwdriver blade inserted between the free and fixed connector can sometimes be helpful in separating the connector. Do not apply side force when removing or reconnecting terminals, or damage may result. Reference to the service illustrations will be helpful in case of difficulty.

GENERAL SERVICE PROCEDURE

To isolate a problem area, a general procedure is as follows. If the Powermixer is completely dead, check the ac power source, line cord, and fuses (external and internal). If the unit turns on but operation is abnormal, check the chassis power supply output (-56 Vdc between test point SHR-11-AB and ground, and +56 Vdc between test point SHR-11-AA and ground; -15 Vdc across C1421, +15 Vdc across C1420, and +24 Vdc between P1404-A and ground). If the measured dc voltages are correct, perform additional AC and DC Voltage Measurements as described below to isolate the problem.

AC VOLTAGE MEASUREMENTS

Numbers within rectangular symbols on the circuit diagrams denote ac voltages at that point under the following test conditions:

1. Voltages measured with respect to chassis unless otherwise indicated.
2. Line voltage: 120 V, 60 Hz.
3. Test signal of 0.5 mV across pins 2 and 3 of connector J101.
4. AC voltage measurements may vary ±20% from values shown.
5. Measurements made with ac voltmeter of 1 megohm or greater input impedance.
6. No load on Speaker Outputs.
7. All controls (of channel under test only) full clockwise except Equalization controls centered.
8. Reverb Return full counterclockwise.
9. Limiter switch and Phantom switch in Off position.
10. Monitor Master control clockwise.

DC VOLTAGE MEASUREMENTS

Numbers within elliptical symbols on the circuit diagrams denote dc voltages at that point under the following test conditions:

1. Voltages measured with respect to chassis unless otherwise indicated.
2. Line voltage: 120 V, 60 Hz.
3. No input signal applied.
4. Dc voltage measurements may vary ±20% from values shown.
5. Measurements made with dc voltmeter of 11 megohms or greater input impedance.
6. Phantom switch in On position.

RESISTANCE MEASUREMENTS

With the ac line cord disconnected from the ac source and the Power On/Off switch off, the following ohmmeter measurements may be made.

1. Reverb pan output coil: approximately 360 ohms; input coils approximately 40 ohms.
2. Transformers may be checked for continuity of each winding.
3. To test transistors, ICs and diodes, refer to the section on CHECKING ACTIVE COMPONENTS.

CHASSIS-MOUNTED BOARDS AND COMPONENTS

The following printed wiring boards and components are chassis-mounted.

SHR-11	POWER BOARD
SHR-12	SENSOR BOARD
SHR-14	MAIN BOARD
A1	REVERB PAN
T1	POWER TRANSFORMER

REVERB PAN

To remove the reverb pan assembly, turn the 1200 on its side (power transformer down) and remove the three screws holding the reverb shield to the chassis bottom. Turn the 1200 upright and remove the screw holding the reverb shield to the standoff attached to the parallel vertical interior shield. Disconnect the phono connectors at the bottom of the reverb pan assembly. Remove the four screws holding the reverb pan to the vertical metal interior shield, and lift the reverb shield and pan assembly out of the chassis holding the pan to the shield. (If necessary to free the reverb shield, remove the cable tie(s) holding the orange and white leads to the metal shield.)

To replace the reverb pan, connect the white lead connector to the reverb Input and the orange lead connector to the reverb Output. Use the previously removed screws to secure the reverb pan to the reverb shield, and to secure the shield to the chassis bottom and the parallel vertical interior shield. Be sure to replace any cable ties that were removed or loosened.

SHR-11 AND SHR-12 POWER AMP BOARD ASSEMBLY

The Power Amplifier Board Assembly consists of SHR-11 and SHR-12 mounted on the large aluminum heat sink. To separate the heat sink and its associated boards from the 1200, remove the screws holding the sink to the power transformer shield bracket, and those holding the sink to the metal shield that divides the fan from the input and output connectors and boards. Disconnect the connectors from P1101, P1102 and P1201, and unsolder the red, green, and white leads from AA, AB and AC, respectively, on SHR-11. (The opposite ends of leads AA and AB are connected to SHR-14, Main Board; the opposite end of lead AC is connected to SHR-13, Speaker Output Board.) The Power Amp Board is now free of the 1200.

To replace parts on SHR-11, it is then necessary to remove SHR-11 from the large heat sink. Do this by removing the four Phillips screws holding the power transistors at the corners of the board, and the two Phillips screws holding the board on the brass standoffs.

NOTES:

1. Removal of SHR-11 from the heat sink may damage the insulators below the power transistors. Therefore, when servicing SHR-11, be prepared to replace all four 802639FK insulators. If either predriver transistor Q1103 or Q1104 (mounted on the vertical heat sink fastened to SHR-11) is replaced, be prepared to replace insulator 802681FK beneath it.

2. If transistor Q1105, mounted on the solder side of board SHR-11, is replaced or if the board has been removed from the heat sink, make certain that Q1105 physically contacts the large heat sink after reassembly of the board to the heat sink is completed. Apply a small amount of Wakefield Type 120 Thermal Joint Compound to the top surface of the transistor in order to ensure proper heat transfer.

To replace SHR-11 in the 1200, solder the red, green and white leads to AA, AB and AC. Connect the cable assembly with three leads from P1405, SHR-14, to P1101 ; and connect the cable with a single lead from P1407, SHR-14, to P1102.

SHR-11 POTENTIOMETER ADJUSTMENT

If any components are replaced on SHR-11, trimpots VR1101, VR1102 and VR1103 may require readjustment. Measure the SHR-11 voltages described in the following paragraphs. If measured voltages are not correct, make adjustments as follows. With power off, no input signal applied, and no load on the 1200's speaker output, turn VR1103 completely clockwise. Turn power on and allow unit to warm up or thermally stabilize for ten minutes prior to making the adjustments. See Figure 2 for trimpot locations.

VR1101 OUTPUT VOLTAGE OFFSET ADJUSTMENT

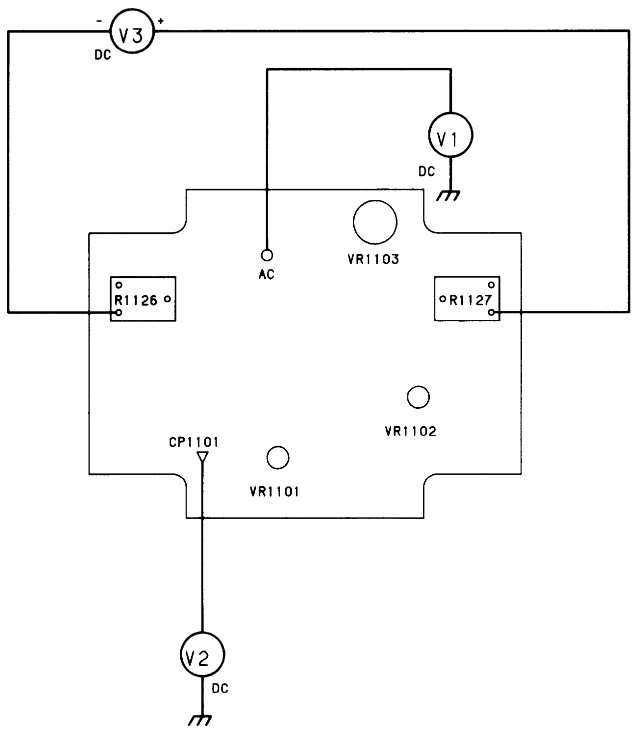
1. Connect a dc voltmeter between SHR-11 terminal AC and ground (see Figure 2).
2. Adjust VR1101 so that V1 equals 0 V ±15 mV

VR1102 DRIVER BALANCE ADJUSTMENT

1. Connect a dc voltmeter between CP1101 and ground (see Figure 2).
2. Adjust VR1102 so that V2 equals 1.2 V.

VR1103 IDLE CURRENT ADJUSTMENT

1. After the unit has been turned on for at least five minutes, connect a dc voltmeter between R1126 and R1127 as shown (see Figure 2) and check the idle current. If the value of V3 does not equal 6.6 mV ±3.3 mV, use a razor blade to carefully remove from the top and side of VR1103 the old cement that prevented its adjustment from changing.
2. Adjust VR1103 so that V3 equals 6.6 mV ±3.3 mV.
3. Apply a drop of cement (white glue, hot melt glue, caulk, etc.) to VR1103 to eliminate movement due to vibration.



SHR-11 POTENTIOMETER ADJUSTMENTS
FIGURE 2

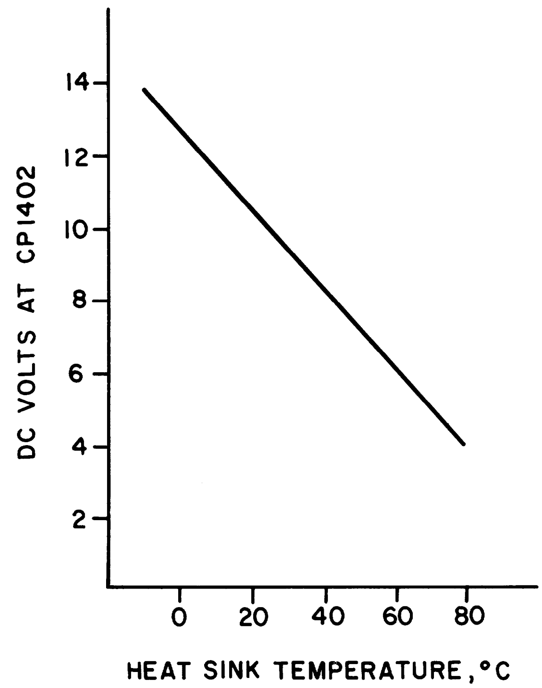
SHR-12 TEMPERATURE SENSOR BOARD

To remove SHR-12 from the large heat sink, remove the Power Amplifier Board Assembly from the 1200 as described above. Then remove the two Phillips screws that hold SHR-12 to the small vertical heat sink. When replacing SHR-12, U1201 (mounted on the solder side of the board) must physically contact the vertical heat sink in order to ensure correct operation of the power amplifier over-temperature protection circuitry. In addition, apply a small amount of Wakefield Type 120 Thermal Joint Compound to the top surface of the IC to allow good heat transfer.

VR1201 TEMPERATURE SENSOR THRESHOLD ADJUSTMENT

If U1201 or other SHR-12 parts are replaced, VR1201 will probably require recalibration as follows.

1. Turn off the unit long enough for the heat sink to reach ambient temperature. Remove all input signal sources and speaker loads.
2. Measure the heat sink temperature or ambient temperature around the heat sink. Consult the graph in Figure 3 to determine the proper voltage at test point CP1402.
3. Attach a dc voltmeter between CP1402 (+) and ground (-).
4. Apply power to the unit and quickly adjust potentiometer VR1201 on SHR-12 until the proper voltage is reached.



TEMPERATURE SHUTDOWN SENSOR CALIBRATION
FIGURE 3

SHR-14 MAIN BOARD

The 1200 contains four internal fuses mounted on the Main Board (SHR-14). If replacement becomes necessary, replace only with identical Normal Blow fuses: two 0.75 A 250 V, and two 8 A 250 V. Do not continue to replace fuses if a fuse continues to blow; have the trouble corrected.

To remove SHR-14 from the chassis, remove the three Phillips screws on each of the long sides of the board and the single screw next to the two 8 A fuses on the short side of the board. This will allow the board to be lifted free of the chassis. If it is necessary to completely separate SHR-14 from the 1200, remove all seven connectors (be sure to label the four 4-pin connectors and their receptacles to ensure proper reattachment). Unsolder the six transformer and two fan leads from pins AA through AH, and the two ground leads connected to AI and AJ. Be sure to label leads also so they can be resoldered to the proper pins. Unsolder from connection pins AA and AB of SHR-11 the red and green wires attached to the solder side of SHR-14. (Remove cable ties as necessary.) The SHR-14 board can now be completely detached from the 1200.

If any of the heat-sink-mounted parts (voltage regulators U1408, U1409 and U1410, or silicon rectifiers D1423 and D1424) is replaced, be sure to apply a small amount of Wakefield Type 120 Thermal Joint Compound between the component and the heat sink to allow maximum heat transfer.

A number of components on SHR-14 are mounted on spacing *insulators* to keep them a measured distance from the board, e.g., R1460, D1422. If any of these parts is replaced, be sure to remount them the required distance above the board on spacing insulators as originally supplied.

VR1401 POWER AMPLIFIER LIMITER THRESHOLD ADJUSTMENT

This adjustment is made under the following conditions.

1. Terminate the Speaker Output in a 4-ohm resistive load.
2. Set the Master control and trimpot VR1401 on SHR-14 fully clockwise.
3. Set the Limiter switch to Out.
4. Connect the unit to a 120 Vac, 60 Hz power source and switch the unit on.
5. Drive one low-impedance input channel at 1 kHz with its channel control fully clockwise. (Turn all the other input channel Volume Controls fully counterclockwise.) Increase the input signal until the signal at the Speaker Output just visibly clips.
6. Reduce the input signal level such that the output voltage drops 1.5 dB.
7. Switch the Limiter In. Slowly turn trimpot VR1401 counter-clockwise until the output voltage drops an additional 0.2 dB.

REAR-PANEL BOARDS AND COMPONENTS

The following printed circuit boards and components are mounted on the rear panel.

SHR-10	INPUT-OUTPUT BOARD
SHR-03	AUX/MIC BOARD
SHR-02	HI-Z INPUT BOARD
SHR-01	LO-Z INPUT BOARD
SHR-13	SPEAKER OUTPUT BOARD
B1	FAN
S3	+24 VDC PHANTOM POWER SWITCH
W1	POWER CORD
J1	AC CONVENIENCE RECEPTACLE
XF1	EXTERNAL FUSEHOLDER

For access to or replacement of any of these parts, turn the 1200 on its side (power transformer down) and remove the four Phillips screws that hold the rear panel to the chassis bottom. The rear panel then can be separated sufficiently from the chassis bottom to permit access to these boards and components.

SHR-10 INPUT-OUTPUT BOARD

To remove SHR-10, use a 1/2-in. nutdriver to remove the nuts on the five phone jacks. Carefully pull the board straight back until the connectors are free of the rear panel. To separate the board completely from the rear panel, remove the 6-pin and 4-pin connectors from P1001 and P1002. Unsolder the green and red leads from the Phantom Power switch, and unsolder from SHR-10 the yellow lead that connects AC on SHR-10 to AA on SHR-01. SHR-10 can now be completely separated from the 1200.

SHR-03 AUX/MIC BOARD

To remove SHR-03, disconnect the four connectors from AA, AB, BA, and BB to P201 and P202 of SHR-02 and from AC, AD, BC, and BD to P102 and P104 of SHR-01. Remove the four Phillips screws that hold the switches to the rear panel; SHR-03 can be completely separated from the 1200.

SHR-02 HI-Z INPUT BOARD

To remove SHR-02, remove the six 1/2-inch nuts on the input jacks. Disconnect the four 3-pin connectors from the SHR-01 LO-Z INPUT BOARD and the two 3-pin connectors from the SHR-03 AUX/MIC BOARD. Pull the board straight back to disengage the jacks from the rear panel: SHR-02 can then be completely separated from the 1200.

SHR-01 LO-Z INPUT BOARD

Remove the twelve screws (two per input) connecting the XLR-type connectors to the rear panel. To remove SHR-01 without first removing SHR-02 HI-Z INPUT BOARD, remove the four Phillips screws that hold the rear panel to the chassis bottom. Rest the unit on its side while performing this operation. Then swivel the rear panel away from the chassis (it is still held by the power cord). This allows SHR-01 to be pulled straight back and away from the rear panel without being stopped by the interior vertical metal shield. Disconnect the four 3-pin connectors (two from SHR-03 and two from SHR-04 CHANNEL BOARDS) and the four 4-pin connectors (from SHR-02 and SHR-04). (Be sure to label all removed lead-connector assemblies.) Unsolder from point AA the yellow lead from SHR-10 REAR PANEL INPUT-OUTPUT BOARD: SHR-01 is now completely free of the 1200.

SHR-13 SPEAKER OUTPUT BOARD

To remove SHR-13 SPEAKER OUTPUT BOARD:

1. Disconnect the 3-pin connector from P1301.
2. With a 1/2-inch nutdriver or wrench, remove the nuts holding the speaker output jacks to the rear panel.
3. Unsolder the leads from AA and AB.
4. The SHR-13 board is now free of the 1200.

B1 FAN

To remove the fan:

1. Remove the four screws, nuts, and starwashers at the four corners of the fan grille. This frees the fan from the rear panel.
2. Unsolder the black fan leads from pins AE and AG on SHR-14.
3. If necessary to remove the fan from the 1200, slide the fan leads out of the insulating tubing and separate the fan from the unit.

> **CAUTION**
> When replacing the fan, be sure to slide the leads through the insulating tubing before soldering them to the pins on SHR-14.

S3 PHANTOM POWER SWITCH

Remove the two screws that fasten the Phantom Power Switch to the rear panel. This will free the switch from the panel. to separate the switch completely from the 1200, unsolder the red and green leads from the switch terminals.

FRONT-PANEL BOARDS AND COMPONENTS

The following printed wiring boards and components are mounted on the front panel.

SHR-04	CHANNEL BOARD (6)
SHR-05	MASTER CONTROL BOARD
SHR-07	HEADPHONES CONTROL BOARD
SHR-06	HEADPHONES OUTPUT BOARD
SHR-09	LIMITER BOARD
SHR-08	INDICATORS BOARD
S2	POWER ON/OFF SWITCH

SHR-04 CHANNEL BOARD

The SHR-04 Channel Boards are assembled and installed in pairs. Therefore, SHR-04s for Channel 1 and Channel 2 constitute one pair, those for Channel 3 and Channel 4 constitute another pair, etc. To remove any pair of Channel Boards:

1. Remove the control knobs by pulling them off the shafts.
2. Remove the two flat-head Phillips screws that hold the Channel Board Assembly in place. One screw is attached to the top of the front panel ledge, the other to the chassis bottom.
3. Disconnect the Channel Bus Connector from the top of each of the two Channel Boards.
4. Disconnect the 3-pin connector (coming from SHR-01 Input Board) from the bottom of each of the two SHR-04 Channel Boards.
5. Pull the Channel Board Assembly horizontally backward to free the control shafts from the front panel; the Assembly is now free of the 1200.

FRONT MOUNTING PANEL

The Front Mounting Panel must be freed from the Front Panel in order to work on or remove SHR-05 MASTER CONTROL BOARD, SHR-06 HEADPHONES INPUT BOARD, SHR-07 HEADPHONES CONTROL BOARD, SHR-09 LIMITER BOARD, SHR-08 INDICATORS BOARD and the Power On/Off Switch from the 1200. To remove the Mounting Panel:

1. Remove the two flat-head Phillips screws from the front panel ledge above the Mounting Panel.
2. Rest the 1200 on its side with the fan and mounting panel upwards.
3. Remove the top three Phillips screws holding the front panel to the chassis bottom. Leave the bottom screw (below Channel 1) in place. (This will permit swiveling the front panel far enough away from the chassis to allow the Mounting Panel to be freed from the 1200 after other required disconnections have been made.)
4. Remove the knobs from the control shafts of the Master and Headphones Controls.
5. Disconnect the 3-pin connector from P701 on the HEADPHONES CONTROL BOARD.
6. Disconnect the 3-pin connector from P601 on the HEADPHONES OUTPUT BOARD.
7. Disconnect the CHANNEL BUS connector from P501 at the top of the MASTER CONTROL BOARD and disconnect 8-, 4-, and 5-pin connectors from P502, P503, and P504 at the bottom of the MASTER CONTROL BOARD.
   IMPORTANT: Mark all connectors before removing them so that they can be reconnected correctly.
8. Loosen the cable tie that holds the cable harness to the hole in the outside bottom of SHR-05.
9. Swivel the front panel away from the chassis bottom enough to permit pulling the control shafts out of the front panel and partially freeing the Mounting Panel from the 1200. (The panel is still connected to the 1200 by the transformer leads connected to the On/Off switch.) From this position it is possible to remove or work on boards SHR-05, -06, -07, -08, and -09.

SHR-05 MASTER CONTROL BOARD

To remove SHR-05 MASTER CONTROL BOARD from the Mounting Panel:

1. Remove the control knobs.
2. Use a nutdriver or wrench to remove the nuts holding the control shafts to the Mounting Panel.
3. To free the board, pull the shafts back out of the panel.

SHR-09 LIMITER BOARD

To free SHR-09 LIMITER BOARD from the Mounting Panel, remove from the front of the panel the two Phillips screws that attach the Limiter Switch to the panel. This frees the board from the panel.

SHR-06 HEADPHONES OUTPUT BOARD AND SHR-07 HEADPHONES CONTROL BOARD

SHR-06 and SHR-07 are connected together by a soldered-in-place 4-conductor ribbon cable. If it is not necessary to replace the cable, either remove both boards (if desired to free one of them completely from the 1200), or only remove one (if freeing the assembly from the 1200 is not essential).

To remove SHR-07 HEADPHONES CONTROL BOARD, remove the 7/16-inch nut that holds the control shaft to the Mounting Panel. This permits the board to be freed from the panel (although it is still connected via the ribbon cable to SHR-06 HEADPHONES OUTPUT BOARD).

To remove SHR-06 HEADPHONES OUTPUT BOARD, remove the 1/2-inch nut that holds the phone jack to the Mounting Panel. This permits the board to be freed from the Panel.

SHR-08 INDICATORS BOARD

Remove the two Phillips screws holding SHR-08 to the back of the Mounting Panel. Pull the board back from the panel to remove the LEDs from their holes and to free the board.

S2 ON/OFF SWITCH

To remove the On/Off Switch from the Mounting Panel:

1. Pull the switch button off the switch control shaft.
2. Remove the two Phillips screws that hold the switch to the panel.
3. Unsolder the red and black transformer leads from the switch.

A1200MX INPUT EXPANSION MODULE

The A1200MX is an optional input expansion module kit that provides two additional input channels to the 1200. A maximum of two A1200MXs can be added to the 1200 for a total of 10 inputs. The A1200MX consists of an input connector module (SHR-15 and SHR-16), an input transformer module (SHR-17), a channel control module (two SHR-04s), control knobs, and hardware.

The A1200MX circuitry is identical to the input circuitry of the other six input channels. Servicing can be accomplished in the same manner. Printed wiring board drawings are provided with the service drawings.

CHECKING ACTIVE COMPONENTS

Integrated circuits can be checked without removing them from their circuit board. Measure the input, output and power supply voltages as shown on the applicable circuit diagram.

Defective transistors and diodes can be located by use of a standard ohmmeter such as a Simpson 260. Polarity of the ohmmeter must be verified before these checks are made; all resistance measurements are made with the power off in the circuit under test.

With a known diode orientation, measure the diode resistance in the forward and reverse directions. The lowest meter reading will establish the probe at the cathode end (schematic symbol arrow points to cathode) as the “minus” probe while the other probe will be “plus.” (Some ohmmeters are not polarized in this manner with relation to “volts plus probe” and “volts minus probe.“) With the ohmmeter “plus” probe on the anode end of a diode, and the “minus” probe on the cathode end, the ohmmeter should be read approximately 2000 ohms or less. With the meter probes reversed, a reading of about 10,000 ohms or more should be obtained. If either of these conditions is not met, one lead should be unsoldered from the circuit and the test repeated. If the results are identical, the diode should be replaced.

To check LEDs, connect the cathode (notch or flat on flange, tab on lead or short lead) of the LED to the negative terminal of a standard 9 V transistor battery. Connect the positive battery terminal through a 4.7 k resistor to the LED anode. Replace any LED that does not light.

CAUTION
Do not check LEDs with an ohmmeter. The LEDs may be damaged or erroneous readings may be obtained.

To check transistors, the ohmmeter should be set to the 100- or 1,000-ohm scale. Transistors must be removed from the circuit before testing. If all conditions in the following table are met, the transistor may be considered free of any major defect; if any of the following conditions are not met, the transistor should be replaced. See Figure 3 for active component lead codes.

OHMMETER CONNECTION		OHMMETER READING	
"Plus" Lead	"Minus" Lead	NPN Transistor	PNP Transistor
Collector	Emitter	High	High
Emitter	Collector	High	High
Collector	Base	High	Low
Emitter	Base	High	Low
Base	Collector	Low	High
Base	Emitter	Low	High

FERRITE BEADS

All low-impedance microphone connectors contain ferrite beads (L101-L112, SHR-01). Be sure to replace any ferrite beads removed during servicing.

SERVICE ILLUSTRATIONS

Immediately following the parts list on the pages that follow are printed wiring board foil and legend drawings, and circuit diagrams. Once a board has been located through the parts location photo (Figure 1), the components on that board can be located from the board drawing. The function of the part is shown on the relevant circuit diagram.

OPTIONAL ACCESSORIES

The following optional accessories are designed for use with the Shure 1200 AUDIOMASTER Powermixer.

Carrying Case A1200C
Input Expansion Module (2 channels,
2 each HI Z and LO Z inputs A1200MX*
Speaker Cable, 15 m (50 ft), with phone plugs A50SC
240 V Conversion Kit RKC209*
Line Matching Transformer (LO Z to HI Z) A95UF
Phono Preamplifier M64A

*For installation by qualified service personnel only.

REPLACEMENT PARTS LIST

The following list provides information on replacement parts for the Shure Model 1200 AUDIOMASTER Powermixer. Shure part numbers are given for all parts and, where available, manufacturer's name and part number for *acceptable* equivalents in parentheses following the part description (note that for optimum performance, only direct replacement parts should be used).

NOTE: Carbon film resistors shown in this parts list are rated at 0.2 watts. Standard 1/8-watt resistors should only be used as replacements if circuit power requirements are not exceeded. Standard 1/4-watt resistors can only be used if they are physically mounted in a vertical position.

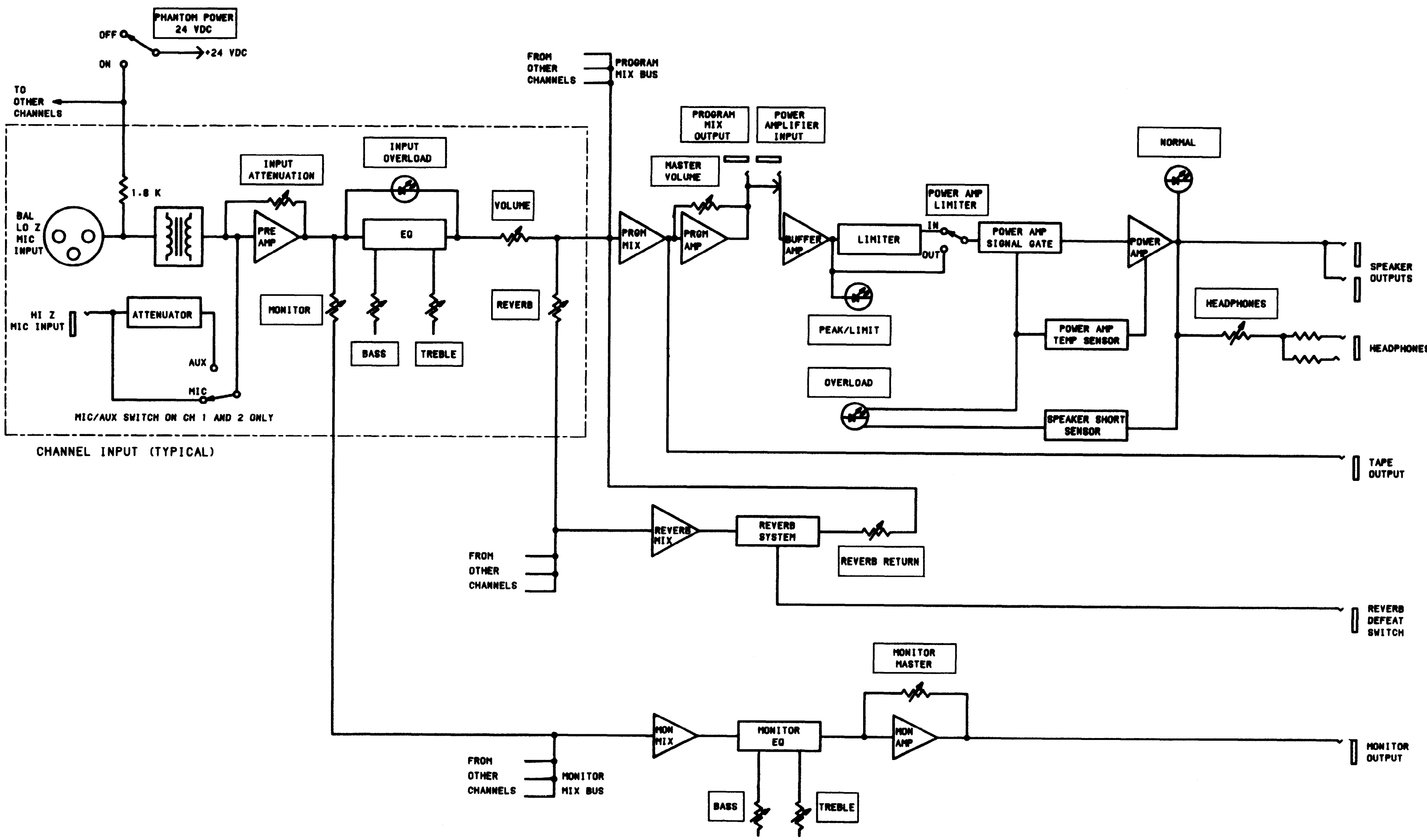
NOTE: In early production, PC Board Assembly SHR-14 contains the following legend error: Capacitor C1423 is marked "+" on the wrong lead. Note the position of C1423 and replace (if necessary) according to the part, not the legend.

REFERENCE DESIGNATION	SHURE PART NO.	DESCRIPTION
A1	803039FK	Reverb Pan
B1	802641FK	Fan
C401, C702, C1405, C1408	707471FK	Capacitor, Electrolytic, 0.22 µF, 50 V (Nichicon UKB1HR22KAA)
C402, C410-C411, C413, C508, C509	707416FK	Capacitor, Electrolytic, 22 µF, 16 V (Nichicon UKB1C100KAA)
C404	707425FK	Capacitor, Electrolytic, 10 µF, 25 V (Nichicon UKB1E100KAA)
C407, C503	707707FK	Capacitor, Mylar, 0.0015 µF (Panasonic ECQ-B1H152JZ)
C408-C409, C501-C502, C1410	707725FK	Capacitor, Mylar, .047 µF (Panasonic ECQ-V1H473JZ)
C412, C1411, C1415	707439FK	Capacitor, Electrolytic, 1 µF, 50 V (Nichicon ULB1H010MAA)
C506, C510-C511, C1414	707424FK	Capacitor, Electrolytic, 4.7 µF, 25 V (Nichicon ULB1H4R7MAA)
C701	800660FK	Capacitor, Electrolytic, 10 µF, 50 V (Nichicon ULB1H100MAA)
C1006	707351FK	Capacitor, Electrolytic, 100 µF, 50 V (Nichicon ULB1H101MPA)
C1101	707344FK	Capacitor, Electrolytic, 1 µF, 50 V (Nichicon ULB1H010MAA)
C1103	707328FK	Capacitor, Electrolytic, 47 µF, 25 V (Nichicon ULB1E470MAA)
C1104, C1113	707358FK	Capacitor, Electrolytic, 10 µF, 63 V (Nichicon ULB1J100MAA)
C1105, C1107	802602FK	Capacitor, Ceramic, 10 pF, 500 V
C1106	707316FK	Capacitor, Electrolytic, 22 µF, 16 V (Nichicon UKB1C100KAA)
C1108	707350FK	Capacitor, Electrolytic, 47 µF, 50 V (Nichicon ULB1H470MAA)
C1109, C1112	708009FK	Capacitor, Ceramic, 100 pF, 100 V
C1110-C1111	707629FK	Capacitor, Mylar, .1 µF (Panasonic ECQ-V1104JZ)
C1201	707315FK	Capacitor, Electrolytic, 10 µF, 16 V (Nichicon UKB1C100KAA)
C1301	802600FK	Capacitor, Mylar, .047 µF, 100 V (Sprague 225P47391WD3)
C1401	707714FK	Capacitor, Mylar, 0.0056 µF (Panasonic ECQ-B1H562JZ)
C1403	707571FK	Capacitor, Bipolar Electrolytic, 10 µF, 16 V (Panasonic ECE-A1CN100S)
C1406, C1412-C1414	707416FK	Capacitor, Electrolytic, 10 µF, 16 V (Nichicon UKB1C100KAA)
C1407	707705FK	Capacitor, Mylar, .001 µF (Panasonic ECQ-B1H102JZ)
C1417-C1418	707438FK	Capacitor, Electrolytic, 0.47 µF, 50 V (Nichicon UKB1HR47KAA)
C1419	707329FK	Capacitor, Electrolytic, 100 µF, 25 V (Nichicon ULB1E101MAA)
C1420-C1421	707322FK	Capacitor, Electrolytic, 1000 µF, 16 V (Nichicon ULB1C102MRA)
C1422-C1423	707354FK	Capacitor, Electrolytic, 470 µF, 50 V (Nichicon ULB1H471MRA)
C1424-C1425	802599FK	Capacitor, Electrolytic, 10,000 µF, 63 V
C1426-C1428	802605FK	Capacitor, Ceramic, .01 µF, 500 V
D401-D404, D701-D702, D1401-D1418	800625FK	Diode (RCA SK3100)
D405	802594FK	LED, Red (RCA SK2022/3022)
D801-D802	800633FK	LED, Red (RCA SK2022/3022)
D803	802596FK	LED, Yellow (RCA SK2021/3021)
D804	802597FK	LED, Green (RCA SK2024/3024)
D1101	706541FK	Diode, Zener (RCA SK24A)
D1102-D1105	802593FK	Diode (RCA SK3100)
D1106-D1107, D1419-D1421	706306FK	Diode (RCA SK3311)
D1422	706319FK	Silicon Rectifier (RCA SK3647)
D1423	706323FK	Silicon Rectifier
D1424	706322FK	Silicon Rectifier
F1	713642FK	Fuse, 5 A, 250 V (Littelfuse 312005)
F1401-F1402	802634FK	Fuse, 0.75 A, 250 V (Littelfuse 312.750)
F1403-F1404	784129FK	Fuse, 8 A, 250 V (Littelfuse 312008)
J1	802633FK	Outlet, Unswitched AC
J101-J106	802629FK	Connector, XLR-type Receptacle, 3-pin (Cannon XLB-3-31PC)
J201-J206, J1001-J1005	713373FK	Phone Jack, 2-Circuit
J601, J1301-J1302	784104FK	Headphone Jack, 3-Circuit
L101-L112	784108FK	Ferrite Bead
L1101	802625FK	Coil, 4.6 µH
MP1	788427FK	Rubber Foot
MP2	802579FK	Knob, Green, Bass
MP3	802580FK	Knob, Green, Treble
MP4	802581FK	Knob, Black
MP5	802582FK	Knob, Gold

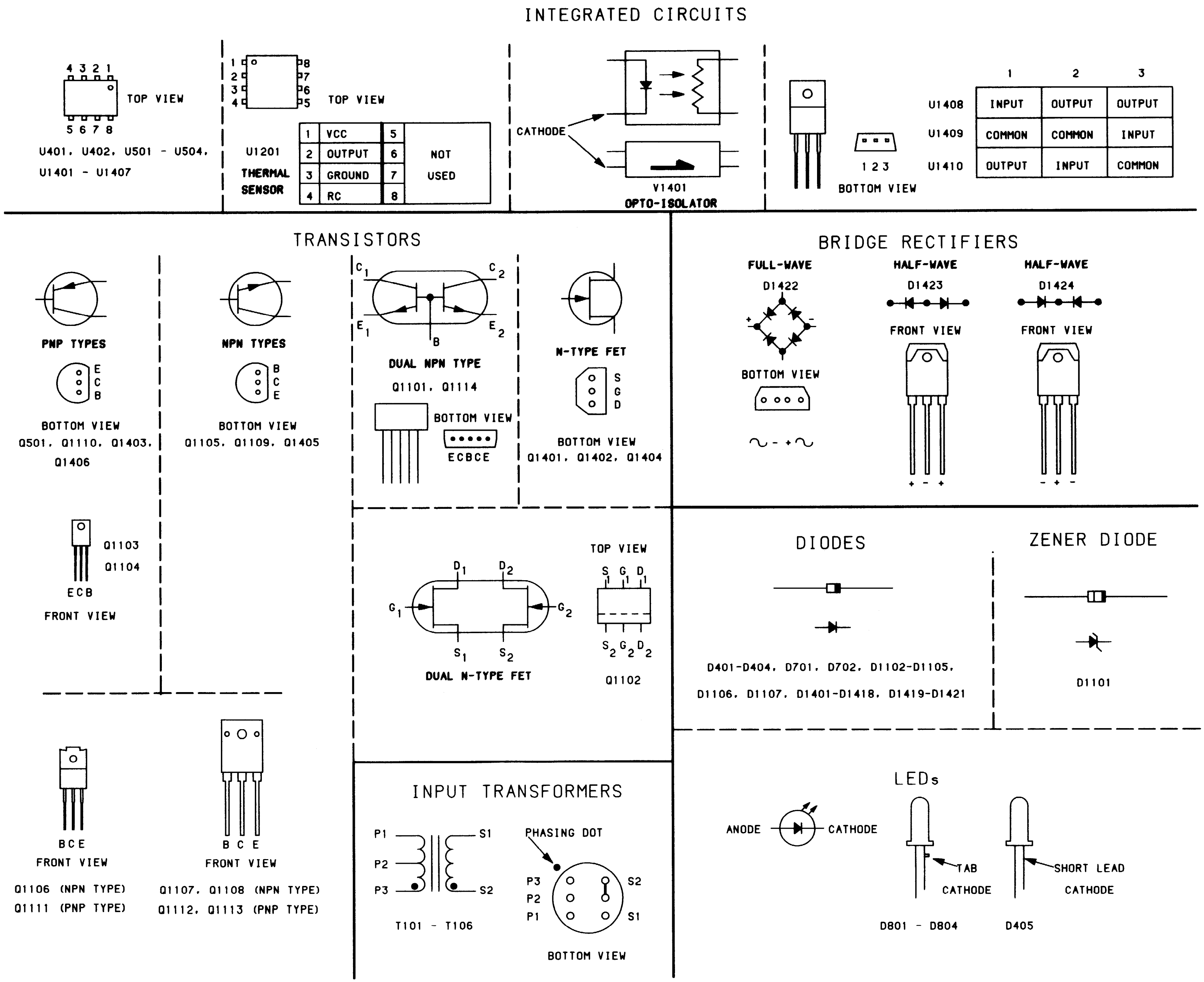
REFERENCE DESIGNATON	SHURE PART NO.	DESCRIPTION
MP6	802583FK	Knob, Red
MP7	802584FK	Knob, Blue
MP8	802585FK	Knob, White
MP9	802587FK	Fan Grille, Front Panel
MP10	802642FK	Fan Grille, Rear Panel
P1003-P1004	802628FK	Connector, Receptacle, 2-pin
P1401	711080FK	Connector, Receptacle, 8-pin
Q501, Q1110, Q1403	706102FK	Transistor, PNP (RCA SK3932)
Q1101, Q1114	706146FK	Transistor, Dual, NPN (RCA SK9427)
Q1102	800412FK	Transistor, Dual, FET
Q1103-Q1104	802590FK	Transistor, Power, PNP (RCA SK9042) (requires 802681FK insulator)
Q1105,Q1109	801798FK	Transistor, NPN
Q1106	706156FK	Transistor, NPN (RCA SK9118)
Q1107-Q1108	802591FK	Transistor, Power, NPN (requires 802639FK insulator)
Q1111	706155FK	Transistor, PNP (RCA SK9363)
Q1112-Q1113	802592FK	Transistor, Power, PNP (requires 802639FK insulator)
Q1401-Q1402, Q1404	706537FK	Transistor, FET
Q1405	706139FK	Transistor, NPN (RCA SK9137)
Q1406	706147FK	Transistor, PNP (RCA SK9138)
R101-R106	802610FK	Resistor, 1.8 K
R201-R206, R405, R520, R522, R1404, R1415, R1445, R1452	801057FK	Resistor, 4.7 K
R301, R304, R514	801059FK	Resistor, 6.8 K
R302, R305	801068FK	Resistor, 39 K
R303, R306, R407, R414, R416, R503, R513, R1401, R1412, R1423, R1426-R1427, R1430	801065FK	Resistor, 22 K
R401, R518	802607FK	Resistor, 2 K, 2%
R402	801075FK	Resistor, 150 K
R403	801076FK	Resistor, 180 K
R404, R409-R410, R502, R504, R512, R519, R602	801061FK	Resistor, 10 K
R406, R408, R505-R506	801058FK	Resistor, 5.6 K
R411, R1410, R1422, R1424, R1448-R1449	801081FK	Resistor, 470 K
R412, R1006, R1409, R1420-R1421, R1433, R1435-R1438, R1443, R1446, R1451, R1458	801073FK	Resistor, 100 K
R413, R1419, R1453	801072FK	Resistor, 82 K
R415, R523, R601, R704, R1414, R1417-R1418, R1425, R1429, R1442, R1444, R1447	801069FK	Resistor, 47 K
R501, R511	801062FK	Resistor, 12 K
R507	801055FK	Resistor, 3.3 K
R508, R515, R1428	801077FK	Resistor, 220 K
R509, R516-R517	801041FK	Resistor, 220
R510	803041FK	Resistor, 43 K (Early Production); 30 K (Later Production)
R521, R1001-R1005, R1413, R1431-R1432, R1459	801053FK	Resistor, 2.2 K
R603-R605	802614FK	Resistor, Metal Oxide Film, 220, 1 W
R701, R703	802815FK	Resistor, 13 K, 1%
R702	803042FK	Resistor, 680, 2%
R1101	708857FK	Resistor, 47 K
R1102, R1104	708842FK	Resistor, 2.7 K
R1103, R1112, R1201	708845FK	Resistor, 4.7 K
R1105	708835FK	Resistor, 680
R1106-R1108	708850FK	Resistor, 12 K
R1109	708906FK	Resistor, 1.8 K, 2%
R1110	708934FK	Resistor, 47 K, 2%
R1111	802617FK	Resistor, Metal Oxide Film, 5.6 K, 2 W
R1113	803043FK	Resistor, Metal Oxide Film, 68, 1/2 W
R1114	708838FK	Resistor, 1.2 K
R1115	708836FK	Resistor, 820
R1116	802616FK	Resistor, Metal Oxide Film, 3.9 K, 2 W
R1117	802610FK	Resistor, Metal Oxide Film, 1.8 K, 1/2 W
R1118-R1119	708849FK	Resistor, 10 K
R1120, R1122	708854FK	Resistor, 27 K
R1121, R1123	708840FK	Resistor, 1.8 K
R1124-R1125	802613FK	Resistor, Metal Oxide Film, 100, 1 W

REFERENCE DESIGNATION	SHURE PART NO.	DESCRIPTION
R1126-R1127	802612FK	Resistor, Ceramic, Dual, .22, 5 W
R1128	708853FK	Resistor, 22 K
R1301	710041FK	Resistor, Ceramic, 10, 5 W
R1402	801064FK	Resistor, 18 K
R1403, R1454	801080FK	Resistor, 390 K
R1406-R1407	800190FK	Resistor, 22, 1/2 W
R1408	801033FK	Resistor, 47
R1411	801085FK	Resistor, 1 M
R1416	801089FK	Resistor, 2.2 M
R1434	801063FK	Resistor, 15 K
R1439	802609FK	Resistor, 51 K, 2%
R1440, R1455	801070FK	Resistor, 56 K
R1441	801051FK	Resistor, 1.5 K
R1450	801045FK	Resistor, 470
R1456	800749FK	Resistor, Metal Film, 100 K, 1%
R1457	802611FK	Resistor, Metal Film, 36 K, 1%
R1460	709314FK	Resistor, Metal Oxide Film, 39, 1/2 W
R1461-R1462	802615FK	Resistor, Metal Oxide Film, 47, 2 W
S1	802630FK	Switch, Voltage Selector, DPDT
S2	802631FK	Switch, On/Off, SPST
S3	802632FK	Switch, Phantom Power, SPST
S301-S302	801599FK	Switch, Slide, DPDT
S901	784110FK	Switch, Slide, DPDT
SHR-01	235901FK	Printed Wiring Assembly, Lo-Z Input
SHR-02	235902FK	Printed Wiring Assembly, Hi-Z Input
SHR-03	235903FK	Printed Wiring Assembly, Aux/Mic
SHR-04	235904FK	Printed Wiring Assembly, Channel
SHR-05	235905FK	Printed Wiring Assembly, Master Control
SHR-06	235906FK	Printed Wiring Assembly, Headphones Out
SHR-07	235907FK	Printed Wiring Assembly, Headphones Control
SHR-08	235908FK	Printed Wiring Assembly, Indicator
SHR-09	235909FK	Printed Wiring Assembly, Limiter
SHR-10	235910FK	Printed Wiring Assembly, Input/Output
SHR-11	235911FK	Printed Wiring Assembly, Power
SHR-12	235912FK	Printed Wiring Assembly, Sensor
SHR-13	235913FK	Printed Wiring Assembly, Speaker Output
SHR-14	235914FK	Printed Wiring Assembly, Main
T1	803474FK	Transformer, Power
T101-T106	802626FK	Transformer, Mic Input
U401-U402, U501-U504, U701, U1401-U1407	706077FK	IC, Quad Op Amp (RCA SK3465+)
U1201	802588FK	IC, Thermal Sensor
U1408	802589FK	IC, Voltage Regulator (Motorola MC7824)
U1409	706097FK	IC, Voltage Regulator, Positive (Motorola MC7815)
U1410	706098FK	IC, Voltage Regulator, Negative (Motorola MC7915)
V1401	802598FK	Opto-Isolator
VR401	802620FK	Potentiometer, Log, 100 K
VR402, VR502	802622FK	Potentiometer, Dual, Linear, 50 K
VR403, VR405, VR701	802619FK	Potentiometer, Log, 10 K
VR404	802621FK	Potentiometer, Linear, 20 K
VR501, VR504	802623FK	Potentiometer, Log, 100 K
VR503	802624FK	Potentiometer, Linear, 10 K
VR1101-VR1102	802618FK	Potentiometer, Linear, 100
VR1103	802681FK	Potentiometer, Linear, 1 K
VR1201	800030FK	Potentiometer, Linear, 47 K
VR1401	710138FK	Potentiometer, Linear, 5 K
W1	802638FK	Power Cable and Plug, 3 m (10 ft), 3-Conductor
W2	908575FK	Channel Bus Cable, Ribbon, 8-Conductor, with Connectors
W3	908580FK	Cable, Ribbon, 5-Conductor
W4	800618FK	Cable, Ribbon, 4-Conductor
XF1	802636FK	Rear Panel Fuseholder

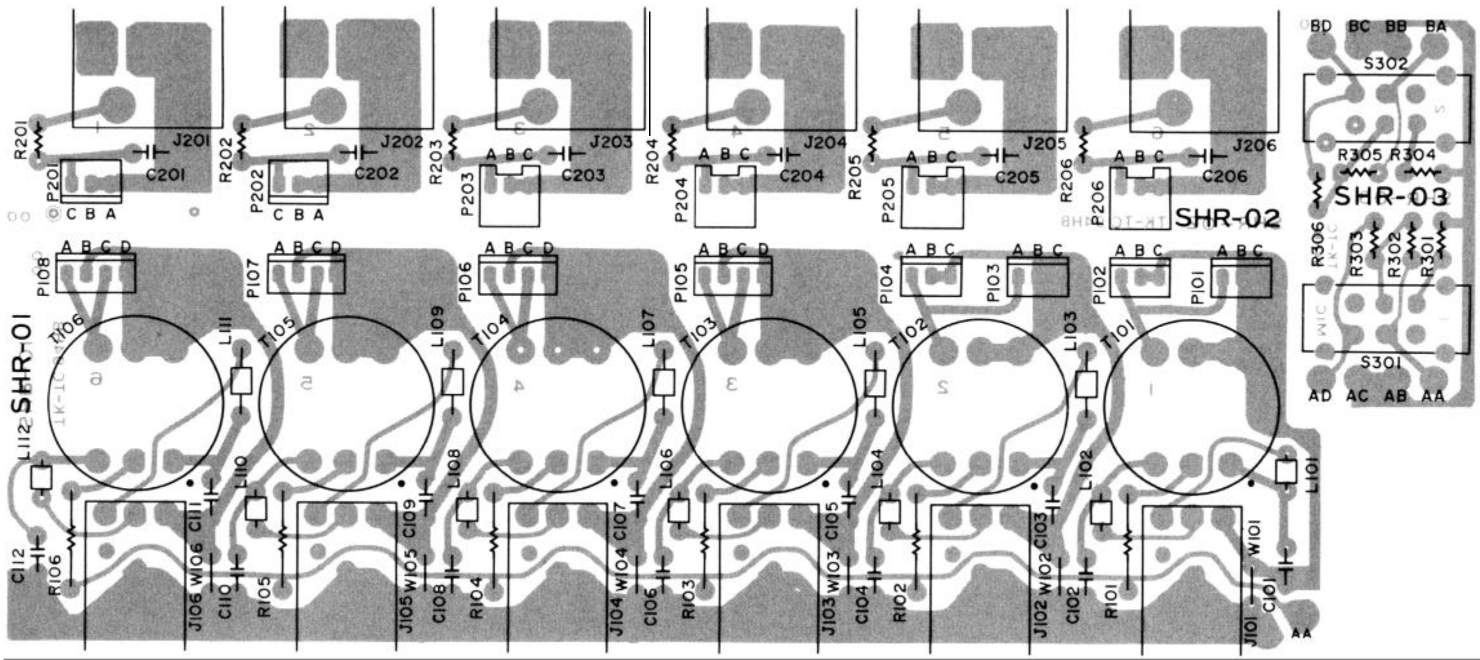
+ May not exhibit the low-noise characteristics of the original part.



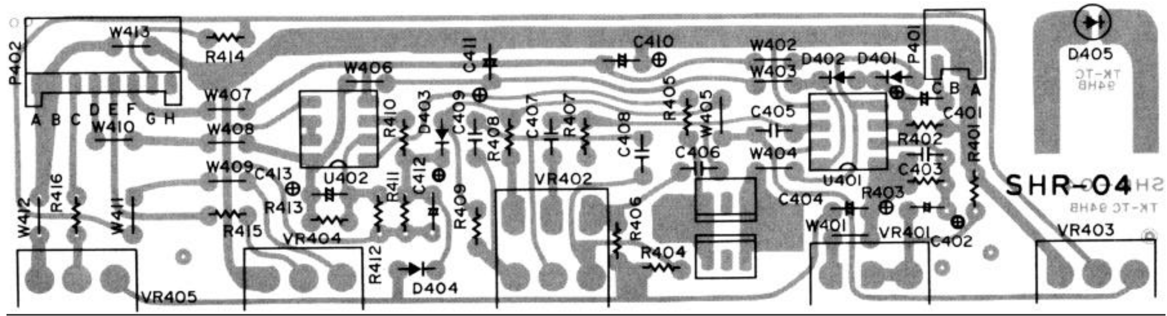
BLOCK DIAGRAM


INTEGRATED CIRCUITS
4 3 2 1
5 6 7 8
TOP VIEW
U401, U402, U501 - U504,
U1401 - U1407
TOP VIEW
U1201
THERMAL SENSOR
1 VCC
2 OUTPUT
3 GROUND
4 RC
5 6 7 8 NOT USED
CATHODE
V1401
OPTO-ISOLATOR
1 2 3
BOTTOM VIEW
1 2 3
U1408 INPUT OUTPUT OUTPUT
U1409 COMMON COMMON INPUT
U1410 OUTPUT INPUT COMMON
TRANSISTORS
PNP TYPES
E C B
BOTTOM VIEW
Q501, Q1110, Q1403,
Q1406
NPN TYPES
B C E
BOTTOM VIEW
Q1105, Q1109, Q1405
DUAL NPN TYPE
Q1101, Q1114
BOTTOM VIEW
ECBCE
N-TYPE FET
S G D
BOTTOM VIEW
Q1401, Q1402, Q1404
Q1103
Q1104
ECB
FRONT VIEW
DUAL N-TYPE FET
TOP VIEW
Q1102
BCE
FRONT VIEW
Q1106 (NPN TYPE)
Q1111 (PNP TYPE)
B C E
FRONT VIEW
Q1107, Q1108 (NPN TYPE)
Q1112, Q1113 (PNP TYPE)
BRIDGE RECTIFIERS
FULL-WAVE
D1422
BOTTOM VIEW
HALF-WAVE
D1423
FRONT VIEW
HALF-WAVE
D1424
FRONT VIEW
DIODES
D401-D404, D701, D702, D1102-D1105,
D1106, D1107, D1401-D1418, D1419-D1421
ZENER DIODE
D1101
INPUT TRANSFORMERS
P1 P2 P3 S1 S2
T101 - T106
PHASING DOT
P3 P2 P1 S2 S1
BOTTOM VIEW
LEDs
ANODE
CATHODE
TAB
CATHODE
SHORT LEAD
CATHODE
D801 - D804
D405

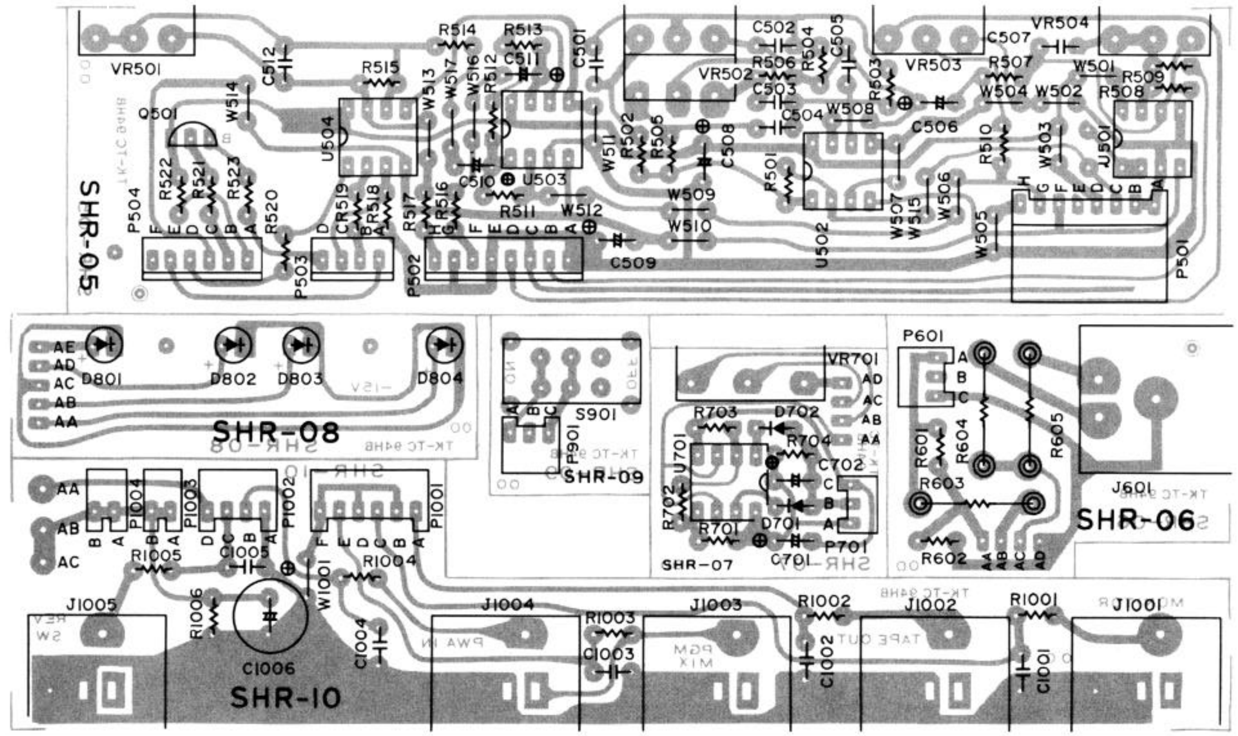
LEAD CODES



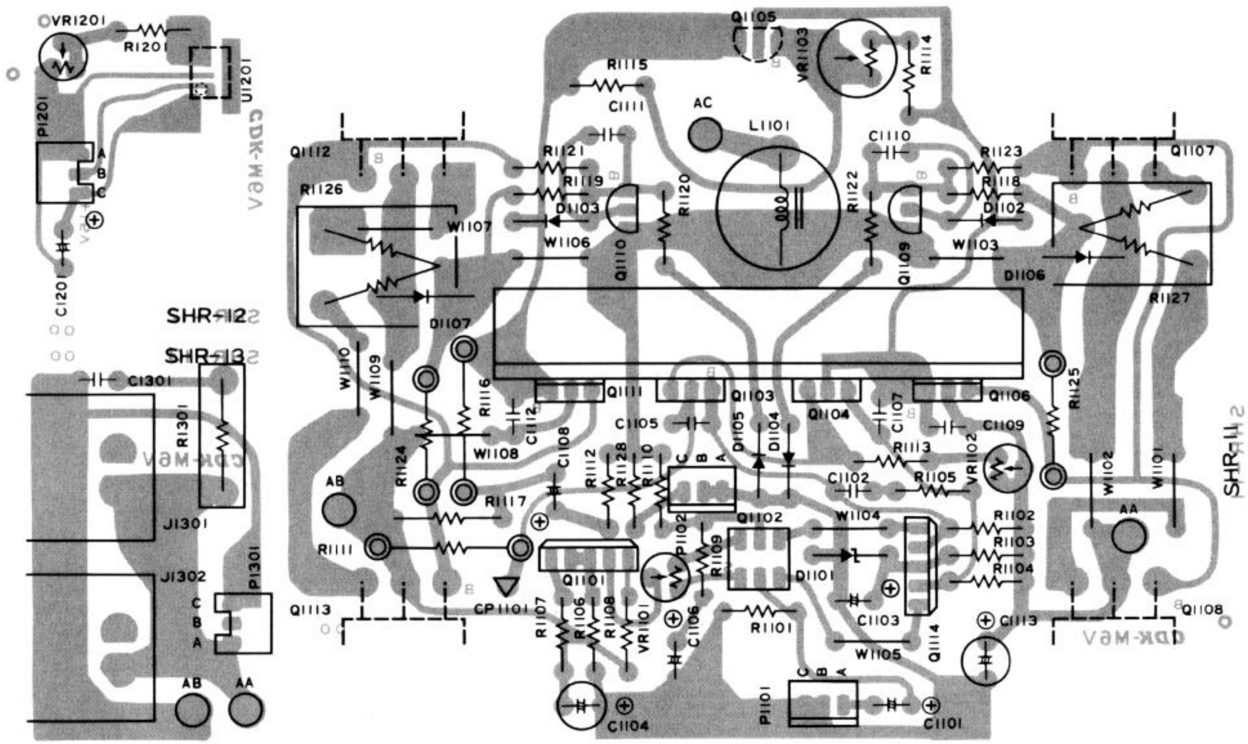
PRINTED WIRING ASSEMBLIES SHR-01, SHR-02, AND SHR-03



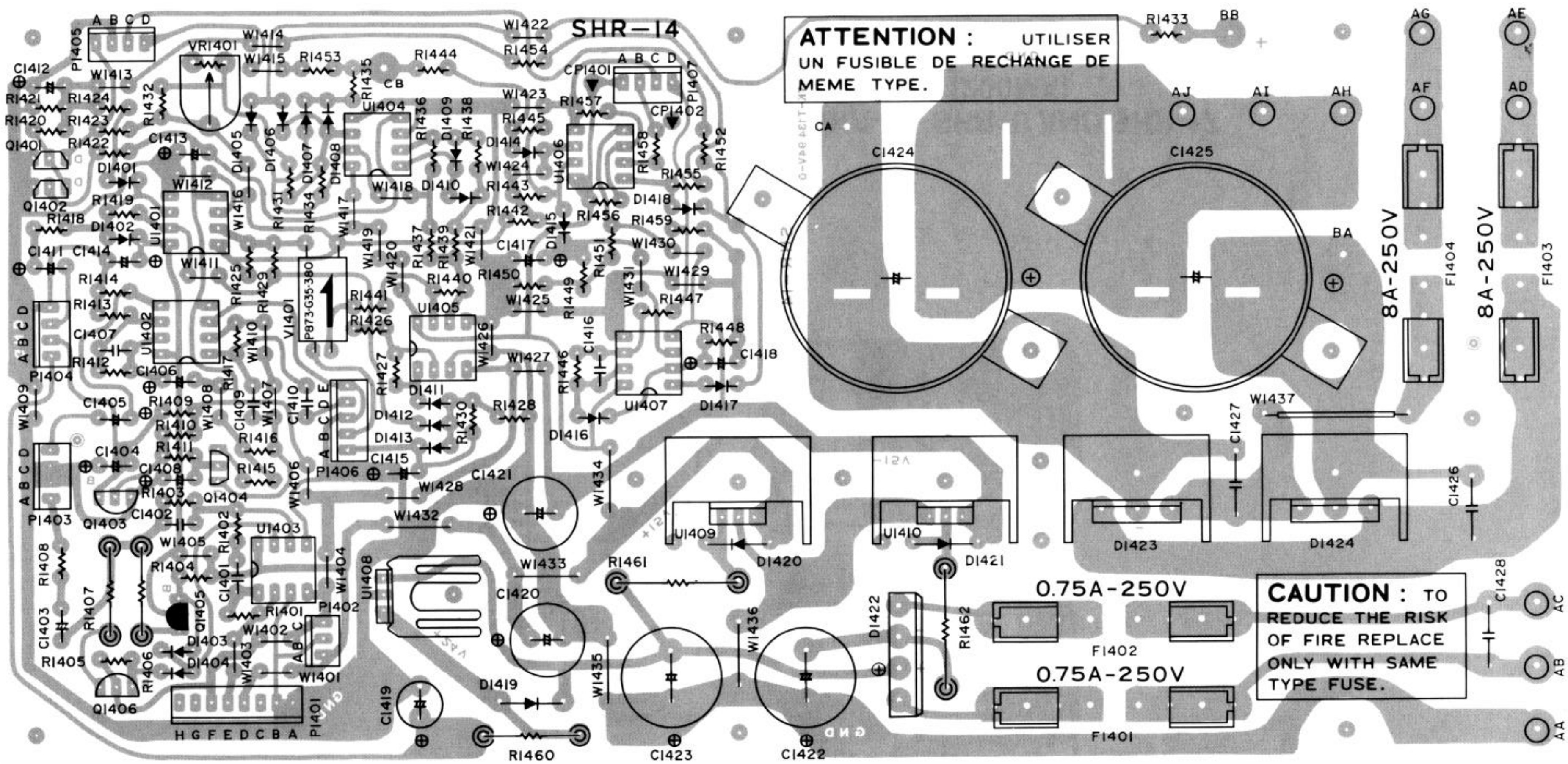
PRINTED WIRING ASSEMBLY SHR-04



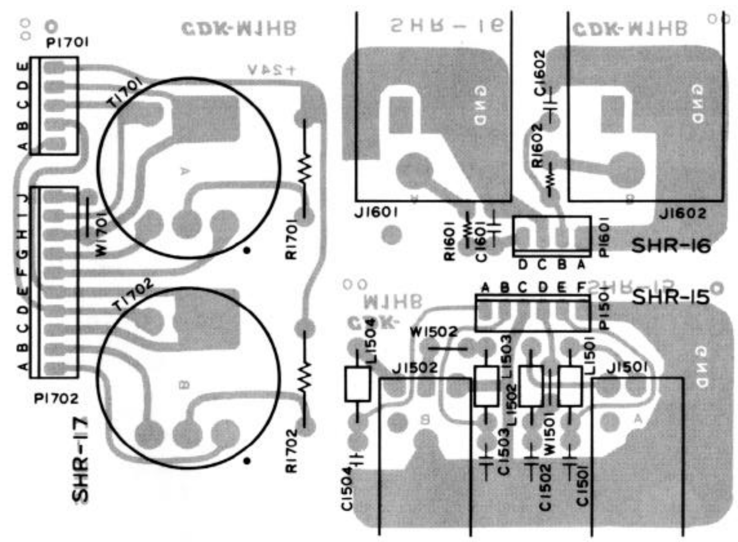
PRINTED WIRING ASSEMBLIES SHR-05, SHR-06, SHR-07, SHR-08, SHR-09 AND SHR-10



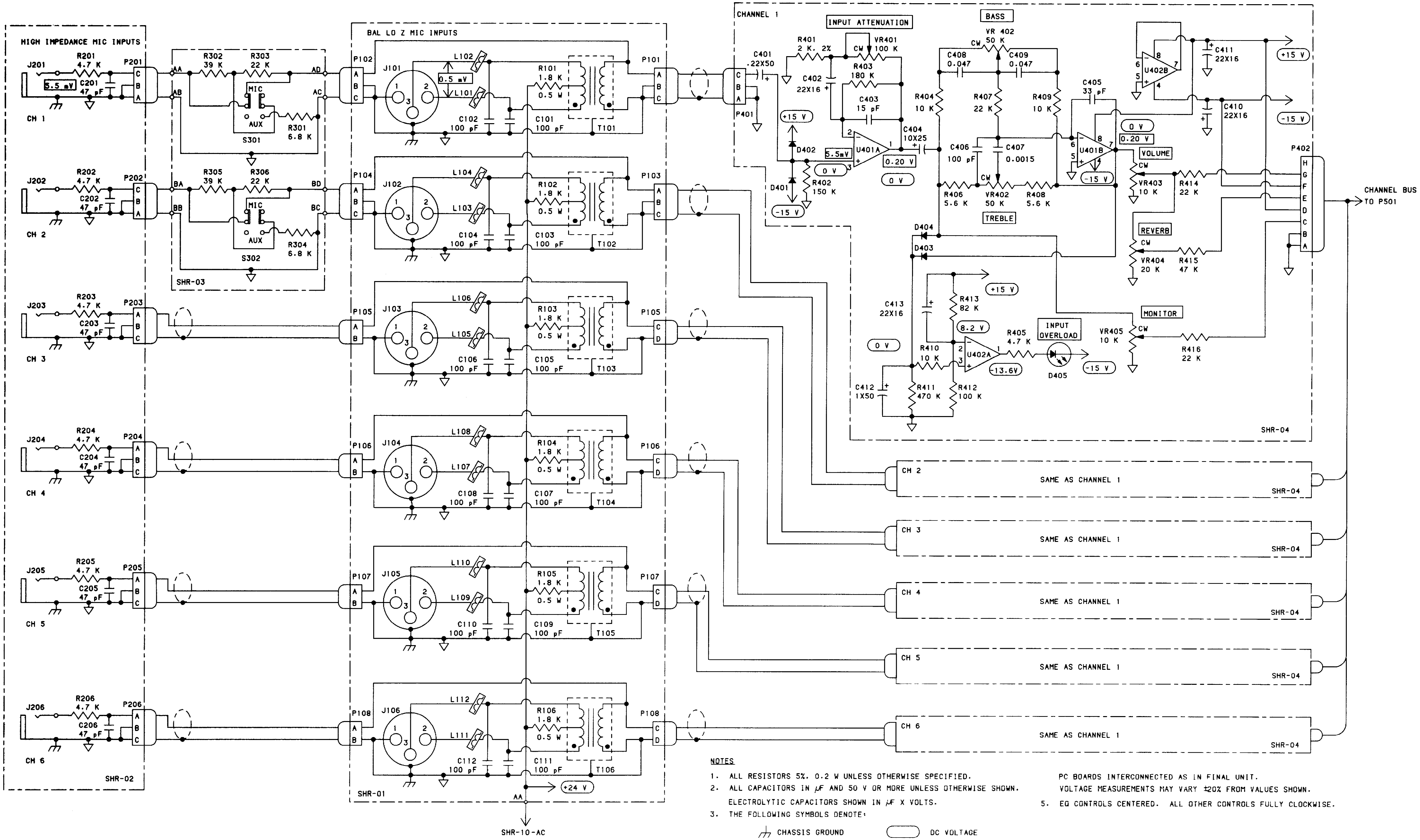
PRINTED WIRING ASSEMBLIES SHR-11, SHR-12 AND SHR-13



PRINTED WIRING ASSEMBLY SHR-14



PRINTED WIRING ASSEMBLIES SHR-15, SHR16 AND SHR-17
(INPUT EXPANSION MODULE A1200MX)



NOTES

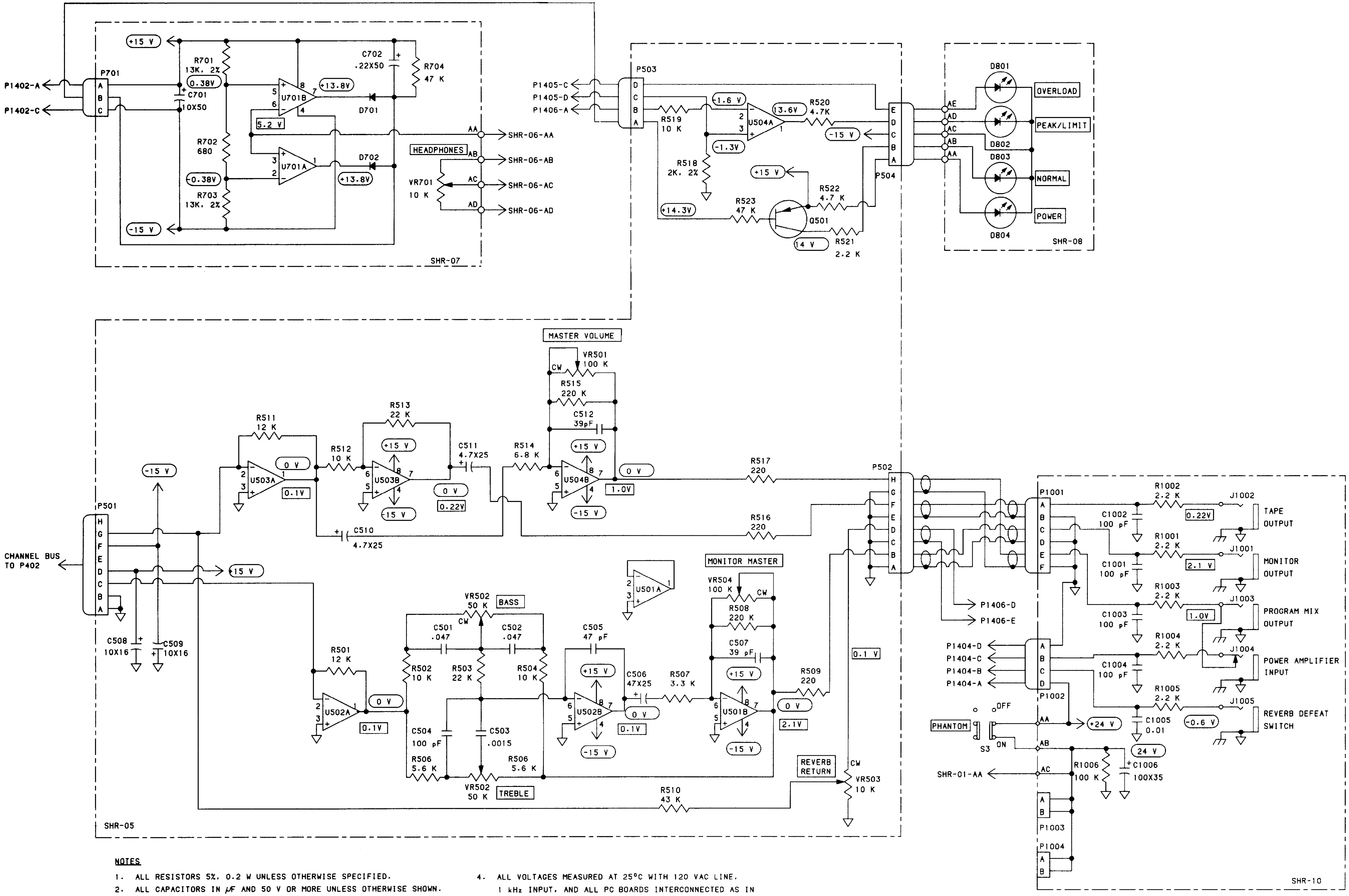
1. ALL RESISTORS 5%, 0.2 W UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN µF AND 50 V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN µF X VOLTS.
3. THE FOLLOWING SYMBOLS DENOTE:

   CHASSIS GROUND — DC VOLTAGE

   PC GROUND — AC VOLTAGE

4. TEST SIGNAL OF 0.5 mV, 1 kHz APPLIED ACROSS PINS 2 AND 3 OF LOW-IMPEDANCE CONNECTORS (CHANNEL 1 INDICATED). ALL VOLTAGES MEASURED AT 25°C WITH 120 VAC AND ALL PC BOARDS INTERCONNECTED AS IN FINAL UNIT. VOLTAGE MEASUREMENTS MAY VARY ±20% FROM VALUES SHOWN.
5. EQ CONTROLS CENTERED. ALL OTHER CONTROLS FULLY CLOCKWISE.

CIRCUIT DIAGRAM-1
(SHR-01, SHR-02, SHR-03, SHR-04)



NOTES

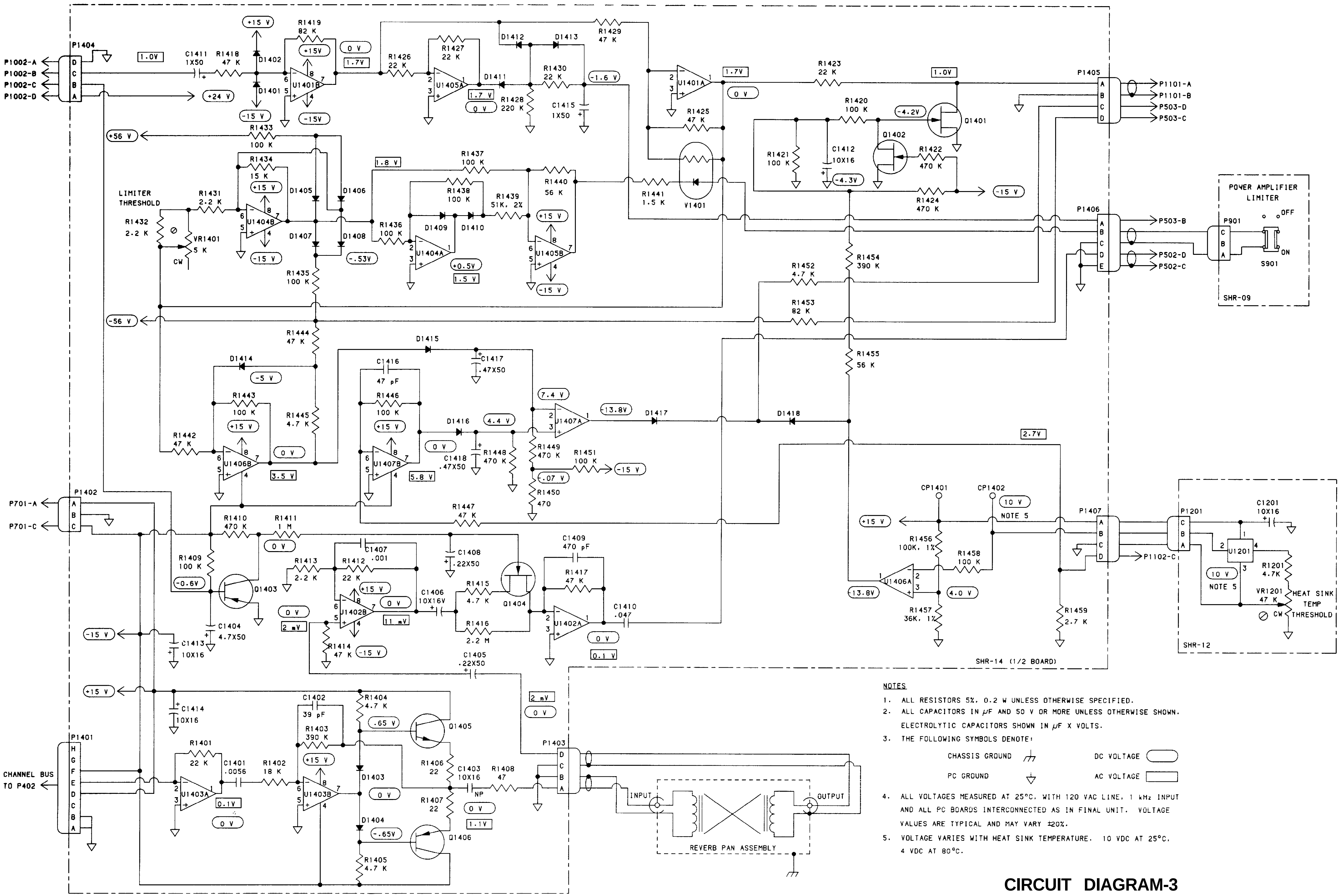
1. ALL RESISTORS 5%, 0.2 W UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN µF AND 50 V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN µF X VOLTS.
3. THE FOLLOWING SYMBOLS DENOTE:

CHASSIS GROUND DC VOLTAGE

PC GROUND AC VOLTAGE

4. ALL VOLTAGES MEASURED AT 25°C WITH 120 VAC LINE. 1 kHz INPUT, AND ALL PC BOARDS INTERCONNECTED AS IN FINAL UNIT. VOLTAGE VALUES ARE TYPICAL AND MAY VARY ±20%.
5. EQUALIZATION CONTROLS CENTERED. OTHER CONTROLS FULLY CLOCKWISE.

CIRCUIT DIAGRAM-2
(SHR-05, SHR-07, SHR-08, SHR-10)



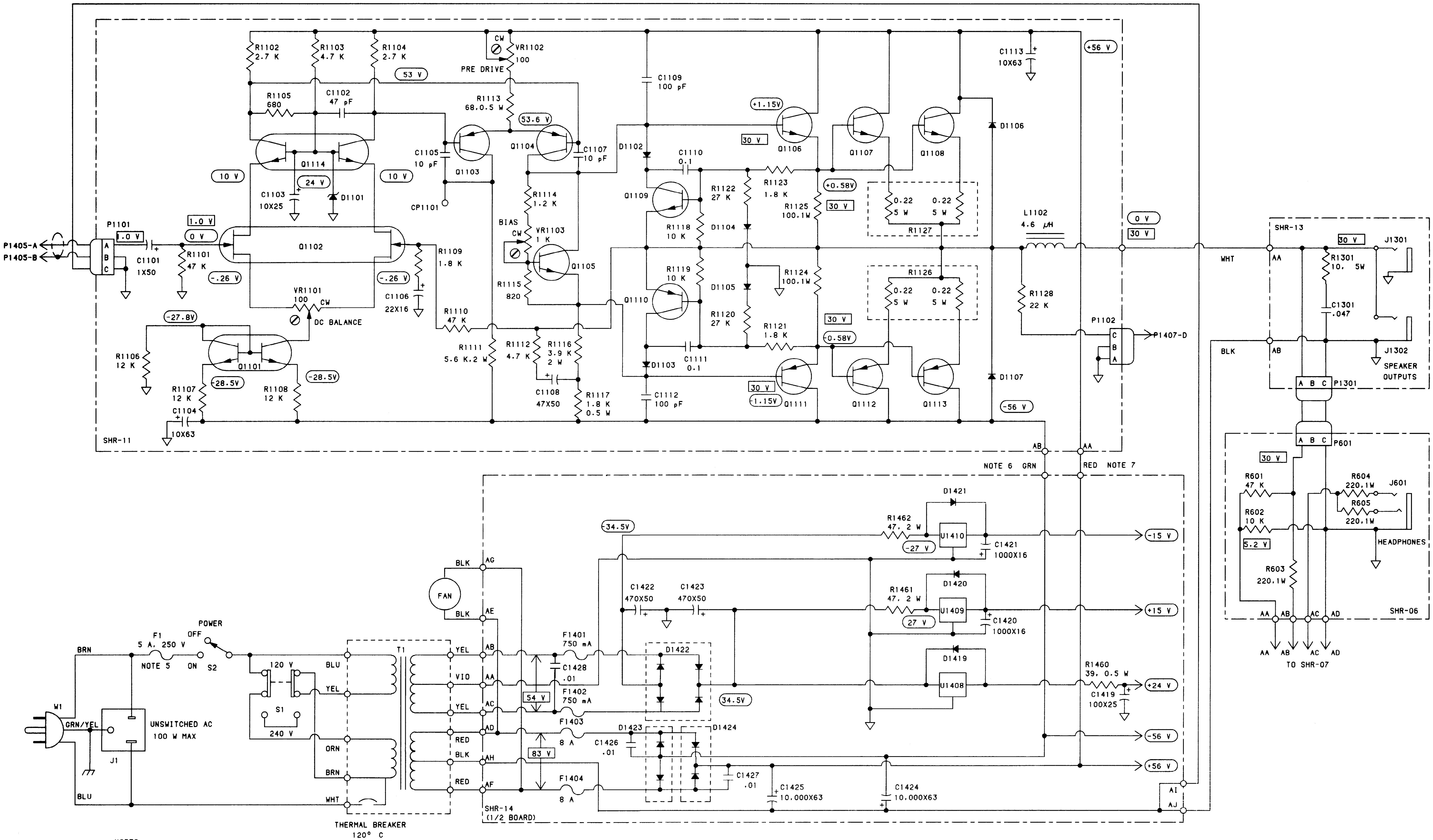
NOTES

1. ALL RESISTORS 5%, 0.2 W UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN µF AND 50 V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN µF X VOLTS.
3. THE FOLLOWING SYMBOLS DENOTE:

   CHASSIS GROUND — DC VOLTAGE

   PC GROUND — AC VOLTAGE
4. ALL VOLTAGES MEASURED AT 25°C, WITH 120 VAC LINE, 1 kHz INPUT AND ALL PC BOARDS INTERCONNECTED AS IN FINAL UNIT. VOLTAGE VALUES ARE TYPICAL AND MAY VARY ±20%.
5. VOLTAGE VARIES WITH HEAT SINK TEMPERATURE. 10 VDC AT 25°C, 4 VDC AT 80°C.

CIRCUIT DIAGRAM-3
(SHR-09, SHR-12, SHR-14)



NOTES

1. ALL RESISTORS 5%, 0.2 W UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN μF AND 50 V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN μF X VOLTS.
3. THE FOLLOWING SYMBOLS DENOTE:
   CHASSIS GROUND — DC VOLTAGE
   PC GROUND — AC VOLTAGE
4. ALL VOLTAGES MEASURED AT 25°C WITH 120 VAC LINE, 1 kHz INPUT, AND ALL PC BOARDS INTERCONNECTED AS IN FINAL UNIT. SPEAKER AND HEADPHONE OUTPUTS ARE UNLOADED. VOLTAGE VALUES ARE TYPICAL AND MAY VARY ±20%.
5. 240 V OPERATION REQUIRES CONVERSION KIT.
6. GREEN LEAD (SOLDER SIDE SHR-14) UNDER SCREW HEAD ATTACHED TO HEAT SINK OF D1423.
7. RED LEAD SOLDERED (SOLDER SIDE OF SHR-14) TO + TERMINAL OF C1425.

CIRCUIT DIAGRAM-4
(SHR-06, SHR-11, SHR-13, SHR-14)

SHURE®