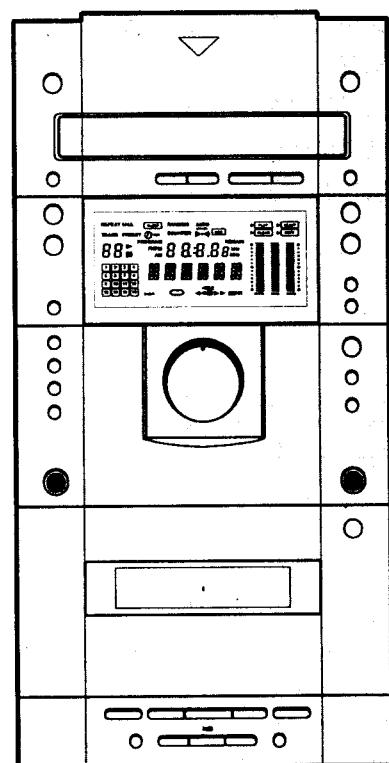




GoldStar

COMPACT DISC STEREO SYSTEM
SERVICE MANUAL



**MODEL : FFH-101KA
FFH-101WA**



GoldStar

ADJUSTMENTS

This set has been aligned at the factory and normally will not require further adjustment. As a result, it is not recommended that any attempt is made to modificate any circuit. If any parts are replaced or if anyone tampers with the adjustment, realignment may be necessary.

IMPORTANT

1. Check power-source voltage.
2. Set the function switch to band being aligned.
3. Turn volume control to minimum unless otherwise noted.
4. Keep the signal input as low as possible to avoid AGC and AFC action.

TEST & ADJUSTMENT POINT

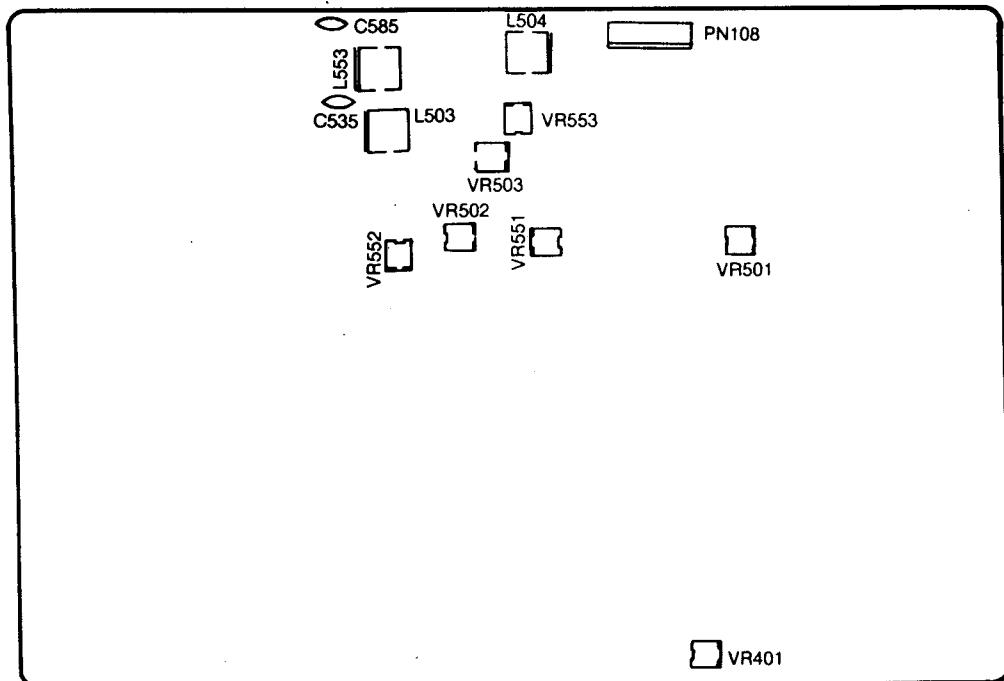


Figure 1. DECK P.C.BOARD

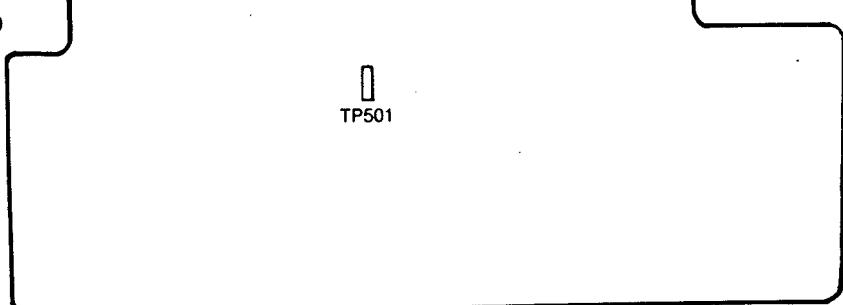
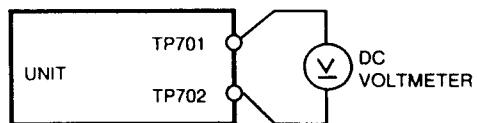


Figure 2. FRONT P.C.BOARD

TUNER ADJUSTMENTS

1. FM OV ADJUSTMENT

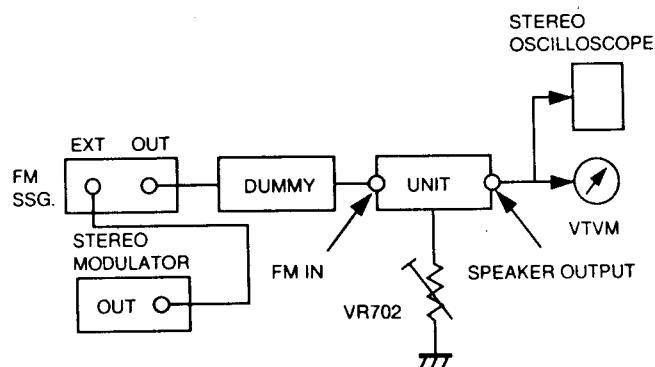
DC Voltmeter Connect to TP701 and TP702.



Step	Frequency	Adjust for	Adjustment
1	98MHz	DC 0V±50mV	L707
2	Repeat step 1 several times.		

Figure 5. FM OV Adjustment Connection Diagram

2. FM MPX ADJUSTMENT-SEPARATION



Pilot Signal	Adjust for	Adjustment
ON	Difference of R and L must be maximum.	VR702

NOTE : In case of adjusting the stereo separation, if input is L (or R) channel, R (or L) channel must be maximum.

Figure 6. FM MPX Adjustment Connection Diagram

3. FM STEREO BEACON SENSITIVITY ADJUSTMENT

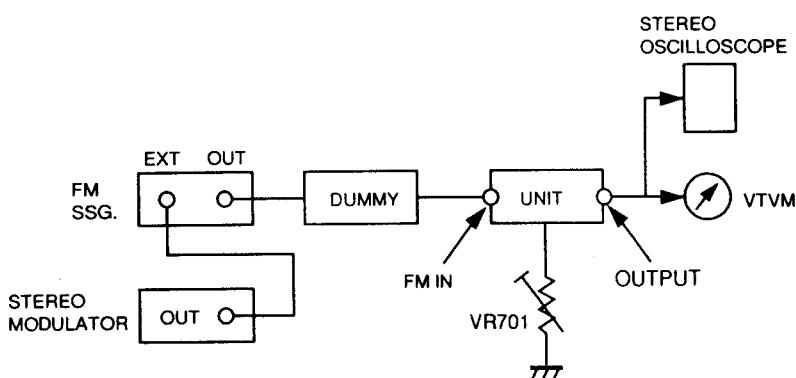


Figure 7. FM Stereo Beacon Sensitivity Adjustment Connection Diagram

Pilot Signal	Test Point	Adjust for	Adjustment
ON	Pilot Display (on FIP)	$25\text{dB}\pm 5\text{dB}$	VR701

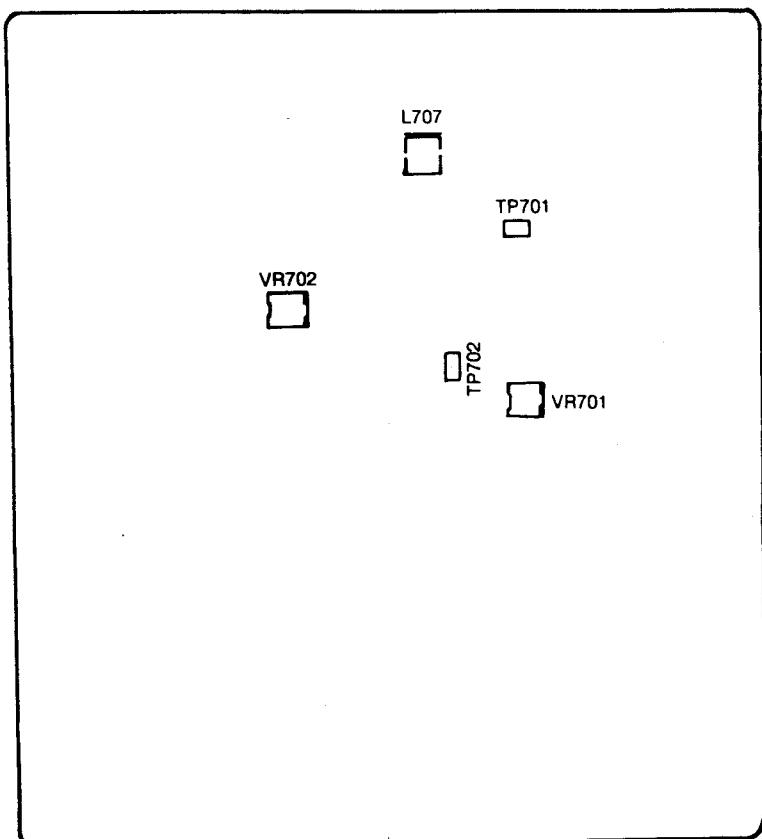


Figure 3. TUNER P.C.BOARD

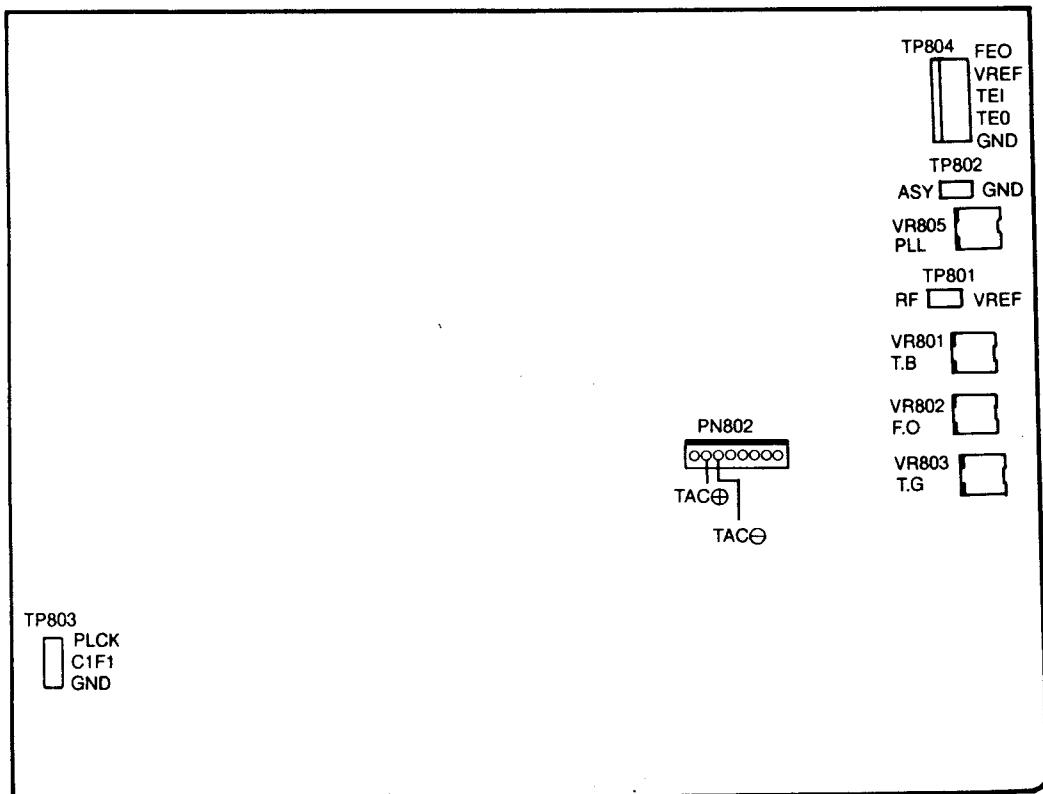
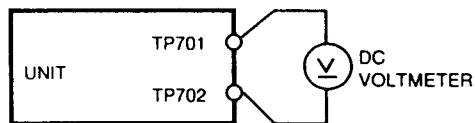


Figure 4. CD P.C.BOARD

TUNER ADJUSTMENTS

1. FM OV ADJUSTMENT

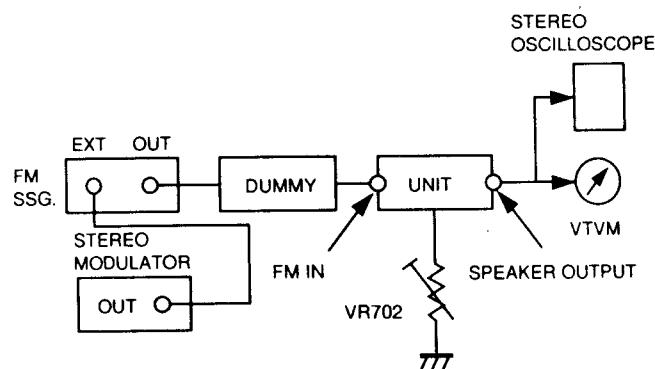
DC Voltmeter Connect to TP701 and TP702.



Step	Frequency	Adjust for	Adjustment
1	98MHz	DC 0V±50mV	L707
2		Repeat step 1 several times.	

Figure 5. FM OV Adjustment Connection Diagram

2. FM MPX ADJUSTMENT-SEPARATION



Pilot Signal	Adjust for	Adjustment
ON	Difference of R and L must be maximum.	VR702

NOTE : In case of adjusting the stereo separation, if input is L (or R) channel, R (or L) channel must be maximum.

Figure 6. FM MPX Adjustment Connection Diagram

3. FM STEREO BEACON SENSITIVITY ADJUSTMENT

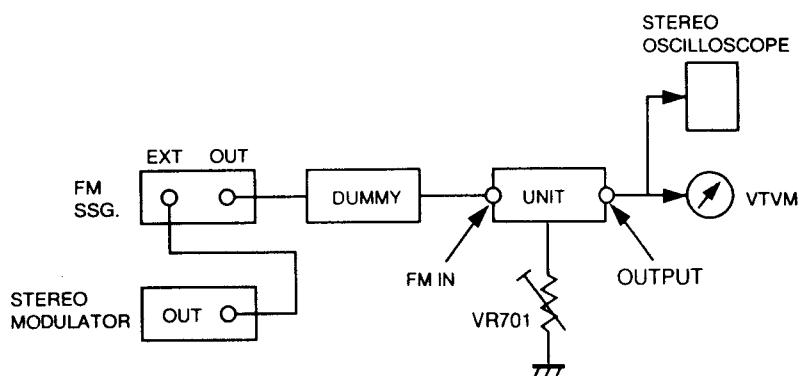


Figure 7. FM Stereo Beacon Sensitivity Adjustment Connection Diagram

Pilot Signal	Test Point	Adjust for	Adjustment
ON	Pilot Display (on FIP)	25dB±5dB	VR701

TAPE DECK ADJUSTMENTS

1. AZIMUTH ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjust for	Adjustment	Remark
Playback	MTT-114	TP501	Head screw	R/L Maximum	Forward : Lefthand side screw Reverse : Righthand side screw

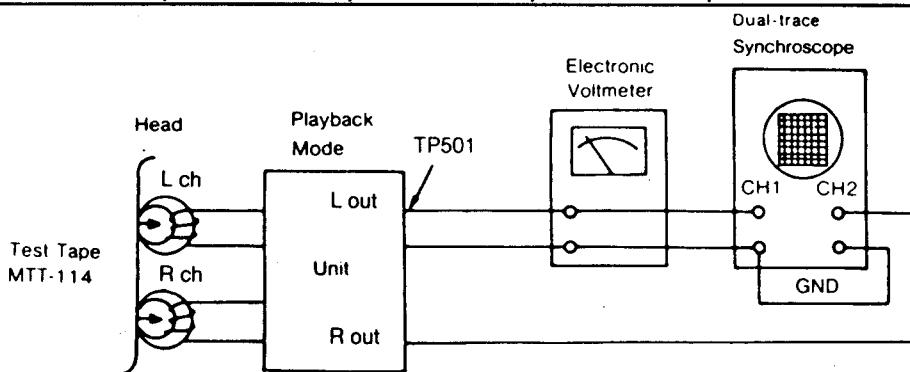


Figure 8. Azimuth Adjustment Connection Diagram

2. MOTOR SPEED ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Adjust for	Remark
Playback	MTT-111	TP501	VR401	$3\text{kHz} \pm 45\text{Hz}$	After adjusting in forward, confirm the specification in reverse mode.

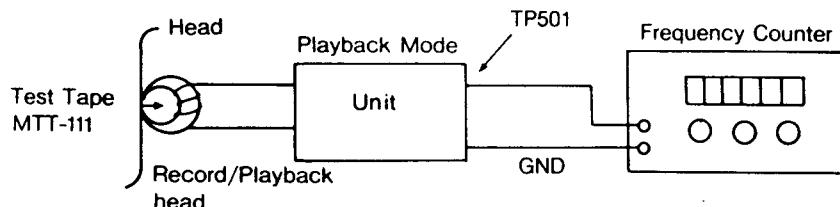


Figure 9. Motor Speed Adjustment Connection Diagram

3. PLAYBACK LEVEL ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Adjust for	Remark
Playback	MTT-150	TP501	VR501 VR551	$580\text{mV} \pm 1\text{dB}$	After adjusting in forward, confirm the specification in reverse mode.

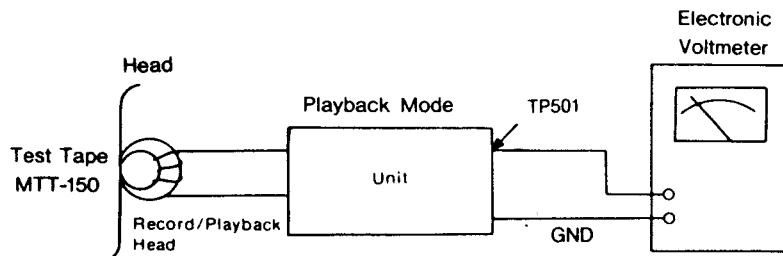


Figure 10. Playback Level Adjustment Connection Diagram

4. RECORD BIAS ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Adjust for
Rec/Pause	MTT-5561	ERASE HEAD WIRE (PN108 #1)	L504	85kHz±5kHz

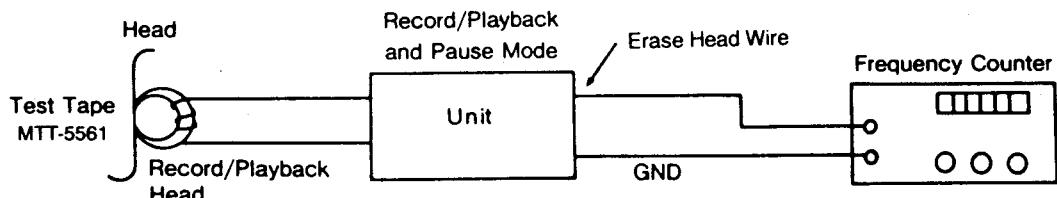


Figure 11. Record Bias Adjustment Connection Diagram

5. BIAS TRAP ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Adjust for
Rec/Pause	MTT-5561	C535	L503	Minimum
		C585	L553	

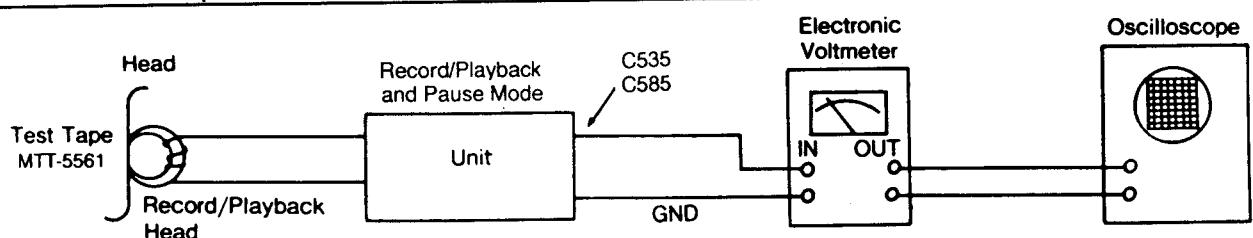


Figure 12. Bias Trap Adjustment Connection Diagram

6. RECORD LEVEL ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Input	Adjust for	Remark
R/P→PB	MTT-5511 MTT-5561	TP501	VR502 VR552	200mV (on AUX)	±0.5dB	<ul style="list-style-type: none"> Dolby OFF After adjusting in MTT-5511, confirm in MTT-5561.

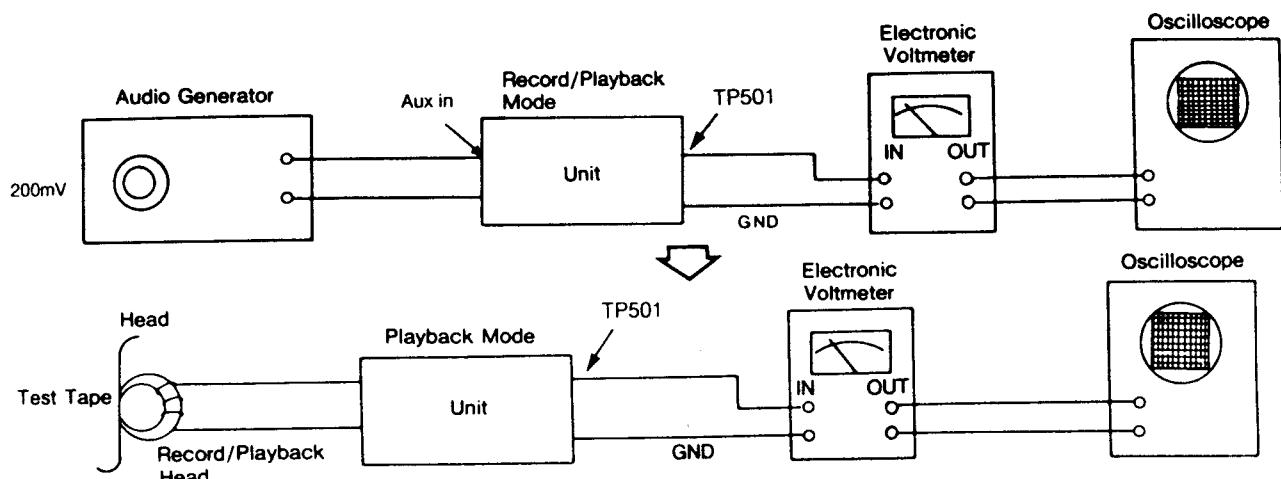


Figure 13. Record Level Adjustment Connection Diagram

7. BIAS ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Input	Adjust for	Remark
R/P→PB	MTT-5511 MTT-5561	TP501	VR503 VR553	400mV -25dB (on AUX)	Adjust for the response of 1kHz/10kHz flat	After adjusting in MTT-5511, confirm in MTT-5561.

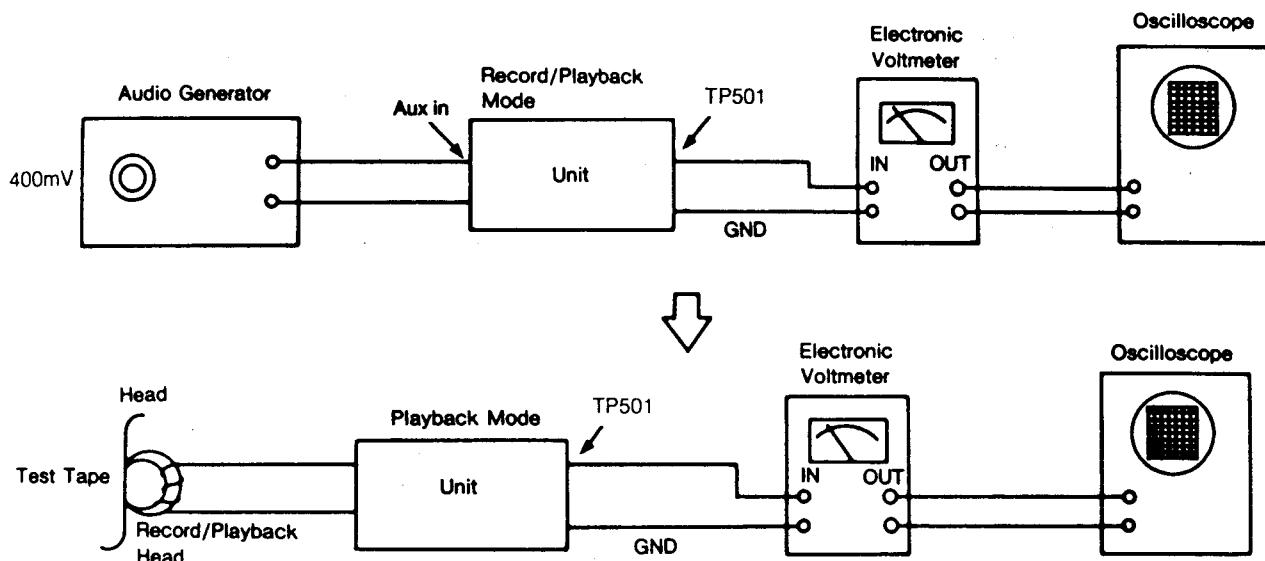


Figure 14. Bias Adjustment Connection Diagram

CDP ADJUSTMENTS

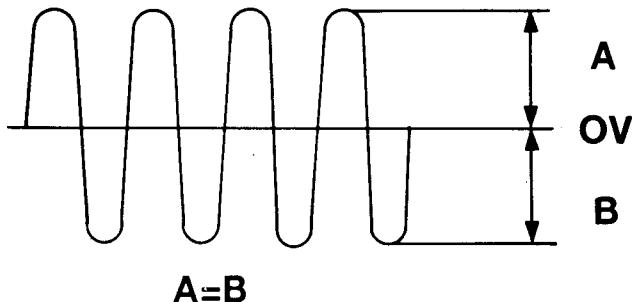
1. Before adjusting, preset adjustment potentiometers VR801, 802, 803, and 805 center.

2. PLL ADJUSTMENT

- 1) Stop mode.
- 2) Connect digital frequency counter to TP803 (PLCK) and TP803 (GND).
- 3) Shortcircuit TP802 (ASY) and TP802 (GND).
- 4) Adjust VR805 so that the frequency counter reading becomes 4.45MHz ($\pm 10\text{kHz}$).
- 5) Opencircuit TP802 (ASY) and TP802 (GND).

3. TRACKING BALANCE ADJUSTMENT

- 1) Connect the oscilloscope to TP804 (pin④-TEO) and TP804 (pin②-Vref).
- 2) Place test disc (YEDS-18) on turntable and play the music number 12.
- 3) Minimize volume VR803.
- 4) Adjust VR801 so that the amplitude above and below the zero DC line becomes equal (amplitude A=B).
- 5) Preset adjustment potentiometer VR803 center again.

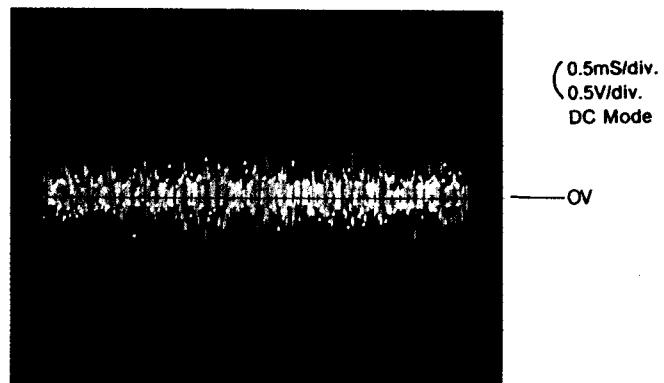


4. FOCUS OFFSET ADJUSTMENT (You have to use 10:1 prove)

- 1) Connect oscilloscope to TP801(RF) and TP801(Vref).
- 2) Put unit into play mode.
- 3) Adjust VR802 so that eye pattern become clear and waveform (Vp-p) is maximum.
- 4) Stop mode.
- 5) Connect oscilloscope to TP804 (pin①-FEO) and TP804 (pin②-Vref).
- 6) Confirm the oscilloscope reading
 - i) Less than 200mV-OK
 - ii) More than 200mV-readjust VR802 200mV.

5. TRACKING GAIN ADJUSTMENT

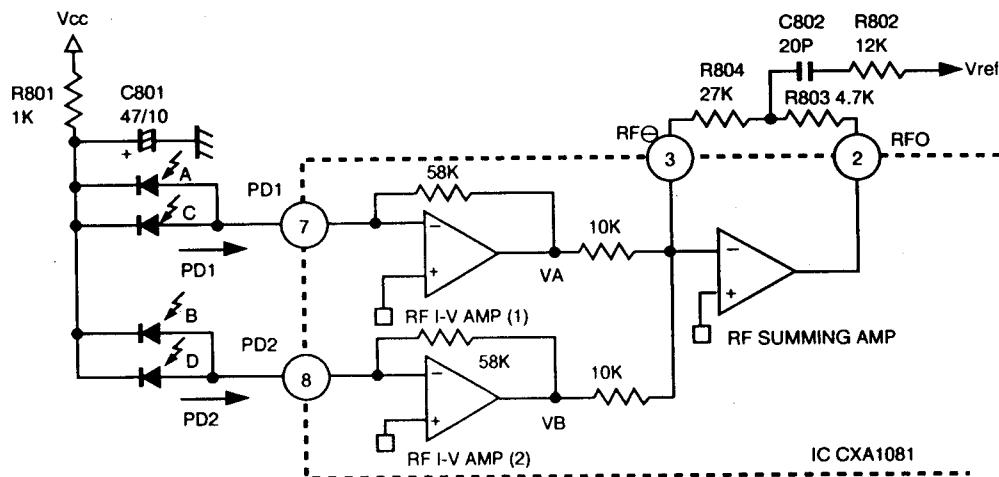
- 1) Connect a oscilloscope to PN802 (pin②-TAC \oplus) and PN802 (pin③-TAC \ominus).
- 2) Insert test disc and put unit into play mode on track.
- 3) Adjust VR803 so that the waveform on the oscilloscope becomes like below.



DESCRIPTION OF FUNCTIONS

1. RF AMPLIFIER

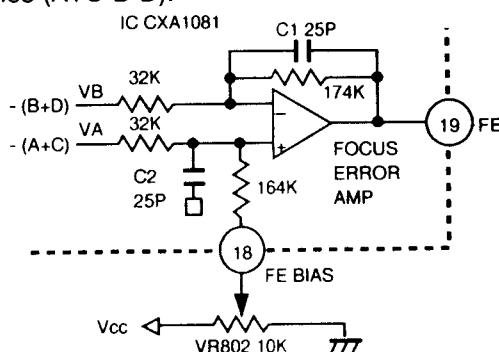
RF 1-V amplifiers (1) and (2) are converted to voltage from the signal current of pin photodiodes connected to PD1 and PD2 through the $58K\Omega$ equivalent resistance. Furthermore, it is added in the RF summing amplifier and (A+B+C+D) is output at RFO. At this pin (RFO), the eye pattern can be checked.



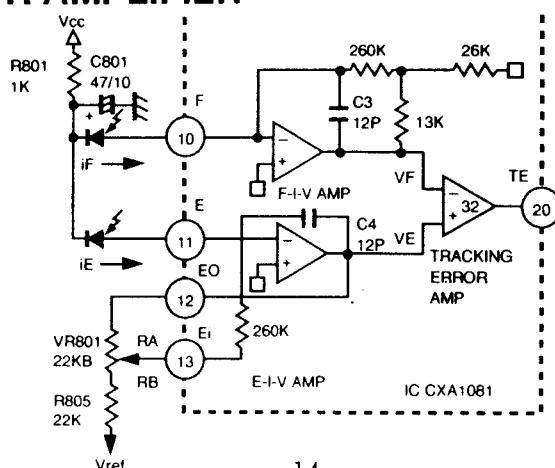
The RF amplifier output voltage (low-frequency) is $V_{RFO}=2.2 \times (V_A + V_B) = 127.6K\Omega \times (i_{PD1} + i_{PD2})$. (at RFO)

2. FOCUS ERROR AMPLIFIER

The Focus Error Amplifier is the difference between RF 1-V amplifier (1) output (A+C) and RF 1-V amplifier (2) output (B+D). The output becomes (A+C-B-D).



3. TRACKING ERROR AMPLIFIER



E I-V amplifier and F I-V amplifier are converted to voltage from the signal current of pin photodiode connected : E and F. The E and F I-V amplifiers output voltage is,

$$V_F = iF \times 403K\Omega, \text{ and}$$

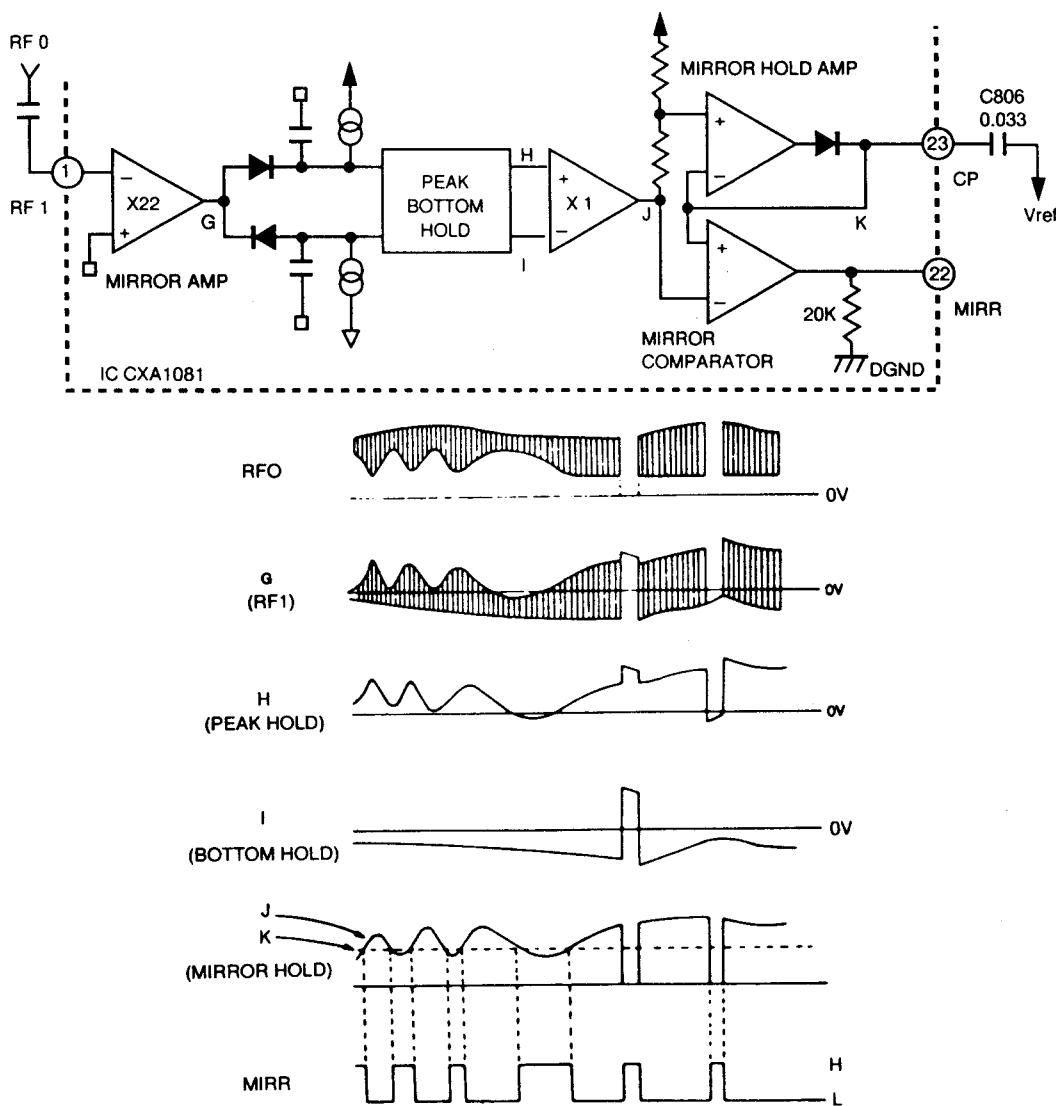
$$V_E + iE \times 260K\Omega \times R_A / (R_B + 22K) + (R_A + 260K).$$

The tracking error amplifier is the difference between the E I-V amplifier ouput and the F I-V amplifier output, this output is (E-F).

$$\begin{aligned} V_{TE} &= (V_E - V_F) \times 3.2 \\ &= (iE - iF) \times 1290K\Omega \end{aligned}$$

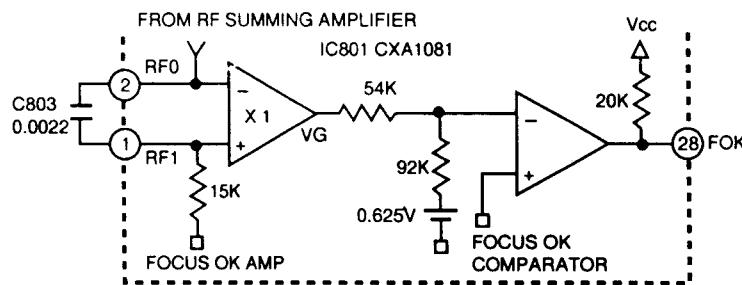
4. MIRROR CIRCUIT

This circuit, after amplifying the RFI signal, holds its bottom and peak. The peak hold is done with a time constant able to track down a 30kHz traverse and the bottom hold. This is done with a time constant able to track down envelope fluctuations in the revolving cycle.



With the differential amplification of these peak and bottom hold signals, H and I, the envelope signal J (demodulated to DC) is obtained. Two-thirds of the peak value of this signal J is held with a large time constant for the signal K. When K is compared with J, a mirror output is obtained. That is, the mirror output gives "L" on the disc track, "H" between tracks (mirror section) and also "H" in the defect detection. The time constant for the mirror hold must be sufficiently larger than that of the traverse signal.

5. FOCUS OK CIRCUIT



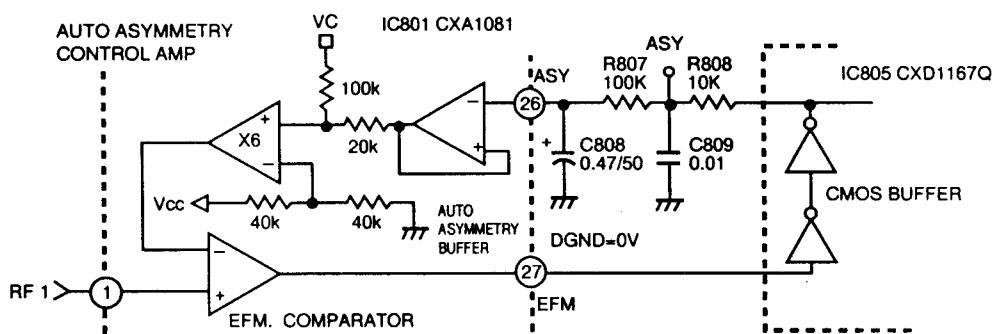
The focus OK circuit generates a timing window to lock on the focus servo from a focus search status. Pin ① will get the HPF (High Pass Filter) output from an RF signal from Pin ②-the LPF (Low Pass Filter) output (opposite phase) for the focus OK amplifier output.

The focus OK amplifier output is inverted when $V_{RF1} - V_{RF0} = -0.37V$.

C803 is for determining the time constants of HPF in the EFM comparator and mirror circuits as well as LPF in the focus OK amplifier. When $0.0022\mu F$ is selected for C803, f_c (cut-off frequency)=1kHz, prevents the block error rate from degenerating as a damaged RF envelope results from the scratched disc, etc.

6. EFM COMPARATOR

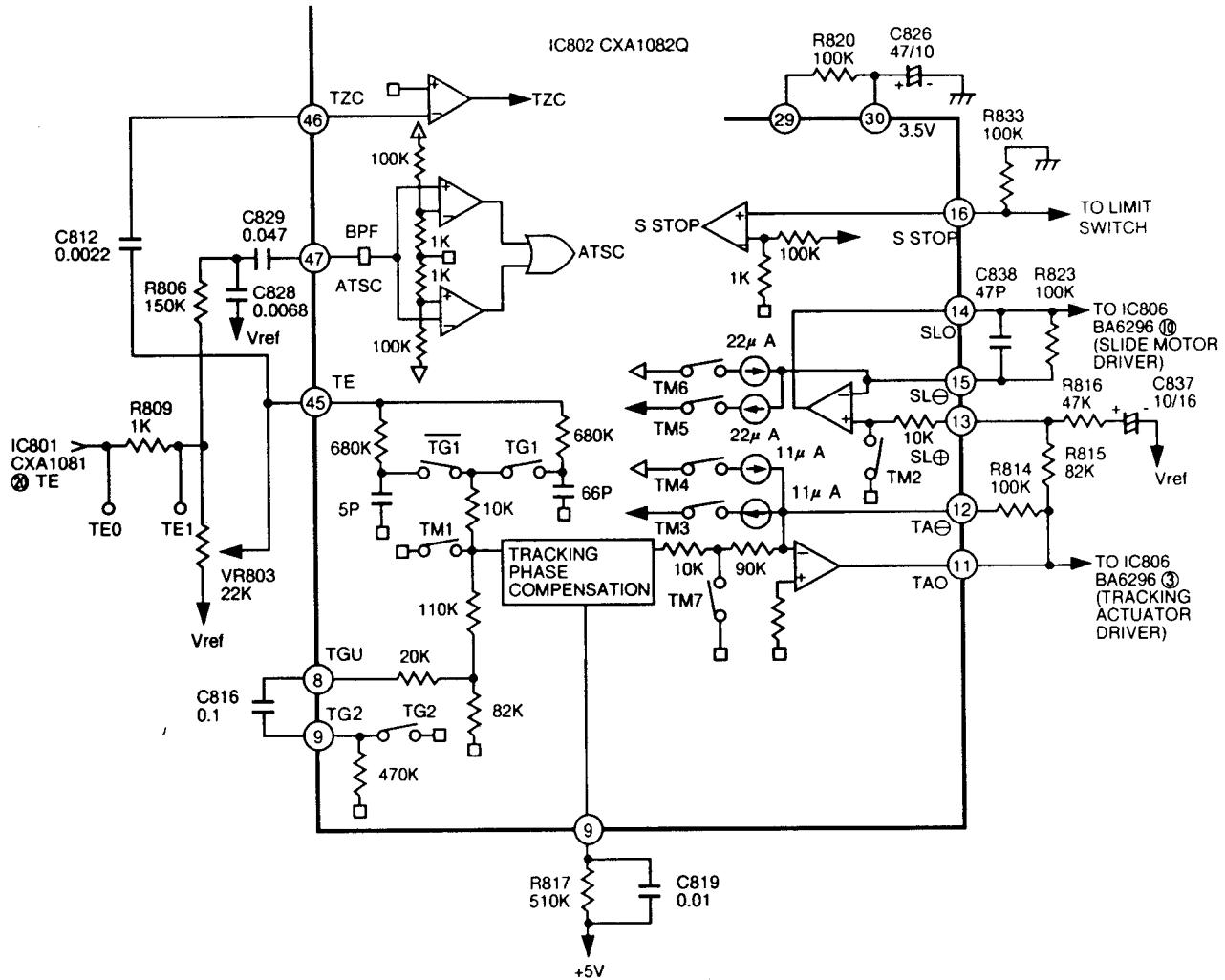
The EFM comparator changes RF signal into a binary value. As the asymmetry generated due to variations in disc manufacturing cannot be eliminated by the AC coupling alone, the reference voltage of EFM comparator is controlled utilizing the fact that the generation probability of 1, 0 is 50% each in the binary EFM signals.



As this comparator is a current SW type, each of the H and L levels does not equal the power supply voltage, requiring feedback through a CMOS buffer.

R807, R808, and C809 form a LPF to obtain $(V_{cc} + DGND)/2V$. When f_c (out-off frequency) is made more than 500Hz, the EFM low-frequency component leaks dably, degenerating the block error rate.

9. TRACKING SERVO SYSTEM



The above is a block diagram of the tracking sled servo system.

The capacitor across pins 8 and 9 has a time constant to lower the high frequency when TG2 is switched off. The tracking phase compensation peak frequency is inversely proportional to the resistor connected to pin 17 (about 1.2kHz when the resistor is 510KΩ).

For a tracking jump in the FWD or REV direction, TM3 or TM4 are set to ON. At this time, the peak voltage fed to the tracking coil is determined by the TM3 and TM4 current values and the feedback resistor from pin 12. That is :

$$\text{Track jump peak voltage} = \text{TM3 (TM4) current value} \times \text{feedback resistor value}$$

The FWD or REV sled kick is done by setting TM5 or TM6 to ON. At this time, the peak voltage added to the sled motor is determined by the TM5 or TM6 current value and the feedback resistor from pin 15.

$$\text{Sled jump peak voltage} = \text{TM5 (TM6) current value} \times \text{feedback resistor value}$$

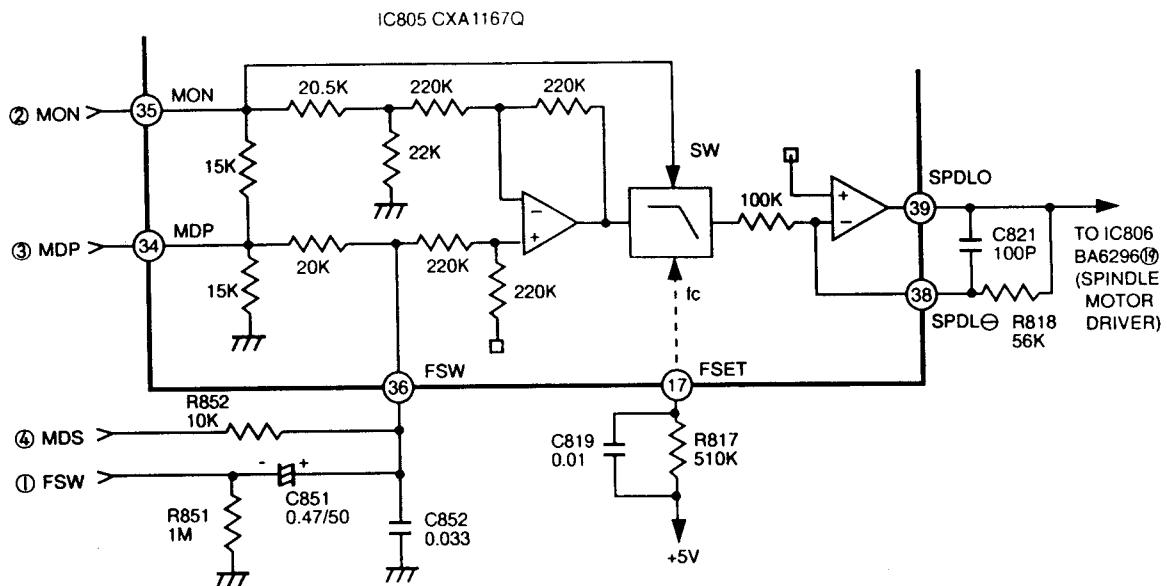
Each SW current value is determined by the resistor connected to pins 29 and 31. When the resistor is at about 120KΩ,

$$\text{TM3 or TM4 is } \pm 11\mu\text{A and TM5 or TM6 is } \pm 22\mu\text{A}$$

This current value is almost inversely proportional to the resistor, variable within a range of about 5 to 40μA for TM3.

S STOP is the ON/OFF detection signal for the limit SW of the sled motor's innermost circumference.

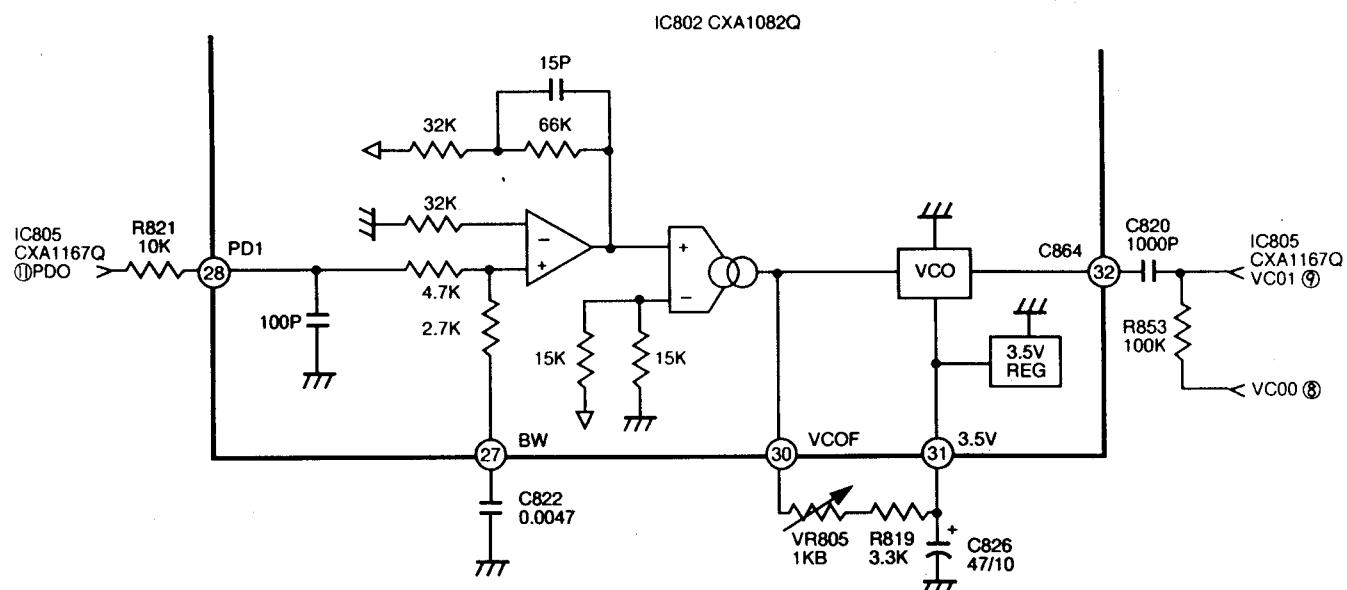
10. SPINDLE SERVO AND LPF



The 200Hz LPF is formed with $0.033\mu F$ and $10k\Omega$ connected to pin 36 and the secondary LPF is formed with the built-in LPF (fc up to 200Hz with $510k\Omega$ for pin 17), and the carrier component of the CLV servo error signals MDS and MDP is eliminated.

In the CLV-S mode, FSW becomes L and the pin 36 LPF fc lowers, strengthening the filter further. With the pin 17 resistor connected to Vcc, fc does not vary with power supply voltage fluctuations.

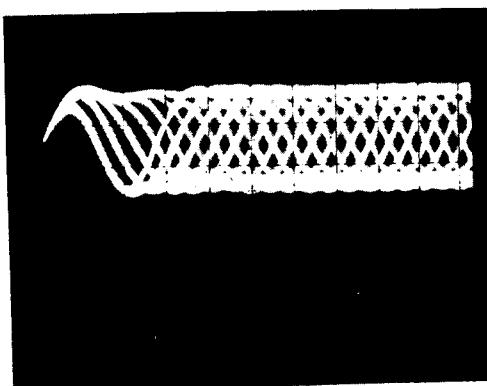
11. VCC LOOP FILTER & 8.64MHz VCO



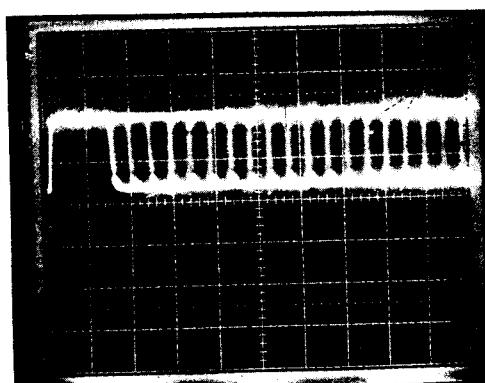
The phase compensation output PDD input from pin 38 has its PWM carrier component removed in the loop filter. Then, the V-I conversion is made and the free-running frequency setting current from pin 30 is added to control the VCO frequency. The VCO self-running frequency is almost inversely proportional to the resistor across pins 30 and 31. This resistor is set so that the PLL capture range center matches the 4.3218MHz at pin 70 of the CXA1167Q.

WAVEFORMS OF MAJOR CHECK POINT

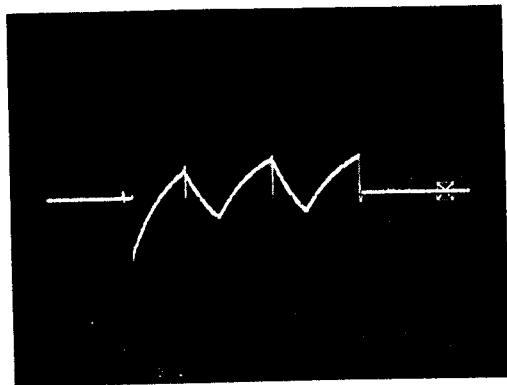
1. HF signal (RF signal) waveform (test point TP801) during normal play



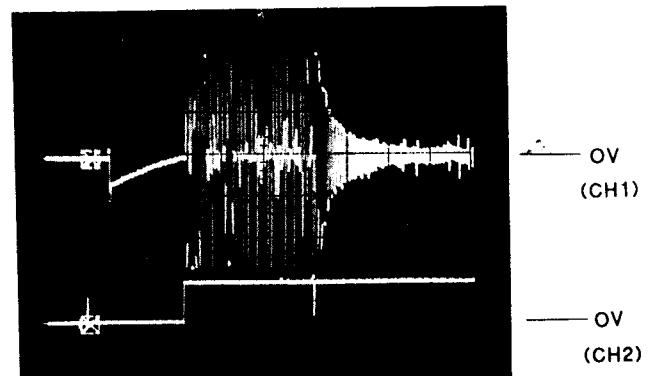
2. EFM signal (pin NO. ⑦ of IC801) waveform during normal play



3. Focus coil drive waveform (pin NO. ⑯, ⑰ of IC806)
- When focus search failed or there is no disc on the tray.

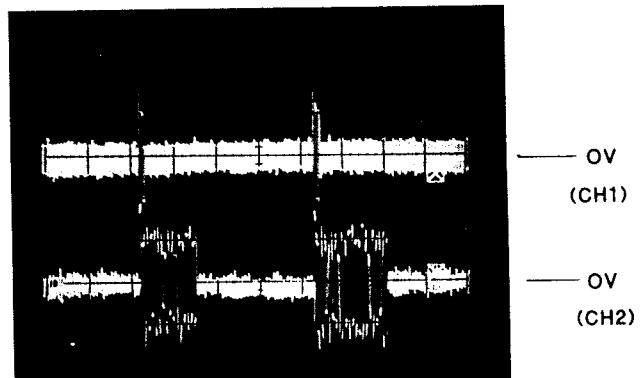


- Focus coil drive waveform (pin NO. ⑯, ⑰ of IC806) and FOK (pin NO. ⑧ of IC801) when focus search is accomplished.



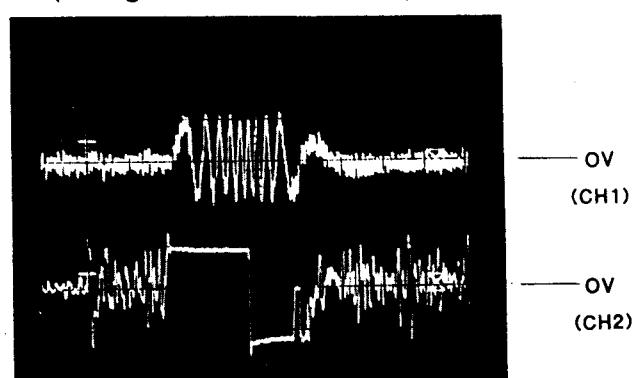
CH1: FOCUS COIL DRIVE SIGNAL
2V/Div.
CH2: FOK

4. Tracking coil drive waveform (pin NO. ③ of IC806) and TEO during track traverse
- (1) When time division is 20mS/div.



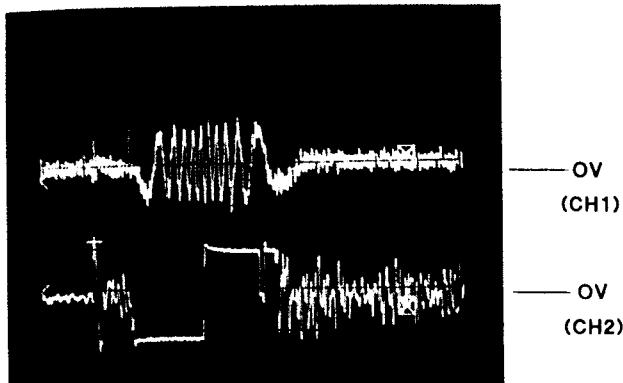
CH1 : TEO
1V/Div.
CH2 : TRACKING COIL DRIVE SIGNAL
2V/Div.

- (2) When time division is 0.5mS/div.
(During forward track traverse)



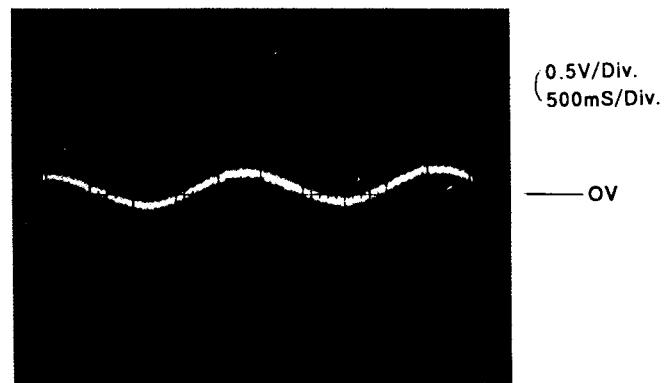
CH1 : TEO
1V/Div.
CH2 : TRACKING COIL DRIVE SIGNAL
2V/Div.

(3) When time division is 0.5mS/div.
(During backward track traverse)

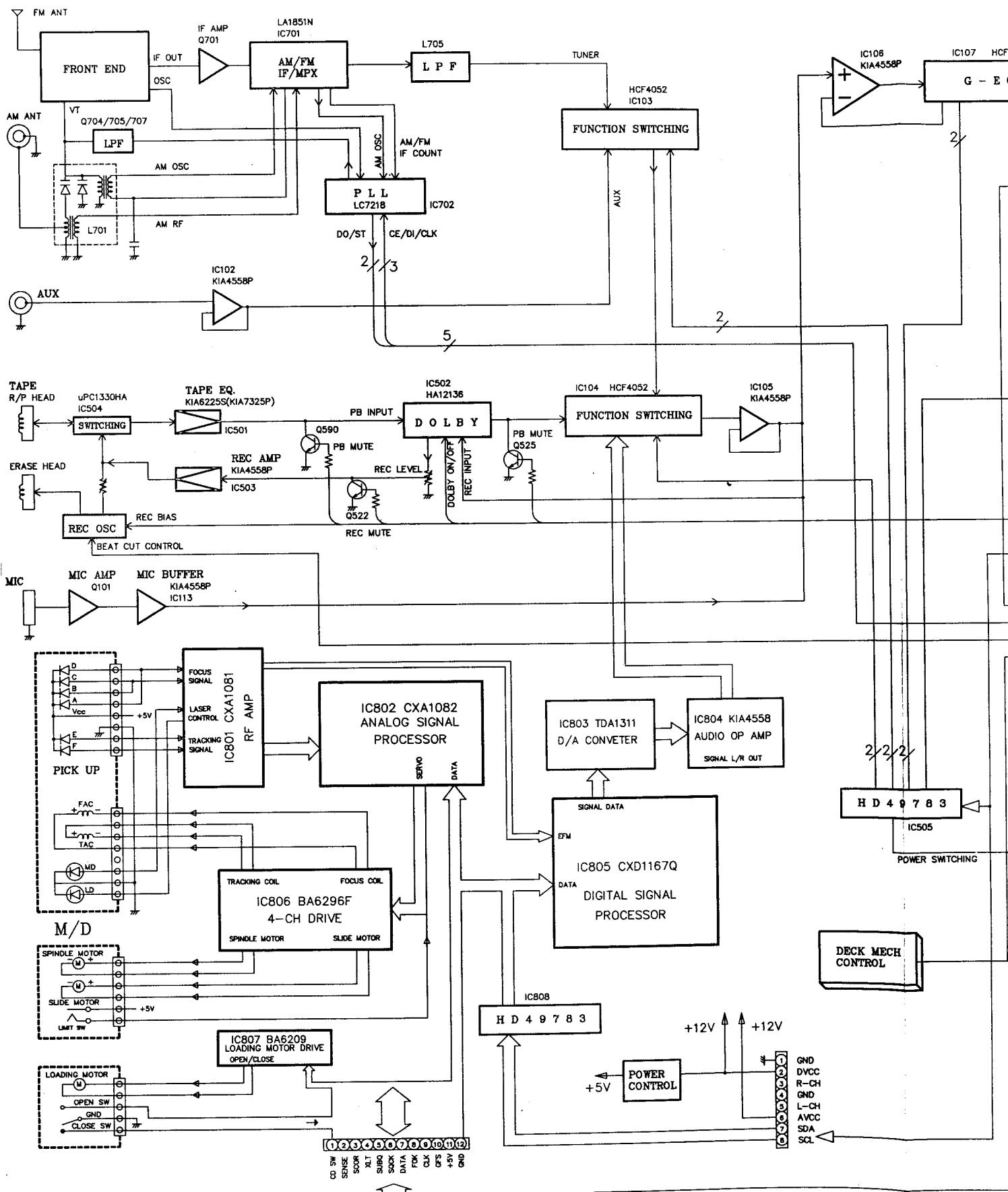


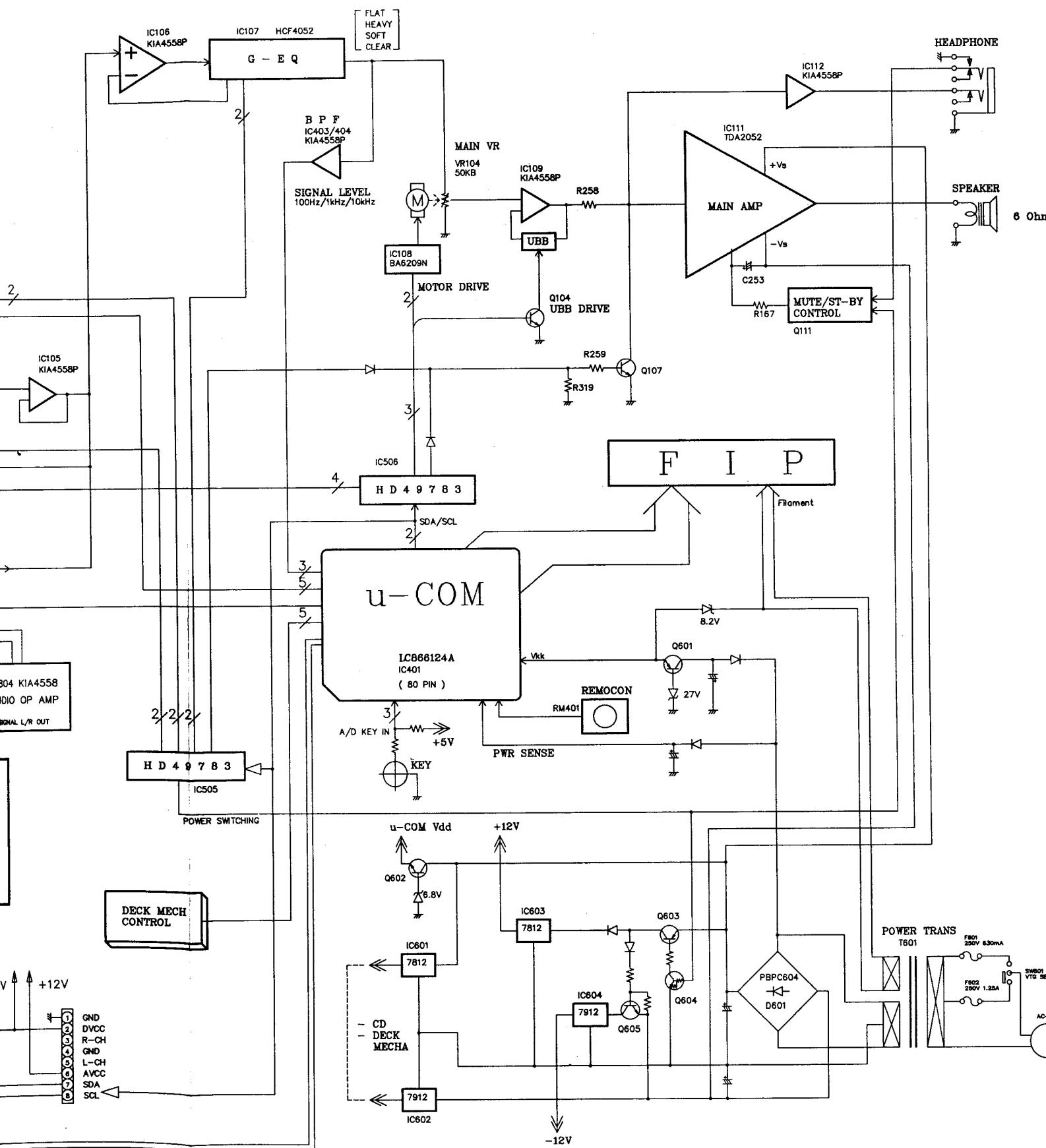
CH1 : TEO
1V/Div.
CH2 : TRACKING COIL DRIVE SIGNAL
2V/Div.

5. Feed motor drive waveform (pin NO. 10 of IC806) During normal play.

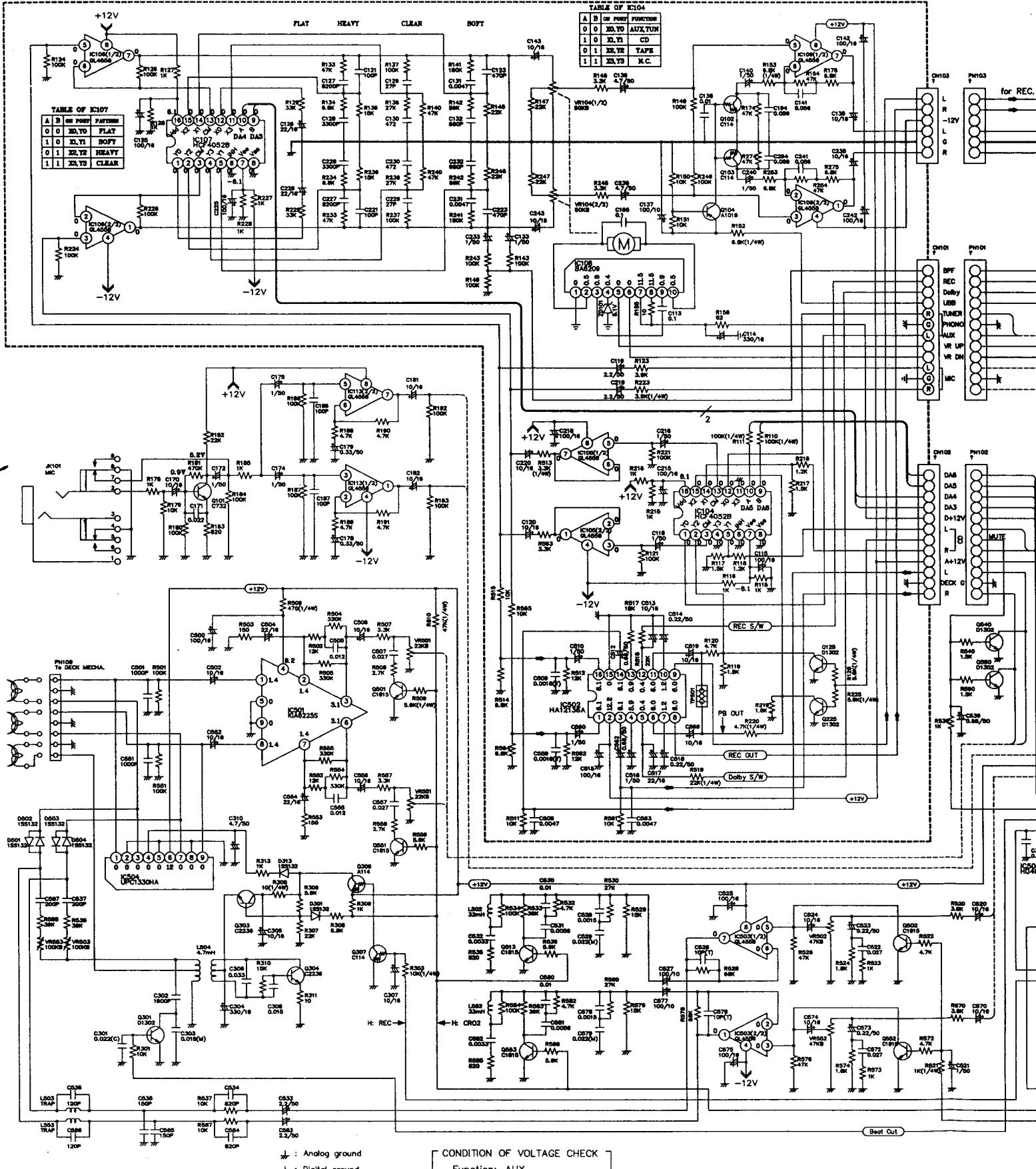


BLOCK DIAGRAM



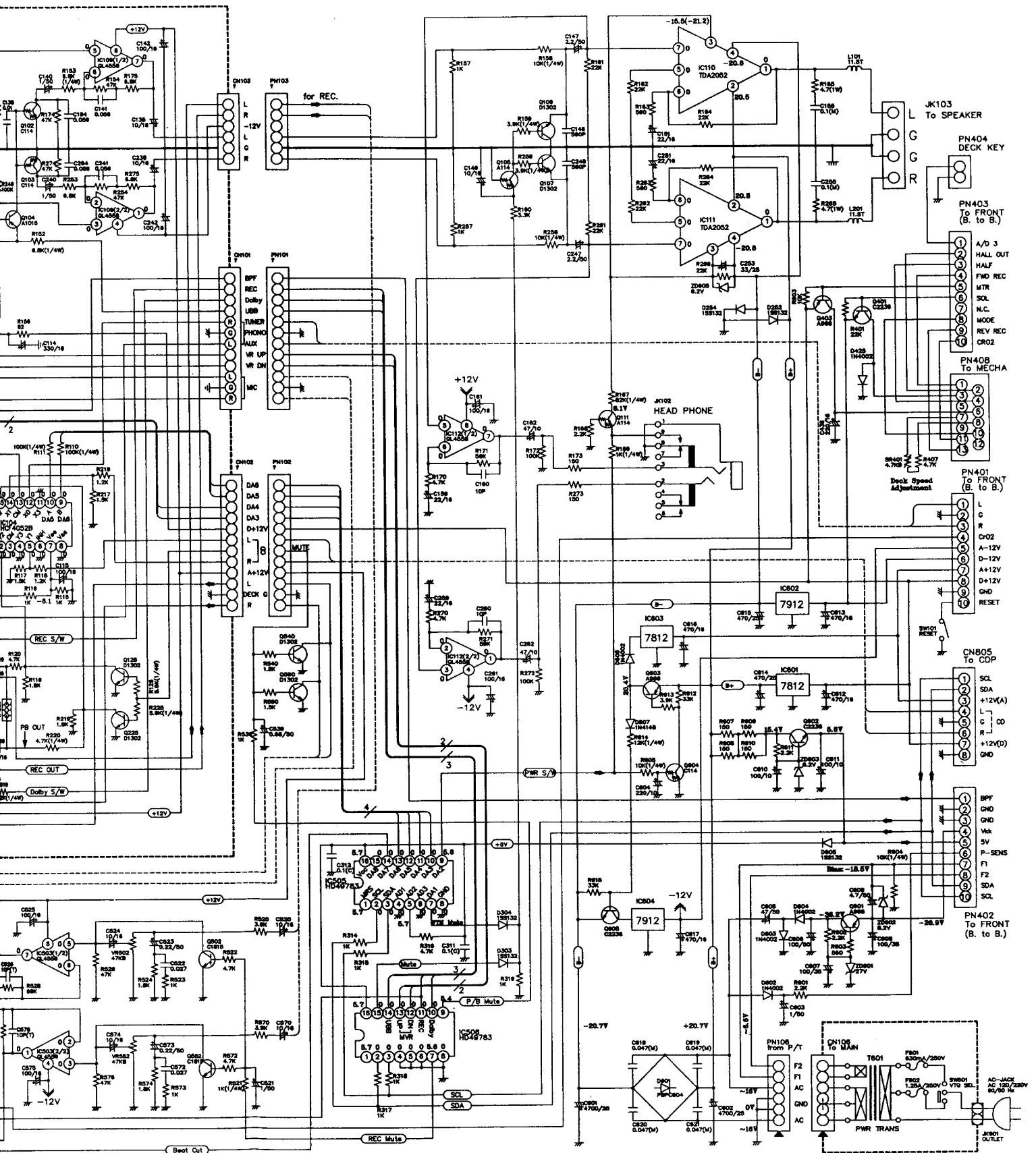


● MAIN CIRCUIT

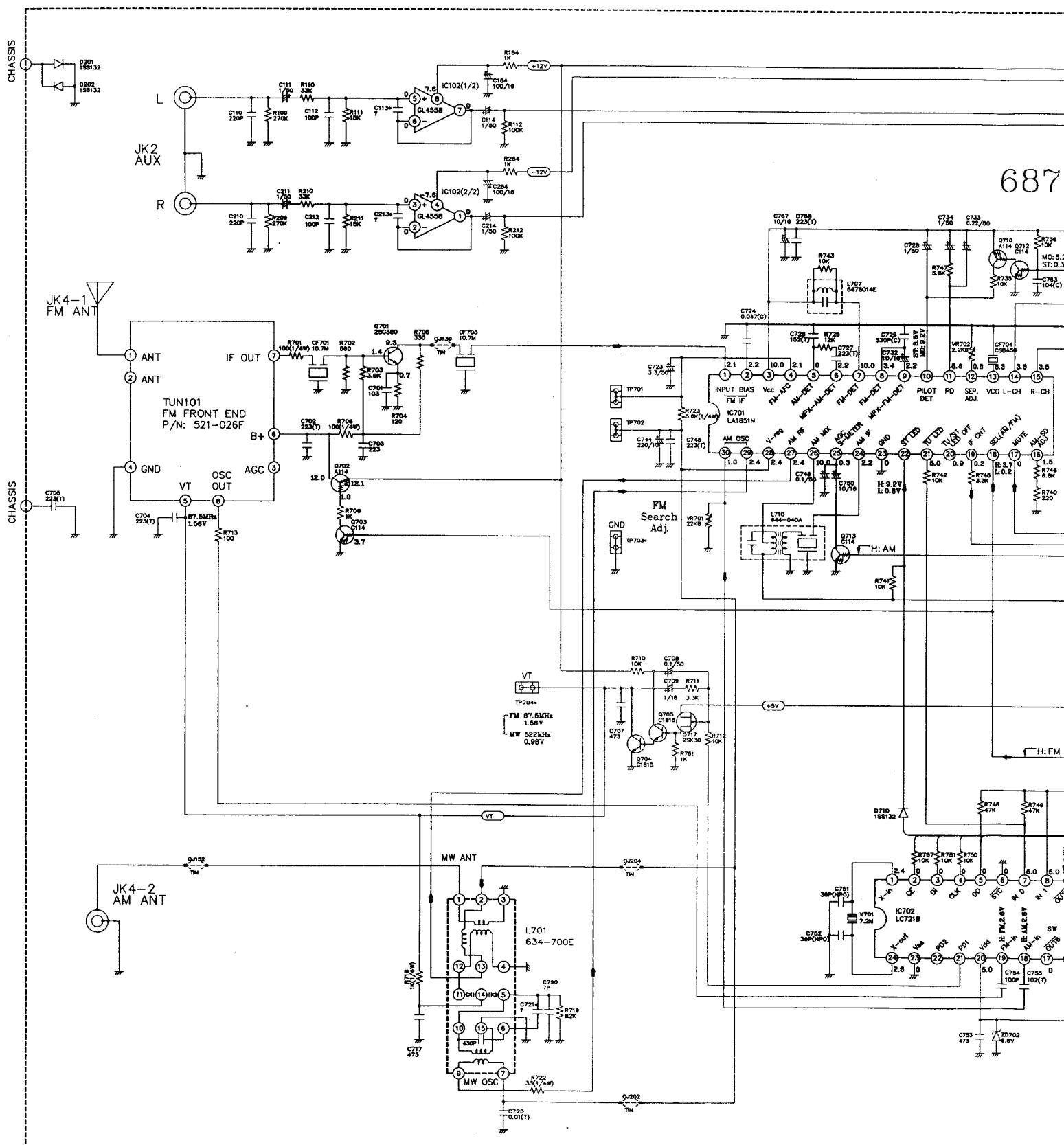


--- : Analog ground
 \perp : Digital ground
 --- : Chassis ground

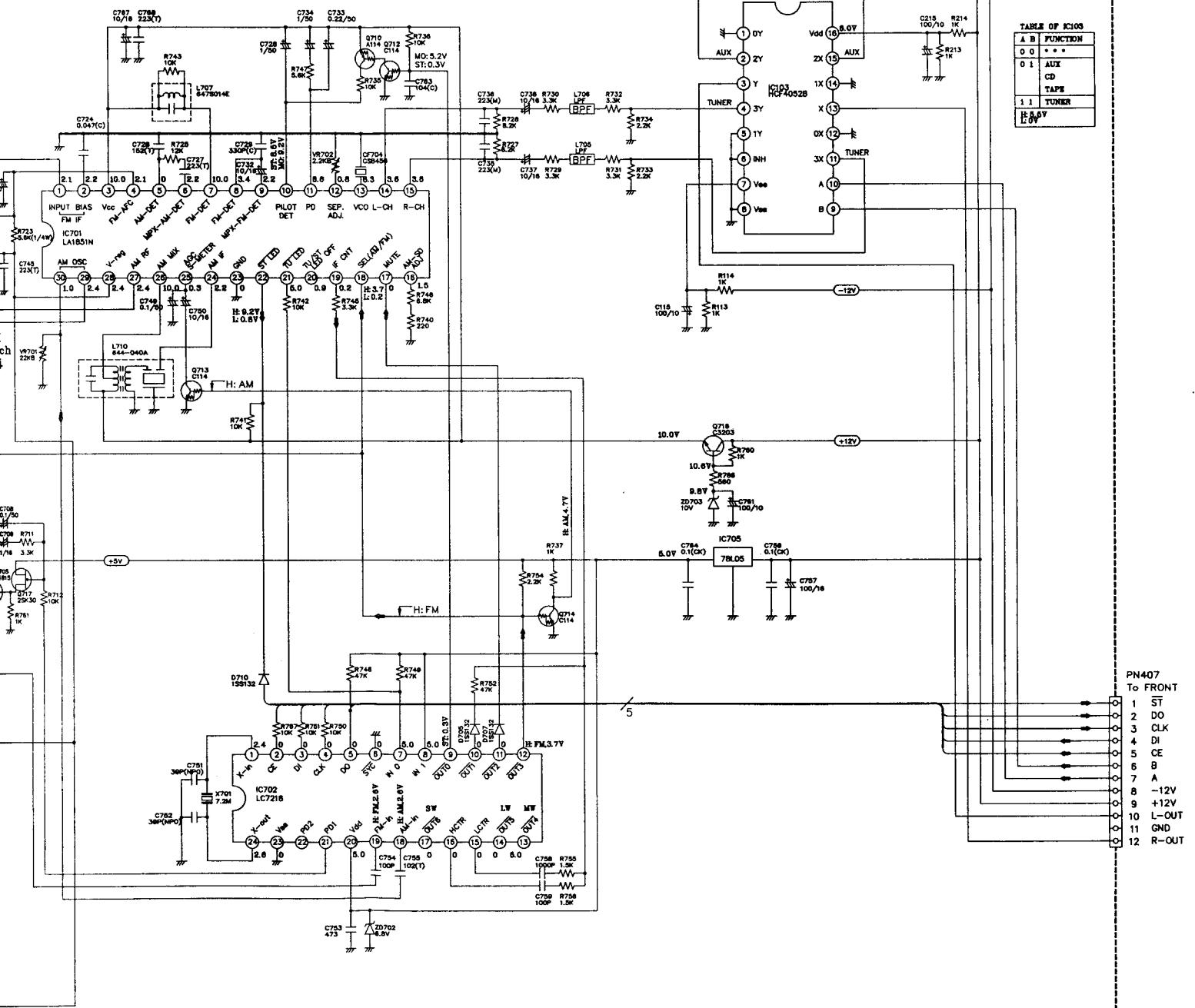
CONDITION OF VOLTAGE CHECK
Function: AUX
EQ: flat
0 Voltage = Ground of C601



● TUNER/AUX CIRCUIT

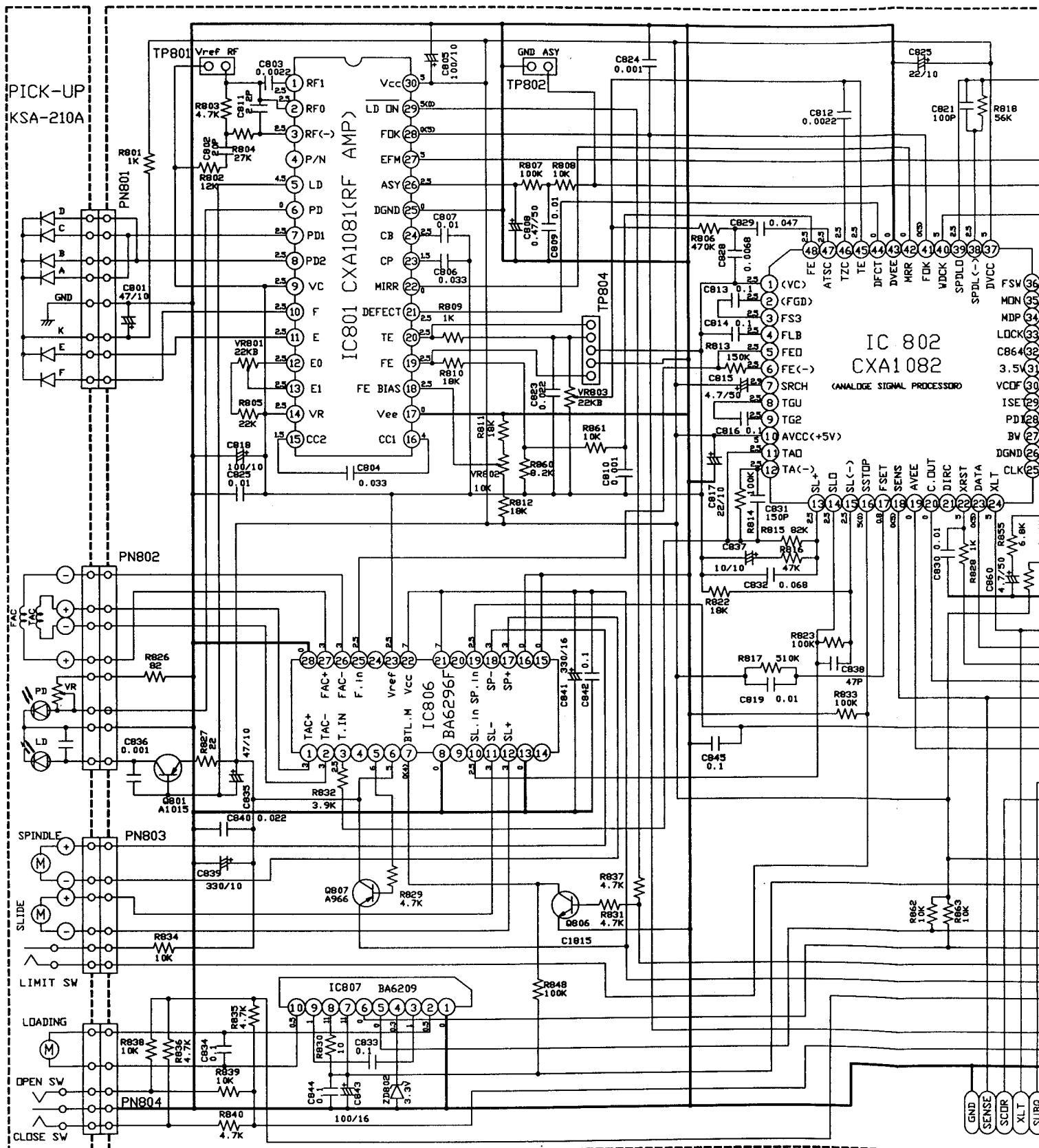


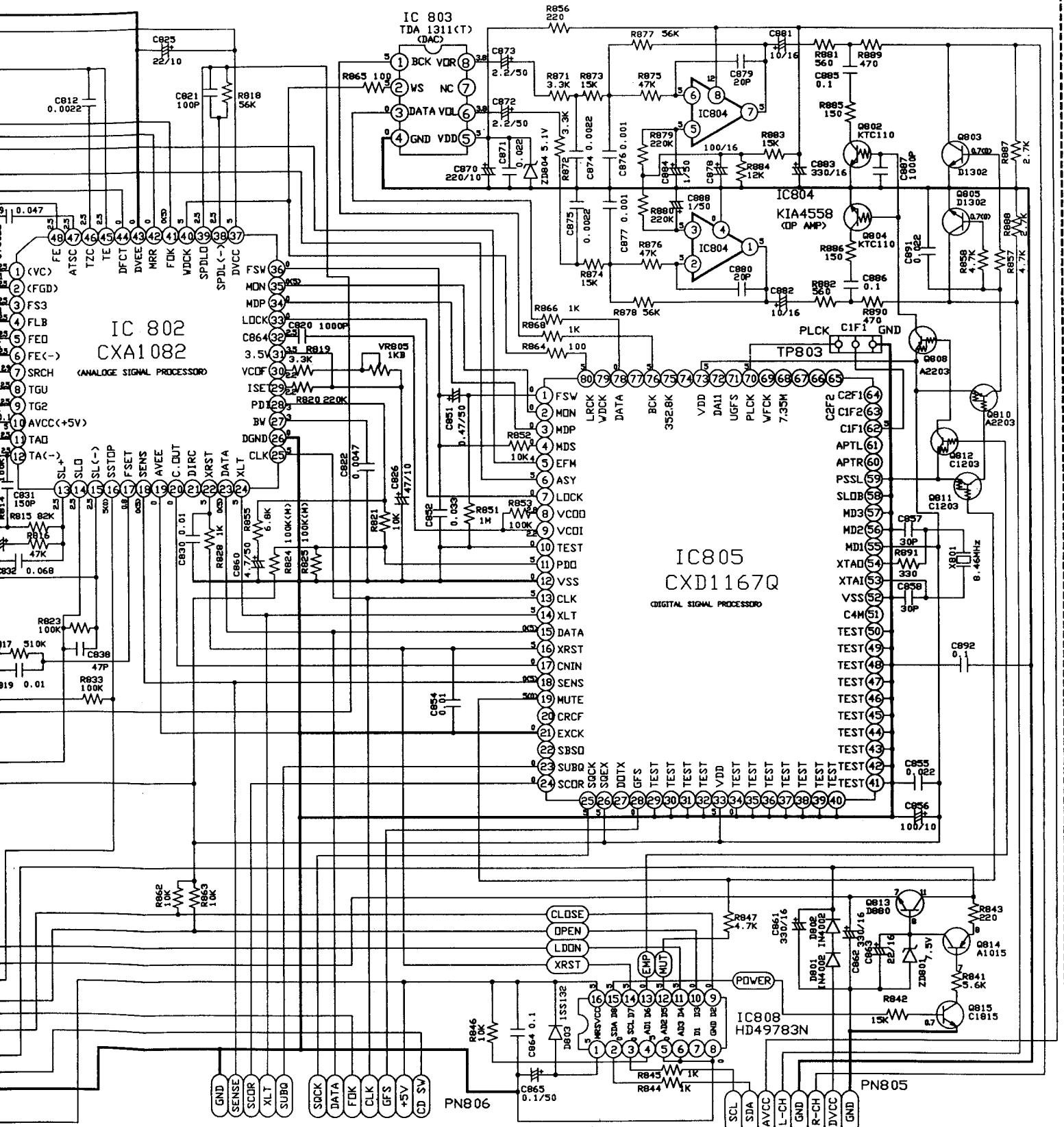
6870-17MAA



NOTES : 1. Resistance values are indicated in ohms unless otherwise specified (K=1,000, M=1,000,000).
 2. Capacitance values are shown in microfarads unless otherwise (P=MICRO-MICRO FARADS).
 3. Schematic diagram for this model are subject to change for improvement without prior notice.

CD CIRCUIT

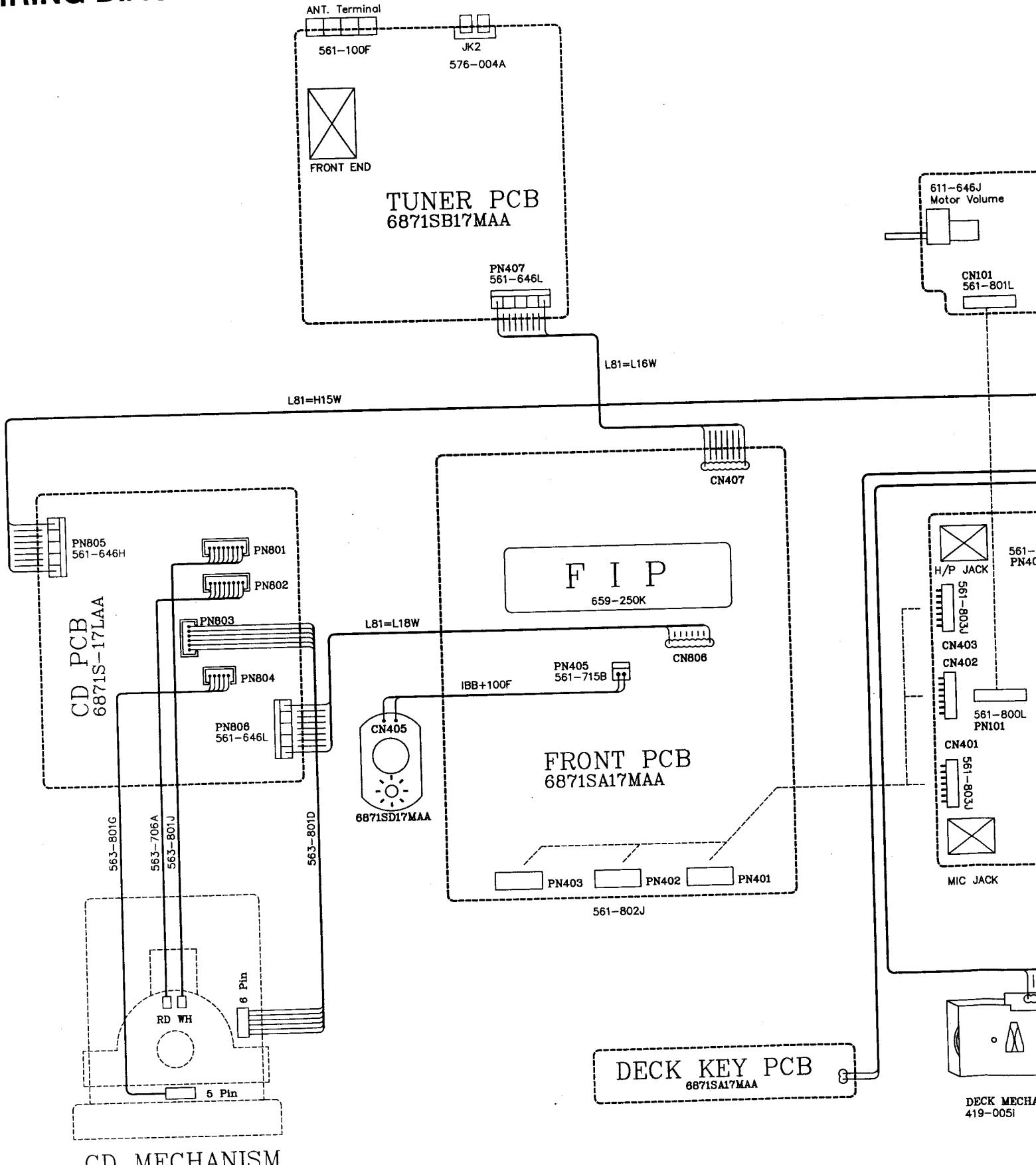


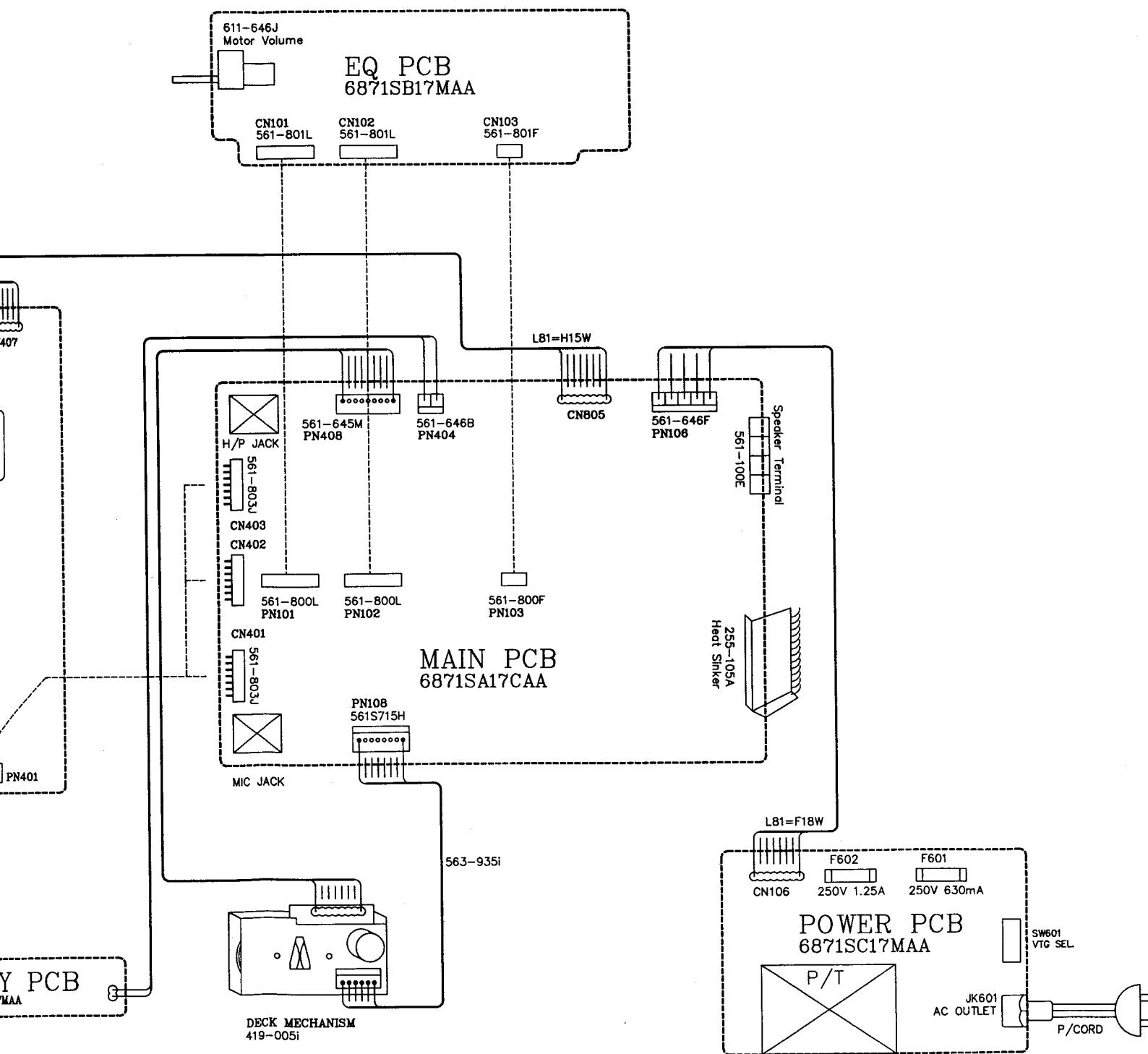


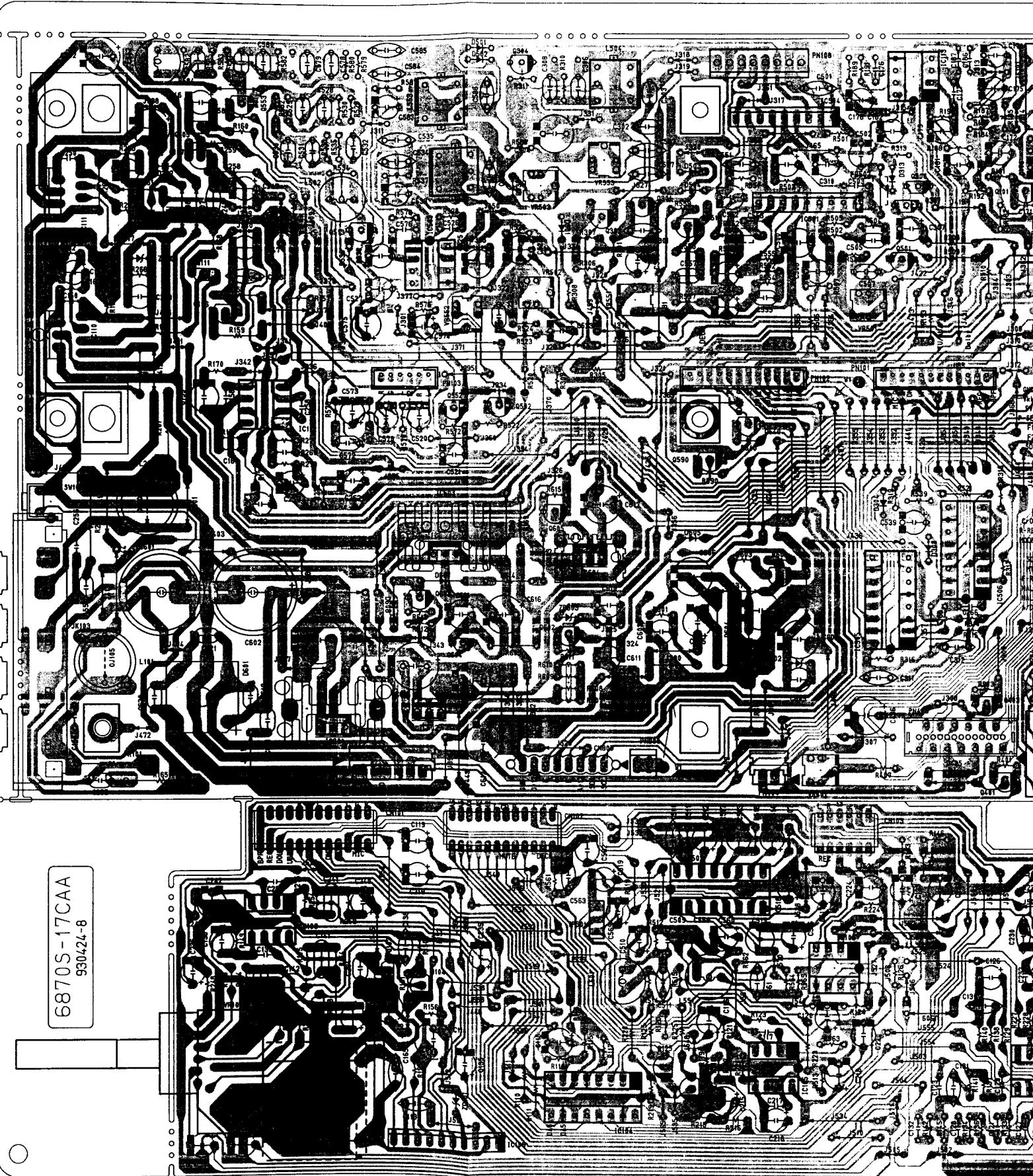
NOTES :

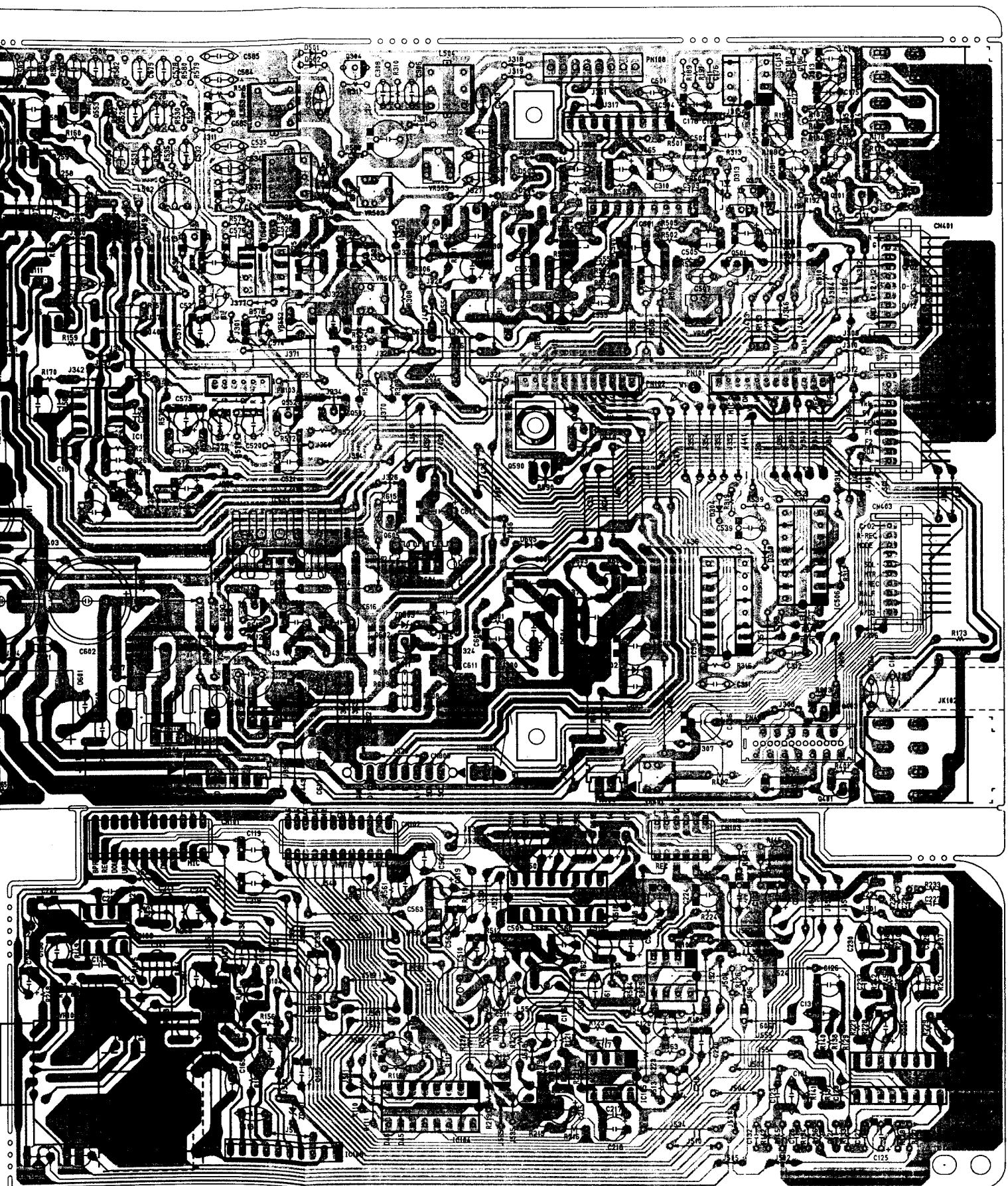
1. Resistance values are indicated in ohms unless otherwise specified (K=1,000, M=1,000,000).
2. Capacitance values are shown in microfarads unless otherwise (P=MICRO-MICRO FARADS).
3. Schematic diagram for this model are subject to change for improvement without prior notice.

WIRING DIAGRAM

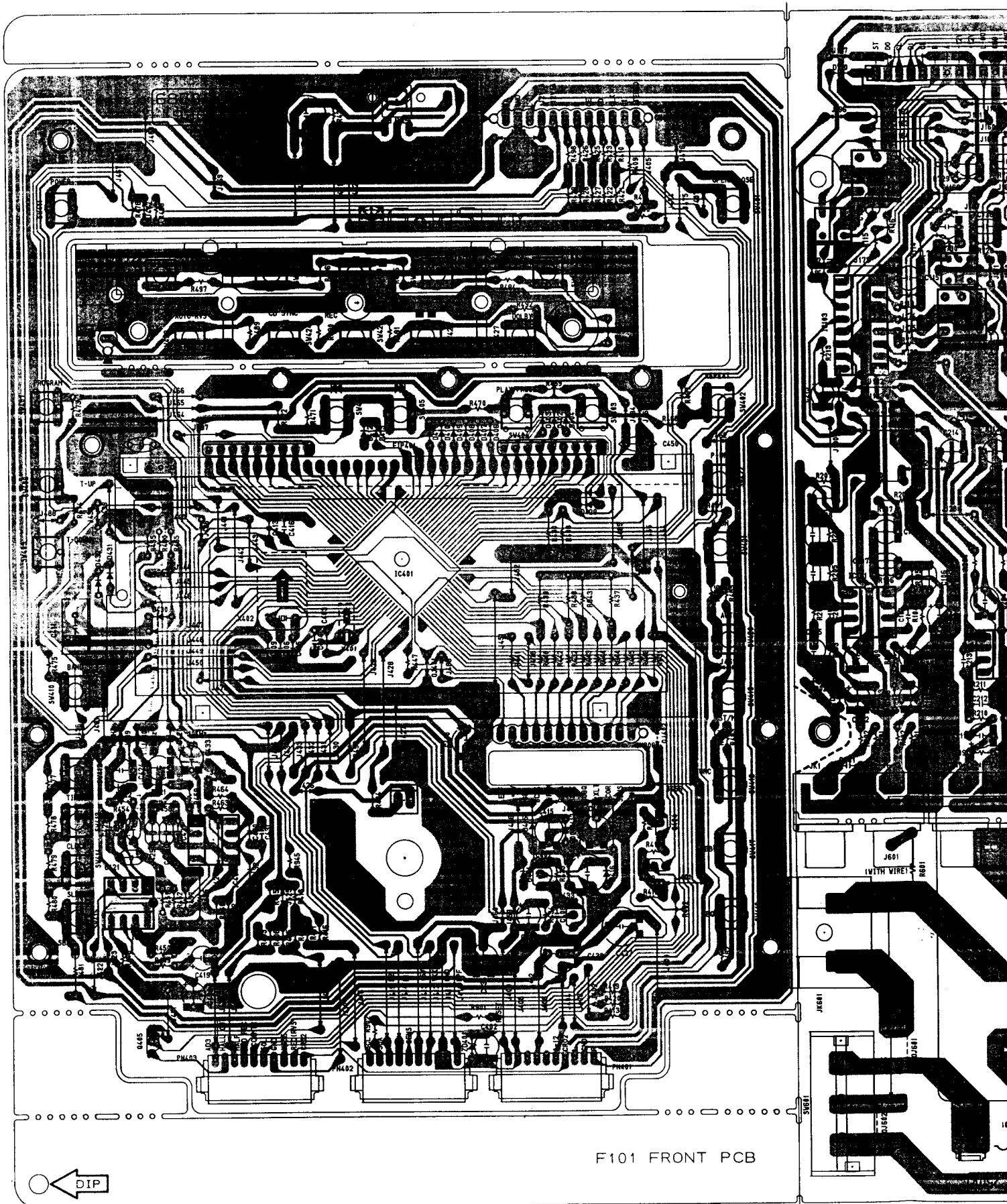




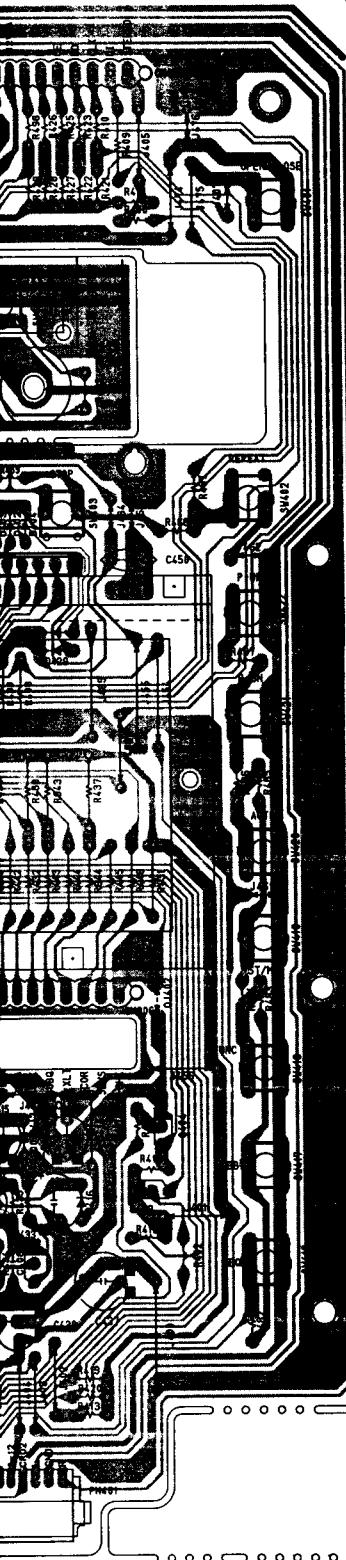




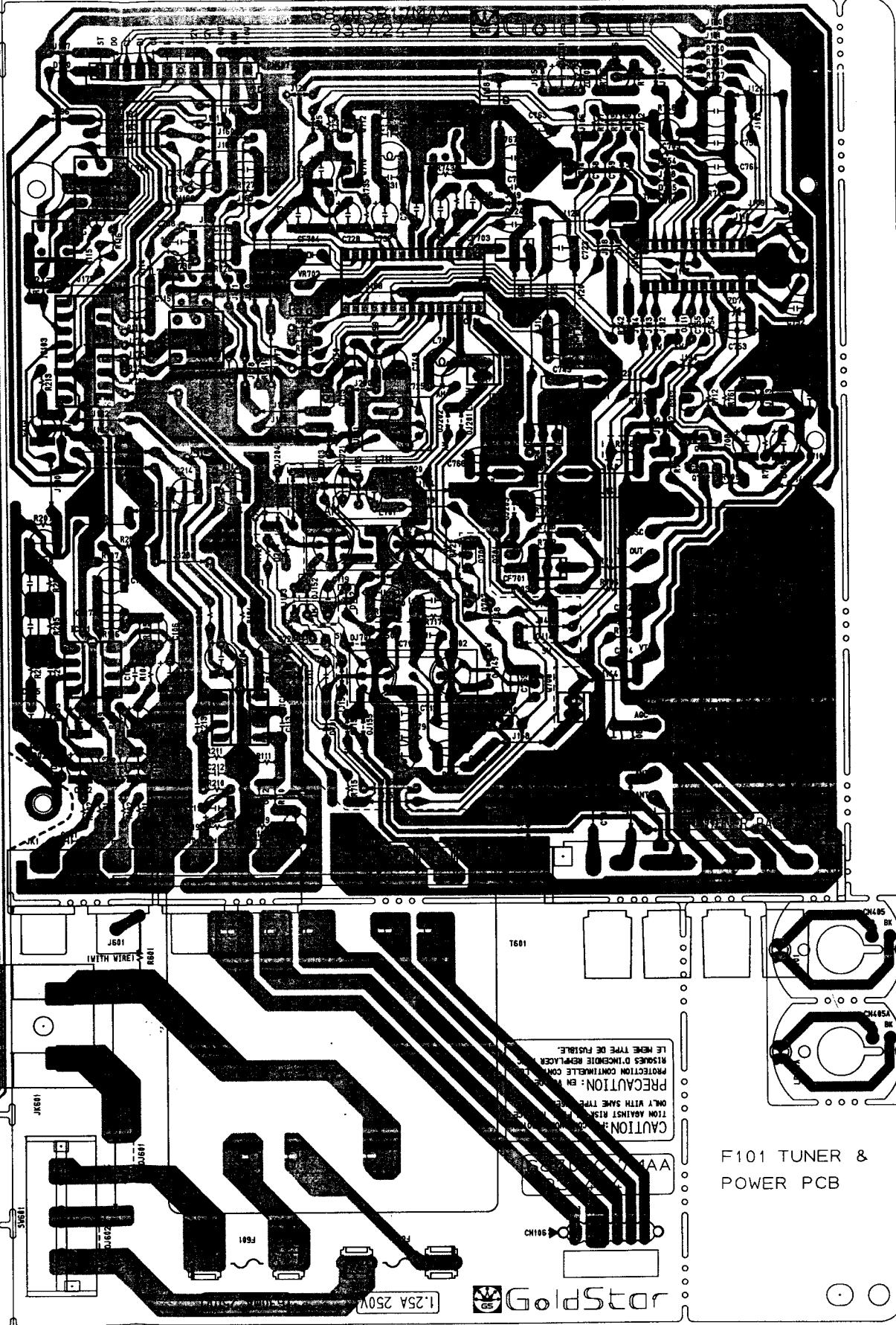
FRONT, TUNER, POWER, LED P.C.BOARD



F101 FRONT PCB



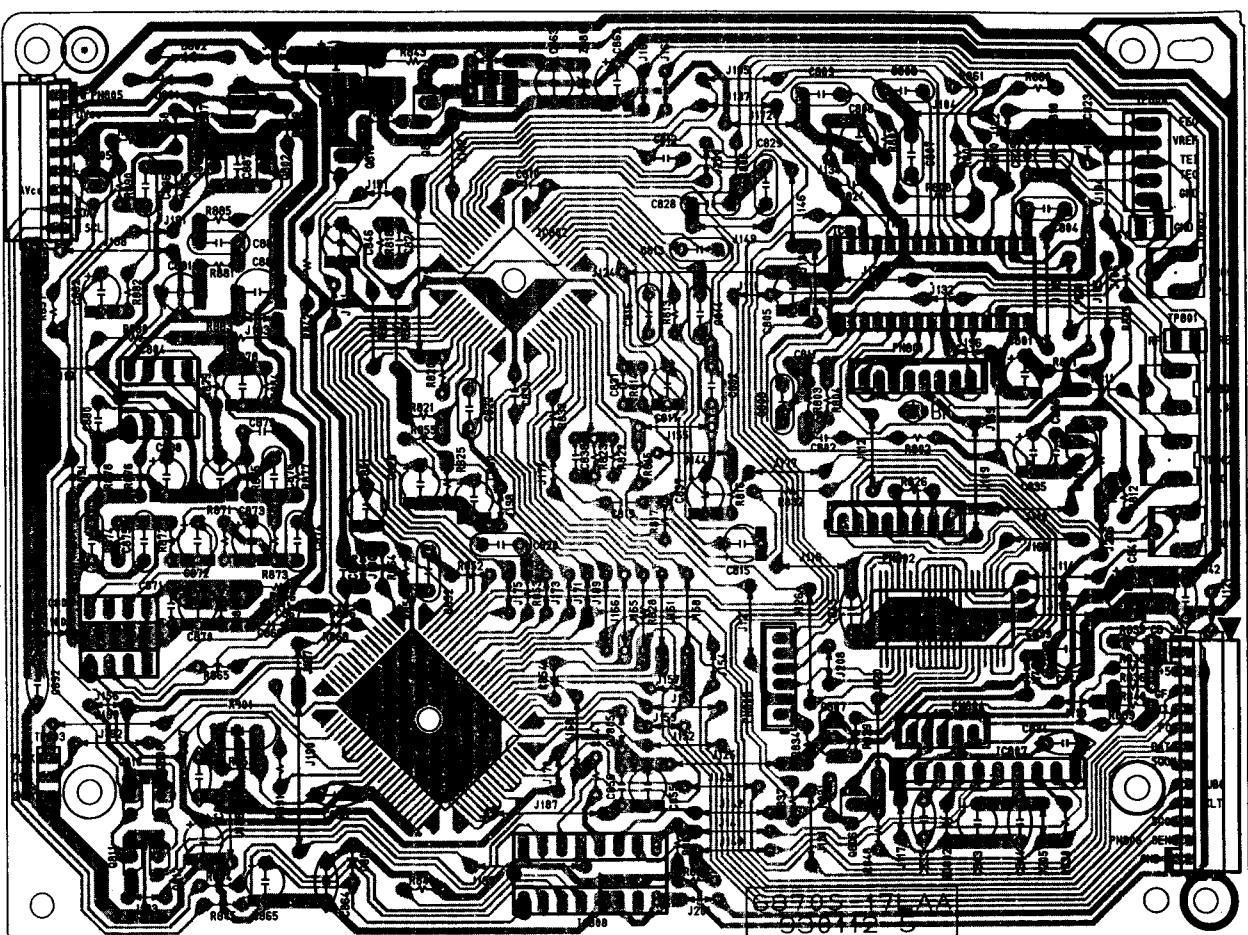
F101 FRONT PCB



F101 TUNER &
POWER PCB

• CD MAIN P.C.BOARD

IC101,10
112,113,
KIA4558



IC501 KI

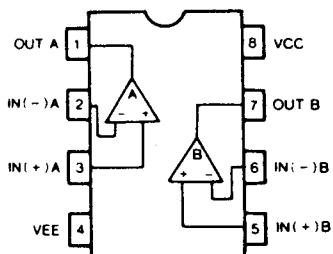
IN 1 1
GND 5
IN 2 8

IC110, 1

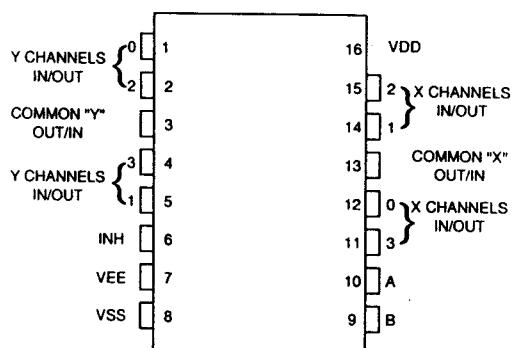


INTERNAL BLOCK DIAGRAM OF ICs

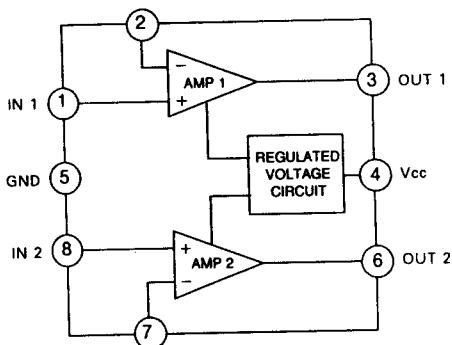
IC101,102,105,106,109
112,113,403,404,503,804
KIA4558P



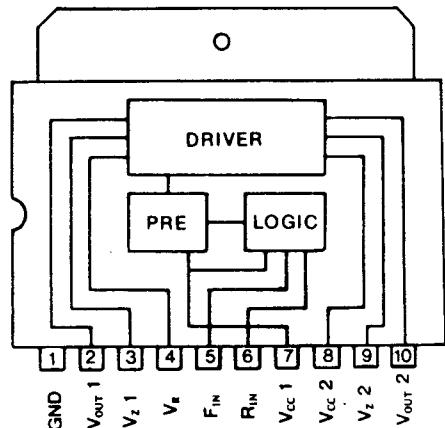
IC103, 104, 107 HCF4052B



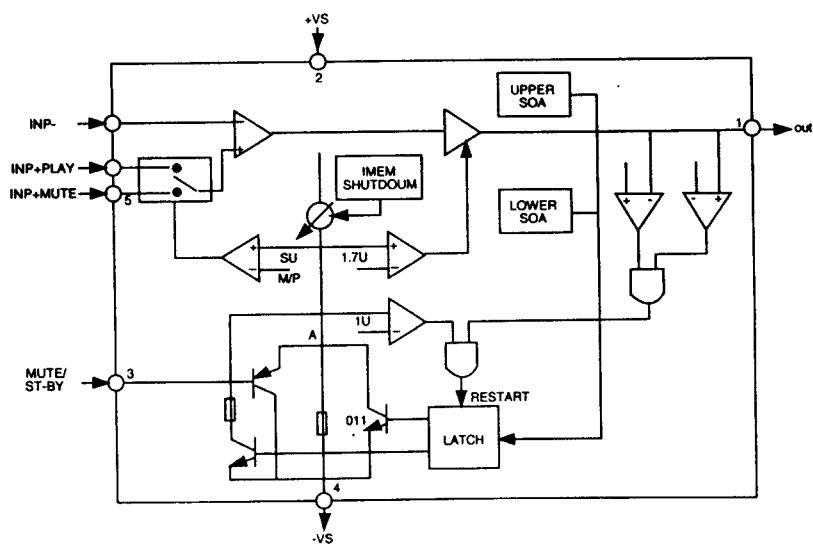
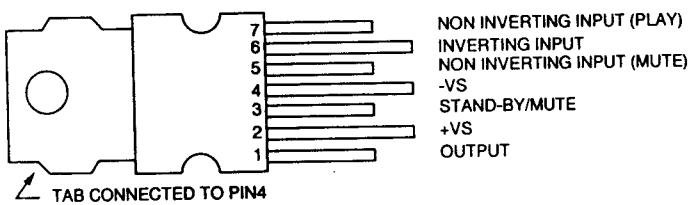
IC501 KIA6225S



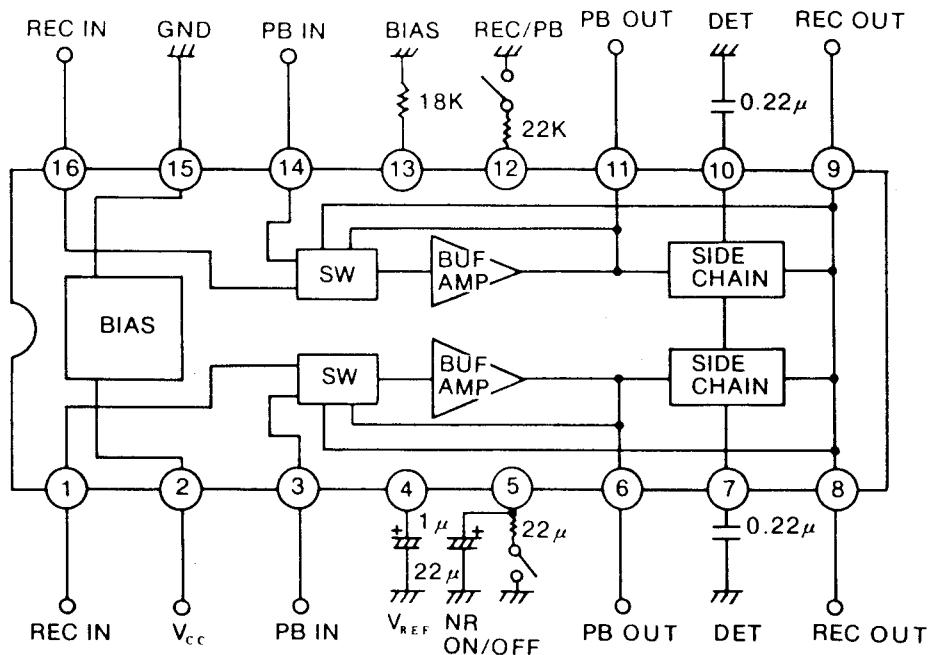
IC108, 807 BA6209



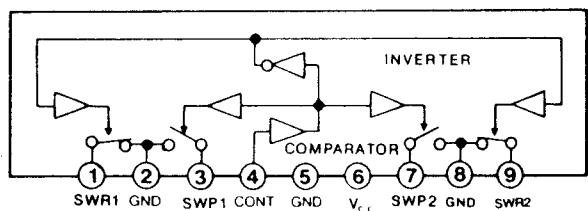
IC110, 111 TDA2052



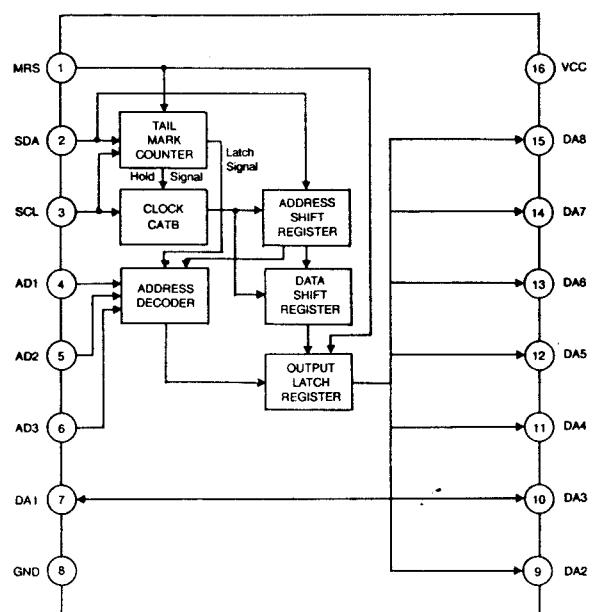
IC502 HA12136A



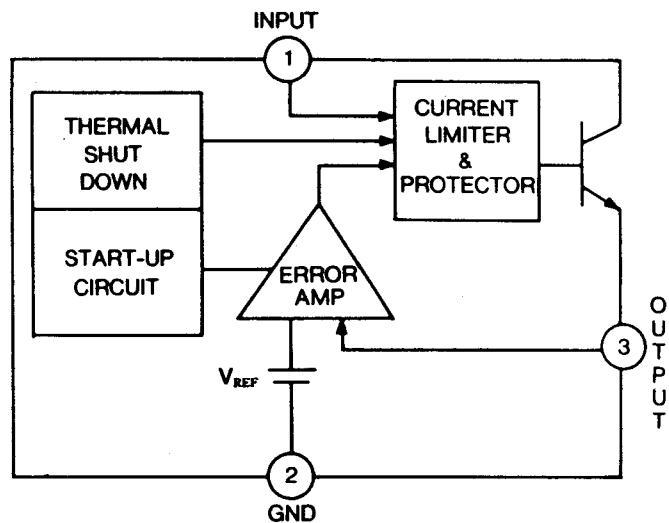
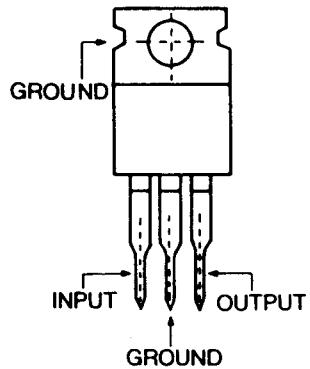
IC504 μPC1330



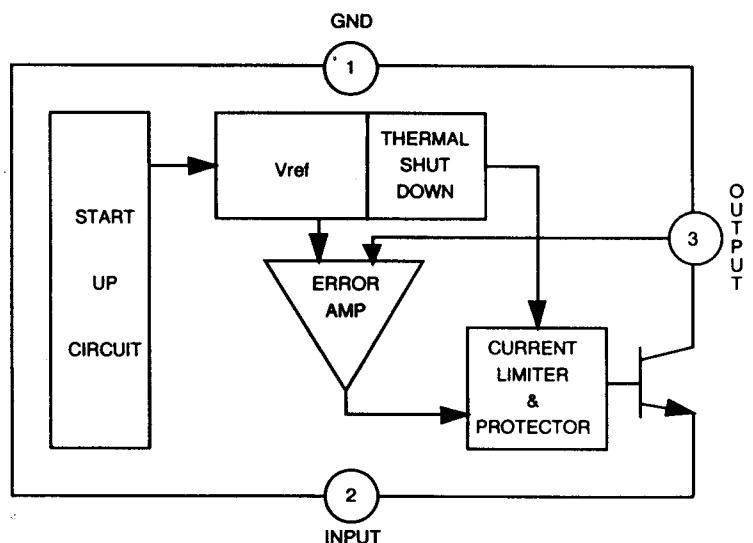
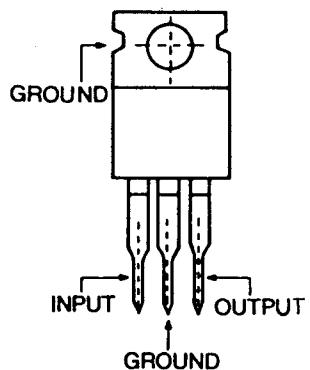
IC505, 506, 808 HD49783



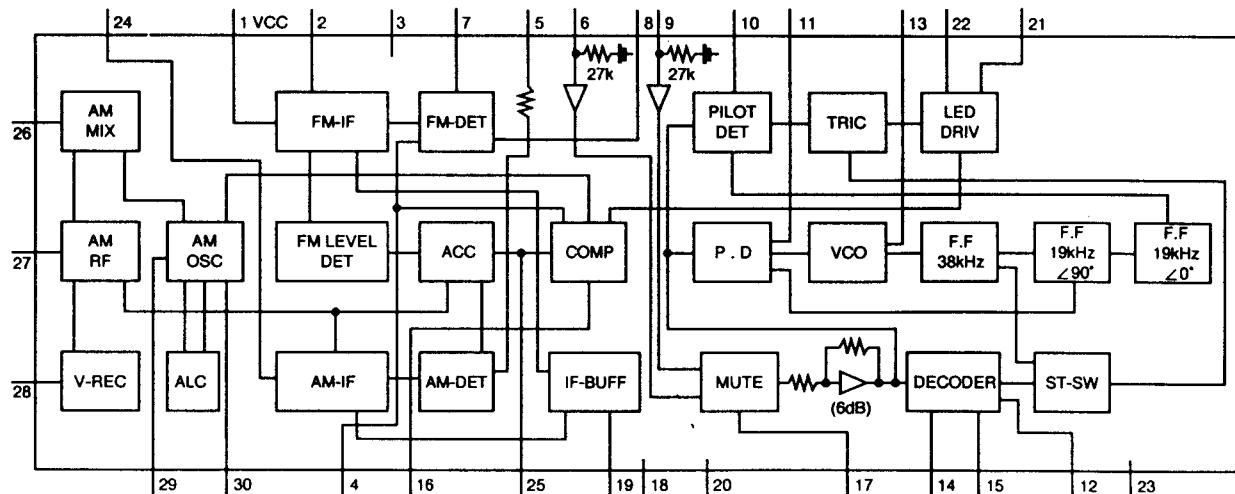
IC601, 603 GL7812



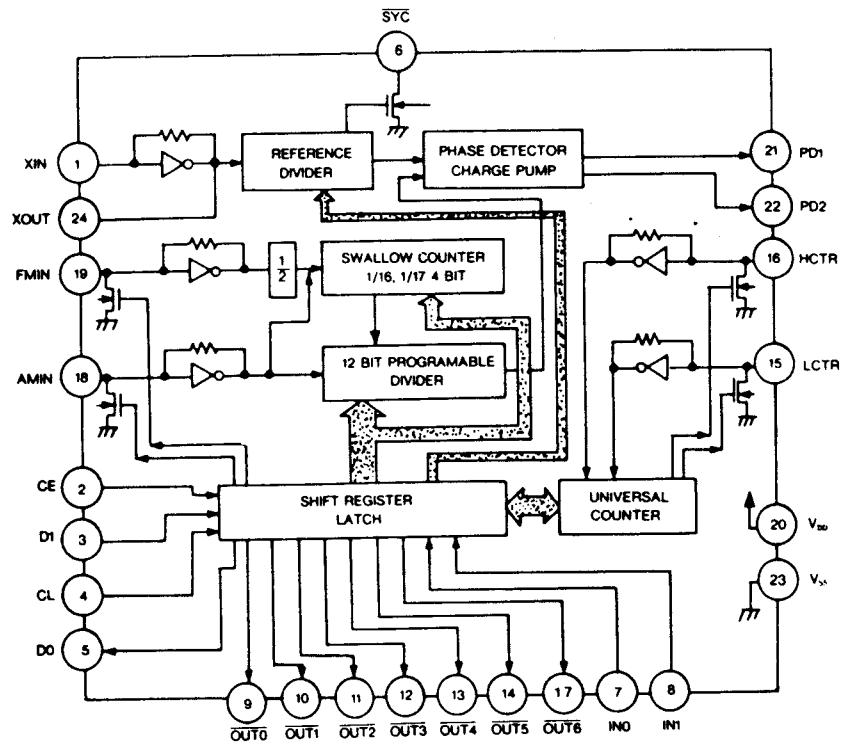
IC602, 604 LM7912



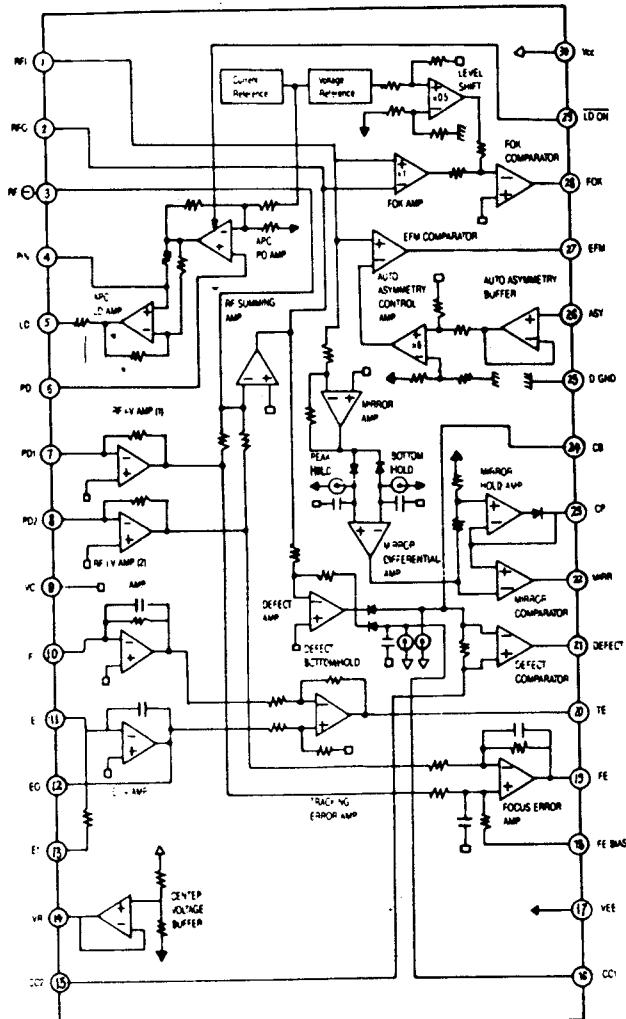
IC701 LA1851N



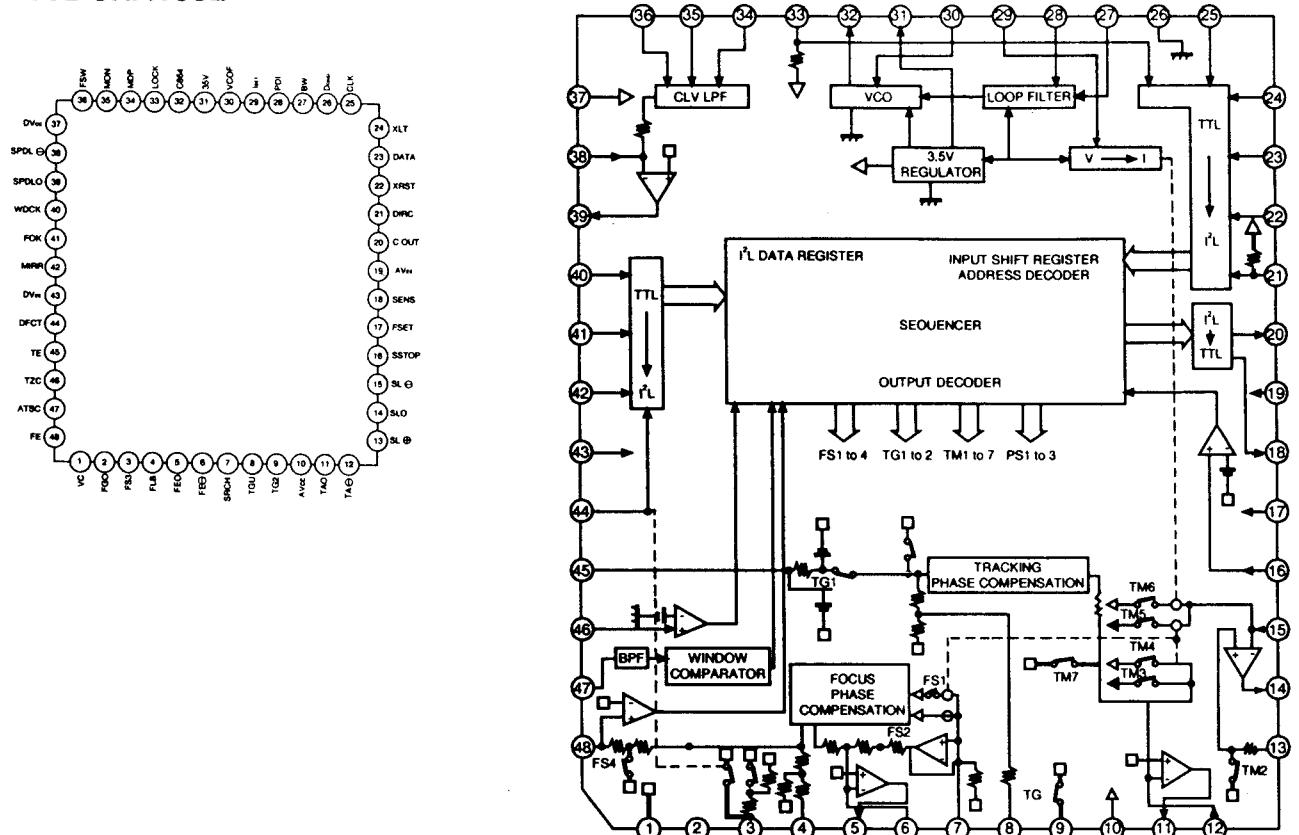
IC702 LC7218



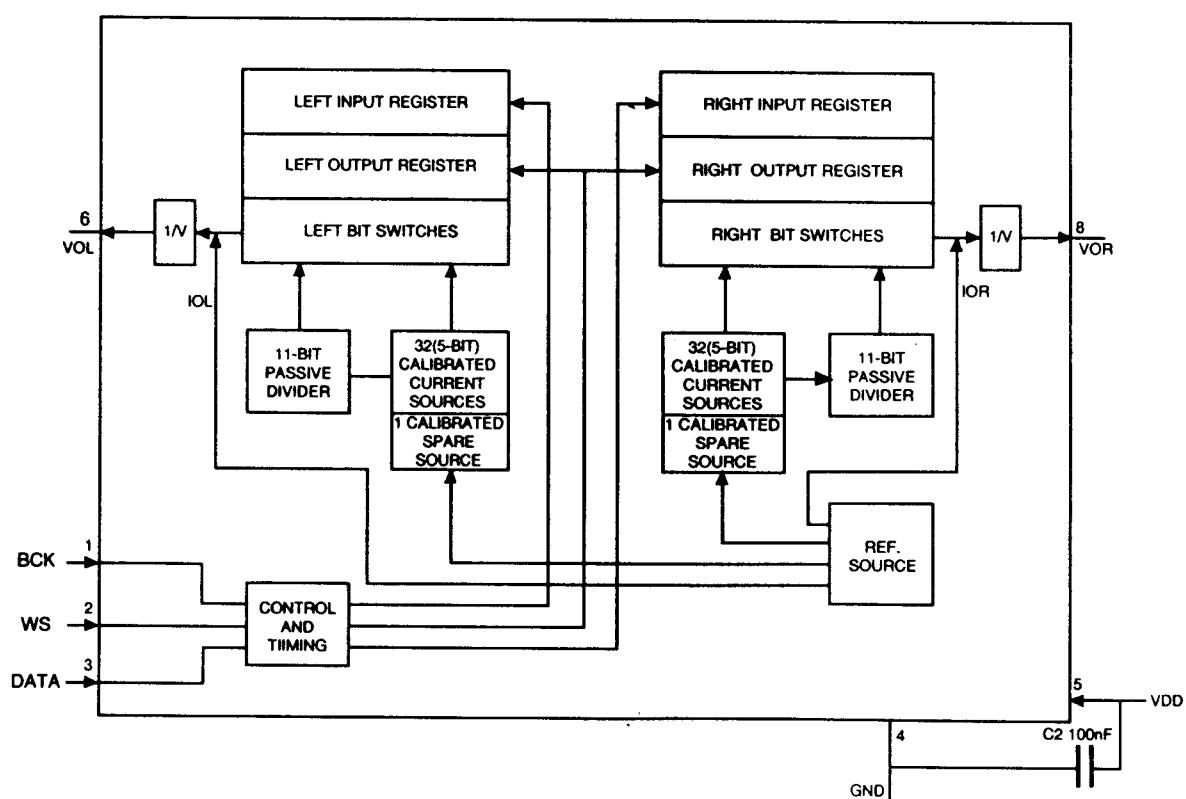
IC801 CXA1081S (RF Amp)



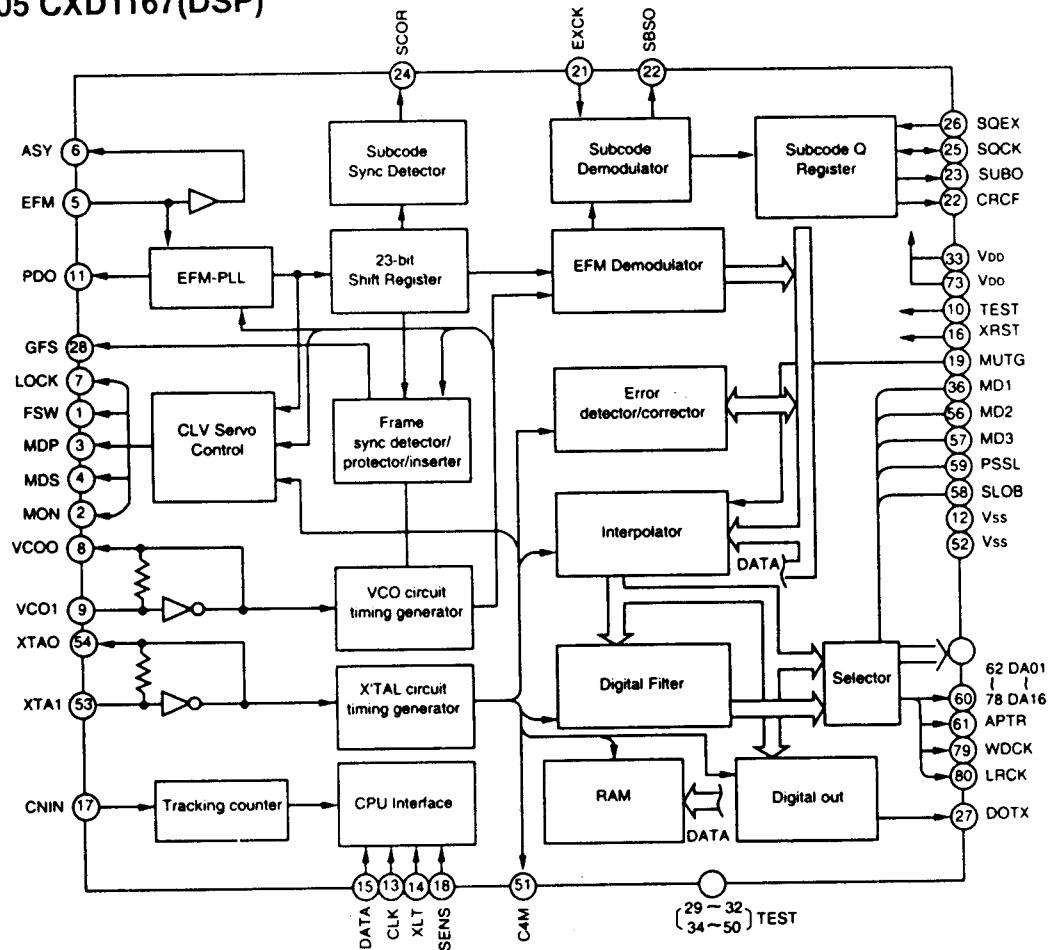
IC802 CXA1082



IC803 TDA1311



IC805 CXD1167(DSP)



IC806 BA6296FP

