

**harman/kardon**

**SUB-TS7** (HKTS 7 SUBWOOFER)

**SUB-TS8** (HKTS 8 SUBWOOFER)

# SERVICE MANUAL



harman/kardon, Inc.  
250 Crossways Park Dr.  
Woodbury, New York 11797

Rev1 10/2006

## CONTENTS

|                                       |    |
|---------------------------------------|----|
| BASIC SPECIFICATIONS . . . . .        | 1  |
| DETAILED SPECIFICATIONS . . . . .     | 2  |
| CONTROLS & CONNECTIONS.....           | 4  |
| SPEAKER CONNECTIONS.....              | 6  |
| OPERATION.....                        | 9  |
| BASIC TROUBLESHOOTING GUIDE . . . . . | 10 |
| UNIT EXPLODED VIEW. . . . .           | 11 |
| AMPLIFIER EXPLODED VIEW. . . . .      | 12 |
| TEST SET-UP AND PROCEDURE. . . . .    | 13 |
| HKTS7 TECH TIP HK2004-04....          | 14 |
| BLOCK DIAGRAM . . . . .               | 15 |
| PCB DRAWINGS. . . . .                 | 16 |
| ELECTRICAL PARTS LIST . . . . .       | 20 |
| SEMICONDUCTOR PINOUTS . . . . .       | 24 |
| HKTS7 SCHEMATIC DIAGRAM . . . . .     | 25 |
| HKTS8 SCHEMATIC DIAGRAM . . . . .     | 28 |
| HKTS7 PACKAGING. . . . .              | 31 |
| HKTS8 PACKAGING. . . . .              | 32 |

## SPECIFICATIONS

|                        |  |
|------------------------|--|
| Amplifier Power (RMS)  | 100 Watts  |
| Driver                 | 10" woofer, Bass Reflex Enclosure  |
| Inputs                 | Stereo Line Level, dedicated Subwoofer (LFE)<br>and Speaker Level with gold-plated binding posts |
| Outputs                | Speaker Level with gold-plated binding posts   |
| Frequency Response     | 35Hz – 120Hz (Filter switch ON)<br>35Hz – 450Hz (Filter switch OFF)                              |
| Dimensions (H x W x D) | 18-7/8" x 13-3/8" x 13-3/8"<br>479mm x 340mm x 340mm   |
| Weight                 | 33 lb/15kg   |

Occasional refinements may be made to existing products without notice but will always meet or exceed original specifications unless otherwise stated.

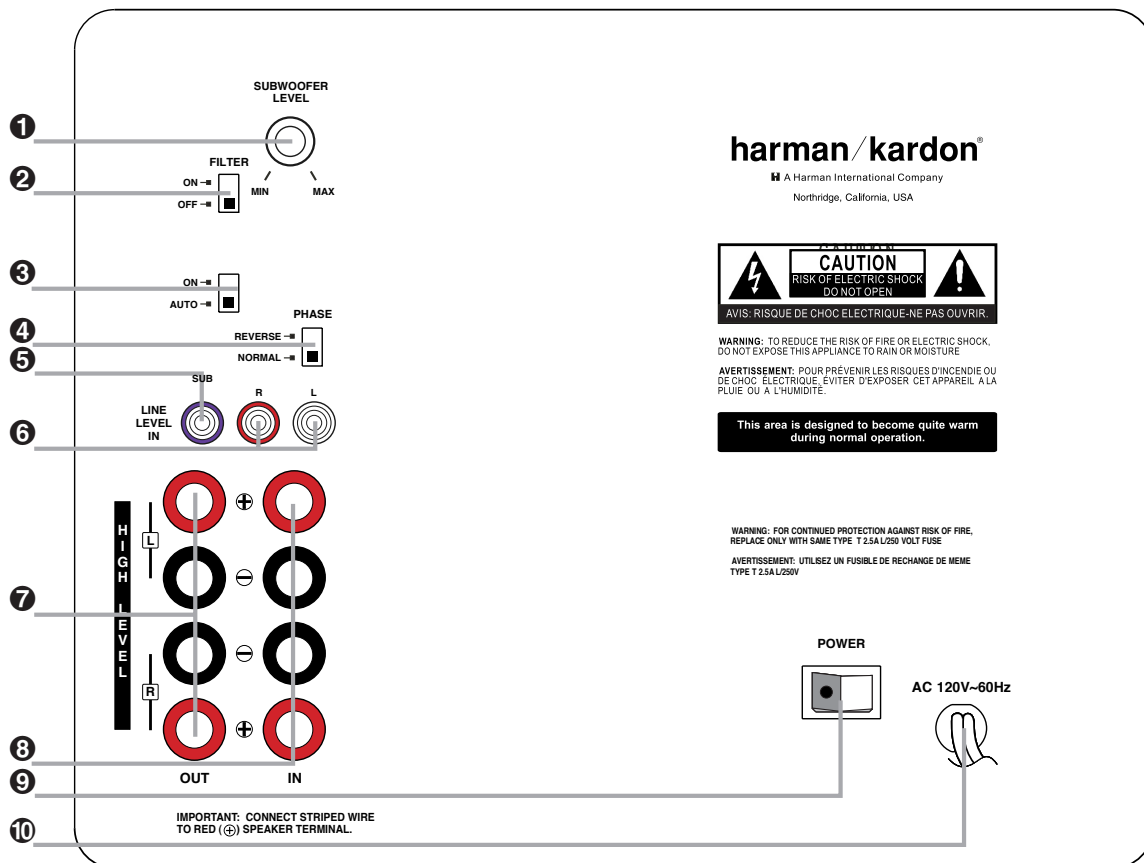
## SUB-TS7 100W Powered Sub/ Plate Amp

## SUB-TS8 100W Powered Sub/ Plate Amp

| LINE VOLTAGE                       | Yes/No                | Hi/Lo Line | Nom.           | Unit  | Notes   |
|------------------------------------|-----------------------|------------|----------------|---|---|
| US 120vac/60Hz                     | Yes                   | 108-132    | 120            | Vrms  | Normal Operation  |
|                                    |                       |            |                |   |   |
| Parameter                          | Nonimal Specification | Unit       | QA Test Limits | Conditions  | Notes   |
| <b>Amp Section</b>                 |                       |            |                |   |   |
| Type (Class AB, D, other)          | AB                    | n/a        | n/a            |   |   |
| Load Impedance (speaker)           | 4                     | Ohms       | n/a            | Nominal   |   |
| Rated Output Power                 | 100                   | Watts      | 75             | 50 - 250 Hz, 1 input driven, limiter off                                  |   |
| THD @ Rated Power                  | 0.08                  | %          | 0.1            | 22k filter  |   |
| THD @ 1 Watt                       | 0.15                  | %          | 0.5            | 22k filter  |   |
| DC Offset                          | 5                     | mV-DC      | 30             | @ Speaker Outputs   |   |
| Damping factor                     | >100                  | n/a        | 30             | Measured at amplifier board   | Measured at the speaker at speaker output terminals on the amp board. |
|                                    |                       |            |                |   |   |
| <b>Input Sensitivity</b>           |                       |            |                |   |   |
| Input Frequency                    | 50                    | Hz         | n/a            | Nominal Freq.   |   |
| Line (L&R) Input                   | 220                   | mVrms      | 154 - 308      | To Rated Power  | Single input driven   |
| SUB (LFE) Input                    | 125                   | mVrms      | 87 - 175       | To Rated Power  | SUB (LFE) input driven only   |
| Speaker/Hi Level Input             | 2.2                   | Vrms       | 1.5 - 3.0      | To Rated Power  | (20 dB below Line In), Single input driven                            |
|                                    |                       |            |                |   |   |
| <b>Hi Level Max. Input Voltage</b> | 32                    | Vrms       | 30             | Nominal Freq., Min. Volume  |   |
|                                    |                       |            |                |   |   |
| <b>Signal to Noise</b>             |                       |            |                |   |   |
| SNR-A-Weighted                     | 100                   | dB         | 85             | relative to rated power   | A-Weighting filter  |
| SNR-unweighted                     | 90                    | dB         | 80             | relative to rated power   | 22k filter  |
| SNR rel. 1W-unweighted             | 65                    | dB         | 60             | relative to 1W Output   | 22k filter  |
| Residual Noise Floor               | 1.2                   | mVrms      | 3.0            | Volume @max, using RMS reading<br>DMM/VOM (or A/P)                        |   |
| Residual Noise Floor               | 0.8                   | mVrms      | 2.0            | Volume @max, w/ A/P Swept Bandpass<br>Measurement (Line freq.+ harmonics) |   |
|                                    |                       |            |                |   |   |
| <b>Input Impedance</b>             |                       |            |                |   |   |
| Line Input (L, R,LFE)              | 10K                   | ohms       | n/a            | Nominal   |   |
| Speaker/Hi Level Input             | 4.7K                  | ohms       | n/a            | Nominal   |   |
|                                    |                       |            |                |   |   |
| <b>Filters</b>                     |                       |            |                |   |   |
| L&R Fixed Low-Pass Filter          | 170                   | Hz         | 150 - 200      | @ -6dB ref. 100Hz   | 2nd order fixed   |
| SUB (LFE) Low pass Filter          | 270                   | Hz         | 240 - 300      | @ -3dB ref. 100Hz   | 2nd order fixed   |
| Subsonic filter (HPF) 3rd Order    | 28                    | Hz         | 22 - 28        | @ -3dB ref. 30Hz  | 3rd order fixed   |
|                                    |                       |            |                |   |   |
| <b>Limiter</b>                     |                       |            |                |   |   |
| THD at Max. Output Power           | 2.0                   | %          | 5.0            |   |   |
|                                    |                       |            |                |   |   |
| <b>Features</b>                    |                       |            |                |   |   |
| Auto - On -Off Selection Switch    | YES                   |            | functional     |   | Refer to ATO section  |
| Phase Switch                       | 0-180                 | deg        | functional     |   |   |
| Filter On/Off Switch               | YES                   |            | functional     |   |   |
| Volume Pot Taper (Lin/Log)         | LOG                   |            | functional     |   | A Taper   |
| Speaker Out                        | YES                   |            | functional     |   | Binding post connector L&R  |
| 2-Color LED power indicator        | YES                   |            | functional     |   | Blue: On, Amber: Stand-by   |
| Power Switch                       | YES                   |            | functional     |   |   |
| Fuse Holder                        | YES                   |            | functional     |   |   |
|                                    |                       |            |                |   |   |
| <b>Input Configuration</b>         |                       |            |                |   |   |
| Line In (L,R)                      | YES                   |            | functional     |   | Dual RCA jack   |
| SUB (LFE)                          | YES                   |            | functional     |   | RCA jack  |
| Speaker/Hi Level In                | YES                   |            | functional     |   | Binding post connector L&R  |
|                                    |                       |            |                |   |   |
| <b>Signal Sensing (ATO)</b>        |                       |            |                |   |   |
| Auto-Turn-On (yes/no)              | YES                   |            | functional     | Auto - on selection switch in Auto  |   |
| ATO Input test frequency           | 50                    | Hz         | n/a            | Auto - on selection switch in Auto  |   |
| ATO Level Line & SUB Input         | 4.0                   | mV         | 2.0 - 6.0      | Auto - on selection switch in Auto  |   |
| ATO Level Speaker in               | 40                    | mV         | 25 - 55        | Auto - on selection switch in Auto  |   |
| ATO Turn-on time                   | 5                     | ms         | functional     | Amp connected and AC on, then input<br>signal applied                     |   |
| ATO Turn-OFF Time                  | 15                    | minutes    | 10 - 20        | Time before muting, after signal is<br>removed                            |   |
|                                    |                       |            |                |   |   |
| <b>Power on Delay time</b>         | 3                     | sec.       | functional     | AC Power Applied  |   |
|                                    |                       |            |                |   |   |
| <b>Transients/Pops</b>             |                       |            |                |   |   |
| ATO Transient                      | 5                     | mV-peak    | 10             | @ Speaker Outputs   |   |
| Turn-on Transient                  | 50                    | mV-peak    | 100            | @ Speaker Outputs   | AC Line cycled from OFF to ON   |

| Parameter                     | Nonimal Specification | Unit    | QA Test Limits | Conditions                      | Notes   |
|-------------------------------|-----------------------|---------|----------------|---------------------------------|---|
| Turn-off Transient            | 50                    | mV-peak | 100            | @ Speaker Outputs               | AC Line cycled from ON to OFF   |
| <b>Efficiency</b>             |                       |         |                |                                 |   |
| Stand-by Input Power          | 10                    | Watts   | 12             | @ nom. line voltage             | Maximum allowable input power under nominal input voltage and frequency, in stand-by mode (HOT or COLD operation).                      |
| Power Consumption @ rated pow | 170                   | Watts   | 200            | @ nom. line voltage             |   |
| <b>Protection</b>             |                       |         |                |                                 |   |
| Short Circuit Protection      | YES                   |         | functional     | Direct short at output          | Amplifier should resume operation after short circuit condition is removed.   |
| Thermal Protection            | YES                   |         | functional     |                                 | Any user accessible metal parts should always remain at 65 degree C or less for domestic version or 55 degree C or less for EU version. |
| DC Offset Protection          | YES                   |         | functional     | DC present at Speaker Out leads | Relay or crowbar (for driver/fire protection),  |
| Primary Fuse Rating           |                       |         |                |                                 |   |
| USA-Domestic (120V)           | 2.5                   | Amps    | n/a            | Type-T or Slo Blo               | User-replacable fuse with UL/SEMCO rated holder.  |

## SUBWOOFER AMPLIFIER PANEL CONTROLS AND CONNECTIONS



- ① Subwoofer-Level Control
- ② High-Cut (Low-Pass) Filter Switch
- ③ Music-Sense On/Off Switch
- ④ Phase Switch
- ⑤ Line-Level Subwoofer (SUB) Input
- ⑥ Line-Level Full-Range Inputs
- ⑦ Speaker-Level Outputs
- ⑧ Speaker-Level Inputs
- ⑨ Master Power Switch
- ⑩ AC Power Cord

**① Subwoofer-Level Control:** Volume may be adjusted using the **Subwoofer-Level Control**. Turn the control clockwise to increase the **Subwfr** volume, or counterclockwise to decrease it.

**② High-Cut (Low-Pass) Filter Switch:** Placing switch in the **ON** position activates circuitry that cuts out all audio input signals above 120Hz. This allows the **Subwfr** to focus its power on reproducing the low-frequency portion of the signal, avoiding

inefficiency and distortion. Engage this filter when using the **Speaker-Level Inputs ⑧**, or when using the **Line-Level Full-Range Inputs ⑥**, unless your receiver or processor processes its line-level output using a low-pass filter. The filter has no effect when the **SUB Input ⑤** is used.

**③ Music-Sense On/Off Switch:** When placed in the **AUTO** position, and when the **Master Power Switch ⑨** is turned on, the **Subwfr** will automatically turn itself on or

place itself in the Standby mode, depending on whether it is receiving an audio signal. When this switch is placed in the **ON** position, the **Subwfr** will remain on, whether or not it is receiving an audio signal.

An LED located on top of the **Subwfr** indicates whether the **Subwfr** is in the **ON** or **STANDBY** state when used with the **Music-Sense On/Off Switch ③** in the **AUTO** position. The LED is lit blue to indicate that the **Subwfr** is receiving an audio signal

## SUBWOOFER AMPLIFIER PANEL CONTROLS AND CONNECTIONS

and is turned on, and the LED is lit amber to indicate that no signal is being received and the **Subwfr** is in Standby mode.

When the **Music-Sense On/Off Switch** ③ is in the **ON** position, the LED will be lit blue, whether or not an audio signal is present.

When the **Master Power Switch** ⑨ is turned off, the LED goes dark, no matter which position the **Music-Sense On/Off Switch** ③ is in.

**④ Phase Switch:** This switch determines whether the subwoofer's piston-like action moves in and out in phase with the main speakers. If the speakers were to play out of phase, the sound waves produced by the subwoofer would be cancelled out, reducing bass response. This phenomenon depends in part on the relative placement of the speakers in the room. In most cases, the **Phase Switch** ④ should be left in the **NORMAL** position. However, it does no harm to experiment with the **Phase Switch** ④, and you may leave it in the position that maximizes bass response.

**⑤ Line-Level Subwoofer (SUB) Input:** Connect the subwoofer output of a receiver with digital surround sound decoding, such as Dolby\* Digital or DTS®, to this input. This input bypasses the **Subwfr**'s internal crossover circuitry, and should only be used with a filtered signal. If your receiver does not have digital decoding, you should use the **Line-Level Full-Range Inputs** ⑥ instead.

**⑥ Line-Level Full-Range Inputs:** Connect the line-level subwoofer output or preamp output(s) of your receiver or amplifier to these inputs. If your receiver does not have a separate subwoofer output, use a Y-adaptor (not supplied) to bridge the receiver's preamp output to the main amp input for that channel, and connect the long end of the adaptor to the corresponding line-level input on the **Subwfr**. If your receiver has only a single subwoofer output, you may connect it to either the left or right line-level input on the **Subwfr**, and no Y-adaptor is needed.

**⑦ Speaker-Level Outputs:** If you are using the **Speaker-Level Inputs** ⑧ on the **Subwfr**, you should connect these binding-post terminals to the front left and right speakers, remembering to maintain polarity by connecting the (+) terminal on the subwoofer to the (+) terminal on the speaker, and the (–) terminal on the subwoofer to the (–) terminal on the speaker. If you are not using the **Speaker-Level Inputs** ⑧, then connect your front left and right speakers directly to your receiver or amplifier. See pages 8 for further information on speaker connections.

**⑧ Speaker-Level Inputs:** Connect these binding-post terminals to the main left and right speaker terminals of your receiver or amplifier, if your receiver or amplifier does not have a line-level subwoofer output. Remember to maintain polarity by connecting the (+) terminal on the receiver/amplifier to the (+) terminal on the subwoofer, and the (–) terminal on the receiver/amplifier to the (–) terminal on the subwoofer.

**⑨ Master Power Switch:** Place this switch in the “●” position to power-on the subwoofer. The **Subwfr** will then be either in the Standby mode or completely on, depending on the position of the **Music-Sense On/Off Switch** ③.

**⑩ AC Power Cord:** Make sure to plug this cord into an active, unswitched electrical outlet for proper operation of the **Subwfr**. The cord should not be plugged into the accessory outlets found on some audio components.

## SPEAKER CONNECTIONS

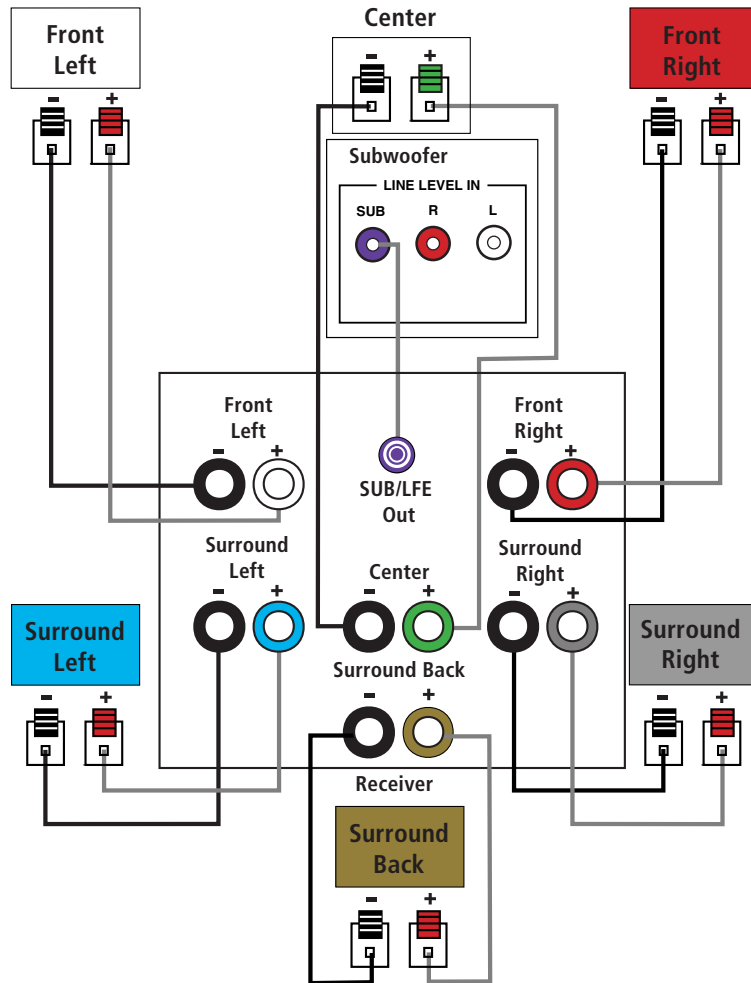
**Dolby® Digital or DTS® (or Other Digital Surround Mode) Connection**

USE THIS INSTALLATION METHOD FOR DOLBY DIGITAL, DTS OR OTHER DIGITAL SURROUND PROCESSORS:

Use the line-level input jack marked **SUB** ⑤ for the Low-Frequency Effects channel. Connect this jack to the subwoofer output or LFE output on your receiver or amplifier. Connect each speaker to the corresponding speaker terminals on your receiver or amplifier.

Make sure you've configured your surround sound processor for "Subwoofer On." The front left, front right, center and surround speakers should all be set to "Small."

When all connections have been made, plug the AC power cord on the subwoofer into an AC outlet.



## SPEAKER CONNECTIONS

**Dolby Pro Logic\*****(Non-Digital) – Line Level**

USE THIS INSTALLATION METHOD FOR DOLBY PRO LOGIC APPLICATIONS (NOT DOLBY DIGITAL, DTS OR OTHER DIGITAL PROCESSING), WHERE THE RECEIVER/PROCESSOR IS EQUIPPED WITH A SUBWOOFER OUTPUT, OR A VOLUME-CONTROLLED PREAMP (LINE-) LEVEL OUTPUT:

Use the supplied RCA-type interconnect cable to connect the line-level subwoofer output on your receiver or amplifier to either the left or right **Line-Level Full-Range Input 6** on the subwoofer. Use both the left and right inputs on the subwoofer if your receiver or processor has both left and right line-level outputs. In that case, you will need to supply a second interconnect cable.

If your receiver is equipped with line-level outputs but does not have a separate subwoofer output, use a Y-adapter (not supplied) to bridge the receiver's preamp output to the main amp input for that channel, and connect the long end of the adapter to the corresponding line-level input on the **Subwfr.**

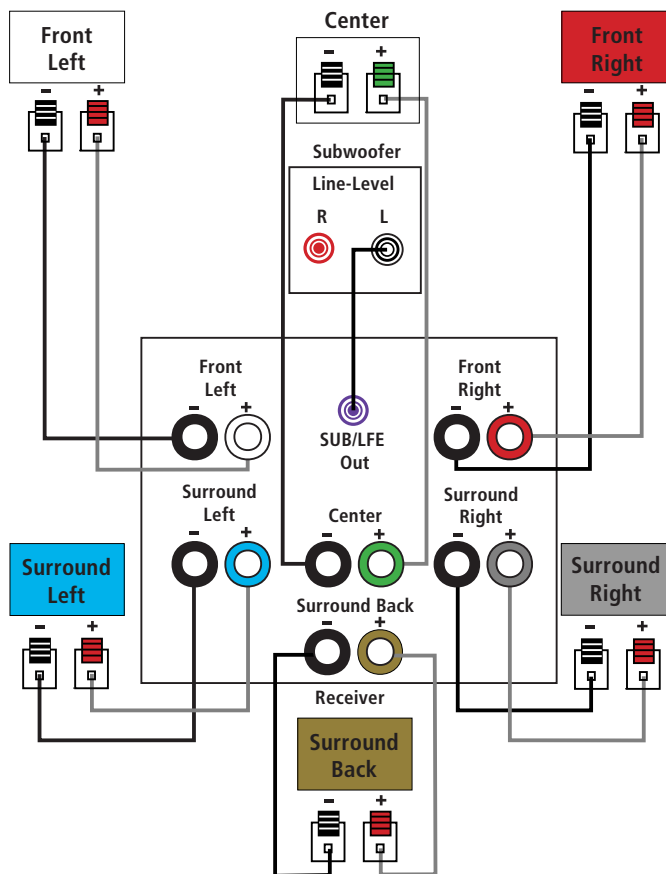
**IMPORTANT:** Do not use the **SUB Input 5** on the subwoofer with Dolby Pro Logic processors.

If your receiver/processor has a built-in low-pass-crossover filter for the subwoofer output, you may use the **SUB Input 5** to bypass the subwoofer's internal crossover.

Connect each speaker to the corresponding speaker terminals on your receiver or amplifier.

Make sure that you have configured your surround sound processor for "Subwoofer On." The front left, front right, center and surround speakers should all be set to "Small."

When all connections have been made, plug the AC power cord on the subwoofer into an AC outlet.





## SPEAKER CONNECTIONS

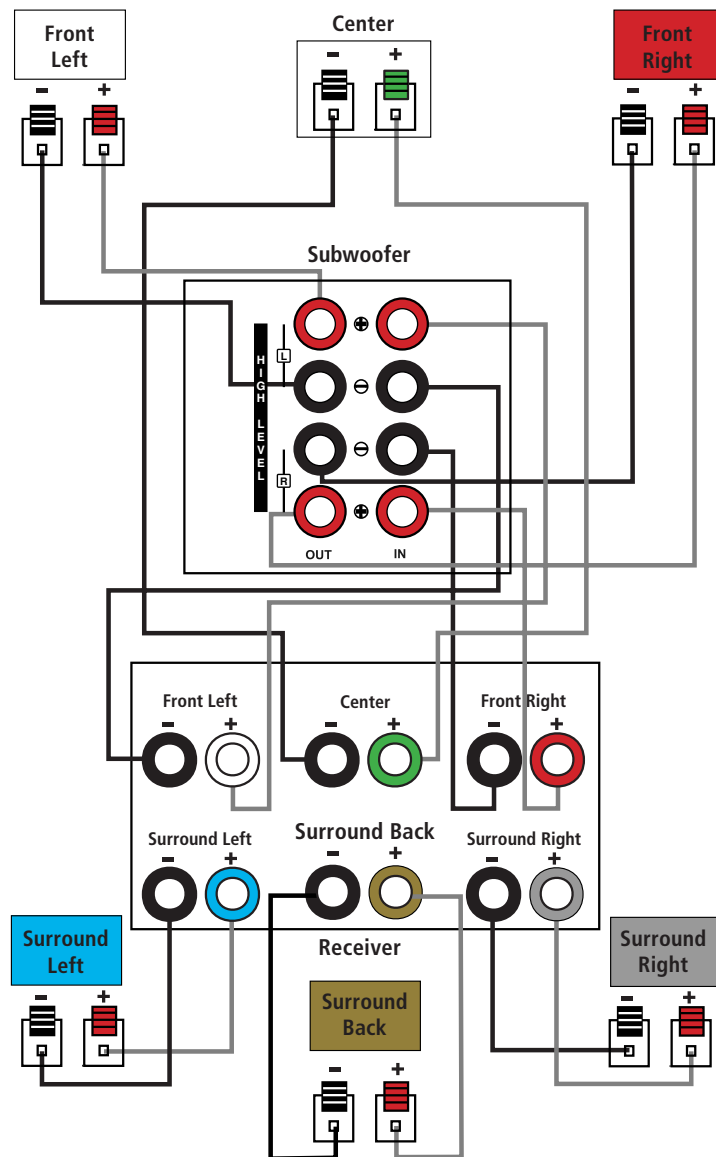
### Dolby Pro Logic (Non-Digital) – Speaker Level

USE THIS INSTALLATION METHOD FOR DOLBY PRO LOGIC APPLICATIONS (NOT DOLBY DIGITAL, DTS OR OTHER DIGITAL PROCESSING), WHERE THE RECEIVER/PROCESSOR DOES NOT HAVE A SUBWOOFER OUTPUT, OR A VOLUME-CONTROLLED PREAMP (LINE-) LEVEL OUTPUT:

Connect your receiver or amplifier's front left and right speaker terminals to the left and right **Speaker-Level Input 8** terminals on the **Subwfr** subwoofer that are marked "High Level In." Connect the left and right **Speaker-Level Output 7** terminals on the **Subwfr** subwoofer that are marked "High Level Out" to the corresponding terminals on the back of your front left and right speakers.

Connect your receiver or amplifier's center and surround speaker terminals to the corresponding terminals on the back of your center and surround speakers.

When all connections have been made, plug the AC power cord on the subwoofer into an AC outlet.



## OPERATION

Move the **Master Power Switch 9** (marked **Power**) to the "•" (On) position. The **Subwfr** subwoofer will automatically turn itself on or go into Standby mode, depending on whether or not a signal is being sent to it by your receiver or surround processor, and provided that the **Music-Sense On/Off Switch 3** is moved down so that it is in the **AUTO** position.

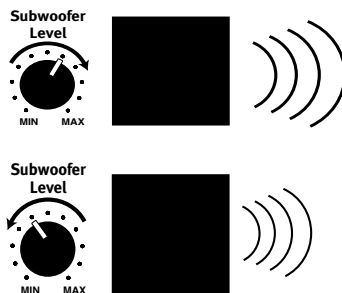
When your receiver or amplifier is off, or is not sending program material to the subwoofer, the subwoofer will be in Standby mode and the LED Indicator on the top of the subwoofer will turn amber. When the subwoofer senses an audio signal, it will automatically turn itself on and the LED Indicator will turn blue. If the subwoofer does not sense a signal after approximately twenty minutes, it will automatically go into Standby mode.

When the **Music-Sense On/Off Switch 3** is switched to the **ON** position, the subwoofer will remain on, whether or not program material is playing, and the LED Indicator will remain lit blue.

If you'll be away from home for an extended period of time, or if the subwoofer will not be used, switch the **Master Power Switch 9** to the **OFF** position.

### Volume

Volume can be adjusted using the **Subwoofer-Level Control 1**, as shown. Turn the control knob clockwise to increase the volume of the subwoofer, and counterclockwise to decrease the subwoofer's volume.



### Additional Bass Adjustments

In addition to the volume adjustments described above, the **Subwfr** subwoofer includes a **Phase Switch 4** and a **Filter Switch 2** that can be used to adjust the bass response to suit your listening environment or taste.

In most situations, the **Phase Switch 4** should be left in the **NORMAL** position. If you suspect that the subwoofer is playing out of phase with the other speakers, which would tend to diminish bass response, try placing this switch in the **REVERSE** position. There is no harm in experimenting, and you may return the switch to the **NORMAL** position at any time. If you rearrange your room and reposition the speakers, it would be a good idea to check whether they are in phase by flipping this switch.

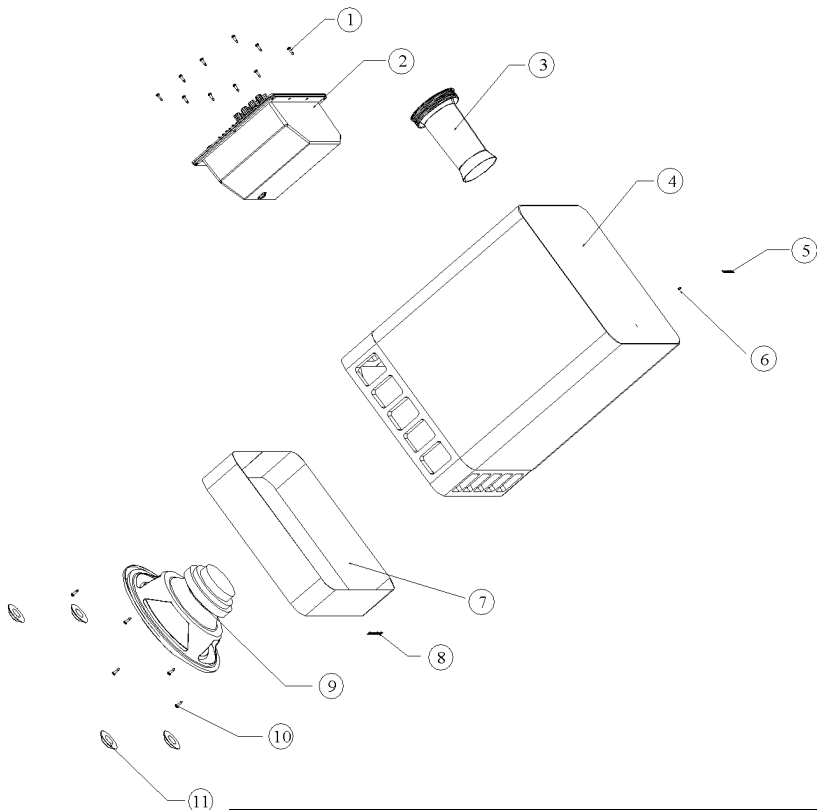
The **High-Cut (Low-Pass) Filter Switch 2** limits the frequencies of the audio signal inputted to the subwoofer to the low frequencies that the subwoofer reproduces best. This allows the subwoofer to perform more efficiently, and with superior bass reproduction, minimizing distortion that might occur if the subwoofer attempted to reproduce higher frequencies. This switch should be left in the **ON** position, **except**:

1. When the **SUB Input 5** is being used, in which case it has no effect, or
2. When the **Speaker-Level Inputs 8** or the **Line-Level Full-Range Inputs 6** are being used with a crossover or filter aboard the receiver or processor.

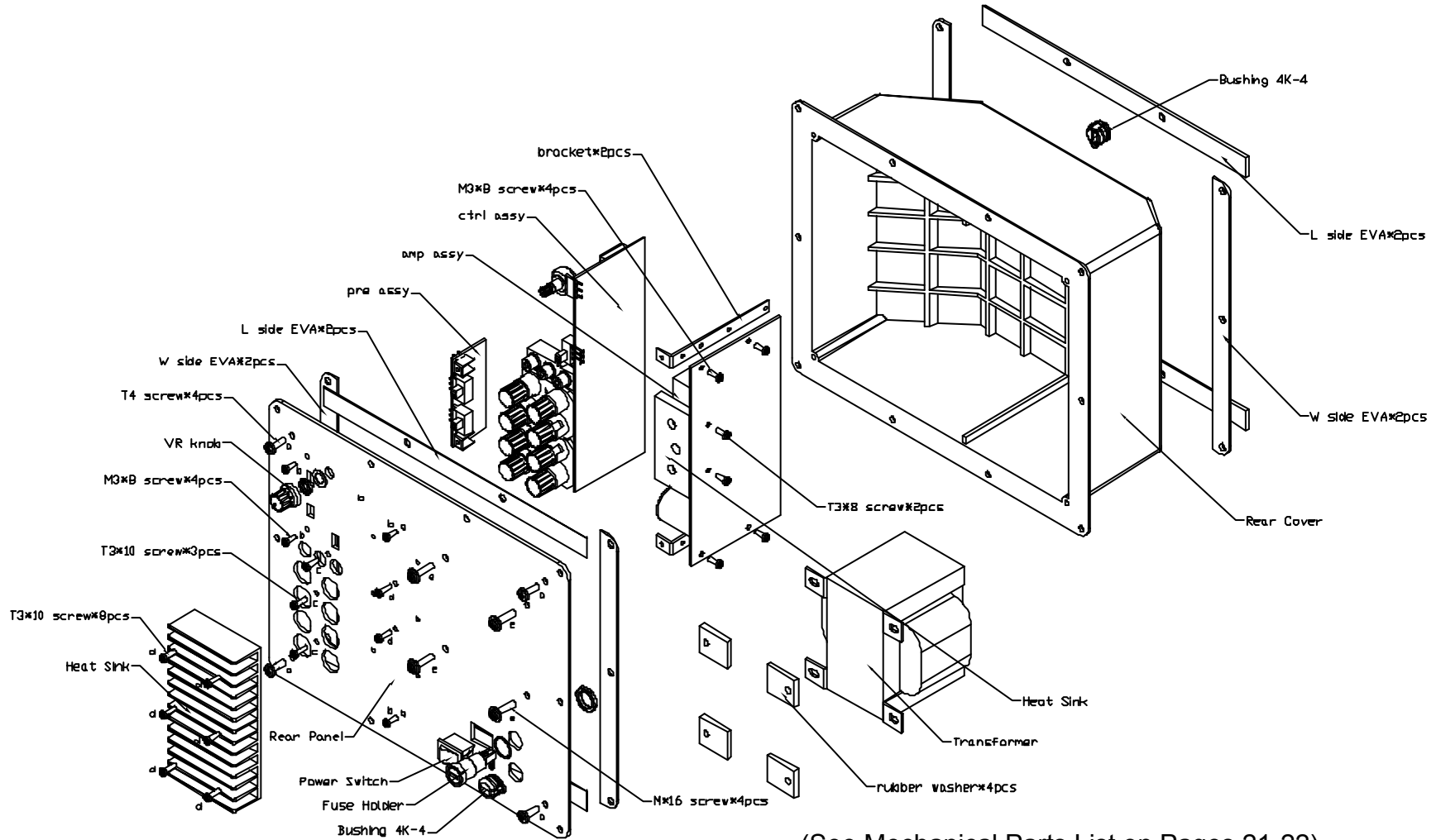
In these two circumstances, place the switch in the **OFF** position.

## TROUBLESHOOTING

| SYMPTOM  | SOLUTION   |
|--|--|
| If there is no sound from any of the speakers:                           | <ul style="list-style-type: none"> <li>• Check that receiver/amplifier is on and a source is playing.</li> <li>• Check that the powered subwoofer is plugged in and its <b>Master Power Switch 9</b> is switched on to the "•" position.</li> <li>• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut, punctured, or touching other wires.</li> <li>• Review proper operation of your receiver/amplifier.</li> </ul>   |
| If there is no sound coming from one speaker:                            | <ul style="list-style-type: none"> <li>• Check the "Balance" control on your receiver/amplifier.</li> <li>• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, and that no wires are touching each other.</li> <li>• In Dolby Digital or DTS mode, make sure that the receiver/processor is configured so that the speaker in question is enabled.</li> <li>• Turn off all electronics and switch the speaker in question with one of the other speakers that is working correctly. Turn everything back on, and determine whether the problem is in the same place: i.e., the speaker that was working previously now has no sound and the speaker that was not working now sounds fine; or whether it has moved: i.e., the speaker that was not working still has no sound and the speaker that was working is still fine. If the problem is in the same place, the source of the problem is most likely with your receiver or amplifier, and you should consult the owner's manual for that product for further information. If the problem has followed the speaker, consult your dealer for further assistance or, if that is not possible, visit our Web site at <a href="http://www.harmankardon.com">www.harmankardon.com</a> for further information.</li> </ul> |
| If there is no sound from the center speaker:                            | <ul style="list-style-type: none"> <li>• Check all wires and connections between receiver/amplifier and speaker. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut, punctured, or touching other wires.</li> <li>• If your receiver/processor is set in Dolby Pro Logic mode, make sure the center speaker is not in phantom mode.</li> <li>• If your receiver/processor is set in Dolby Digital or DTS mode, make sure the receiver/processor is configured so that the center speaker is enabled.</li> </ul>  |
| If the system plays at low volumes but shuts off as volume is increased: | <ul style="list-style-type: none"> <li>• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut, punctured, or touching other wires.</li> <li>• If more than one pair of main speakers is being used, check the minimum impedance requirements of your receiver/amplifier.</li> </ul>   |
| If there is low (or no) bass output:                                     | <ul style="list-style-type: none"> <li>• Make sure the <b>SUB 1</b> or <b>Line-Level Inputs 6</b> of the subwoofer and SUB or LFE output of your receiver or amplifier are properly connected by the RCA-type interconnect cable.</li> <li>• If you are using the Subwfr's <b>Speaker-Level Inputs 8</b>, check your speaker cables to make sure they are all connected; that none of the wires are frayed, cut, punctured, or touching other wires; and that you have maintained the correct polarity by connecting positive terminals to positive terminals, and negative terminals to negative terminals.</li> <li>• Make sure the subwoofer is plugged into an active electrical outlet and its <b>Master Power Switch 9</b> is switched on to the "•" position.</li> <li>• Check the speaker setup (bass management) settings in your AV receiver or processor to make certain that the front, center and surround speakers are configured for "Small," and that the subwoofer is set for "Yes" or "On."</li> </ul>   |
| If there is no sound from the surround speakers:                         | <ul style="list-style-type: none"> <li>• Check all wires and connections between receiver/amplifier and speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut, punctured, or touching other wires.</li> <li>• Review proper operation of your receiver/processor and its surround sound features.</li> <li>• Make sure the movie or TV show you are watching is recorded in a surround sound mode. If it is not, check to see whether your receiver/processor has other surround modes you may use.</li> <li>• In Dolby Digital or DTS mode, make sure your receiver/processor is configured so that the surround speakers are enabled.</li> <li>• Review the operation of your DVD player and the jacket of your DVD to make sure that the DVD features the desired Dolby Digital or DTS mode, and that you have properly selected that mode using both the DVD player's menu and the DVD disc's menu.</li> </ul>  |

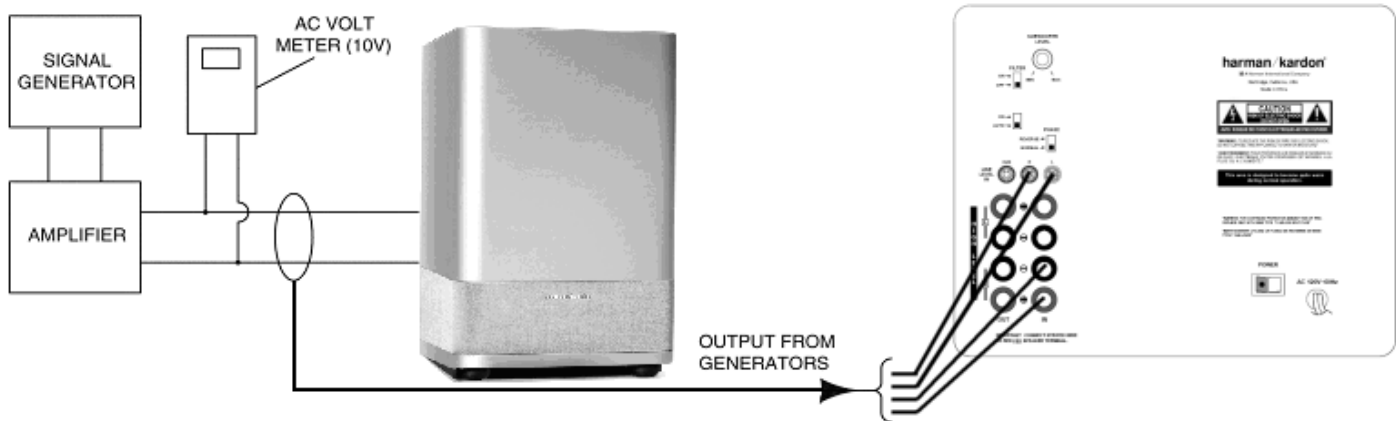


| Ref# | Description           | Part Number     | Qty |
|------|-----------------------|-----------------|-----|
| 1    | Amplifier screw       | 352-AM04020D210 | 10  |
| 2    | SUB-TS7/TS8 Amplifier | Not for Sale    | 1   |
| 3    | Port Tube             | Not for Sale    | 1   |
| 4    | SUB-TS7/TS8 Cabinet   | Not for Sale    | 1   |
| 5    | Logo                  | 316-AG-00557    | 1   |
| 6    | LED                   | Not for Sale    | 1   |
| 7    | Grille                | Not for Sale    | 1   |
| 8    | Logo                  | 316-AL-00553    | 1   |
| 9    | 10" woofer            | 25PF12DZB-DW01  | 1   |
| 10   | Woofer screw          | 352-FM04020D605 | 5   |
| 11   | Foot Pad              | 320-EVA-00057   | 4   |



(See Mechanical Parts List on Pages 21-22)

## Test Set Up and Procedure



### Equipment needed:

- Function/signal generator/sweep generator
- Integrated Amplifier
- Multimeter
- Speaker cables

### Initial Control Settings:

- Power Switch OFF; Filter OFF
- Level MIN (Full CCW)
- Phase, Auto/On switches do not matter

### General Unit Function (UUT = Unit Under Test)

- 1) From the signal generator, connect one line level (RCA) cable to the Subwoofer Line Level Input jacks L/R on the UUT. Use a Y-cable from a mono source if necessary to connect to both inputs. Do not connect to the single, purple SUB input.
- 2) Turn on generator; adjust to **75mV, 50 Hz**.
- 3) Plug in UUT; turn the power switch ON. Turn LEVEL control full clockwise (MAX)
- 4) LED should turn from Amber to Blue (on top of UUT); immediate and vigorous bass response should be heard and felt from port tube opening.
- 5) Turn off generator, turn LEVEL control full counterclockwise (MIN), and disconnect RCA cable.
- 6) Connect one pair of speaker cables to Speaker Level input terminal (IN) on UUT. Cables should be connected to an integrated amplifier fed by the signal generator.
- 7) Turn on generator and adjust so that speaker level input at the amplifier is **1.6V, 50 Hz**. Turn LEVEL control full clockwise.
- 8) LED should turn from Amber to Blue; immediate and vigorous bass response should be heard and felt from the port tube opening.

### Sweep Function

- 1) Follow steps 6-8 above, using a sweep generator as a signal source.
- 2) Sweep generator from 20Hz to 300Hz. Listen to the cabinet and drivers for any rattles, clicks, buzzes or any other noises. If any unusual noises are heard, remove woofers and test.

### Driver Function

- 1) Remove woofer from cabinet; detach + and - wire clips.
- 2) Check DC resistance of woofer; it should be **3.0 ohms ±10%**
- 3) Connect a pair of speaker cables to driver terminals. Cables should be connected to an integrated amplifier fed by a signal generator. Turn on generator and adjust so that speaker level output is **5.0V**.
- 4) Sweep generator from 20Hz to 1kHz. Listen to driver for any rubbing, buzzing, or other unusual noises.

# harman/kardon

# TECH TIPS

Troubleshooting tips and solutions to common service problems

For models: HKTS7 SUB (SUB-TS7)

TIP# HKTT2004-04

**Subject:**

Improved filter performance

**Instructions:**

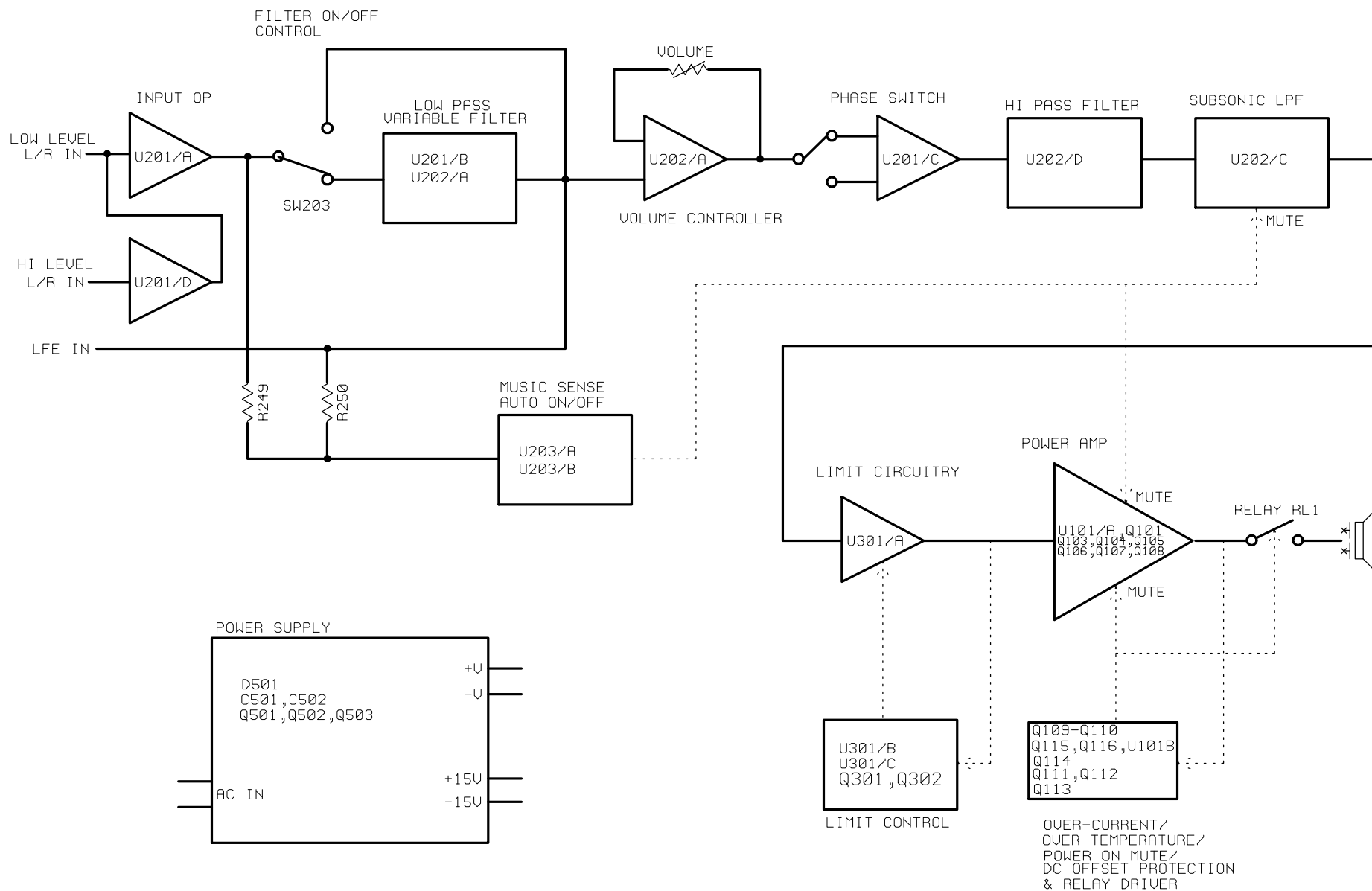
Change four 1/6W  $\pm 5\%$  CF Resistors in the PREAMP PCB of the HKTS 7 subwoofer amplifier. It is recommended this procedure be followed for every unit that has to be serviced, for any reason.

| Designator | Original value | New value    | h/k part number |
|------------|----------------|--------------|-----------------|
| R223       | 51k $\Omega$   | 30k $\Omega$ | 110-16303J26    |
| R224       | 51k $\Omega$   | 30k $\Omega$ |                 |
| R226       | 27k $\Omega$   | 10k $\Omega$ | 110-16103j26    |
| R227       | 27k $\Omega$   | 12k $\Omega$ | 110-16123j26    |

**NOTE:**

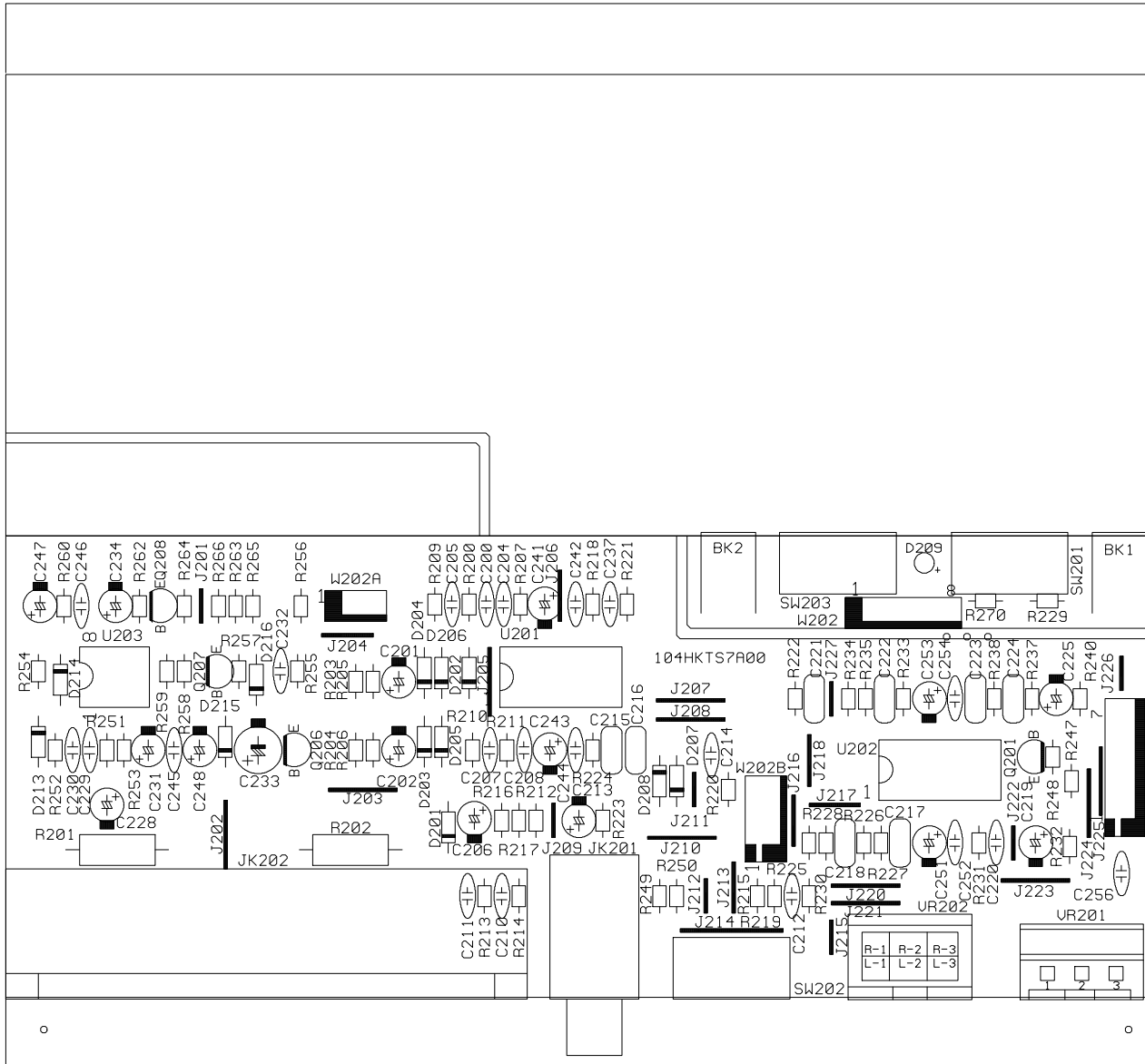
- Lack of this modification is unlikely to generate a complaint
- It will have no effect in applications when the SUB input is used, or when the sub amp is used with the FILTER switch in the OFF position.

| Model   | Serial Number (120v)  | Serial Number (230v)  | Status                         | Action                           |
|---------|-----------------------|-----------------------|--------------------------------|----------------------------------|
| SUB-TS7 | ME048503390 and below | ME048708198 and below | In need of filter modification | Change value of R223,224,226,227 |
| SUB-TS7 | ME048503391 and above | ME048708199 and above | Modified by Factory            | None Required                    |

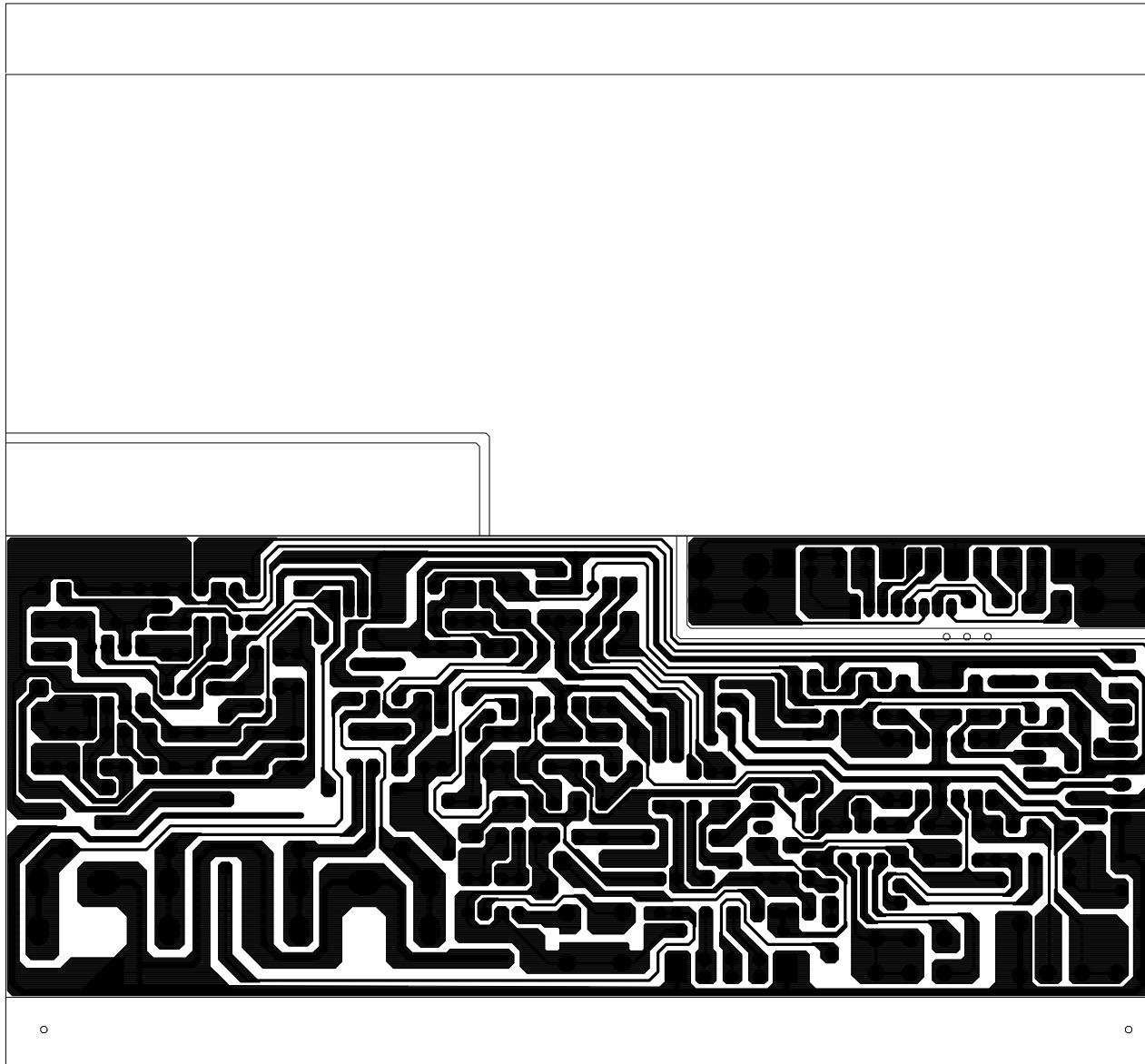


BLOCK DIAGRAM

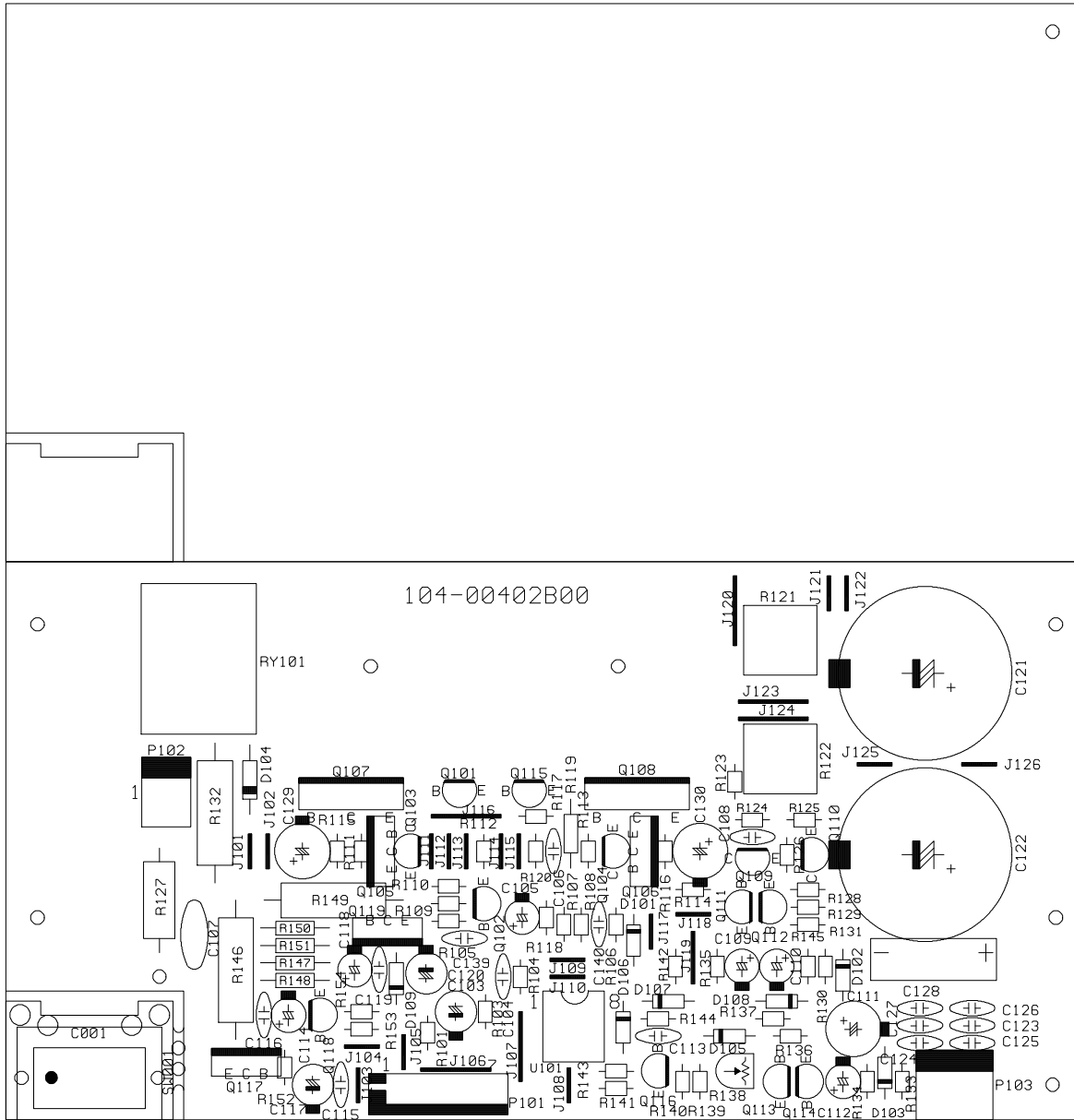




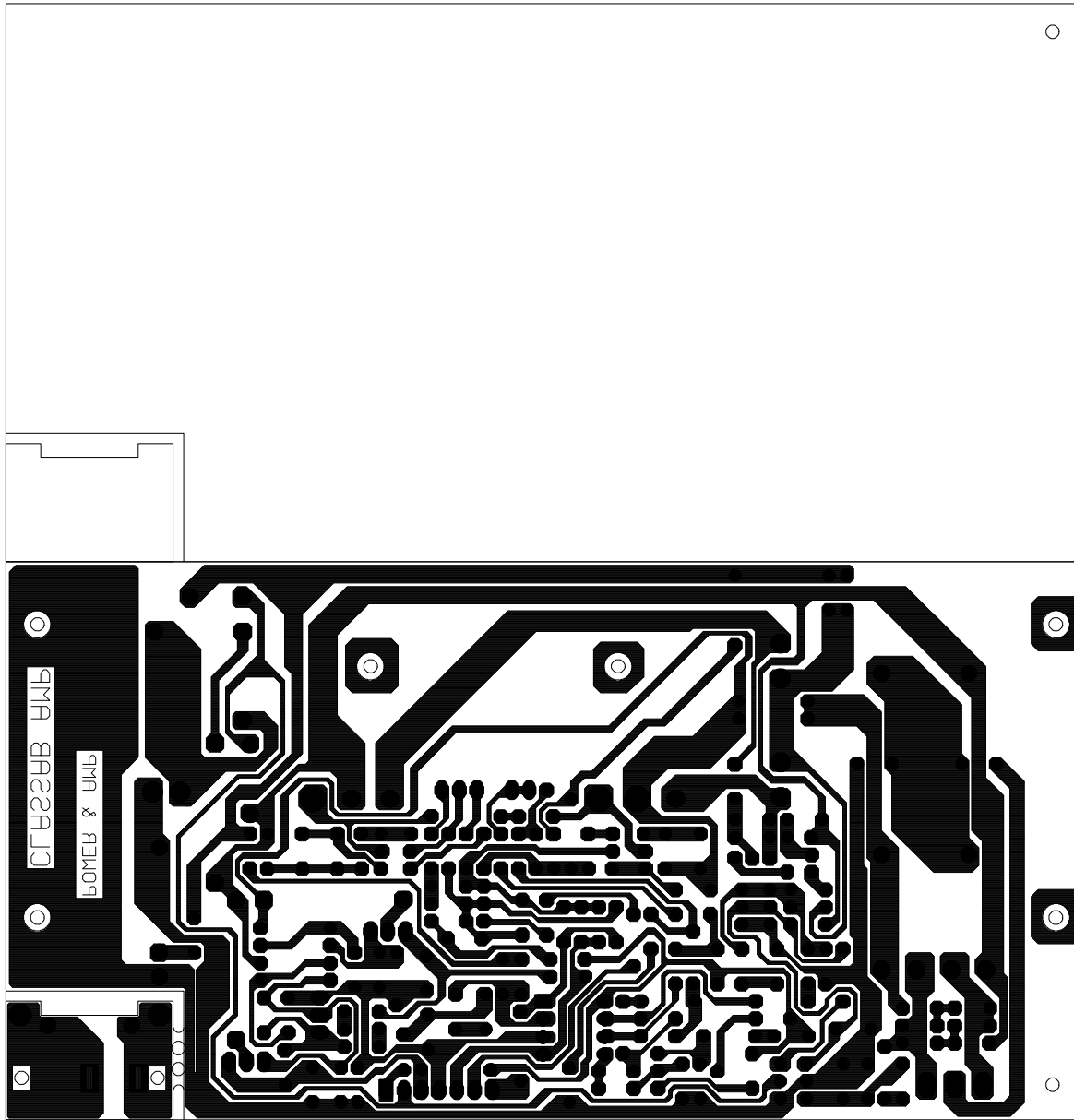
|       |       |       |                         |           |
|-------|-------|-------|-------------------------|-----------|
| DRAW. | DSGN. | APUD. | FILENAME : HKTS7PRE.PCB | REVISION: |
|       |       |       | MODEL NO. 104-HKTS7A00  | 1         |
|       |       |       | MATERIAL : FR-1 (94V0)  | 2         |
|       |       |       | LAYER SILK SCREEN       | 3         |



|  |       |  |       |                         |           |
|--|-------|--|-------|-------------------------|-----------|
|  |       |  |       | FILENAME : HKTS7PRE.PCB | REVISION: |
|  | DRAW. |  | DSGN. | MODEL NO. 104-HKTS7A00  | 1         |
|  |       |  | APUD. | MATERIAL : FR-1 (94V0)  | 2         |
|  |       |  |       | LAYER SOLDER PATTERN    | 3         |



|       |       |       |                        |           |
|-------|-------|-------|------------------------|-----------|
| DRAW. | DSGN. | APVD. | FILENAME : HKTS7U.PCB  | REVISION: |
|       |       |       | MODEL NO. 104-00402B00 | 1         |
|       |       |       | MATERIAL : FR-1 (94U0) | 2         |
|       |       |       | LAYER SILK SCREEN      | 3         |



|  |       |       |       |                        |           |  |
|--|-------|-------|-------|------------------------|-----------|--|
|  |       |       |       | FILENAME : HKTS7U.PCB  | REVISION: |  |
|  | DRAW. |       |       | MODEL NO. 104-00402B00 | 1         |  |
|  |       | DSGN. |       | MATERIAL : FR-1 (94U0) | 2         |  |
|  |       |       | APVD. | LAYER SOLDER PATTERN   | 3         |  |

| <b>SUB-TS7/TS8 120V Electrical parts list</b> |   |  |
|---|---|--|
| Part number                                   | Description                                     | Reference Designator                     |
| <b>LIMITER PCB</b>                            |   |  |
| <i>Resistors</i>                              |   |  |
| 110-16103j26                                  | Resistor 10K 1/6W ±5% CF 26mm                   | R301,R303,R304,R308,R309,R314,           |
| 110-16153j26                                  | Resistor 15K 1/6W ±5% CF 26mm                   | R302,                                    |
| 110-16223j26                                  | Resistor 22K 1/6W ±5% CF 26mm                   | R310,R312,                               |
| 110-16333j26                                  | Resistor 33K 1/6W ±5% CF 26mm                   | R305,                                    |
| 110-16474j26                                  | Resistor 470K 1/6W ±5% CF 26mm                  | R307,                                    |
| 110-16751j26                                  | Resistor 750Ω 1/6W ±5% CF 26mm                  | R311,R313,                               |
| 110-16755j26                                  | Resistor 7.5M 1/6W ±5% CF 26mm                  | R306,                                    |
| <i>Capacitors</i>                             |   |  |
| 135-3226m50                                   | Elec. Capacitor 22U 50V ±20%                    | C301,                                    |
| 135-3476m25                                   | Elec. Capacitor 47U 25V ±20%                    | C304,                                    |
| 130-2f104z503                                 | disk capacitor 0.1U 50V +80/-20%                | C305,C306,                               |
| 132-103j503                                   | Mylar capacitor 0.01U 50V ±5%                   | C302,C303,                               |
| 162-10059001                                  | Single wire 50mm WHITE UL1007 AWG26             |  |
| <i>Semiconductors</i>                         |   |  |
| 190-16tl074cn                                 | I.C TL074CN ST QUAD OP-AMP+B78                  | U301,                                    |
| 192-027c1815gr                                | Transistor 2SC1815GR NPN                        | Q301,Q302,                               |
| 197-131n4148                                  | Diode 1N4148 26mm                               | D301,D302,                               |
| <i>Miscellaneous</i>                          |   |  |
| 162-50159002                                  | 7PIN 150mm AWG26 UL 2468                        | P302,                                    |
| 175-9f40hr2                                   | connector 40PIN PITCH=2.54mm                    |  |
| <b>PREAMP PCB</b>                             |   |  |
| <i>Resistors</i>                              |   |  |
| 110-12472j52                                  | Resistor 4.7K 1/2W ±5% CF 52mm                  | R201,R202,                               |
| 110-16102j26                                  | Resistor 1K 1/6W ±5% CF 26mm                    | R213,R214,R215,R254,R209,R212,R216,R217, |
| 110-16103j26                                  | Resistor 10K 1/6W ±5% CF 26mm                   | R218,R220,R221,R222,R225,R228,R229,R230, |
|   |   | R232,R235,R240,R248,R260,R270,           |
| 110-16104j26                                  | Resistor 100K 1/6W ±5% CF 26mm                  | R231,R263,R266,                          |
| 110-16105j26                                  | Resistor 1M 1/6W ±5% CF 26mm                    | R259,                                    |
| 110-16122j26                                  | Resistor 1.2K 1/6W ±5% CF 26mm                  | R265,                                    |
| 110-16124j26                                  | Resistor 120K 1/6W ±5% CF 26mm                  | R233,                                    |
| 110-16151j26                                  | Resistor 150Ω 1/6W ±5% CF 26mm                  | R253,                                    |
| 110-16154j26                                  | Resistor 150K 1/6W ±5% CF 26mm                  | R252,                                    |
| 110-16183j26                                  | Resistor 18K 1/6W ±5% CF 26mm                   | R262,                                    |
| 110-16203j26                                  | Resistor 20K 1/6W ±5% CF 26mm                   | R237,R238,                               |
| 110-16205j26                                  | Resistor 2M 1/6W ±5% CF 26mm                    | R257,                                    |
| 110-16223j26                                  | Resistor 22K 1/6W ±5% CF 26mm                   | R247,R255,R256,                          |
| 110-16273j26                                  | Resistor 27K 1/6W ±5% CF 26mm                   | R226,R227,                               |
| 110-16472j26                                  | Resistor 4.7K 1/6W ±5% CF 26mm                  | R200,R207,R258,                          |
| 110-16473j26                                  | Resistor 47K 1/6W ±5% CF 26mm                   | R219,R249,R250,R251,R264                 |
| 110-16512j26                                  | Resistor 5.1K 1/6W ±5% CF 26mm                  | R210,R211,                               |
| 110-16513j26                                  | Resistor 51K 1/6W ±5% CF 26mm                   | R223,R224,                               |
| 110-16752j26                                  | Resistor 7.5K 1/6W ±5% CF 26mm TA               | R234,                                    |
| 110-16913j26                                  | Resistor 91K 1/6W ±5% CF 26mm                   | R203,R204,R205,R206,                     |
| 115-h503a102                                  | Variable resistor RV16AE-20B2-15K-A54-104(A50K) | VR201                                    |
| <i>Capacitors</i>                             |   |  |
| 129-a154j633                                  | Mylar capacitor 0.15U 63V ±5% MSC               | C221,C222,                               |
| 129-a224j633                                  | Mylar capacitor 0.22uF 63V ±5% MSC              | C218                                     |
| 130-2b221k503                                 | disk capacitor 220P 50V ±10%                    | C200,C204,C205,C207,C208,C210,C211,C212, |
|   |   | C214,C220,C230,C237,                     |
| 130-2b470k503                                 | disk capacitor 47P 50V ±10%                     | C229,                                    |
| 130-2f104z503                                 | disk capacitor 0.1U 50V +80/-20%                | C232,C242,C244,C245,C246,C252,C254,C256, |

| Part number           | Description                      | Reference Designator  |
|-----------------------|----------------------------------|---|
| <b>PREAMP PCB</b>     |                                  |   |
| 132-183j503           | Mylar capacitor 0.018uF 50V ±5%  | C223,   |
| 132-223ja03           | Mylar capacitor 0.022uF 100V ±5% | C215,   |
| 132-473j503           | Mylar capacitor 0.047U 50V ±5%   | C224,   |
| 132-563j503           | Mylar capacitor 0.056U 50V ±5%   | C216,   |
| 132-823j503           | Mylar capacitor 0.082U 50V ±5%   | C217,   |
| 135-3105m50           | elec. capacitor 1U 50V ±20%      | C228,   |
| 135-3106m50           | Elec. Capacitor 10uF 50V ±20%    | C201,C202,C206,C213,C219,C231,C241,C243,<br>C251,C253,      |
| 135-3107m16           | Elec. Capacitor 100uF 16V ±20%   | C234,   |
| 135-3226m50           | Elec. Capacitor 22U 50V ±20%     | C225,   |
| 135-3227m16           | Elec. Capacitor 220U 16V ±20%    | C233,   |
| <i>Semiconductors</i> |                                  |   |
| 192-027c1815gr        | Transistor 2SC1815GR NPN         | Q201,Q206,Q207,Q208,  |
| 197-131n4148          | Diode 1N4148 26mm                | D201,D202,D203,D204,D205,D206,D207,D208,<br>D214,D215,D216, |
| 199-15000335          | ZENER diode 3.3V 1/2W 52mm       | D213,   |
| 162-50332003          | 2PIN 330mm RED/GREEN LED         | D209,   |
| 190-06m4558d          | I.C. OPA 4558D Dual Op-Amp       | U203,   |
| 190-16tl074cn         | I.C TL074CN ST Quad Op-Amp       | U201,U202,  |
| <i>Miscellaneous</i>  |                                  |   |
| 162-a016d001          | wire assembly UL1007 160/80mm#26 |   |
| 174-0rca313v          | RCA JACK RCA-313G V/R/W          | JK201,  |
| 174-20810360g         | SPK JK BP 8PIN                   | JK202,  |
| 175-1b08v01           | connector 8 PIN PITCH=2.0mm      |   |
| 180-tms7210v          | SWITCH SLIDE 6PIN MS7210V        | SW201,SW202,SW203,  |
| 362-FE-00041          | PCB bracket 11.75*8.5*12.5H      |   |
| <b>MAIN PCB</b>       |                                  |   |
| <i>Resistors</i>      |                                  |   |
| 110-14472j26          | Resistor 4.7K 1/4W ±5% CF 26mm   | R147,R150,  |
| 110-14681j26          | Resistor 680Ω 1/4W ±5% CF 26mm   | R148,R151,  |
| 110-16101j26          | Resistor 100Ω 1/6W ±5% CF 26mm   | R120,   |
| 110-16102j26          | Resistor 1K 1/6W ±5% CF 26mm     | R124,   |
| 110-16103j26          | Resistor 10K 1/6W ±5% CF 26mm    | R134,   |
| 110-16105j26          | Resistor 1M 1/6W ±5% CF 26mm     | R143,   |
| 110-16123j26          | Resistor 12K 1/6W ±5% CF 26mm    | R135,R139,  |
| 110-16152j26          | Resistor 1.5K 1/6W ±5% CF 26mm   | R103,R123,R136,R137,R141,R142,                              |
| 110-16153j26          | Resistor 15K 1/6W ±5% CF 26mm    | R118,R145,R152,R154,  |
| 110-16154j26          | Resistor 150K 1/6W ±5% CF 26mm   | R131,   |
| 110-16181j26          | Resistor 180Ω 1/6W ±5% CF 26mm   | R111,R114   |
| 110-16182j26          | Resistor 1.8K 1/6W ±5% CF 26mm   | R153,   |
| 110-16223j26          | Resistor 22K 1/6W ±5% CF 26mm    | R128,R129,R133,   |
| 110-16332j26          | Resistor 3.3K 1/6W ±5% CF 26mm   | R106,R107,R144  |
| 110-16392j26          | Resistor 3.9K 1/6W ±5% CF 26mm   | R105,R108,  |
| 110-16393j26          | Resistor 39K 1/6W ±5% CF 26mm    | R126,   |
| 110-16470j26          | Resistor 47Ω 1/6W ±5% CF 26mm    | R112,R113,R115,R116,  |
| 110-16471j26          | Resistor 470Ω 1/6W ±5% CF 26mm   | R140,   |
| 110-16472j26          | Resistor 4.7K 1/6W ±5% CF 26mm   | R110,R125,R130,   |
| 110-16473j26          | Resistor 47K 1/6W ±5% CF 26mm    | R101,   |
| 110-16560j26          | Resistor 56Ω 1/6W ±5% CF 26mm    | R117,   |
| 110-16563j26          | Resistor 56K 1/6W ±5% CF 26mm    | R104,   |
| 110-16682j26          | Resistor 6.8K 1/6W ±5% CF 26mm   | R109,   |
| 110-10821jk2          | Resistor 820Ω 1W ±5%             | R132,   |
| 110-122r2j15          | Resistor 2.2Ω 1/2W ±5%           | R127,   |
| 110-20331jk2          | Resistor 330Ω 2W ±5% 5mm         | R146,R149,  |
| 113-50r10j10          | Cermem resistor 0.1Ω 5W ±5%      | R121,R122,  |
| 114-03302m0           | Variable resistor 3K 0.3W ±20%   | R138,   |

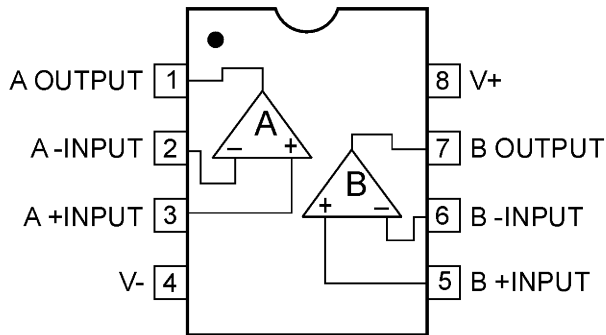
| Part number                     | Description                                    | Reference Designator     |
|---------------------------------|--|--------------------------|
| <b>MAIN PCB</b>                 |  |                          |
| <i>Semiconductors</i>           |  |                          |
| 192-027c1815gr                  | Transistor 2SC1815GR NPN                       | Q102,Q111,Q112,Q113,Q118 |
| 192-028a1015gr                  | Transistor 2SA1015GR PNP                       | Q114,Q116,               |
| 192-1672n5551                   | Transistor 2N5551 NPN                          | Q103,Q109,               |
| 192-1682n5401                   | Transistor 2N5401 AI-PNP 350V                  | Q104,Q110,               |
| 197-131n4148                    | Diode 1N4148 26mm                              | D101,D103,D105,D108,     |
| 199-15000335                    | ZENER diode 3.3V 1/2W 52mm                     | D102,                    |
| 199-15000625                    | ZENER diode 6.2V 1/2W 52mm                     | D106,D107,               |
| 199-15001605                    | ZENER diode 16V 1/2W 52mm                      | D109,                    |
| 192-021c1815gr                  | Transistor 2SC1815GR NPN                       | Q101,Q115,               |
| 192-021tip35c                   | Transistor TIP35C NPN                          | Q107,                    |
| 192-022tip36c                   | Transistor TIP36C PNP                          | Q108,                    |
| 192-201d882y                    | Transistor KSD882Y NPN                         | Q117,                    |
| 192-202b772y                    | Transistor KSB772Y PNP                         | Q119,                    |
| 192-991d669a                    | TransistorHI-SINCERITY HSD669A NPN             | Q106,                    |
| 192-992b649t                    | Transistor HSB649T PNP                         | Q105,                    |
| 197-00kbl405                    | bridge diode 4A 500V KBL405                    | D110,                    |
| 197-101n4002                    | Diode 1N4002                                   | D104,                    |
| 190-06m4558d                    | I.C. OPA 4558D Dual Op-Amp                     | U101,                    |
| <i>Capacitors</i>               |  |                          |
| 130-2b102k503                   | disk capacitor 1000P 50V ±10%                  | C116,                    |
| 130-2f104z503                   | disk capacitor 0.1U 50V +80/-20%               | C108,C113,C115,C119,     |
| 130-3f473m503                   | disk capacitor 0.047U 50V ±20%                 | C106,                    |
| 130-sl101k503                   | disk capacitor 100P 50V SL ±10%                | C139,C140,               |
| 132-104j503                     | Mylar capacitor 0.1U 50V ±5%                   | C107,                    |
| 132-223ja03                     | Mylar capacitor 0.022uF 100V ±5%               | C124,C125,C126,C128,     |
| 135-3105m50                     | elec. Capacitor 1U 50V ±20%                    | C105,C112,               |
| 135-3107m16                     | Elec. Capacitor 100uF 16V ±20%                 | C109,C117,C120,          |
| 135-3226m50                     | Elec. Capacitor 22U 50V ±20%                   | C114,C118,               |
| 135-3227m10                     | Elec. Capacitor 220U 10V ±20%                  | C129,C130,               |
| 135-3227m16                     | Elec. Capacitor 220U 16V ±20%                  | C111,                    |
| 135-3476m25                     | Elec. Capacitor 47U 25V ±20%                   | C103,                    |
| 130-3f472md00                   | disk capacitor 4700P 400V ± 20%                | for Power Switch         |
| 132-223ja03                     | Mylar capacitor 0.022uF 100V ±5%               | C123,C127,               |
| 135-3107m16                     | Elec. Capacitor 100uF 16V ±20%                 | C110,                    |
| 135-4688m50                     | Elec. Capacitor 6800U/50V ±20%                 | C121,C122,               |
| <i>Miscellaneous</i>            |  |                          |
| 171-udhss124d                   | relay 5A 24V UDH-SS124D                        | RY101,                   |
| 175-1c07v01                     | connector 7PIN PITCH=2.5mm                     | P101,                    |
| 175-1d02v01                     | connector 2PIN PITCH=3.96mm                    | P102,                    |
| 175-1d03v01                     | connector 3 PIN PITCH=3.96mm                   | P103,                    |
| 193-3m2520                      | Insulator TO-3P 25x20mm                        | for Q107,Q108,           |
| <b>MISCELLANEOUS/MECHANICAL</b> |  |                          |
| 323-AL-00020                    | HEAT SINK 65*32*31                             |                          |
| 351-AM03014A094                 | SCREW M3*14 BLK                                |                          |
| 352-AM03008D040                 | SCREW □3*8 B type                              |                          |
| 361-FE-00051                    | Transistor holder 14.2*8.0*5.2                 |                          |
| 361-NYL-00054                   | Transistor Insulator (SW06002)                 |                          |
| 150-e8604107                    | Power Transformer EI-86 60Hz 120V TT0869906580 |                          |
| 152-u602015                     | AC Line cord SVT FT-2                          |                          |
| 154-u25006t0                    | fuse 2.5A 250V 20mm                            |                          |
| 155-520020                      | fuse holder R3-11                              |                          |
| 162-10082007                    | WIRE RED 18AWG 80mm                            |                          |
| 162-a040d001                    | Speaker cable #1015 400mm 991110-00            |                          |
| 176-wjce1                       | terminal CE-1                                  |                          |
| 180-pbr12c11s                   | Power switch PUSH BR12C11S                     |                          |
| 302-AL-00435-0BA                | Alum. Back panel 270*215*2.5T HKTS7            |                          |
|                                 | Alum. Back panel 270*215*2.5T HKTS8            |                          |

| Part number                     | Description                       | Reference Designator |
|---------------------------------|-----------------------------------|----------------------|
| <b>MISCELLANEOUS/MECHANICAL</b> |                                   |                      |
| 306-ABS-00004                   | REAR CABINET 268*213*102 A.B.S UL |                      |
| 311-ABS-00028                   | knob 46077-W P.V.C.               |                      |
| 320-RUB-00033                   | Rubber pad 25*21*4t               | R-4                  |
| 323-AL-00019                    | HEAT SINK 117.5*60*25             |                      |
| 333-EVA-00096                   | EVA (Gasket) 213*15*2.0mm         |                      |
| 333-EVA-00097                   | EVA (Gasket) 213*15*1.0t          |                      |
| 333-EVA-00132                   | EVA (Gasket) 238*15*2.0mm         |                      |
| 333-EVA-00133                   | EVA (Gasket) 238*15*1.0t          |                      |
| 333-EVA-00188                   | EVA (Gasket) 170x5x1t             |                      |
| 333-EVA-00220                   | EVA (Gasket) 225*15*1t UL         |                      |
| 335-NYL-00002                   | bushing 4K-4 NO-BB                |                      |
| 350-EM04012D024                 | SCREW 4□*12 BLK                   | R/C-4                |
| 351-AM03008A079                 | SCREW M3*8 BLK                    | BRKT-2,PCB TO BRKT-4 |
| 351-HM04016A218                 | SCREW M4*16                       | R-4                  |
| 352-AM03010D063                 | SCREW □3*10 B type                | R/P-6,R/P TO H/S-2   |
| 352-AM03010D065                 | SCREW □3*10 P type                | -2,RCA JK-1          |
| 354-GM04002                     | M4 NUT BLK                        | R-4                  |
| 362-FE-00013                    | PCB bracket L TYPE t=1.6mm        |                      |

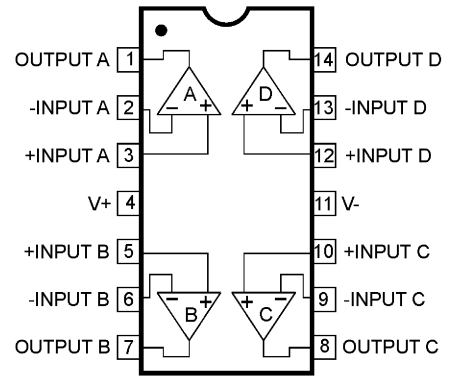


# Integrated Circuit Diagrams

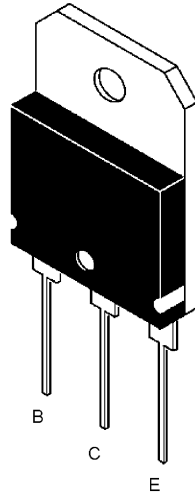
4558 Dual Op Amp  
U101,203



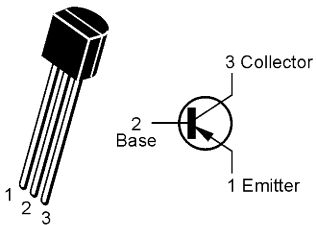
OPAMP, QUAD 14P DIL TL074  
U201, 202, 301



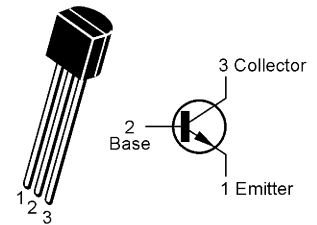
TIP35C, TIP36C  
Q107,108



2N5401  
Q104, 110



2N5551  
Q103, 109



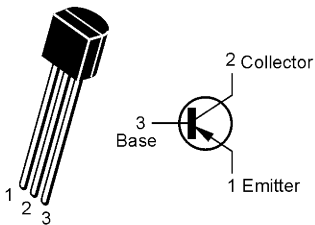
HSD669, HSB649,  
KSD772Y, KSD8827

Q106, 109, 117, 119

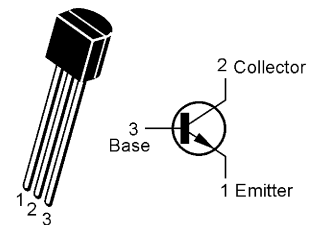


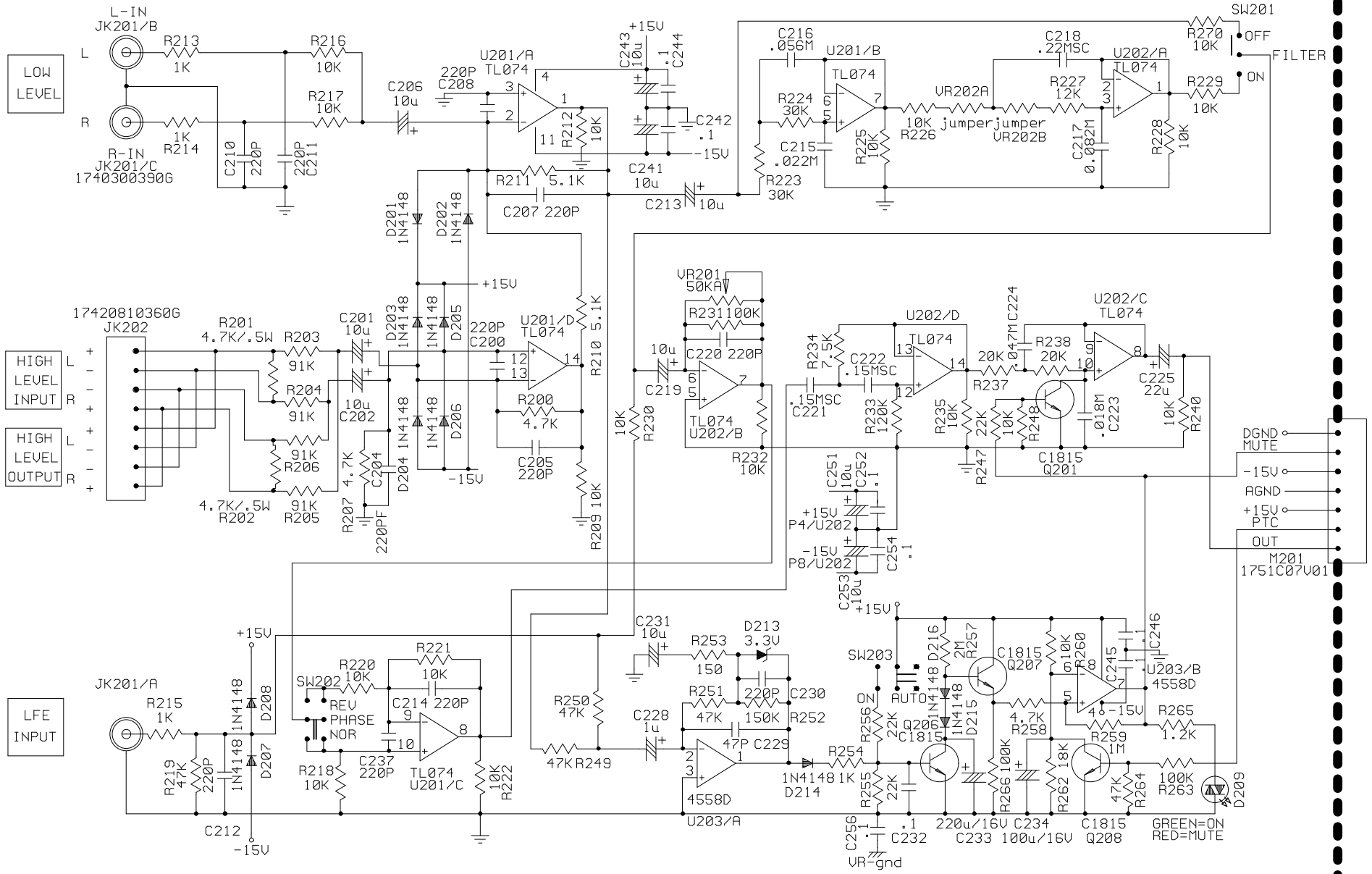
1. Emitter
2. Collector
3. Base

2SA1015  
Q114, 116, 105



2SC1815  
Q101, 102, 111, 112, 113, 115, 118, 201,  
206, 207, 208, 301, 302

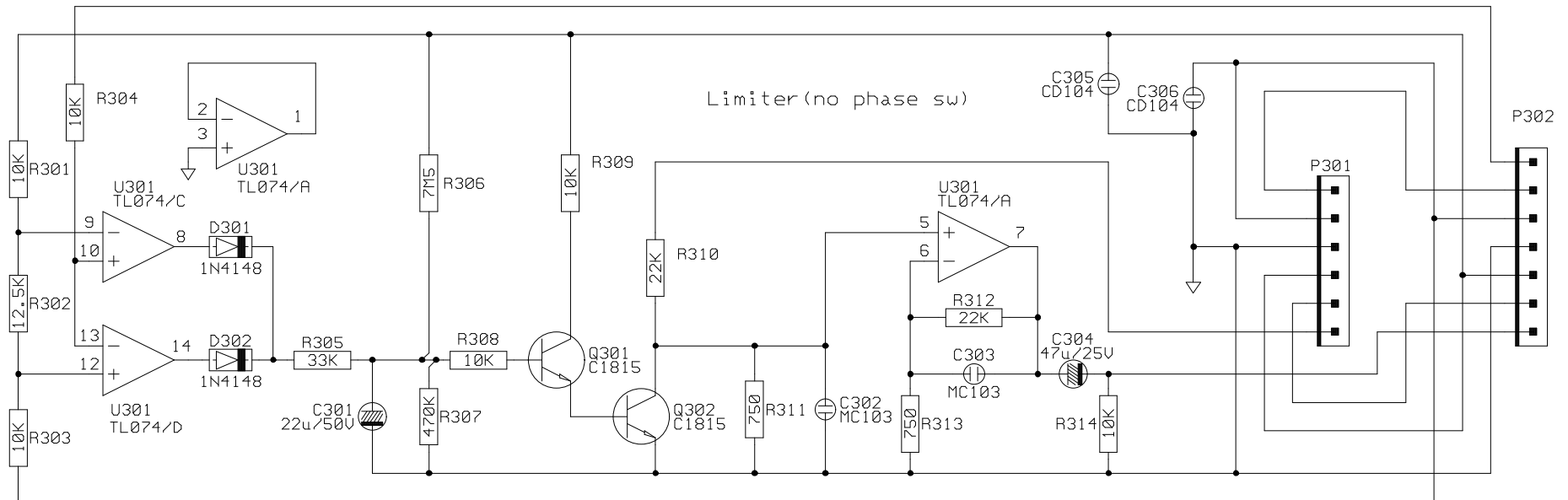




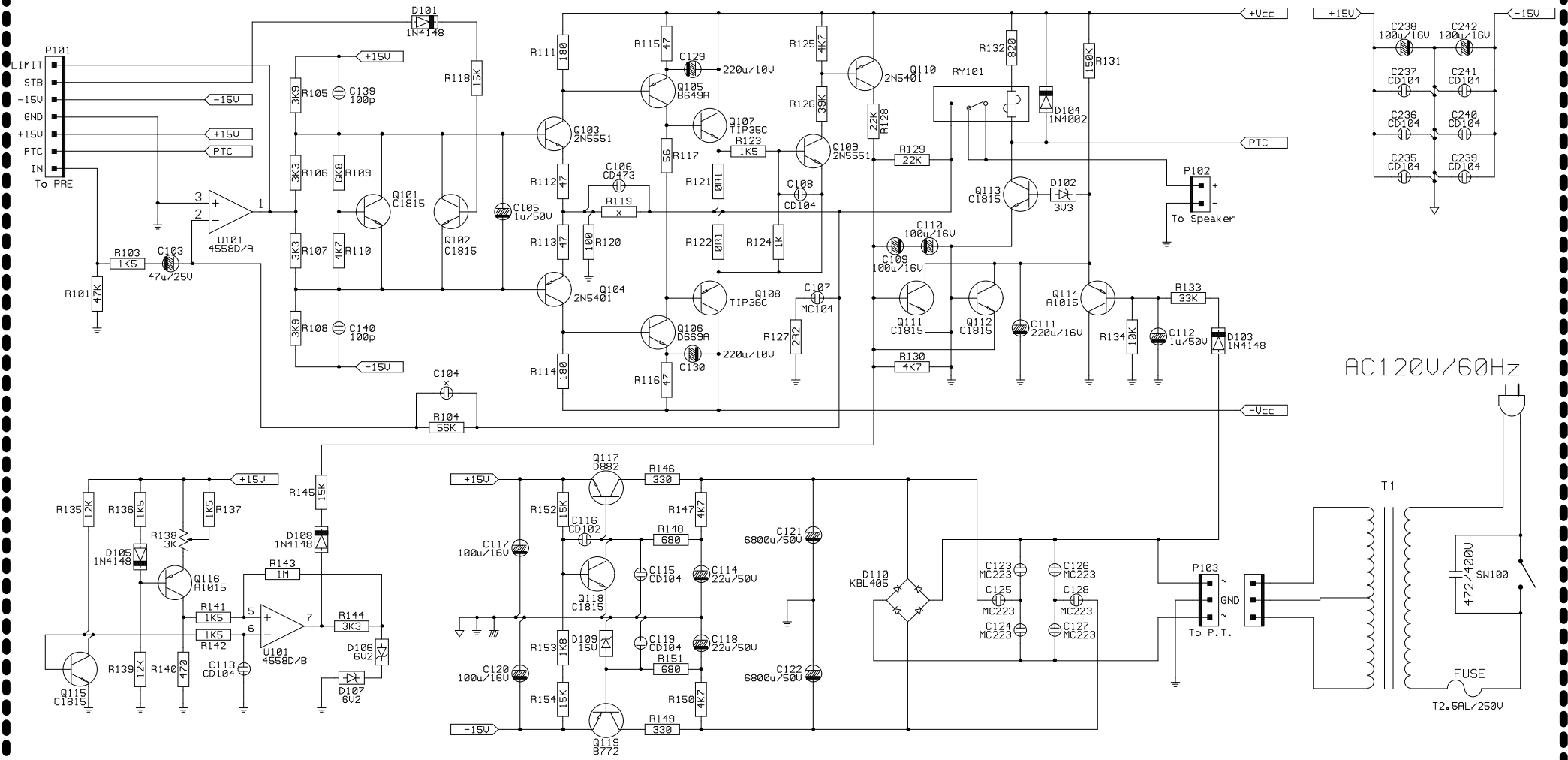
HKTS 7:  
JACK PANEL PCB

|            |          |            |                         |        |
|------------|----------|------------|-------------------------|--------|
| APPROVE BY | CHECK BY | DRAWING BY | NAME: PRE-AMP           | 1 / 3  |
|            |          |            | MODEL: HKTS7            | REV:A0 |
|            |          |            | CUSTOMER: HARMAN/KARDON |        |
|            |          |            | DATE: 2006.8.24         |        |

# HKTS7

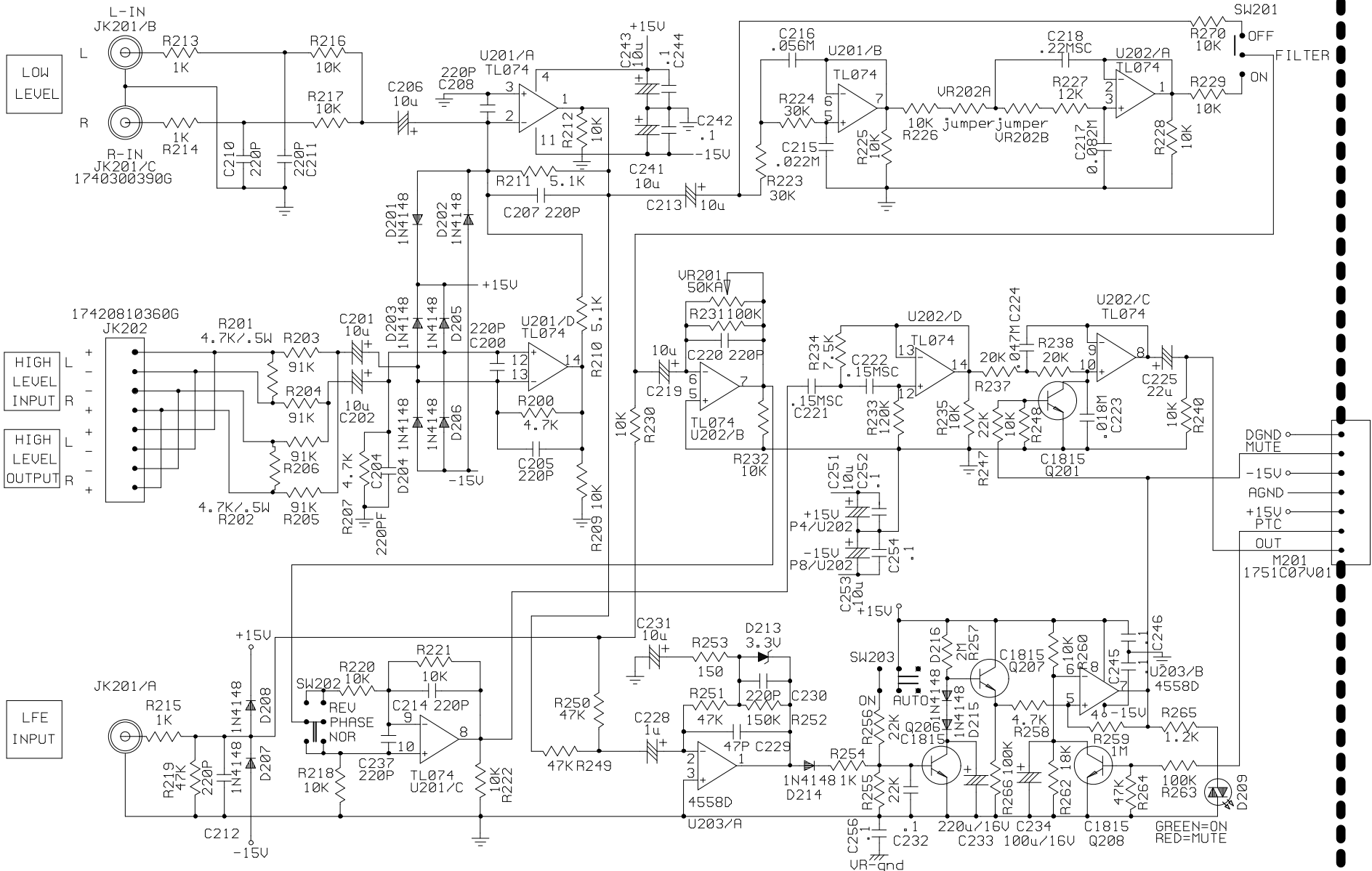


|            |          |            |           |               |        |
|------------|----------|------------|-----------|---------------|--------|
| APPROVE BY | CHECK BY | DRAWING BY | NAME:     | LIMIT         | 2 / 3  |
|            |          |            | MODEL:    | HKTS7         | REV:A0 |
|            |          |            | CUSTOMER: | HARMAN/KARDON |        |
|            |          |            | DATE:     | 2006.8.24     |        |



HKTS7

|            |          |            |                         |         |
|------------|----------|------------|-------------------------|---------|
| APPROVE BY | CHECK BY | DRAWING BY | NAME: POWER-AMP         | 3 / 3   |
|            |          |            | MODEL: HKTS7            | REV: A0 |
|            |          |            | CUSTOMER: HARMAN/KARDON |         |
|            |          |            | DATE: 2006.8.24         |         |

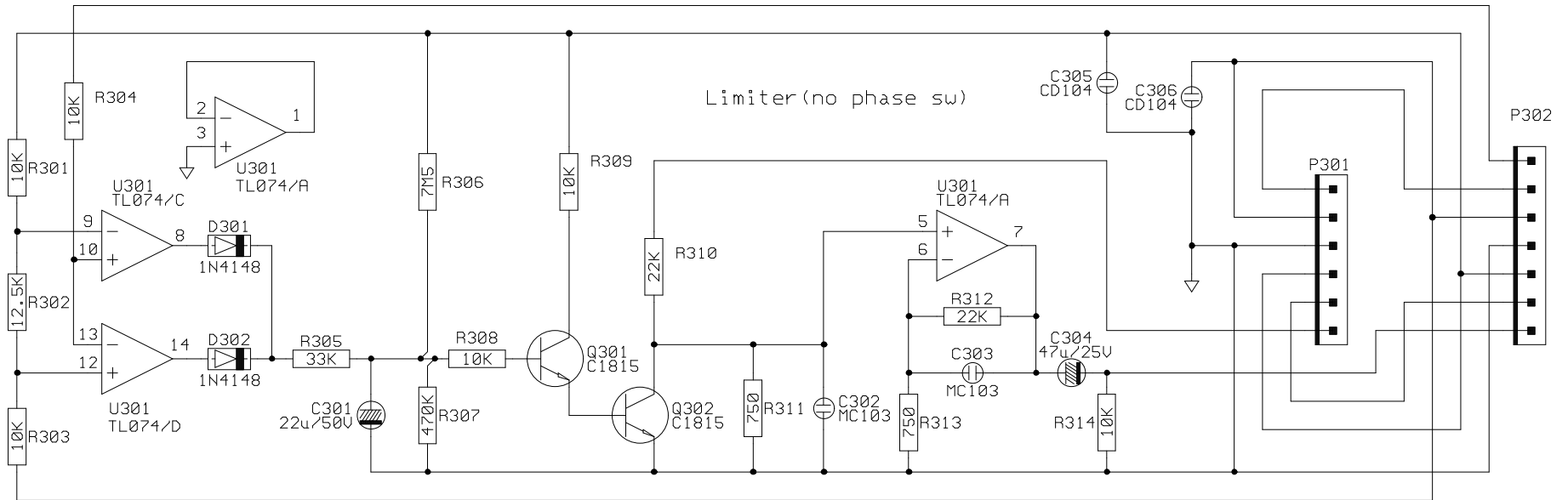


HKTS8

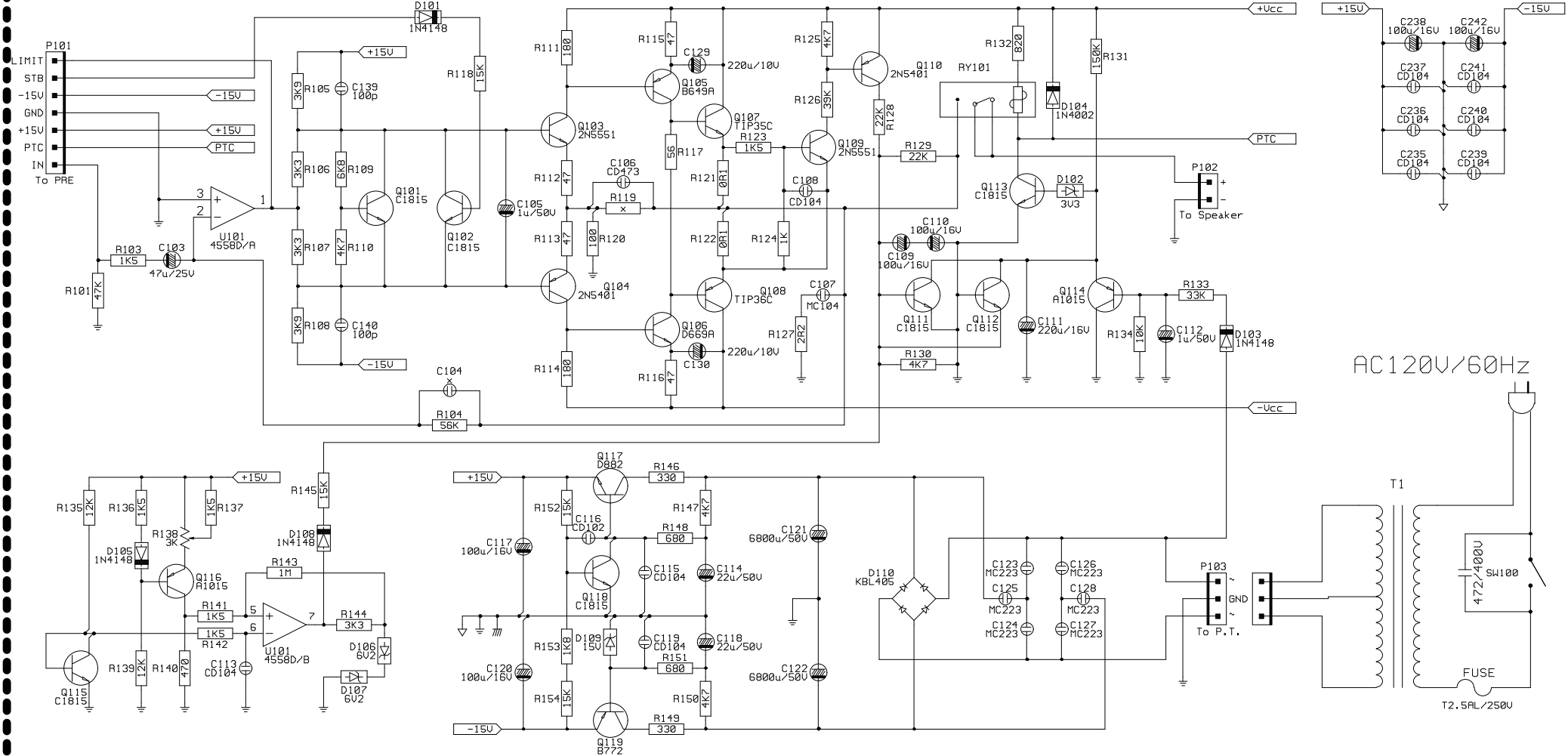
JACK PANEL PCB

|            |          |            |                         |         |
|------------|----------|------------|-------------------------|---------|
| APPROVE BY | CHECK BY | DRAWING BY | NAME: PRE-AMP           | 1 / 3   |
|            |          |            | MODEL: HKTS8            | REV: A0 |
|            |          |            | CUSTOMER: HARMAN/KARDON |         |
|            |          |            | DATE: 2006.8.24         |         |

# HKTS8



|            |          |            |                         |         |
|------------|----------|------------|-------------------------|---------|
| APPROVE BY | CHECK BY | DRAWING BY | NAME: LIMIT             | 2 / 3   |
|            |          |            | MODEL: HKTS8            | REV: A0 |
|            |          |            | CUSTOMER: HARMAN/KARDON |         |
|            |          |            | DATE: 2006.8.24         |         |

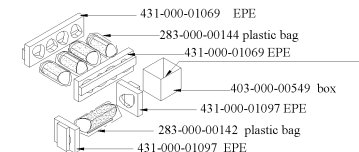


HKTS8

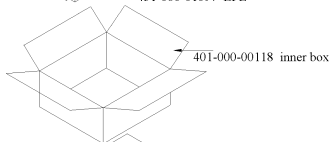
|            |          |            |                         |         |
|------------|----------|------------|-------------------------|---------|
| APPROVE BY | CHECK BY | DRAWING BY | NAME: POWER-AMP         | 3 / 3   |
|            |          |            | MODEL: HKTS8            | REV: A0 |
|            |          |            | CUSTOMER: HARMAN/KARDON |         |
|            |          |            | DATE: 2006.8.24         |         |

## Package drawing

Model: HKTS 7

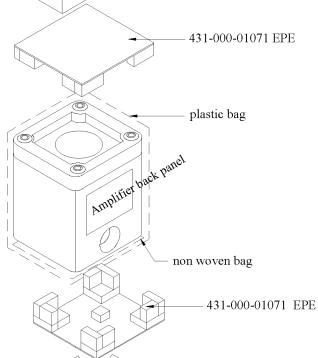


326-ABS-00108 Mounting bracket  
326-FE-00109 Metal plate  
317-PS-00172 Terminal cover  
370-000-00257 green cable  
370-000-00261 white cable  
370-000-00256 red cable  
370-000-00264 grey cable  
370-000-00265 blue cable  
370-000-00092 purple RCA cable  
371-000-00360 screw package



(in a bag in inner box)

398-PAP-00319 color code  
405-000-00333 warranty card  
406-000-00980 owners manual



402-000-01847 gift box



HKTS 8

harman/kardon®

# Packaging

