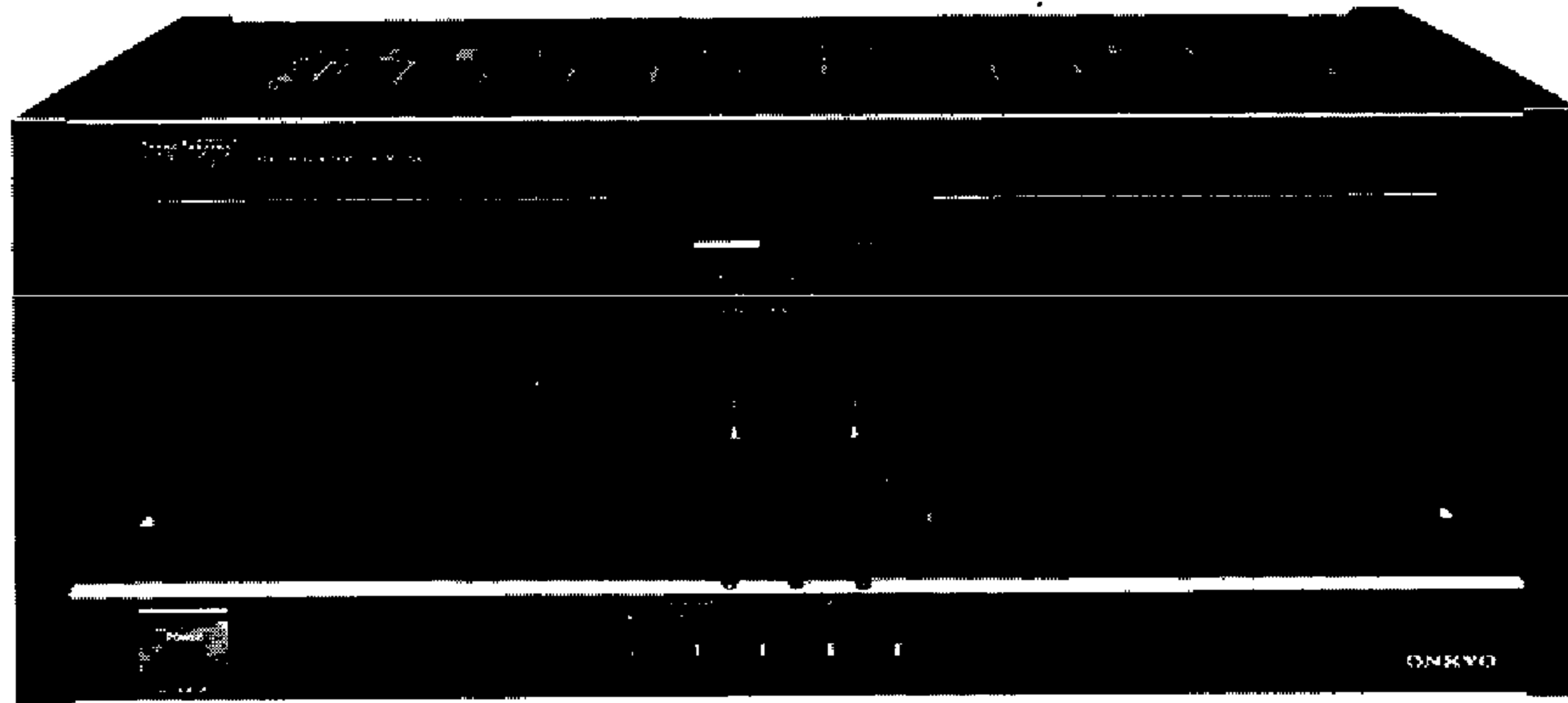


# ONKYO SERVICE MANUAL

## Stereo Power Amplifier

### MODEL M-508



|    |                          |
|----|--------------------------|
| UD | 120V AC, 60Hz            |
| UG | 220V AC, 50Hz            |
| UQ | 240V AC, 50Hz            |
| UW | 120V or 220V AC, 50/60Hz |

#### 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.



# SPECIFICATIONS

|                             |                                                                                                                                                                                    |                                      |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Music Power Output:         | 2 x 450 watts at 4 ohms, 1 kHz (DIN)                                                                                                                                               | 2 x 260 watts at 8 ohms, 1 kHz (DIN) |
| Continuous Power Output:    | 2 x 315 watts at 4 ohms, 1 kHz (DIN)                                                                                                                                               | 2 x 215 watts at 8 ohms, 1 kHz (DIN) |
|                             | 200 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20 Hz to 20 kHz, with no more than 0.003% THD                                                               |                                      |
| Total harmonic distortion:  | 0.003% at rated power                                                                                                                                                              |                                      |
|                             | 0.003% at 1 watt output                                                                                                                                                            |                                      |
| Intermodulation distortion: | 0.003% at rated power                                                                                                                                                              |                                      |
| Frequency response:         | +0, -1.5 dB at 1 Hz to 100kHz                                                                                                                                                      |                                      |
| Input sensitivity:          | 1.0V                                                                                                                                                                               |                                      |
| Input impedance:            | 20kohms                                                                                                                                                                            |                                      |
| Damping factor:             | 140 (8 ohms, 1 kHz)                                                                                                                                                                |                                      |
| S/N ratio:                  | 120 dB (IHFA, Shorted)                                                                                                                                                             |                                      |
| Outputs:                    | SPEAKERS 1 & 2, AC OUTLET (120V models only)                                                                                                                                       |                                      |
| Inputs:                     | INPUT (VARIABLE, DIRECT)                                                                                                                                                           |                                      |
| Power Supply:               | European models: AC 220V, 50Hz<br>Canadian models: AC 120V, 60Hz<br>British and Australian models: AC 240V, 50Hz<br>Worldwide models: AC 120V, 60Hz<br>(Switchable): AC 220V, 50Hz |                                      |
| Dimensions:                 | 465(W) x 185(H) x 426(D) mm.<br>18 5/16" x 7 9/32" x 16 25/32"                                                                                                                     |                                      |
| Weight:                     | 25 kg, (55.1 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                                           |
|-------------|----------|-------------------------------------------------------|
| F801, F802  | 252052   | 7A (ST-6), Primary fuse (120V, 120V/220V model)       |
| F803, F804  | 252077   | 4A-SE-EAK, Primary fuse (220V, 120V/220V, 240V model) |
| F702        | 252044   | 2A (ST-6), Secondary fuse (120V, 120V/220V model)     |
| F702        | 252074   | 2A-SE-EAK, Secondary fuse (220V, 240V model)          |

### 2. Replacing the lamp

This unit uses the lamp listed below.

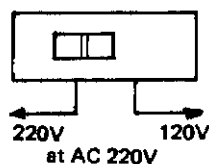
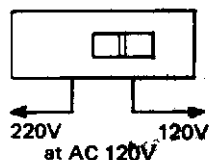
| CIRCUIT NO.  | PARTS NO. | DESCRIPTION          |
|--------------|-----------|----------------------|
| PL881, PL882 | 210191    | PL14V 150mA (Green)  |
| PL883, PL884 |           |                      |
| PL885, PL886 | 210192    | PL14V 150mA (Orange) |
| PL887, PL888 |           |                      |

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

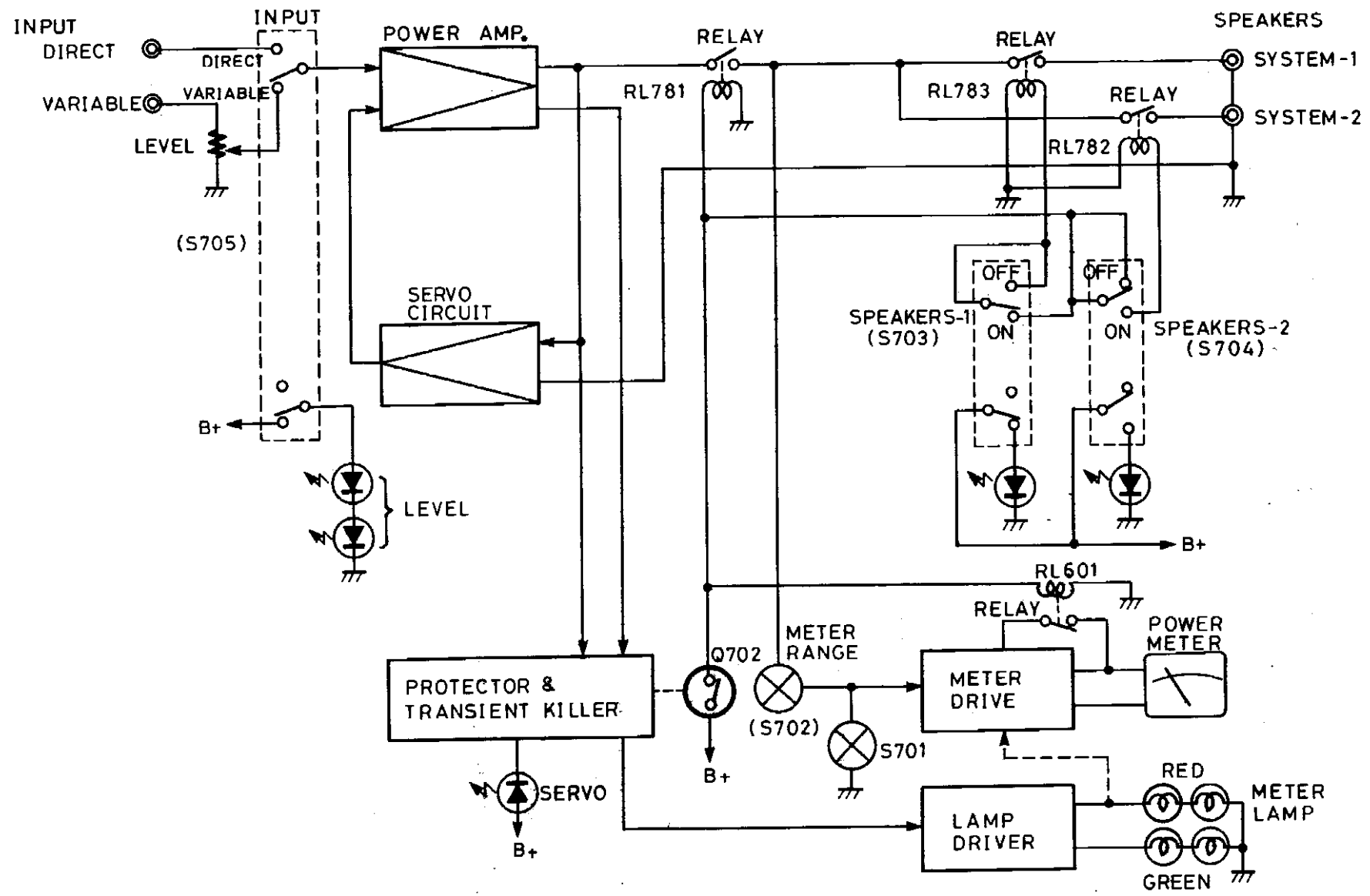
Connect the insulating-resistance tester between the plug of power supply cable and the terminal GND on the back panel. Specifications; More than 10 MΩ at 500V.

### 4. 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 or similar instrument to the up or down position. Confirm that the switch has been moved all the way to the up or down before turning the power switch on. If there is no voltage selector switch on the unit you have purchased, it can only be used in areas where the power supply voltage is the same as that of the unit.



# BLOCK DIAGRAM



# ADJUSTMENT PROCEDURES

## 1. Preparation

- (1) Leave the machine in a normal condition parallel to the work bench, maintaining a clearance of 15mm from the bottom for air circulation.
- (2) Set the level to minimum with no load and no signal.
- (3) When making the adjustment, there must be no breeze blowing from the outside.

## 2. Zero adjustment of meter

- (1) Turn power OFF.
- (2) Make the adjustment with the zero adjustment knob to set the meter needle to zero.

Caution: Do not make the adjustment immediately after turning off the power.

## 3. Adjustment of idling current

- (1) Turn ON the power switch, and leave the unit as is for about 5 minutes.
- (2) Adjust the semi-fixed resistor R423 (R424) so that the voltage between the terminals  $V_{CT}$  and  $I_{ID}$  of the printed circuit board NAPA-2625 is 5mV.

## 4. Meter circuit offset adjustment

- (1) Adjust the semi-fixed resistor R645 (R646) of the printed circuit board NAMA-2615 so that the meter needle is at zero.

## 5. Meter circuit level adjustment

- (1) Input the 1kHz signal from the low frequency oscillator so that the amplifier output is 12.65V (22.0db).
- (2) Adjust the semi-fixed resistor R613 (R614) of the printed circuit board NAMA-2615 so that the meter needle is at 0db.

Caution: The adjustment must be made while inputting the signal to a each single channel of the L and R channels.

## 6. Operating check of protection circuit

- (1) When the power switch is turned ON,
  - 1) Even though there is a signal input, the meter should have no deflection.
    - The meter lighting lamps PL885, PL886, PL887, and PL888 (red) light.
    - SERVO OPERATION LED does not light.
  - 2) After about 5 minutes, relay RL781 of the NAOP-2619 printed circuit board and relay RL601 of NAMA-2615 go ON.
    - SERVO OPERATION LED lights.
    - The meter lighting lamps change to PL881, PL882, PL883, and PL884 (green).
    - When SPEAKER SWITCH 1 and 2 are turned ON, relay RL782 and RL783 go ON.
    - The meter needle deflects in response to the signal.
- (2) When the power is turned OFF,
  - Immediately all relays go OFF.

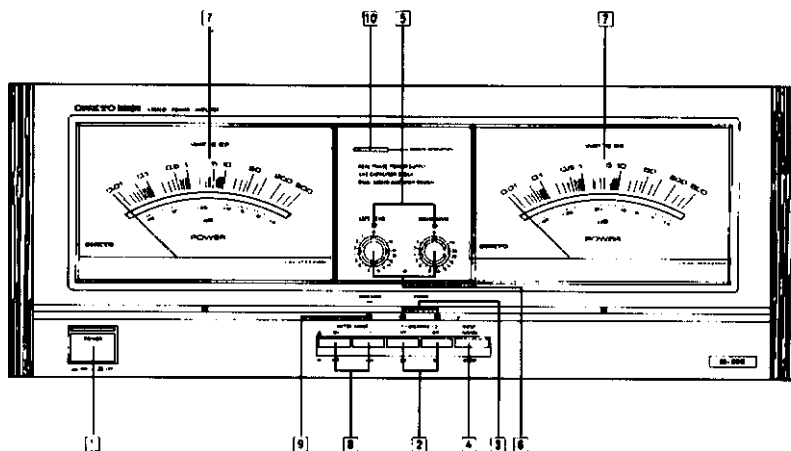
## 7. Check of direct current detection circuit of protection circuit

- (1) With no load, when 1V DC is input, the speaker relay operates, the SERVO OPERATION LED goes out, and the meter lighting lamps change to red.
- (2) Make the same check with -1V DC.

Caution: During this test, there should be absolutely no load connected and the load terminals must not be shorted.

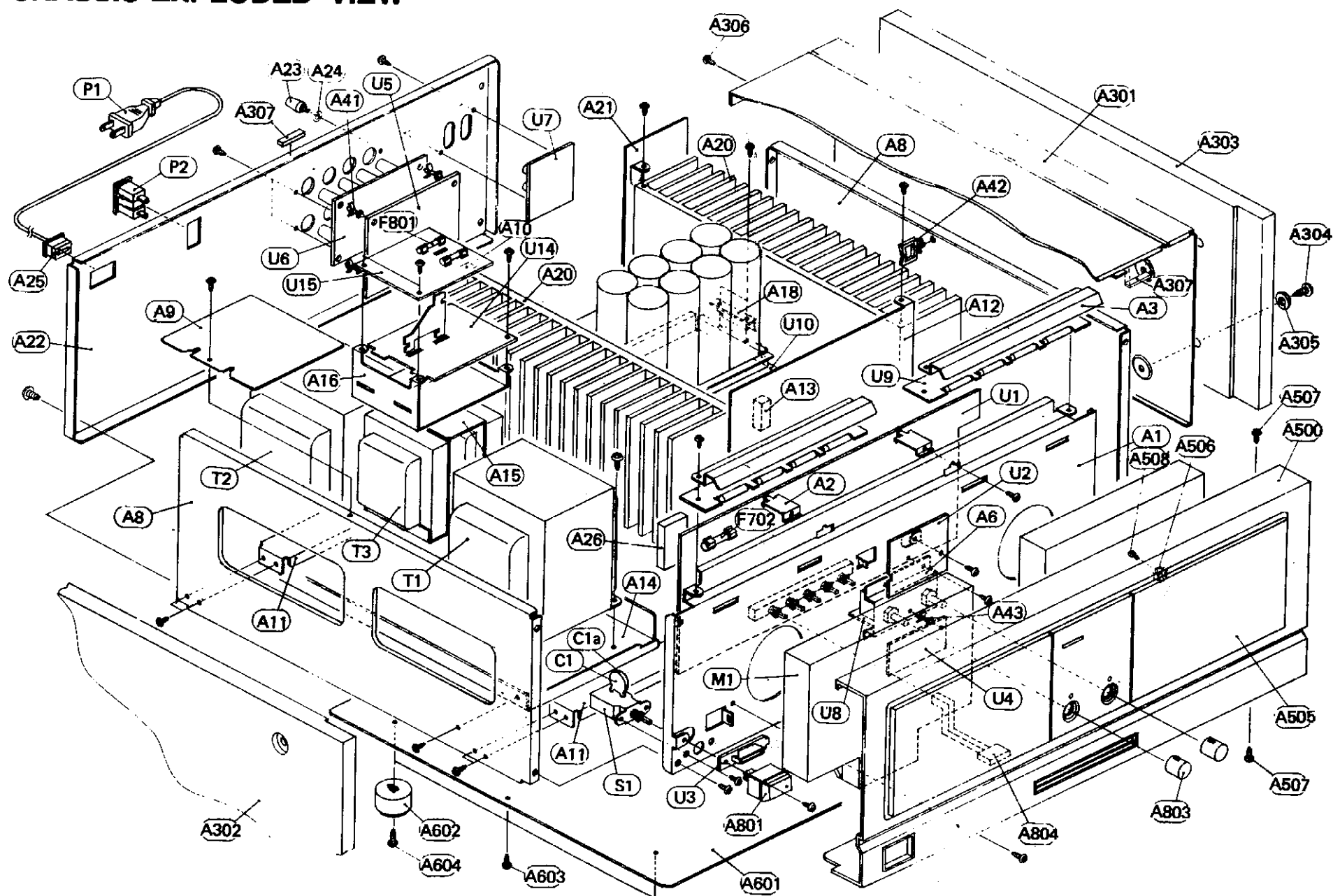
Note: When the protection circuit operates due to an abnormality in the circuit, after several seconds, the protection circuit holds. Also, even after the cause of the abnormality is eliminated, the circuit is held as is. To cancel, turn the power OFF for several minutes.

# FRONT PANEL FACILITIES



1. Power Switch (POWER)
2. Speaker Selector Switches (SPEAKERS)
3. Speaker Selector Indicators (SPEAKERS)
4. Input Selector Switch (INPUT)
5. Input Selector Indicators
6. Level Controls (LEFT/RIGHT LEVEL)
7. Peak Power Meters
8. Meter Range Selector Switches (METER RANGE)
9. Meter Range Indicator (METER RANGE)
10. Servo Operation Indicator (SERVO OPERATION)

# CHASSIS-EXPLODED VIEW



# CHASSIS-EXPLODED VIEW-PARTS LIST

| REF NO. | PARTS NO.   | DESCRIPTION                         |
|---------|-------------|-------------------------------------|
| A1      | 27110285A   | Front bracket                       |
| A2      | 27141064    | Bracket (FPC)                       |
| A3      | 27141065A   | Bracket (LAMP)                      |
| A6      | 27141066    | Bracket (VOL)                       |
| A8      | 27115204A   | Side bracket                        |
| A9      | 28175129    | Insulating plate                    |
| A10     | 29360626-1  | Label                               |
| A11     | 27130427    | Bracket                             |
| A12     | 27150212B   | Shield plate                        |
| A14     | 27130428A   | Bracket (PT)                        |
| A15     | 27130429    | Bracket (PHT)                       |
| A16     | 27141067    | Bracket (PC)                        |
| A18     | 27141068    | Bracket (HE)                        |
| A20     | 27160186    | Radiator                            |
| A21     | 27150215A   | Shield plate                        |
| A22     | 27120851    | Back panel                          |
|         | 27120852    | Back panel [G]                      |
|         | 27120854    | Back panel [W]                      |
|         | 27120858    | Back panel [X]                      |
|         | 27120856    | Back panel [Q]                      |
| A23     | 25060041    | 3 × 14mm, Ground terminal           |
| A24     | 87644010    | W4 × 10F(BC), Washer                |
| A25     | 27300750    | #2271, Bushing (Power supply cable) |
|         | 28190009    | #2272, Bushing (Power supply cable) |
|         |             | [W]                                 |
| A26     | 28140676    | 11 × 50 × 30mm, Cushion             |
| A30     | 28330072    | Cap (AC outle) [X]                  |
| A40     | 27190009    | Holder                              |
| A41     | 27190480    | Holder                              |
| A42     | 27300243    | WS-2WS, Wire holder                 |
| A43     | 27190458    | WLS-06-0, Holder                    |
| A301    | 28184319B   | Top cover                           |
| A302    | 28185257    | Side board (L)                      |
| A303    | 28185259    | Side board (R)                      |
| A304    | 83G440303   | 4STV × 30FN(BC), Screw              |
| A305    | 870086      | 4 × 12BS(BC), Special washer        |
| A306    | 838440089   | 4TTB + 8C(BC), Tapping screw        |
| A307    | 28140020    | 4 × 10 × 40mm, Cushion              |
| A500    | 17818121    | Front panel ass'y                   |
|         | 17819121    | Front panel ass'y [N][X]            |
| A505    | 28191351B   | Clear plate                         |
| A506    | 27190451    | Holder, (Grass)                     |
| A508    | 833430080   | 3TTP+8P(BC), Tapping screw          |
| A601    | 27170226 1A | Bottom board                        |
| A602    | 280889B     | Bottom leg                          |
| A603    | 831430088   | 3TTW + 8B(BC), Tapping screw        |
| A604    | 831430168   | 3TTW + 16B(BC), Tapping screw       |

| REF NO.      | PARTS NO.  | DESCRIPTION                          |
|--------------|------------|--------------------------------------|
| A801         | 28322541   | Knob ass'y (POW)                     |
| A803         | 28322542A  | Knob (VOL)                           |
| A804         | 28322543A  | Knob (PUSH) C D009                   |
| Q449, Q450   | 2201653 or | 2SC3856(O) or                        |
| Q453, Q454   | 2201655 or | 2SC3856(P) or                        |
| Q457, Q458   | 2201654    | 2SC3856(Y), Transister               |
| Q451, Q452   | 2201663 or | 2SA1492(O) or                        |
| Q455, Q456   | 2201665 or | 2SA1492(P) or                        |
| Q459, Q460   | 2201664    | 2SA1492(Y), Transister               |
| Δ T1         | 2300128    | NPT-928D, Power transformer          |
|              | 2300129    | NPT-928G, Power transformer [G]      |
|              | 2300130    | NPT-928DG, Power transformer [W][X]  |
|              | 2300131    | NPT-928Q, Power transformer [Q]      |
| Δ T2         | 2300098A   | NPT-918D, Power transformer          |
|              | 2300099    | NPT-918G, Power transformer [G]      |
|              | 2300100    | NPT-918DG, Power transformer [W][X]  |
|              | 2300101    | NPT-918Q, Power transformer [Q]      |
| Δ T3, T4     | 231097     | NCH-3144, Choke coil                 |
| Δ S1         | 25035381   | NPS-121-L345P, Power switch          |
| Δ S2         | 25065195   | NSS-1288P, Slide switch [W][X]       |
| Δ P1         | 253122     | AS-UC-6#16, Power supply cable       |
|              | 253092-1   | AS-CEE-2, Power supply cable [G]     |
|              | 253118     | AS-SAA, Power supply cable [Q]       |
|              | 253131     | AS-CEE-3, Power supply cable [W]     |
| Δ P2         | 25050290   | NSCT-2P118T, AC outlet [D][N][X]     |
| M1, M2       | 243148     | NIND-2000S148, Power meter           |
| Δ C1, C2     | 3500065A   | 0.01μF, AC400V, Capacitor (IS)       |
| C1a, C2a     | 27300601   | SB-1925, Cover (Capacitor)           |
| F702         | 252044     | 2A ST-6, Secondary fuse              |
|              | 252074     | 2A SE-EAK, Secondary fuse [G][Q]     |
| Δ F801, F802 | 252052     | 7A ST-6, Primary fuse [D][N][W][X]   |
| Δ F803, F804 | 252077     | 4A SE EAK, Primary fuse [G][W][X][Q] |

## NOTE

[D]: Only 120V models  
 [G]: Only 220V models  
 [W]: Only 120V/220V models  
 [N]: Only U.S.A. models  
 [X]: Only Military market models  
 [Q]: Only British and Australian models

| REF NO. | PARTS NO.   | DESCRIPTION                                                     |
|---------|-------------|-----------------------------------------------------------------|
| U1      | 17818515-1  | NAMA-2615-1, Meter and protector circuit pc board ass'y         |
|         | 17814515-1A | NAMA-2615-1A, Meter and protector circuit pc board ass'y [G][Q] |
| U2      | 17818516-1  | NADIS-2616-1, Volume/Servo LED pc board ass'y                   |
| U3      | 17818517-1  | NADIS-2617-1, Power LED pc board ass'y                          |
| U4      | 17818518-1  | NADIS-2618-1, Speaker LED pc board ass'y                        |
| U5      | 17818519-1  | NAOP-2619-1, Relay circuit pc board ass'y                       |
| U6      | 17818520-1  | NAST-2620-1, Speaker terminal pc board ass'y                    |
|         | 17814520-1A | NAST-2620 1A, Speaker terminal pc board ass'y [G][W][X][Q]      |
| U7      | 17818521-1  | NAPJ-2621-1, Input terminal pc board ass'y                      |
| U8      | 17818522-1  | NAVR-2622-1, Level volume pc board ass'y                        |
|         | 17818523-1  | NAPL-2623-1, Meter lamp pc board ass'y                          |
| U10     | 17818525-1  | NAPA-2625-1, Power amplifier pc board ass'y                     |
| U11     | 17818526-1  | NACC-2626-1, Transistor pc board ass'y                          |
| U12     | 17818527-1  | NADA-2627-1, Transistor pc board ass'y                          |
| U13     | 17818528-1  | NADA-2628-1, Transistor pc board ass'y                          |
| U14     | 17818529-1  | NARC-2629-1, Power supply circuit pc board ass'y                |
| U15     | 17818530-1  | NAFU-2630-1, Fuse pc board ass'y                                |
|         | 17814530-1A | NAFU-2630-1A, Fuse pc board ass'y [G][Q]                        |
|         | 17810530-1B | NAFU-2630 1B, Fuse pc board ass'y [W][X]                        |

NOTE: THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

# PRINTED CIRCUIT BOARD PARTS LIST

## METER AND PROTECTOR CIRCUIT PC BOARD (NAMA-2615-1,NAMA-2615-1A)

| CIRCUIT NO.                                                                                                                                                                                         | PARTS NO.   | DESCRIPTION                            | CIRCUIT NO.       | PARTS NO.    | DESCRIPTION                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------|-------------------|--------------|----------------------------------------|
| Q201,Q202<br>Q601,Q602<br>Q604,Q605<br>Q702<br>Q703<br>Q704,Q705<br>Q706                                                                                                                            | Transistors |                                        | R723              | 442520474    | 4.7 $\Omega$ , 1/2W, Metal oxide film  |
|                                                                                                                                                                                                     | 2212806 or  | 2SK389(BL) or                          | R724              | 441721814    | 180 $\Omega$ , 2W, Metal oxide film    |
|                                                                                                                                                                                                     | 2212807     | 2SK389(V)                              | R725              | 441720474    | 4.7 $\Omega$ , 2W, Metal oxide film    |
|                                                                                                                                                                                                     | 2211945     | 2SK246(GR)                             | R727              | 442520474    | 4.7 $\Omega$ , 1/2W, Metal oxide film  |
|                                                                                                                                                                                                     | 2211255     | 2SC1815(GR)                            | R735              | 442521824    | 1.8k $\Omega$ , 1/2W, Metal oxide film |
|                                                                                                                                                                                                     | 2211504     | 2SA950(Y)                              |                   | Switch       |                                        |
|                                                                                                                                                                                                     | 2211455     | 2SA1015(GR)                            | S701~S705         | 25035522     | NPS-242-222-162L484                    |
|                                                                                                                                                                                                     | 2201276 or  | 2SB772(P) or                           |                   | Relay        |                                        |
|                                                                                                                                                                                                     | 2201275     | 2SB772(Q)                              | RL601             | 25065048     | FRL-644D-12/2AS                        |
|                                                                                                                                                                                                     | 2201286 or  | 2SD882(P) or                           |                   | Fuse holders |                                        |
| Q203,Q204<br>Q603<br>Q606,Q607<br>Q701                                                                                                                                                              | 2201285     | 2SD882(Q)                              | F701a,F702a       | 250113       | S-N5051                                |
|                                                                                                                                                                                                     | ICs         |                                        | F702a             | 25050065     | YSH403T [G][X][Q]                      |
|                                                                                                                                                                                                     | 222652      | M5218L                                 |                   | Fuse label   |                                        |
|                                                                                                                                                                                                     | 222529      | TA7318P(R)                             |                   | 29360364     | T2A/250V [G][Q]                        |
| D201~D204<br>D205~D208<br>D601,D602<br>D603,D604<br>D605<br>D701<br>D702<br>D703<br>D705                                                                                                            | 222502      | NJM4558DX                              | JC601,JC607       | 25050282     | NSCT-5P110                             |
|                                                                                                                                                                                                     | 222584      | TA7317P                                | JC409             | 25050283     | NSCT-6P111                             |
|                                                                                                                                                                                                     | Diodes      |                                        | JC603             | 25050281     | NSCT-4P109                             |
|                                                                                                                                                                                                     | 223155      | 1SS138                                 | JC401,JC402,JC604 | 25050285     | NSCT-8P113                             |
|                                                                                                                                                                                                     | 2239651 or  | RD13E-B1 or                            | P201,P202         | 2000553      | NSAS-6P509 Socket ass'y                |
|                                                                                                                                                                                                     | 2243241     | MTZ13-A                                | P703              | 2000550      | NSAS-6P506 Socket ass'y                |
|                                                                                                                                                                                                     | 223145      | 1S2076TD                               |                   |              |                                        |
|                                                                                                                                                                                                     | 2239672 or  | RD15E-B2 or                            |                   |              |                                        |
|                                                                                                                                                                                                     | 2243252     | MTZ-15B                                |                   |              |                                        |
|                                                                                                                                                                                                     | 223145      | 1S2076TD                               |                   |              |                                        |
| C201~C204<br>C205~C208<br>C215~C218<br>C223~C226<br>C601,C602<br>C605,C606<br>C607<br>C608,C609<br>C613,C614<br>C615,C616<br>C617,C618<br>C701,C702<br>C704<br>C706<br>C707<br>C708<br>C710<br>C711 | 223155      | 1SS138                                 |                   |              |                                        |
|                                                                                                                                                                                                     | 2239493 or  | RD6.2E-B3 or                           |                   |              |                                        |
|                                                                                                                                                                                                     | 2239533 or  | RD7.5E-B3 or                           |                   |              |                                        |
|                                                                                                                                                                                                     | 2243183     | MTZ7.5-C                               |                   |              |                                        |
|                                                                                                                                                                                                     | 2243163     | MTZ6.2-C                               |                   |              |                                        |
|                                                                                                                                                                                                     | 223865      | 2W02                                   |                   |              |                                        |
|                                                                                                                                                                                                     | Capacitors  |                                        |                   |              |                                        |
|                                                                                                                                                                                                     | 372125614   | 560pF, 50V, Styrene                    |                   |              |                                        |
|                                                                                                                                                                                                     | 372122214   | 220pF, 50V, Styrene                    |                   |              |                                        |
|                                                                                                                                                                                                     | 391251017   | 100 $\mu$ F, 25V, Elect. (MUSE)        |                   |              |                                        |
| R215,R216<br>R225,R226<br>R613,R614<br>R633,R634<br>R645,R646<br>R717<br>R718<br>R719<br>R720<br>R721<br>R722                                                                                       | 354741019   | 100 $\mu$ F, 16V, Elect.               |                   |              |                                        |
|                                                                                                                                                                                                     | 354784799   | 0.47 $\mu$ F, 50V, Elect.              |                   |              |                                        |
|                                                                                                                                                                                                     | 354780339   | 3.3 $\mu$ F, 50V, Elect.               |                   |              |                                        |
|                                                                                                                                                                                                     | 354780109   | 1 $\mu$ F, 50V, Elect.                 |                   |              |                                        |
|                                                                                                                                                                                                     | 379121035   | 0.01 $\mu$ F, 50V, Film (DEW)          |                   |              |                                        |
|                                                                                                                                                                                                     | 354752209   | 22 $\mu$ F, 25V, Elect.                |                   |              |                                        |
|                                                                                                                                                                                                     | 354780339   | 3.3 $\mu$ F, 50V, Elect.               |                   |              |                                        |
|                                                                                                                                                                                                     | 354754709   | 47 $\mu$ F, 25V, Elect.                |                   |              |                                        |
|                                                                                                                                                                                                     | 354722219   | 220 $\mu$ F, 6.3V, Elect.              |                   |              |                                        |
|                                                                                                                                                                                                     | 354732209   | 22 $\mu$ F, 10V, Elect.                |                   |              |                                        |
| R215,R216<br>R225,R226<br>R613,R614<br>R633,R634<br>R645,R646<br>R717<br>R718<br>R719<br>R720<br>R721<br>R722                                                                                       | 354784799   | 0.47 $\mu$ F, 50V, Elect.              |                   |              |                                        |
|                                                                                                                                                                                                     | 354732219   | 220 $\mu$ F, 10V, Elect.               |                   |              |                                        |
|                                                                                                                                                                                                     | 354742229   | 2200 $\mu$ F, 16V, Elect.              |                   |              |                                        |
|                                                                                                                                                                                                     | 379121045   | 0.1 $\mu$ F, 50V, Film (DEW)           |                   |              |                                        |
|                                                                                                                                                                                                     | 354741009   | 10 $\mu$ F, 16V, Elect.                |                   |              |                                        |
|                                                                                                                                                                                                     | Resistors   |                                        |                   |              |                                        |
|                                                                                                                                                                                                     | 441722434   | 24 k $\Omega$ , 2W, Metal oxide film   |                   |              |                                        |
|                                                                                                                                                                                                     | 442524724   | 4.7k $\Omega$ , 1/2W, Metal oxide film |                   |              |                                        |
|                                                                                                                                                                                                     | 5221023     | N10HR470BEM, Semi-fixed                |                   |              |                                        |
|                                                                                                                                                                                                     | 4000028     | D33A, Thermistor                       |                   |              |                                        |
| R215,R216<br>R225,R226<br>R613,R614<br>R633,R634<br>R645,R646<br>R717<br>R718<br>R719<br>R720<br>R721<br>R722                                                                                       | 5221023     | N10HR470BEM, Semi-fixed                |                   |              |                                        |
|                                                                                                                                                                                                     | 442520684   | 6.8 $\Omega$ , 1/2W, Metal oxide film  |                   |              |                                        |
|                                                                                                                                                                                                     | 442528204   | 82 $\Omega$ , 1/2W, Metal oxide film   |                   |              |                                        |
|                                                                                                                                                                                                     | 442524714   | 470 $\Omega$ , 1/2W, Metal oxide film  |                   |              |                                        |
|                                                                                                                                                                                                     | 441720274   | 2.7 $\Omega$ , 2W, Metal oxide film    |                   |              |                                        |
|                                                                                                                                                                                                     | 442524714   | 470 $\Omega$ , 1/2W, Metal oxide film  |                   |              |                                        |
|                                                                                                                                                                                                     | 442522214   | 220 $\Omega$ , 1/2W, Metal oxide film  |                   |              |                                        |
|                                                                                                                                                                                                     |             |                                        |                   |              |                                        |
|                                                                                                                                                                                                     |             |                                        |                   |              |                                        |
|                                                                                                                                                                                                     |             |                                        |                   |              |                                        |

## VOLUME/SERVO LED PC BOARD (NADIS-2616-1)

| CIRCUIT NO. | PARTS NO.   | DESCRIPTION     |
|-------------|-------------|-----------------|
| D710,D711   | Diodes      |                 |
|             | 225137CG or | SEL-2413E-CG or |
|             | 225137CY or | SEL-2413E-CY or |
|             | 225137DG or | SEL-2413E-DG or |
| D712,D713   | 225137DY    | SEL-2413E-DY    |
|             | 225174 or   | SLR55MC3N or    |
|             | 225173      | SLR55MC3M       |
|             | Holders     |                 |
|             | 27190453    | Holder (SLED)   |
|             | 27190319A   | Holder (LED)    |

## POWER LED PC BOARD (NADIS-2617-1)

| CIRCUIT NO. | PARTS NO. | DESCRIPTION   |
|-------------|-----------|---------------|
| D714,D715   | Diodes    |               |
|             | 225142    | SEL2913K      |
|             | Holder    |               |
|             | 27190454  | Holder (PLED) |

## SPEAKER LED PC BOARD (NADIS-2618-1)

| CIRCUIT NO. | PARTS NO.   | DESCRIPTION    |
|-------------|-------------|----------------|
| D716        | Diodes      |                |
|             | 225167RB or | GL-5HY10-RB or |
| D717,D718   | 225167RC    | GL-5HY10-RC    |
|             | 225174 or   | SLR55MC3N or   |
|             | 225173      | SLR55MC3M      |

# CIRCUIT NO. PARTS NO. DESCRIPTION

Holders  
27190319A Holder (LED)

## RELAY CIRCUIT PC BOARD (NAPQ-2619-1)

### CIRCUIT NO. PARTS NO. DESCRIPTION

|               |                         |                                     |
|---------------|-------------------------|-------------------------------------|
| D781 ~ D783   | Diodes<br>223145        | 1S2076TD                            |
| L781 ~ L784   | Coils<br>231015         | S-0.8C                              |
| C783 ~ C786   | Capacitors<br>379121245 | 0.12 $\mu$ F, 50V, Film (DEW)       |
| R781 ~ R784   | Resistors<br>441620514  | 5.1 $\Omega$ , 1W, Metal oxide film |
| R785, R786    | 441720514               | 5.1 $\Omega$ , 2W, Metal oxide film |
| RL781 ~ RL783 | Relaies<br>25065036     | NRL-4P3A-DC12-01                    |
| JC407, JC408  | Sockets<br>25050273     | NSCT-9P131                          |
| JC603         | 25050268                | NSCT-4P96                           |

## SPEAKER TERMINAL PC BOARD (NAST-2620-1, NAST-2620-1A)

### CIRCUIT NO. PARTS NO. DESCRIPTION

|            |                       |             |
|------------|-----------------------|-------------|
| P791, P792 | Terminals<br>25060100 | NTM-4PDMN40 |
| P791, P792 | 25060101              | NTM-4PDMN41 |

[G] [W] [X] [Q]

## INPUT TERMINAL PC BOARD (NAPJ-2621-1)

### CIRCUIT NO. PARTS NO. DESCRIPTION

|      |                      |             |
|------|----------------------|-------------|
| P101 | Terminal<br>25045196 | NPJ-4PDBL77 |
|------|----------------------|-------------|

## LEVEL VOLUME PC BOARD (NAVR-2622-1)

### CIRCUIT NO. PARTS NO. DESCRIPTION

|            |                       |              |
|------------|-----------------------|--------------|
| R151, R152 | Resistors<br>5104183A | N27DGL30KBB0 |
| P151       | Sockets<br>2000551    | NSAS-6P507   |
| P152       | 2000552               | NSAS-6P508   |

## METER LAMP PC BOARD (NAPL-2623-1)

### CIRCUIT NO. PARTS NO. DESCRIPTION

|               |                 |                     |
|---------------|-----------------|---------------------|
| PL881 ~ PL884 | Lamps<br>210191 | PL14V150mA (Green)  |
| PL885 ~ PL888 | 210192          | PL14V150mA (Orange) |

# POWER AMPLIFIER PC BOARD (NAPA-2625-1)

### CIRCUIT NO. PARTS NO. DESCRIPTION

|             |                                      |                                     |
|-------------|--------------------------------------|-------------------------------------|
| Q401 ~ Q404 | Transistors<br>2211732 or<br>2211733 | 2SC1845(F) or<br>2SC1845(E)         |
| Q405, Q406  | 2211792 or<br>2211793                | 2SA992(F) or<br>2SA992(E)           |
| Q407, Q408  | 2211414                              | 2SC1627(Y)                          |
| Q411 ~ Q414 | 2211782 or<br>2211783                | 2SA991(F) or<br>2SA991(E)           |
| Q415 ~ Q418 | 2211902 or<br>2211903                | 2SC1844(F) or<br>2SC1844(E)         |
| Q421 ~ Q424 | 2211359 or<br>2211358                | 2SA949-Y(ONK) or<br>2SA949-O(ONK)   |
| Q425, Q426  | 2211639 or<br>2211638                | 2SC2229-Y(ONK) or<br>2SC2229-O(ONK) |
| Q427, Q428  | 2211792 or<br>2211793                | 2SA992(F) or<br>2SA992(E)           |
| Q429, Q430  | 2212560                              | 2SC3433                             |
| Q431, Q432  | 2211255                              | 2SC1815(GR)                         |
| Q433, Q434  | 2211455                              | 2SA1015(GR)                         |
| Q435, Q436  | 2211639 or<br>2211638                | 2SC2229-Y(ONK) or<br>2SC2229-O(ONK) |
| Q437, Q438  | 2211359 or<br>2211358                | 2SA949-Y(ONK) or<br>2SA949-O(ONK)   |
| Q441        | 2200394                              | 2SC1625(Y)                          |
| Q442        | 2200404                              | 2SA815(Y)                           |
| Q443        |                                      | 2SC3439                             |

|             |                  |               |
|-------------|------------------|---------------|
| D401 ~ D408 | Diodes<br>223155 | 1SS138        |
| D409 ~ D412 | 225218           | LTZ-MR15, LED |
| D413 ~ D416 | 223162           | 1SS82         |
| D417 ~ D420 | 225218           | LTZ-MR15, LED |
| D421, D422  | 223155           | 1SS138        |
| D423, D424  | 223168           | DA210S        |
| D431, D432  | 223155           | 1SS138        |
| D433, D434  | 223145           | 1S2076TD      |
| D435 ~ D438 | 223963           | GP-30DL       |
| D439 ~ D442 | 223162           | 1SS82         |
| D451, D452  | 2243293          | MTZ22-C       |
| D453        | 2243251          | MTZ15-A       |
| D454, D455  | 223155           | 1SS138        |

|            |                 |          |
|------------|-----------------|----------|
| L401, L402 | Coils<br>231098 | NCH-4145 |
|------------|-----------------|----------|

|             |                         |                                |
|-------------|-------------------------|--------------------------------|
| C405 ~ C408 | Capacitors<br>354723319 | 330 $\mu$ F, 6.3V, Elect.      |
| C413 ~ C416 | 391241007               | 10 $\mu$ F, 16V, Elect. (MUSE) |
| C417, C418  | 379121025               | 0.001 $\mu$ F, 50V, Film (DEW) |
| C423, C424  | 391241007               | 10 $\mu$ F, 16V, Elect. (MUSE) |
| C425 ~ C428 | 379131035               | 0.01 $\mu$ F, 100V, Film (DEW) |
| C435, C436  | 379131045               | 0.1 $\mu$ F, 100V, Film (DEW)  |
| C437, C438  | 379122245               | 0.22 $\mu$ F, 50V, Film (DEW)  |
| C443 ~ C446 | 379124735               | 0.047 $\mu$ F, 50V, Film (DEW) |
| C451, C452  | 354752209               | 22 $\mu$ F, 25V, Elect.        |
| C453, C454  | 354751019               | 100 $\mu$ F, 25V, Elect.       |
| C455 ~ C462 | 3504197                 | 10000 $\mu$ F, 90V, Elect.     |
| C463 ~ C466 | 354780339               | 3.3 $\mu$ F, 50V, Elect.       |

|             |                        |                                        |
|-------------|------------------------|----------------------------------------|
| R401 ~ R404 | Resistors<br>442525614 | 560 $\Omega$ , 1/2W, Metal oxide film  |
| R405, R406  | 442523314              | 330 $\Omega$ , 1/2W, Metal oxide film  |
| R411, R412  | 442521614              | 160 $\Omega$ , 1/2W, Metal oxide film  |
| R413, R414  | 441625634              | 56 k $\Omega$ , 1W, Metal oxide film   |
| R415, R416  | 442521534              | 15 k $\Omega$ , 1/2W, Metal oxide film |
| R423, R424  | 5225076                | N10HR22KBDM, Semi-fixed                |
| R425 ~ R428 | 442520514              | 5.1 $\Omega$ , 1/2W, Metal oxide film  |
| R429 ~ R432 | 441724324              | 4.3k $\Omega$ , 2W, Metal oxide film   |

| CIRCUIT NO.       | PARTS NO. | DESCRIPTION                           |
|-------------------|-----------|---------------------------------------|
| R433~R436         | 442521214 | 120 $\Omega$ , 1/2W, Metal oxide film |
| R445~R448         | 442523914 | 390 $\Omega$ , 1/2W, Metal oxide film |
| R449,R450         | 442521204 | 120 $\Omega$ , 1/2W, Metal oxide film |
| R457~R460         | 442525104 | 51 $\Omega$ , 1/2W, Metal oxide film  |
| R463,R464         | 442520514 | 5.1 $\Omega$ , 1/2W, Metal oxide film |
| R465,R466         | 441720754 | 7.5 $\Omega$ , 2W, Metal oxide film   |
| R467~R478         | 442520224 | 2.2 $\Omega$ , 1/2W, Metal oxide film |
| R479~R490         | 442521014 | 100 $\Omega$ , 1/2W, Metal oxide film |
| R491~R504         | 4000080   | 0.47 $\Omega$ , 5W, Metal plate       |
| R505~R516         | 4000063   | 0.47 $\Omega$ , 2W, Metal plate       |
| R531,R532         | 441621024 | 1k $\Omega$ , 1W, Metal oxide film    |
| R535              | 441724324 | 4.3k $\Omega$ , 2W, Metal oxide film  |
| Sockets           |           |                                       |
| JC403,JC404       | 25050267  | NSCT-3P95                             |
| JC405,JC406,JC409 | 25050270  | NSCT-6P98                             |
| Bracket           |           |                                       |
|                   | 27130430  | Bracket (KE)                          |
| Bus plate         |           |                                       |
|                   | 27300826A | Bus (S)                               |
|                   | 27300827A | Bus (C)                               |

### TRANSISTOR PC BOARD (NACC-2626-1)

| CIRCUIT NO.                   | PARTS NO.                           | DESCRIPTION                    |
|-------------------------------|-------------------------------------|--------------------------------|
| <del>Q443</del><br>Q403(Q444) | Transistor<br>2212884 or<br>2212863 | 2SC3419(Y) or<br>2SC3419(O)    |
| C463(C464)                    | Capacitor<br>379122235              | 0.022 $\mu$ F, 50V, Film (DEW) |

### TRANSISTOR PC BOARD (NADA-2627-1)

| CIRCUIT NO. | PARTS NO.                           | DESCRIPTION                   |
|-------------|-------------------------------------|-------------------------------|
| Q445(Q446)  | Transistor<br>2201684 or<br>2201683 | 2SC3298A(Y) or<br>2SC3298A(O) |

### TRANSISTOR PC BOARD (NADA-2628-1)

| CIRCUIT NO. | PARTS NO.                           | DESCRIPTION                   |
|-------------|-------------------------------------|-------------------------------|
| Q447(Q448)  | Transistor<br>2201674 or<br>2201673 | 2SA1306A(Y) or<br>2SA1306A(O) |

### POWER SUPPLY CIRCUIT PC BOARD (NARC-2629-1)

| CIRCUIT NO. | PARTS NO.               | DESCRIPTION                            |
|-------------|-------------------------|----------------------------------------|
| D801,D802   | Diodes<br>22380008      | RB604                                  |
| C801~C804   | Capacitors<br>375103345 | 0.33 $\mu$ F, 125V, Film (ME)          |
| C805,C806   | 375104745               | 0.47 $\mu$ F, 125V, Film (ME)          |
| R801~R804   | Resistors<br>442522294  | 0.22 $\Omega$ , 1/2W, Metal oxide film |

| CIRCUIT NO. | PART NO.  | DESCRIPTION                          |
|-------------|-----------|--------------------------------------|
| R805,R806   | 442527504 | 75 $\Omega$ , 1/2W, Metal oxide film |

### FUSE PC BOARD (NAFU-2630-1,NAFU-2630-1A,NAFU-2630-1B)

| CIRCUIT NO.  | PARTS NO. | DESCRIPTION          |
|--------------|-----------|----------------------|
| Fuse holders |           |                      |
| F801a,F802a  | 250113    | S-N5051              |
| F803a,F804a  | 25050065  | YSH403T [G][W][X][Q] |
| Terminals    |           |                      |
| P801,P802    | 25060092  | NTM 1S33             |

### NOTE

G: Only 220V models  
W: Only 120V/220V models  
X: Only Military market models  
Q: British and Australian models

# SCHEMATIC DIAGRAM

(120V Model)

