



For more Hi-Fi manuals and set-up information  
please visit [www.hifiengine.com](http://www.hifiengine.com)

---

STEREO  
PREAMPLIFIER  
**BETA III**



**SERVICE MANUAL**

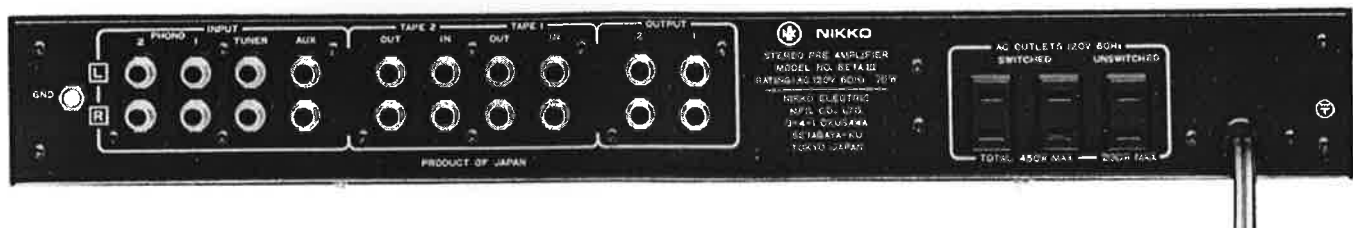
TYPE AND VOLTAGE

|                                       |             |
|---------------------------------------|-------------|
| <b>W-TYPE</b><br>UL and CSA type      | 120V AC     |
| <b>E-TYPE</b><br>NK-STD type          | 220/240V AC |
| <b>N-TYPE</b><br>DEMKO and SEMKO type |             |
| <b>D-TYPE</b><br>DIN type             |             |

**NIKKO**

## CONTENTS

|                             |      |
|-----------------------------|------|
| Specifications . . . . .    | 2    |
| Disassembly . . . . .       | 2, 3 |
| Alignment . . . . .         | 3    |
| Schematic Diagram . . . . . | 4    |
| PC Boards . . . . .         | 5, 6 |
| Parts Location . . . . .    | 7    |
| Parts List . . . . .        | 8-11 |
| Semiconductor Data          |      |
| Transistors . . . . .       | 11   |
| FETs . . . . .              | 11   |
| Diodes, LEDs . . . . .      | 11   |
| Zener Diodes . . . . .      | 11   |



# SPECIFICATIONS

## Semiconductors:

|                               |    |
|-------------------------------|----|
| Bipolar Transistors . . . . . | 9  |
| FETs . . . . .                | 36 |
| Diodes . . . . .              | 9  |
| LEDs . . . . .                | 1  |
| Zener Diodes . . . . .        | 3  |

## Total Harmonic Distortion (20Hz to 20kHz):

|                                                 |        |
|-------------------------------------------------|--------|
| Phono 1, 2 to Tape Out<br>(3V output) . . . . . | .0004% |
| Tuner to Output (2V output) . .                 | .0005% |
| Aux to Output (2V output) . . .                 | .0005% |
| Tape in 1, 2 to Output<br>(2V output) . . . . . | .0005% |

## Input Sensitivity (1kHz, 1V output):

|                                  |        |
|----------------------------------|--------|
| Phono 1, 2 to Output . . . . .   | .20mV  |
| Tuner to Output . . . . .        | .110mV |
| Aux to Output . . . . .          | .110mV |
| Tape in 1, 2 to Output . . . . . | .110mV |

## Maximum Input Signal (1kHz, 0.05%THD):

|                        |        |
|------------------------|--------|
| Phono 1, 2 . . . . .   | 350mV  |
| Tuner . . . . .        | 2000mV |
| Aux . . . . .          | 2000mV |
| Tape In 1, 2 . . . . . | 2000mV |

## Input Impedance (1kHz, 1V output):

|                        |                  |
|------------------------|------------------|
| Phono 1, 2 . . . . .   | 22k/47k/100kohms |
| Tuner . . . . .        | 47kohms          |
| Aux . . . . .          | 47kohms          |
| Tape In 1, 2 . . . . . | 47kohms          |

## Output Level (1kHz, 2mV input):

|                                   |        |
|-----------------------------------|--------|
| Phono 1, 2 to Tape Out 1, 2 . . . | .100mV |
| Phono 1, 2 to Output 1, 2 . . . . | .950mV |

## Output Impedance:

|                         |          |
|-------------------------|----------|
| Tape Out 1, 2 . . . . . | 2.2kohms |
| Output 1, 2 . . . . .   | 100ohms  |

## Signal to Noise Ratio (IHF A network):

|                        |       |
|------------------------|-------|
| Phono 1, 2 . . . . .   | 81dB  |
| Tuner . . . . .        | 100dB |
| Aux . . . . .          | 100dB |
| Tape In 1, 2 . . . . . | 100dB |

## Frequency Response (10Hz to 50kHz):

|                        |              |
|------------------------|--------------|
| Tuner . . . . .        | $\pm 0.5$ dB |
| Aux . . . . .          | $\pm 0.5$ dB |
| Tape In 1, 2 . . . . . | $\pm 0.5$ dB |

## RIAA Equalization Deviation

(30Hz to 15kHz):

|                                  |              |
|----------------------------------|--------------|
| Phono to Tape Out 1, 2 . . . . . | $\pm 0.2$ dB |
|----------------------------------|--------------|

## Tape Controls:

|                          |             |
|--------------------------|-------------|
| Bass (50Hz) . . . . .    | $\pm 10$ dB |
| Treble (20kHz) . . . . . | $\pm 10$ dB |

## Filters:

|                    |                |
|--------------------|----------------|
| Subsonic . . . . . | 20Hz—12dB/oct. |
| Low Cut . . . . .  | 40Hz—6dB/oct.  |

Mute Time . . . . . 3 second

## Power Input:

|                                  |                          |
|----------------------------------|--------------------------|
| W-Type . . . . .                 | 120V AC, 60Hz            |
| E-Type, N-Type, D-Type . . . . . | 220V or 240V AC,<br>50Hz |

## Power Consumption:

|                                  |         |
|----------------------------------|---------|
| W-Type . . . . .                 | 20watts |
| E-Type, N-Type, D-Type . . . . . | 23watts |

## Dimensions:

|                  |                    |
|------------------|--------------------|
| Width . . . . .  | 19in. (482mm)      |
| Height . . . . . | 2-3/22in. (63.5mm) |
| Depth . . . . .  | 13in. (330mm)      |
| Weight . . . . . | 13 lbs. (5.9kg)    |

Specifications subject to change without notice.

# DISASSEMBLY

## CABINET COVER REMOVAL

Remove four tapping screws from the top of the metal cover. Remove four screws from both sides of the metal cover.

## BOTTOM PLATE REMOVAL

Remove eight tapping screws (no. 1—8) (Photo 1).

## FRONT PANEL REMOVAL

1. As indicated in Photo 2, disconnect LED connector (2A) (Photo 2) from the LED mounted on the front panel by pulling it backward.
  2. Remove six knobs (no. 1, 6—10) (Photo 2) from the front panel by pulling them forward.
  3. Using a hexagon wrench, remove five screws (no. 2—5, 11) (Photo 2).
  4. Remove two (three) nuts (no. 1, 2 (3) ) (Photo 3) and lift out the front panel.
- To reassemble, reverse the procedure.

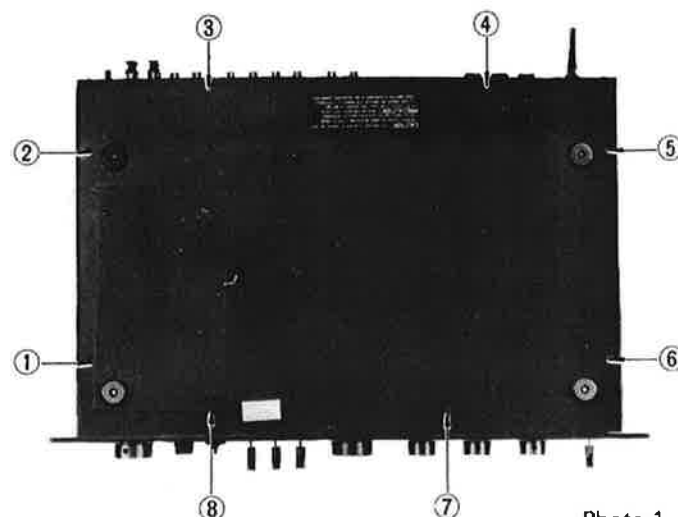


Photo 1

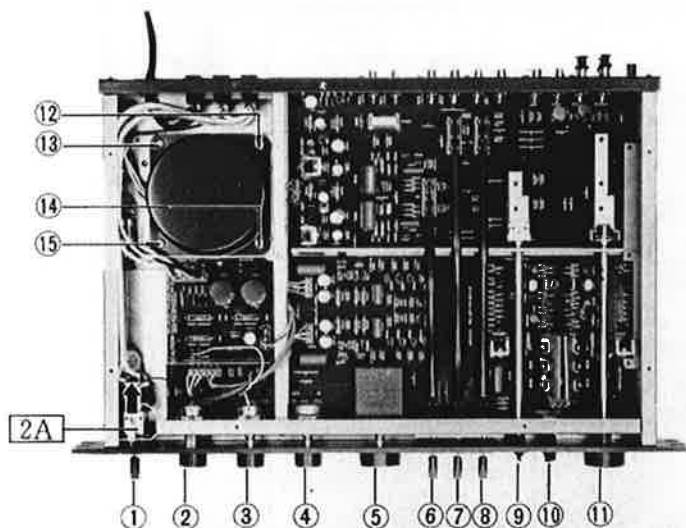


Photo 2

## POWER TRANSFORMER REMOVAL

1. Disconnect all wires from the power transformer.
  2. Remove four tapping screws (no. 12–15) (Photo 2) and lift the power transformer up and out of chassis.
- To reassemble, reverse the procedure.



Photo 3

## ALIGNMENT

### TEST EQUIPMENT

Allow a minimum of 10 minutes warm-up for test equipment.

Maintain rated line voltage.

DC Voltmeter

### LEFT/RIGHT CHANNEL EQ AMP DC BALANCE ADJUSTMENT

NOTE: See illustration, Figure 1. for test equipment hook-up.

1. Connect DC voltmeter to test points 13/15 and 14 on preamp PC board.
2. Adjust potentiometer R417/R418 for a  $0 \pm 2.0V$  DC voltmeter reading.
3. Remove DC voltmeter.

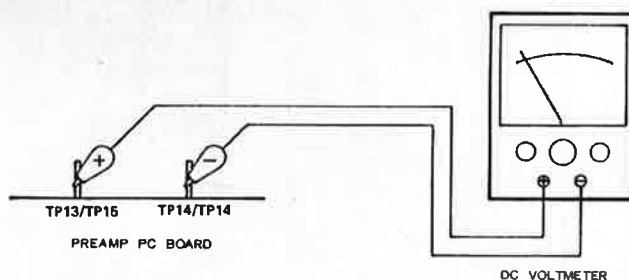


Figure 1. Test Equipment Hook-up

## 4







Figure 2. Preamp PC Board (Bottom View)

- ① To 1, TONE PC BOARD
- ② To 2, TONE PC BOARD
- ③ To 3, TONE PC BOARD
- ④ To 4, TONE PC BOARD
- ⑤ To 5, TONE PC BOARD
- ⑥ NO CONNECTION
- ⑦⑧ To GND TERMINAL, BACK PLATE
- ⑨ To CHASSIS GROUND
- ⑩ To 10, TONE PC BOARD
- ⑪ To 11, TONE PC BOARD
- ⑫ To 12, TONE PC BOARD

- ① To 1, PREAMP PC BOARD
- ② To 2, PREAMP PC BOARD
- ③ To 3, PREAMP PC BOARD
- ④ To 4, PREAMP PC BOARD
- ⑤ To 5, PREAMP PC BOARD
- ⑥ From P.TRANSFORMER,YEL
- ⑦ From P.TRANSFORMER,WHT
- ⑧ From P.TRANSFORMER,WHT
- ⑨ From P.TRANSFORMER,BLK
- ⑩ To 10, PREAMP PC BOARD
- ⑪ To 11, PREAMP PC BOARD
- ⑫ To 12, PREAMP PC BOARD

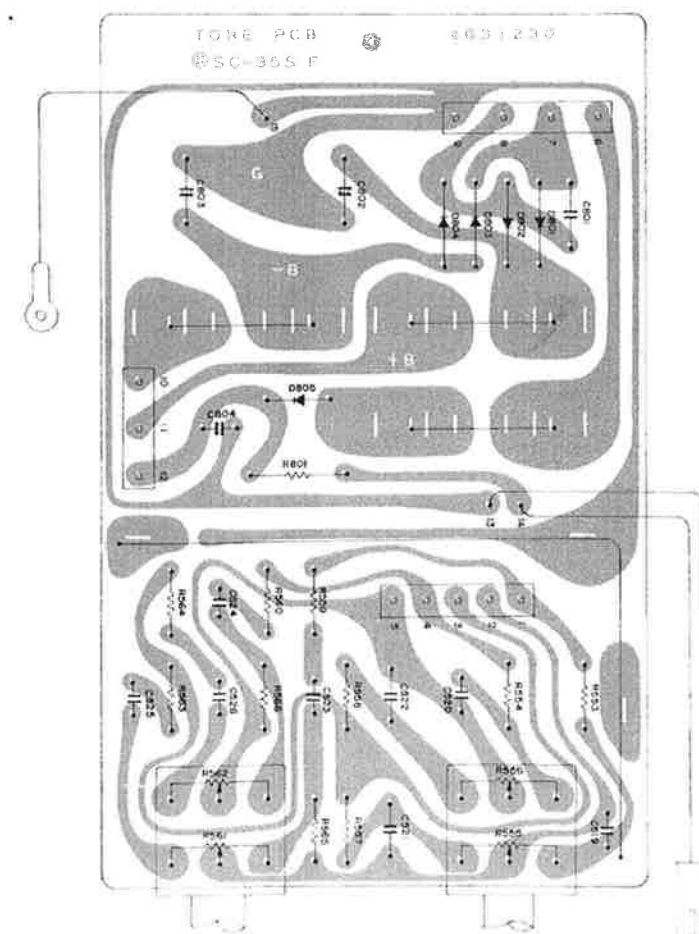


Figure 3. Tone PC Board (Bottom View)



# PARTS LOCATION

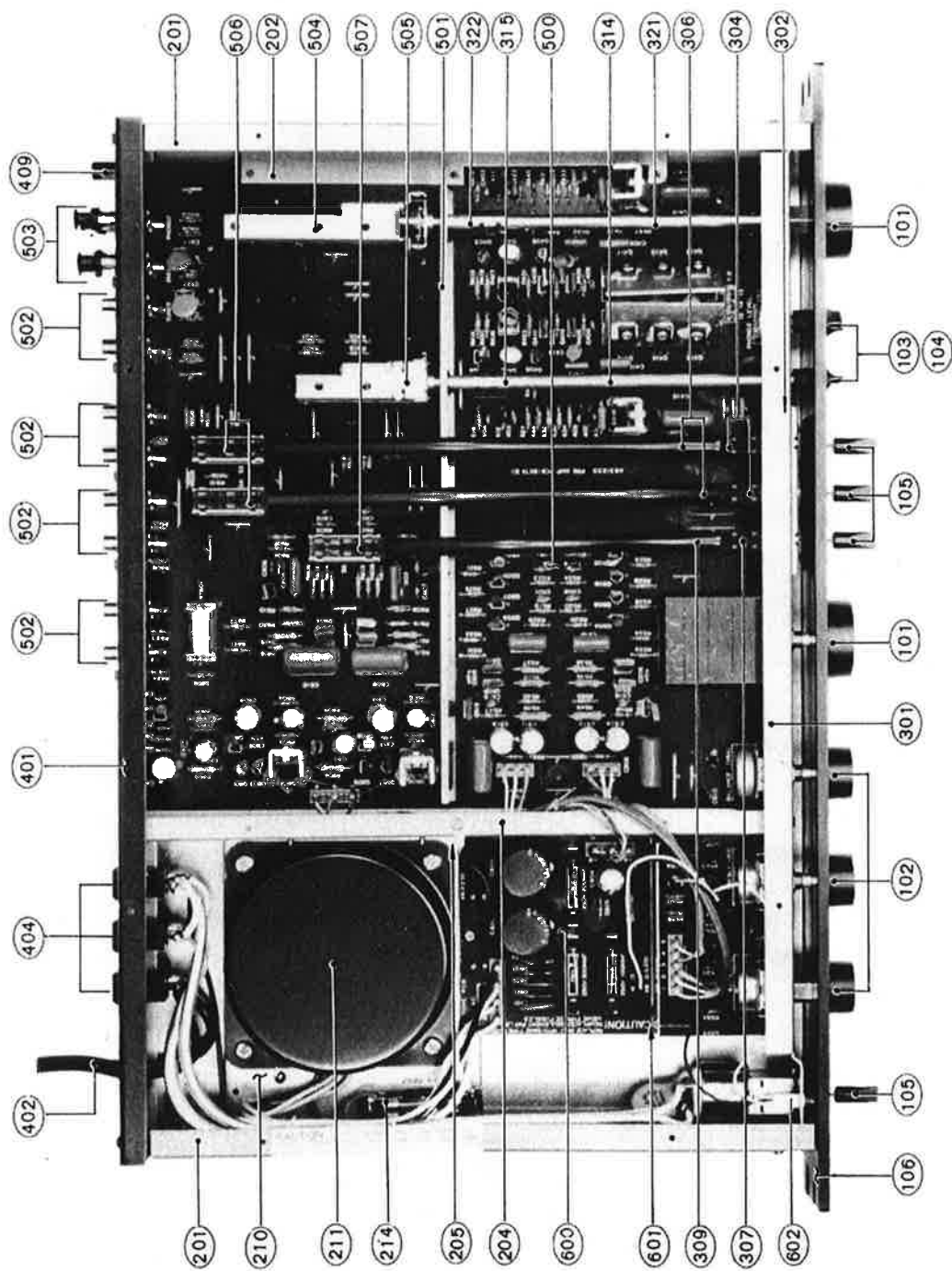


Photo 4

# PARTS LIST

## NOTES:

1. ★ The KEY NUMBER (#) marked with a (★) on parts list relate to numbers of three digits with a ( ) (Photo 4)
2. + Numerals in file indicate the quantity of parts used in one type.
3. ++ FET: Field effect transistor  
IC: Integrated circuit  
VR: Volume control (Variable resistor)  
RES: Carbon film fixed resistor  
MO-RES: Metal oxide film fixed resistor  
CEM-RES: Cemented wirewound fixed resistor  
NF: Nonflammable  
C-CAP: Ceramic capacitor  
E-CAP: Aluminium electrolytic capacitor  
M-CAP: Polyester film capacitor  
S-CAP: Polystyrene film capacitor

T-CAP: Tantalum electrolytic capacitor  
BP-CAP: Bipolar electrolytic capacitor

E-CAP, T-CAP and BP-CAP values (1 x 10uF) are in (1) uF, (10) WV.

4. Assembled and parts are subject to change without notice.
5. Parts ordering procedure:
  - A. DO NOT USE THE "KEY" NUMBER AND "SYMBOL" NUMBER (these are control # for the factory only.)
  - B. Include in any order.
    - a. Part number.
    - b. Part description.
    - c. Model number.

(any of the above lacking from an order may delay shipment of that order.)

| KEY NO. | SYMBOL NO. | TYPE+<br>W-type<br>Z-type<br>D-type | DESCRIPTION++ | PART NO. |
|---------|------------|-------------------------------------|---------------|----------|
|---------|------------|-------------------------------------|---------------|----------|

### PACKING MATERIALS & ACCESSORIES

|      |         |                                |         |
|------|---------|--------------------------------|---------|
| 001  | 1 1 1 1 | Carton                         | 9825430 |
| 002  | 1 1 1 1 | Pad (L)                        | 9840750 |
| 003  | 1 1 1 1 | Pad (R)                        | 9840760 |
| 004  | 1 1 1 1 | Sack, polyethylene cloth       | 9640650 |
| 005  | 1 1 1 1 | Dryer, SILICA GEL              | 9690010 |
| 006  | 1 1 1 1 | Sack (#13), polyethylene cloth | 9640320 |
| 007a | 1 — — — | Manual (E), instruction        | 960246E |
| 007b | — 1 1 — | Manual (SEI), instruction      | 960247K |
| 007c | — 1 1 — | Manual (K), instruction        | 960247K |
| 007d | — — — 1 | Manual (G), instruction        | 960247K |
| 008  | 1 1 1 1 | Cloth, polishing               | 9690040 |
| 009  | 1 1 1 1 | Cord 2T-1(NK), phono pin plug  | 962014A |
| 010  | 4 4 4 4 | Plug, shorting pin             | 4440180 |

| KEY NO. | SYMBOL NO. | TYPE+<br>W-type<br>Z-type<br>D-type | DESCRIPTION++ | PART NO. |
|---------|------------|-------------------------------------|---------------|----------|
|---------|------------|-------------------------------------|---------------|----------|

|       |         |                                         |         |
|-------|---------|-----------------------------------------|---------|
| 108   | 1 1 1 1 | Cloth, DUST COV 2442 — for power switch | 7001760 |
| ★109  | 1 1 1 1 | LED, GD-4-207RD                         | 5060010 |
| 110   | 3 3 3 3 | Nut, SN 9φ                              | 892249S |
| 111   | 3 3 3 3 | Washer, W 9φ                            | 893109S |
| ★112a | 1 — — — | Cover, metal                            | 7820870 |
| 112b  | — 1 1 1 | Cover, metal                            | 7820880 |
| 113   | 4 4 4 4 | Screw, TFS 4φ x 10                      | 887410W |
| 114   | 4 4 4 4 | Washer, W 4φ                            | 893104W |
| 115   | 4 4 4 4 | Screw, PTS 3φ x 6                       | 814306W |
| 116   | 1 1 1 1 | Plate, bottom                           | 7325210 |
| 117   | 6 6 6 6 | Screw, PTS 3φ x 6 BLK                   | 814306W |
| 118   | 1 1 1 1 | Plate, bottom shield                    | 7226700 |
| 119   | 4 4 4 4 | Screw, PTS 3φ x 6 BLK                   | 814306W |
| 120   | 4 4 4 4 | Foot                                    | 7401350 |
| 121   | 4 4 4 4 | Screw, PTS 3φ x 8                       | 814308S |

### CABINET ASSEMBLY

|       |         |                                                                       |         |
|-------|---------|-----------------------------------------------------------------------|---------|
| 101a  | 2 2 2 2 | Knob, 2GL-34D — SELECTOR/ATTE-NUATOR «GOLD MODEL»                     | 7851460 |
| ★101b | 2 2 2 2 | Knob, 2BK-34D — SELECTOR/ATTE-NUATOR «BLACK MODEL»                    | 7851740 |
| 102a  | 3 3 3 3 | Knob, 2GL-23D — BALANCE/BASS/TREBLE «GOLD MODEL»                      | 7851670 |
| ★102b | 3 3 3 3 | Knob, 2BK-23D — BALANCE/BASS/TREBLE «BLACK MODEL»                     | 7851770 |
| ★103  | 2 2 2 2 | Knob, P2BK-16LVD — PHONO IMPED-ANCE/PHONO 2 LEVEL                     | 7851800 |
| ★104  | 2 2 2 2 | Washer, POLY SL 10φ — for P2BK-16LVD                                  | 7001920 |
| 105a  | 4 4 4 4 | Knob, tab type, 15GL-8LS — DUBBING/MONITOR/FILTER/POWER «GOLD MODEL»  | 7841110 |
| ★105b | 4 4 4 4 | Knob, tab type, 15BK-8LS — DUBBING/MONITOR/FILTER/POWER «BLACK MODEL» | 7841120 |
| 106a  | 1 1 1 1 | Panel (GI), front — «GOLD MODEL»                                      | 7884150 |
| ★106b | 1 1 1 — | Panel (BW), front — «BLACK MODEL»                                     | 7884160 |
| 106c  | — — — 1 | Panel (BY), front — «BLACK MODEL»                                     | 7884160 |
| 107   | 1 1 1 1 | Cloth, DUST COV (3) — for dubbing, monitor, filter switches           | 7001950 |

### CHASSIS ASSEMBLY

|       |          |                                          |         |
|-------|----------|------------------------------------------|---------|
| ★201  | 2 2 2 2  | Angle, side                              | 7226630 |
| ★202  | 1 1 1 1  | Holder, PC board                         | 7226650 |
| 203   | 8 8 8 8  | Screw, PTS 3φ x 6                        | 814306S |
| ★204  | 1 1 1 1  | Angle, center                            | 7226670 |
| ★205  | 1 1 1 1  | Lug, solder                              | 4400000 |
| 206   | 3 3 3 3  | Screw, PTS 3φ x 6 (Front Plate Assembly) | 814306S |
| 207   | 2 2 2 2  | Screw, PTS 3φ x 6 (Back Plate Assembly)  | 814306S |
| 208   | 6 5 5 5  | Screw, PTS 3φ x 6 BLK                    | 814306W |
| 209   | 10111111 | Screw, PTS 3φ x 8 BLK                    | 814308W |
| ★210  | 1 1 1 1  | Holder, power transformer                | 7226670 |
| ★211a | T1       | Transformer, power, T-1-330 — 120V only  | 1103300 |
| 211b  | T2       | Transformer, power, T-1-331 — 220/240V   | 1103310 |
| 212   | 4 4 4 4  | Screw, BLTS 4φ x 6                       | 874406S |
| 213   | 4 4 4 4  | Washer, TW(1) 4φ                         | 893404U |
| ★214a | F1       | Fuse, 1A                                 | 4700590 |
| 215b  | 1 — — —  | Holder, fuse                             | 4581840 |
| 216c  | 1 — — —  | Screw, PTS 3φ x 10                       | 814310S |
| 214a  | F2       | Fuse, midget, 500mA T — time-lag         | 4720310 |
| 215b  | — 1 1 1  | Holder, midget fuse                      | 4581430 |

**PART ORDERING PROCEDURE**..... A. DO NOT USE THE "KEY" NUMBER AND "SYMBOL" NUMBER. (these are control # for the factory only)  
B. Include in any order: a. Part number, b. Part description, c. Model number. (any of the above lacking from an order may delay shipment of that order.)

| KEY NO. | SYMBOL NO. | TYPE+<br>W-type-u<br>-type-n<br>-type-d<br>-type-g<br>W-Z-D | DESCRIPTION++                                 | PART NO. |
|---------|------------|-------------------------------------------------------------|-----------------------------------------------|----------|
| 216c    |            | - 1 1 1                                                     | Screw. PTS 3 $\phi$ x 8<br>(PRE AMP PCB ASSY) | 814308S  |
| 217     |            | 1 1 1 1                                                     | Spacer (#885) — for attenuator                | 7152230  |
| 218     |            | 2 2 2 2                                                     | Screw. PTS 3 $\phi$ x 8                       | 814308S  |
| 219     |            | 1 1 1 1                                                     | Washer. TW(1) 3 $\phi$<br>(TONE PCB ASSY)     | 893403U  |
| 220     |            | 1 1 1 1                                                     | Spacer (#885) — for bass control              | 7152230  |
| 221     |            | 2 2 2 2                                                     | Screw. PTS 3 $\phi$ x 6                       | 814306S  |
| 222     |            | 1 1 1 1                                                     | Washer. TW(1) 3 $\phi$                        | 893403U  |

| KEY NO. | SYMBOL NO. | TYPE+<br>W-type-u<br>-type-n<br>-type-d<br>-type-g<br>W-Z-D | DESCRIPTION++                 | PART NO. |
|---------|------------|-------------------------------------------------------------|-------------------------------|----------|
| 403b    |            | 1 1 1 1                                                     | Bracket (EH), cord stopper    | 7029800  |
| ★404    |            | 3 - - -                                                     | Socket, AC                    | 4500150  |
| 405     |            | - 1 1 1                                                     | Plate, blind                  | 7031690  |
| 406     |            | 2 1 1 1                                                     | Screw. PTS 3 $\phi$ x 6 BLK   | 814306W  |
| 407     |            | - 1 1 1                                                     | Screw. PTS 3 $\phi$ x 8 BLK   | 814308W  |
| 408     |            | 1 1 1 1                                                     | Shaft (MK-3), ground terminal | 7152050  |
| ★409    |            | 1 1 1 1                                                     | Nut (MK-21), ground terminal  | 7152060  |
| 410     |            | 1 1 1 1                                                     | Washer. W 3 $\phi$            | 893203D  |
| 411     |            | 1 1 1 1                                                     | Nut. 1N 3 $\phi$              | 892013S  |
| 412     |            | 1 1 1 1                                                     | Washer. TW(1) 3 $\phi$        | 893403U  |
| 413     |            | 1 1 1 1                                                     | Lug, solder                   | 4400000  |

### FRONT PLATE ASSEMBLY

|      |        |         |                                                   |         |
|------|--------|---------|---------------------------------------------------|---------|
| ★301 |        | 1 1 1 1 | Plate, front                                      | 7325220 |
| ★302 |        | 1 1 1 1 | Holder, lever switch                              | 7226640 |
| 303  |        | 3 3 3 3 | Screw. PTS 3 $\phi$ x 6<br>Dubbing/Monitor Switch | 814306S |
| ★304 |        | 2 2 2 2 | Lever Section. SLL02301D                          | 4025340 |
| 305  |        | 4 4 4 4 | Screw. PMS 3 $\phi$ x 6                           | 810306S |
| ★306 |        | 2 2 2 2 | Wire Section. SWR-216MM<br>Filter Switch          | 4582360 |
| ★307 |        | 1 1 1 1 | Lever Section. SLL02301D                          | 4025340 |
| 308  |        | 2 2 2 2 | Screw. PMS 3 $\phi$ x 6                           | 810306S |
| ★309 |        | 1 1 1 1 | Wire Section. SWR-168MM                           | 4582350 |
| ★310 |        | 1 1 1 1 | Bearing — for phono impedance                     | 7152340 |
| 311  |        | 1 1 1 1 | Nut. SN 9 $\phi$                                  | 892249S |
| 312  |        | 1 1 1 1 | Washer. TW(1) 9 $\phi$                            | 893409U |
| 313  |        | 1 1 1 1 | Washer. W 9 $\phi$                                | 893109S |
| ★314 |        | 1 1 1 1 | Shaft                                             | 7152390 |
| ★315 |        | 1 1 1 1 | Joint                                             | 7121060 |
| 316  |        | 4 4 4 4 | Screw. SET SCW 3 x 4                              | 7121070 |
| ★317 |        | 1 1 1 1 | Bearing — for selector switch                     | 7152340 |
| 318  |        | 1 1 1 1 | Spacer (#985)                                     | 7152240 |
| 319  |        | 1 1 1 1 | Washer. TW(1) 9 $\phi$                            | 893409U |
| 320  |        | 1 1 1 1 | Washer. W 9 $\phi$                                | 893109S |
| ★321 |        | 1 1 1 1 | Shaft                                             | 7152390 |
| ★322 |        | 1 1 1 1 | Joint                                             | 7121060 |
| 323  |        | 4 4 4 4 | Screw. SET SCW 3 x 4                              | 7121070 |
| 324a | S6     | 1 - - - | Switch, lever — POWER                             | 4025290 |
| 324b | S7     | - 1 1 1 | Switch, lever — POWER                             | 4025150 |
| 325  |        | 2 2 2 2 | Screw. PMS 3 $\phi$ x 6                           | 810306S |
| 326  | C1     | 1 - - - | C-CAP 0.0047uf 125VAC                             | 239472C |
| 327  | C2, C3 | - 2 2 2 | C-CAP 0.0047uf 250VAC                             | 239472E |
| 328  |        | - 2 2 2 | Cover (M), C-CAP                                  | 7400980 |

### BACK PLATE ASSEMBLY

|       |  |         |                        |         |
|-------|--|---------|------------------------|---------|
| ★401a |  | 1 - - - | Plate, back            | 7325230 |
| 401b  |  | - 1 1 1 | Plate, back            | 7325240 |
| ★402a |  | 1 - - - | Cord, AC line. SPT-2   | 606008A |
| 402b  |  | - 1 1 1 | Cord, AC line. CEE-2T  | 600508A |
| 403a  |  | 1 1 1 1 | Stopper, Cord. SR-4N-4 | 7400690 |

### PREAMP PC BOARD

|                  |         |               |                                                                               |         |
|------------------|---------|---------------|-------------------------------------------------------------------------------|---------|
| ★500             |         | 1 1 1 1       | PC Board, complete. PRE AMP PCB ASSY                                          | 9441350 |
| ★501             |         | 1 1 1 1       | PCB Stay                                                                      | 7226680 |
| ★502             |         | 4 4 4 4       | Terminals, pin jack. CB 2P x 2 (SE) —<br>TUNER, AUX/TAPE 1/TAPE 2/OUT-<br>PUT | 4444030 |
| ★503             |         | 1 1 1 1       | Terminals, pin jack. CB 2P x 2 (G) —<br>PHONO                                 | 4444050 |
| (EQ AMP SECTION) |         |               |                                                                               |         |
| C401,C402        | 2 2 2 2 | C-CAP         | 100pf 10% 50V SL                                                              | 232101K |
| C403,C404        | 2 2 2 2 | M-CAP         | 0.01uf 10% 50V                                                                | 222103K |
| C405,C406        | 2 2 2 2 | C-CAP         | 22pf 10% 50V SL                                                               | 232220K |
| C407,C408        | 2 2 2 2 | M-CAP         | 0.01uf 10% 50V                                                                | 222103K |
| C409,C410        | 2 2 2 2 | M-CAP         | 0.039uf 2% 50V ECQ-P                                                          | 228393G |
| C411,C412        | 2 2 2 2 | M-CAP         | 0.011uf 2% 50V ECQ-P                                                          | 228113G |
| C413,C414        | 2 2 2 2 | S-CAP         | 470pf 5% 50V                                                                  | 223471V |
| C415,C416        | 2 2 2 2 | M-CAP         | 2.2uf 10% 100V                                                                | 282225K |
| C417,C418        | 2 2 2 2 | C-CAP         | 330pf 10% 50V SL                                                              | 232331K |
| C419             | 1 1 1 1 | C-CAP         | 0.047uf 80, -20% 50V YG                                                       | 231473Z |
| D401,D402        | 2 2 2 2 | Diode         | VD1212                                                                        | 505016S |
| Q401,D402        | 2 2 2 2 | FET           | 2SK131(K)                                                                     | 516028S |
| Q403             |         |               |                                                                               |         |
| ~Q406            | 2 2 2 2 | FET           | 2SK106(D)                                                                     | 516029S |
| Q407             |         |               |                                                                               |         |
| ~Q410            | 4 4 4 4 | FET           | UP07(C)                                                                       | 517004S |
| Q411             |         |               |                                                                               |         |
| ~Q416            | 6 6 6 6 | FET           | UN07(DS)                                                                      | 516030S |
| Q417,Q418        | 2 2 2 2 | Transistor    | 2SD381(M,N)                                                                   | 510038S |
| R401             |         |               |                                                                               |         |
| ~R404            | 4 4 4 4 | RES           | 2.2megohm 5% 1/4W                                                             | 328225J |
| R405,R406        | 2 2 2 2 | RES           | 27kohm 5% 1/4W                                                                | 328273J |
| R407,R408        | 2 2 2 2 | RES           | 100kohm 5% 1/4W                                                               | 328104J |
| R409,R410        | 2 2 2 2 | RES           | 68ohm 5% 1/4W                                                                 | 328680J |
| R411,R412        | 2 2 2 2 | RES           | 100kohm 5% 1/4W                                                               | 328104J |
| R413,R414        | 2 2 2 2 | RES           | 82kohm 5% 1/4W                                                                | 328823J |
| R415,R416        | 2 2 2 2 | RES           | 22kohm 5% 1/4W                                                                | 328223J |
| R417,R418        | 2 2 2 2 | Potentiometer | B50kohm (M-HVR-<br>RVG-0911V)                                                 | 4300840 |
| R419             |         |               |                                                                               |         |
| ~R422            | 4 4 4 4 | RES           | 68kohm 5% 1/4W                                                                | 328683J |

**PART ORDERING PROCEDURE**..... A. DO NOT USE THE "KEY" NUMBER AND "SYMBOL" NUMBER. (these are control # for the factory only)  
 B. Include in any order: a. Part number. b. Part description, c. Model number. (any of the above lacking from an order may delay shipment of that order.)

| KEY NO. | SYMBOL NO. | TYPE+<br>W-type-u<br>E-type-n<br>Z-type-d<br>D-type-g | DESCRIPTION++                                        | PART NO. | KEY NO. | SYMBOL NO. | TYPE+<br>W-type-u<br>E-type-n<br>Z-type-d<br>D-type-g | DESCRIPTION++                                               | PART NO. |
|---------|------------|-------------------------------------------------------|------------------------------------------------------|----------|---------|------------|-------------------------------------------------------|-------------------------------------------------------------|----------|
|         | R423,R424  | 2 2 2 2                                               | RES 220kohm 5% 1/4W                                  | 328224J  |         | R541,R542  | 2 2 2 2                                               | RES 470ohm 5% 1/4W                                          | 328471J  |
|         | R425,R426  | 2 2 2 2                                               | RES 390ohm 5% 1/4W                                   | 328391J  |         | R543+R544  |                                                       | -VR4-                                                       |          |
|         | R427,R428  | 2 2 2 2                                               | RES 4.7kohm 5% 1/4W                                  | 328472J  |         | R545+R546  |                                                       | -1/2 VR5-                                                   |          |
|         | R429,R430  | 2 2 2 2                                               | RES 39kohm 5% 1/4W                                   | 328393J  |         | R547,R548  | 2 2 2 2                                               | RES 1megohm 5% 1/4W                                         | 328105J  |
|         | R433,R434  | 2 2 2 2                                               | RES 22kohm 5% 1/4W                                   | 328223J  |         | R549,R550  | 2 2 2 2                                               | RES 22kohm 5% 1/4W                                          | 328223J  |
|         | R435,R436  | 2 2 2 2                                               | NF-MO-RES 27ohm 5% 1/2W                              | 360270L  |         | R551,R552  | 2 2 2 2                                               | RES 10kohm 5% 1/4W                                          | 328103J  |
|         | R437,R438  | 2 2 2 2                                               | M-RES 82kohm 2% 1/4W MR25G                           | 304823G  |         |            |                                                       |                                                             |          |
|         | R439,R440  | 2 2 2 2                                               | M-RES 6.8kohm 2% 1/4W MR25G                          | 304682G  | ★506    | S3, S4     | 2 2 2 2                                               | Switch, lever slide, SSR24302D -<br>DUBBING/MONITOR         | 4020530  |
|         | R441,R442  | 2 2 2 2                                               | RES 68ohm 5% 1/4W                                    | 328680J  |         | VR4        | 1 1 1 1                                               | VR MN250kohm(GJ60E024) -<br>BALANCE                         | 4320820  |
|         | R443,R444  | 2 2 2 2                                               | RES 18ohm 5% 1/4W                                    | 328180J  |         | VR5        | 1 1 1 1                                               | VR S50kohm x 2 + S100kohm x 2<br>(WKHJ-110A03) - ATTENUATOR | 4390140  |
|         | R445,R446  | 2 2 2 2                                               | RES 150ohm 5% 1/4W                                   | 328151J  |         |            |                                                       |                                                             |          |
|         | R447,R448  | 2 2 2 2                                               | RES 470ohm 5% 1/4W                                   | 328471J  |         |            |                                                       |                                                             |          |
|         | R449+R450  |                                                       | -VR1-                                                |          |         |            |                                                       |                                                             |          |
| ★504    | S1         | 1 1 1 1                                               | Switch, rotary slide, SRZ-K084S -<br>SELECTOR        | 4055150  |         |            |                                                       |                                                             |          |
| ★505    | S2         | 1 1 1 1                                               | Switch, rotary slide, SRZ-V043S -<br>PHONO IMPEDANCE | 4051090  |         |            |                                                       |                                                             |          |
|         | VR1        | 1 1 1 1                                               | VR A100kohm x 2(GM80R640C) -<br>PHONO 2 LEVEL        | 4320830  |         |            |                                                       | (FILTER AMP SECTION)                                        |          |
|         |            | 2 2 2 2                                               | Heat Sink - for Q411~413/Q414~416                    | 7082060  |         | C601,C602  | 2 2 2 2                                               | M-CAP 0.012uf 10% 50V                                       | 222123K  |
|         | 10101010   |                                                       | Screw, PTS 3φ x 8                                    | 814308S  |         | C603,C604  | 2 2 2 2                                               | M-CAP 0.47uf 10% 100V                                       | 282474K  |
|         |            | 2 2 2 2                                               | Washer, TW(II) 3φ                                    | 893403U  |         | C605       |                                                       |                                                             |          |
|         |            | 2 2 2 2                                               | Heat Sink (S10) - for Q417, Q418                     | 7081820  |         | ~C608      | 4 4 4 4                                               | M-CAP 0.033uf 10% 50V                                       | 222333K  |
|         |            | 2 2 2 2                                               | Screw, PMS 3φ x 6                                    | 810306S  |         | C609,C610  | 2 2 2 2                                               | M-CAP 3.3uf 10% 100V                                        | 282335K  |
|         |            | 2 2 2 2                                               | Washer, TW(II) 3φ                                    | 893403U  |         | Q601,Q602  | 2 2 2 2                                               | FET UN07(D)                                                 | 516031S  |
|         |            |                                                       |                                                      |          |         | Q603,Q604  | 2 2 2 2                                               | FET UP07(D)                                                 | 517003S  |
|         |            |                                                       |                                                      |          |         |            |                                                       |                                                             |          |
|         |            |                                                       | (FLAT AMP SECTION)                                   |          |         | R601       |                                                       |                                                             |          |
|         | C501,C502  | 2 2 2 2                                               | C-CAP 100pt 10% 50V SL                               | 232101K  |         | ~R608      | 8 8 8 8                                               | RES 1megohm 5% 1/4W                                         | 328105J  |
|         | C503,C504  | 2 2 2 2                                               | M-CAP 0.01uf 10% 50V                                 | 222103K  |         | R609,R610  | 2 2 2 2                                               | RES 150kohm 5% 1/4W                                         | 328154J  |
|         | C505,C506  |                                                       | -DELETED-                                            |          |         | R611       |                                                       |                                                             |          |
|         | C507,C508  | 2 2 2 2                                               | M-CAP 3.3uf 10% 100V                                 | 282335K  |         | ~R614      | 4 4 4 4                                               | RES 680kohm 5% 1/4W                                         | 328684J  |
|         | C509,C510  | 2 2 2 2                                               | M-CAP 0.0012uf 10% 50V                               | 222122K  |         | R615       |                                                       |                                                             |          |
|         | C511       |                                                       |                                                      |          |         | ~R618      | 4 4 4 4                                               | MO-RES 180ohm 5% 1/2W                                       | 360181L  |
|         | ~C514      | 2 2 2 2                                               | E-CAP 25R100uf                                       | 211330V  |         | R619,R620  | 2 2 2 2                                               | RES 100ohm 5% 1/4W                                          | 328101J  |
|         | C515,C516  | 2 2 2 2                                               | C-CAP 5pf ±0.5pf 50V SL                              | 232509D  |         | R621,R622  | 2 2 2 2                                               | RES 220kohm 5% 1/4W                                         | 328224J  |
|         | C517,C518  | 2 2 2 2                                               | M-CAP 1uf 10% 100V                                   | 282105K  |         | R623,R624  | 2 2 2 2                                               | RES 47kohm 5% 1/4W                                          | 328473J  |
|         | C527       | 1 1 1 1                                               | C-CAP 0.047uf 80, -20% 50V YG                        | 231473Z  | ★507    | S5         | 1 1 1 1                                               | Switch, lever slide, SSR24301D -<br>FILTER                  | 4020520  |
|         | Q501       |                                                       |                                                      |          |         |            |                                                       |                                                             |          |
|         | ~Q508      | 8 8 8 8                                               | FET 2SK106(D)                                        | 516029S  |         |            |                                                       | (REGULATOR SECTION)                                         |          |
|         | Q509       |                                                       |                                                      |          |         | C805       | 1 1 1 1                                               | M-CAP 0.01uf 10% 50V                                        | 222103J  |
|         | ~Q512      | 4 4 4 4                                               | FET UP07(C)                                          | 517004S  |         | C806       | 1 1 1 1                                               | E-CAP 10R100uf                                              | 211130V  |
|         | Q513,Q514  | 2 2 2 2                                               | FET UN07(D)                                          | 516031S  |         | C807       | 1 1 1 1                                               | E-CAP 50R10uf                                               | 211520V  |
|         |            |                                                       |                                                      |          |         | C808       |                                                       | -DELETED-                                                   |          |
|         | R501       |                                                       |                                                      |          |         | C809       | 1 1 1 1                                               | E-CAP 50R47uf                                               | 211525V  |
|         | ~R508      | 2 2 2 2                                               | RES 2.2megohm 5% 1/4W                                | 328225J  |         | C810       | 1 1 1 1                                               | M-CAP 0.01uf 10% 50V                                        | 222103J  |
|         | R509       |                                                       |                                                      |          |         | C811       | 1 1 1 1                                               | E-CAP 10R100uf                                              | 211130V  |
|         | ~R512      | 2 2 2 2                                               | RES 2.2kohm 5% 1/4W                                  | 328222J  |         | C812       | 1 1 1 1                                               | E-CAP 50R10uf                                               | 211520V  |
|         | R513,R514  | 2 2 2 2                                               | RES 100kohm 5% 1/4W                                  | 328104J  |         | C813       |                                                       | -DELETED-                                                   |          |
|         | R515+R516  |                                                       | -1/2 VR5-                                            |          |         | C814       | 1 1 1 1                                               | E-CAP 50R47uf                                               | 211525V  |
|         | R517,R518  | 2 2 2 2                                               | RES 470ohm 5% 1/4W                                   | 328471J  |         | Q801       | 1 1 1 1                                               | FET 2SK106(B)                                               | 516033S  |
|         | R519,R520  | 2 2 2 2                                               | RES 1megohm 5% 1/4W                                  | 328105J  |         | Q802       | 1 1 1 1                                               | Transistor, 2SD381(M,N)                                     | 510038S  |
|         | R521,R522  | 2 2 2 2                                               | RES 82kohm 5% 1/4W                                   | 328823J  |         | Q803       | 1 1 1 1                                               | Transistor, 2SC2089(BL)                                     | 511024S  |
|         | R523,R524  | 2 2 2 2                                               | RES 22kohm 5% 1/4W                                   | 328223J  |         | Q804       | 1 1 1 1                                               | Transistor, 2SC945L(P,Q)                                    | 515077S  |
|         | R525       |                                                       |                                                      |          |         | Q805       | 1 1 1 1                                               | FET 2SK106(B)                                               | 516033S  |
|         | ~R528      | 2 2 2 2                                               | RES 18kohm 5% 1/4W                                   | 328183J  |         | Q806       | 1 1 1 1                                               | Transistor, 2SB536(M,N)                                     | 510039S  |
|         | R529,R530  | 2 2 2 2                                               | RES 27kohm 5% 1/4W                                   | 328273J  |         | Q807       | 1 1 1 1                                               | Transistor, 2SA942(BL)                                      | 510049S  |
|         | R531,R532  |                                                       | -DELETED-                                            |          |         | Q808       | 1 1 1 1                                               | Transistor, 2SA733(Q,R)                                     | 514074S  |
|         | R533,R534  | 2 2 2 2                                               | RES 3.9kohm 5% 1/4W                                  | 328392J  |         |            |                                                       |                                                             |          |
|         | R535       |                                                       |                                                      |          |         |            |                                                       |                                                             |          |
|         | ~R538      | 2 2 2 2                                               | MO-RES 22kohm 5% 1/2W                                | 360223L  |         |            |                                                       |                                                             |          |
|         | R539,R540  | 2 2 2 2                                               | MO-RES 8.2kohm 5% 1W                                 | 361822L  |         |            |                                                       |                                                             |          |

**PART ORDERING PROCEDURE**----- A. DO NOT USE THE "KEY" NUMBER AND "SYMBOL" NUMBER. (these are control # for the factory only)  
 B. Include in any order: a. Part number, b. Part description, c. Model number, (any of the above lacking from an order may delay shipment of that order.)

| KEY NO. | SYMBOL NO. | TYPE+<br>W-type-u<br>E-type-n<br>Z-type-o<br>D-type-g | DESCRIPTION++                     | PART NO. |
|---------|------------|-------------------------------------------------------|-----------------------------------|----------|
|         | R802       | 1 1 1 1                                               | MO-RES 150ohm 5% 1/2W             | 360151L  |
|         | R803       | 1 1 1 1                                               | RES 22kohm 5% 1/4W                | 328223J  |
|         | R804       | 1 1 1 1                                               | RES 15kohm 5% 1/4W                | 328153J  |
|         | R805       | 1 1 1 1                                               | MO-RES 3.3kohm 5% 1/2W            | 360332L  |
|         | R806       | 1 1 1 1                                               | MO-RES 150ohm 5% 1/2W             | 360151L  |
|         | R807       | 1 1 1 1                                               | RES 22kohm 5% 1/4W                | 328223J  |
|         | R808       | 1 1 1 1                                               | RES 15kohm 5% 1/4W                | 328153J  |
|         | R809       | 1 1 1 1                                               | MO-RES 3.3kohm 5% 1/2W            | 360332L  |
|         | ZD801,     |                                                       |                                   |          |
|         | ZD802      | 2 2 2 2                                               | Zener Diode. RD8.2EB1             | 502052S  |
|         |            | 2 2 2 2                                               | Heat Sink (S10) — for Q802, Q806  | 7081820  |
|         |            | 2 2 2 2                                               | Screw. PMS 3φ x 6                 | 810306S  |
|         |            | 2 2 2 2                                               | Washer. TW(1) 3φ                  | 893403U  |
|         |            |                                                       | (RELAY DRIVER SECTION)            |          |
|         | C816       | 1 1 1 1                                               | E-CAP 16R220uf                    | 211232V  |
|         | D806       | 1 1 1 1                                               | Diode. 1S2076A — navy blue        | 501020S  |
|         | D807       | 1 1 1 1                                               | Diode. 1S2076 — light blue        | 501019S  |
|         | Q809       | 1 1 1 1                                               | Transistor. 2SC2089(BL)           | 511024S  |
|         | R810       | 1 1 1 1                                               | RES 68kohm 5% 1/4W                | 328683J  |
|         | RY801      | 1 1 1 1                                               | Reed Relay. URT103                | 1700200  |
|         | ZD803      | 1 1 1 1                                               | Zener Diode. RD4.7EB2             | 502051S  |
|         |            |                                                       | <b>TONE PC BOARD</b>              |          |
| ★600    | 1 1 1 1    |                                                       | PC Board, complete. TONE PCB ASSY | 9441330  |

| KEY NO. | SYMBOL NO. | TYPE+<br>W-type-u<br>E-type-n<br>Z-type-o<br>D-type-g | DESCRIPTION++                         | PART NO. |
|---------|------------|-------------------------------------------------------|---------------------------------------|----------|
| ★601    |            | 1 1 1 1                                               | Plate, shield                         | 7226690  |
|         |            |                                                       | (TONE SECTION)                        |          |
|         | C519,C520  | 2 2 2 2                                               | M-CAP 0.027uf 5% 50V                  | 222273J  |
|         | C521,C522  | 2 2 2 2                                               | M-CAP 0.15uf 5% 50V                   | 222154J  |
|         | C523,C524  | 2 2 2 2                                               | M-CAP 0.0033uf 5% 50V                 | 222332J  |
|         | C525,C526  | 2 2 2 2                                               | M-CAP 0.018uf 5% 50V                  | 222183J  |
|         | R553,R554  | 2 2 2 2                                               | RES 22kohm 5% 1/4W                    | 328223J  |
|         | R555+R556  |                                                       | —VR2—                                 |          |
|         | R557       |                                                       |                                       |          |
|         | ~R560      | 4 4 4 4                                               | RES 3.9kohm 5% 1/4W                   | 328392J  |
|         | R561+R562  |                                                       | —VR3—                                 |          |
|         | R563,R564  | 2 2 2 2                                               | RES 680ohm 5% 1/4W                    | 328681J  |
|         | R565,R566  | 2 2 2 2                                               | RES 1megohm 5% 1/4W                   | 328105J  |
|         | VR2        | 1 1 1 1                                               | VR V24L5G4PHN-25R61Z100Kx2—<br>BASS   | 4320840  |
|         | VR3        | 1 1 1 1                                               | VR V24L5G4PHN-25R62Z100Kx2—<br>TREBLE | 4320850  |
|         |            |                                                       | (REGULATOR SECTION)                   |          |
|         | C801       | 1 1 1 1                                               | C-CAP 0.01uf 100, —0% 500V            | 23B103P  |
|         | C802,C803  | 2 2 2 2                                               | E-CAP 63R1000uf TSW                   | 217640Q  |
|         | C804       | 1 1 1 1                                               | E-CAP 16R100uf                        | 211230V  |
|         | D801       |                                                       |                                       |          |
|         | ~D804      | 4 4 4 4                                               | Diode. S5277D                         | 560047S  |
|         | D805       | 1 1 1 1                                               | Diode. 1S2076A                        | 501020S  |
|         | R801       | 1 1 1 1                                               | MO-RES 560ohm 5% 1W                   | 361561L  |
| ★602    | 1 1 1 1    |                                                       | Socket (3021-2-N), LED cable          | 4510090  |



# SEMICONDUCTOR DATA

1 NOTES Ge: Germanium  
Si: Silicon

A: Alloy  
B: Base  
D: Diffused  
Dd: Double-diffused

Df: Drift-field  
E: Epitaxial  
G: Grown  
J: Junction

M: Mesa  
P: Planar  
Pc: Point-contact  
Td: Triple-diffused

## TRANSISTORS

| DEVICE<br>TYPE | APPLICATIONS                  | STRUC-<br>TURE† | MAXIMUM RATINGS Absolute Maximum Values:<br>(TA = 25°C unless otherwise specified) |                                           |                                    |                                             |                                            | ELECTRICAL CHARACTERISTICS Typical Values: (TA = 25°C unless otherwise specified) |            |                                          |            |                 |                                         |              |                     |                        |                   |                                           |         |          | MANU-<br>FACTURER |
|----------------|-------------------------------|-----------------|------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------|------------|------------------------------------------|------------|-----------------|-----------------------------------------|--------------|---------------------|------------------------|-------------------|-------------------------------------------|---------|----------|-------------------|
|                |                               |                 | Collector-to-Base<br>Voltage<br>VCBO<br>(V)                                        | Emitter-to-Base<br>Voltage<br>VEBO<br>(V) | Collector<br>Current<br>IC<br>(mA) | Collector<br>Dissipa-<br>tion<br>PC<br>(mW) | Junction<br>Tempera-<br>ture<br>TJ<br>(°C) | Collector Cutoff<br>Current<br>ICBO<br>(μA)                                       | VCE<br>(V) | Static Forward Current<br>Transfer Ratio |            |                 | Collector-Emitter<br>Saturation Voltage |              |                     | Gain-Bandwidth Product |                   | Output<br>Capaci-<br>tance<br>Cob<br>(pF) | Others  |          |                   |
|                |                               |                 |                                                                                    |                                           |                                    |                                             |                                            |                                                                                   | hFE        | VCE<br>(V)                               | IC<br>(mA) | VCE(sat)<br>(V) | IC<br>(mA)                              | IB<br>(mA)   | fT<br>fcb*<br>(MHz) | VCE<br>VCE*<br>(V)     | IE<br>IE*<br>(mA) |                                           |         |          |                   |
| 2SA733(Q,R)    | AF                            | PNP<br>Si-E     | -50                                                                                | -5                                        | -100                               | 250                                         | 125                                        | -0.1                                                                              | -40        | 90<br>~270                               | -6         | -1              | -0.1                                    | -30          | -3                  | 180                    | -6                | 10                                        | 12      |          | NEC               |
| 2SA942(B,L)    | AF: Low noise<br>amp.         | PNP<br>Si-E     | -90                                                                                | -5                                        | -50                                | 300                                         | 125                                        | -0.1                                                                              | -90        | 350<br>~700                              | -6         | -2              | -0.4                                    | -10          | -1                  |                        |                   |                                           | 5.0 max | NF=6.0dB | TOSHIBA           |
| 2SB536(M,N)    | AF: Power amp.                | PNP<br>Si-E     | -130                                                                               | -5                                        | -1.5A<br>(TC=25°C)                 | 20W                                         | 150                                        | -1.0                                                                              | -120       | 60<br>~160                               | -12        | -2              | max                                     | -1A<br>~0.1A |                     | 40                     | -5                | -0.1A*                                    | 35      |          | NEC               |
| 2SC945(L,P,Q)  | AF: Low noise<br>general amp. | NPN<br>Si-E     | 50                                                                                 | 5                                         | 100                                | 250                                         | 125                                        | 0.1                                                                               | 60         | 135<br>~400                              | 5          | 1               | 0.15                                    | 100          | 10                  | 250                    | 5                 | 10                                        | 3.5     |          | NEC               |
| 2SC7089(B,L)   | AF: Low noise<br>amp.         | NPN<br>Si-E     | 120                                                                                | 5                                         | 50                                 | 300                                         | 125                                        | 0.1                                                                               | 120        | 350<br>~700                              | 5          | 2               | 0.3                                     | 10           | 1                   |                        |                   |                                           | 3.0 max | NF=6.0dB | TOSHIBA           |

## FIELD EFFECT TRANSISTORS

| DEVICE TYPE | APPLICATIONS       | STRUCTURE†              | MAXIMUM RATINGS Absolute Maximum Values:<br>(TA = 25°C unless otherwise specified) |                                 |                      |                       |                           |                              |                             |                                          |                         |                    | ELECTRICAL CHARACTERISTICS Typical Values: (TA = 25°C unless otherwise specified) |         |                     |          |                                |         |                                |          |                 |           |                 |                     | MANUFACTURER         |
|-------------|--------------------|-------------------------|------------------------------------------------------------------------------------|---------------------------------|----------------------|-----------------------|---------------------------|------------------------------|-----------------------------|------------------------------------------|-------------------------|--------------------|-----------------------------------------------------------------------------------|---------|---------------------|----------|--------------------------------|---------|--------------------------------|----------|-----------------|-----------|-----------------|---------------------|----------------------|
|             |                    |                         | Gate-to-Drain Voltage VG0 (V)                                                      | Gate-to-Source Voltage VGS0 (V) | Gate Current IG (mA) | Drain Current ID (mA) | Total Dissipation PD (mW) | Channel Temperature Tch (°C) | Gate Leak Current IGSS (mA) | Gate-to-Drain Breakdown Voltage VBDG (V) | Drain Current IDSS (mA) | VDS (V)            | Test Conditions                                                                   | VGS (V) | Test Conditions     | VDS (V)  | Test Conditions                | VGS (V) | Test Conditions                | Yfs (mS) | Test Conditions | Ciss (pF) | Test Conditions | Power Gain Gps (dB) | Noise Figure NF (dB) |
| 2SK106 (B)  | AF: Low noise amp. | N-channel Si-J          | -50                                                                                |                                 | 10                   | 20                    | 300                       | 125                          | VGS=-30V<br>VDS=0V          | -10 max                                  |                         | VDS=10V<br>VGS=0V  | 1~3<br>4~12                                                                       | VGS=0V  | VDS=10V<br>ID=10μA  | -1.5 max | VDS=10V<br>ID=0.5mA<br>f=1kHz  | 3.5 min |                                |          |                 |           |                 |                     | HITACHI              |
| 2SK106 (D)  |                    |                         |                                                                                    |                                 |                      |                       |                           |                              |                             |                                          |                         |                    |                                                                                   |         |                     |          |                                |         |                                |          |                 |           |                 |                     |                      |
| 2SK131 (K)  | AF: Low noise amp. | N-channel Si-J Dual FET | -30                                                                                | -30                             | 10                   | 50                    | 250                       | 125                          | VGS=-20V<br>VDS=0V          | -1.0                                     |                         | VDS=5.0V<br>VGS=0V | 5.0~12.0                                                                          | VGS=0V  | VDS=5.0V<br>ID=10μA | -1.5 max | VDS=5.0V<br>ID=5.0mA<br>f=1kHz | 32      | VDS=5.0V<br>ID=5.0mA<br>f=1kHz | 10       |                 |           |                 |                     | NEC                  |
| UN07 (D)    | AF                 | N-channel Si-J          | -100                                                                               | -50                             | 10                   | 50                    | 800                       | 125                          | VGS=-30V<br>VDS=0V          | -5.0 max                                 |                         | VDS=50V<br>VGS=0V  | 8.0~24.0<br>12.0~24.0                                                             | VGS=0V  | VDS=50V<br>ID=1μA   | -1.2     | VDS=50V<br>ID=1mA<br>f=1kHz    | 3.8     | VGS=-50V<br>ID=1mA<br>f=1kHz   | 2.0      |                 |           |                 |                     | SHINDENGEN           |
| UN07 (DS)   |                    |                         |                                                                                    |                                 |                      |                       |                           |                              |                             |                                          |                         |                    |                                                                                   |         |                     |          |                                |         |                                |          |                 |           |                 |                     |                      |
| UP07 (C)    | AF                 | P-channel Si-J          | 100                                                                                | 50                              | 10                   | 50                    | 800                       | 125                          | VGS=30V<br>VDS=0V           | 5.0 max                                  |                         | VDS=-50V<br>VGS=0V | 4.0~12.0<br>8.0~12.0                                                              | VGS=0V  | VDS=-50V<br>ID=-1μA | 1.2      | VDS=-50V<br>ID=-1μA<br>f=1kHz  | 3.8     | VGS=-50V<br>ID=-1μA<br>f=1kHz  | 2.0      |                 |           |                 |                     | SHINDENGEN           |
| UP07 (D)    |                    |                         |                                                                                    |                                 |                      |                       |                           |                              |                             |                                          |                         |                    |                                                                                   |         |                     |          |                                |         |                                |          |                 |           |                 |                     |                      |

## DIODES, LEDS

| DEVICE TYPE | APPLICATIONS     | STRUCTURE <sup>1</sup> | MAXIMUM RATINGS Absolute - Maximum Values:<br>(T <sub>A</sub> = 25°C unless otherwise specified) |                                             |                                       |                                             |                                              |                                                  |                                                   |                                             |                                                |                        | ELECTRICAL CHARACTERISTICS Typical Values<br>(T <sub>A</sub> = 25°C unless otherwise specified) |                       |                                       |                         |                                      |                               |         |  |  |  | MANUFACTURER |
|-------------|------------------|------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------------|---------------------------------------------|----------------------------------------------|--------------------------------------------------|---------------------------------------------------|---------------------------------------------|------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------|-------------------------|--------------------------------------|-------------------------------|---------|--|--|--|--------------|
|             |                  |                        | Reverse Surge Voltage<br>V <sub>RSurge</sub> (V)                                                 | Peak Reverse Voltage<br>V <sub>RM</sub> (V) | Reverse Voltage<br>V <sub>R</sub> (V) | Peak Forward Voltage<br>V <sub>FM</sub> (V) | Peak Forward Current<br>I <sub>FM</sub> (mA) | Average Rectified Current<br>I <sub>O</sub> (mA) | Forward Surge Current<br>I <sub>F surge</sub> (A) | Junction Temperature<br>T <sub>J</sub> (°C) | Total Power Dissipation<br>P <sub>D</sub> (mW) | Forward Current        |                                                                                                 | Forward Voltage       |                                       | Reverse Current         |                                      | Others                        |         |  |  |  |              |
|             |                  |                        |                                                                                                  |                                             |                                       |                                             |                                              |                                                  |                                                   |                                             |                                                | I <sub>Fmin</sub> (mA) | Test Condition<br>V <sub>F</sub> (V)                                                            | V <sub>Fmax</sub> (V) | Test Condition<br>I <sub>F</sub> (mA) | I <sub>IRmax</sub> (μA) | Test Condition<br>V <sub>R</sub> (V) |                               |         |  |  |  |              |
|             |                  |                        |                                                                                                  |                                             |                                       |                                             |                                              |                                                  |                                                   |                                             |                                                |                        |                                                                                                 |                       |                                       |                         |                                      |                               |         |  |  |  |              |
| 1S2075      | Various detector | Si-DJ                  |                                                                                                  | 35                                          | 30                                    |                                             | 450                                          | 150                                              | 1                                                 | 175                                         | 250                                            |                        |                                                                                                 | 0.8                   | 10                                    | 1                       | 30                                   |                               | HITACHI |  |  |  |              |
| 1S2078A     | Various detector | Si-DJ                  |                                                                                                  | 70                                          | 60                                    |                                             | 450                                          | 150                                              | 1                                                 | 175                                         | 250                                            |                        |                                                                                                 | 0.8                   | 10                                    | 1                       | 30                                   |                               | HITACHI |  |  |  |              |
| SS277D      | Rectifier        | Si-DJ                  |                                                                                                  | 200                                         |                                       |                                             | 2.0A                                         | 1.0A                                             | 50A                                               | 150                                         |                                                |                        |                                                                                                 | 1.2                   | 1.0A                                  | 10                      | 200                                  |                               | TOSHIBA |  |  |  |              |
| GD 4-207RD  | LED lamp         | GaP-J                  |                                                                                                  |                                             | 3                                     |                                             |                                              | I <sub>F</sub> =50mA                             |                                                   | 100                                         | 100                                            |                        |                                                                                                 | 1.7                   | 20                                    | 100                     | 3                                    | 10ft-L (I <sub>F</sub> =20mA) | STANLEY |  |  |  |              |

## ZENER DIODES

| DEVICE TYPE | APPLICATIONS            | STRUCTURE† | MAXIMUM RATINGS Absolute - Maximum Values:<br>(TA = 25°C unless otherwise specified) |                      |                              |                  | ELECTRICAL CHARACTERISTICS Typical Values: (TA = 25°C unless otherwise specified) |                            |                    |                 |                 |                 |                 |                 |                 |                 |                 |                 | MANUFACTURER |
|-------------|-------------------------|------------|--------------------------------------------------------------------------------------|----------------------|------------------------------|------------------|-----------------------------------------------------------------------------------|----------------------------|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|
|             |                         |            | Total Power Dissipation PD (mW)                                                      | Zener Current IZ (A) | Junction Temperature TJ (°C) | Zener Voltage VZ | Differential Resistance FZ                                                        | Temperature Coefficient γZ | Reverse Current IZ | Test Conditions | Test Conditions | Test Conditions | Test Conditions | Test Conditions | Test Conditions | Test Conditions | Test Conditions | Test Conditions |              |
| RD4.7EB2    | Stabilized power supply |            | 400                                                                                  |                      | 175                          | 4.55             | 4.80                                                                              | 20                         | 35                 | 20              |                 |                 |                 |                 |                 | 10              | 1.0             |                 | NEC          |
| RD8.2EB1    | Stabilized power supply |            | 400                                                                                  |                      | 175                          | 7.53             | 7.92                                                                              | 20                         | 10                 | 20              |                 |                 |                 |                 |                 | 2               | 5.0             |                 | NEC          |

**NIKKO ELECTRIC MFG. CO., LTD.**

**HEAD OFFICE**

4-1, Okusawa 3-chome, Setagaya-ku, Tokyo 158, Japan

**SALES OFFICE**

Mitsubishi Bank Bldg., 3-2, Dogenzaka 1-chome  
Shibuya-ku, Tokyo 150, Japan

**NIKKO ELECTRIC CORP. OF AMERICA**

**HEAD OFFICE**

16270 Raymer St., Van Nuys, Ca. 91406, U.S.A.

**NY OFFICE**

218 Sherwood Ave., Farmingdale, NY 11735, U.S.A.

