

# ONKYO SERVICE MANUAL

## AV Surround Processor

### MODEL ES-300

|     |                         |
|-----|-------------------------|
| UD  | 120V AC, 60Hz           |
| UW  | 120V/220V AC, 50Hz/60Hz |
| UQA | 240V AC, 50Hz           |

#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\Delta$  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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# SPECIFICATIONS

|                                       |   |
|---------------------------------------|---|
| Power Output                          | 30 Watts per channel, min. RMS, at 8 ohms, both channels driven, from 40 to 20 kHz, with no more than 0.09 % total harmonic distortion. (Power Amplifier Section) |
| Total Harmonic Dist. Output (DECODER) | 0.09 % at 30 Watts (Power Amplifier Section)  |
| Sensitivity and Imp.                  | 150 mV (Master volume max.)<br>Dolby : 150 mV, 30 kohms<br>Theater : 150 mV, 30 kohms<br>Hall : 300 mV, 30 kohms  |
| Frequency Response                    | 40 to 7,000 Hz, +0/-3 dB (DOLBY)  |
| Signal to Noise Ratio                 | 79 dB (DOLBY, IHF-A, Shorted)   |
| Delay Time                            | 20 ms/30 ms   |
| Power Supply Rating                   | USA & Canadian models: AC 120 V, 60 Hz<br>U.K. & Australian models: AC 240 V, 50 Hz<br>Worldwide models: 120 and 220 V swichable 50/60 Hz                         |
| Dimensions                            | 435 W x 89 H x 274 D mm<br>17 1/8" x 3 4/8" x 10 13/16"   |
| Weight                                | 4.5 kg, 9.9 lbs.  |

Specifications and features are subject to change without notice.

## PRECAUTIONS

### 1. Replacing the fuses

For continued protection against risk fire, replace only with same type and same rating fuse.

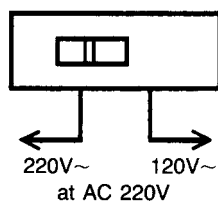
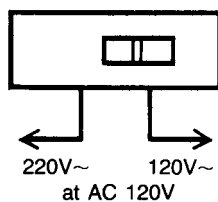
| CIRCUIT NO. | PART NO. | DESCRIPTION                                  |
|-------------|----------|--|
| F1          | 252123   | 2A-UL-5TT, Primary fuse (120V model)         |
| F1          | 252125   | T1 .25A/250V, Primary fuse (240V model)      |
| F2          | 252124   | T2A/250V, Primary fuse (120V/220V model)     |
| F3          | 252125   | T1 .25A/250V, Primary fuse (120V/220V model) |

### 2. Insulation resistance measurement (Only U.S.A. model)

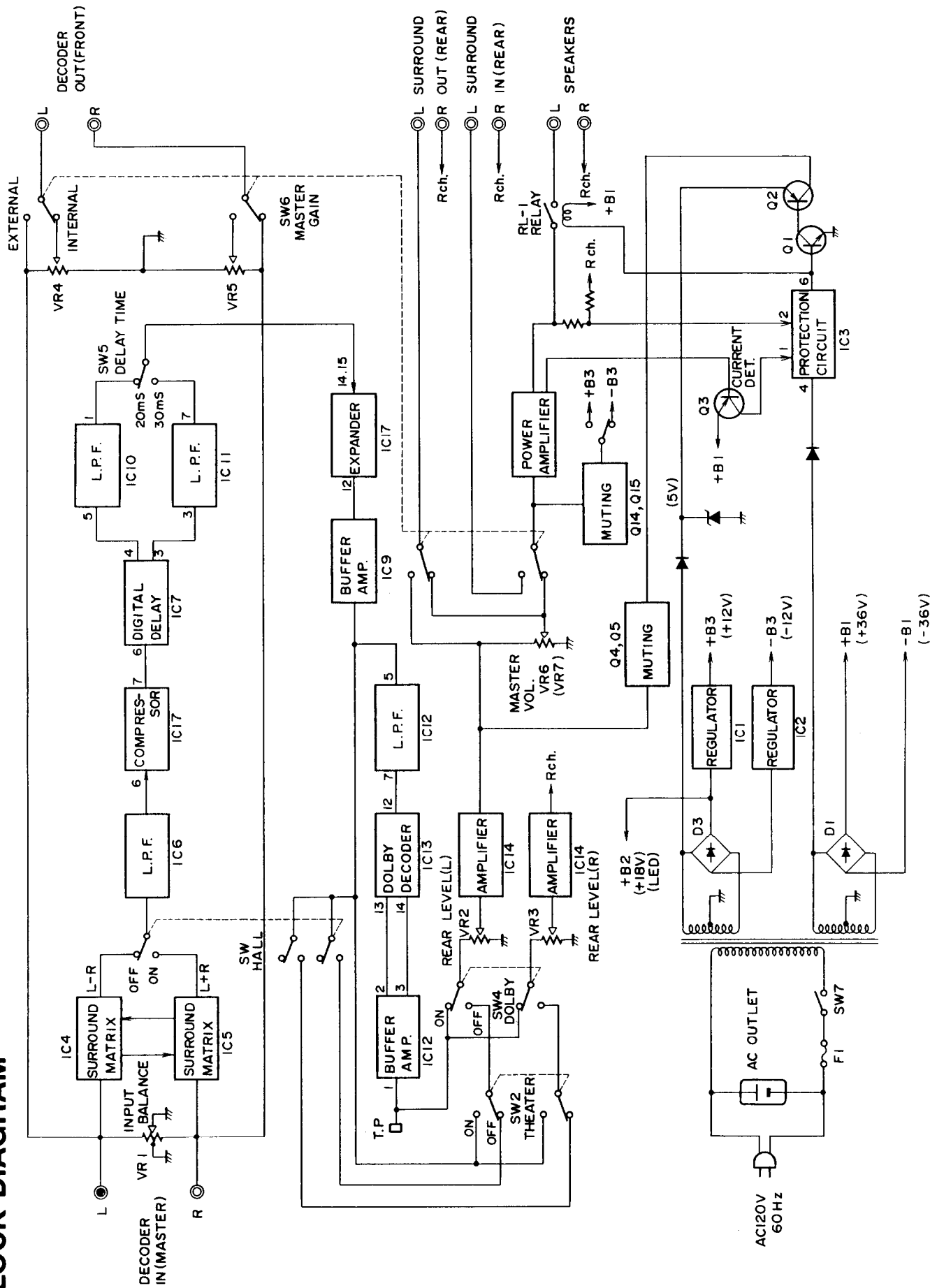
Connect the insulating-resistance tester between the plug of power supply cable and the terminal GND on the back panel.  
Specifications; More than 10 MΩ at 500V.

### 3. Voltage selector (rear panel)

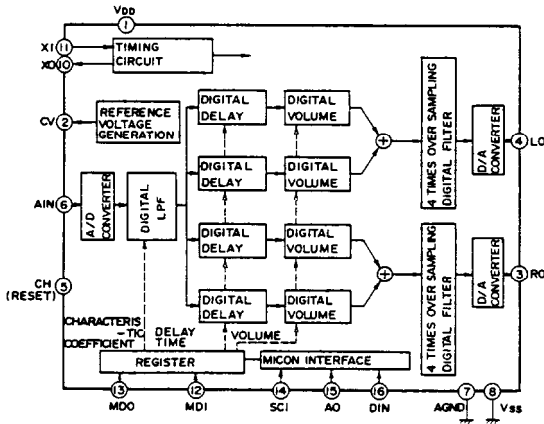
Worldwide models are equipped with a voltage selector to conform with local power supplies. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on. Voltage is changed by sliding the groove in the switch with a screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on. Models without a voltage selector can only be used in areas where the power supply is the same as that of the unit.



# BLOCK DIAGRAM

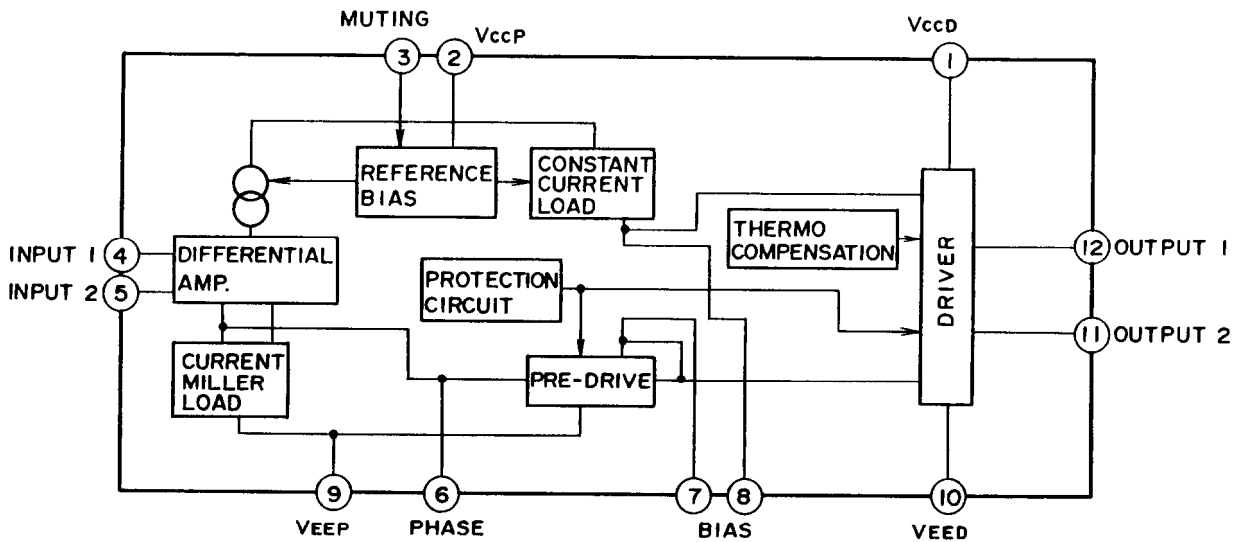


## YM3428 (Digital Surround)



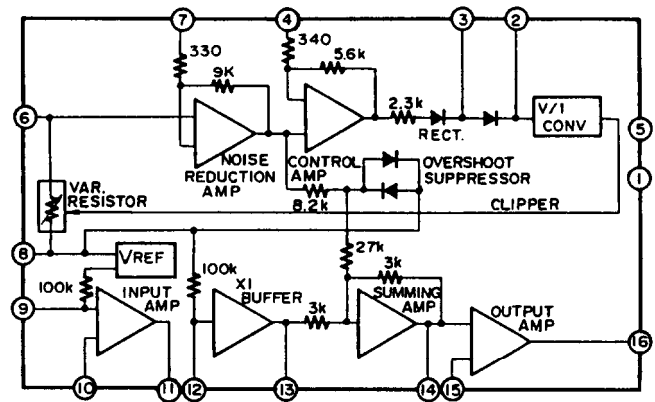
| Pin No. | Terminal        | I/O | Descriptions   |
|---------|-----------------|-----|--|
| 1       | V <sub>DD</sub> |     | Power supply terminal. (+5V)   |
| 2       | CV              | O   | Reference voltage output for A/D converter. (+2.5V)                              |
| 3       | RO              | O   | Right channel output (D/A converter analog output)                               |
| 4       | LO              | O   | Left channel output (D/A converter analog output)                                |
| 5       | CH              | O   | Capacitor connection terminal for sampling hold.                                 |
| 6       | AIN             | I   | Analog signal input terminal.  |
| 7       | AGND            |     | Ground terminal of A/D and D/A converters. Connect to terminal V <sub>SS</sub> . |
| 8       | V <sub>SS</sub> |     | Ground terminal.   |
| 9       | /IC             | I   | Rest terminal.   |
| 10      | XO              | O   | Connect to the crystal oscillator.   |
| 11      | XI              | I   | The terminal XI is the clock input terminal when used the external clock.        |
| 12      | MD1             | I   | Mode setting terminals.  |
| 13      | MD0             | I   |  |
| 14      | SCI             | I   | Data shift clock input terminal when used the microprocessor.                    |
| 15      | A0              | I   | Address/data identifier signal input terminal when used the microprocessor.      |
| 16      | DIN             | I   | Data input terminal when used the microprocessor.                                |

## μPC1270H (Power Amplifier Driver)

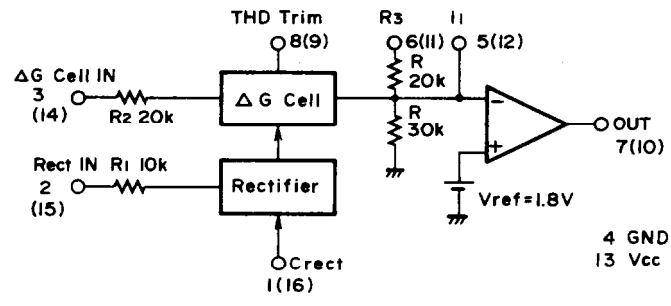


**LA2730 (Dolby Encoder/Decoder)**

- |                    |   |    |                 |
|--------------------|---|----|-----------------|
| GND                | 1 | 16 | OUTPUT AMP OUT  |
| RECT. FILTER       | 2 | 15 | OUTPUT AMP GAIN |
| RECT. FILTER       | 3 | 14 | SUMMING AMP OUT |
| CONTROL GAIN       | 4 | 13 | BUFFER OUT      |
| V+                 | 5 | 12 | BUFFER IN       |
| NOISE RED. IN      | 6 | 11 | INPUT AMP OUT   |
| N. R. AMP DECCUPLE | 7 | 10 | INPUT AMP GAIN  |
| VREF               | 8 | 9  | INPUT AMP IN    |

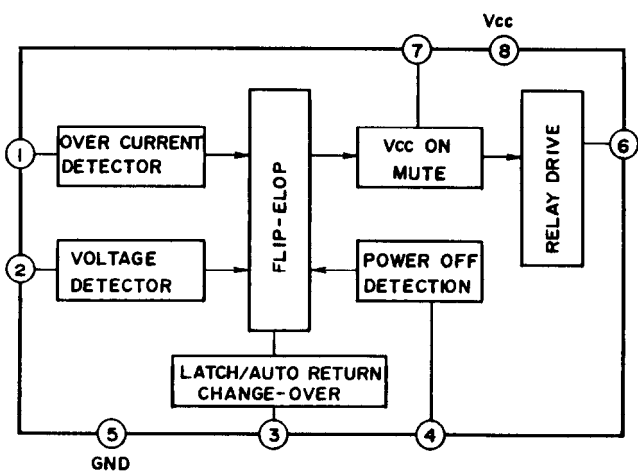


**μPC1571C (Noise Ruduction Circuit)**

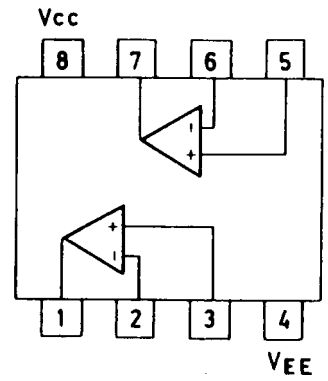


| Pin No. | Function         | Pin No. | Function         |
|---------|------------------|---------|------------------|
| 1       | Crect1           | 9       | THD Trim 2       |
| 2       | Rect IN1         | 10      | OUT 2            |
| 3       | Δ G Cell IN1     | 11      | R <sub>3</sub> 2 |
| 4       | GND              | 12      | I <sub>1</sub> 2 |
| 5       | I <sub>1</sub> 1 | 13      | V <sub>cc</sub>  |
| 6       | R <sub>3</sub> 1 | 14      | Δ G Cell IN 2    |
| 7       | OUT 1            | 15      | Rect IN 2        |
| 8       | THD Trim 1       | 16      | Crect 2          |

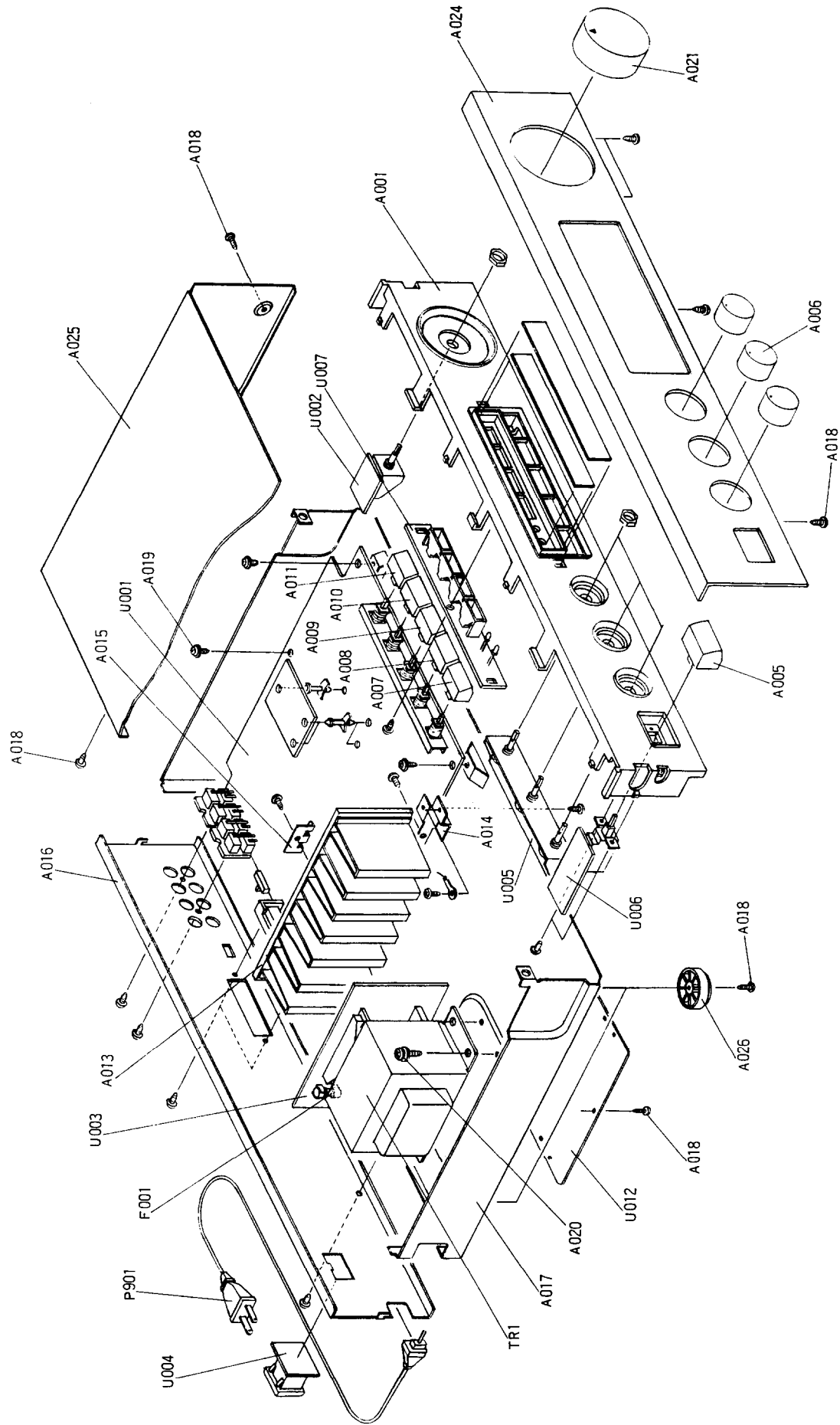
**μPC1237H (Protective Circuit)**



**NJM4558DX (Operation Amplifier)**



CHASSIS-EXPLODED VIEW



## CHASSIS-EXPLODED VIEW-PARTS LIST

| REF. NO. | PART NO.    | DESCRIPTION                                    | REF. NO. | PART NO.    | DESCRIPTION   |
|----------|-------------|--|----------|-------------|---|
| A001     | 27110584    | FRONT GUIDE PANEL ASS'Y                        | U005     | 1W065533-1  | NAETC-3933-1, VARIABLE RESISTOR (REAR), PC BOARD ASS'Y [D]  |
| (A002)   | 27110580    | GUIDE PANEL                                    |          |             |   |
| (A003)   | 28191564    | CLEAR PANEL                                    |          |             |   |
| (A004)   | 28133246    | BACK PLATE                                     |          | 1W065533-1A | NAETC-3933-1A, VARIABLE RESISTOR (REAR), PC BOARD ASS'Y [W] |
| A005     | 28323970    | KNOB (POW)                                     |          |             |   |
| A006     | 28323240    | KNOB (TONE)                                    |          |             |   |
| A007     | 28324053    | KNOB (DEL)                                     |          | 1W065533-1B | NAETC-3933-1B, VARIABLE RESISTOR (REAR), PC BOARD ASS'Y [A] |
| A008     | 28324054    | KNOB (DOL)                                     |          |             |   |
| A009     | 28324055    | KNOB (THEA)                                    | U006     | 1W065534-1  | NAETC-3934-1, POWER SWITCH PC BOARD ASS'Y [D]               |
| A010     | 28324056    | KNOB (HALL)                                    |          |             |   |
| A011     | 28324057    | KNOB (OFF)                                     |          |             |   |
| A012     | 27130618    | BRACKET (PT)                                   |          | 1W065534-1A | NAETC-3934-1A, POWER SWITCH PC BOARD ASS'Y [W]              |
| A013     | 27160260    | HEATSINK                                       |          |             |   |
| A014     | 27141406    | BRACKET (HEAT)                                 |          | 1W065534-1B | NAETC-3934-1B, POWER SWITCH PC BOARD ASS'Y [A]              |
| A015     | 27141407    | BRACKET (TR)                                   | U007     | 1W065535-1  | NADIS-3935-1, DISPLAY (LED) PC BOARD ASS'Y                  |
| A016     | 27121352    | REAR PANEL [D]                                 |          |             |   |
|          | 27121352-1  | REAR PANEL [W]                                 |          |             |   |
|          | 27121352-2  | REAR PANEL [A]                                 | U009     | 1W065548-1  | NASW-3948-1, SLIDE SWITCH PC BOARD ASS'Y [W]                |
| A017     | 27100217    | CHASSIS  |          |             |   |
| A018     | 838430088   | 3TTB+8BBC, TAPPING SCREW                       |          |             |   |
| A019     | 831130088   | 3TTW+8B, TAPPING SCREW                         |          |             |   |
| A020     | 801450      | 4SMP10WSW+10CBC, SPECIAL TAPPING SCREW         |          |             |   |
| A021     | 28323242A   | KNOB ASS'Y (VOL)                               |          |             |   |
| A024     | 27211215    | FRONT PANEL                                    |          |             |   |
| A025     | 28184461    | TOP COVER                                      |          |             |   |
| A026     | 27175217    | BOTTOM LEG                                     |          |             |   |
| ▲ TR-1   | 2300573     | NPT-1076D, POWER TRANSFORMER [D]               |          |             |   |
|          | 2300574     | NPT-1076DG, POWER TRANSFORMER [W]              |          |             |   |
|          | 2300575     | NPT-1076Q, POWER TRANSFORMER [A]               |          |             |   |
| ▲ P901   | 253165      | AS-UL/CSA(WP), POWER SUPPLY CABLE[D]           |          |             |   |
|          | 253154      | AS-EQ540-UW, POWER SUPPLY CABLE [W]            |          |             |   |
|          | 253155      | AS-EQ540-UQA, POWER SUPPLY CABLE [A]           |          |             |   |
| ▲ F1     | 252123      | 2A-UL-5TT, PRIMALY FUSE [D]                    |          |             |   |
|          | 252125      | T1.25A/250V, PRIMALY FUSE [A]                  |          |             |   |
| ▲ F2     | 252124      | T2A/250V, PRIMALY FUSE [W]                     |          |             |   |
| ▲ F3     | 252125      | T1.25A/250V, PRIMALY FUSE [W]                  |          |             |   |
| Q6, Q7   | 2211255     | 2SC1815GR, TRANSISTOR                          |          |             |   |
| Q8, Q9   | 2202303 OR  | 2SC4512O OR                                    |          |             |   |
|          | 2202304     | 2SC4512Y, TRANSISTOR                           |          |             |   |
| Q10, Q11 | 2202313 OR  | 2SA1726O OR                                    |          |             |   |
|          | 2202314     | 2SA1726Y, TRANSISTOR                           |          |             |   |
| U001     | 1W065529-1  | NAAF-3929-1, MAIN CIRCUIT PC BOARD ASS'Y [D]   |          |             |   |
|          | 1W065529-1A | NAAF-3929-1A, MAIN CIRCUIT PC BOARD ASS'Y [W]  |          |             |   |
|          | 1W065529-1B | NAAF-3929-1B, MAIN CIRCUIT PC BOARD ASS'Y [A]  |          |             |   |
| U002     | 1W065530-1  | NAETC-3930-1, MASTER VOLUME PC BOARD ASS'Y     |          |             |   |
| U003     | 1W065531-1  | NAETC-3931-1, FUSE CIRCUIT PC BOARD ASS'Y [D]  |          |             |   |
|          | 1W065531-1A | NAETC-3931-1A, FUSE CIRCUIT PC BOARD ASS'Y [W] |          |             |   |
|          | 1W065531-1B | NAETC-3931-1B, FUSE CIRCUIT PC BOARD ASS'Y [A] |          |             |   |
| U004     | 1W065532-1  | NAETC-3932-1, AC OUTLET PC BOARD ASS'Y         |          |             |   |

NOTE [D]: ONLY 120V MODEL  
[W]: ONLY 120V/220V MODEL  
[A]: ONLY AUSTRALIAN MODEL

NOTE: THE COMPONENTS IDENTIFIED BY MARK ▲ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

## 1. Preparations

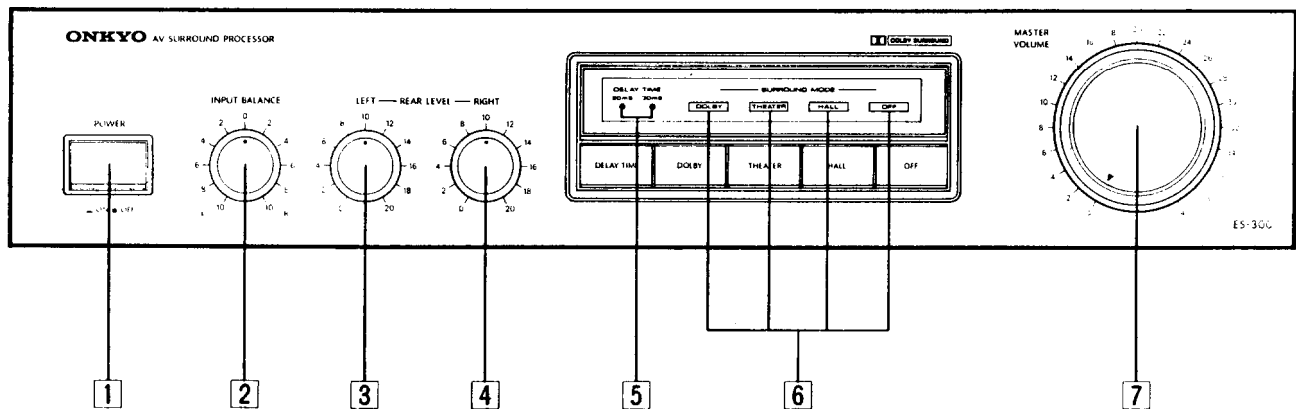
- 1) Place the unit on the workbench.
- 2) Set up the unit as follows.
  - (1) No load
  - (2) No signal
  - (3) Volume turned all the way down
  - (4) Power switch off

## 2. Adjustment of idling current

- 1) Turn the power switch ON and allow the unit to warm up for about 10 minutes.  
Adjust VR9 (VR10) so that the voltage at test point "BIAS" socket on the NAAF-3929 circuit board is 10 mV.

Note) Semi-fixed resistors enclosed in parentheses ( ) are for the right channel.

## FRONT PANEL FACILITIES



- 1] POWER Switch (POWER)**  
Press once to turn on the power. Press again to turn off the power.
- 2] INPUT BALANCE Control Knob (INPUT BALANCE)**  
Use this control to adjust the relative volume level of the left and right channel input. (For details, see Operations)
- 3] REAR LEVEL - LEFT Control Knob (REAR LEVEL - LEFT)**  
Use this control to adjust the volume level of the rear left channel speaker.
- 4] REAR LEVEL - RIGHT Control Knob (REAR LEVEL - RIGHT)**  
Use this control to adjust the volume level of the rear right channel speaker.
- 5] DELAY TIME Switch and Indicators (DELAY TIME)**  
When the Surround Mode is set to DOLBY, THEATER, or HALL, this switch can be used to set the delay time of the sound from the rear speakers to 20ms or 30ms. Select the delay time depending on the positions of the front and rear speakers to improve the sound effect.
- 6] SURROUND MODE Switches and Indicators**  
**DOLBY:** Press to produce a Dolby Surround effect for programs recorded by a Dolby Surround system.  
**THEATER:** Press to produce the acoustic effect of a movie theater.  
 The REAR signal is generated from the difference between the left and right channel signal levels. The rear speakers thus basically produce no sound when the input source is monaural (left=right), but will produce sound if the REAR-L and REAR-R input signals have different levels.  
**HALL:** Press to produce the acoustic effect of a concert hall.  
**OFF:** Press to disable the Surround effect (no sound is produced from the rear speakers).
- 7] MASTER VOLUME Control Knob (MASTER VOLUME)**  
Use this control to simultaneously adjust the volume level of both the front and rear speakers. If an ONKYO preamplifier with SURROUND jacks is connected and the MASTER GAIN switch is set to EXTERNAL, the overall volume cannot be adjusted by this control.



# PRINTED CIRCUIT BOARD PARTS LIST

## MAIN CIRCUIT PC BOARD (NAAF-3929-1, NAAF-3929-1A, NAAF-3929-1B)-PART LIST

| CIRCUIT NO.   | PART NO.              | DESCRIPTION               | CIRCUIT NO.            | PART NO.     | DESCRIPTION                          |
|---------------|-----------------------|---------------------------|------------------------|--------------|--------------------------------------|
|               | <b>PC board ass'y</b> |                           |                        |              |                                      |
| U008          | 1W065536-1            | NAAF-3936-1               | C67, C68               | 371124714    | 470pF, 50V, Mylar                    |
|               | <b>ICs</b>            |                           | C69, C70               | 354780229    | 2.2 $\mu$ F, 50V, Elect.             |
| IC1           | 222780125             | 78M12HF                   | C73, C74, C79          | 354781019    | 100 $\mu$ F, 50V, Elect.             |
| IC2           | 222790125             | 79M12HF                   | C80                    |              |                                      |
| IC3           | 22240360              | $\mu$ PC1237H             | C77, C78               | 371123334    | 0.033 $\mu$ F, 50V, Mylar            |
| IC4~IC6       | 222502                | NJM4558DX                 | C81, C82               | 375524734    | 0.047 $\mu$ F, 50V, Film (MMT)       |
| IC10~IC12     |                       |                           | C83                    | 354754709    | 47 $\mu$ F, 25V, Elect.              |
| IC14          |                       |                           | C84                    | 371121834    | 0.018 $\mu$ F, 50V, Mylar            |
| IC7           | 22240281              | YM3428                    | C111, C112             | 371122224    | 2200pF, 50V, Mylar                   |
| IC8           | 222780053             | 78L05                     |                        |              |                                      |
| IC13          | 22240139              | LA2730                    | <b>Resistors</b>       |              |                                      |
| IC15, IC16    | 22240359              | $\mu$ PC1270H             | R13                    | 442623914    | 390 $\Omega$ , 1W, Metal oxide film  |
|               | <b>Transistors</b>    |                           | R48, R128              | 442521004    | 10 $\Omega$ , 1/2W, Metal oxide film |
| Q1            | 2213284               | 2SC1740SR                 | R129, R138             |              |                                      |
| Q2            | 2213750               | DTA144ES                  | R139, R142             |              |                                      |
| Q3            | 2212205               | 2SA1175EF                 | R122, R123             | 4800048      | 0.22 $\Omega$ ×2, METAL PLATE        |
| Q4, Q5        | 2213683               | 2SC3327A                  | VR9, VR10              | 5210227      | N06HR500BC, Semi fixed               |
| Q12, Q13      | 2212215               | 2SC2785EF                 |                        |              |                                      |
| Q14, Q15      | 2213683               | 2SC3327A                  | <b>Switches</b>        |              |                                      |
|               | <b>Diodes</b>         |                           | SW1~SW5                | 25035626     | NPS-342-162-L584, Push switch        |
| D1            | 22380037              | KBU6DL                    | SW6                    | 25065395     | NSS-62149, Slide switch              |
| D2, D4, D12   | 223188                | MPG06B                    |                        |              |                                      |
| D3            | 223892                | DF02M                     | <b>Input terminals</b> |              |                                      |
| D5            | 224450512T            | MTZ5.1B, Zener            | 25045297               | NPJ-4PDBL156 |                                      |
| D7~D11        | 223172                | 1SS131                    | <b>Terminal</b>        |              |                                      |
| D15, D16      |                       |                           | 25060150               | NTM-4PDML078 |                                      |
|               | <b>Coils</b>          |                           | <b>Plugs</b>           |              |                                      |
| L1, L2        | 231174                | S-1.0A                    | 25055100               | NPLG-3P84    |                                      |
|               | <b>Osc. element</b>   |                           | 25055146               | NPLG-2P130   |                                      |
| X1            | 3010162               | KBR3.5MES                 | <b>Relay</b>           |              |                                      |
|               | <b>Capacitors</b>     |                           | RL1                    | 25065389     | NRL-2P2A-DC24-064                    |
| C1, C2        | 354751029             | 1000 $\mu$ F, 25V, Elect. | <b>Jumper sockets</b>  |              |                                      |
| C3, C4        | 354741019             | 100 $\mu$ F, 16V, Elect.  | 25050142               | NJPS-5P-S    |                                      |
| C5, C32       | 354752219             | 220 $\mu$ F, 25V, Elect.  | 25050143               | NJPS-6P-S    |                                      |
| C7, C8        | 3500126               | 6800 $\mu$ F, 50V, Elect. | 25050144               | NJPS-7P-S    |                                      |
| C9, C31       | 354780479             | 4.7 $\mu$ F, 50V, Elect.  | <b>Sockets ass'y</b>   |              |                                      |
| C10           | 354732219             | 220 $\mu$ F, 10V, Elect.  | CN51                   | 2009990101   | NSAS-6P0141                          |
| C11           | 354782209             | 22 $\mu$ F, 50V, Elect.   | CN54, CN56             | 2009990100   | NSAS-4P0140                          |
| C12           | 354781009             | 10 $\mu$ F, 50V, Elect.   | <b>Heatsink</b>        |              |                                      |
| C16, C17, C22 | 354780109             | 1 $\mu$ F, 50V, Elect.    | 27160256               |              |                                      |
| C37, C38, C48 |                       |                           | <b>Holder</b>          |              |                                      |
| C51, C59      |                       |                           | 27190781               | Holder (PC)  |                                      |
| C89~C91       |                       |                           |                        |              |                                      |
| C23, C26, C39 | 371121524             | 1500pF, 50V, Mylar        |                        |              |                                      |
| C40           |                       |                           |                        |              |                                      |
| C25, C28, C43 | 371124724             | 4700pF, 50V, Mylar        |                        |              |                                      |
| C44, C53, C58 |                       |                           |                        |              |                                      |
| C30           | 371121024             | 1000pF, 50V, Mylar        |                        |              |                                      |
| C33           | 354734709             | 47 $\mu$ F, 10V, Elect.   |                        |              |                                      |
| C46           | 371121834             | 0.018 $\mu$ F, 50V, Mylar |                        |              |                                      |
| C47           | 371121824             | 1800pF, 50V, Mylar        |                        |              |                                      |
| C49           | 354783399             | 0.33 $\mu$ F, 50V, Elect. |                        |              |                                      |
| C50           | 354781099             | 0.1 $\mu$ F, 50V, Elect.  |                        |              |                                      |
| C52           | 371123334             | 0.033 $\mu$ F, 50V, Mylar |                        |              |                                      |
| C54           | 371122734             | 0.027 $\mu$ F, 50V, Mylar |                        |              |                                      |
| C55           | 354742209             | 22 $\mu$ F, 16V, Elect.   |                        |              |                                      |
| C56, C71, C72 | 354741019             | 100 $\mu$ F, 16V, Elect.  |                        |              |                                      |
| C57, C88, C92 | 354741009             | 10 $\mu$ F, 16V, Elect.   |                        |              |                                      |
| C60~C64       |                       |                           |                        |              |                                      |

## MASTER VOLUME PC BOARD (NAETC-3930-1)-PART LIST

| CIRCUIT NO.   | PART NO.         | DESCRIPTION      |
|---------------|------------------|------------------|
|               | <b>Resistors</b> |                  |
| VR4 (VR5~VR7) | 5104273          | N16RGL50KA20F    |
|               | <b>Plate</b>     |                  |
|               | 27150303         | Shield plate (B) |

**FUSE CIRCUIT PC BOARD (NAETC-3931-1, NAETC-3931-1A, NAETC-3931-1B)-PART LIST**

| CIRCUIT NO. | PART NO.                           | DESCRIPTION             |
|-------------|------------------------------------|-------------------------|
| △ C100      | <b>Capacitor</b><br>3500077        | 4700pF, AC400V/125V, IS |
|             | <b>Fuse holder</b><br>27190765     | [W]                     |
|             | <b>Fuse label</b><br>29361263      | T1.25A/250V [A]         |
| F1a         | <b>Plug</b><br>25055490            | NPLG-2P465              |
| CN7<br>CN10 | <b>Sockets ass'y</b><br>2009990095 | NSAS-6P0134             |
|             | 2009990096                         | NSAS-6P0135             |

**AC OUTLET PC BOARD (NAETC-3932-1)-PART LIST**

| CIRCUIT NO. | PART NO.                  | DESCRIPTION |
|-------------|---------------------------|-------------|
|             | <b>Outlet</b><br>25050411 | NSCT-2P236  |

**VARIABLE RESISTOR (REAR) PC BOARD (NAETC-3933-1, NAETC-3933-1A, NAETC-3933-1B)-PART LIST**

| CIRCUIT NO.     | PART NO.                    | DESCRIPTION                |
|-----------------|-----------------------------|----------------------------|
| VR1<br>VR2, VR3 | <b>Resistors</b><br>5146056 | N16RLC200KBTP20F, Variable |
|                 | 5146057                     | N16RL100KA20F, Variable    |
|                 | <b>Plate</b><br>27150302    | Shield plate (A)           |
| CN13            | <b>Socket</b><br>2009990102 | NSAS-6P0142                |

**POWER SWITCH PC BOARD (NAETC-3934-1, NAETC-3934-1A, NAETC-3934-1B)-PART LIST**

| CIRCUIT NO. | PART NO.                          | DESCRIPTION         |
|-------------|-----------------------------------|---------------------|
| △ C13       | <b>Capacitor</b><br>3500065A      | 0.01μF, AC400V/125V |
|             | <b>Switch</b><br>25035627         | NPS-111-L585P       |
| △ SW7       | <b>Socket ass'y</b><br>2009990093 | NSAS-2P0132         |

**DISPLAY PC BOARD (NADIS-3935-1)-PART LIST**

| CIRCUIT NO.   | PART NO.                  | DESCRIPTION      |
|---------------|---------------------------|------------------|
| <b>Diodes</b> |                           |                  |
| LED1          | 225227                    | SLV-31VC, LED    |
| LED2~LED4     | 225228L                   | SLV-31MC(L), LED |
| LED5, LED6    | 225261                    | SLR-34MC, LED    |
|               | <b>Holder</b><br>27190773 | LED holder       |

**EXPANDER CIRCUIT PC BOARD (NAAF-3936-1)-PART LIST**

| CIRCUIT NO.       | PART NO.  | DESCRIPTION         |
|-------------------|-----------|---------------------|
| <b>ICs</b>        |           |                     |
| IC9               | 222502    | NJM-4558DX          |
| IC17              | 22240131  | μPC1571C            |
| <b>Capacitors</b> |           |                     |
| C29, C97          | 354780109 | 1μF, 50V, Elect.    |
| C45, C101         | 354741009 | 10μF, 16V, Elect.   |
| C102, C106        |           |                     |
| C95, C96, C103    | 354782299 | 0.22μF, 50V, Elect. |
| C105              | 354742209 | 22μF, 16V, Elect.   |

**SLIDE SWITCH PC BOARD (NASW-3948-1)-PART LIST**

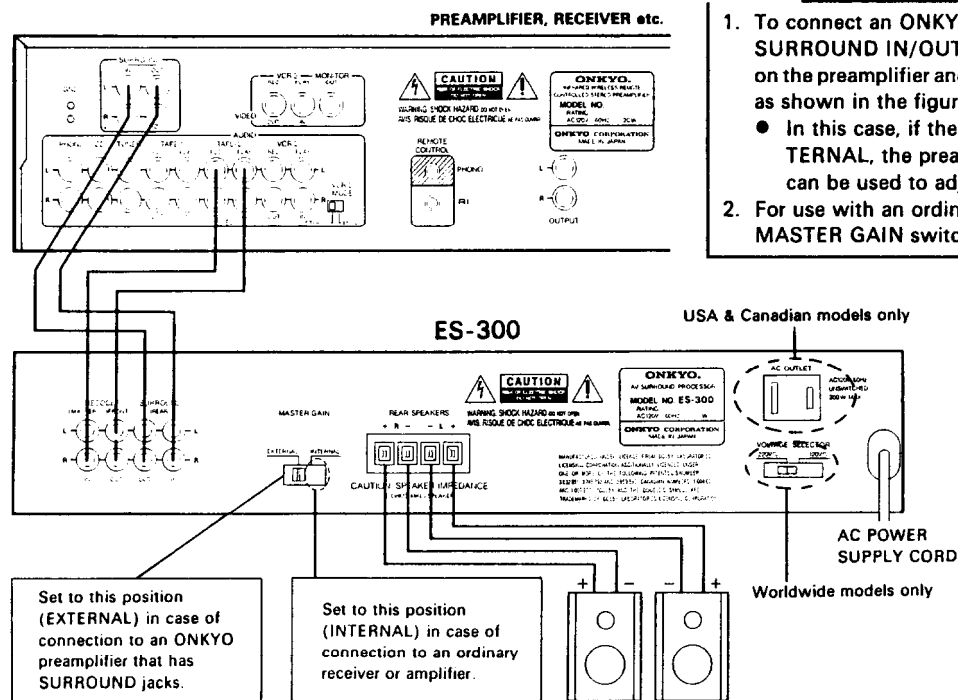
| CIRCUIT NO. | PART NO.                    | DESCRIPTION                |
|-------------|-----------------------------|----------------------------|
|             | <b>Switch</b><br>△ 25065228 | NSS-2299, Slide switch [W] |

NOTE [D]: Only 120V model  
[W]: Only 120V/220V model  
[A]: Only Australian model

NOTE: THE COMPONENTS IDENTIFIED BY MARK △ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

# SYSTEM CONNECTIONS

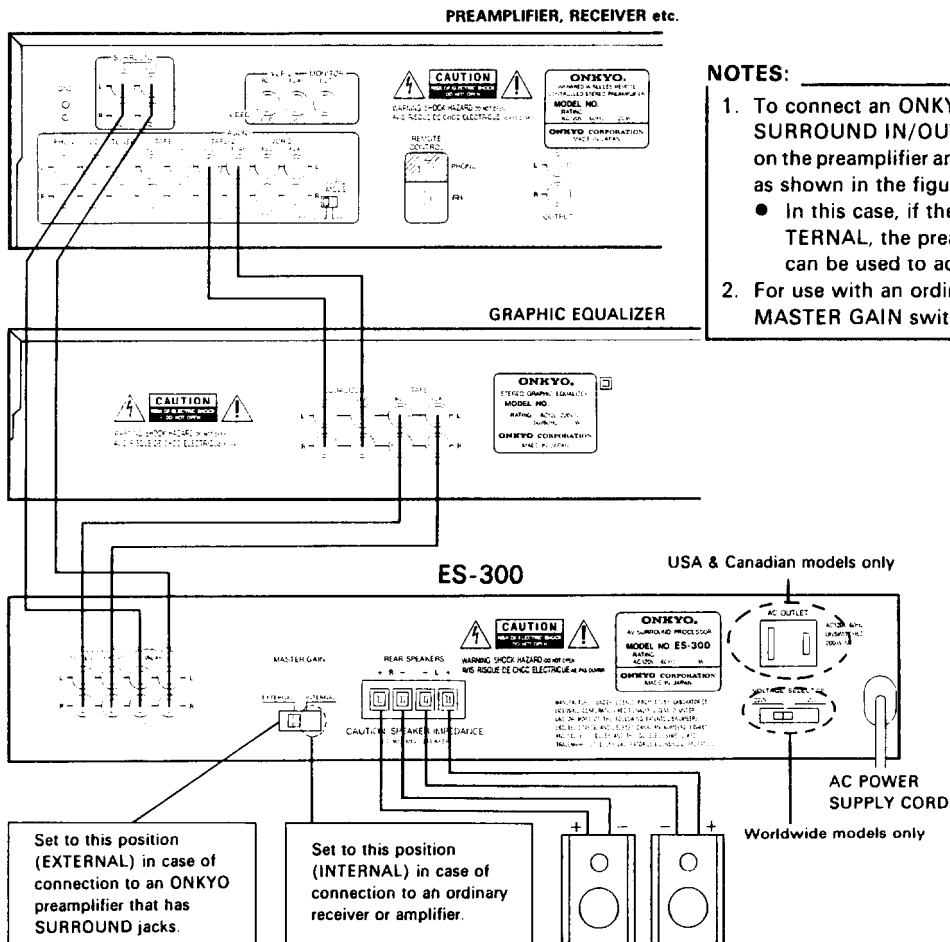
● Standard Connection Procedures



**NOTES:**

1. To connect an ONKYO preamplifier that is equipped with SURROUND IN/OUT jacks, connect the SURROUND jacks on the preamplifier and on the AV SURROUND PROCESSOR as shown in the figure.
  - In this case, if the MASTER GAIN switch is set to EXTERNAL, the preamplifier's MASTER VOLUME control can be used to adjust the volume of the rear speakers.
2. For use with an ordinary amplifier or receiver, leave the MASTER GAIN switch set to INTERNAL.

● To connect the AV SURROUND PROCESSOR to a GRAPHIC EQUALIZER:



**NOTES:**

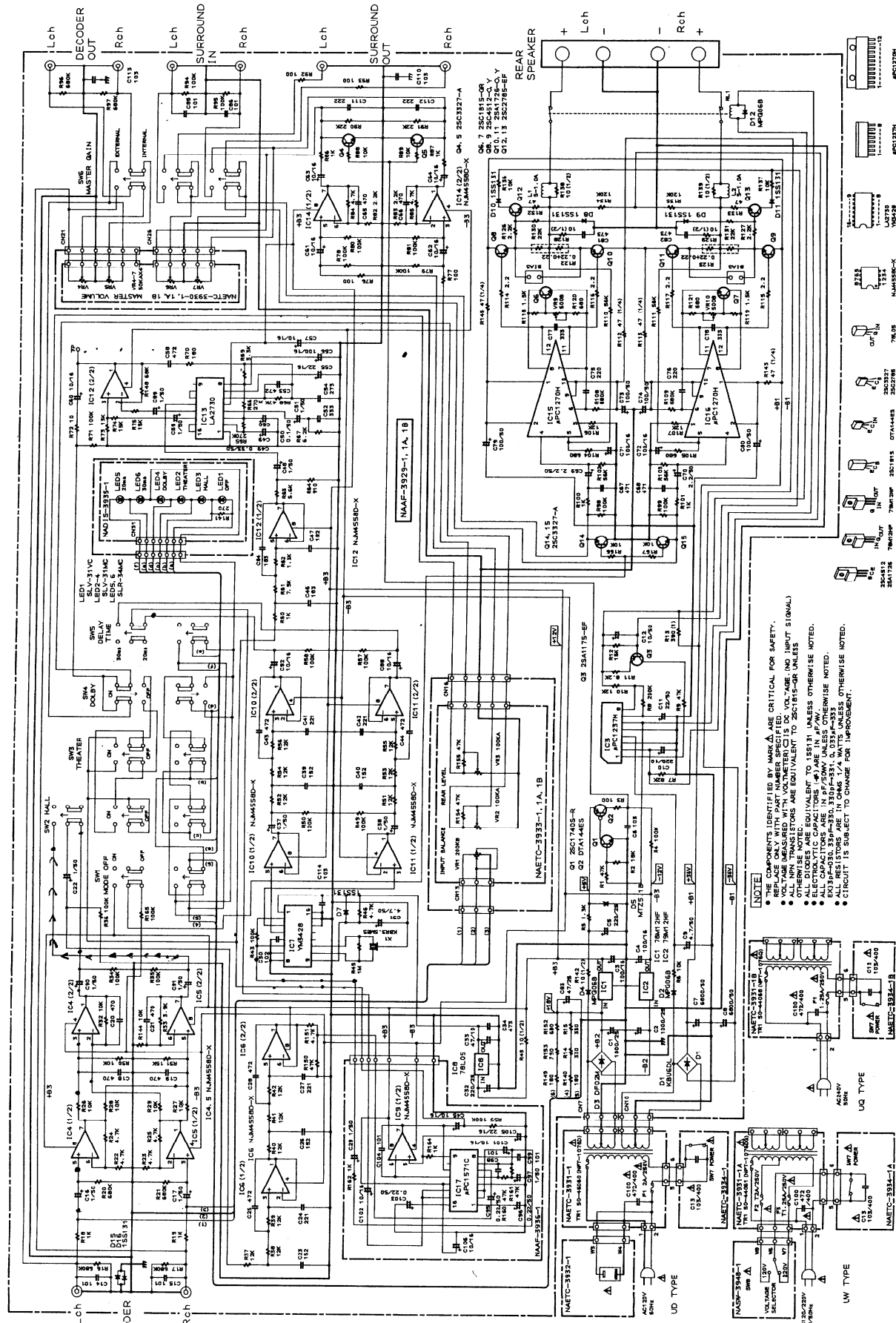
1. To connect an ONKYO preamplifier that is equipped with SURROUND IN/OUT jacks, connect the SURROUND jacks on the preamplifier and on the AV SURROUND PROCESSOR as shown in the figure.
  - In this case, if the MASTER GAIN switch is set to EXTERNAL, the preamplifier's MASTER VOLUME control can be used to adjust the volume of the rear speakers.
2. For use with an ordinary amplifier or receiver, leave the MASTER GAIN switch set to INTERNAL.

SCHEMATIC DIAGRAM

ES-300

Model ES-300

A B C D E F G



**NOTE**

- THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY.
- USE ONLY PART NUMBERS SPECIFIED UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1815-OR UNLESS OTHERWISE NOTED.
- ALL DIODES ARE EQUIVALENT TO 1N4148 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (C) ARE IN μF/WV UNLESS OTHERWISE NOTED.
- EXCEPT 400 Ω 1/4 WATT RESISTORS ARE IN Ω/WATT UNLESS OTHERWISE NOTED.
- ALL RESISTORS ARE IN Ω/WATT UNLESS OTHERWISE NOTED.
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.


- IC1, IC2, IC3, IC4, IC5, IC6, IC7, IC8, IC9, IC10, IC11, IC12: NAAAF-3923-1, 1A, 1B
- IC13: MAETC-3934-1A, 1B
- IC14: MAETC-3934-1A, 1B
- IC15: MAETC-3934-1A, 1B
- IC16: MAETC-3934-1A, 1B
- IC17: MAETC-3934-1A, 1B
- IC18: MAETC-3934-1A, 1B
- IC19: MAETC-3934-1A, 1B
- IC20: MAETC-3934-1A, 1B
- IC21: MAETC-3934-1A, 1B
- IC22: MAETC-3934-1A, 1B
- IC23: MAETC-3934-1A, 1B
- IC24: MAETC-3934-1A, 1B
- IC25: MAETC-3934-1A, 1B
- IC26: MAETC-3934-1A, 1B
- IC27: MAETC-3934-1A, 1B
- IC28: MAETC-3934-1A, 1B
- IC29: MAETC-3934-1A, 1B
- IC30: MAETC-3934-1A, 1B
- IC31: MAETC-3934-1A, 1B
- IC32: MAETC-3934-1A, 1B
- IC33: MAETC-3934-1A, 1B
- IC34: MAETC-3934-1A, 1B
- IC35: MAETC-3934-1A, 1B
- IC36: MAETC-3934-1A, 1B
- IC37: MAETC-3934-1A, 1B
- IC38: MAETC-3934-1A, 1B
- IC39: MAETC-3934-1A, 1B
- IC40: MAETC-3934-1A, 1B
- IC41: MAETC-3934-1A, 1B
- IC42: MAETC-3934-1A, 1B
- IC43: MAETC-3934-1A, 1B
- IC44: MAETC-3934-1A, 1B
- IC45: MAETC-3934-1A, 1B
- IC46: MAETC-3934-1A, 1B
- IC47: MAETC-3934-1A, 1B
- IC48: MAETC-3934-1A, 1B
- IC49: MAETC-3934-1A, 1B
- IC50: MAETC-3934-1A, 1B
- IC51: MAETC-3934-1A, 1B
- IC52: MAETC-3934-1A, 1B
- IC53: MAETC-3934-1A, 1B
- IC54: MAETC-3934-1A, 1B
- IC55: MAETC-3934-1A, 1B
- IC56: MAETC-3934-1A, 1B
- IC57: MAETC-3934-1A, 1B
- IC58: MAETC-3934-1A, 1B
- IC59: MAETC-3934-1A, 1B
- IC60: MAETC-3934-1A, 1B
- IC61: MAETC-3934-1A, 1B
- IC62: MAETC-3934-1A, 1B
- IC63: MAETC-3934-1A, 1B
- IC64: MAETC-3934-1A, 1B
- IC65: MAETC-3934-1A, 1B
- IC66: MAETC-3934-1A, 1B
- IC67: MAETC-3934-1A, 1B
- IC68: MAETC-3934-1A, 1B
- IC69: MAETC-3934-1A, 1B
- IC70: MAETC-3934-1A, 1B
- IC71: MAETC-3934-1A, 1B
- IC72: MAETC-3934-1A, 1B
- IC73: MAETC-3934-1A, 1B
- IC74: MAETC-3934-1A, 1B
- IC75: MAETC-3934-1A, 1B
- IC76: MAETC-3934-1A, 1B
- IC77: MAETC-3934-1A, 1B
- IC78: MAETC-3934-1A, 1B
- IC79: MAETC-3934-1A, 1B
- IC80: MAETC-3934-1A, 1B
- IC81: MAETC-3934-1A, 1B
- IC82: MAETC-3934-1A, 1B
- IC83: MAETC-3934-1A, 1B
- IC84: MAETC-3934-1A, 1B
- IC85: MAETC-3934-1A, 1B
- IC86: MAETC-3934-1A, 1B
- IC87: MAETC-3934-1A, 1B
- IC88: MAETC-3934-1A, 1B
- IC89: MAETC-3934-1A, 1B
- IC90: MAETC-3934-1A, 1B
- IC91: MAETC-3934-1A, 1B
- IC92: MAETC-3934-1A, 1B
- IC93: MAETC-3934-1A, 1B
- IC94: MAETC-3934-1A, 1B
- IC95: MAETC-3934-1A, 1B
- IC96: MAETC-3934-1A, 1B
- IC97: MAETC-3934-1A, 1B
- IC98: MAETC-3934-1A, 1B
- IC99: MAETC-3934-1A, 1B
- IC100: MAETC-3934-1A, 1B
- IC101: MAETC-3934-1A, 1B
- IC102: MAETC-3934-1A, 1B
- IC103: MAETC-3934-1A, 1B
- IC104: MAETC-3934-1A, 1B
- IC105: MAETC-3934-1A, 1B
- IC106: MAETC-3934-1A, 1B
- IC107: MAETC-3934-1A, 1B
- IC108: MAETC-3934-1A, 1B
- IC109: MAETC-3934-1A, 1B
- IC110: MAETC-3934-1A, 1B
- IC111: MAETC-3934-1A, 1B
- IC112: MAETC-3934-1A, 1B
- IC113: MAETC-3934-1A, 1B
- IC114: MAETC-3934-1A, 1B
- IC115: MAETC-3934-1A, 1B
- IC116: MAETC-3934-1A, 1B
- IC117: MAETC-3934-1A, 1B
- IC118: MAETC-3934-1A, 1B
- IC119: MAETC-3934-1A, 1B
- IC120: MAETC-3934-1A, 1B
- IC121: MAETC-3934-1A, 1B
- IC122: MAETC-3934-1A, 1B
- IC123: MAETC-3934-1A, 1B
- IC124: MAETC-3934-1A, 1B
- IC125: MAETC-3934-1A, 1B
- IC126: MAETC-3934-1A, 1B
- IC127: MAETC-3934-1A, 1B
- IC128: MAETC-3934-1A, 1B
- IC129: MAETC-3934-1A, 1B
- IC130: MAETC-3934-1A, 1B
- IC131: MAETC-3934-1A, 1B
- IC132: MAETC-3934-1A, 1B
- IC133: MAETC-3934-1A, 1B
- IC134: MAETC-3934-1A, 1B
- IC135: MAETC-3934-1A, 1B
- IC136: MAETC-3934-1A, 1B
- IC137: MAETC-3934-1A, 1B
- IC138: MAETC-3934-1A, 1B
- IC139: MAETC-3934-1A, 1B
- IC140: MAETC-3934-1A, 1B
- IC141: MAETC-3934-1A, 1B
- IC142: MAETC-3934-1A, 1B
- IC143: MAETC-3934-1A, 1B
- IC144: MAETC-3934-1A, 1B
- IC145: MAETC-3934-1A, 1B
- IC146: MAETC-3934-1A, 1B
- IC147: MAETC-3934-1A, 1B
- IC148: MAETC-3934-1A, 1B
- IC149: MAETC-3934-1A, 1B
- IC150: MAETC-3934-1A, 1B
- IC151: MAETC-3934-1A, 1B
- IC152: MAETC-3934-1A, 1B
- IC153: MAETC-3934-1A, 1B
- IC154: MAETC-3934-1A, 1B
- IC155: MAETC-3934-1A, 1B
- IC156: MAETC-3934-1A, 1B
- IC157: MAETC-3934-1A, 1B
- IC158: MAETC-3934-1A, 1B
- IC159: MAETC-3934-1A, 1B
- IC160: MAETC-3934-1A, 1B
- IC161: MAETC-3934-1A, 1B
- IC162: MAETC-3934-1A, 1B
- IC163: MAETC-3934-1A, 1B
- IC164: MAETC-3934-1A, 1B
- IC165: MAETC-3934-1A, 1B
- IC166: MAETC-3934-1A, 1B
- IC167: MAETC-3934-1A, 1B
- IC168: MAETC-3934-1A, 1B
- IC169: MAETC-3934-1A, 1B
- IC170: MAETC-3934-1A, 1B
- IC171: MAETC-3934-1A, 1B
- IC172: MAETC-3934-1A, 1B
- IC173: MAETC-3934-1A, 1B
- IC174: MAETC-3934-1A, 1B
- IC175: MAETC-3934-1A, 1B
- IC176: MAETC-3934-1A, 1B
- IC177: MAETC-3934-1A, 1B
- IC178: MAETC-3934-1A, 1B
- IC179: MAETC-3934-1A, 1B
- IC180: MAETC-3934-1A, 1B
- IC181: MAETC-3934-1A, 1B
- IC182: MAETC-3934-1A, 1B
- IC183: MAETC-3934-1A, 1B
- IC184: MAETC-3934-1A, 1B
- IC185: MAETC-3934-1A, 1B
- IC186: MAETC-3934-1A, 1B
- IC187: MAETC-3934-1A, 1B
- IC188: MAETC-3934-1A, 1B
- IC189: MAETC-3934-1A, 1B
- IC190: MAETC-3934-1A, 1B
- IC191: MAETC-3934-1A, 1B
- IC192: MAETC-3934-1A, 1B
- IC193: MAETC-3934-1A, 1B
- IC194: MAETC-3934-1A, 1B
- IC195: MAETC-3934-1A, 1B
- IC196: MAETC-3934-1A, 1B
- IC197: MAETC-3934-1A, 1B
- IC198: MAETC-3934-1A, 1B
- IC199: MAETC-3934-1A, 1B
- IC200: MAETC-3934-1A, 1B

ONKYO CORPORATION

# PACKING PARTS LIST

| REF. NO. | PART NO.                   | DESCRIPTION                 |
|----------|----------------------------|-----------------------------|
| A851     | 29052075                   | Master carton box           |
| A852     | 29091420                   | Pad                         |
| A853     | 29100110                   | 800 × 450, Poly-vinyl bag   |
| A854     | 29110077-1                 | Damplon tape                |
| A855     | 282301                     | Sealing hook                |
|          | <b>ACCESSARY BAG ASS'Y</b> |                             |
| A891     | 29341518                   | Instruction manual          |
| A893     | 2010112                    | Connection cable            |
| A896     | 29100006A                  | 250 × 360, Poly-vinyl bag   |
|          | 29365019                   | Warranty card [N]           |
|          | 29358002H                  | Service station list [N]    |
|          | 25055040                   | CV-K-2, Conversion plug [W] |

NOTE [N]: Only U.S.A. model  
 [W]: Only 120V/220V model

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