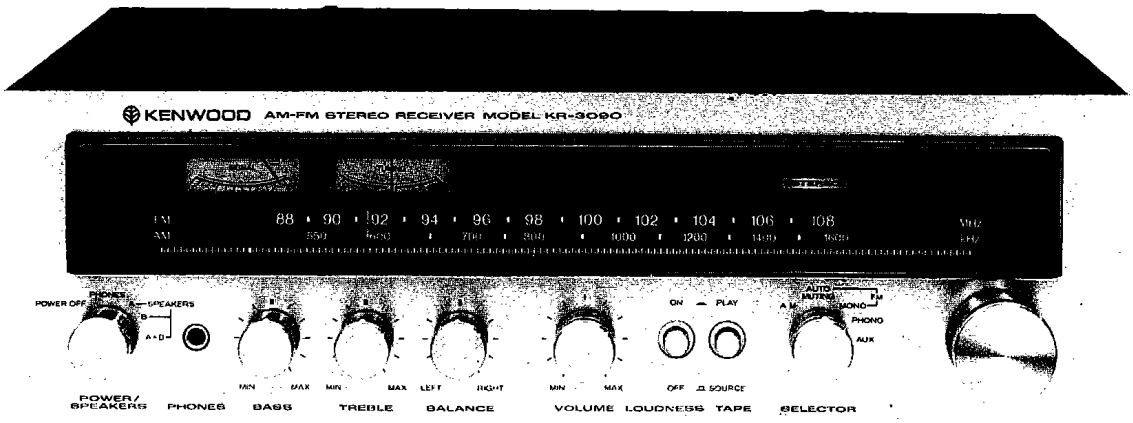
KENWOOD

HI/FI STEREO COMPONENTS

# SERVICE MANUAL

## KR-2090
## KR-3090




## AM-FM STEREO RECEIVER

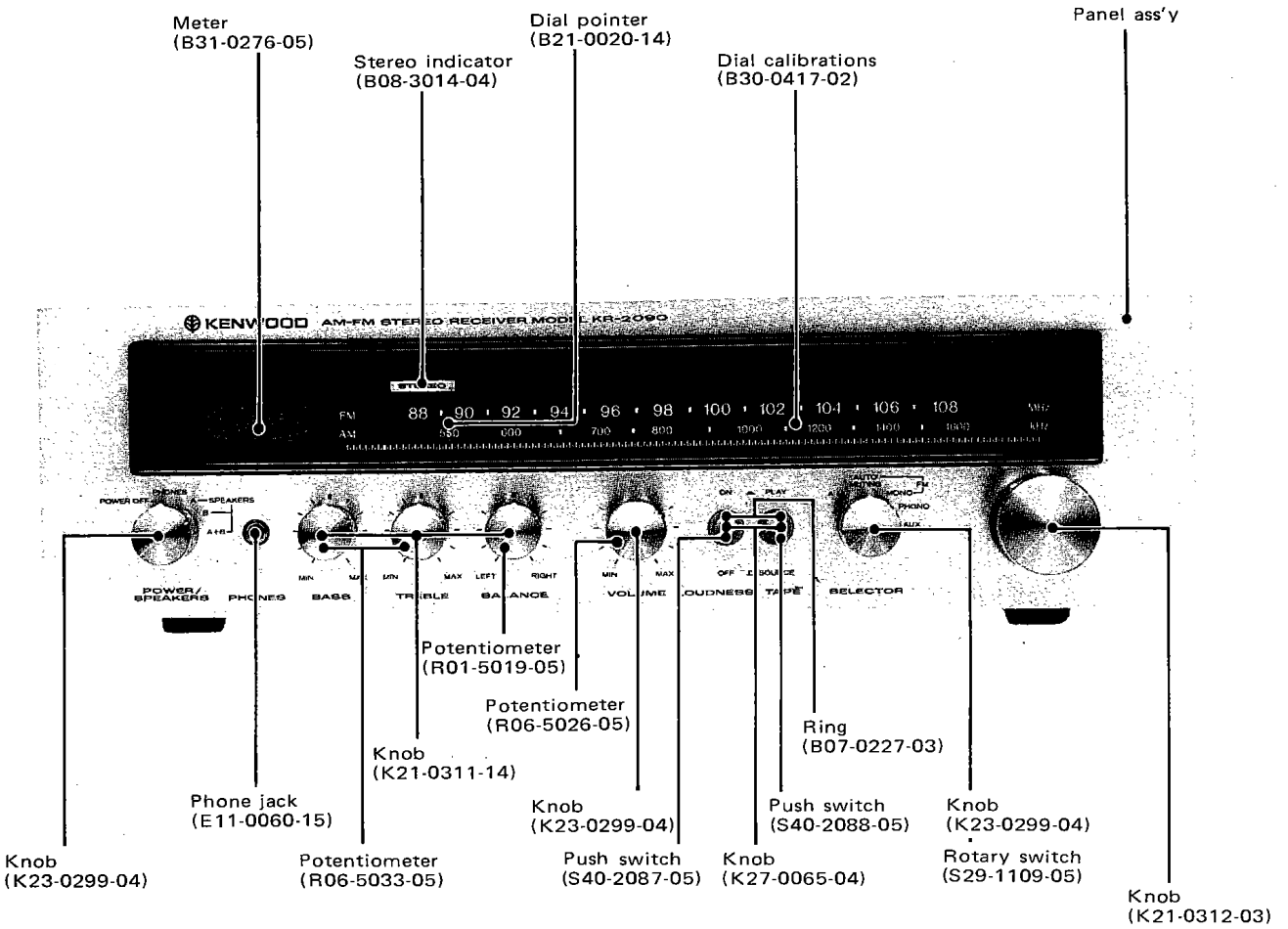
# CONTENTS

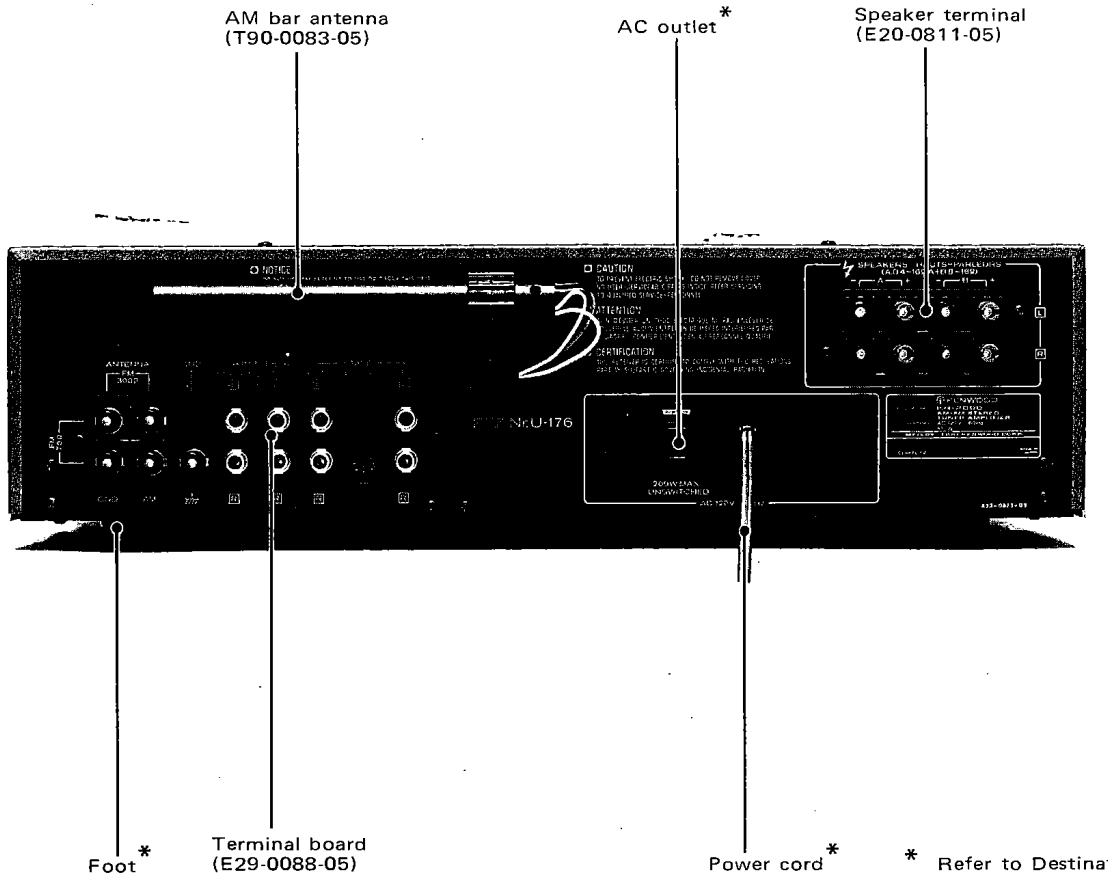


**Note:**
The products are subject to modification in components and circuits in different countries and regions. This is because each product must be used under the best condition. This manual provides information of modification based on the standard in the U.S. for the convenience of ordering associated components and parts.

| | |
|---|---|
| U.S.A. | K |
| Canada | P |
| PX | U |
| Australia | X |
| Europe | W |
| England | T |
| Scandinavia | L |
| South Africa | S |
| Other areas | M |

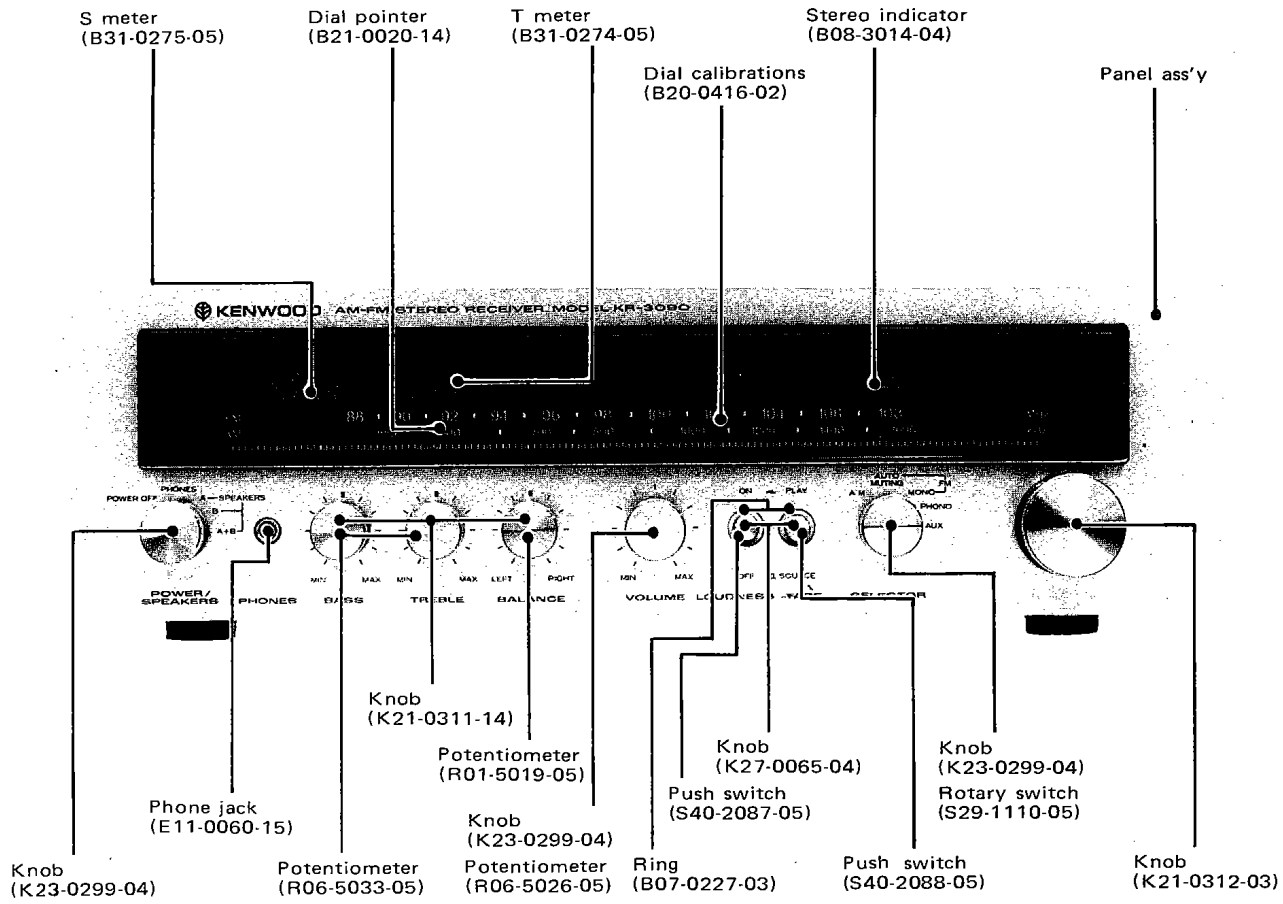
# EXTERNAL VIEW(KR-2090)

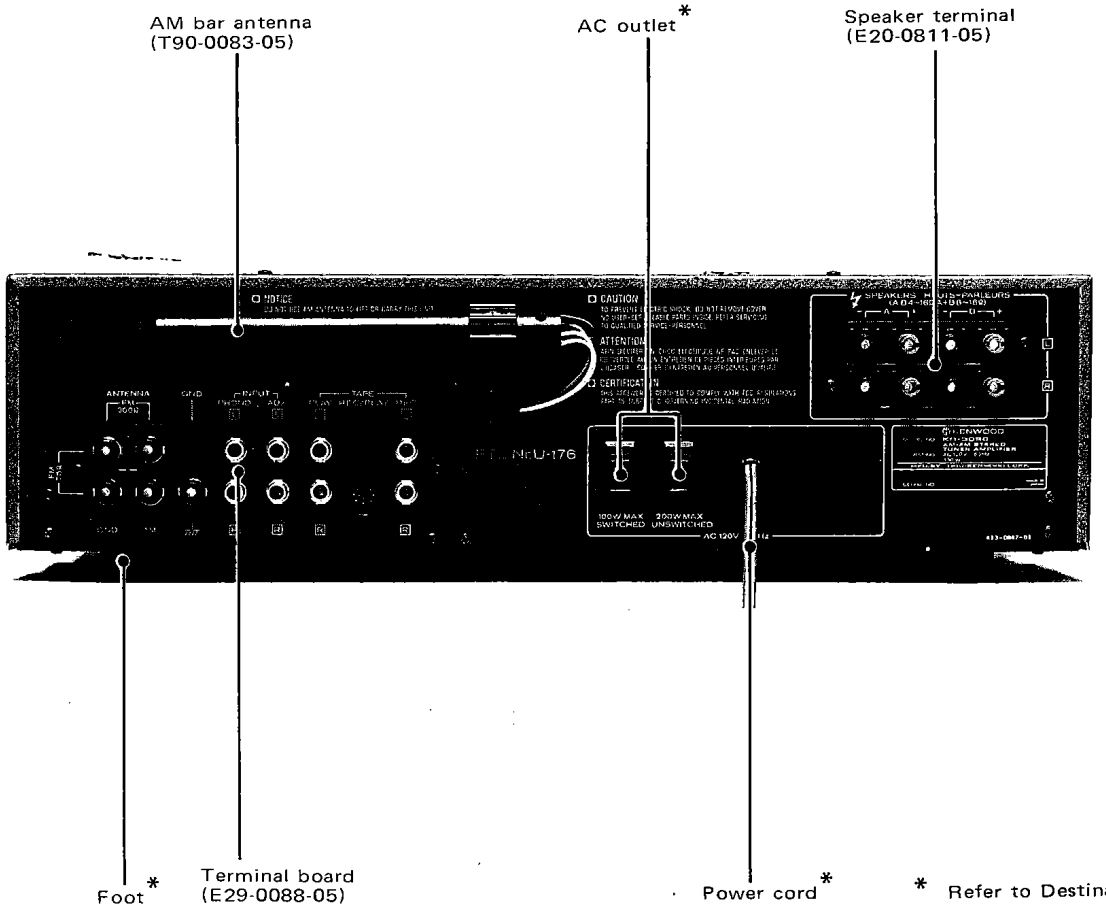



* Refer to Destinations' Parts List.

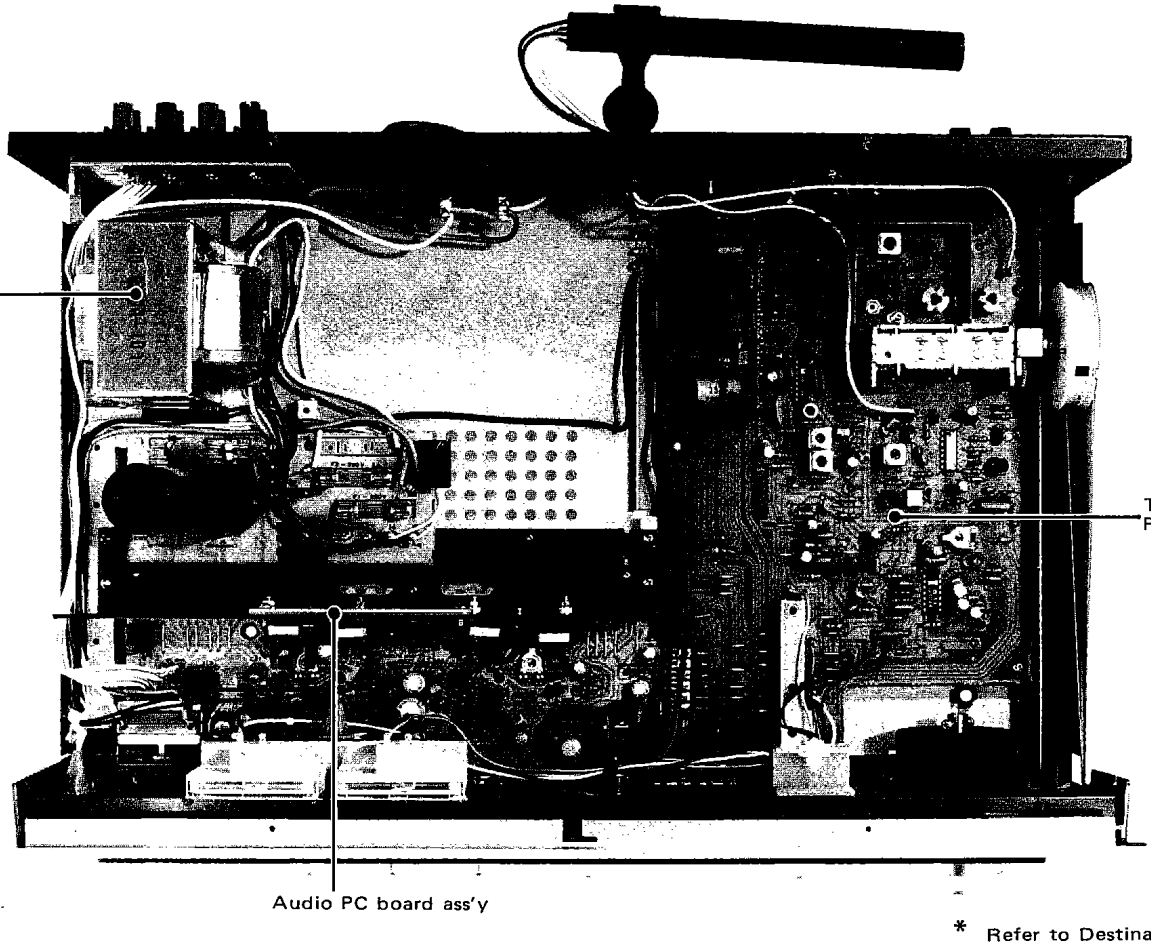
# EXTERNAL VIEW(KR-3090)




* Refer to Destinations' Parts List.

# INTERNAL VIEW/DIAL CORD STRINGING

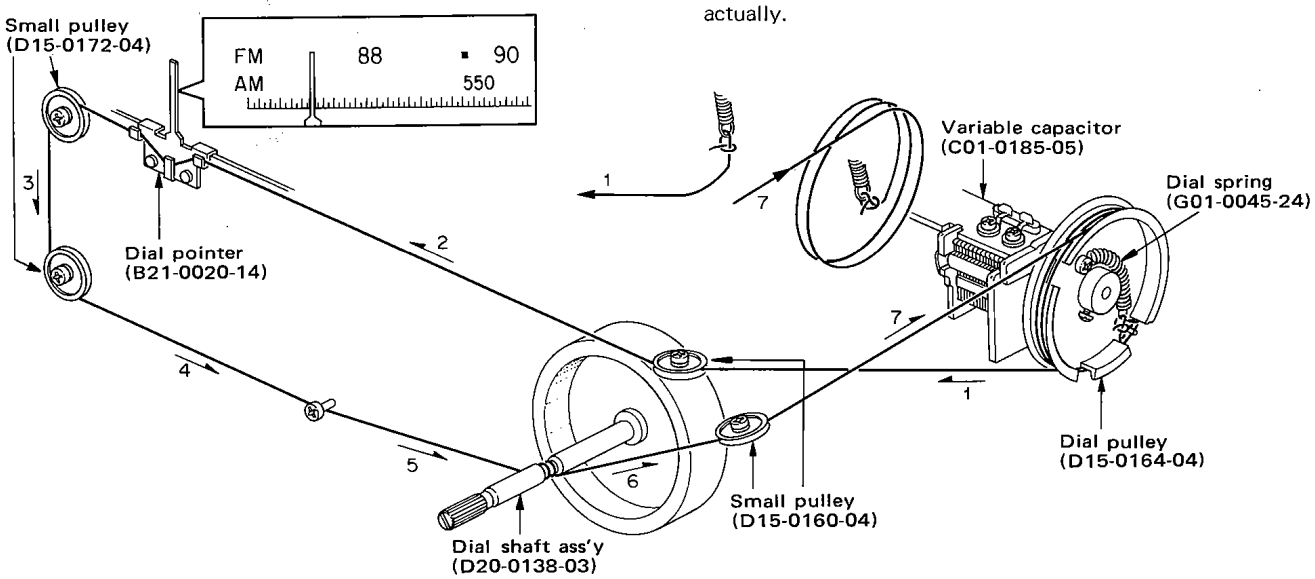



* Refer to Destinations' Parts List.

Photo is KR-3090.

## DIAL CORD STRINGING

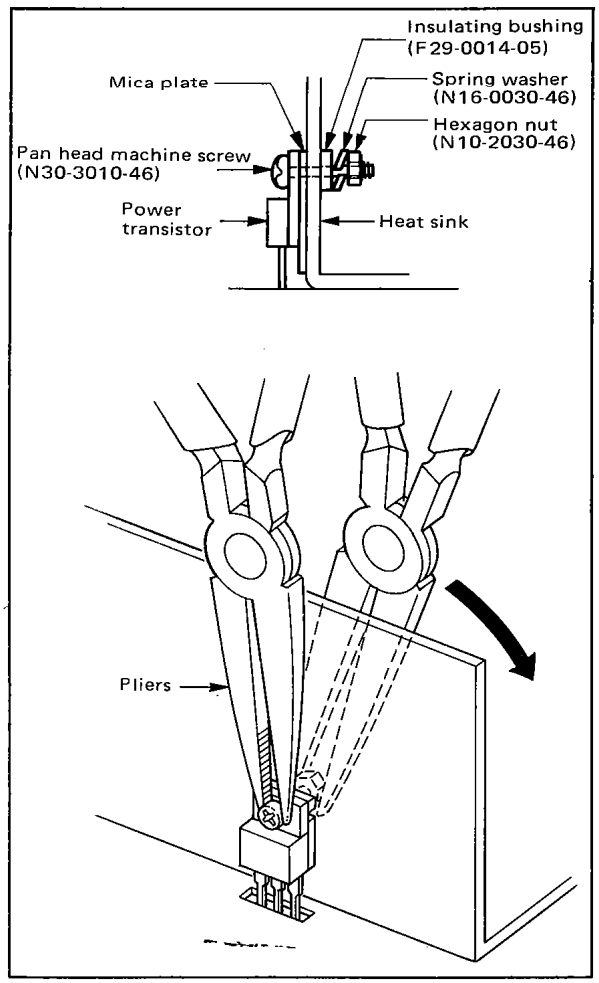
1. Fully close the variable capacitor.
2. Set the dial pulley as illustrated, and fix it with a screw.
3. Tie the end of the dial cord at the dial spring, giving a margin of about 10 cm.
4. Hook the spring on the boss.
5. Dress the dial cord in the direction of "1" to "5", and wind it 2 turns around the dial shaft counterclockwise.
6. Dress the dial cord in the direction of "6" to "7", and wind it two and half turns around the dial pulley starting from its upper side.
7. Tie the dial cord rigidly with the margin cord (about 10 cm, described in 3, above) without permitting any slack.
8. Cut off the unnecessary part of the cord, and release the dial spring from the boss.
9. Mount the dial pointer in position as illustrated. This setting should be checked by receiving a suitable broadcast station actually.

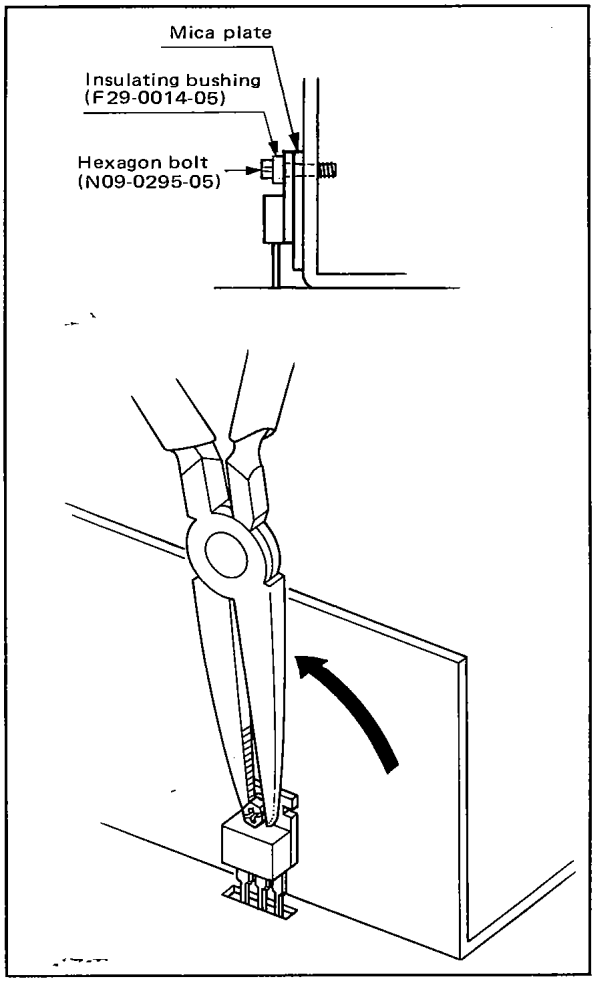


# DISASSEMBLY FOR REPAIR

## POWER TRANSISTOR REPLACEMENT

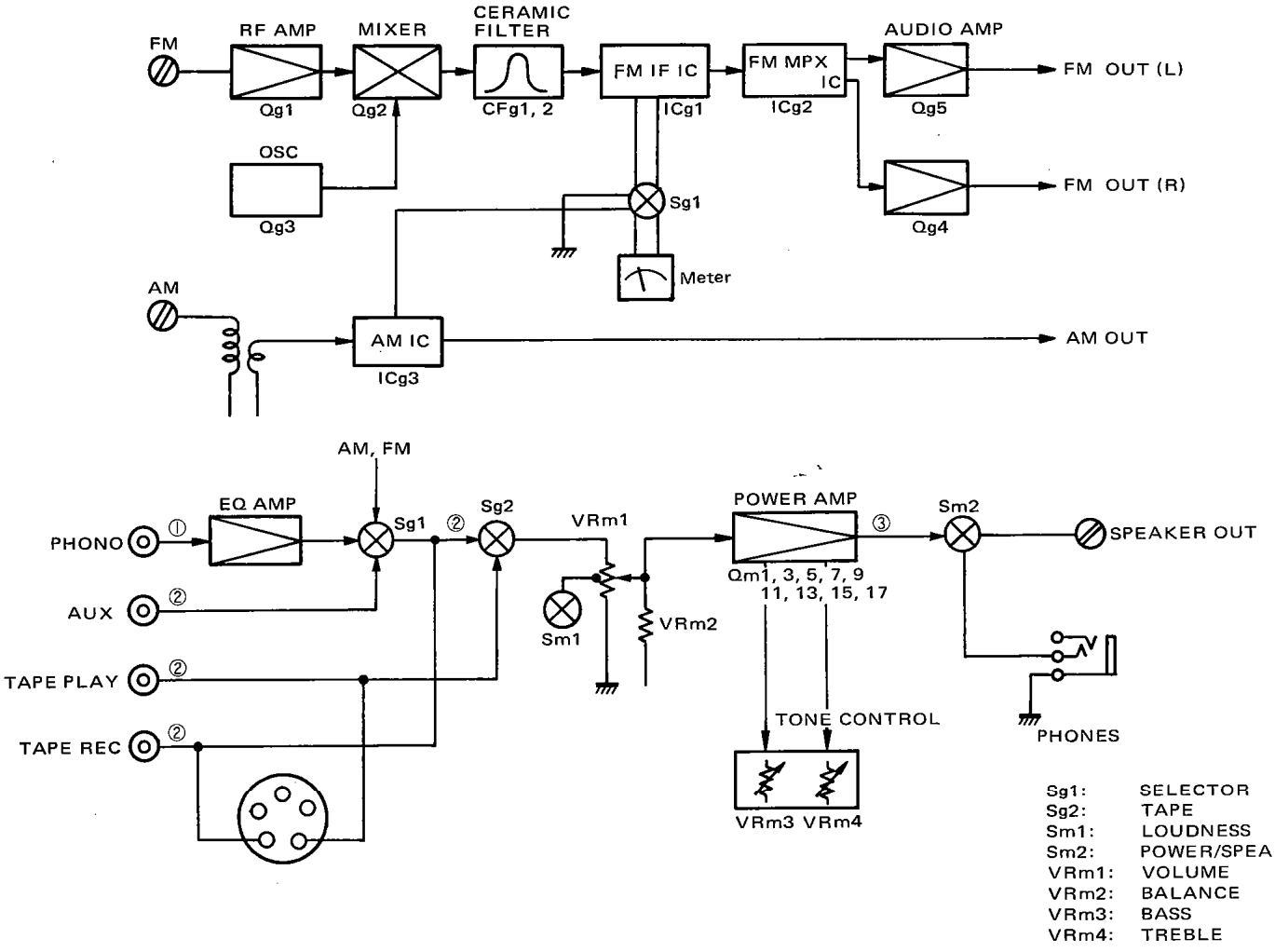
There are two way of fixing the power transistors as illustrated. The power transistor can be removed by using the pliers.



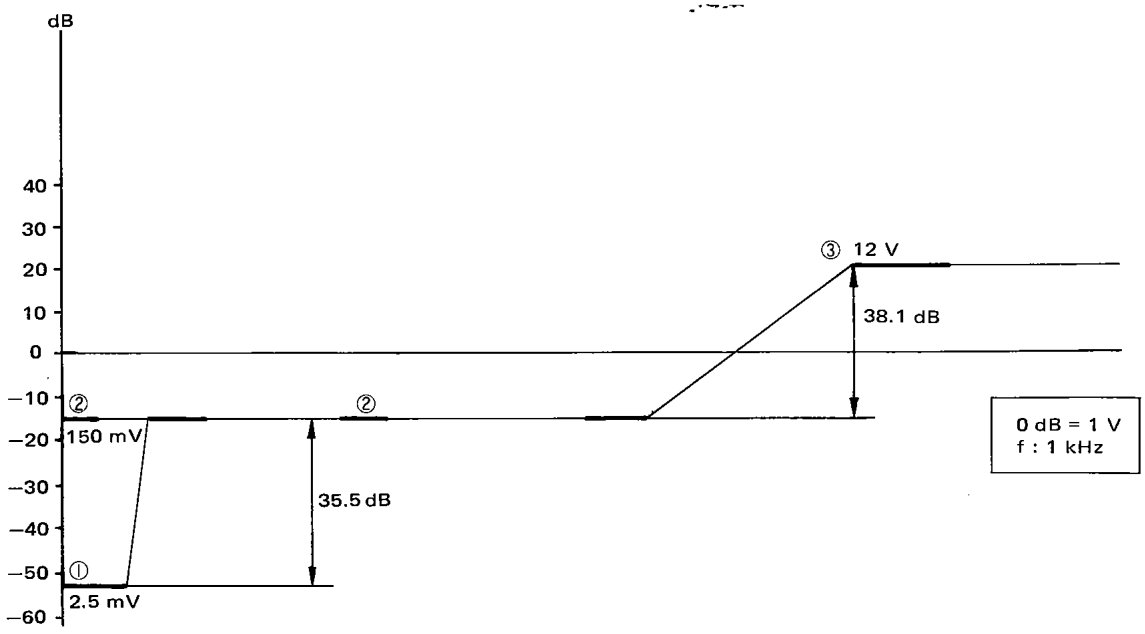
# BLOCK & LEVEL DIAGRAM(KR-2090)

## BLOCK DIAGRAM



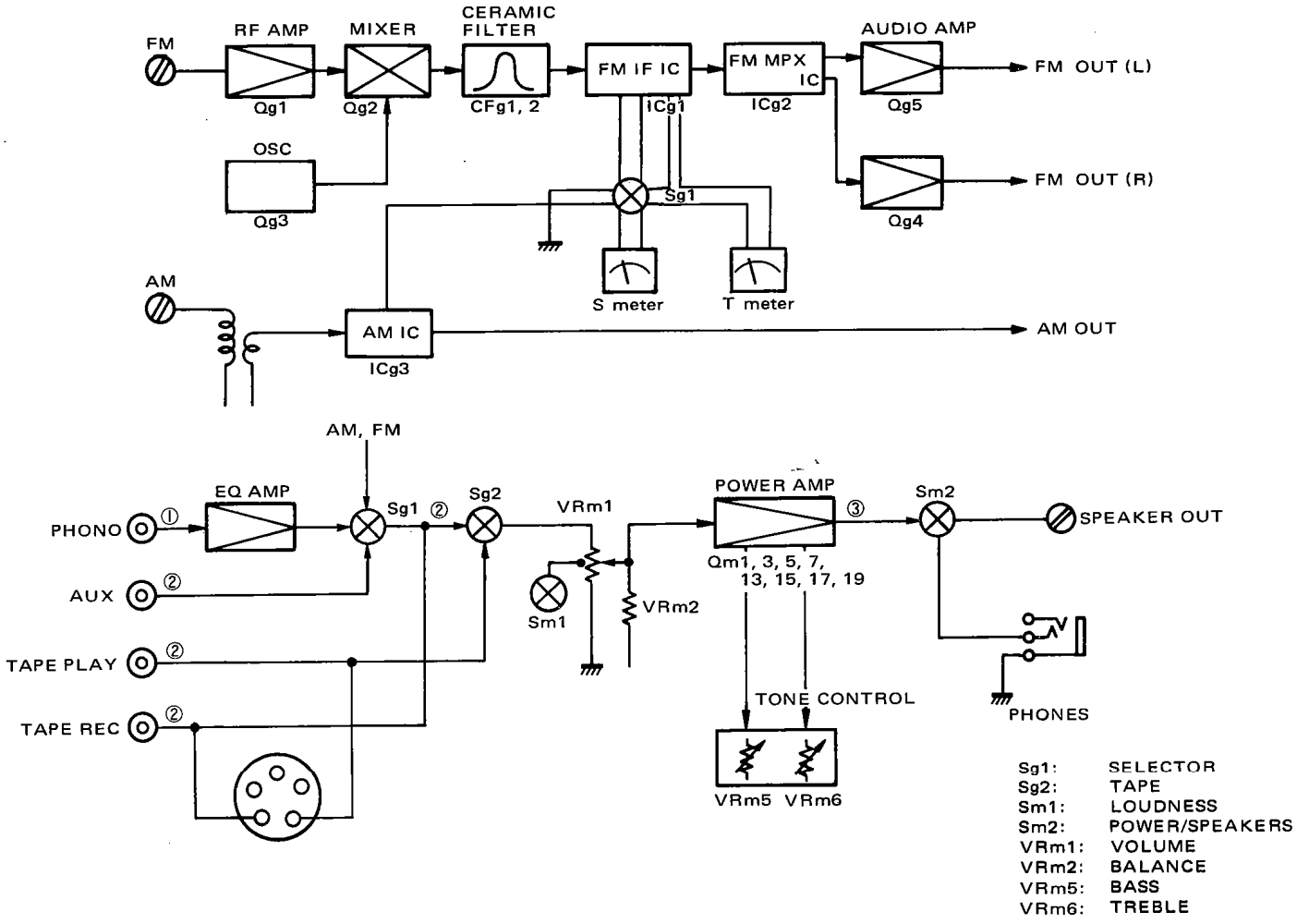

Sg1: SELECTOR
Sg2: TAPE
Sm1: LOUDNESS
Sm2: POWER/SPEAKERS
VRm1: VOLUME
VRm2: BALANCE
VRm3: BASS
VRm4: TREBLE

## LEVEL DIAGRAM



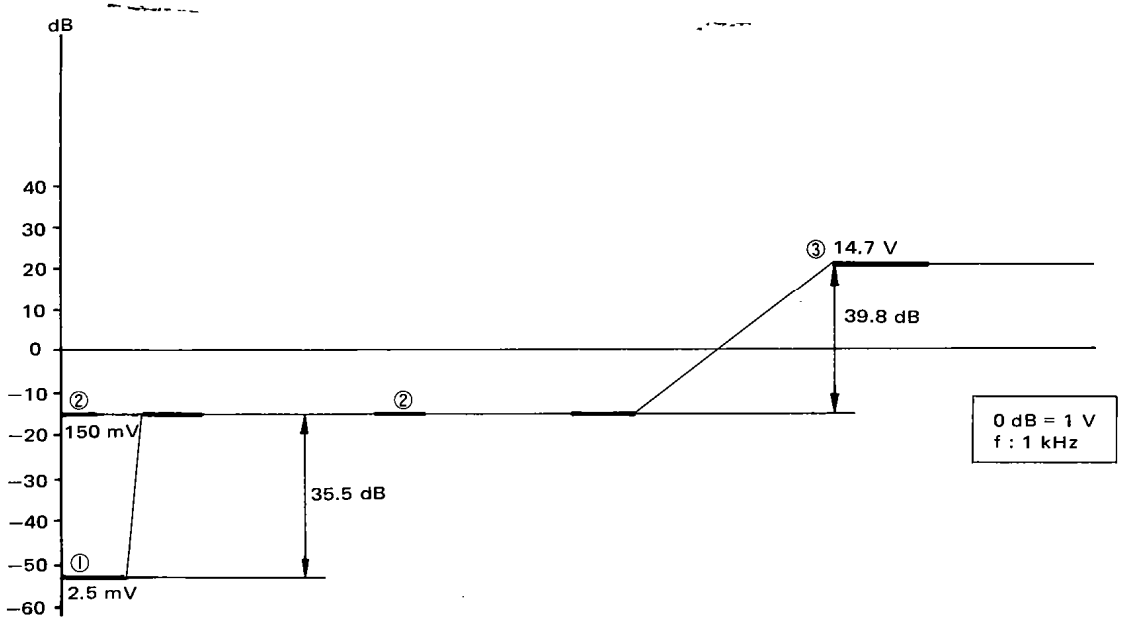
# BLOCK & LEVEL DIAGRAM(KR-3090)

## BLOCK DIAGRAM




Sg1: SELECTOR
Sg2: TAPE
Sm1: LOUDNESS
Sm2: POWER/SPEAKERS
VRm1: VOLUME
VRm2: BALANCE
VRm5: BASS
VRm6: TREBLE

## LEVEL DIAGRAM



☆ : New Parts

| Model | Ref. No. | U.S.A. (K) | Canada (P) | Australia (X) | Europe (W) | Scandinavia (L) | England (T) | South Africa (S) | Other Area (M) | Description |
|---|---|---|---|---|---|---|---|---|---|---|
| KR-2090 | – | A20-1259-03 | A20-1259-03 | A20-1259-03 | A20-1259-03 | A20-1259-03 | A20-1260-03 | A20-1259-03 | A20-1259-03 | Panel ass'y ☆ |
| | – | B46-0061-10 | B46-0055-20 | B46-0064-00☆ | – | – | B46-0060-00 | – | – | Warranty card |
| | – | B50-1710-00 | B50-1712-00 | B50-1710-00 | B50-1710-00 | B50-1710-00 | B50-1711-00 | B50-1710-00 | B50-1712-00 | Instruction manual ☆ |
| | – | – | – | D32-0075-04 | D32-0075-04 | D32-0075-04 | – | D32-0075-04 | D32-0075-04 | Switch stopper (Voltage selector) |
| | – | E03-0008-05 | E03-0008-05 | E03-0008-05 | – | – | – | E03-0008-05 | E03-0008-05 | AC outlet |
| | – | – | – | – | E04-0004-05 | E04-0004-05 | E04-0004-05 | – | – | DIN type coaxial connector plug |
| | – | E30-0181-05 | E30-0181-05 | E30-0185-05 | E30-0459-05 | E30-0292-05 | E30-0602-05 | E30-0602-05 | E30-0545-05 | Power cord |
| | – | H01-1788-04 | H01-1789-04 | H01-1788-04 | H01-1788-04 | H01-1788-04 | H01-1790-04 | H01-1788-04 | H01-1788-04 | Carton box ☆ |
| | – | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0416-04 | Polyethylene cover |
| | – | – | – | – | – | – | – | – | H40-0004-04 | Anti-rust paper |
| | – | J02-0088-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | Foot X 4 |
| | – | J41-0034-05 | J41-0034-05 | J41-0024-15 | J41-0033-05 | J41-0033-05 | J41-0024-15 | J41-0024-15 | J41-0034-05 | Power cord bushing |
| | – | – | – | – | – | J61-0038-05 | – | – | – | Power cord band |
| | – | L01-1511-05 | L01-1518-05 | L01-1515-05 | L01-1516-05 | L01-1516-05 | L01-1517-05 | L01-1515-05 | L01-1515-05 | Power transformer ☆ |
| | – | – | – | S31-2001-05 | S31-2001-05 | S31-2001-05 | – | S31-2001-05 | S31-2001-05 | Slide switch (Voltage selector) |
| | – | X05-1540-11 | X05-1540-11 | X05-1540-62 | X05-1540-62 | X05-1540-62 | X05-1540-62 | X05-1540-62 | X05-1540-82 | Tuner PC board ass'y ☆ |
| | – | X09-1280-10 | X09-1281-01 | X09-1280-81 | X09-1280-61 | X09-1280-61 | X09-1281-71 | X09-1280-81 | X09-1280-81 | Audio PC board ass'y ☆ |
| KR-3090 | – | A20-1256-03 | A20-1256-03 | A20-1256-03 | A20-1256-03 | A20-1256-03 | A20-1257-03 | A20-1256-03 | A20-1256-03 | Panel ass'y ☆ |
| | – | B46-0061-10 | B46-0055-20 | B46-0064-00 | – | – | B46-0060-00 | – | – | Warranty card |
| | – | B50-1707-00 | B50-1709-00 | B50-1707-00 | B50-1707-00 | B50-1707-00 | B50-1708-00 | B50-1707-00 | B50-1709-00 | Instruction manual ☆ |
| | – | – | – | D32-0075-04 | D32-0075-04 | D32-0075-04 | – | D32-0075-04 | D32-0075-04 | Switch stopper (Voltage selector) |
| | – | E03-0008-05 | E03-0008-05 | E03-0008-05 | – | – | – | E03-0008-05 | E03-0008-05 | AC outlet X 2 |
| | – | – | – | – | E04-0004-05 | E04-0004-05 | E04-0004-05 | – | – | DIN type coaxial connector plug |
| | – | E30-0181-05 | E30-0181-05 | E30-0185-05 | E30-0459-05 | E30-0292-05 | E30-0602-05 | E30-0602-05 | E30-0545-05 | Power cord |
| | – | H01-1775-04 | H01-1776-04 | H01-1775-04 | H01-1775-04 | H01-1775-04 | H01-1777-04 | H01-1775-04 | H01-1775-04 | Carton box ☆ |
| | – | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0394-04 | H20-0416-04 | Polyethylene cover |
| | – | – | – | – | – | – | – | – | H40-0004-04 | Anti-rust paper |
| | – | J02-0088-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | J02-0089-05 | Foot X 4 |
| | – | J41-0034-05 | J41-0034-05 | J41-0024-15 | J41-0033-05 | J41-0033-05 | J41-0024-15 | J41-0024-15 | J41-0034-05 | Power cord bushing |
| | – | – | – | – | – | J61-0038-05 | – | – | – | Power cord band |
| | – | L01-1501-05 | L01-1508-05 | L01-1505-05 | L01-1506-05 | L01-1506-05 | L01-1507-05 | L01-1505-05 | L01-1505-05 | Power transformer ☆ |
| | – | – | – | S31-2001-05 | S31-2001-05 | S31-2001-05 | – | S31-2001-05 | S31-2001-05 | Slide switch (Voltage selector) |
| | – | X05-1540-10 | X05-1540-10 | X05-1540-61 | X05-1540-61 | X05-1540-61 | X05-1540-61 | X05-1540-61 | X05-1540-81 | Tuner PC board ass'y ☆ |
| | – | X09-1290-10 | X09-1291-01 | X09-1290-81 | X09-1290-61 | X09-1290-61 | X09-1291-71 | X09-1290-81 | X09-1290-81 | Audio PC board ass'y ☆ |

# PARTS LIST

☆ : New parts
RD: Carbon film resistor
RC: Carbon composition resistor
RW: Wire wound power resistor
RN: Meter film resistor
RS: Metal oxide film resistor

## KR-2090 TOTAL

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **MISCELLANEOUS** | |
| — | A01-0335-03 | Case | |
| — | A30-0136-05 | Dial back board ass'y | ☆ |
| — | B01-0115-02 | Dial escutcheon | |
| — | B07-0227-03 | Ring X 2 (push switch) | |
| — | B08-3014-04 | Stereo indicator | |
| — | B20-0417-02 | Dial calibrations | ☆ |
| — | B21-0020-14 | Dial pointer | |
| — | B30-0132-05 | Pilot lamp 8V, 300mA (Black) | |
| — | B30-0147-05 | Pilot lamp 8V, 300mA (White) | |
| — | B30-0149-05 | Pilot lamp 8V, 50mA | ☆ |
| — | B31-0276-05 | Meter | ☆ |
| — | D15-0160-04 | Small pulley X 2 | |
| — | D15-0164-04 | Dial pulley | |
| — | D15-0172-04 | Small pulley X 2 | |
| — | D20-0138-03 | Dial shaft ass'y | |
| — | G01-0045-24 | Dial spring | |
| — | G01-0358-04 | Spring X 2 (push switch) | |
| — | H10-1508-02 | Polystyrene foamed fixture | |
| — | H10-1509-02 | Polystyrene foamed fixture | |
| — | H25-0078-00 | Instruction bag | |
| — | J19-0306-05 | Lead holder X 2 | |
| — | J19-0506-05 | PC board supporter X 2 | |
| — | J19-0507-05 | Antenna holder | |
| — | J19-0518-04 | Lead stopper board | |
| — | K21-0311-14 | Knob X 3 TONE, BAL | |
| — | K21-0312-03 | Knob TUNING | |
| — | K23-0299-04 | Knob X 3 SEL, VOL, SPKR | |
| — | K27-0065-04 | Knob X 2 Push switch | |
| — | T90-0083-05 | AM bar antenna | |
| — | T90-0202-05 | FM indoor antenna | |
| — | 351-0003-14 | Dial string ($\phi$0.5) | |

## KR-3090 TOTAL

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **MISCELLANEOUS** | |
| — | A01-0355-03 | Case | ☆ |
| — | A30-0135-05 | Dial back board ass'y | ☆ |
| — | B01-0115-02 | Dial escutcheon | ☆ |
| — | B07-0227-03 | Ring X 2 (push switch) | ☆ |
| — | B08-3014-04 | Stereo indicator | ☆ |
| — | B20-0416-02 | Dial calibrations | ☆ |
| — | B21-0020-14 | Dial pointer | ☆ |
| — | B30-0132-05 | Pilot lamp 8V, 300mA (Black) | ☆ |
| — | B30-0147-05 | Pilot lamp 8V, 300mA (White) | ☆ |
| — | B30-0148-05 | Pilot lamp 8V, 50mA | ☆ |
| — | B31-0274-05 | T meter | ☆ |
| — | B31-0275-05 | S meter | ☆ |
| — | D15-0160-04 | Small pulley X 2 | |
| — | D15-0164-04 | Dial pulley | |
| — | D15-0172-04 | Small pulley X 2 | |
| — | D20-0138-03 | Dial shaft ass'y | ☆ |
| — | G01-0045-24 | Dial spring | |
| — | G01-0358-04 | Spring X 2 (push switch) | ☆ |
| — | H10-1508-02 | Polystyrene foamed fixture | ☆ |
| — | H10-1509-02 | Polystyrene foamed fixture | ☆ |
| — | H25-0078-00 | Instruction bag | |
| — | J19-0306-05 | Lead holder X 2 | |
| — | J19-0506-05 | PC board supporter X 2 | |
| — | J19-0507-05 | Antenna holder | |
| — | J19-0518-04 | Lead stopper board | |
| — | K21-0311-14 | Knob X 3 TONE, BAL | |
| — | K21-0312-03 | Knob TUNING | |
| — | K23-0299-04 | Knob X 3 SEL, VOL, SPKR | |
| — | K27-0065-04 | Knob X 2 Push switch | |
| — | T90-0083-05 | AM bar antenna | |
| — | T90-0202-05 | FM indoor antenna | |
| — | 351-0003-14 | Dial string | |

## TUNER (X05-1540- )

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| Cg1 | CC45SL1H150K | Ceramic 15pF ±10% | |
| Cg2 | CK45F1H103Z | Ceramic 0.01μF +80%,−20% | |
| Cg3 | CC45SL1H100D | Ceramic 10pF ±0.5pF | |
| Cg4 | CC45SL1H221K | Ceramic 220pF ±10% | |
| Cg5 | CK45F1H103Z | Ceramic 0.01μF +80%,−20% | |
| Cg6 | CC45PG1H220J (Lg4:L32-0187-05) | Ceramic 22pF ±5% (Yel/Red) | |
| | CC45RG1H220J (Lg4:L32-0210-05) | or 22pF ±5% (Yel) | |
| Cg7 | CC45SH1H080D | Ceramic 8pF ±0.5pF | |
| Cg8 | C91-0037-05 | Low capacitive 0.47pF | |
| Cg9 | CC45CH1H150K | Ceramic 15pF ±10% | |
| Cg10 | CC45CH1H390K | Ceramic 39pF ±10% | |
| Cg11~14 | CK45F1H103Z | Ceramic 0.01μF +80%,−20% | |
| Cg15 | CE04W1E4R7CC | Electrolytic 4.7μF 25WV | |
| Cg16 | CE04AW1HR47MCC | Electrolytic 0.47μF 50WV | |
| Cg17 | CK45F1H473Z | Ceramic 0.047μF +80%,−20% | |
| Cg18 | CC45SL1H101K | Ceramic 100pF ±10% | |
| Cg19~21 | CK45F1H103Z | Ceramic 0.01μF +80%,−20% | |
| Cg22, 23 | CK45F1H473Z | Ceramic 0.047μF +80%,−20% | |
| Cg24 | CE04W1H010CC | Electrolytic 1μF 50WV | |
| Cg25 | CC45UJ1H180K | Ceramic 18pF ±10% | |
| Cg26 | CQ09FS1H361J | Polystyrene 360pF ±5% | |
| Cg27 | CK45F1H103Z | Ceramic 0.01μF +80%,−20% | |
| Cg28 | C90-0245-05 | Semiconductor type ceramic 0.01μF ±20% | |
| Cg29, 30 | CK45F1H103Z | Ceramic 0.01μF +80%,−20% | |
| Cg31 | CC45SL1H470K | Ceramic 47pF ±10% | |
| Cg32 | CE04W1C100CC | Electrolytic 10μF 16WV | |
| Cg33 | CE04W1H010CC | Electrolytic 1μF 50WV | |
| Cg34 | CK45B1H102K | Ceramic 1000pF ±10% | |
| Cg35, 36 | C90-0245-05 | Semiconductor type ceramic 0.01μF ±20% | |
| Cg37 | CQ93M1H104M | Mylar 0.1μF ±20% | |
| Cg38 | C90-0245-05 | Semiconductor type ceramic 0.01μF ±20% | |
| Cg39 | CE04W1C100CC | Electrolytic 10μF 16WV | |

# PARTS LIST

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| Cg40 | CQ09FS1H471J | Polystyrene 470pF ±5% | |
| Cg41 | CQ93M1H473K | Mylar 0.047μF ±10% | |
| Cg42~44 | CE04W1C100CC | Electrolytic 10μF 16WV | |
| Cg45 | CE04AW1HR47MCC | Electrolytic 0.47μF 50WV | |
| Cg46 | CE04AW1HR22MCC | Electrolytic 0.22μF 50WV | |
| Cg47 | CE04AW1HR47MCC | Electrolytic 0.47μF 50WV | |
| Cg48, 49 | CQ93M1H333J | Mylar 0.033μF ±5% **(X05-1540-10, -11, -81, -82)** | |
| Cg48, 49 | CQ93M1H223J | Mylar 0.022μF ±5% **(X05-1540-61, -62)** | |
| Cg50, 51 | CQ93M1H272K | Mylar 2700pF ±10% | |
| Cg52, 53 | CK45B1H391K | Ceramic 390pF ±10% | |
| Cg54, 55 | CQ93M1H272K | Mylar 2700pF ±10% | |
| Cg56, 57 | CE04W1H010CC | Electrolytic 1μF 50WV | |
| Cg58, 59 | CS15E1A3R3MCC | Tantalum 3.3μF 10WV | |
| Cg60~63 | CC45SL1H101K | Ceramic 100pF ±10% | |
| Cg64, 65 | CE04W1A101CC | Electrolytic 100μF 10WV | |
| Cg66, 67 | CC45SL1H220K | Ceramic 22pF ±10% | |
| Cg68, 69 | CQ93M1H123J | Mylar 0.012μF ±5% | |
| Cg70, 71 | CQ93M1H332J | Mylar 3300pF ±5% | |
| Cg72, 73 | CE04W1H010CC | Electrolytic 1μF 50WV | |
| Cg74 | CE04W1E330CC | Electrolytic 33μF 25WV **(X05-1540-10, -61, -81)** | |
| Cg75 | CE04W1V221CC | Electrolytic 220μF 35WV **(X05-1540-10, -61, -81)** | |
| Cg74, 75 | CE04W1E470CC | Electrolytic 47μF 25WV **(X05-1540-11, -62, -82)** | |
| Cg76 | CC45SL1H150K | Ceramic 15pF ±10% | |
| Cg77~ 79 | CK45F1H103Z | Ceramic 0.01μF +80%,−20% | |
| Cg80 | CE04W1C100CC | Electrolytic 10μF 16WV | |
| **RESISTOR** | | | |
| Rg9, 10,34 | RD14GY2E101J | Flame-proof RD 100Ω ±5% 1/4W | |
| Rg38 | RD14GY2E330J | Flame-proof RD 33Ω ±5% 1/4W | |
| Rg55 | RS14GB3A121J | RS 120Ω ±5% 1W | |
| Rg76 | RD14GY2E101J | Flame-proof RD 100Ω ±5% 1/4W | |
| Rg77 | RD14GY2E391J | Flame-proof RD 390Ω ±5% 1/4W **(X05-1540-10, -61, -81)** | |
| **SEMICONDUCTOR** | | | |
| Qg1 | V09-0124-10 | FET 2SK61 (Y), (GR) | |
| Qg2 | V03-0098-05 | Transistor 2SC535(B) | |
| Qg3 | V03-0357-05 | Transistor 2SC1342(A), (B) | |
| Qg4, 5 | V01-0146-05 | Transistor 2SA640(E) | |
| | V01-0190-05 | or 2SA841(BL) | |
| ICg1 | V30-0133-05 | IC HA1137W | |
| ICg2 | V30-0160-05 | IC HA1156W (B) | |
| ICg3 | V30-0134-05 | IC HA1151 | |
| ICg4, 5 | V30-0264-10 | IC HA1457 | |
| Dg1~5 | V11-0271-05 | Diode 1S2076 | |
| | V11-0076-05 | or 1S1555 **(X05-1540-10, -61, -81)** | |
| Dg1,2,4,5 | V11-0271-05 | Diode 1S2076 | |
| | V11-0076-05 | or 1S1555 **(X05-1540-11, -62, -82)** | |
| Dg6, 7 | V11-0051-05 | Diode 1N60 | |
| **VC/TRIMMER/POTENTIOMETER** | | | |
| — | C01-0185-05 | Variable capacitor | |
| TCg1 | C05-0055-05 | Ceramic trimmer (6 P, Red) | |
| VRg1 | R12-2016-05 | Trimming potentiometer 5kΩ(B) | |
| **COIL/INDUCTOR/IFT/FILTER** | | | |
| Lg1 | L31-0412-05 | FM ANT coil | ☆ |
| Lg2 | L31-0410-05 | FM RF coil | |
| Lg3 | L40-1091-41 | Inductor 1μH | |
| Lg4 | L32-0187-05 | FM OSC coil | |
| — | (Cg6:CC45PG1H220J) L32-0210-05 | or | |
| | (Cg6:CC45RG1H220J) | | |
| Lg5 | L30-0282-05 | FM IFT | |
| Lg6 | L40-2205-25 | Inductor 22μH | |
| Lg7 | L30-0305-05 | FM IFT | ☆ |
| Lg8 | L30-0306-05 | FM IFT | ☆ |
| Lg9 | L40-2292-44 | Inductor 2.2μH | |
| Lg10 | L40-1092-44 | Inductor 1μH | |
| | L40-1092-03 | or 1μH | |
| Lg11 | L32-0205-15 | AM OSC coil | |
| Lg12 | L30-0307-05 | AM IFT | ☆ |
| Lg13 | L30-0300-05 | AM IFT | |
| Lg14 | L40-1021-45 | Inductor 1mH | |
| | L40-1021-03 | or 1mH | |
| CFg1, 2 | L72-0052-05 | FM ceramic filter **(X05-1540-10, -11, -81, 82)** | |
| CFg1, 2 | L72-0058-05 | FM ceramic filter **(X05-1540-61, 62)** | |
| CFg3 | L72-0054-05 | AM ceramic filter | ☆ |
| **SWITCH** | | | |
| Sg1 | S29-1110-05 | Slide rotary switch SELECTOR **(X05-1540-10, -61, -81)** | ☆ |
| Sg1 | S29-1109-05 | Slide rotary switch SELECTOR **(X05-1540-11, -62, -82)** | ☆ |
| Sg2 | S40-2088-05 | Push switch TAPE | ☆ |
| **MISCELLANEOUS** | | | |
| — | E29-0088-05 | Terminal board | |

## KR-2090 AUDIO (X09-1280, -1281- )

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| **CAPACITOR** | | | |
| Cm1, 2 | CQ93M1H183K | Mylar 0.018μF ±10% | |
| Cm3, 4 | CE04AW1H010M | Electrolytic 1μF 50WV | |
| Cm5, 6 | CC45SL1H221K | Ceramic 220pF ±10% | |
| Cm7~10 | CE04W1E100 | Electrolytic 10μF 25WV | |
| Cm11, 12 | CC45SL1H470K | Ceramic 47pF ±10% | |
| Cm13, 14 | CC45SL1H101K | Ceramic 100pF ±10% | |
| Cm15, 16 | CC45SL1H100D | Ceramic 10pF ±0.5pF | |
| Cm17, 18 | CC45SL1H220K | Ceramic 22pF ±10% | |
| Cm19, 20 | CE04W1E330 | Electrolytic 33μF 25WV | |
| Cm21, 22 | CE04W1A470 | Electrolytic 47μF 10WV | |
| Cm23, 24 | CE04BW1C100M | Non-pole electrolytic 10μF 16WV | |
| Cm25, 26 | CQ93M1H153K | Mylar 0.015μF ±10% | |
| Cm27, 28 | CQ93M1H683K | Mylar 0.068μF ±10% | |
| Cm29, 30 | CQ93M1H472K | Mylar 4700pF ±10% | |
| Cm31, 32 | CQ93M1H223K | Mylar 0.022μF ±10% | |
| Cm33, 34 | CQ93M1H224M | Mylar 0.22μF ±20% | |
| Cm35 | CE04W1C100 | Electrolytic 10μF 16WV | |
| Cm36 | CE04W1V221 | Electrolytic 220μF 35WV | |
| Cm37 | CE04W1V101 | Electrolytic 100μF 35WV | |
| Cm38 | CE04W1C221 | Electrolytic 220μF 16WV | |
| Cm39 | CE04W1C470 | Electrolytic 47μF 16WV | |
| Cm40, 41 | C90-0368-05 | Electrolytic 4700μF 35WV | |
| Cm42, 43 | CK45E2H103P | Ceramic 0.01μF +100%,−0% | |
| Cm44 | C90-0145-05 | Film capacitor 0.01μF 125WV | |
| | C91-0001-05 | or Ceramic 0.01μF 125WV **(X09-1280-10)** | |
| Cm44 | C91-0025-05 | Ceramic 0.01μF 125WV **(X09-1281-01)** | |
| Cm44 | C91-0023-05 | Ceramic 0.01μF 250WV **(X09-1280-81)** | |
| Cm44 | CK45E3D103PMU | Ceramic 0.01μF 2KWV **(X09-1280-61, -1281-71)** | |

# PARTS LIST

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **RESISTOR** | |
| Rm17, 18 | RD14GY2E221J | Flame-proof RD 220Ω ±5% 1/4W | |
| Rm31, 32 | RD14GY2E101J | Flame-proof RD 100Ω ±5% 1/4W | |
| Rm39~42 | RD14GY2E331J | Flame-proof RD 330Ω ±5% 1/4W | |
| Rm43~46 | R92-0110-05 | Cement 0.47Ω 1W | |
| Rm57, 58 | RS14GB3A3R3J | Flame-proof RS 3.3Ω ±5% 1W | |
| Rm59, 60 | RC05GF2H271K | RC 270Ω ±10% 1/2W | |
| Rm61 | RD14GY2E560J | Flame-proof RD 56Ω ±5% 1/4W | |
| Rm62 | RD14GY2E391J | Flame-proof RD 390Ω ±5% 1/4W | |
| Rm64 | RD14GY2E821J | Flame-proof RD 820Ω ±5% 1/4W | |
| Rm65 | RS14GB3A220J | RS 22Ω ±5% 1W | |
| Rm66 | RS14GB3A331J | RS 330Ω ±5% 1W | |
| Rm67 | RC05GF2H225M | RC 2.2MΩ ±20% 1/2W **(X09-1280-10, -1281-01)** | |
| | | **SEMICONDUCTOR** | |
| Qm1~4 | V01-0146-05 | Transistor 2SA640(E), (F) | |
| | V01-0190-05 | or 2SA841(GR), (BL) | |
| Qm5~8 | V03-1890-20 | Transistor 2SC1890(E), (F) | |
| | V03-0424-05 | or 2SC1400(U) | |
| Qm9, 10 | V03-1890-20 | Transistor 2SC1890(F) | |
| Qm11, 12 | V03-2274-20 | Transistor 2SC2274K(E), (F) | |
| | V03-0215-05 | or 2SC1213A(C), (D) | |
| Qm13, 14 | V01-0984-30 | Transistor 2SA984K(E), (F) | |
| | V01-0073-05 | or 2SA673A(C), (D) | |
| Qm15, 16 | V02-0690-10 | Transistor 2SB690(B), (C) | ☆ |
| | V02-0507-10 | or 2SB507V(D), (E) | ☆ |
| Qm17, 18 | V04-0726-10 | Transistor 2SD726(B), (C) | ☆ |
| | V04-0313-20 | or 2SD313V(D), (E) | ☆ |
| Qm19 | V03-0270-05 | Transistor 2SC945(Q), (R) | |
| Qm20 | V04-0330-20 | Transistor 2SD330(E) | |
| Dm1 | V11-1300-60 | Diode S2VC10 | ☆ |
| | V11-1300-70 | or S2VC20 | ☆ |
| Dm2 | V11-1300-80 | Diode S2VC10R | ☆ |
| | V11-1300-90 | or S2VC20R | ☆ |
| Dm3 | V11-0076-05 | Diode 1S1555 | |
| | V11-0271-05 | or 1S2076 | |
| Dm4, 5 | V11-0254-05 | Zener diode YZ-140 | |
| | | **POTENTIOMETER** | |
| VRm1 | R06-5026-05 | Potentiometer 100kΩ(B) VOLUME | |
| VRm2 | R01-5019-05 | Potentiometer 200kΩ(M) BALANCE | |
| VRm3, 4 | R06-5033-05 | Potentiometer 100kΩ(C) TONE | |
| | | **SWITCH** | |
| Sm1 | S40-2087-05 | LOUDNESS | |
| Sm2 | S02-1011-05 | POWER/SPEAKERS **(X09-1280-10, -1281-01)** | |
| Sm2 | S02-1012-05 | Rotary switch POWER/SPEAKERS **(X09-1280-81)** | |
| Sm2 | S02-1013-05 | Rotary switch POWER/SPEAKERS **(X09-1280-61, -1281-71)** | |
| | | **FUSE** | |
| Fm1 | F05-1021-05 | Fuse 1A, 250V **(X09-1280-10, -1280-01)** | |
| Fm1, 3 | F05-1023-05 | Fuse 1A, 250V **(X09-1280-81)** | |
| Fm1, 3 | F06-1021-05 | Fuse 1A, 250V **(X09-1280-61, -1281-71)** | |
| Fm2 | F05-2021-05 | Fuse 2A, 250V **(X09-1280-10, -1281-01)** | |
| Fm2 | F05-2023-05 | Fuse 2A, 250V **(X09-1280-81)** | |
| Fm2 | F05-2029-05 | Fuse 2A, 250V **(X09-1280-61)** | |
| | | **MISCELLANEOUS** | |
| Lm1 | L40-1021-03 | Ferri-inductor | |
| – | E11-0060-15 | Phone jack | |

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| – | E20-0811-05 | Speaker terminal board | |
| – | F29-0014-05 | Insulating bushing X 4 | |
| – | J13-0041-05 | Fuse clip X 4 **(X09-1280-10, -1281-01)** | |
| – | J13-0041-05 | Fuse clip X 6 **(X09-1280-81)** | |
| – | J13-0054-05 | Fuse clip X 6 **(X09-1280-61)** | |
| – | J13-0054-05 | Fuse clip X 4 **(X09-1281-71)** | |

## KR-3090 AUDIO (X09-1290, -1291- )

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| | | **CAPACITOR** | |
| Cm1, 2 | CQ93M1H183K | Mylar 0.018μF ±10% | |
| Cm3, 4 | CS15E1VR68M | Tantalum 0.68μF 35WV | |
| Cm5, 6 | CC45SL1H221K | Ceramic 220pF ±10% | |
| Cm7, 8 | CE04W1C220 | Electrolytic 22μF 16WV | |
| Cm9, 10 | CE04W1E100 | Electrolytic 10μF 25WV | |
| Cm11, 12 | CC45SL1H470K | Ceramic 47pF ±10% | |
| Cm13, 14 | CC45SL1H100D | Ceramic 10pF ±0.5pF | |
| Cm15, 16 | CC45SL1H150K | Ceramic 15pF ±10% | |
| Cm17, 18 | CE04W1A470 | Electrolytic 47μF 10WV | |
| Cm19, 20 | CE04W1E330 | Electrolytic 33μF 25WV | |
| Cm21, 22 | CE04W1A470 | Electrolytic 47μF 10WV | |
| Cm23, 24 | CE04BW1C100M | Electrolytic 10μF 16WV | |
| Cm25, 26 | CQ93M1H153K | Mylar 0.015μF ±10% | |
| Cm27, 28 | CQ93M1H683K | Mylar 0.068μF ±10% | |
| Cm29, 30 | CQ93M1H472K | Mylar 4700pF ±10% | |
| Cm31, 32 | CQ93M1H223K | Mylar 0.022μF ±10% | |
| Cm33, 34 | CQ93M1H104M | Mylar 0.1μF ±20% | |
| Cm50 | CE04W1V101 | Electrolytic 100μF 35WV | |
| Cm51 | CE04W1V221 | Electrolytic 220μF 35WV | |
| Cm52 | CE04W1E100 | Electrolytic 10μF 25WV | |
| Cm53 | CE04W1C101 | Electrolytic 100μF 16WV | |
| Cm54 | CE04W1C470 | Electrolytic 47μF 16WV | |
| Cm55, 56 | C90-0369-05 | Electrolytic 6800μF 44WV | ☆ |
| Cm57, 58 | CK45E2H103P | Ceramic 0.01μF +100%,–0% | |
| Cm59 | C90-0145-05 | Film 0.1μF AC 125V | |
| | C91-0001-05 | or Ceramic 0.1μF AC 125V **(X09-1290-10)** | |
| Cm59 | C91-0025-05 | Film 0.1μF AC 125V **(X09-1291-01)** | |
| Cm59 | C91-0023-05 | Ceramic 0.1μF AC 125V **(X09-1290-81)** | |
| Cm59 | CK45E3D103PMU | Ceramic 0.01μF DC 2kV **(X09-1290-61, -1291-71)** | |
| | | **RESISTOR** | |
| Rm15, 16 | RD14GY2E221J | Flame-proof RD 220Ω ±5% 1/4W | |
| Rm17, 18 | RD14GY2E101J | Flame-proof RD 100Ω ±5% 1/4W | |
| Rm33, 34 | RD14GY2E161J | Flame-proof RD 160Ω ±5% 1/4W | |
| Rm35~38 | RD14GY2E331J | Flame-proof RD 330Ω ±5% 1/4W | |
| Rm39~42 | R92-0110-05 | Cement 0.47Ω 1W | |
| Rm59, 60 | RS14GB3A4R7J | RS 4.7Ω ±5% 1W | |
| Rm61, 62 | RC05GF2H271K | RC 270Ω ±10% 1/2W | |
| Rm81 | RD14GY2E560J | Flame-proof RD 56Ω ±5% 1/4W | |
| Rm82 | RD14GY2E681J | Flame-proof RD 680Ω ±5% 1/4W | |
| Rm83 | RS14GB3D680J | Flame-proof RS 68Ω ±5% 2W | |
| Rm84 | RS14GB3A102J | Flame-proof RS 1kΩ ±5% 1W | |
| Rm85 | RC05GF2H225M | RC 2.2MΩ ±20% 1/2W **(X09-1290-10, -1291-01)** | |
| | | **SEMICONDUCTOR** | |
| Qm1~4 | V01-0146-05 | Transistor 2SA640(E), (F) | |
| | V01-0190-05 | or 2SA841(GR), (BL) | |

# PARTS LIST

| Ref. No. | Parts No. | Description | Remarks |
|---|---|---|---|
| Qm5~8 | V03-1890-20 | Transistor 2SC1890(E), (F) | |
| | V03-0424-05 | or 2SC1400(U) | |
| Qm9, 10 | V03-0270-05 | Transistor 2SC945(R), (Q) | |
| Qm11, 12 | V01-0084-05 | Transistor 2SA733(R), (Q) | |
| Qm13, 14 | V03-0452-05 | Transistor 2SC1735(D), (E) | |
| | V03-0494-05 | or 2SC1509(R), (Q) **(X09-1290-10, -61, -81, -1291-71)** | |
| Qm13, 14 | V03-0494-05 | Transistor 2SC1509(R), (Q) **(X09-1291-01)** | |
| Qm15, 16 | V01-0173-05 | Transistor 2SA850(D), (E) | |
| | V01-0208-05 | or 2SA777(R), (Q) **(X09-1290-10, -61, -81, -1291-71)** | |
| Qm15, 16 | V01-0208-05 | Transistor 2SA777(R), (Q) **(X09-1291-01)** | |
| Qm17, 18 | V04-0078-05 | Transistor 2SD525 | |
| Qm19, 20 | V02-0059-05 | Transistor 2SB595 | |
| Qm21 | V03-0270-05 | Transistor 2SC945(R), (Q) | |
| Qm22 | V04-0330-20 | Transistor 2SD330 | |
| Dm1, 2 | V11-5100-10 | Varistor STV-4H(W) | |
| Dm3~5 | V11-0076-05 | Diode 1S1555 | |
| | V11-0271-05 | or 1S2076 | |
| Dm6 | V11-4100-30 | Zener diode WZ-197 | |
| Dm7 | V11-0254-05 | Zener diode YZ-140 | |
| Dm8~11 | V11-2100-50 | Diode U08C | |
| **POTENTIOMETER** | | | |
| VRm1 | R06-5026-05 | Potentiometer 100kΩ(B) VOLUME | |
| VRm2 | R01-5019-05 | Potentiometer 200kΩ(M) BALANCE | |
| VRm5, 6 | R06-5033-05 | Potentiometer 100kΩ(C) TONE | ☆ |
| **SWITCH** | | | |
| Sm1 | S40-2087-05 | Push switch LOUDNESS | ☆ |
| Sm2 | S02-1011-05 | Rotary switch POWER/SPEAKERS **(X09-1290-10, -1291-01)** | ☆ |
| Sm2 | S02-1012-05 | Rotary switch POWER/SPEAKERS **(X09-1290-81)** | ☆ |
| Sm2 | S02-1013-05 | Rotary switch POWER/SPEAKERS **(X09-1290-61, -1291-71)** | ☆ |
| **FUSE** | | | |
| Fm1 | F05-1021-05 | Fuse 1A, 250V **(X09-1290-10, -1291-01)** | |
| Fm1 | F05-1023-05 | Fuse 1A, 250V **(X09-1290-81)** | |
| Fm1 | F06-1021-05 | Fuse 1A, 250V **(X09-1290-61, -1291-71)** | |
| Fm2 | F05-3021-05 | Fuse 3A, 250V **(X09-1290-10, -1291-01)** | |
| Fm2 | F05-3022-05 | Fuse 3A, 250V **(X09-1290-81)** | |
| Fm2 | F05-3122-05 | Fuse 3.15A, 250V **(X09-1290-61)** | |
| Fm3 | F05-1521-05 | Fuse 1.5A, 250V **(X09-1290-81)** | |
| Fm3 | F05-1622-05 | Fuse 1.6A, 250V **(X09-1290-61, -1291-71)** | |
| **MISCELLANEOUS** | | | |
| Lm1 | L40-1021-03 | Ferri-inductor | |
| – | E11-0060-15 | Phone jack | |
| – | E20-0811-05 | Speaker terminal board | |
| – | F29-0014-05 | Insulating bushing X 4 | |
| – | J13-0041-05 | Fuse clip X 4 **(X09-1290-10, -1291-01)** | |
| – | J13-0041-05 | Fuse clip X 6 **(X09-1290-81)** | |
| – | J13-0054-05 | Fuse clip X 6 **(X09-1290-61)** | |
| – | J13-0054-05 | Fuse clip X 4 **(X09-1291-71)** | |

**Note:**

Resistors except the special type (example: cement, metal film, etc.) are not detailed in PARTS LIST. With regard to the value, refer to the schematic diagram or the PC board illustration.

Resistors not detailed are carbon type (1/4W or 1/8W).

You should give an order for the carbon resistors according to the ways described as follows:

A carbon resistor's part number is example RD-14BY 2E 222J.

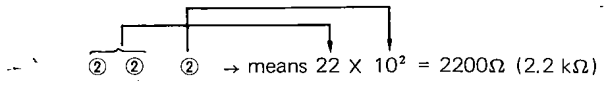
1. Kinds of the carbon resistor

RD14BY

RD14CY

2. Wattage
   1/4W 2E
   1/8W 2B

3. Resistance value




Significant figure Multiplier

Example:

| | |
|---|---|
| 221 | 220Ω |
| 222 | 2.2kΩ |
| 223 | 22kΩ |
| 224 | 220kΩ |
| 225 | 2.2MΩ |

4. Tolerance
   J = ±5% (Gold color)
   K = ±10% (Silver color)

# ADJUSTMENT

## INSTRUMENTS USED

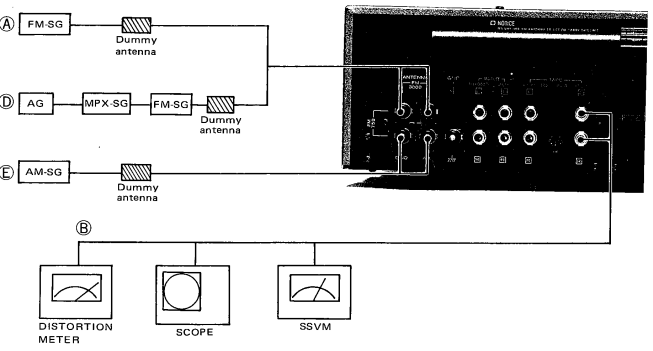
Oscilloscope . . . . . SCOPE
AM signal generator . . . . . AM-SG
FM signal generator . . . . . FM-SG
Audio generator . . . . . AG
Solid state voltmeter . . . . . SSVM
FM multiplex generator . . . . . FM-MPX
Frequency counter

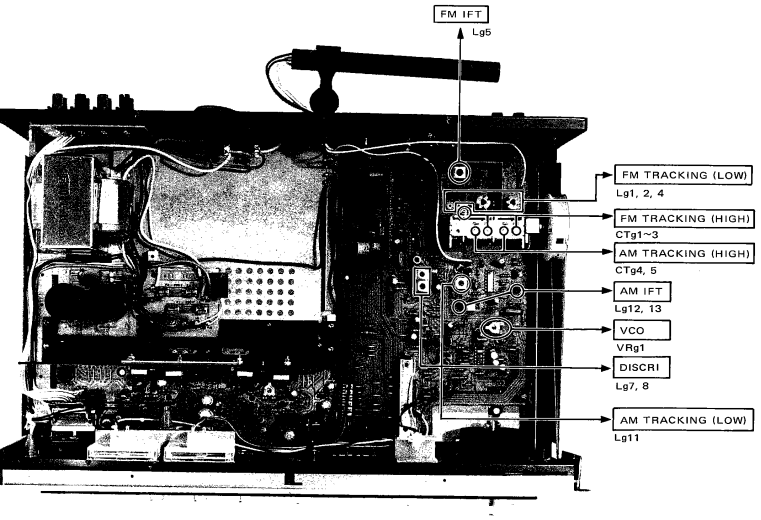
## NOTES FOR ADJUSTMENTS

* Use moderate instrument outputs at all times.
* Repeat tracking adjustments 2 or 3 times and finally confirm the result using respective local stations.
* The output level of RF-SG is made a loss by the dummy antenna.
* 0 dB = 1 μV

| ORDER | ITEM | INSTRUMENT | | RECEIVER SETTING | OUTPUT | ADJUSTMENT POINTS | ADJUSTMENT METHOD |
|---|---|---|---|---|---|---|---|
| | | CONNECTION | SETTING | | | | |
| **FM SECTION** | | | | | | | |
| 1 | IFT | Ⓐ | 95 MHz<br>1 kHz (Mod)<br>75 kHz (Dev) | FM<br>95 MHz | Ⓑ | Lg5 | Maximum optimum waveform, minimum distortion. |
| 2 | DISCRI | — | — | FM<br>Noise (between local stations) | T meter | Lg7 | Meter indication in the center. |
| 3 | | Ⓐ | 95 MHz 60 dB<br>1 kHz (Mod)<br>75 kHz (Dev) | FM<br>95 MHz | Ⓑ | Lg8 | Maximum optimum waveform, minimum distortion. |
| 4 | TRACKING | Ⓐ | 90 MHz<br>1 kHz (Mod)<br>75 kHz (Dev) | FM<br>90 MHz<br>FM MUTING OFF | Ⓑ | Lg1, 2, 4 | Maximum optimum waveform. |
| 5 | | | 106 MHz (Dev)<br>1 kHz (Mod)<br>75 kHz (Dev) | FM<br>106 MHz<br>FM MUTING OFF | | CTg1~3 | |
| 6 | VCO | Ⓐ | 95 MHz 60 dB<br>0 (Dev) | FM<br>95 MHz | Frequency counter to TP. | VRg1 (See schematic diagram) | Adjusted to 19 kHz. |
| 7 | IFT | Ⓓ | FM-MPX:<br>SELECTOR<br>L + R<br>1 kHz (Mod)<br>FM-SG:<br>95 MHz 60 dB<br>68.25 kHz (Dev) | FM<br>95 MHz | Ⓑ | Lg5 | Maximum optimum waveform.<br>Minimum distortion. |
| **AM SECTION** | | | | | | | |
| 1 | IFT | Ⓔ | 1000 kHz<br>400 Hz 30% (Mod)<br>100 dB | AM<br>1000 kHz | Ⓑ | Lg12, 13 | Maximum optimum waveform. |
| 2 | TRACKING | Ⓔ | 600 kHz<br>400 Hz 30% (Mod)<br>100 dB | AM<br>600 kHz | Ⓑ | Lg11<br>Bar antenna | Maximum optimum waveform. |
| 3 | | | 1400 kHz<br>400 Hz 30% (Mod)<br>100 dB | AM<br>1400 kHz | | CTg4, 5 | |

# ADJUSTMENT / ABSOLUTE MAX. RATINGS

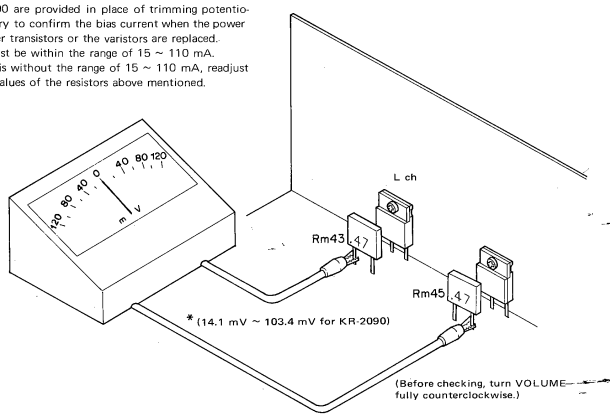



## BIAS CURRENT

There is no adjustment to be made by trimming potentiometer in a conventional manner. Rm25 (Rm26) for KR-2090 and Rm33 (Rm34) for KR-3090 are provided in place of trimming potentiometers. It is necessary to confirm the bias current when the power transistors, the driver transistors or the varistors are replaced.
The bias current must be within the range of 15 ~ 110 mA.
If the bias current is without the range of 15 ~ 110 mA, readjust it by changing the values of the resistors above mentioned.

## BIAS CURRENT CHECK

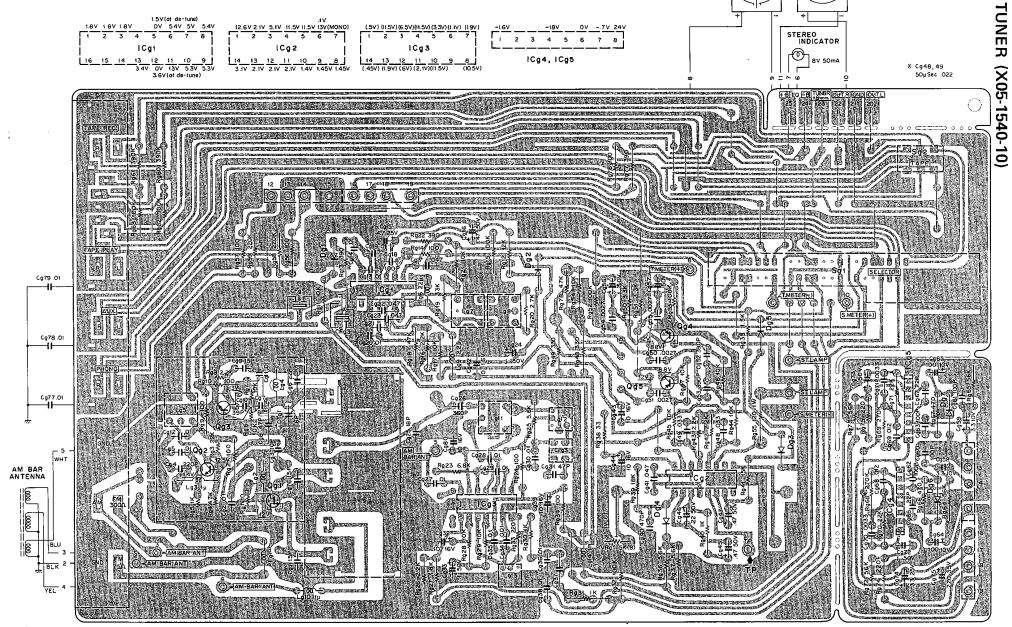



* (Rm43 + Rm45) X 15 mA ~ (Rm43 + Rm45) X 110 mA.

## ABSOLUTE MAX. RATINGS

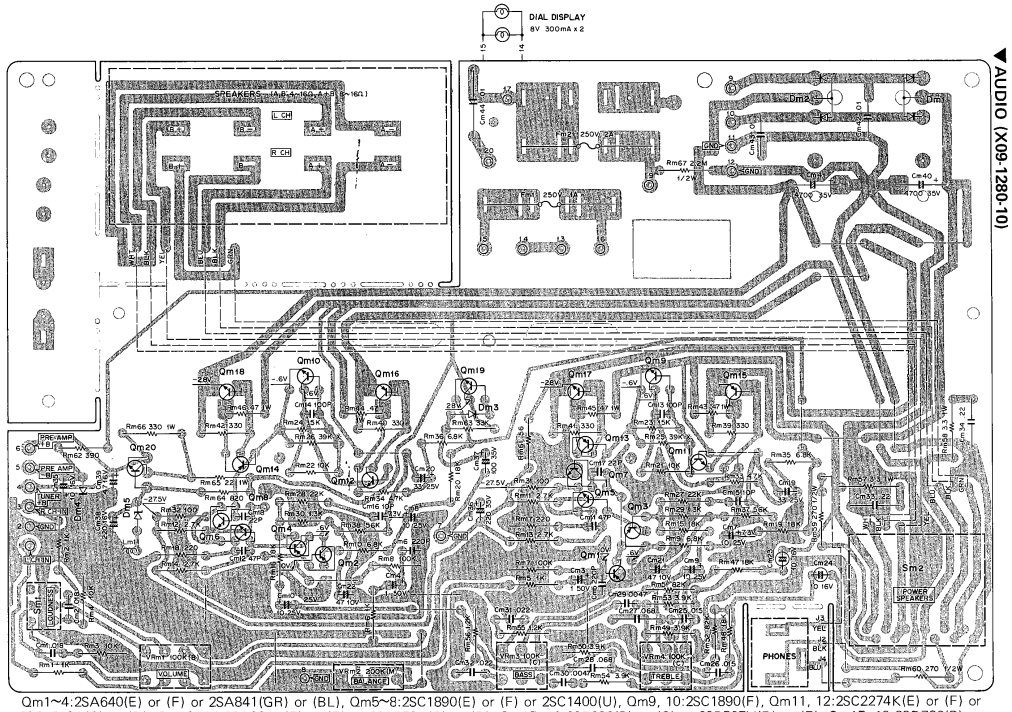
| TRANSISTOR | $V_{CBO}$ | $V_{EBO}$ | $V_{CEO}$ | $I_C$ | $P_C$ | $T_j$ | $T_{stg}$ | $f_T$ |
|---|---|---|---|---|---|---|---|---|
| 2SB507 | –75V | –5V | –75V | –3A | 30W (Tc = 25°C) | 150°C | –40 ~ +150°C | 8 MHz |
| 2SB690 | –100V | –5V | –80V | –4A | 40W (Tc = 25°C) | 150°C | –45 ~ +150°C | – |
| 2SD313V | 75V | 5V | 75V | 3A | 30W (Tc = 25°C) | 150°C | –40 ~ +150°C | 8 MHz |
| 2SD726 | 100V | 5V | 80V | 4A | 40W (Tc = 25°C) | 150°C | –45 ~ +150°C | – |
| **DIODE** | **$V_{RM}$** | **$V_F$** | **$I_R$** | **$I_o$** | **$V_I$** | **P** | **$T_j$** | **$T_{stg}$** |
| S2VC10 | 100V | 1.05V | 10 μA | 2A | 35V | – | 150°C | –30 ~ +150°C |
| S2VC10R | 100V | 1.05V | 10 μA | 2A | 35V | – | 150°C | –30 ~ +150°C |
| S2VC20 | 200V | 1.05V | 10 μA | 2A | 70V | – | 150°C | –30 ~ +150°C |
| S2VC20R | 200V | 1.05V | 10 μA | 2A | 70V | – | 150°C | –30 ~ +150°C |

## ▼TUNER (X05-1540-10)




Qg1:2SK61(GR) or (Y), Qg2:2SC535(B), Qg3:2SC1342(A) or (B), Qg4; 5:2SA640(E) or 2SA841(BL), ICg1:HA1137W, ICg2:HA1156W(B), ICg3:HA1151, ICg4, 5:HA1457, Dg1~5:1S2076 or 1S1555, Dg6, 7:1N60

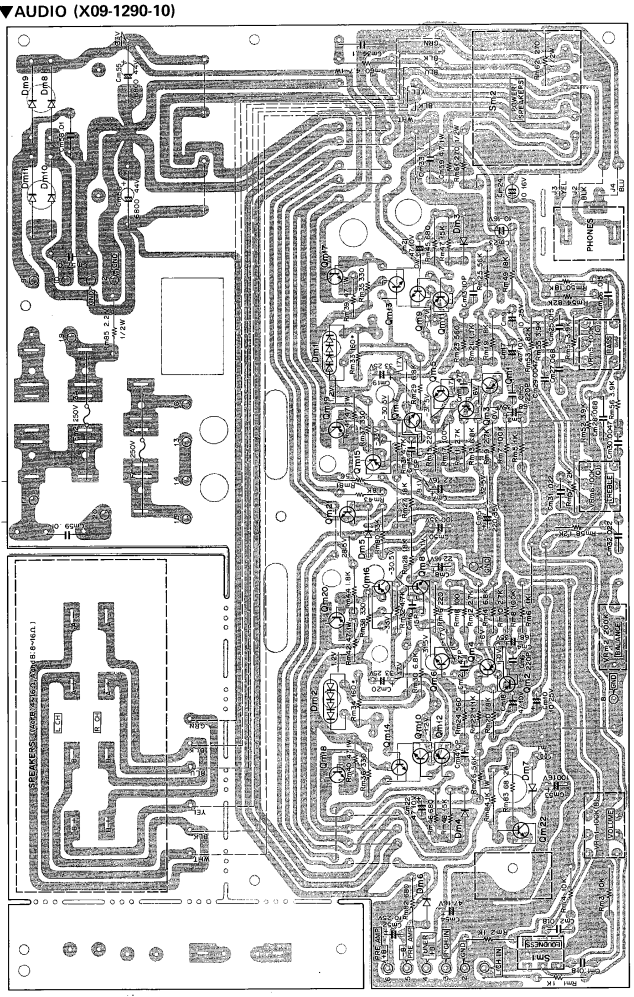
## ▼AUDIO (X09-1280-10)




Qm1~4:2SA640(E) or (F) or 2SA841(GR) or (BL), Qm5~8:2SC1890(E) or (F) or 2SC1400(U), Qm9, 10:2SC1890(F), Qm11, 12:2SC2274K(E) or (F) or 2SC1213A(C) or (D), Qm13, 14:2SA984K(E) or (F) or 2SA673A(C) or (D), Qm15, 16:2SB690(B) or (C) or 2SB507V(D) or (E), Qm17, 18:2SD726(B) or (C) or 2SD313V(D) or (E), Qm19:2SC945(Q) or (R), Qm20:2SD330(E), Dm1:S2VC10 or S2VC20, Dm2:S2VC10R or S2VC20R, Dm3:1S1555 or 1S2076, Dm4, 5:YZ-140

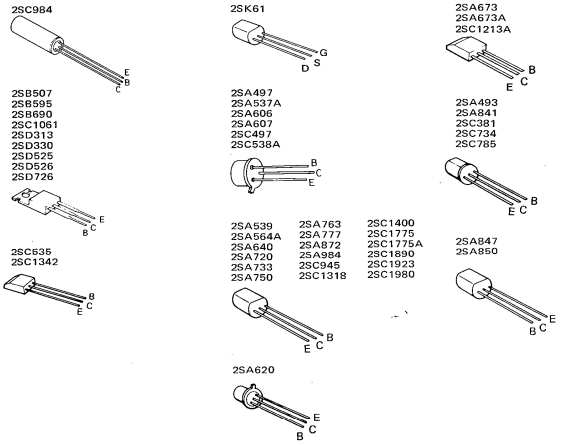
# PC BOARD / SEMICONDUCTOR SUBSTITUTIONS

## ▼AUDIO (X09-1290-10)



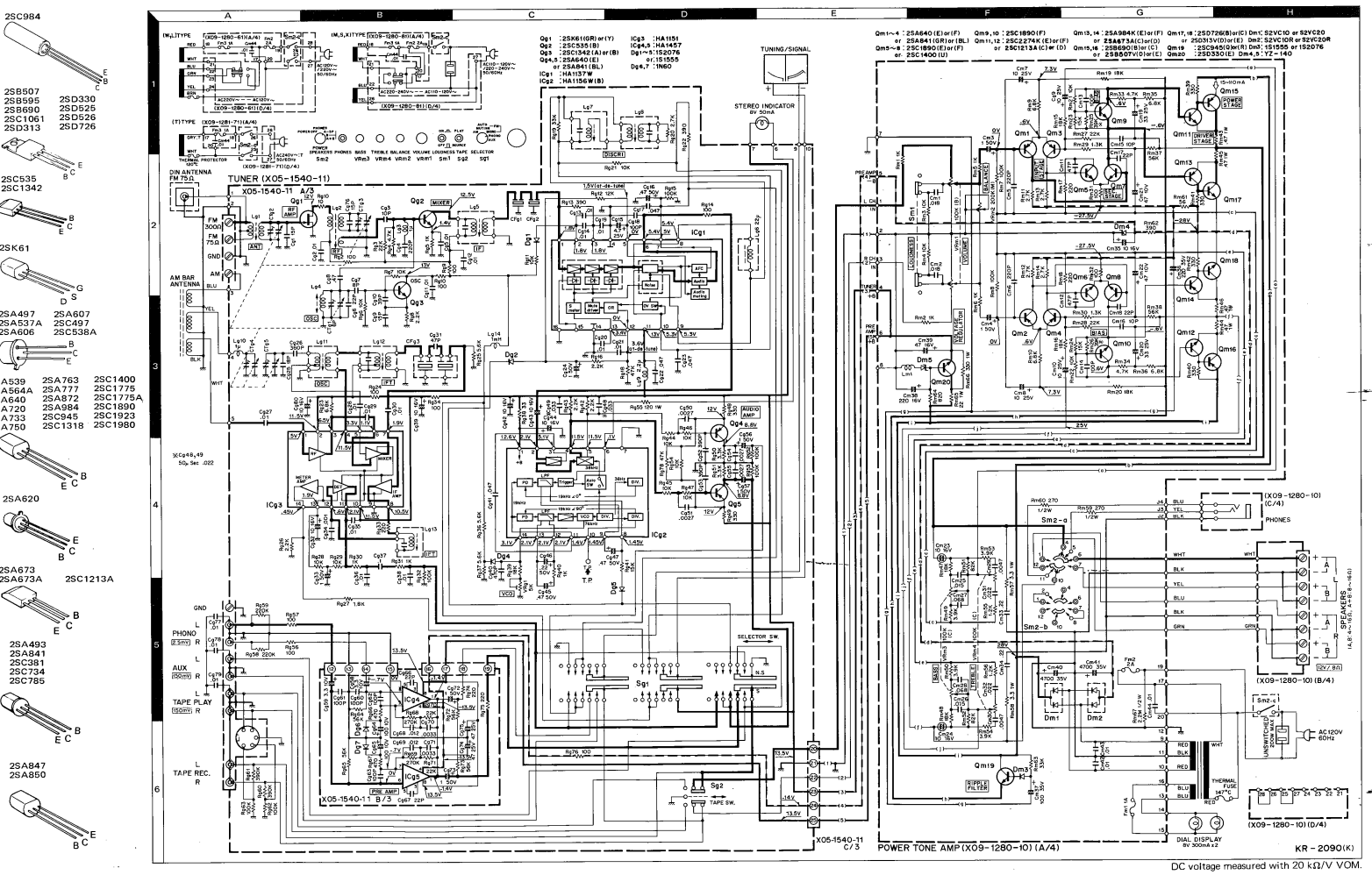
Qm1~4: 2SA640(E) or (F) or 2SA841(GR) or (BL), Qm5~8: 2SC1890(E) or (F) or 2SC1400(U), Qm9, 10, 21: 2SC945(Q) or (R), Qm11, 12: 2SA733(Q) or (R), Qm13, 14: 2SC1735(D) or (E) or 2SC1509(R) or (Q), Qm15, 16: 2SA850(D) or (E) or 2SA777(R) or (Q), Qm17, 18: 2SD525, Qm19, 20: 2SB595, Qm22: 2SD330, Dm1, 2: STV-4H(W), Dm3~5, 1S1555 or 1S2076, Dm6: WZ-197, Dm7: YZ-140, Dm8~11: U08C

* Refer to "BIAS CURRENT" on page 15.




| PC board ass'y | Ref. No. | Semiconductor name | Substitutions |
|---|---|---|---|
| **X05-1540-10** | Qg1 | 2SK61(GR, Y) | – |
| | Qg2 | 2SC535(B) | 2SC785(R, O), 2SC381(R, O), 2SC535(A), 2SC1342(A, B), 2SC1923(R) |
| | Qg3 | 2SC1342(A, B) | 2SC785(R) |
| | Qg4, 5 | 2SA640(E), 2SA841(B, L) | 2SA733(P, Q), 2SA564A |
| **X09-1280-10** | Qm1~4 | 2SA640A(E, F) , 2SA841(GR,BL) | 2SA750(E, F), 2SA872(D,E,F), 2SA620WLH(5), 2SA493(GR), 2SA847(G, H),2SA620WL(5, 6), 2SA620WN(5), 2SA763WL |
| | Qm5~8 | 2SC1890(E, F), 2SC1400(U) | 2SC1775(E, F), 2SC1775A(E, F), 2SC1980(S, T) |
| | Qm9, 10 | 2SC1890(F) | 2SC1775(E, F), 2SC1775A(E, F), 2SC1980(S, T) |
| | Qm11, 12 | 2SC2274K(E,F), 2SC1213A(C, D) | 2SC1318(Q, R), 2SC497(R) |
| | Qm13, 14 | 2SA984K(E, F), 2SA673A(C, D) | 2SA497(Y) |
| | Qm15, 16 | 2SB690(B, C), 2SB507(D, E) | – |
| | Qm17, 18 | 2SD726(B, C), 2SD313V(D, E) | – |
| | Qm19 | 2SC945(Q, R) | 2SC734(Y), 2SC538A, 2SC984(C), 2SC1213A(C), 2SC1318(Q,R) |
| | Qm20 | 2SD330(E) | 2SC1061, 2SD525, 2SD526 |
| **X09-1290-10** | Qm1~4 | 2SA640(E,F), 2SA841(GR, BL) | 2SA750(E, F), 2SA872(D, E, F), 2SA620WLH(5), 2SA493(GR), 2SA620WL(5, 6), 2SA620WN(5), 2SA763WL(5, 6) 2SA847(G,H) |
| | Qm5~8 | 2SC1890(E, F), 2SC1400(U) | 2SC1775(E, F), 2SC1775A(E, F), 2SC1980(S, T) |
| | Qm9, 10 | 2SC945(Q, R) | 2SC734(Y), 2SC538(A), 2SC984(C), 2SC1213A(C), 2SC1318(Q, R) |
| | Qm11, 12 | 2SA733(Q, R) | 2SA561, 2SA564A, 2SA539, 2SA720(Q, R), 2SA673A, 2SA673 |
| | Qm13, 14 | 2SC1735(D, E), 2SC1509(R, B) | – |
| | Qm15, 16 | 2SA850(D, E), 2SA777(R, Q) | 2SA537A(C), 2SA607(L, K), 2SA606(L) |
| | Qm17, 18 | 2SD525 | – |
| | Qm19, 20 | 2SB595 | – |
| | Qm21 | 2SC945(Q, R) | 2SC734(Y), 2SC538A, 2SC984(C), 2SC1213A(C), 2SC1318(Q,R) |
| | Qm22 | 2SD330 | 2SC1061, 2SD525, 2SD526 |

# SCHEMATIC DIAGRAM(KR-2090)




DC voltage measured with 20 kΩ/V VOM.

2SC984

2SB507 2SD330
2SB595 2SD525
2SB690 2SD526
2SC1061 2SD726
2SD313

2SC535
2SC1342

2SK61

2SA497 2SA607
2SA537A 2SC497
2SA606 2SC538A

A539 2SA763 2SC1400
A564A 2SA777 2SC1775
A640 2SA872 2SC1775A
A720 2SA984 2SC1890
A733 2SC945 2SC1923
A750 2SC1318 2SC1980

2SA620

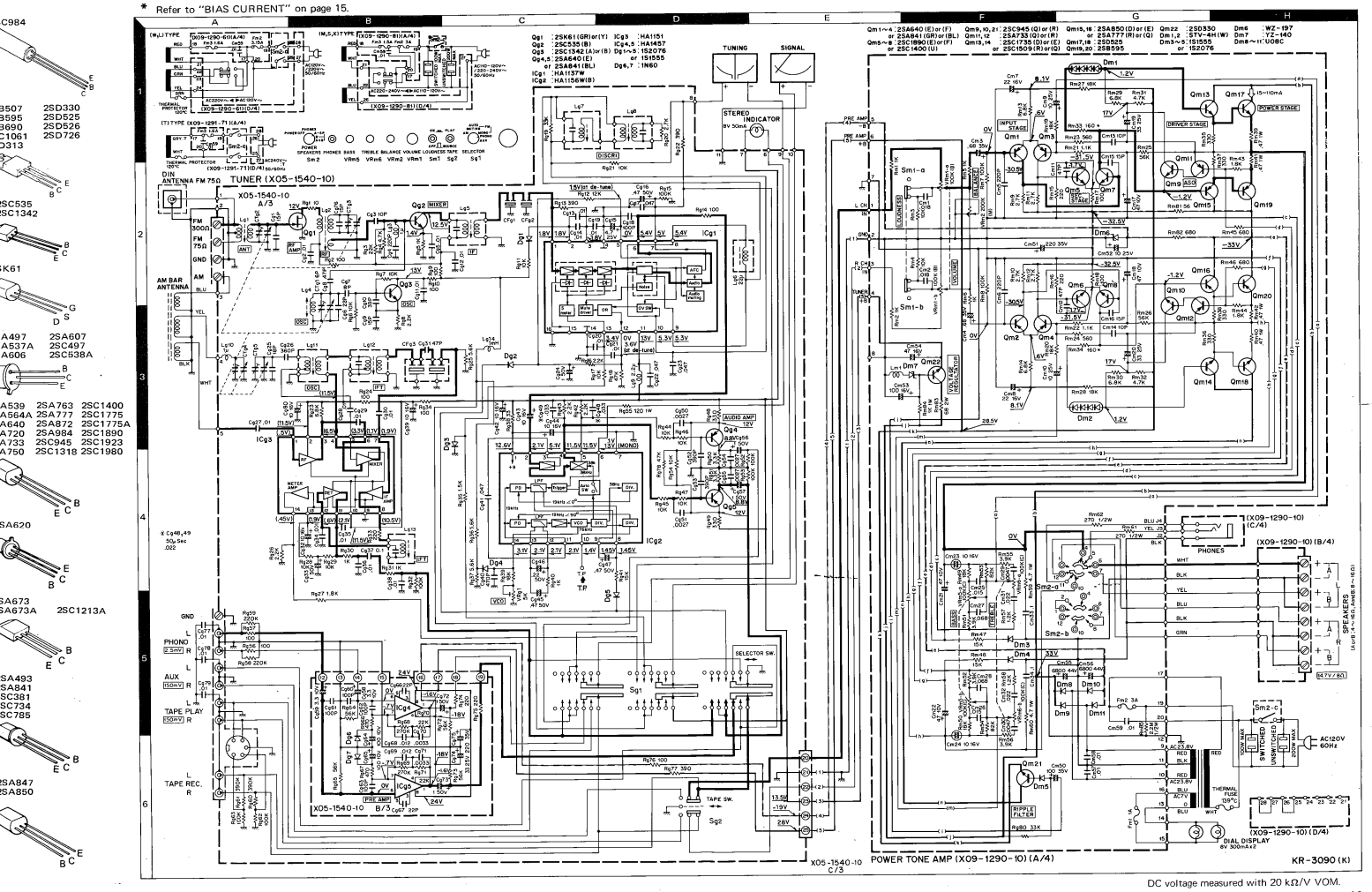
2SA673 2SA673A 2SC1213A

2SA493
2SA841
2SC381
2SC734
2SC785

2SA847
2SA850

# SCHEMATIC DIAGRAM(KR-3090)

* Refer to "BIAS CURRENT" on page 15.




DC voltage measured with 20 kΩ/V VOM.

# SPECIFICATIONS

090

### AMPLIFIER SECTION

**Power Output**
**16 watts* per channel, minimum RMS both channels driven, at 8 ohms from 20 to 20,000 Hz with no more than 0.1% total harmonic distortion.**

| | |
|---|---|
| **Both Channel Driven** | 18 + 18 watts 8 ohms at 1,000 Hz |
| | 22 + 22 watts 4 ohms at 1,000 Hz |
| **Dynamic Power Output** | 90 watts 4 ohms |
| **Total Harmonic Distortion** | 0.1% at rated power into 8 ohms |
| | 0.05% at 1 watt into 8 ohms |
| **Intermodulation Distortion (60 Hz : 7 kHz 4 : 1)** | 0.1% at rated power into 8 ohms |
| | 0.05% at 1 watt into 8 ohms |
| **Power Bandwidth** | 10 Hz to 60,000 Hz |
| **Damping Factor** | 30 at 8 ohms |
| **Speaker Impedance** | Accept 4 ohms to 16 ohms |
| **Input Sensitivity/Impedance/Signal to Noise Ratio (IHF A Curve)** | |
| **Phono** | 2.5 mV/50 k ohms/ 76 dB |
| **AUX** | 150 mV/45 k ohms/100 dB |
| **Tape** | 150 mV/45 k ohms/100 dB |
| **Maximum Input Level for Phono** | 120 mV (RMS), T.H.D. 0.1% at 1,000 Hz |
| **Output Level/Impedance** | |
| **Tape REC (Pin)** | 150 mV / 100 ohms |
| **(DIN)** | 30 mV / 80 k ohms |
| **Frequency Response** | |
| **Phono** | RIAA standard curve ±0.5 dB |
| **AUX & Tape** | 20 Hz to 50,000 Hz +0.5 dB −1.0 dB |
| **Tone Control** | |
| **Bass** | ±8 dB at 100 Hz |
| **Treble** | ±8 dB at 10 kHz |
| **Loudness Control (−30 dB)** | +10 dB at 100 Hz |

### FM TUNER SECTION (IHF)

| | |
|---|---|
| **Usable Sensitivity** | 11.2 dBf (2.0 μV) |
| **50 dB Quieting Sensitivity** | |
| **Mono** | 15.6 dBf (3.3 μV) |
| **Stereo** | 36.1 dBf (35 μV) |
| **Signal to Noise Ratio at 65 dBf** | |
| **Mono** | 76 dB |
| **Stereo** | 72 dB |
| **Total Harmonic Distortion** | |
| **Mono** | 0.2% |
| **Stereo** | 0.3% |
| **Frequency Response** | 20 Hz to 15,000 Hz +1.0 dB −2.0 dB |
| **Capture Ratio** | 1.5 dB |
| **Image Response Ratio** | 60 dB |
| **Spurious Response Ratio** | 75 dB |
| **IF Response Ratio** | 90 dB |
| **Alternate Channel Selectivity** | 54 dB |
| **AM Suppression Ratio** | 55 dB |
| **Stereo Separation Ratio** | 43 dB at 1,000 Hz |
| | 35 dB at 50 Hz to 10,000 Hz |
| **Sub Carrier Product Ratio** | 40 dB |
| **Antenna Impedance** | 300 ohms balanced & 75 ohms unbalanced |
| **FM Frequency Range** | 88 MHz to 108 MHz |

### AM SECTION

| | |
|---|---|
| **Usable Sensitivity** | 20 μV |
| **Signal to Noise Ratio** | 50 dB |
| **Image Rejection** | 50 dB |
| **Selectivity** | 35 dB |

### GENERAL

| | |
|---|---|
| **Power Consumption** | 150 watts at full power |
| **AC Outlet** | Unswitched 1 |
| **Dimensions** | W 18-7/16" (468 mm) |
| | H 5-1/2" (140 mm) |
| | D 13-11/16" (348 mm) |
| **Weight (Net)** | 15.9 lb (7.2 kg) |
| **(Gross)** | 18.3 lb (8.3 kg) |

090

### AMPLIFIER SECTION

**Power Output**
**26 watts* per channel, minimum RMS both channels driven, at 8 ohms from 20 to 20,000 Hz with no more than 0.1% total harmonic distortion.**

| | |
|---|---|
| **Both Channel Driven** | 27 + 27 watts 8 ohms at 1,000 Hz |
| | 30 + 30 watts 4 ohms at 1,000 Hz |
| **Dynamic Power Output** | 100 watts 4 ohms |
| **Total Harmonic Distortion** | 0.1% at rated power into 8 ohms |
| | 0.05% at 1 watt into 8 ohms |
| **Intermodulation Distortion (60 Hz : 7 kHz 4 : 1)** | 0.1% at rated power into 8 ohms |
| | 0.05% at 1 watt into 8 ohms |
| **Power Bandwidth** | 10 Hz to 50,000 Hz |
| **Damping Factor** | 40 at 8 ohms |
| **Speaker Impedance** | Accept 4 ohms to 16 ohms |
| **Input Sensitivity/Impedance/Signal to Noise Ratio (IHF A Curve)** | |
| **Phono** | 2.5 mV/50 k ohms/ 77 dB |
| **AUX** | 150 mV/45 k ohms/100 dB |
| **Tape** | 150 mV/45 k ohms/100 dB |
| **Maximum Input Level for Phono** | 160 mV (RMS), T.H.D. 0.1% at 1,000 Hz |
| **Output Level/Impedance** | |
| **Tape REC (Pin)** | 150 mV / 100 ohms |
| **(DIN)** | 30 mV / 80 k ohms |
| **Frequency Response** | |
| **Phono** | RIAA standard curve ±0.5dB |
| **AUX & Tape** | 20 Hz to 50,000 Hz +0.5dB −1.0dB |
| **Tone Control** | |
| **Bass** | ±8 dB at 100 Hz |
| **Treble** | ±8 dB at 10 kHz |
| **Loudness Control (−30 dB)** | +10 dB at 100 Hz |

### FM TUNER SECTION (IHF)

| | |
|---|---|
| **Usable Sensitivity** | 11.2 dBf (2.0 μV) |
| **50 dB Quieting Sensitivity** | |
| **Mono** | 15.6 dBf (3.3 μV) |
| **Stereo** | 36.1 dBf (35 μV) |
| **Signal to Noise Ratio at 65 dBf** | |
| **Mono** | 76 dB |
| **Stereo** | 72 dB |
| **Total Harmonic Distortion** | |
| **Mono** | 0.2% |
| **Stereo** | 0.3% |
| **Frequency Response** | 20 Hz to 15,000 Hz +1.0 dB −2.0 dB |
| **Capture Ratio** | 1.5 dB |
| **Image Response Ratio** | 60 dB |
| **Spurious Response Ratio** | 75 dB |
| **IF Response Ratio** | 90 dB |
| **Alternate Channel Selectivity** | 54 dB |
| **AM Suppression Ratio** | 55 dB |
| **Stereo Separation Ratio** | 43 dB at 1,000 Hz |
| | 35 dB at 50 Hz to 10,000 Hz |
| **Sub Carrier Product Ratio** | 40 dB |
| **Antenna Impedance** | 300 ohms balanced & 75 ohms unbalanced |
| **FM Frequency Range** | 88 MHz to 108 MHz |

### AM SECTION

| | |
|---|---|
| **Usable Sensitivity** | 20 μV |
| **Signal to Noise Ratio** | 50 dB |
| **Image Rejection** | 50 dB |
| **Selectivity** | 35 dB |

### GENERAL

| | |
|---|---|
| **Power Consumption** | 240 watts at full power |
| **AC Outlet** | Switched 1, Unswitched 1 |
| **Dimensions** | W 18-7/16" (468 mm) |
| | H 5-1/2" (140 mm) |
| | D 13-11/16" (348 mm) |
| **Weight (Net)** | 16.5 lb (7.5 kg) |
| **(Gross)** | 18.7 lb (8.4 kg) |

*asured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifier in U.S.A.
Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.


A product of

**TRIO-KENWOOD CORPORATION**

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