KENWOOD

HI/FI STEREO COMPONENTS

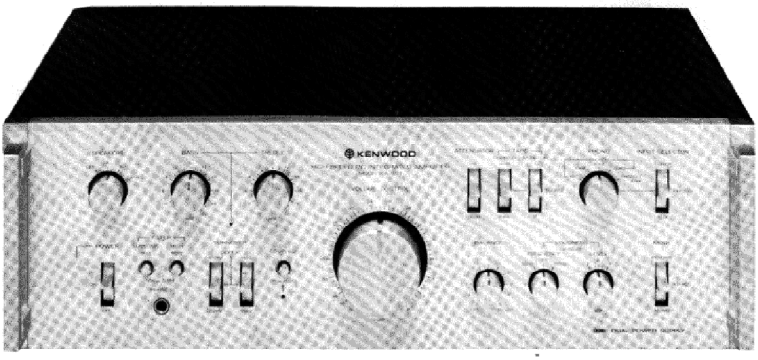
SERVICE MANUAL

KA-907
(KA-9077)

An item of adjustment is written in three languages — English, French and German.

Un article sur réglages est écrit en trois langues, Anglais, Français et Allemand.

Ein Artikel der Abgleich wird auf drei Sprachen, Englische, Französisch und Deutsch geschrieben.



HIGH SPEED DC INTEGRATED AMPLIFIER

CIRCUIT DESCRIPTION

MC HEAD AMPLIFIER

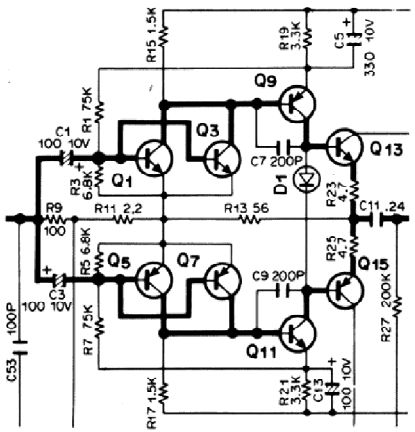


Fig. 1 MC Head Amplifier

The MC head amplifier consists of a three-stage, symmetrical complementary circuit, using low-noise transistors in the first stage.

An emitter follower circuit is used in the final stage so that the common emitter circuit in the second stage gives sufficient amplifier.

Negative feedback from the final stage emitter is applied to the first stage emitter, and the additional DC negative feedback from the second stage emitter is applied to the first stage base, which makes operation very stable.

The advantages of the complementary circuit are:

1. Although transistors Q1 and Q3, Q5 and Q7, and Q9 and Q11 are directly connected in series, these pairs of transistors can conduct as a parallel circuit for the output and input signals. Consequently the output impedance can be lowered and a higher output voltage can be obtained.
2. Push-pull operation reduces the distortion.
3. The circuit configuration makes the best use of the high S/N characteristics of the transistors.

POWER SAFETY INDICATOR CIRCUIT

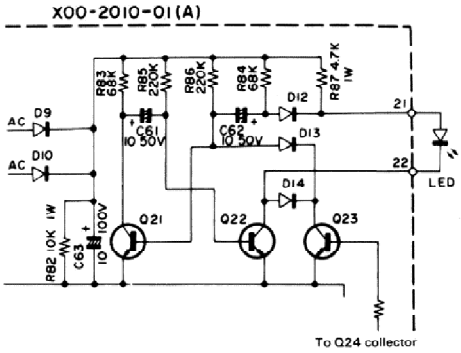


Fig. 2 Power safety indicator circuit

The LED flickers for about ten seconds after power-on and becomes constant by the protection relay being energized when all circuits in the KA-907 are stabilized, an astable multivibrator is used to flicker the LED.

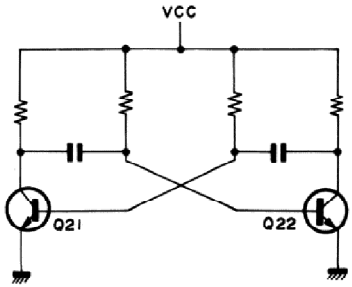


Fig. 3 Astable Multivibrator

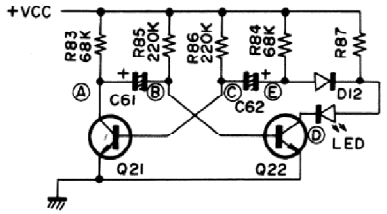
The astable multivibrator consists of two same transistors, Q21 and Q22. Strictly, characteristics of transistors are different.

When the circuit is energized, Q21 and Q22, both of the collector currents flow.

The collector current of either of two is larger than the other because of hFE difference or the like.

Assume the collector current of Q21 is larger than that of Q22.

CIRCUIT DESCRIPTION



Base current of Q21 flows. → Collector current of Q21 flows.
↓
Collector current of Q21 increases. → Collector voltage of Q21 drops.
↑ ↓
Base current of Q21 increases. Base voltage of Q22 drops.
↑ ↓
Collector voltage of Q22 increases. ← Collector current of Q22 decreases.

Fig. 4 Operation of Astable Multivibrator

Then, the voltage at (A) is lower than at (E). (Both voltages result from voltage drop across each collector load.)
These voltages are applied to (B) and (C) through C61 and C62, respectively. Since the base voltage of Q21 is higher than that of Q22, the collector current of Q21 further increases and that of Q22 further decreases, then stops flowing.
Then, Q21 is ON and Q22 is OFF. At this time, the voltage at each point is as follows: (A) = 0.1V, (B) = 0.1V, (C) = 0.7V, (D) = +Vcc. And C62 is charged at about Vcc.
Then, C61 is charged through R85, so voltage at (B) gradually increases. When the voltage at (B) reaches about 0.6V, the collector current of Q22 starts flowing, reducing the voltage at (E) by the voltage drop across R84. Voltage drop at (E) causes the voltage at (C), i.e., the base voltage of Q21, to drop through C62.
Then Q21 is cut off. C62 discharges through a path of (E) → R84 → R86 → (C), but it takes a certain time to complete discharge because of high resistance of R86 + R84. Therefore, C62 keeps the Vcc voltage for a few seconds after Q21 is cut off.

Since Q22 turns on, the voltage at (E) is lowered to about 2V by the voltage drop across R84. Since the potential difference between (C) and (E) is Vcc, the voltage at (C) is (2 − Vcc) ÷ −Vcc. (Refer to Fig. 5.)
At this time, the voltage at each point is as follows: A = +Vcc, (B) = 0.7V, (C) = +Vcc, (D) = 0.1V and (E) = 2V. The voltage at (E) is about 2V higher than at (D) by the forward voltage drop of LED and D12. Current energizing the LED mostly flows through R87.
Then, C62 is gradually charged and voltage at (C) increases from −Vcc. When the voltage at (C) reaches 0.6V, Q12 is turned on and Q22 is cut off, resulting in LED off. At this time, the voltage at each point is as follows: (A) = 0.1V, (B) = +Vcc, (C) = 0.7V, (D) = +Vcc and (E) = +Vcc.
The above procedures are repeated and the LED flickers. Waveform at each point is shown in the following chart.

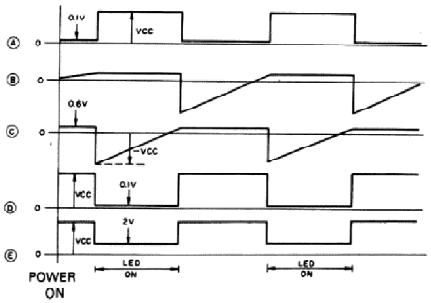


Fig. 6. Waveform at Each Point

After the circuit operation becomes stable, the protection relay is energized. The collector voltage of the relay drive transistor Q24 is fed to the base of Q23 through R73, causing Q23 to conduct. Q23 stops function of the multivibrator by means of D13 and D14, causing the LED keeping on lighting.

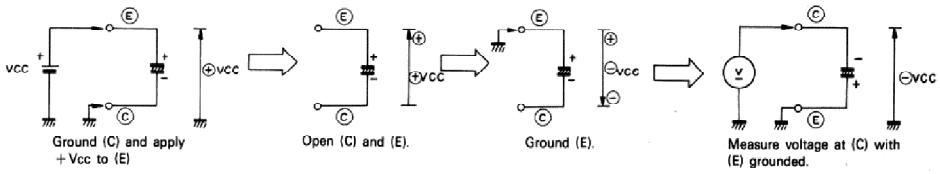


Fig. 5 Operation of C61 and C62

ADJUSTMENT

PREAMP OFFSET VOLTAGE ADJUSTMENT

1. Remove the rear panel and model name plate.
2. Connect a DC voltmeter between the adjusting point 14 and GND (13 and GND) of the Preamp (X08-1670-10).
3. Adjusting the trimming pot. VR1 (VR2). as shown in Fig 1, for 0V reading of the DC voltmeter.

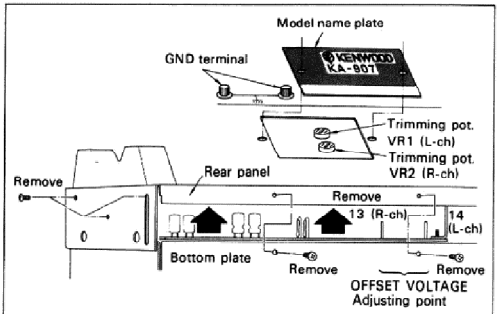


Fig. 1 Preamp offset voltage adjustment (Bottom view)

TONE CONTROL OFFSET VOLTAGE ADJUSTMENT

1. Connect the DC voltmeter between the adjusting point 15 and GND (17 and GND) of the Tone Control (X11-1520-10).
2. Adjust the trimming pot. VR4 (VR2) for a 0V reading of the DC voltmeter.

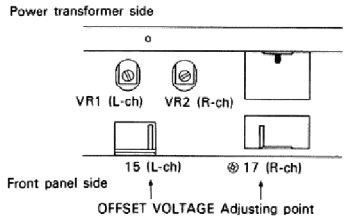


Fig. 2. Tone control offset voltage adjustment

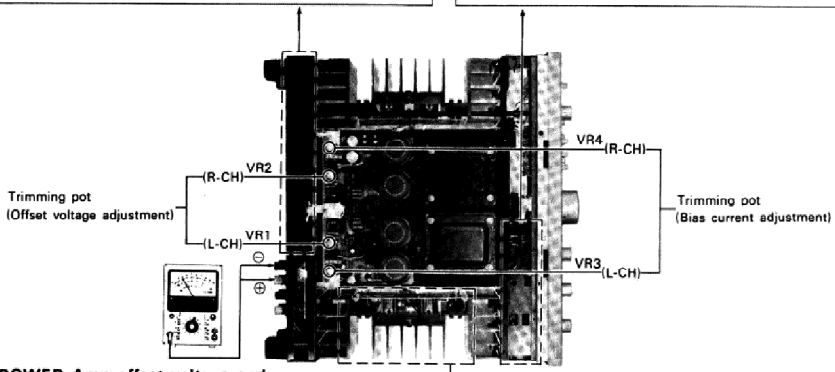


Fig. 3. POWER Amp offset voltage and Bias current adjustment

POWER AMP OFFSET VOLTAGE ADJUSTMENT

1. Connect the DC voltmeter between the ⊕ and ⊖ speaker terminals.
2. Adjust the trimming pot. VR1 (VR2) for a 0V reading of the DC voltmeter.

POWER AMP BIAS CURRENT ADJUSTMENT

1. Turn the volume control knob fully counterclockwise.
2. Connect the DC voltmeter between the emitters of Q3 and of Q4, as shown in Fig. 4.
3. Adjust the trimming pot. VR3 (VR4), as shown in Fig. 3, for 20 mV reading of the voltmeter.

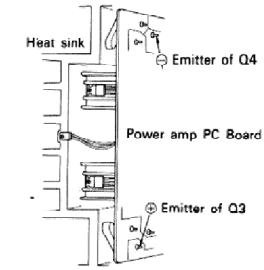


Fig. 4. Bias current adjustment

KENWOOD

2SA850
2SA978
2SC2385

2SA640 2SC1222
2SA733A 2SC1400
2SA750 2SC1775
2SA872 2SC1845
2SA954 2SA992
2SC1885 2SC1980
2SC945 2SC2003
2SC2274

2SA995
2SC2291

2SA979

2SA913 2SC1913
2SA1125 2SC2633
2SB514 2SD330

2SA1065
2SC2489

2SA784
2SA899
2SC1904

2SK109

2SK68A

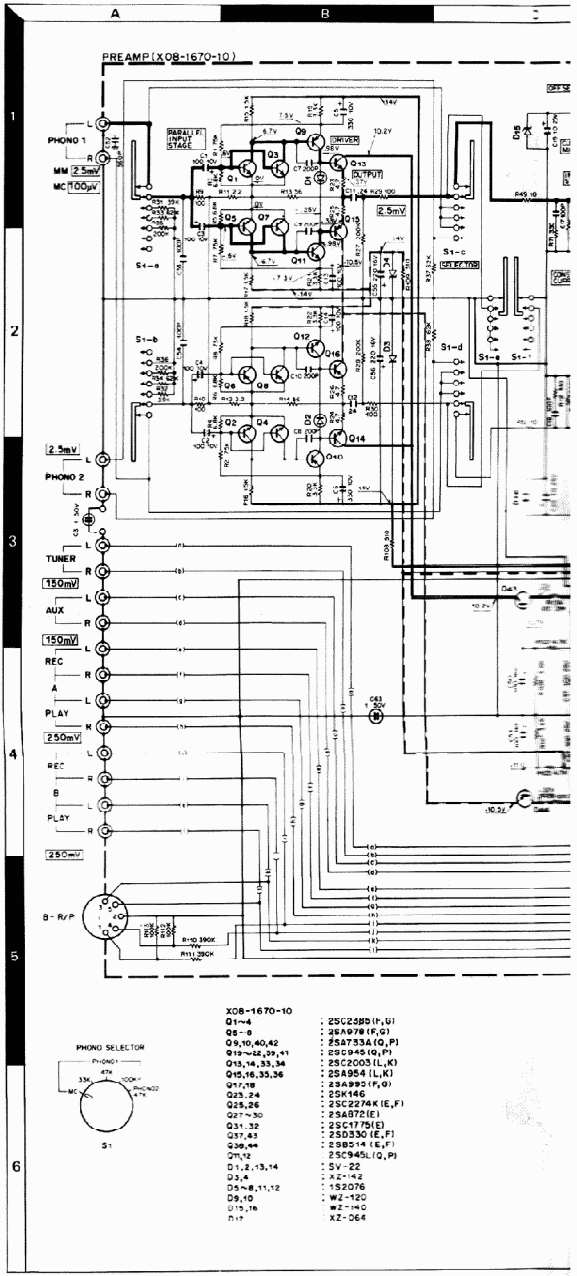
2SK146

HA12002

HA1457

2SC1213A

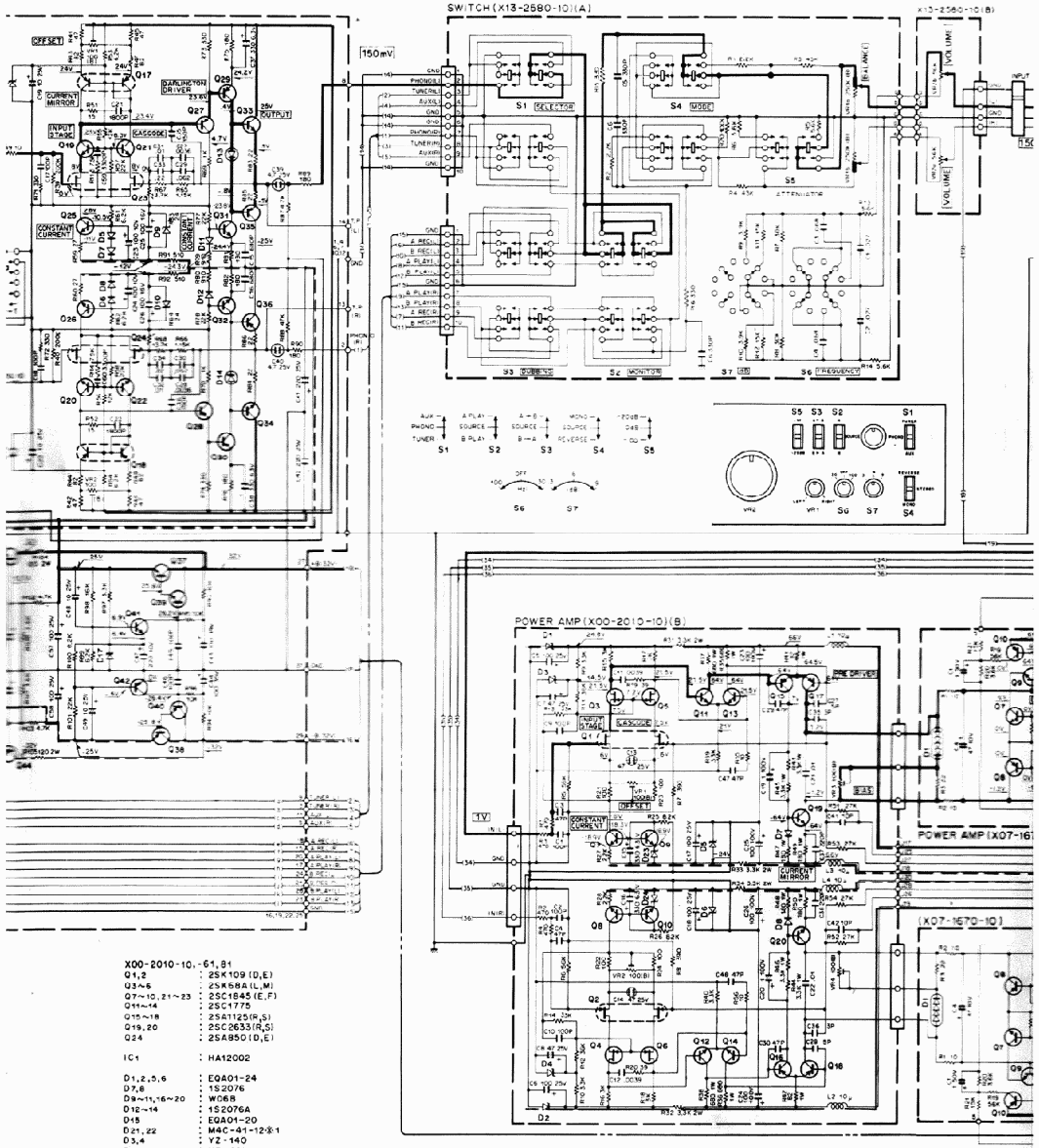
2SK150A



X08-1670-10

Q1~4	: 2SC2580(F,G)
Q5~8	: 2SA978(F,G)
Q9,10,40,42	: 2SA733A(Q,P)
Q11~22,29,41	: 2SC945(Q,P)
Q13,14,33,34	: 2SC2003(L,K)
Q15,16,35,36	: 2SA954(L,K)
Q17,18	: 2SA992(P,Q)
Q23,24	: 2SK146
Q25,26	: 2SC2274K(E,F)
Q27~30	: 2SA872(E)
Q31,32	: 2SC1775(E)
Q37,43	: 2SD330(E,F)
Q39,44	: 2SB514(E,F)
Q7,12	: 2SC945L(Q,P)
D1,2,13,14	: SV-22
D3,4	: XZ-142
D5~8,11,12	: 1S2076
D9,10	: WZ-120
D15,16	: WZ-140
D17	: XZ-064

C D E F G



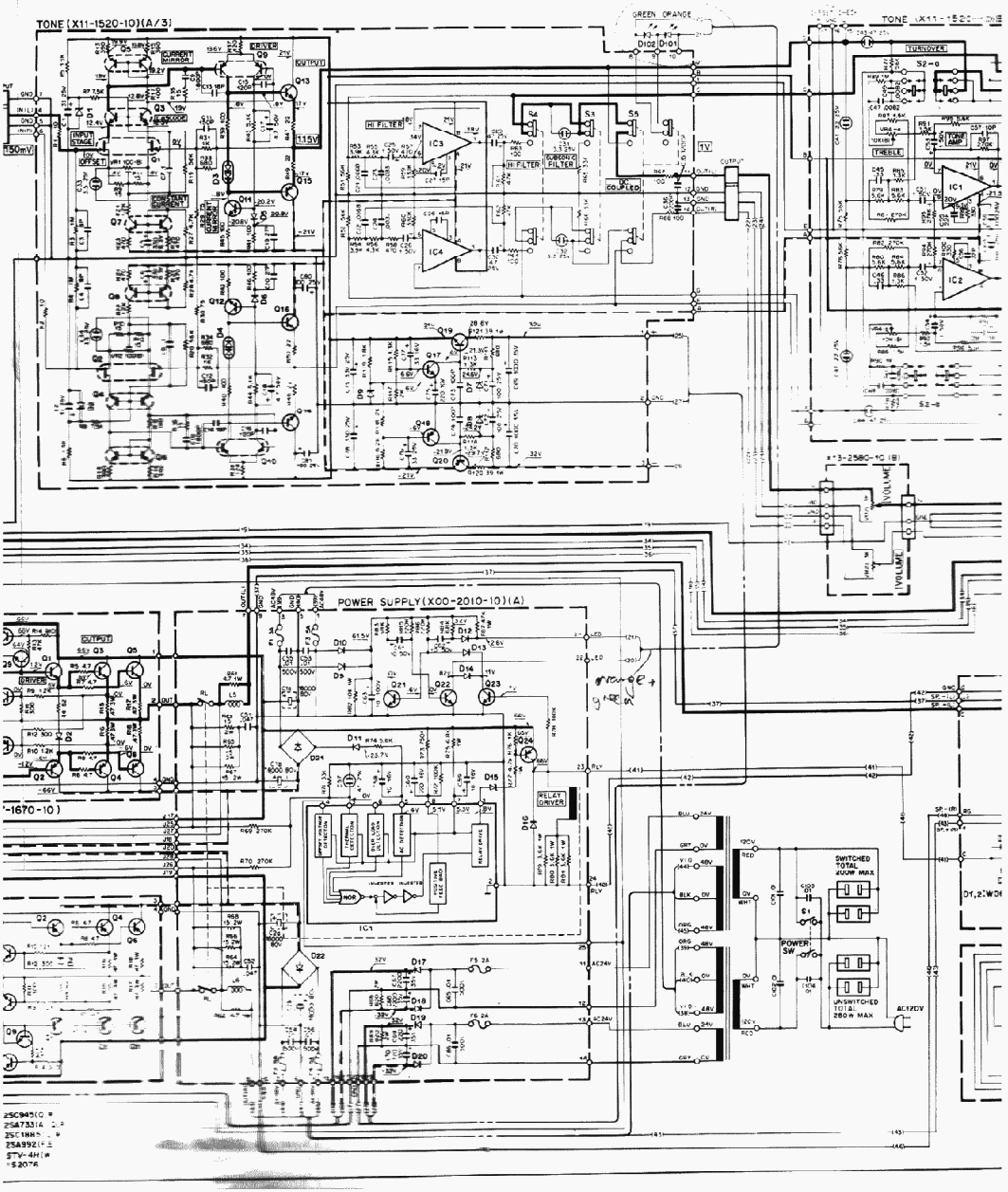
X00-2010-10, -61, 81

Q1,2	: 2SK109 (D,E)
Q3~6	: 2SK68A (L,M)
Q7~10, 21~23	: 2SC1845 (E,F)
Q11~14	: 2SC1775
Q15~18	: 2SA1125 (R,S)
Q19, 20	: 2SC2633 (R,S)
Q24	: 2SA850 (D,E)
IC1	: HA12002
D1,2,5,6	: EQA01-24
D7,8	: 1S2076
D9~11,16~20	: W06B
D12~14	: 1S2076A
D15	: EQA01-20
D21, 22	: M4C-41-12※1
D3,4	: YZ-140
D23, 24	: XZ-051

Q1 X07-1670-10

Q1	: 2SC1913 (Q,R)
Q2	: 2SA913 (Q,R)
Q3,5	: 2SC2489 (P,Q)
Q4,6	: 2SA1065 (P,Q)
Q7	: 2SC94
Q8	: 2SA73
Q9	: 2SC18
Q10	: 2SA99
D1	: STV-4
D2	: 1S207

C INTEGRATED AMPLIFIER



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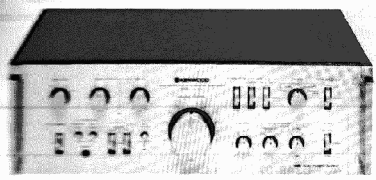

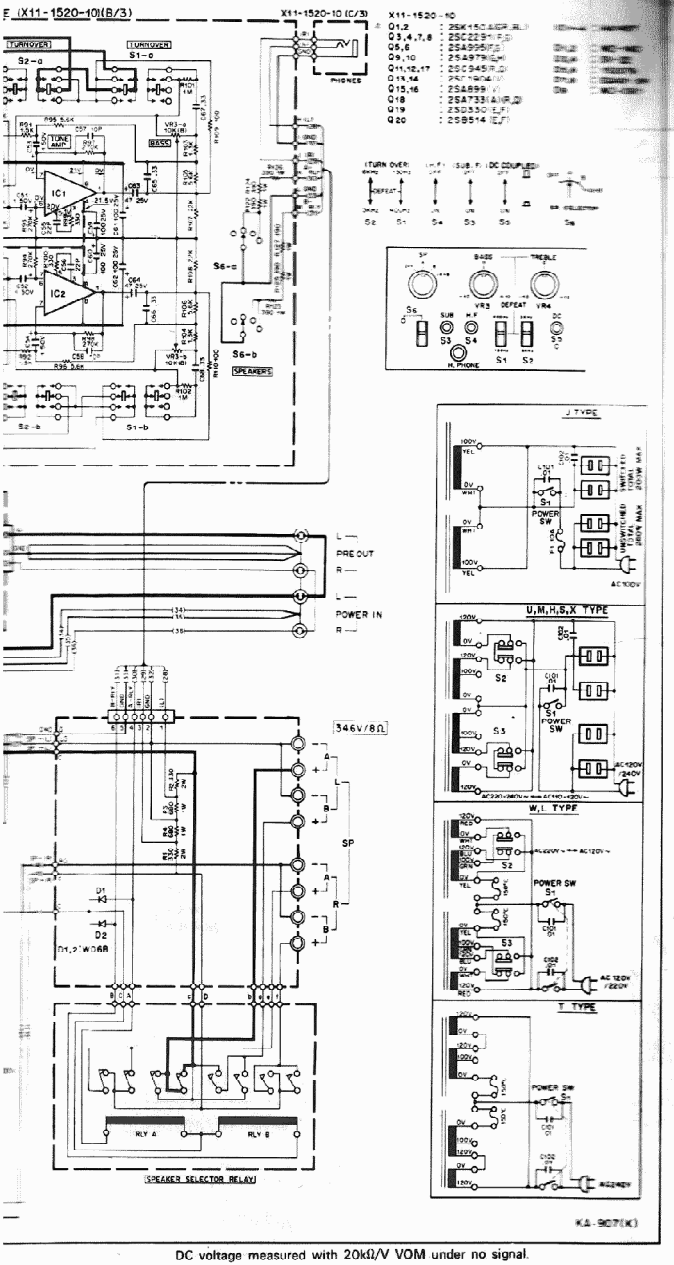

DC voltage measured with 20kΩ/V VOM under no signal.

Note: Kenwood follows a policy of continuous advancements in developments. For this reason specifications may be changed without notice.

SPECIFICATIONS

POWER OUTPUT

150 watts* per channel minimum RMS, both channels driven, at 8Ω from 20 Hz to 20,000 Hz with no more than 0.01% total harmonic distortion.

Both Channels Driven	150+150 watts 8Ω at 1,000 Hz 180+180 watts 4Ω at 1,000 Hz
Total Harmonic Distortion (20 Hz to 20,000 Hz)	
AUX input to SPEAKER output	0.01% at rated power into 8Ω 0.008% at 1/2 rated power into 8Ω
PHONO input to SPEAKER output	0.01% at rated power with VOLUME −20 dB
Intermodulation Distortion (60 Hz: 7 kHz=4 : 1)	0.0045% at rated power into 8Ω
Damping Factor	100, DC~20,000 Hz into 8Ω
Transient Response	
Rise Time	0.8μs
Slew Rate	±230 V/μs
Power Bandwidth	5 Hz to 100 kHz at 0.03% T.H.D.
Frequency Response	
(DC COUPLED at ON)	DC to 100 kHz at 0.003% T.H.D.
(DC COUPLED at OFF)	1 Hz to 400 kHz, +0 dB, −3 dB
Speaker Impedance	Accept 4Ω to 16Ω
Power IN Sensitivity/Impedance	1 V/50kΩ
Input Sensitivity	
Phono 1 (MM)	2.5 mV/33kΩ, 47kΩ and 100kΩ
Phono 2 (MM)	2.5 mV/47kΩ
Phono 1 (MC)	0.1 mV/100Ω
Tuner, AUX, Tape A, B	150 mV/50kΩ
Signal to Noise Ratio (IHF, A)	
Phono 1 & 2 (MM)	90 dB for 2.5 mV input 98 dB for 5.0 mV input 102 dB for 10 mV input
Phono 1 (MC)	70 dB for 0.1 mV input 78 dB for 0.2 mV input
Tuner AUX, Tape A, B	105 dB for 150 mV input
Maximum Input Level	
for Phono 1 & 2 (MM)	230 mV (RMS), T.H.D. 0.01% at 1,000 Hz
for Phono 1 (MC)	9 mV (RMS), T.H.D. 0.01% at 1,000 Hz
Output Level/Impedance	
Tape REC (Pin)	150 mV/150Ω
(DIN)	30 mV/80kΩ
PRE OUT (Maximum)	9 V/750Ω
Frequency Response for Phono	RIAA standard curve ±0.2 dB (20 Hz to 20,000 Hz)
Tone Control	
Bass	±10 dB, Crossover Freq. 150 Hz and 400 Hz
Treble	±10 dB, Crossover Freq. 3 kHz and 6 kHz
Loudness Control (at −60 dB VOLUME Level)	+3 dB, +6 dB, +9 dB at 30 Hz or at 100 Hz
Subsonic Filter	18 Hz, 6 dB/oct
High Filter	8 kHz, 12 dB/oct

GENERAL

Power Consumption	1,000 watts at full power
A.C. Outlet	Switched 2, Unswitched 2
Dimensions	W 480 mm (18-1/8") H 161 mm (6-11/32") D 483 mm (19-7/32")
Net Weight (less handles)	25.8 kg (56.9 lbs)

* Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifier in U.S.A.

HIGH SPEED DC INTEGRATED AMPLIFIER