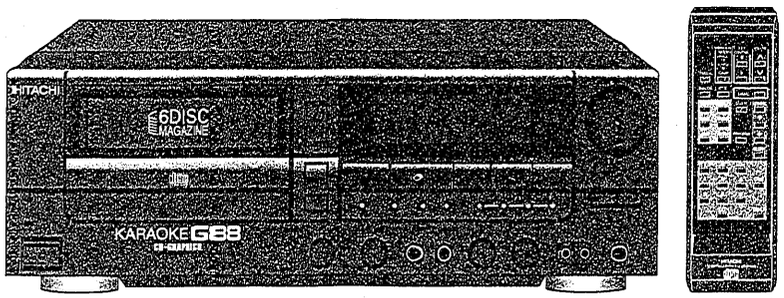
HITACHI

SERVICE MANUAL

TT	No.0001EC

AK-G88

[W,T]



CAUTION

DANGER

Invisible laser radiation when open and interlocks failed or defeated. AVOID DIRECT EXPOSURE TO BEAM.

小心

危險

打開時和連鎖故障或失控時，會有肉眼看不見的鐳射輻射。避免直接曝光。

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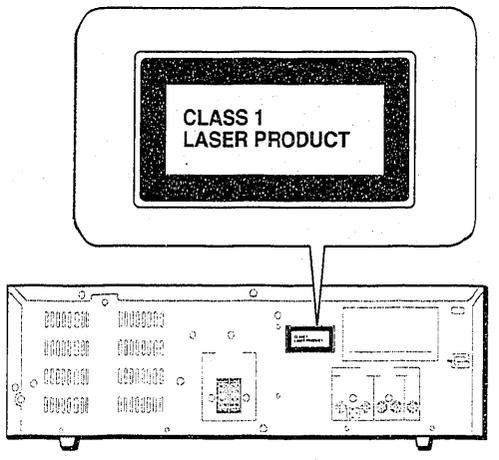
SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT.

AMUSEMENT KARAOKE PLALYER

DECEMBER 1992 HITACHI TELEVISION (TAIWAN), LTD.

- The caution labels on laser usage
- 鐳射使用警告標籤



Inside of the set is a laser component emitting a laser radiation over the limit for laser class 1.

機件內部有一個鐳射零件，其釋出的鐳射輻射超過一級鐳射限度。

SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi's replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers. Critical parts are marked with ⚠ in the circuit diagram and printed wiring board.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS

- CD PLAYER SECTION

DISCS USED:	CD/CD-Graphics
Playing time:	Approx. 60 minutes/one side
Diameter:	12 cm/8 cm
SIGNAL FORMAT	
Sampling frequency:	44.1 kHz
Quantization number:	16 bit linear/channel
Transmission bit rate:	4.3218 Mb/second
PICK-UP	
System:	Object lens drive system optical pick-up
Optical source:	Semiconductor laser

- AMPLIFIER SECTION

Input sensitivity/Impedance:	MIC 1, MIC 2: 1.5 mV (10 kohms) LINE IN: 150 mV (47 kohms)
Output level:	AUDIO OUTPUT: 150 mV
Output Impedance:	External speaker terminals Suitable Impedance: 6 to 16 ohms Headphones Suitable Impedance: 8 to 100 ohms
Audio output:	20 W + 20 W (6 ohms, T.H.D. 1%)

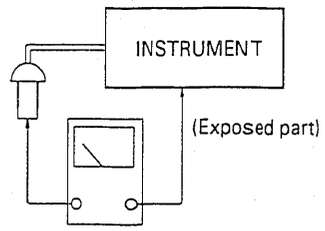
- GENERAL

Image output level:	1 Vp-p/75 ohms
RD output:	UHF Channel 38 (Channel E30-E39 adjustable) [UHF Channel C25 (Channel C22-C26 adjustable)]
Aerial input:	75 ohms unbalanced type
Power supply:	AC 110-120V, 200-220V, 230-240V, 50/60Hz (for W) AC 110V, 60Hz (for T)
Power consumption:	130 W (for W) 120 W (for T)
Dimensions:	435 W x 137 H x 420 D (mm)
Weight:	8.6 kg

Check that exposed parts are acceptably insulated from the supply circuit before returning the instrument repaired to the customer.

- **Checking method**

Power (Operate) switch is set to ON.
Next, measure the resistance value between the both poles of attachment cup (Power supply plug) and the CD OUT terminal of rear plate and check that the resistance value is 500 kohms or more.



Insulation tester (DC 500V)

安全注意事項

操作時請留心下列事項：

1．本機件中因有許多零件具有與安全性有關之特殊性能，故更換時敬請務必選用日立公司出品的原廠零件，尤其是電源線路區臨界零件更不宜使用其他廠牌產品來替代。線路圖和基板上有註明⚠記號者爲臨界零件。

2．修理過後的機件在歸還給顧客之前，技術服務人員務必要徹底檢查，以確保機件操作起來完全安全，沒有觸電之危險。

規格說明

• 鐳射碟播放機部份

使用的碟片：	鐳射唱碟／鐳射影碟
播放時間：	將近６０分鐘／一面
直徑：	１２厘米／８厘米
信號格式	
取樣頻率：	４４．１千赫茲
量化數：	１６位線性／通到
傳輸位速率：	４．３２１８兆位／秒
拾音	
系統：	目標透鏡驅動系統的光拾音
光源：	半導體鐳射

• 擴音機部份

輸入靈敏度／阻抗：	麥克風（ＭＩＣ１，ＭＩＣ２）：１．５毫伏（１０千歐姆）
	線路輸入（ＬＩＮＥ　ＩＮ）：１５０毫伏（４７千歐姆）
輸出水平：	音頻輸出（ＡＵＤＩＯ　ＯＵＴ）：１５０毫伏
輸出阻抗：	外部揚聲器接點
	適合阻抗：６到１６歐姆
	耳機
	適合阻抗：８到１００歐姆
音頻輸出：	２０瓦特＋２０瓦特（６歐姆，總諧波失眞Ｔ．Ｈ．Ｄ．１％）

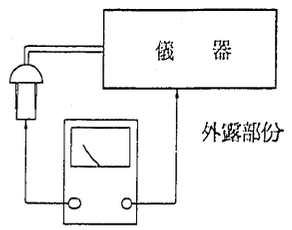
• 總體

盤面輸出水平：	１Ｖｐ－ｐ／７５歐姆
射頻（ＲＦ）輸出：	超高頻（ＵＨＦ）頻道３８（頻道Ｅ３０－Ｅ３９可調節）
	〔超高頻（ＵＨＦ）頻道Ｃ２５（頻道Ｃ２２－Ｃ２６可調節）〕
天線輸入：	７５歐姆不平衡型
電源：	交流電１１０－１２０伏特，２００－２２０伏特，２３０－２４０伏特，５０／６０赫茲（新加坡，香港，東南亞）
	交流電１１０伏特（臺灣）
功耗：	１３０瓦特（新加坡，香港，東南亞）
	１２０瓦特（臺灣）
尺寸：	４３５寬×１３７高×４２０深（厘米）
重量：	８．６公斤

修理過後的儀器在歸還給顧客之前，須確認其外露部份確實與電流絕緣。

• 確認方法

把電源開關設在開的狀態。
然後測量電源插頭和背板鐳射輸出端兩極間的電阻值，並確認其電阻值是否爲５００仟歐姆或超過５００仟歐姆。



絕緣測試器（直流電５００伏特）

SERVICE POINT

1. **Top Cover (Fig. 1)**
Remove 9 screws ① and remove the top cover backwards.

2. **CD P.W.B. (Fig. 2 and 3)**
(1) After removing the top cover, relase 4 screws ② and disconnect connectors Ⓐ (8 locations). The earth terminal and pin lead wire will be disconnected at the same time.
(2) Disconnect connectors Ⓑ and Ⓒ (3 locations) If it needs to remove the CD P.W.B..

3. **Front Panel Block (Fig. 3)**
After removing the CD P.W.B., release 3 screws ③ and 3 screws ③-1 . The LED P.W.B./MIC P.W.B./VR P.W.B./FL P.W.B. will be separated from bottom chassis at the same time.

4. **P.T. P.W.B. (Fig. 2)**
After removing the CD P.W.B., release 4 screws ④ and also remove the solders of the lead wire from the transformer.

5. **MAIN P.W.B. (Fig. 1 and 4)**
After removing the transformer, release 2 screws ⑤ on heat sink, 6 screws ⑥⑦ on MAIN P.W.B., 2 screws ⑧ on speaker jack, and disconnect connectors Ⓓ (6 locations).

6. **LED P.W.B. (Fig. 5)**
After removing the front panel block, release the screw ⑨ .

7. **VR P.W.B. (Fig. 5)**
After removing the front panel block, remove the VR knob and hexagonal nut. Then, release the VR P.W.B. backwards.

8. **FL P.W.B. (Fig. 6)**
After removing the front panel block, release 10 screws ⑩ .

9. **MIC P.W.B. (Fig. 5)**
After removing the front panel block, release 2 screws ⑪ and also remove 4 knobs.

10. **MD P.W.B. (Fig. 1 and 4)**
(1) After removing the top cover, release 2 screws ⑫ , a screw ⑬ and 3 screws ⑭
(2) Release the solders of power cord, transformer lead wire, and 2 connecting wire Ⓔ if it needs to remove MD P.W.B..

11. **CD Changer Mechanism (Fig. 4)**
After removing the top cover, release 2 screws ⑮ .

12. **Disengage CD Changer Mechanism (Fig. 7)**
(1) Release 2 screws ⑯ , and remove Ⓕ. Push lift cam to the position as shown in Fig. 7, then raise the rail base up.

(2) Pull P rail base out, and remove P1 tray from the set. Use a "-" screwdriver to lift the hook (Part A), then pull out the P rail base from the set.

(3) **Remove rail base as followed: (Fig. 8, 9, 10 and 11)**
1. Press Arm ① with left little finger and Arm ② with left thumb, then hold the rail base with back of left hand. Release Arm ③ -1 located on rail base from the P base with right hand, then remove Arm ③ -2 beside the P base from the rail base.
2. Use left little finger to press Arm ①, and back of left hand to hold rail base. Release Arm ② -1 located on rail base from the P base with right hand, then remove Arm ② -2 beside the P base from the rail base.
3. Use back of right hand to hold the rail base. Release Arm ① -1 located on rail base from the P base with left hand, then remove Arm ① -2 beside the P base from the rail base.

Place rail base on P base on the order of 3→2→1.

(4) **T/T Base (Fig. 12)**
Remove 3 screws ⑰ , then disengage T/T base from the P base.

(5) **Installation of Gear (Fig. 13, 14 and 15)**
1. Pull P slide rail to the front, then fit P rail base on the top of P base and P slide rail.

2. When P rail base is inserted into P base, and the hook of P rail base in Part A matches with P slide rail, P gear B shall be at the position as shown in the figure of Part B.

3. Fit up P gear B with point B aiming at the direction of P gear A1 and assemble the wheel shafts of P gear A1 and P gear B. Then conjungate P gear B and P gear A1.

(6) CD Changer Mechanism packing status when transporting (Fig. 16)
For assembly or transportion of the set, the rail base and lift cam should be positioned as Fig. 16.

13. Checking the objective lens (Fig. 17)
Handle so that dirt or dust does not adhere to the objective lens in the lens actuator. When the unit has been used for a logn time, dust or dirt may adhere to the objective lens. Clean the lens surface using a cotton swab.

14. Cautions when servicing (Fig. 18 and 19)

(1) Semiconductor laser
The semiconductor laser is very sensitive to electrostatic breakdown and surge current. Do not touch the terminals of the semiconductor laser and flexible P.W.B. with your fingers or tools.
Relationship between current and light intensity is shown in Fig. 18. When the threshold current is exceeded, intensity changes steeply.
The threshold current value is a little different depending on individual laser.

(2) Handling of the unit mechanism section (Fig. 19)
When handling the pickup mechanism section or the unit mechanism section, use the grounding ring as shown in Fig. 19.
(The grounding ring can be made from a normal lead wire.)

維修重點

1. 上蓋（TOP COVER）（圖1）
拆下鎖於上蓋的9支螺絲（記號：①），並向後方取出上蓋。

2. 鐳射碟基板（CD PWB）（圖2和圖3）
移去上蓋之後，拆下鎖於基板上的4支螺絲（記號：②）、8處（記號：Ⓐ）連接線（CONNECTORS）、接地線及整線夾。如需整個基板取下時，則將再鬆開3處（記號：Ⓑ Ⓒ）連接線。

3. 前面板（FRONT PANEL）（圖3）
取下鐳射碟基板之後，拆下鎖於前面板上的6支螺絲（記號：③ (3-1)），取下面板，同時將LED、麥克風、音量控制、顯示器等基板和底座分離。

4. 變壓器基板（PT PWB）（圖2）
取下鐳射碟基板之後，拆下鎖於變壓器上的4支螺絲（記號：④）部再將基板上的導線銲開，取下基板。

5. 主基板（MAIN PWB）（圖1和圖4）
拆下鎖於變壓器上的螺絲之後，再將鎖於散熱片上的2支螺絲（記號：⑤）、主基板上的6支螺絲（記號：⑥⑦）、揚聲器插座上的2支螺絲（記號：⑧）拆下及鬆開6處（記號：Ⓓ）連接線，然後取下基板。

6. LED基板（LED PWB）（圖5）
移開前面板之後，拆下鎖於基板上的1支螺絲（記號：⑨），取下基板。

7. 音量控制基板（VR PWB）（圖5）
移開前面板之後，拔掉音量控制旋鈕和拆下六角螺帽之後，向後取下音量控制基板。

8. 液晶顯示器基板（FL PWB）（圖6）
移開前面板之後，拆下鎖於基板上的10支螺絲（記號：⑩），取下基板。

9. 麥克風基板（MIC PWB）（圖5）
移開前面板之後，拆下鎖於基板上的2支螺絲（記號：⑪）和拔掉4個旋鈕，取下基板。

10. MD基板（MD PWB）（圖1和圖4）
移開上蓋之後，拆下鎖於基板上的2支螺絲（記號：⑫）、1支（記號：⑬）鎖於開關上及3支（記號：⑭）鎖於後背板上的螺絲。如需整個基板取下時，則將再銲開電源線、變壓器導線及鬆開2處（記號：Ⓔ）連接線。

11. 鐳射碟機架（CD CHANGER MECHANISM）（圖4）
移開前面板之後，拆下鎖於鐳射碟機架上的2支螺絲（記號：⑮），取下鐳射碟機架。

12. 鐳射碟機架拆解方法（圖7）
(1) 拆下2支螺絲（記號：⑯），將 Ⓕ 取下後，同時將昇降盤（LIFT CAM）推至圖中（圖7）所指示位置，使磁軌機座（RAIL BASE）抬高。

(2) 將P磁軌機座（P RAIL BASE）拉出來，然後將P1托盤（TRAY）由機件取下。再以"－"字型螺絲起子將A部的鉤子挑高。將P磁軌機座往前（箭頭方向）抽出。

(3) 拆下磁軌機座可依下述順序進行：
（圖8，圖9，圖10和圖11）
1. 以左手小指壓住支撐桿①，以姆指壓住支撐桿②，再以左手背支撐磁軌機座。用右手將固定在磁軌機座側的支撐桿（ARM）③－1取下，再將固定在基座（P BASE）側的支撐桿③－2取下。
2. 用左手小指壓住支撐桿①，用左手背將磁軌機座支撐住。用右手將固定在磁軌機座上的支撐桿②－1取下，再將固定於基座側的支撐桿②－2取下。
3. 用右手背支撐磁軌機座，以左手將固定在磁軌機座的支撐桿①－1取下，再將固定在基座側的支撐桿①－2取下。

將磁軌機座裝置在基座上時，可依上述3→2→1的次序進行。

(4) 鐳射機構（T／T BASE）（圖12）
拆下3支螺絲（記號：⑰），可取下鐳射機構（T／T BASE）。

(5) 齒輪的嵌合（圖１３，圖１４和圖１５）

1. 將 P滑動軌道(P SLIDE RAIL)拉至最前端，再將P磁軌機座裝在P基座及P滑動軌道之上。
2. 當P磁軌機座插入P基座時，A部的P磁軌機座的鉤子和P滑動軌道相嵌合，P齒輪B的位置必須和圖中的B部相同。
3. 將P齒輪B的B朝向P齒輪A１的方向，同時分別組合P齒輪A１和P齒輪B之輪軸。將P齒輪B和P齒輪A１組合。

(6) 產品運送時，鐳射碟機架放置狀態（圖１６）

組合機架或搬運整個產品時，機架上的磁軌機盤和昇降盤位置應如圖１６所示。

13. 檢查透物鏡（圖１７）

勿使透鏡傳動器的透物鏡沾惹灰塵和污垢。機件使用一段長時間後。灰塵和污垢會附著於物透鏡，此時則用棉布塊來清潔透鏡表面。

14. 維修注意事項（圖１８和１９）

(1) 鐳射半導體

鐳射半導體對於靜電擊穿電流和突波電流相當敏感。因此勿用手指或用工具觸摸鐳射半導體終端或軟性印刷線路板。

電流和光強度的關係請見圖１８。當超過臨界電流時，則強度變化相當大。

(2) 處理鐳射碟機構部份

使用如圖１９的接地環來處理拾音機構部份或鐳射碟機構部份。（可用一般導線做成接地環使用）

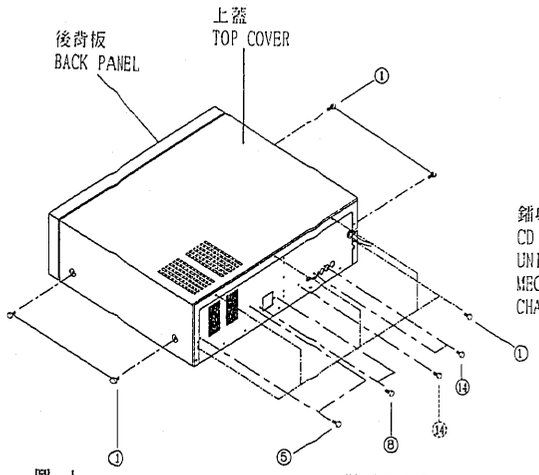


圖 1
FIG.1

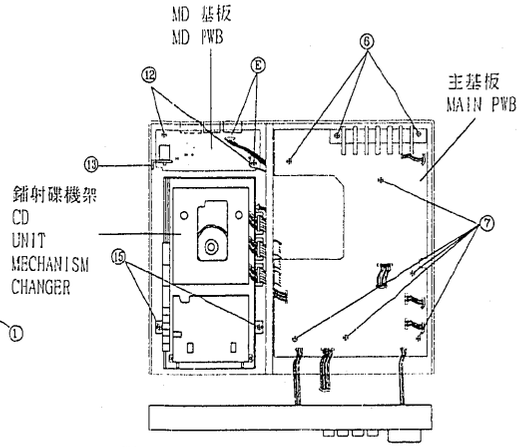


圖 4
FIG.4

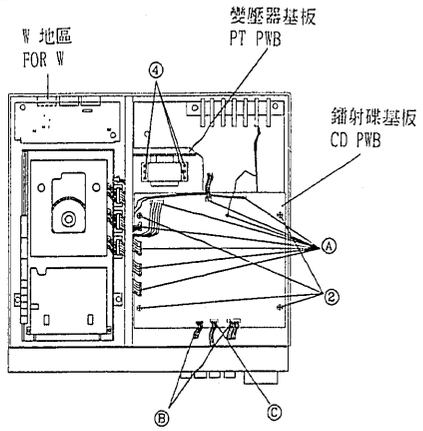


圖 2
FIG.2

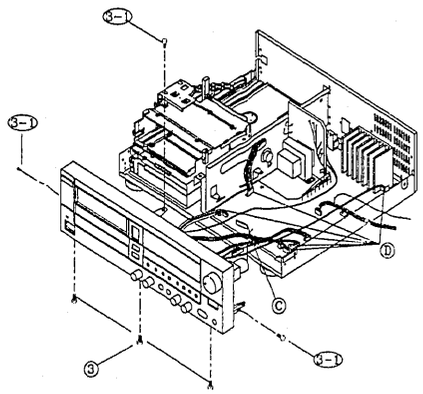


圖 3
FIG.3

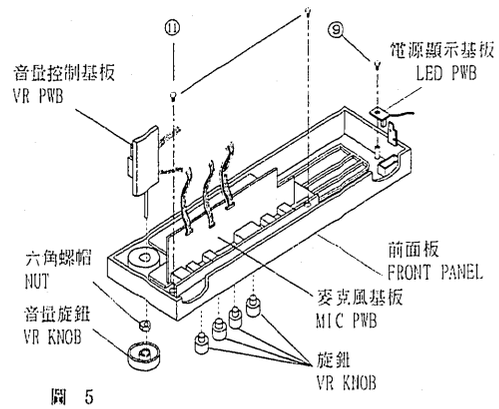


圖 5
FIG.5

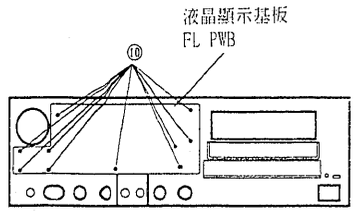


圖 6
FIG.6

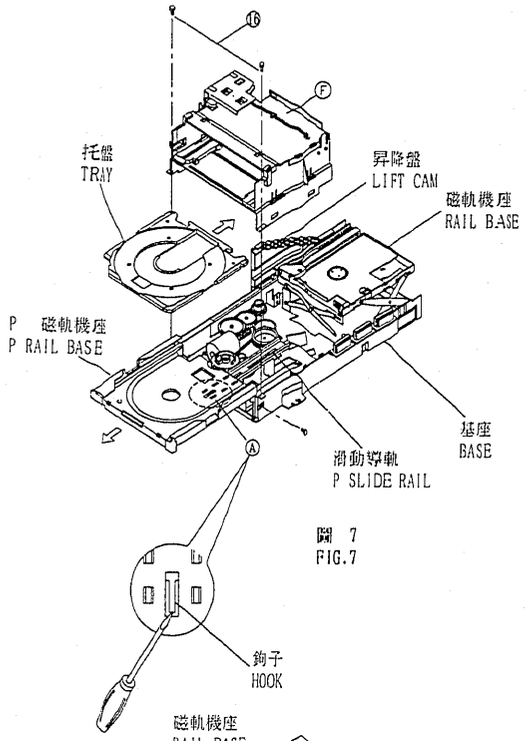


圖 7
FIG.7

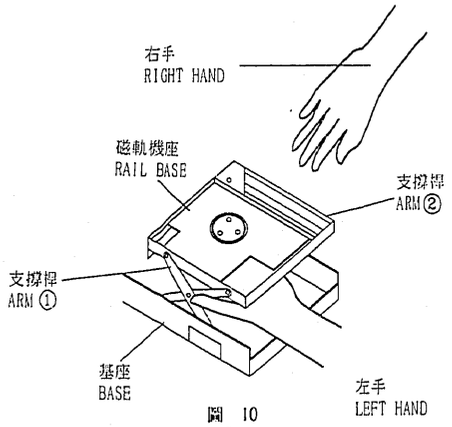


圖 10
FIG.10

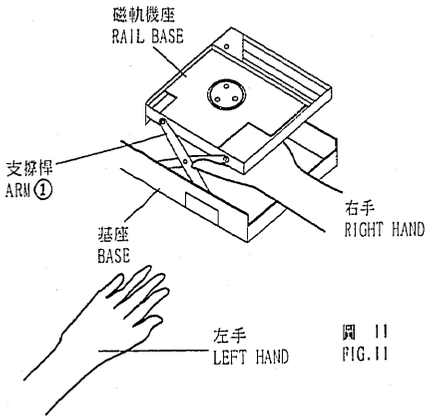


圖 11
FIG.11

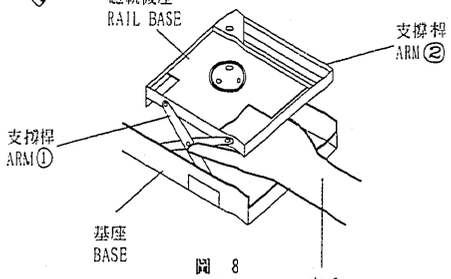


圖 8
FIG.8

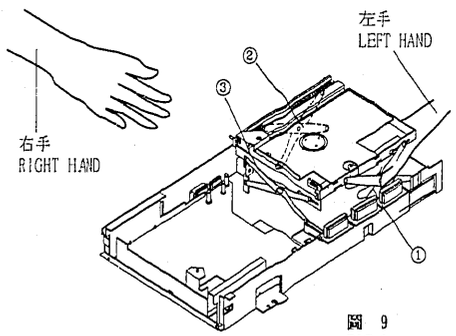


圖 9
FIG.9

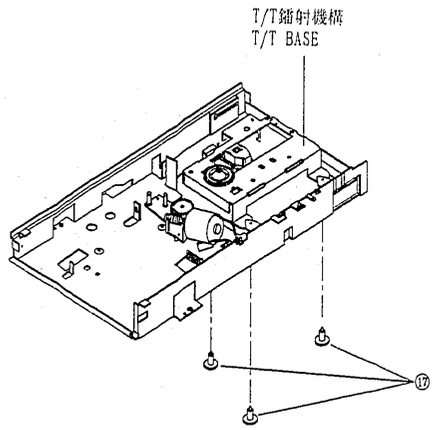


圖 12
FIG.12

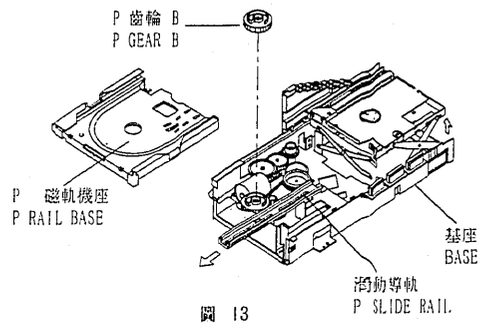


圖 13
FIG.13

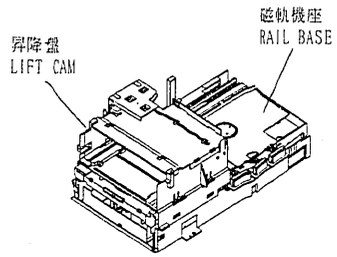


圖 16
FIG.16

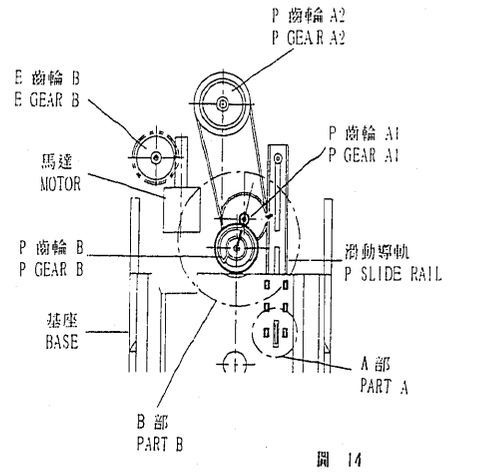


圖 14
FIG.14

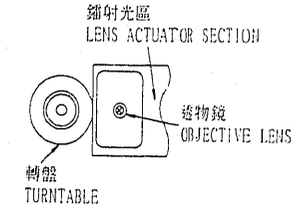


圖 17
FIG.17

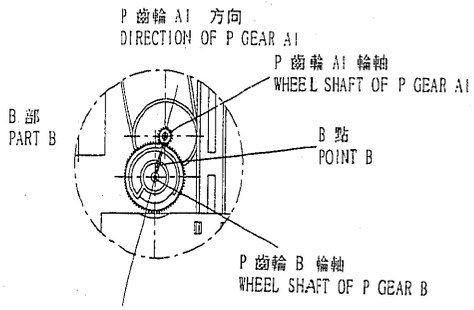


圖 15
FIG.15

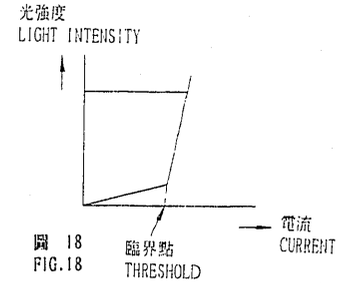


圖 18
FIG.18

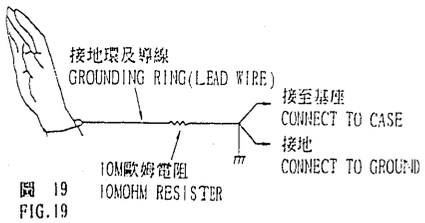
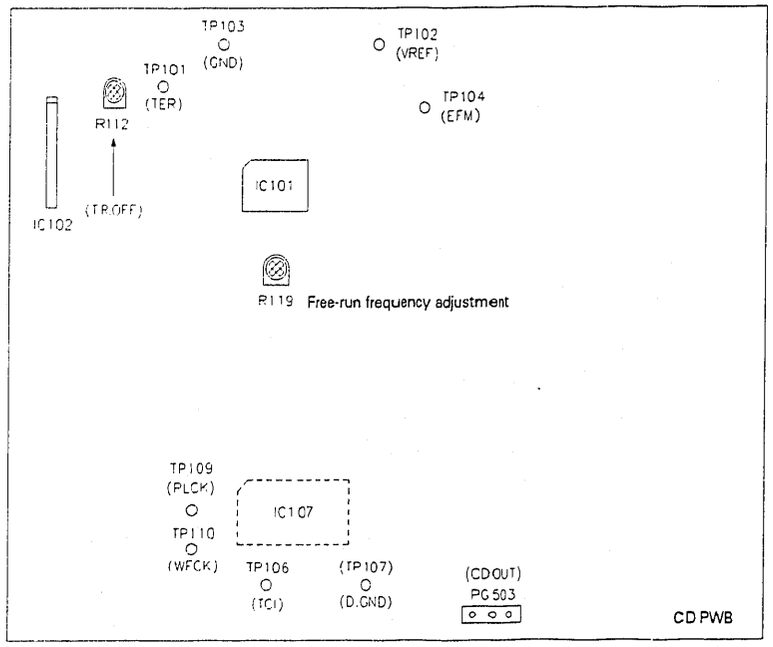


圖 19
FIG.19

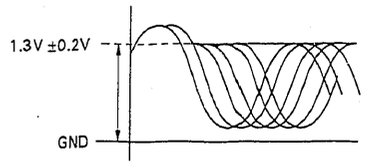
1. CD PLAYER SECTION

- Adjustment points



EFM level measurement

Connect the ⊕ side of the oscilloscope to TP104 (EFM), ⊖ side to TP102 (VR) and check that the level is within 1.3V±0.2V as shown on the right.



Perform the following steps before starting adjustment.

(1) Set the function to CD.

No.	Adjustment Item	Disc	Mode	Connection Terminal	Measuring Instrument	Adjustment Point	Remarks
1	Tracking offset adjustment	Not loaded	STOP	TP101 (T.E.R) ⊕ TP102 (VR center) ⊖	Oscilloscope	R112	[Note 1]
2	Free-run frequency adjustment	Not loaded	STOP	TP109 (PLCK) ⊕ TP107 (D.GND) ⊖	Frequency counter	R119	[Note 2]

[Note 1]

(1) Perform adjustment in the Stop mode.

(2) Connect the ⊖ side of oscilloscope to TP102 (VR center), ⊕ side to TP101 (T.E.R.) and adjust R112 so that the reading is 0±5 mV.

[Note 2]

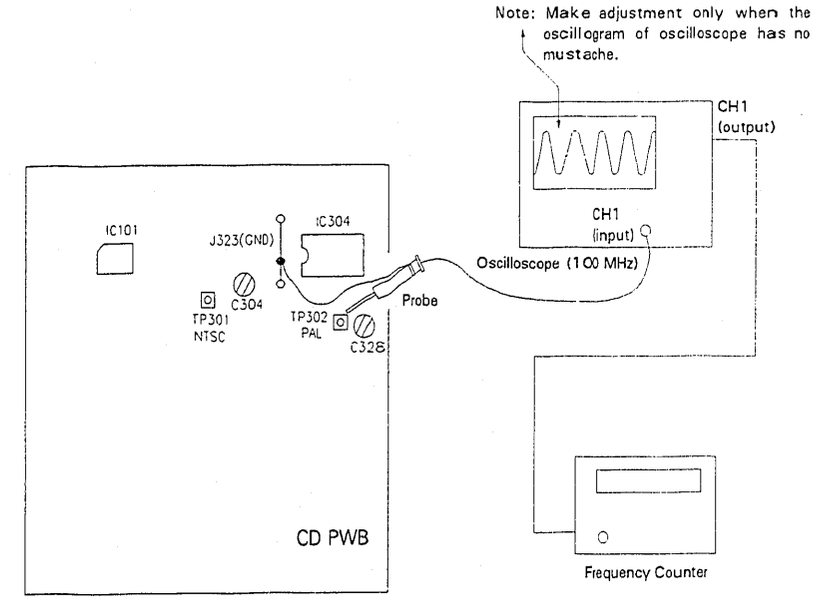
Refer to the Test mode (set to the normal speed mode).

(1) Perform adjustment in the Stop mode.

(2) Connect the ⊖ side of the frequency counter to TP107 (D.GND), ⊕ side to TP109 (PLCK) and adjust R119 so that the reading is 4.52 MHz ±20 KHz.

2. CDG VIDEO SECTION

- Sub carrier frequency adjustment



Perform the following steps before starting adjustment.

(1) Set the function to CD KARAOKE.

Mode PAL [for W]

No.	Adjustment Item	Disc	Mode	Connection Terminal	Measuring Instrument	Adjustment Point	Remarks
1	Sub carrier frequency adjustment	Not loaded	STOP	TP302 (PAL) ⊕ J323 (GND) ⊖	Oscilloscope and frequency counter	C328	[Note 1]

[Note 1]

(1) Perform adjustment in the Stop mode.

(2) Connect the ⊖ side of oscilloscope to J323 (GND), ⊕ side to TP302 (PAL) and adjust C328 so that the reading is 4.433619MHz± 50Hz.

Mode NTSC [for T]

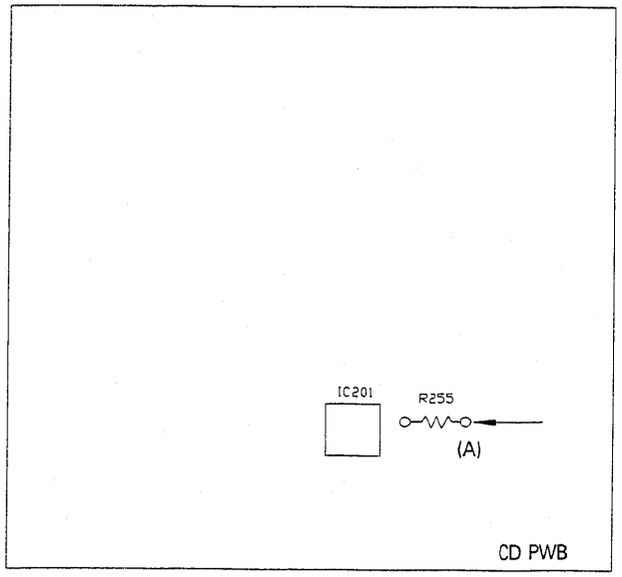
No.	Adjustment Item	Disc	Mode	Connection Terminal	Measuring Instrument	Adjustment Point	Remarks
1	Sub carrier frequency adjustment	Not loaded	STOP	TP301 (NTSC) ⊕ J323 (GND) ⊖	Oscilloscope and frequency counter	C304	[Note 2]

[Note 2]

(1) Perform adjustment in the Stop mode.

(2) Connect the ⊖ side of oscilloscope to J323 (GND), ⊕ side to TP301 (NTSC) and adjust C304 so that the reading is 3.579545MHz ±50Hz.

3. CD-G TEST MODE



(1) Three types of test signal: Grey scale
Colour bar
Tone vast

(2) Methods of confirming test signal:

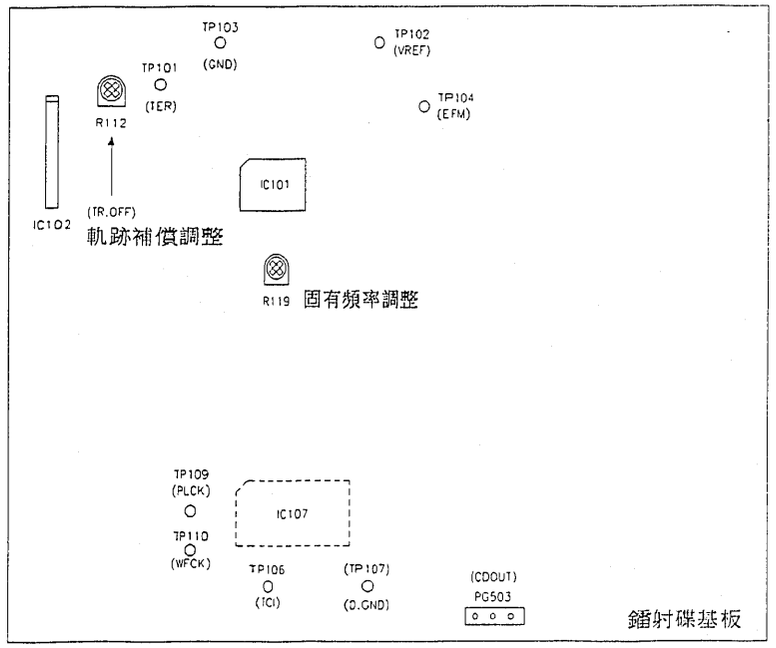
Power OFF: Connect short circuit between test R255 (A) and GND.

Power ON : Test signal is out from video terminal (Video out).
Switch of test signal is controlled by ⏮ , ⏭ switch.

(3) Turn the power OFF to release test signal.

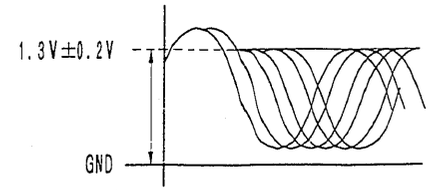
1・鐳射碟部份

• 調整點



ＥＦＭ水平測量

把示波器的正端連接至ＴＰ１０４端子（ＥＦＭ），負端連接至ＴＰ１０２端子（ＶＲ），然後確認水平是否如右圖所示，介於1.3伏特±0.2伏特。



開始調整之前請先執行下列步驟。

（１）把功能設定在鐳射碟

項次	調整項目	鐳射碟	方式	連接終端	測量儀器	調整點	備註
1	軌跡補償調整	未裝	停止	TP101正端(T.E.R) TP102負端(VREF中點)	示波器	R112	[附註1]
2	固有頻率調整	未裝	停止	TP109正端(PLCK) TP107負端(D.GND)	頻率計數器	R119	[附註2]

〔附註１〕

（１）在停止狀態時執行調整。

（２）把示波器的負端連接至ＴＰ１０２（ＶＲＥＦ中點），正端連接至ＴＰ１０１（Ｔ・Ｅ・Ｒ），而後調整Ｒ１１２使讀數成爲０±５ｍＶ。

〔附註２〕

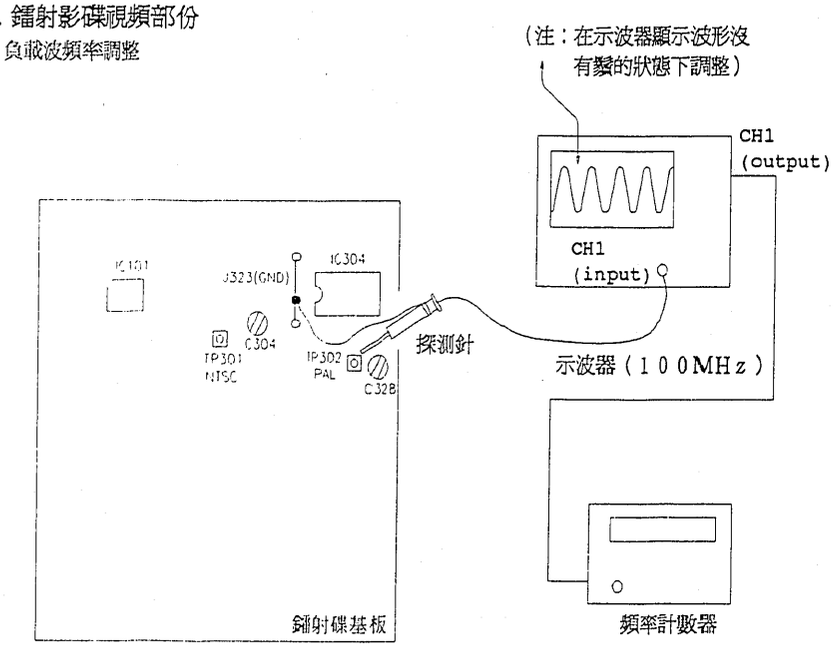
參考測試方式（設定爲正常速度方式）

（１）在停止方式時執行調整。

（２）把頻率計數器的負端連接至ＴＰ１０７（Ｄ・ＧＮＤ），正端連接至ＴＰ１０９（ＰＬＣＫ），調整Ｒ１１９使讀數成爲４．５２ＭＨｚ±２０ＫＨｚ。

2．鐳射影碟視頻部份

• 負載波頻率調整



開始啓動前請先執行下列步驟。

（1）把功能設定爲鐳射碟卡拉OK（KARAOKE）。

PAL方式〔新加坡，香港，東南亞〕

項次	調整項目	鐳射碟	方式	連接終端	測量儀器	調整點	備註
1	負載波頻率調整	未裝	停止	TP302正端(PAL) J323接地 (GND)	示波器和頻率計數器	C328	[附註1]

〔附註1〕

（1）在停止方式下執行調整。

（2）把示波器的負端連接至J323接地（GND），正端連接至TP302（PAL），然後調整C328，使讀數成爲4.433619MHz±50Hz。

NTSC方式〔臺灣〕

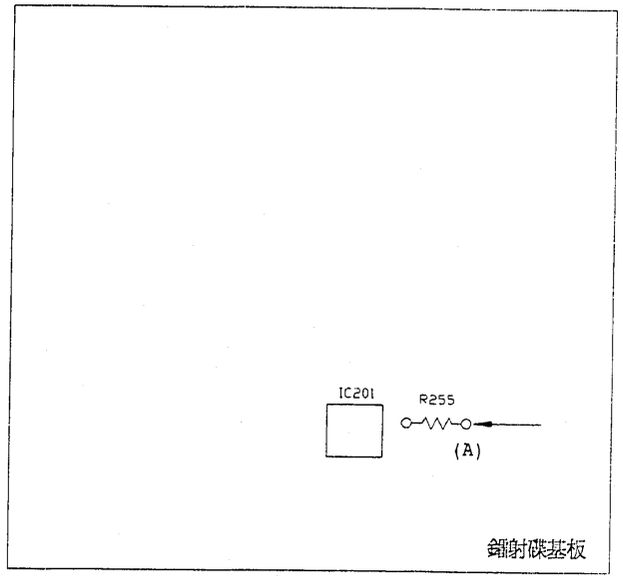
項次	調整項目	鐳射碟	方式	連接終端	測量儀器	調整點	備註
1	負載波頻率調整	未裝	停止	TP301正端(NTSC) J323接地 (GND)	示波器和頻率計數器	C304	[附註2]

〔附註2〕

（1）在停止方式下執行調整。

（2）把示波器的負端連接至J323接地（GND），正端連接至TP301（NTSC），然後調整C304，使讀數成爲3.579545MHz±50Hz。

3．鐳射影碟測試方式



（1）測試信號有三種 ： 灰色階梯（GREY SCALE）
色帶（COLOUR BAR）
色調（TONE VAST）

（2）測試信號確認方法：

電源關閉：在於R255（A）和接地（GND）間以線短路連接

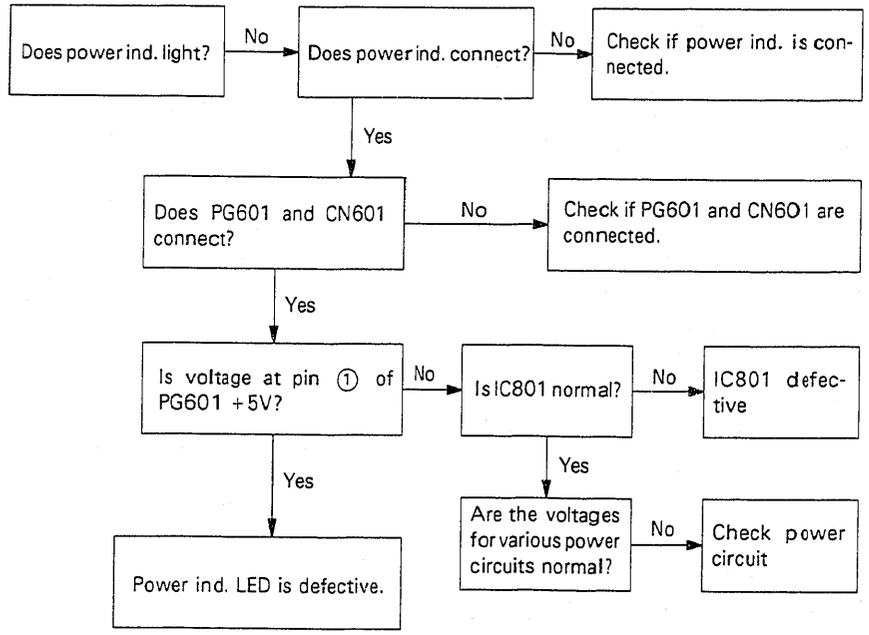
電源開啓：測試信號由影像端子出力（VIDEO OUT）

測試信號的切換由 ⋘ ， ⋙ 開關控制

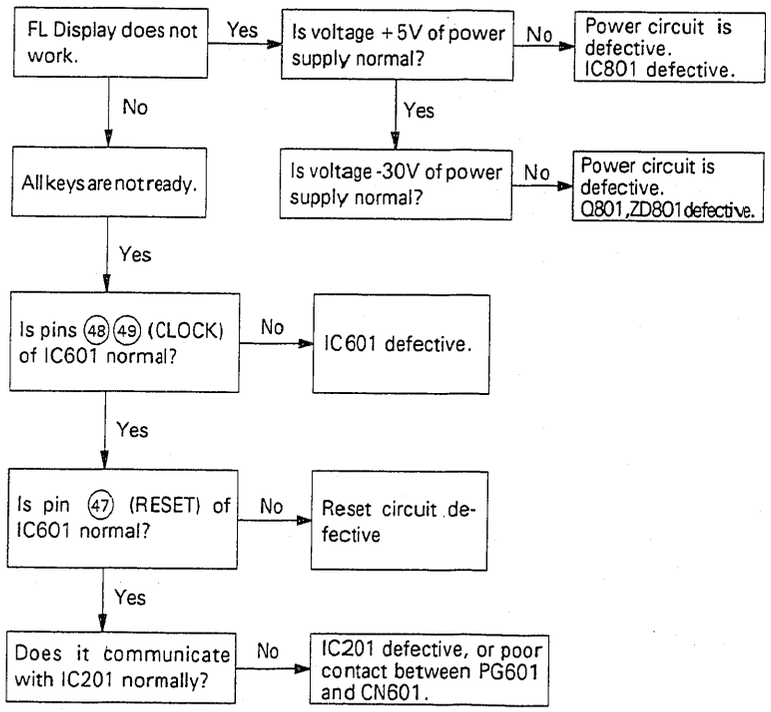
（3）解除測試信號只要關閉電源即可。

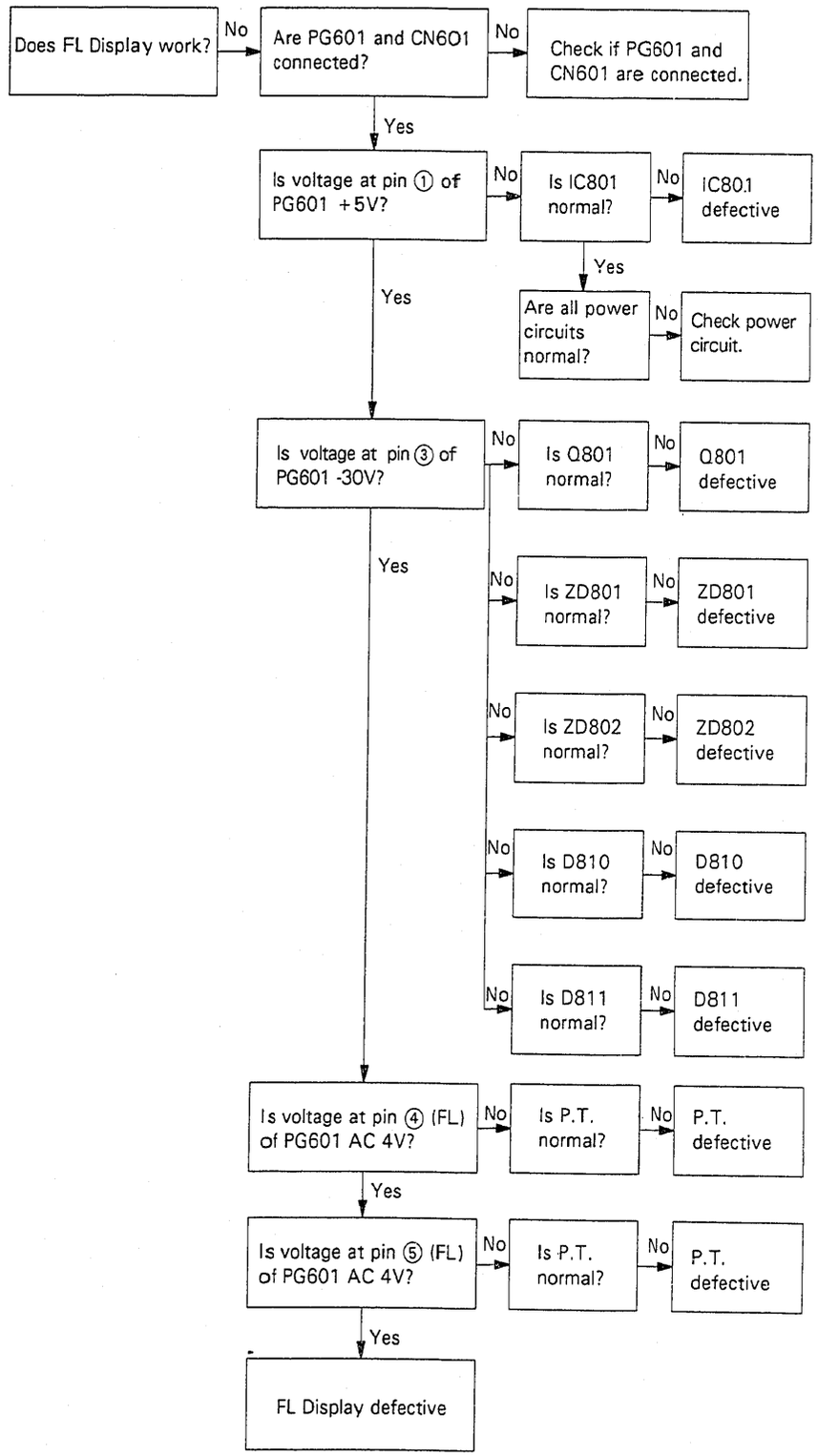
TROUBLESHOOTING

• Check Power Circiut

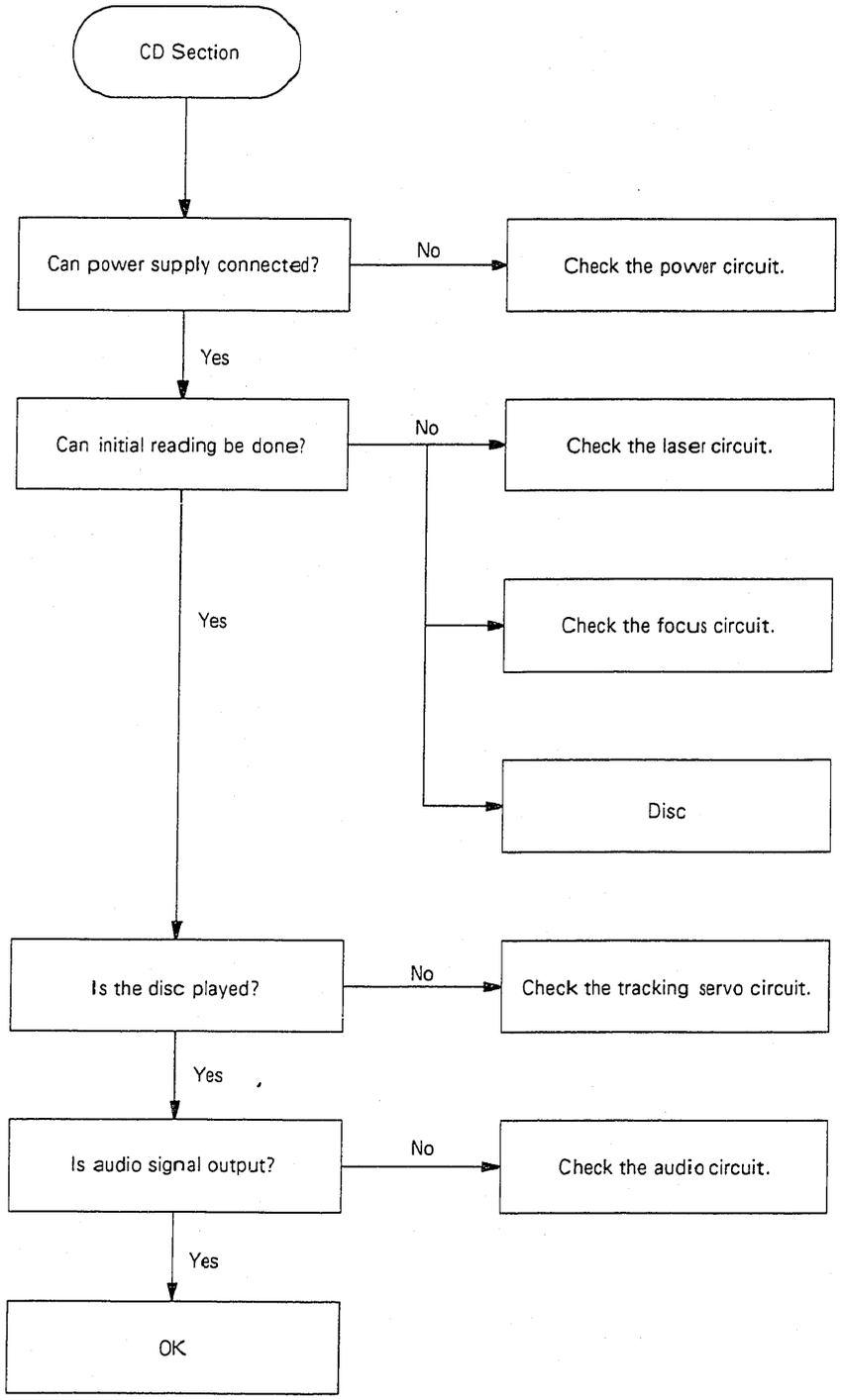


• Troubleshooting for Microprocessor

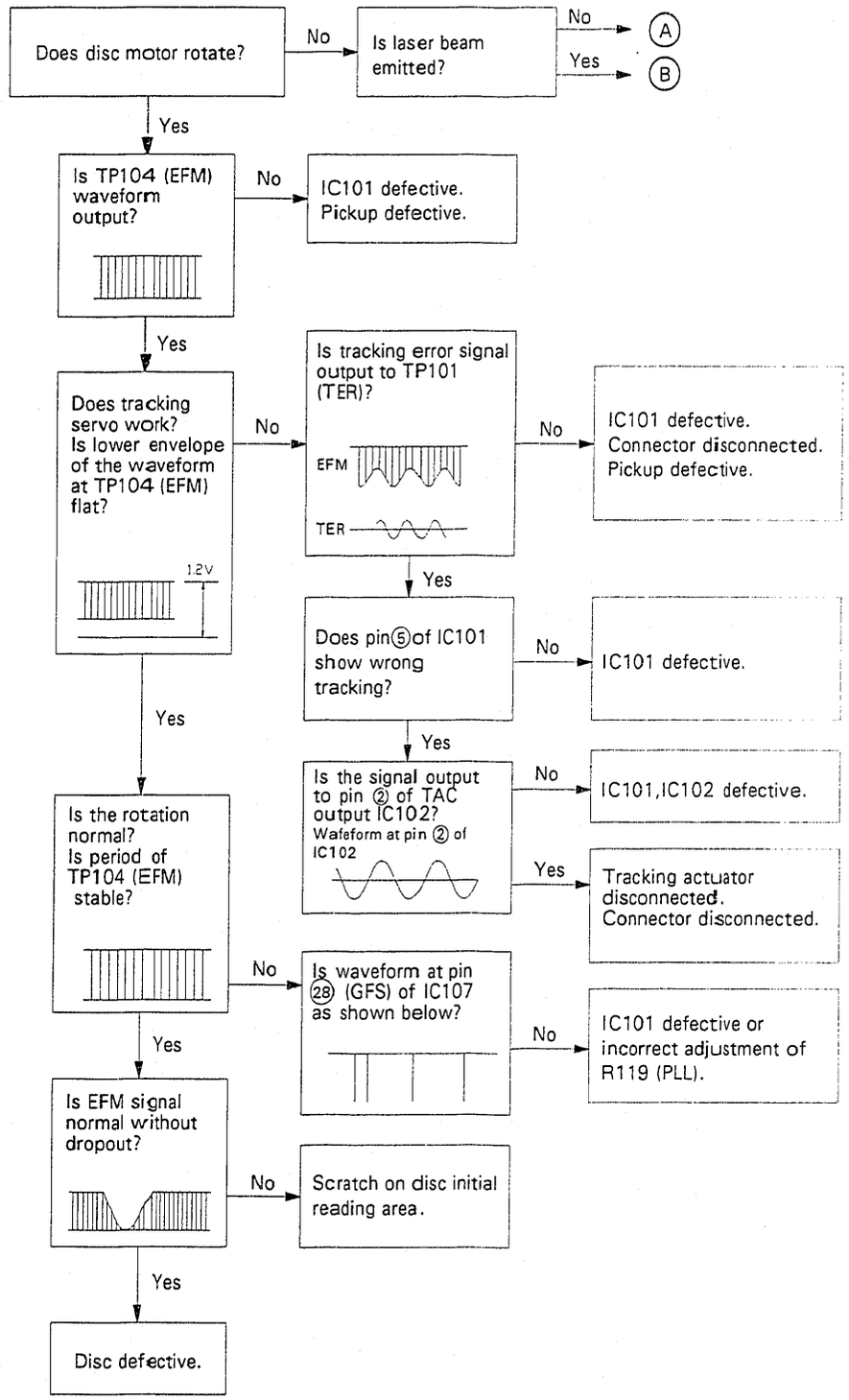


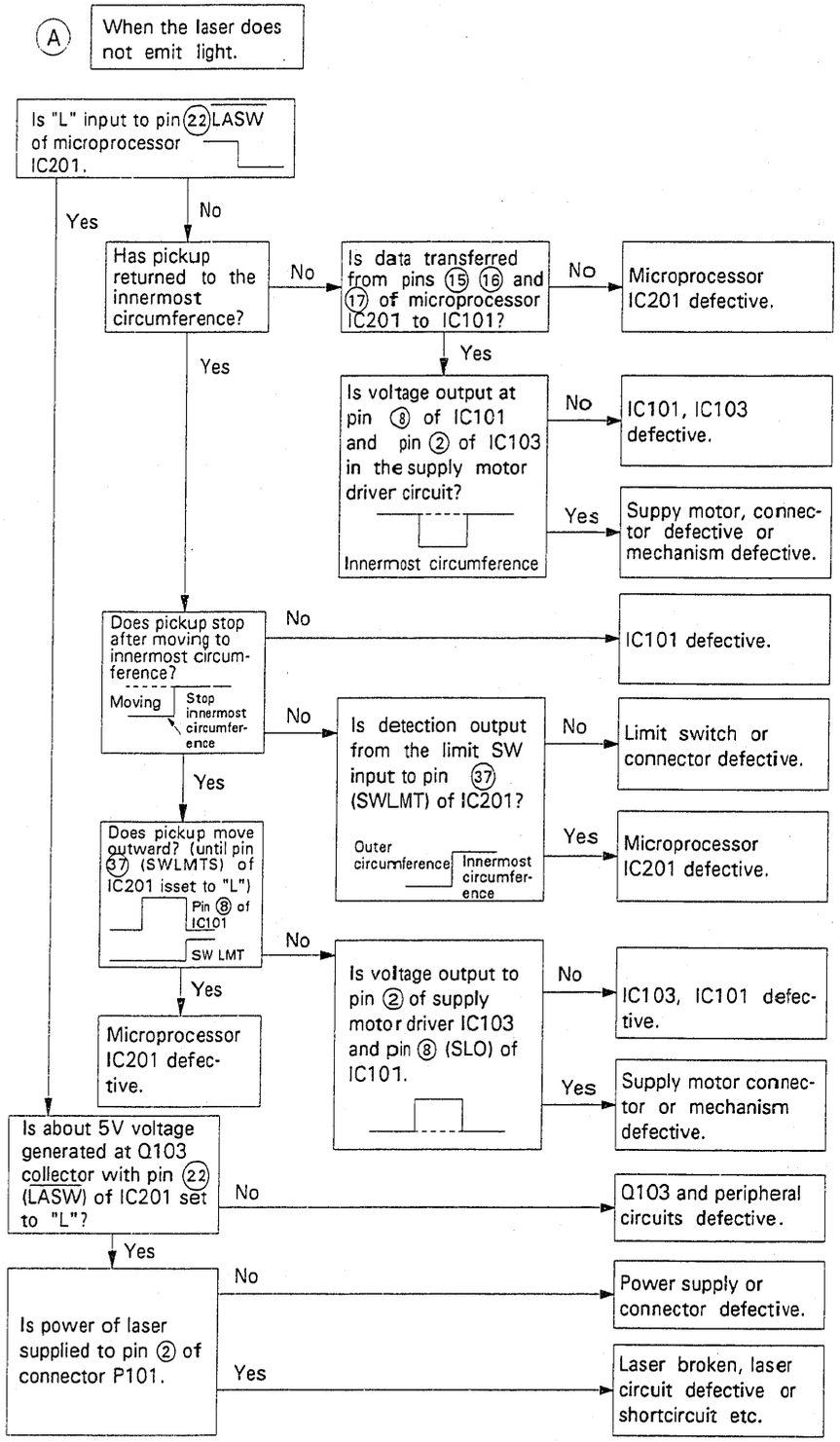


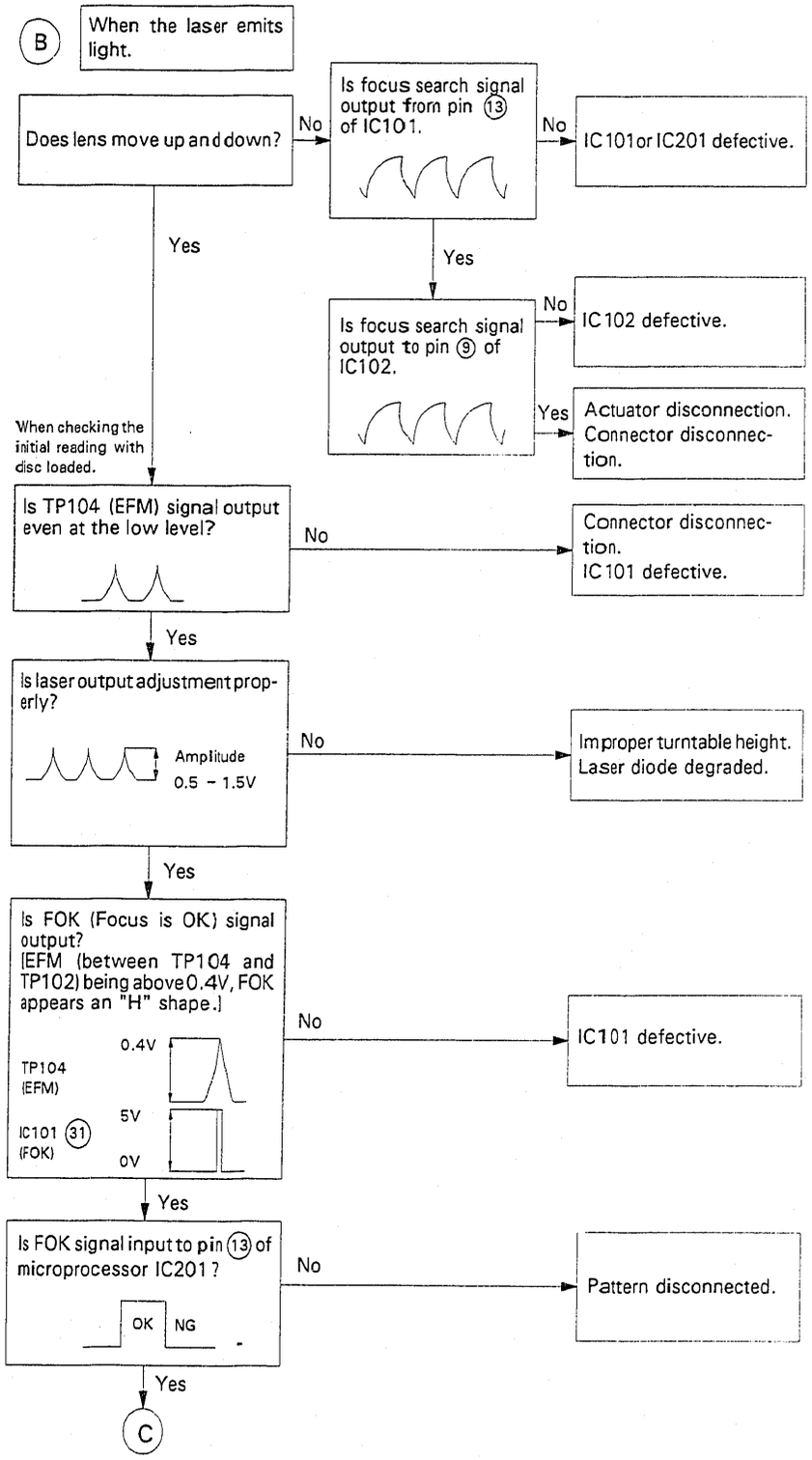
• CD

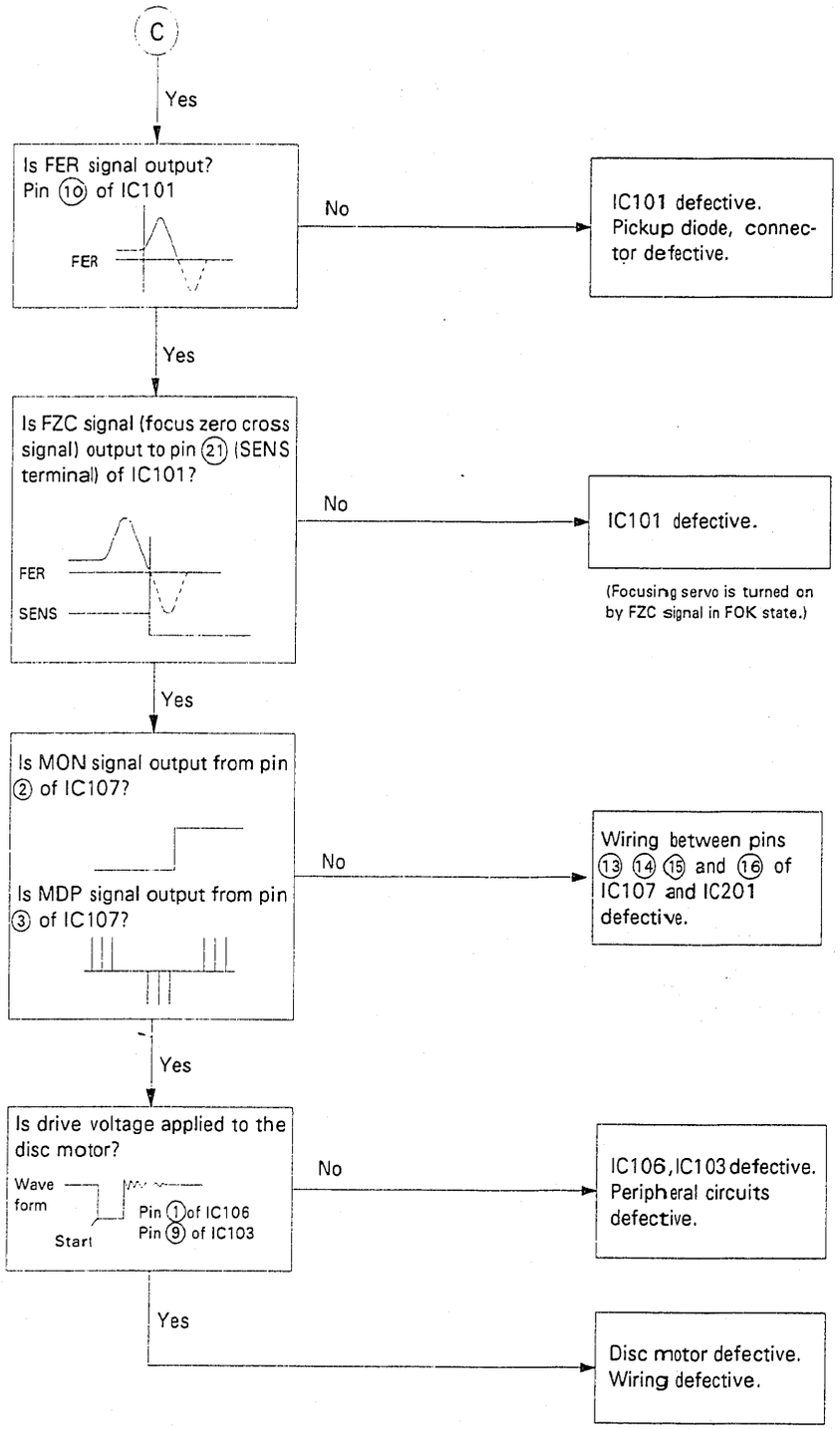


• When the intial reading cannot be done.



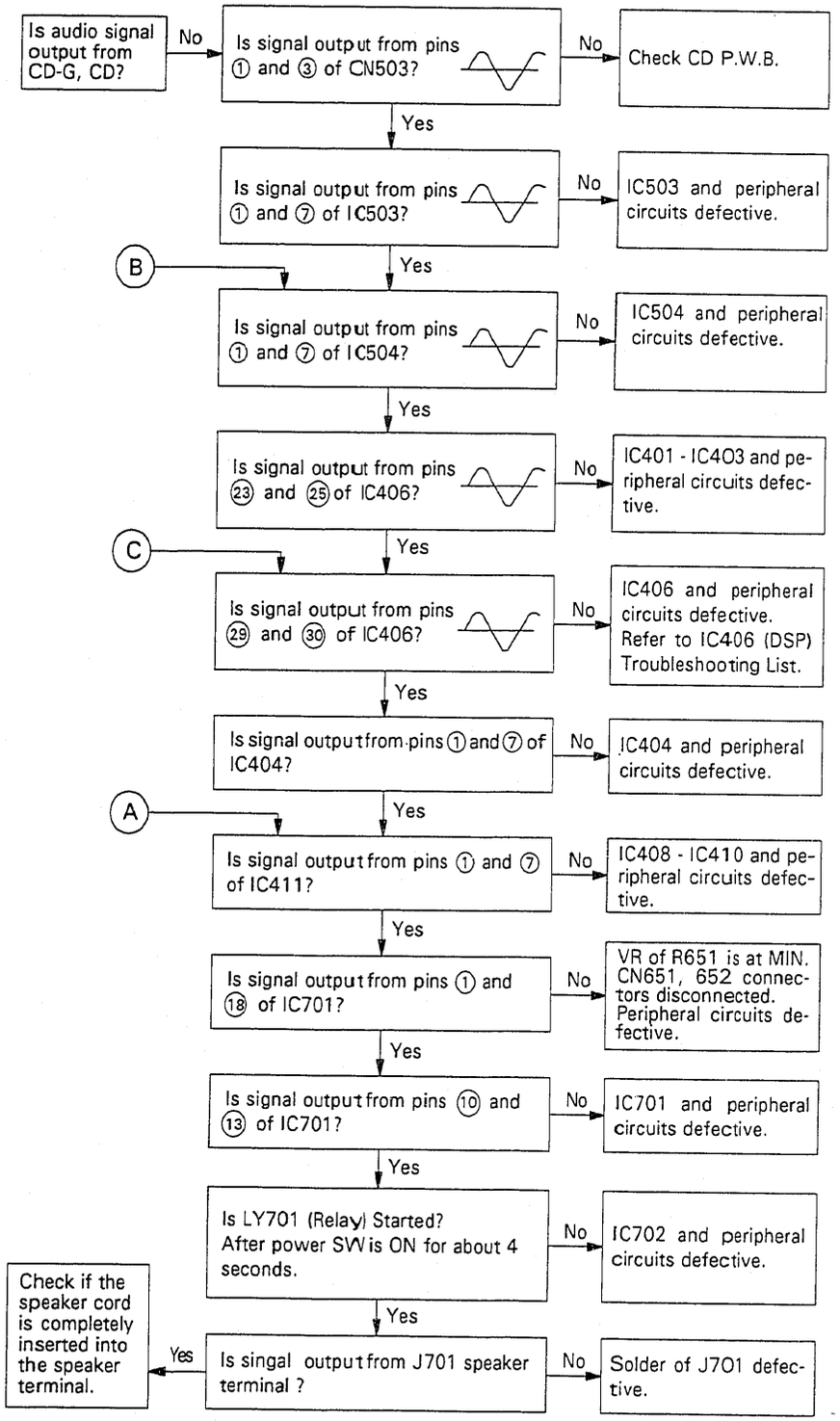

A
When the laser does not emit light.
Is "L" input to pin (22) LASW of microprocessor IC201.
Yes
No
Has pickup returned to the innermost circumference?
No
Is data transferred from pins (15) (16) and (17) of microprocessor IC201 to IC101?
No
Microprocessor IC201 defective.
Yes
Is voltage output at pin (8) of IC101 and pin (2) of IC103 in the supply motor driver circuit?
No
IC101, IC103 defective.
Yes
Innermost circumference
Suppy motor, connector defective or mechanism defective.
Does pickup stop after moving to innermost circumference?
No
IC101 defective.
Moving
Stop innermost circumference
No
Is detection output from the limit SW input to pin (37) (SWLMT) of IC201?
No
Limit switch or connector defective.
Yes
Outer circumference
Innermost circumference
Yes
Microprocessor IC201 defective.
Does pickup move outward? (until pin (37) (SWLMTS) of IC201 isset to "L")
Pin (8) of IC101
SW LMT
No
Is voltage output to pin (2) of supply motor driver IC103 and pin (8) (SLO) of IC101.
No
IC103, IC101 defective.
Yes
Microprocessor IC201 defective.
Yes
Supply motor connector or mechanism defective.
Is about 5V voltage generated at Q103 collector with pin (22) (LASW) of IC201 set to "L"?
No
Q103 and peripheral circuits defective.
Yes
Is power of laser supplied to pin (2) of connector P101.
No
Power supply or connector defective.
Yes
Laser broken, laser circuit defective or shortcircuit etc.


B
When the laser emits light.
Does lens move up and down?
No
Is focus search signal output from pin (13) of IC101.
No
IC101 or IC201 defective.
Yes
Yes
Is focus search signal output to pin (9) of IC102.
No
IC102 defective.
Yes
Actuator disconnection. Connector disconnection.
When checking the initial reading with disc loaded.
Is TP104 (EFM) signal output even at the low level?
No
Connector disconnection. IC101 defective.
Yes
Is laser output adjustment properly?
Amplitude 0.5 - 1.5V
No
Improper turntable height. Laser diode degraded.
Yes
Is FOK (Focus is OK) signal output? (EFM (between TP104 and TP102) being above 0.4V, FOK appears an "H" shape.)
0.4V
TP104 (EFM)
5V
IC101 (31) (FOK)
0V
No
IC101 defective.
Yes
Is FOK signal input to pin (13) of microprocessor IC201?
OK
NG
No
Pattern disconnected.
Yes
C

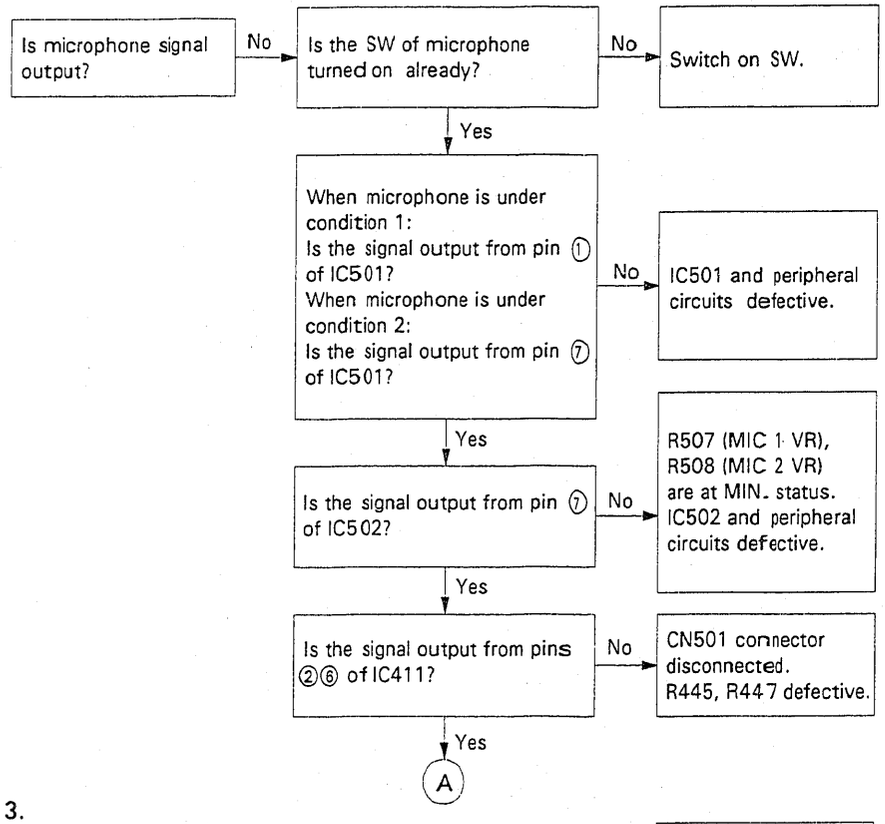


• **Check Audio Circuit**

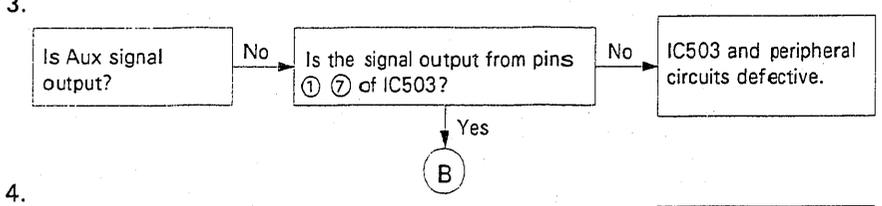
1.



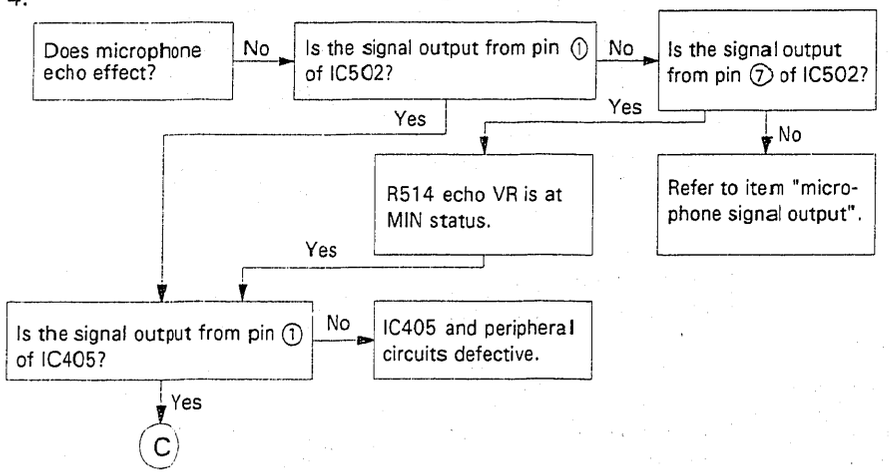
2.



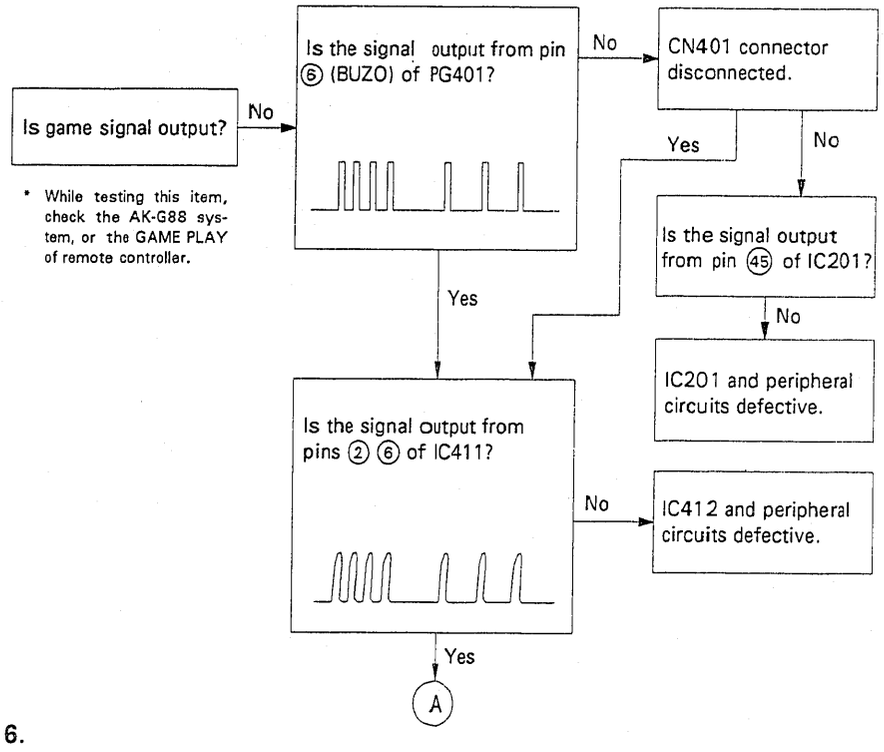
3.



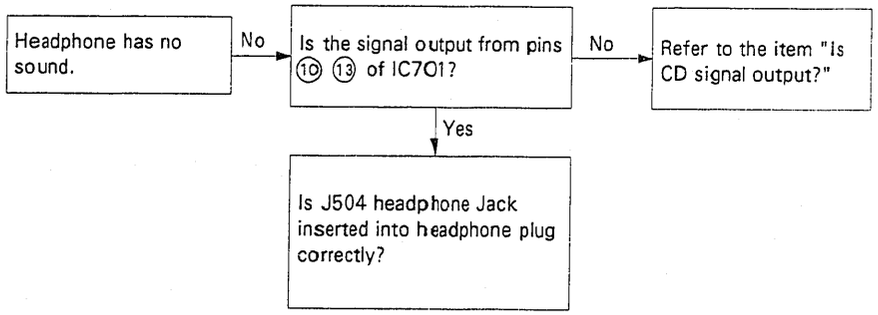
4.



5.

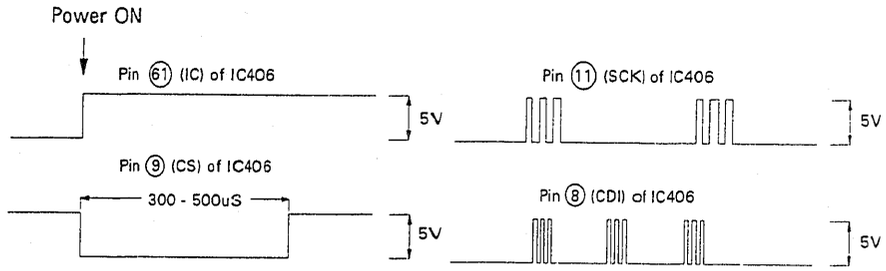


6.



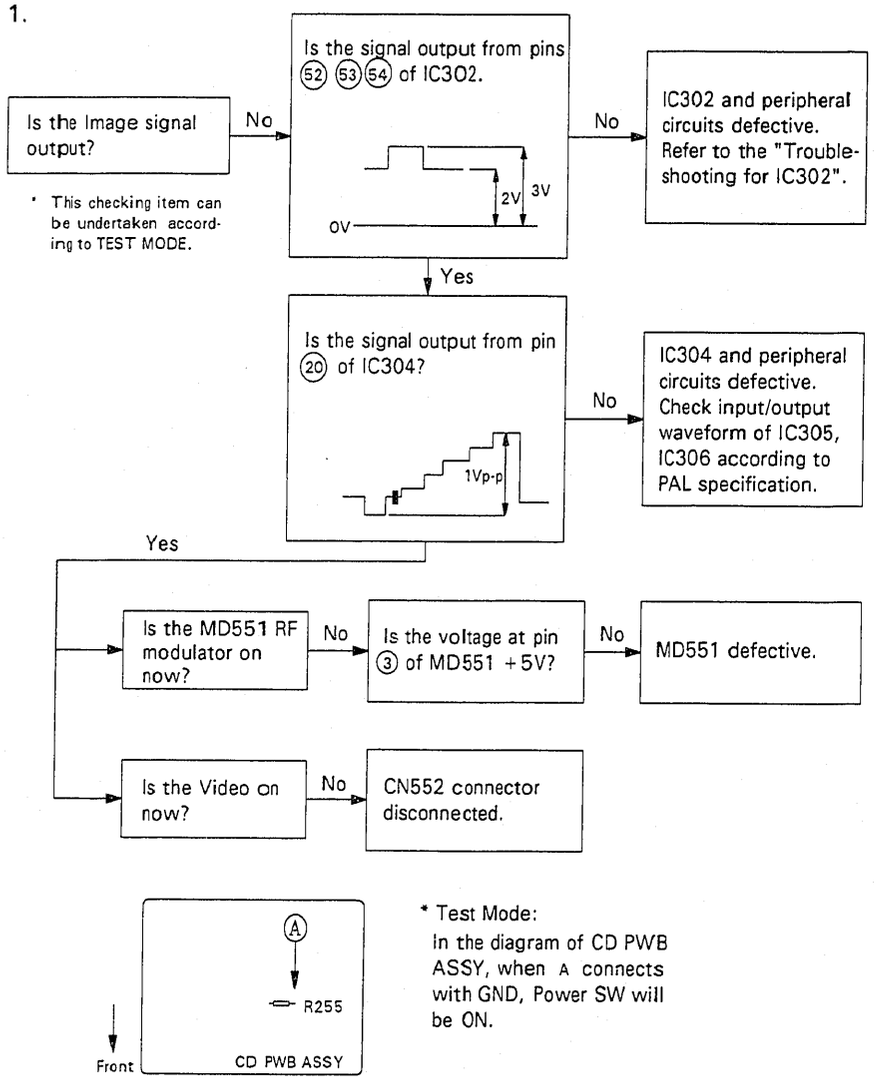
7. Troubleshooting for IC406 (DSP) (Way of checking)

This IC, based on microprocessor (IC201), will react by referring to the data of time constant. If this IC is defective, please check signal according to the following diagram.



• Check Image Circuit

1.

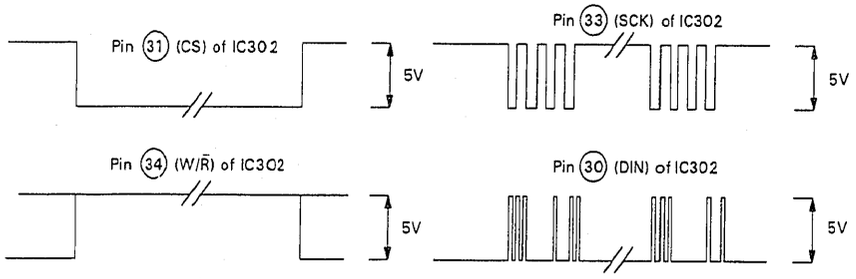


• This checking item can be undertaken according to TEST MODE.

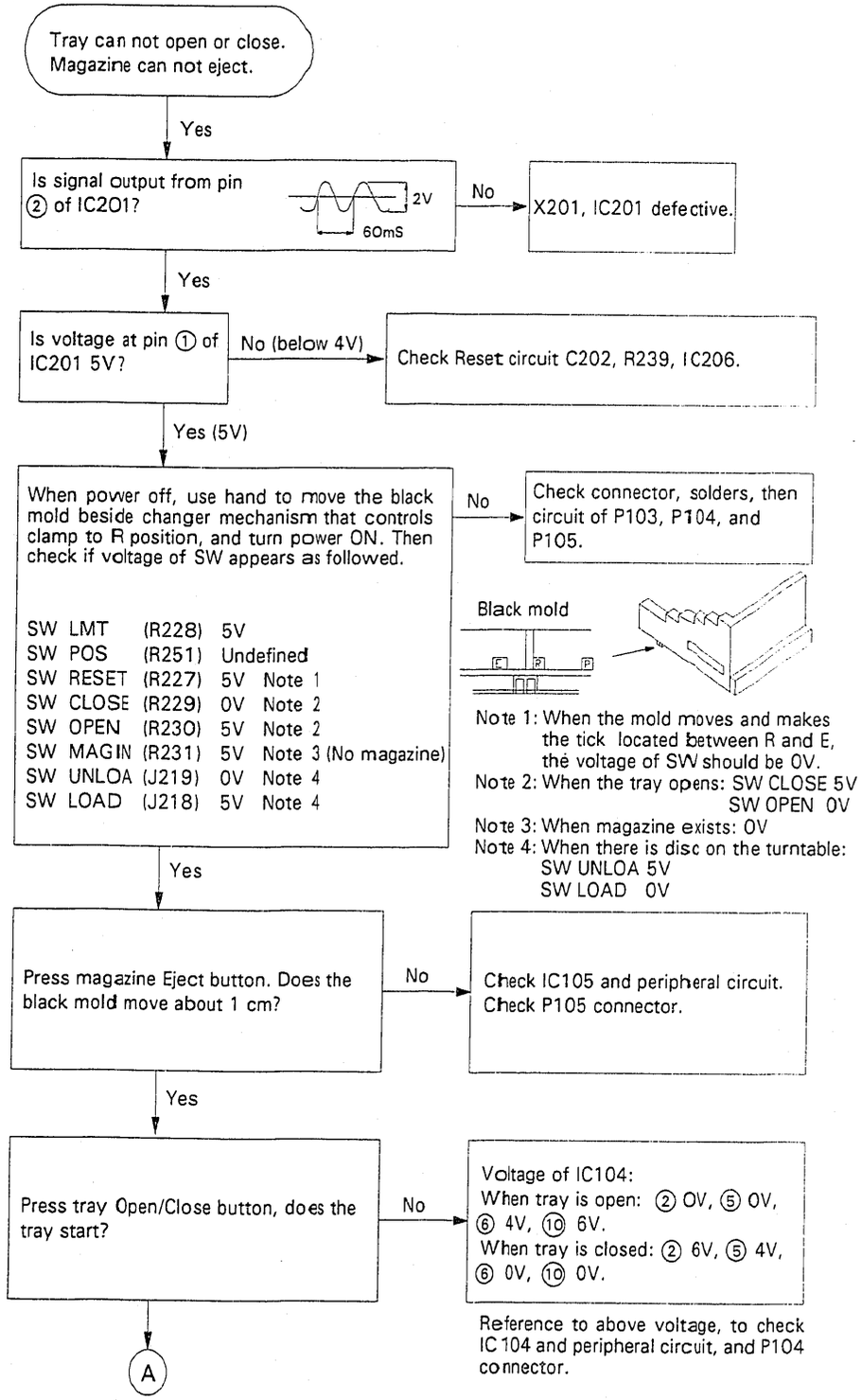
* Test Mode:
In the diagram of CD PWB ASSY, when A connects with GND, Power SW will be ON.

2. Troubleshooting for IC302 (CD-G) (Ways of Checking)

This IC, based on microprocessor (IC201), will react by referring to the data of time constant. If this IC is defective, please check the signal according to the following diagram.



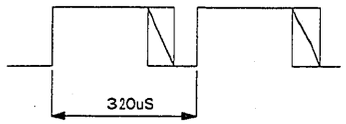
• Check Main Microprocessor



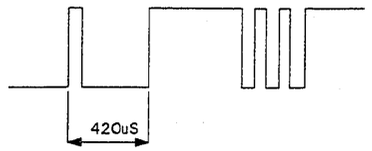
Ⓐ

Check wave of terminal IC201. If the wave does not appear, check IC201 and peripheral circuit.

㉘ FL BUSY

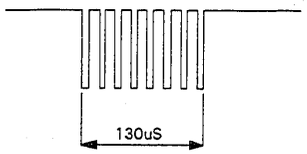


㉗ FL SIN
Normally, it is 0V. Waves appear when pressing the buttons.

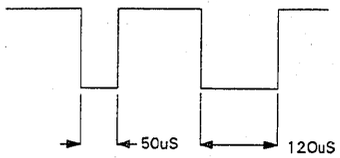


After pressing "CANCEL" button.

㉖ FL CLK

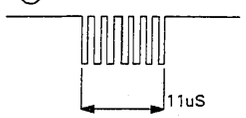


㉕ FL SOUT

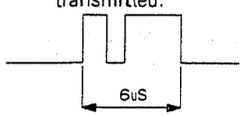


According to the data transmitted to FL tube, the wave will show as above.
The above is the signal wave of front FL microprocessor.

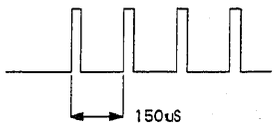
㉚ SCK



㉘ D OUT
It changes according to different data transmitted.

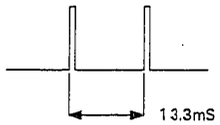


㉕ DSPCS

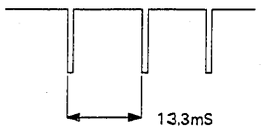


Above is the signal waves of DSP (IC405 YS 205). When press "Surround Mode" of remote controller , the waves will appear.

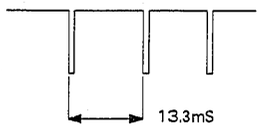
⑥ ⑲ $\overline{NMI}$, SCOR



㊻

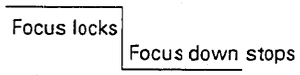


⑨ SOCK

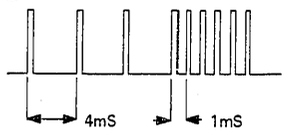


Above waves appear when disc is playing.

⑬ FOK



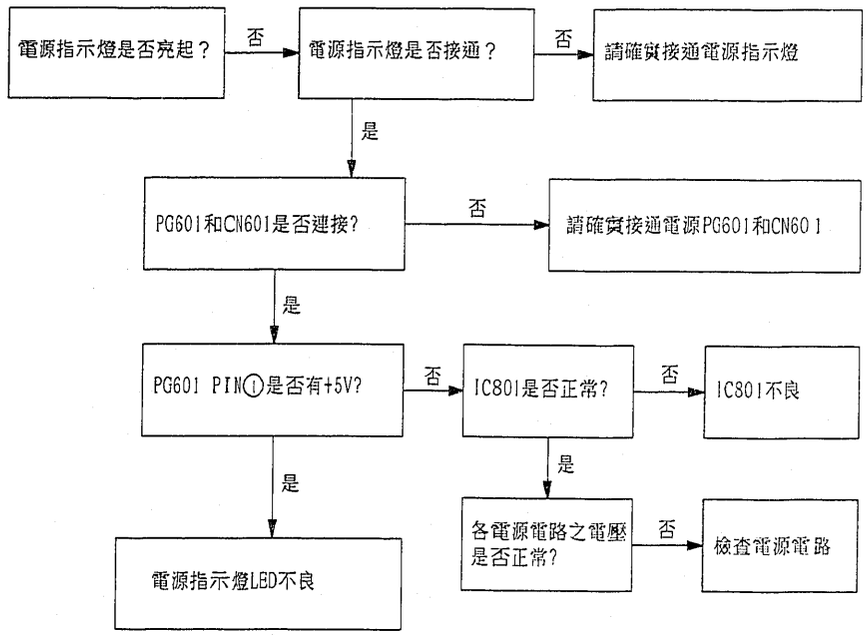
㊺ BUZO



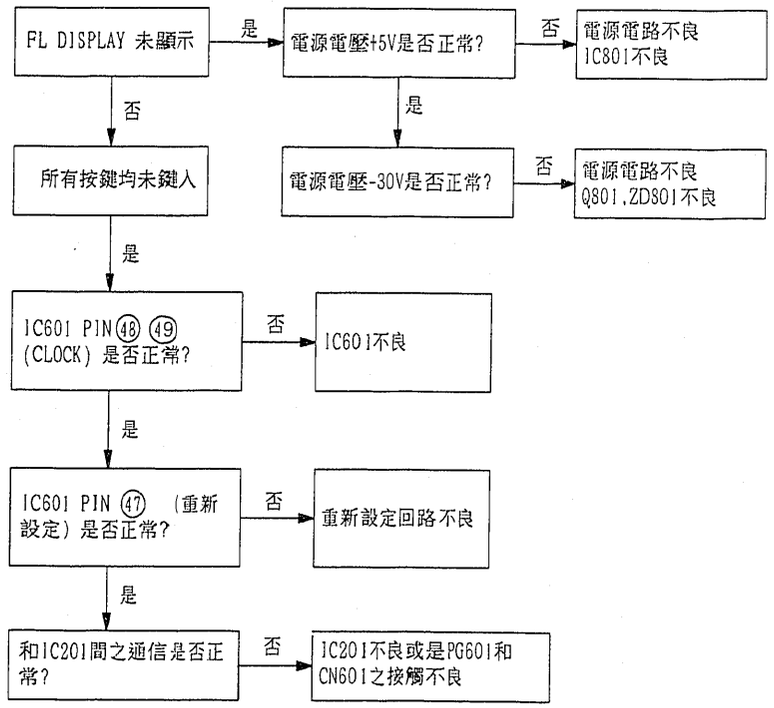
Above waves appear when game is playing.

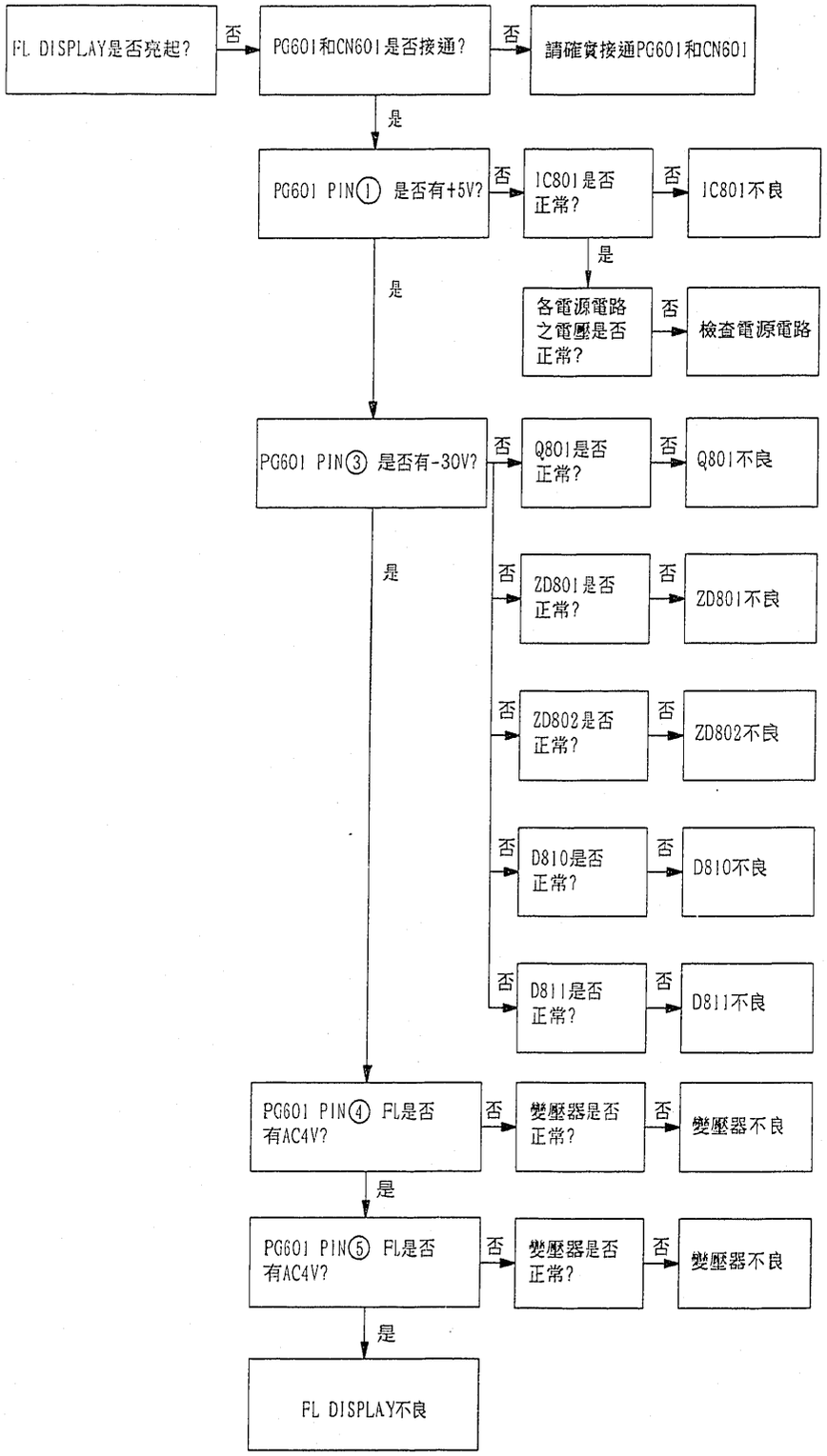
故障尋找

• 檢查電源電路

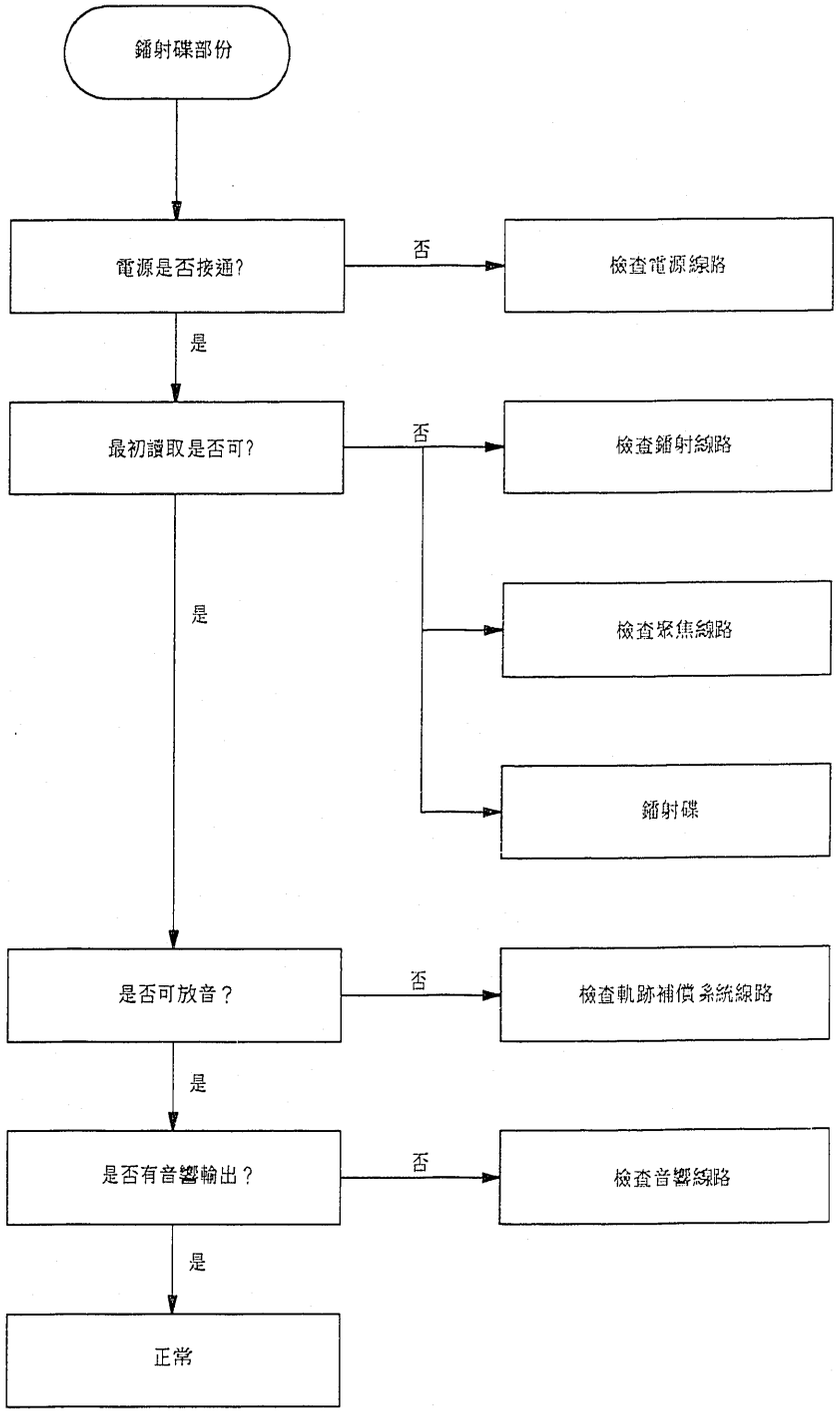


• 微處理器檢查故障表

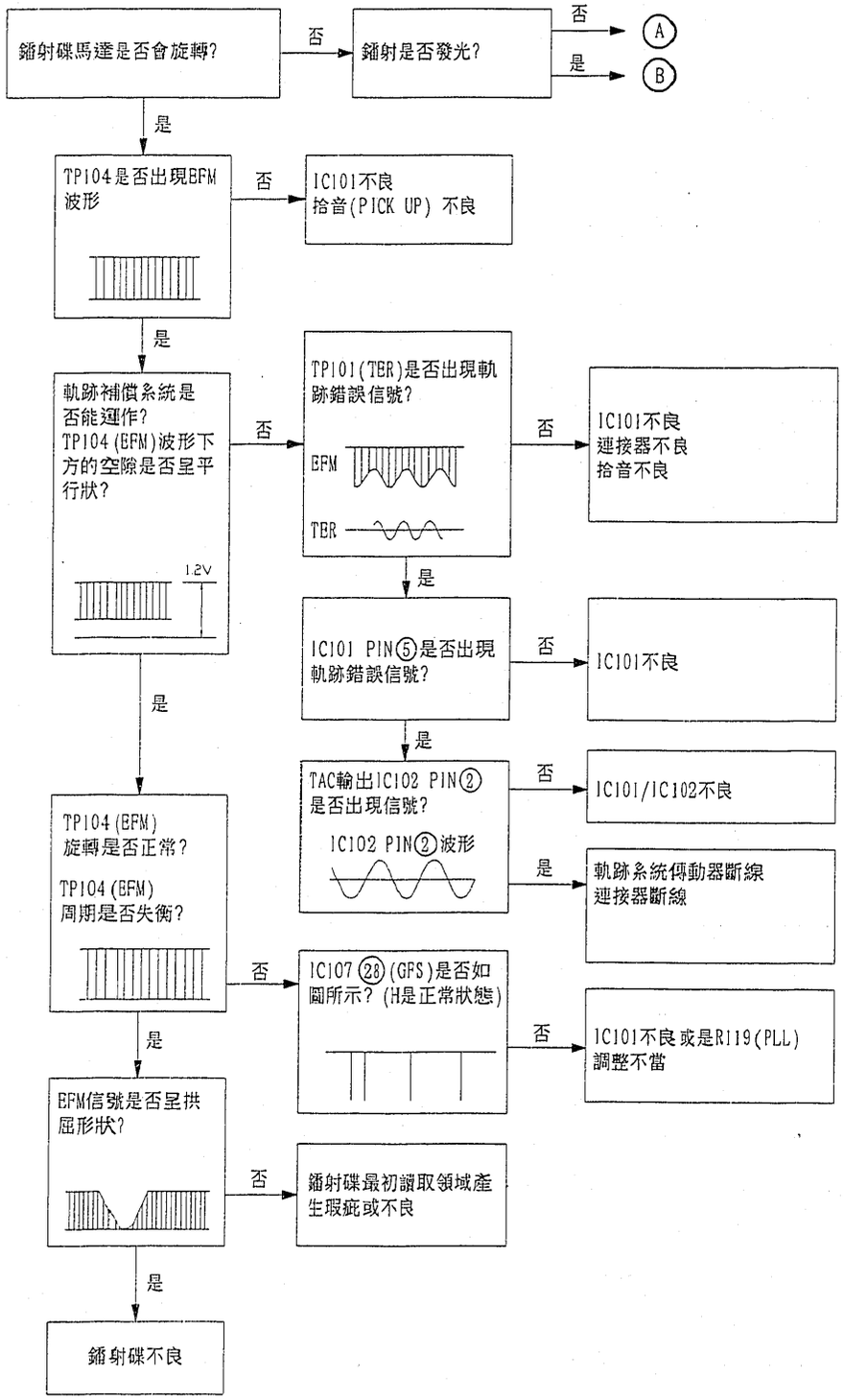


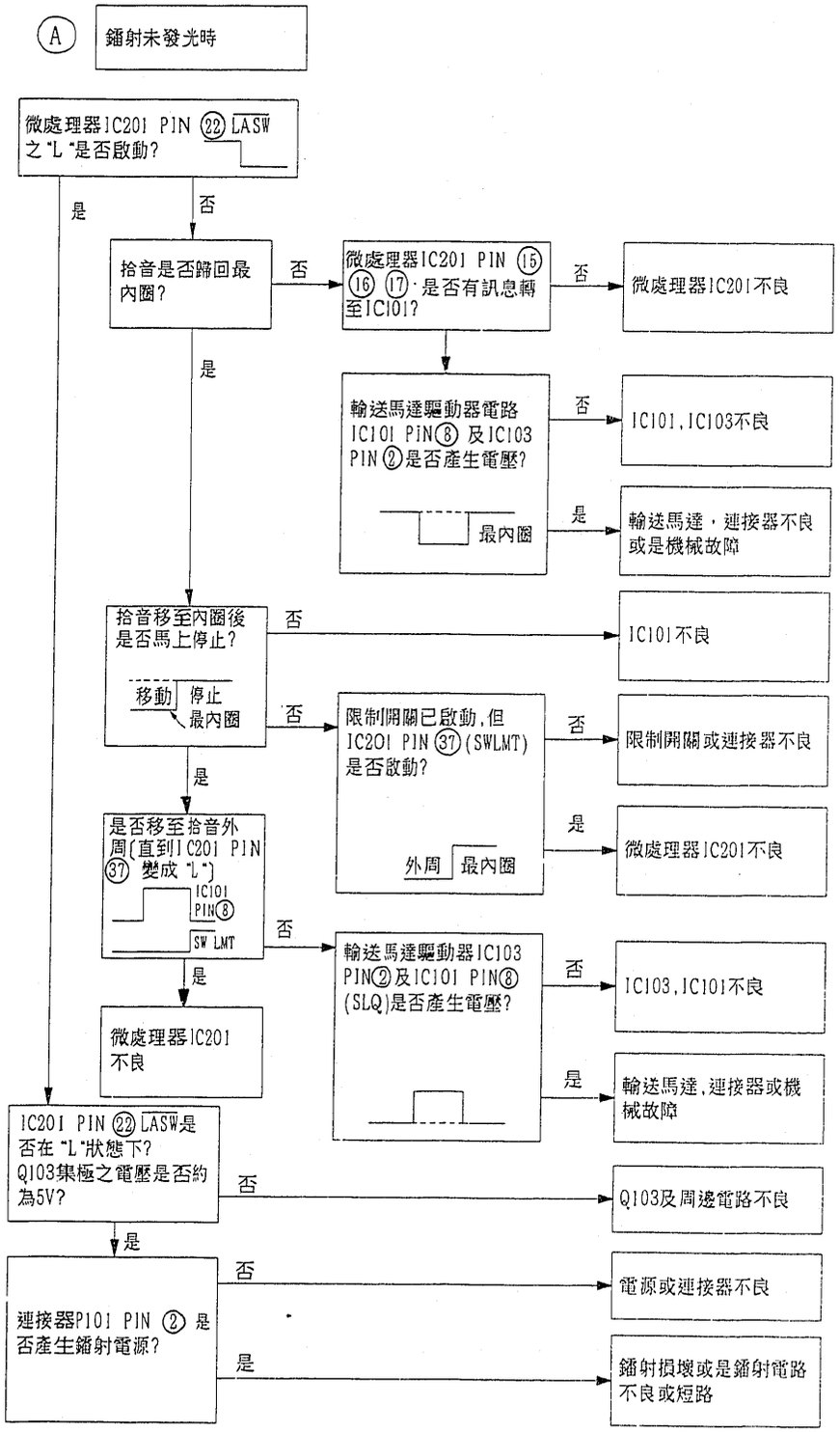

FL DISPLAY是否亮起?
否
PG601和CN601是否接通?
否
請確實接通PG601和CN601
是
PG601 PIN① 是否有+5V?
否
IC801是否正常?
否
IC801不良
是
各電源電路之電壓是否正常?
否
檢查電源電路
是
PG601 PIN③ 是否有-30V?
否
Q801是否正常?
否
Q801不良
是
否
ZD801是否正常?
否
ZD801不良
否
ZD802是否正常?
否
ZD802不良
否
D810是否正常?
否
D810不良
否
D811是否正常?
否
D811不良
PG601 PIN④ FL是否有AC4V?
否
變壓器是否正常?
否
變壓器不良
是
PG601 PIN⑤ FL是否有AC4V?
否
變壓器是否正常?
否
變壓器不良
是
FL DISPLAY不良

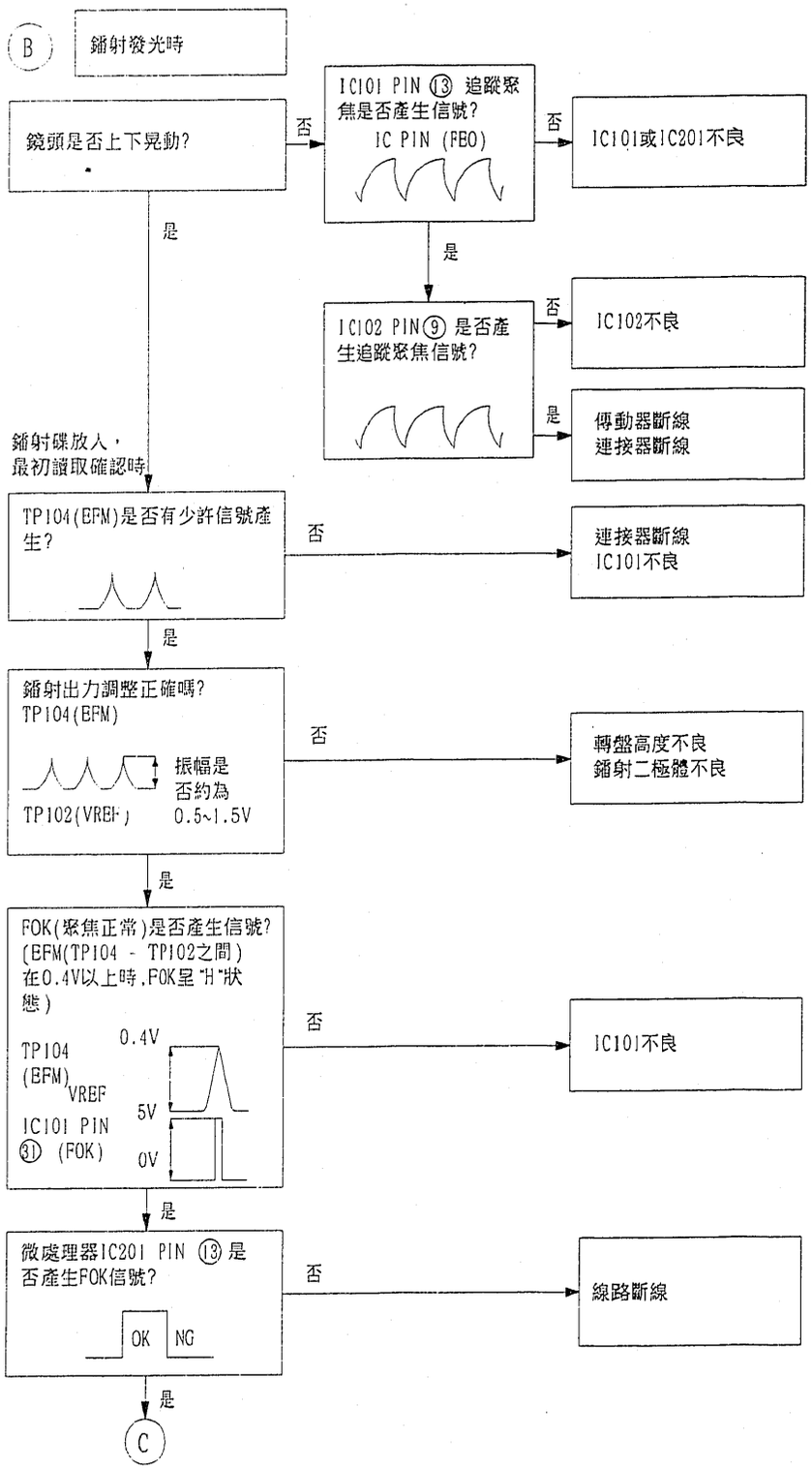
• 鐳射碟

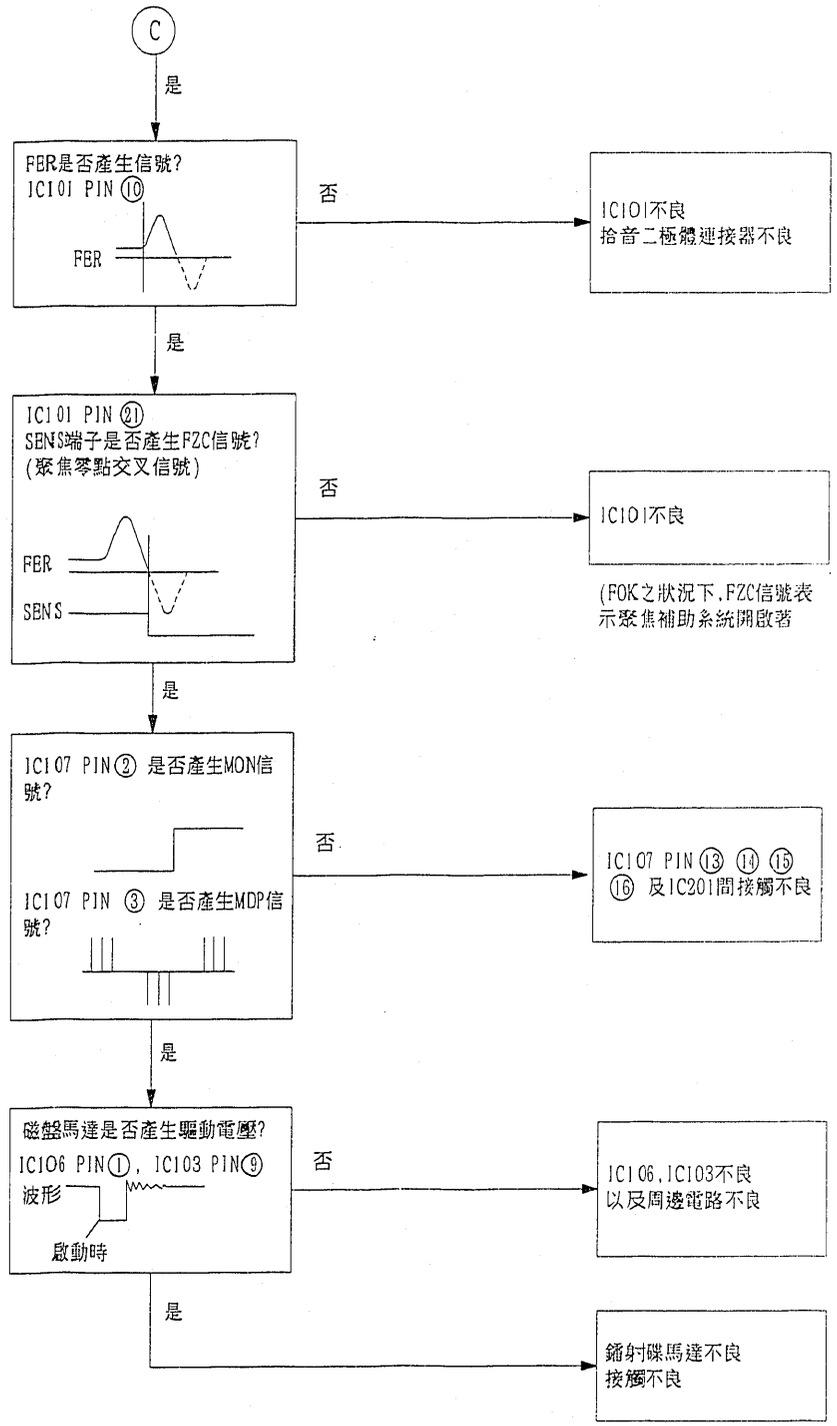

鐳射碟部份
電源是否接通?
否
檢查電源線路
是
最初讀取是否可?
否
檢查鐳射線路
是
檢查聚焦線路
鐳射碟
是否可放音?
否
檢查軌跡補償系統線路
是
是否有音響輸出?
否
檢查音響線路
是
正常

• 最初讀取不可時


錨射碟馬達是否會旋轉?
否
錨射是否發光?
否
是
A
B
是
TP104是否出現BFM波形
否
IC101不良
拾音(PICK UP) 不良
是
軌跡補償系統是否能運作?
TP104 (BFM)波形下方的空隙是否呈平行狀?
1.2V
否
TP101(TER)是否出現軌跡錯誤信號?
BFM
TER
否
IC101不良
連接器不良
拾音不良
是
IC101 PIN⑤是否出現軌跡錯誤信號?
否
IC101不良
是
TAC輸出IC102 PIN②是否出現信號?
IC102 PIN②波形
否
IC101/IC102不良
是
軌跡系統傳動器斷線
連接器斷線
是
TP104 (BFM)旋轉是否正常?
TP104 (BFM)周期是否失衡?
否
IC107 ㉘ (GFS)是否如圖所示? (H是正常狀態)
否
IC101不良或是R119(PLL)調整不當
是
BFM信號是否呈拱屈形狀?
否
錨射碟最初讀取領域產生瑕疵或不良
是
錨射碟不良

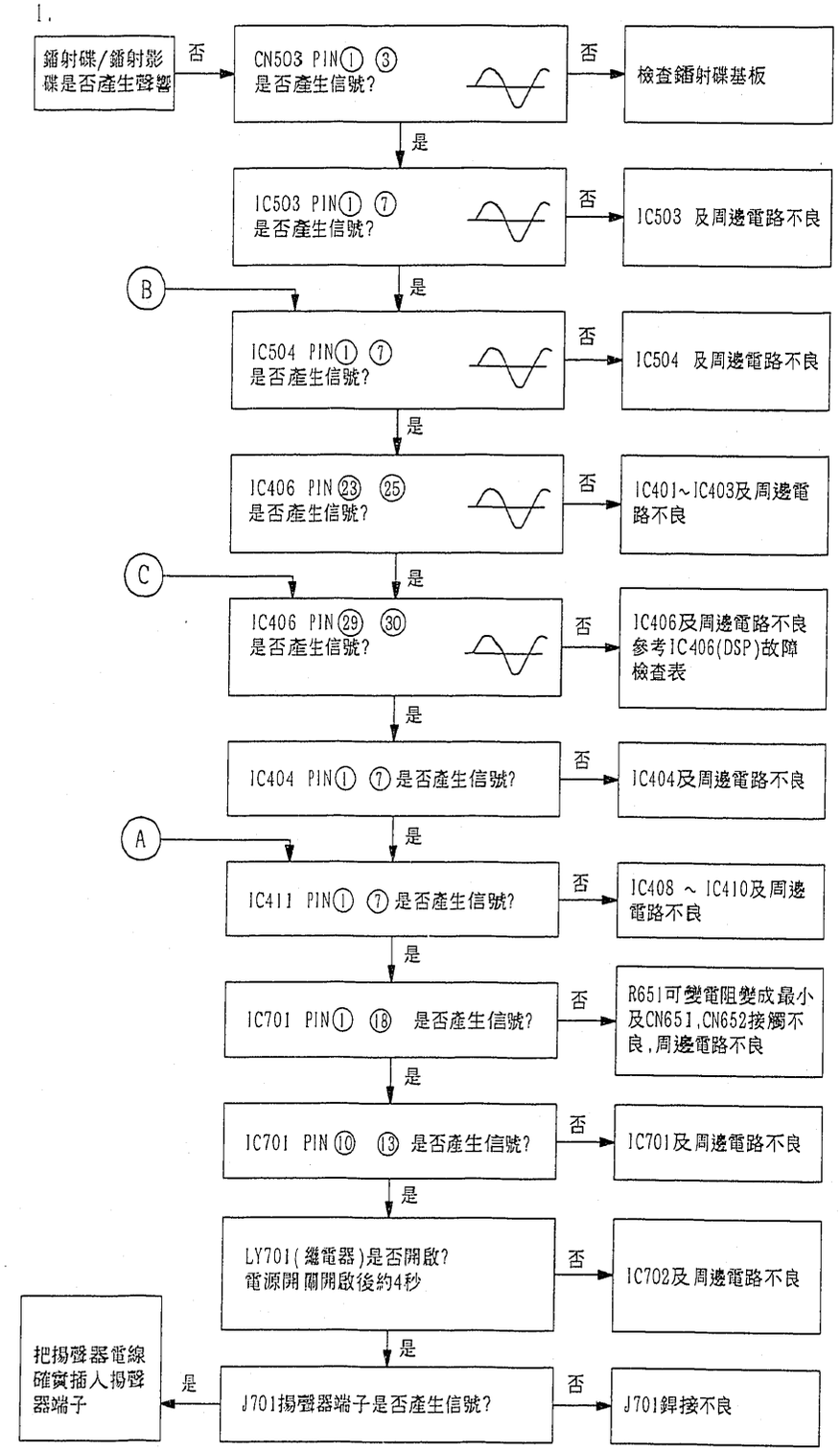

A
錨射未發光時
微處理器IC201 PIN ㉒ LASW之"L"是否啟動?
是
否
拾音是否歸回最內圈?
否
微處理器IC201 PIN ⑮ ⑯ ⑰ 是否有訊息轉至IC101?
否
微處理器IC201不良
是
輸送馬達驅動器電路IC101 PIN⑧及IC103 PIN②是否產生電壓?
最內圈
否
IC101,IC103不良
是
輸送馬達,連接器不良或是機械故障
拾音移至內圈後是否馬上停止?
移動
停止
最內圈
否
IC101不良
是
是否移至拾音外周〔直到IC201 PIN ㊲ 變成"L"〕
IC101 PIN⑧
SW LMT
否
限制開關已啟動,但IC201 PIN ㊲ (SWLMT)是否啟動?
外周
最內圈
否
限制開關或連接器不良
是
微處理器IC201不良
是
微處理器IC201不良
否
輸送馬達驅動器IC103 PIN②及IC101 PIN⑧(SLQ)是否產生電壓?
否
IC103,IC101不良
是
輸送馬達,連接器或機械故障
IC201 PIN ㉒ LASW是否在"L"狀態下?
Q103集極之電壓是否約為5V?
否
Q103及周邊電路不良
是
連接器P101 PIN ② 是否產生錨射電源?
否
電源或連接器不良
是
錨射損壞或是錨射電路不良或短路


B
鐳射發光時
鏡頭是否上下晃動?
否
是
IC101 PIN ⑬ 追蹤聚焦是否產生信號?
IC PIN (FEO)
否
IC101或IC201不良
是
IC102 PIN⑨ 是否產生追蹤聚焦信號?
否
IC102不良
是
傳動器斷線
連接器斷線
鐳射碟放入，最初讀取確認時
TP104(BFM)是否有少許信號產生?
否
連接器斷線
IC101不良
是
鐳射出力調整正確嗎?
TP104(BFM)
振幅是否約為
TP102(VREF)
0.5~1.5V
否
轉盤高度不良
鐳射二極體不良
是
FOK(聚焦正常)是否產生信號?
(BFM(TP104 - TP102之間)在0.4V以上時,FOK呈"H"狀態)
TP104 (BFM)
VREF
0.4V
5V
IC101 PIN ㉛ (FOK)
0V
否
IC101不良
是
微處理器IC201 PIN ⑬ 是否產生FOK信號?
OK
NG
否
線路斷線
是
C

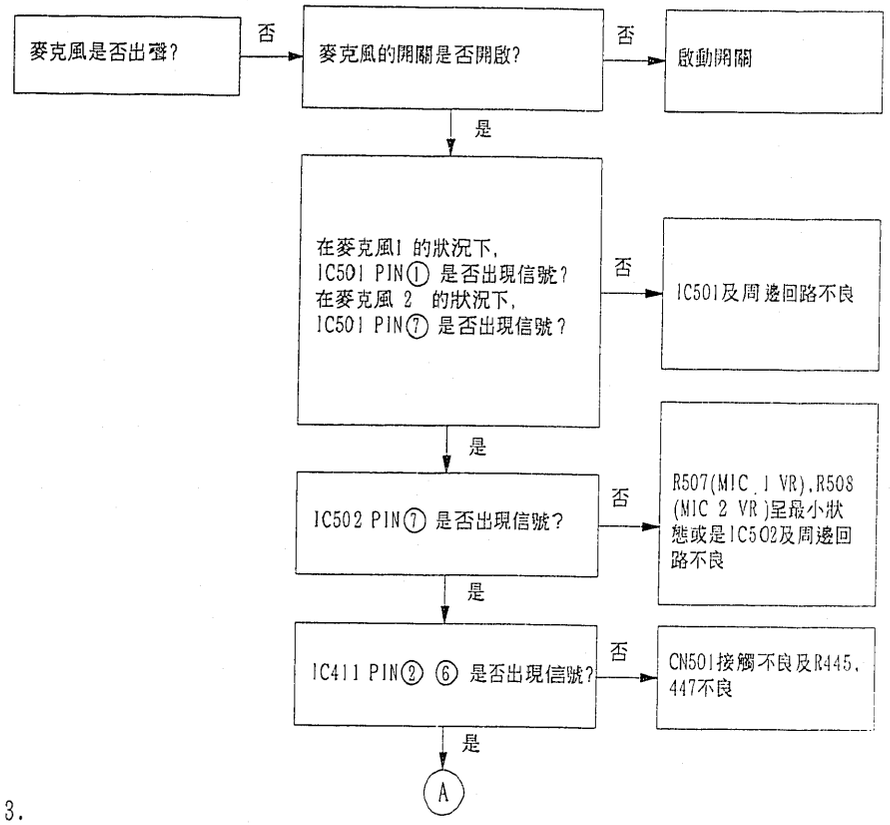

C
是
FBR是否產生信號?
IC101 PIN ⑩
FBR
否
IC101不良
拾音二極體連接器不良
是
IC101 PIN ㉑
SENS端子是否產生FZC信號?
(聚焦零點交叉信號)
FBR
SENS
否
IC101不良
(FOK之狀況下,FZC信號表示聚焦補助系統開啟著
是
IC107 PIN② 是否產生MON信號?
IC107 PIN ③ 是否產生MDP信號?
否
IC107 PIN ⑬ ⑭ ⑮ ⑯ 及IC201間接觸不良
是
磁盤馬達是否產生驅動電壓?
IC106 PIN①, IC103 PIN⑨
波形
啟動時
否
IC106,IC103不良
以及周邊電路不良
是
鐳射碟馬達不良
接觸不良

• 檢查音頻電路

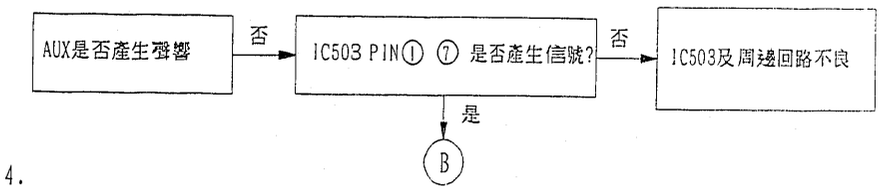
1.


鐳射碟/鐳射影碟是否產生聲響
否
CN503 PIN① ③ 是否產生信號?
否
檢查鐳射碟基板
是
IC503 PIN① ⑦ 是否產生信號?
否
IC503 及周邊電路不良
是
B
IC504 PIN① ⑦ 是否產生信號?
否
IC504 及周邊電路不良
是
IC406 PIN㉓ ㉕ 是否產生信號?
否
IC401~IC403及周邊電路不良
是
C
IC406 PIN㉙ ㉚ 是否產生信號?
否
IC406及周邊電路不良參考IC406(DSP)故障檢查表
是
IC404 PIN① ⑦ 是否產生信號?
否
IC404及周邊電路不良
是
A
IC411 PIN① ⑦ 是否產生信號?
否
IC408 ~ IC410及周邊電路不良
是
IC701 PIN① ⑱ 是否產生信號?
否
R651可變電阻變成最小及CN651,CN652接觸不良,周邊電路不良
是
IC701 PIN⑩ ⑬ 是否產生信號?
否
IC701及周邊電路不良
是
LY701(繼電器)是否開啟?電源開關開啟後約4秒
否
IC702及周邊電路不良
是
J701揚聲器端子是否產生信號?
否
J701銲接不良
是
把揚聲器電線確實插入揚聲器端子

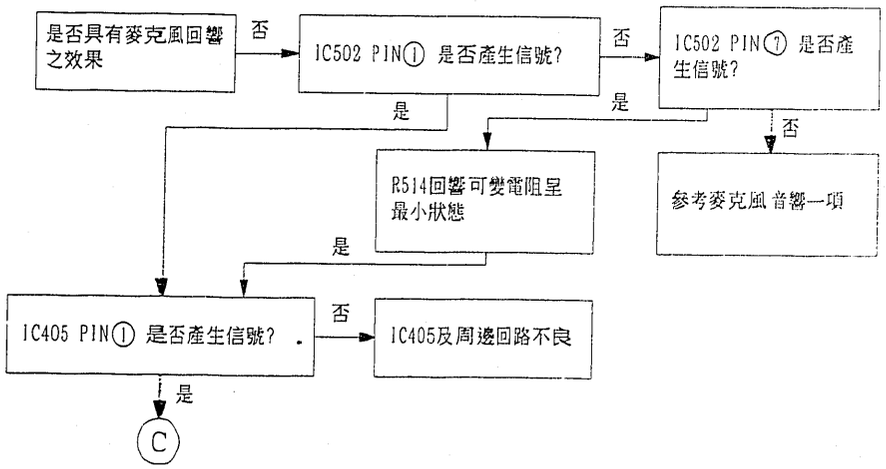
2.


麥克風是否出聲?
否
麥克風的開關是否開啟?
否
啟動開關
是
在麥克風1 的狀況下,IC501 PIN① 是否出現信號?在麥克風 2 的狀況下,IC501 PIN⑦ 是否出現信號?
否
IC501及周邊回路不良
是
IC502 PIN⑦ 是否出現信號?
否
R507(MIC 1 VR),R508(MIC 2 VR)呈最小狀態或是IC502及周邊回路不良
是
IC411 PIN② ⑥ 是否出現信號?
否
CN501接觸不良及R445,447不良
是
A

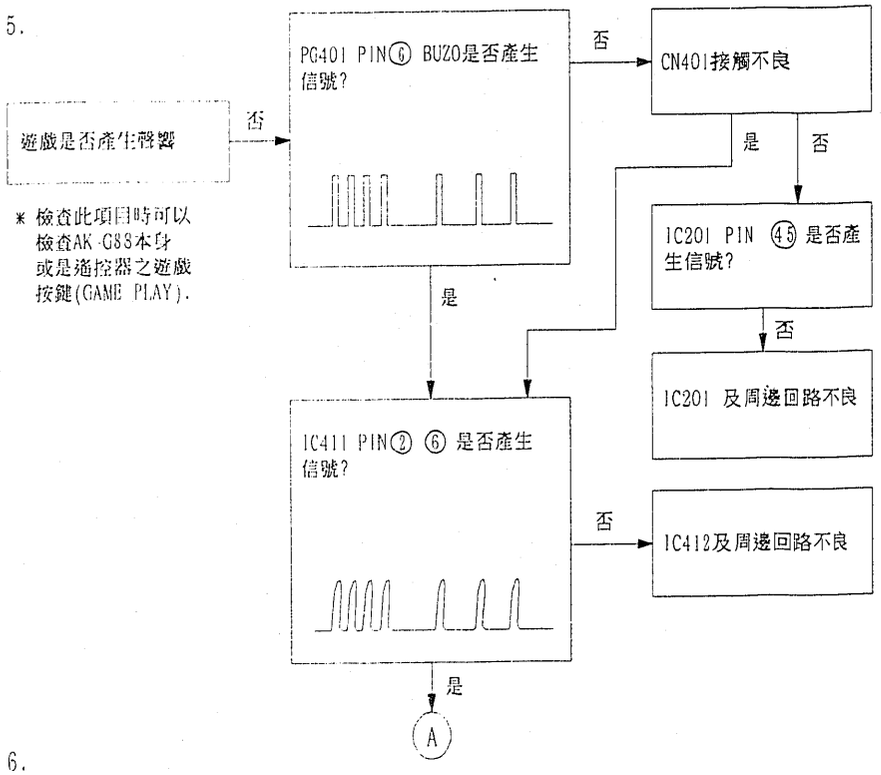
3.


AUX是否產生聲響
否
IC503 PIN① ⑦ 是否產生信號?
否
IC503及周邊回路不良
是
B

4.

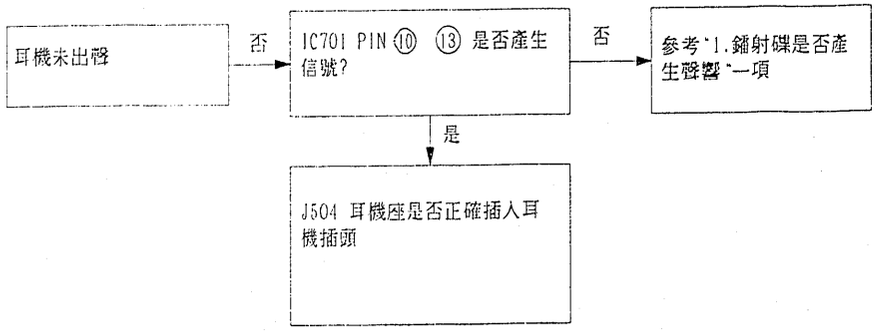

是否具有麥克風回響之效果
否
IC502 PIN① 是否產生信號?
否
IC502 PIN⑦ 是否產生信號?
否
是
是
R514回響可變電阻呈最小狀態
參考麥克風音響一項
是
IC405 PIN① 是否產生信號?
否
IC405及周邊回路不良
是
C

5.



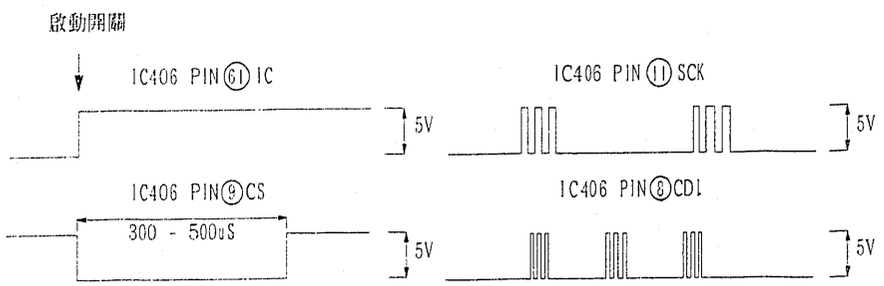
＊ 檢查此項目時可以檢查AK-G88本身或是遙控器之遊戲按鍵(GAME PLAY).

6.



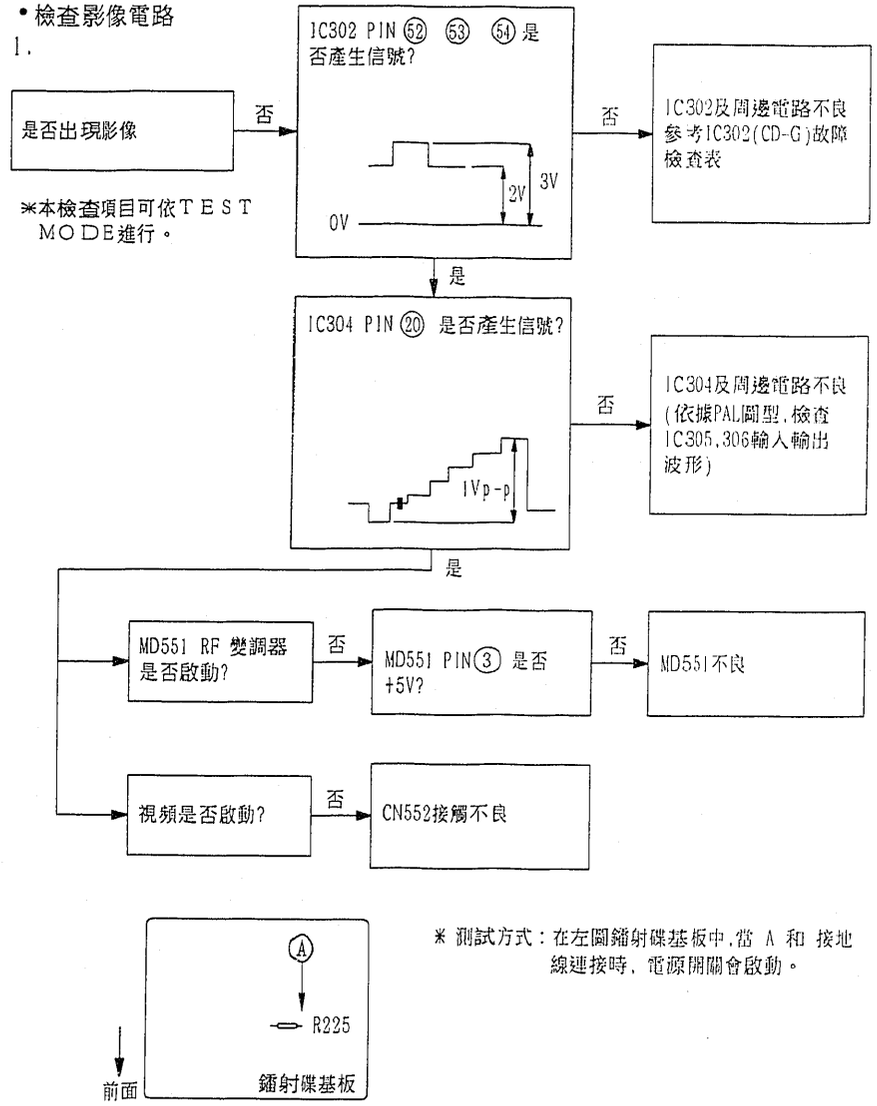
7.檢查IC406(DSP)故障(檢查方式)

本IC依據微處理器(IC201)而將參考時間常數資料寫入而動作,確定本IC故障時，請依下列圖形信號調查。



• 檢查影像電路

1.

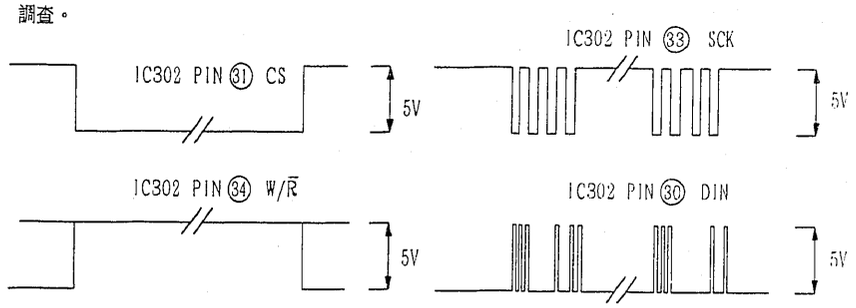


＊本檢查項目可依TEST MODE進行。

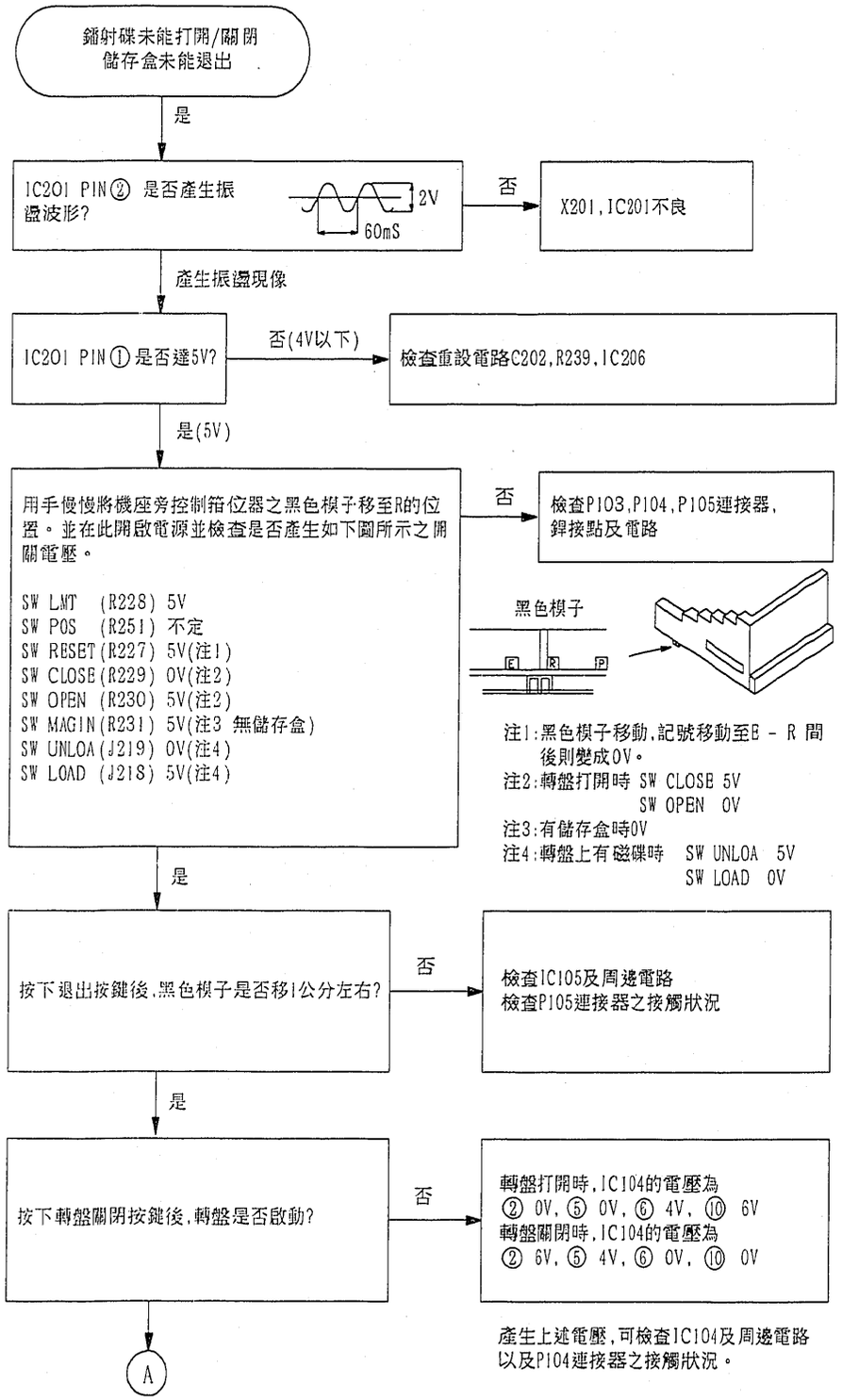
＊ 測試方式：在左圖鏑射碟基板中,當 A 和 接地線連接時，電源開關會啟動。

2.檢查IC302(CD-G)故障(檢查方式)

本IC根據微處理器(IC201)而將參考時間常數資料寫入而動作。確定本IC故障時。請依下列圖形信號調查。



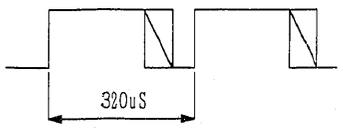
• 主微處理器檢查法


鏑射碟未能打開/關閉
儲存盒未能退出
是
IC201 PIN② 是否產生振盪波形?
2V
60mS
否
X201,IC201不良
產生振盪現像
IC201 PIN① 是否達5V?
否(4V以下)
檢查重設電路C202,R239,IC206
是(5V)
用手慢慢將機座旁控制箱位器之黑色模子移至R的位置。並在此開啟電源並檢查是否產生如下圖所示之開關電壓。
SW LMT (R228) 5V
SW POS (R251) 不定
SW RESET(R227) 5V(注1)
SW CLOSE(R229) 0V(注2)
SW OPEN (R230) 5V(注2)
SW MAGIN(R231) 5V(注3 無儲存盒)
SW UNLOA(J219) 0V(注4)
SW LOAD (J218) 5V(注4)
否
檢查P103,P104,P105連接器,
銲接點及電路
黑色模子
E
R
P
注1:黑色模子移動,記號移動至E - R 間後則變成0V。
注2:轉盤打開時 SW CLOSE 5V
SW OPEN 0V
注3:有儲存盒時0V
注4:轉盤上有磁碟時 SW UNLOA 5V
SW LOAD 0V
是
按下退出按鍵後,黑色模子是否移1公分左右?
否
檢查IC105及周邊電路
檢查P105連接器之接觸狀況
是
按下轉盤關閉按鍵後,轉盤是否啟動?
否
轉盤打開時,IC104的電壓為
② 0V, ⑤ 0V, ⑥ 4V, ⑩ 6V
轉盤關閉時,IC104的電壓為
② 6V, ⑤ 4V, ⑥ 0V, ⑩ 0V
產生上述電壓,可檢查IC104及周邊電路
以及P104連接器之接觸狀況。
A

Ⓐ

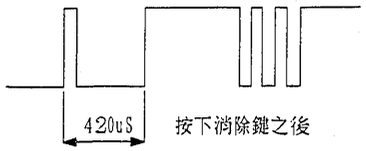
檢查IC201端子波形，未出現波形時，再檢查IC201及周邊回路

㉘ FL BUSY

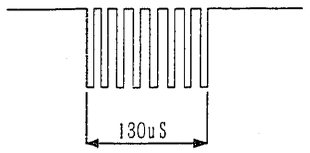


㉗ FL SIN

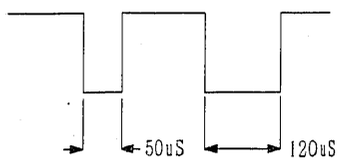
平常為0V時，按下按鍵後才會產生波形



㉖ FL CLK

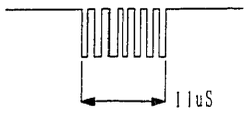


㉕ FL SOUT



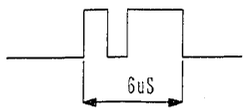
根據輸送至FL管之資料的不同，波形大抵呈上記之幅度。
以上是正面FL微處理IC之通信波形

㊵ SCK

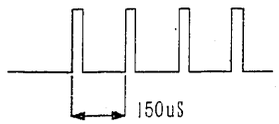


㊽ D OUT

依輸送之資料的不同而產生變化

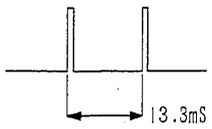


㉕ DSPCS

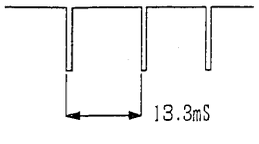


以上為DSP (IC405 YSS205)之通信波形。
按下搖控器之環繞方式選擇按鈕(SURROUND MODE)後會產生波形。

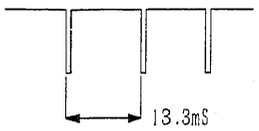
⑥ ⑲ $\overline{\text{NMI}}$ SCOR



㊻

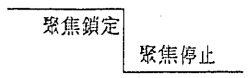


⑨ SQCK

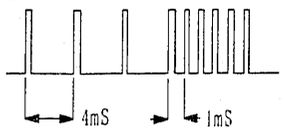


以上為錘射碟轉動時之波形

⑬ FOK

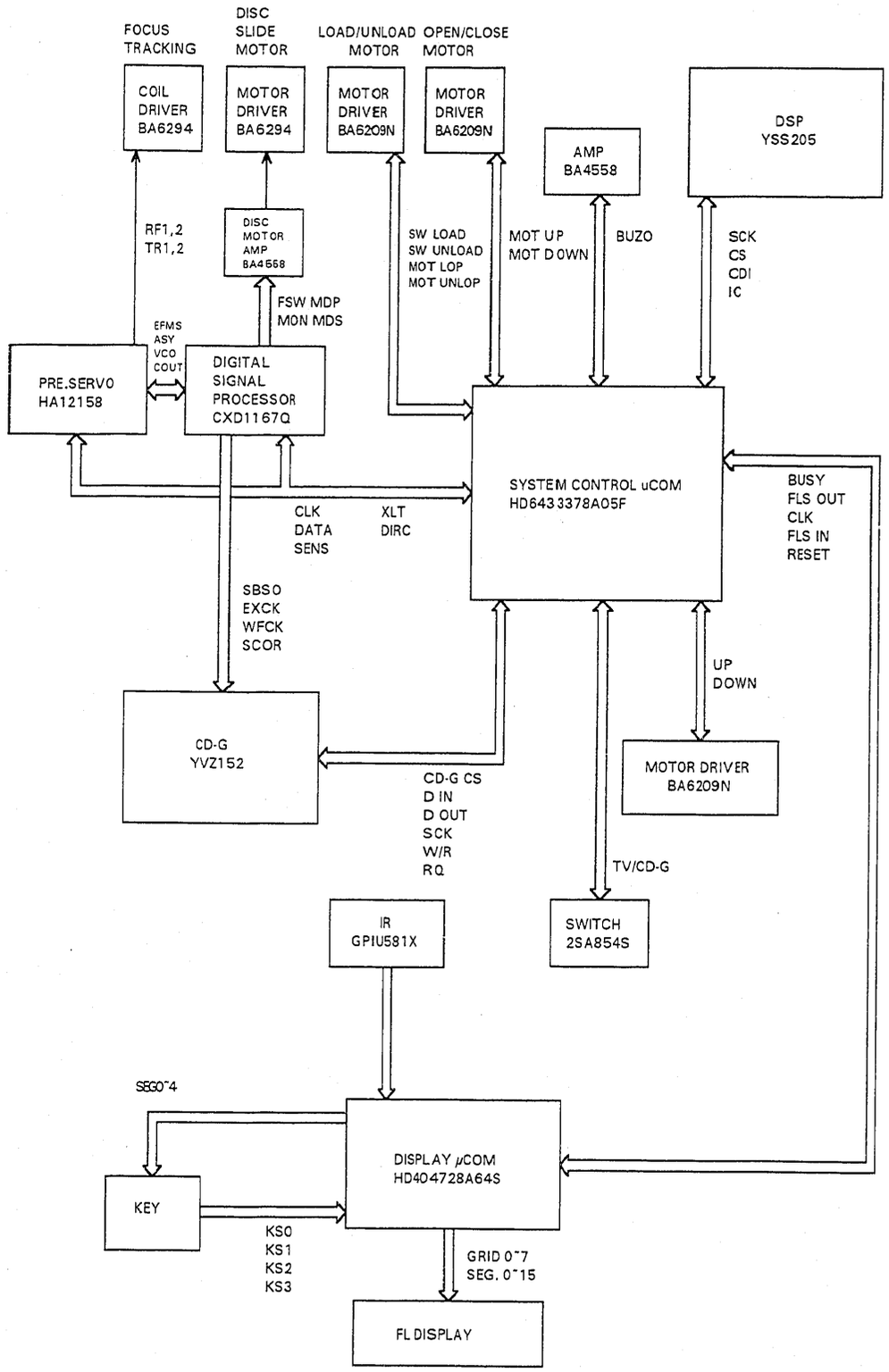


㊺ BUZO



遊戲(GAME)情況下產生之波形

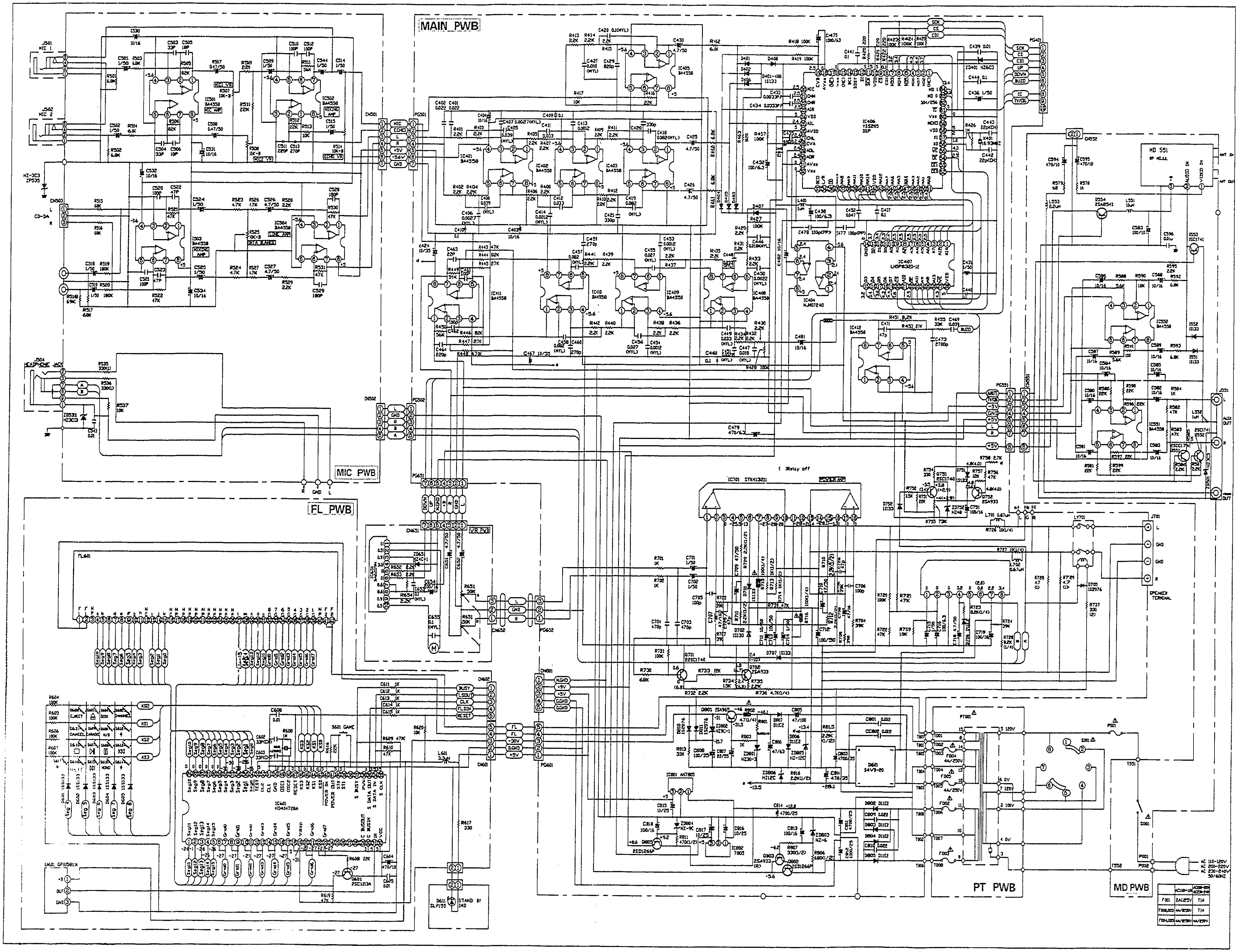
INTERFACE BLOCK DIAGRAM



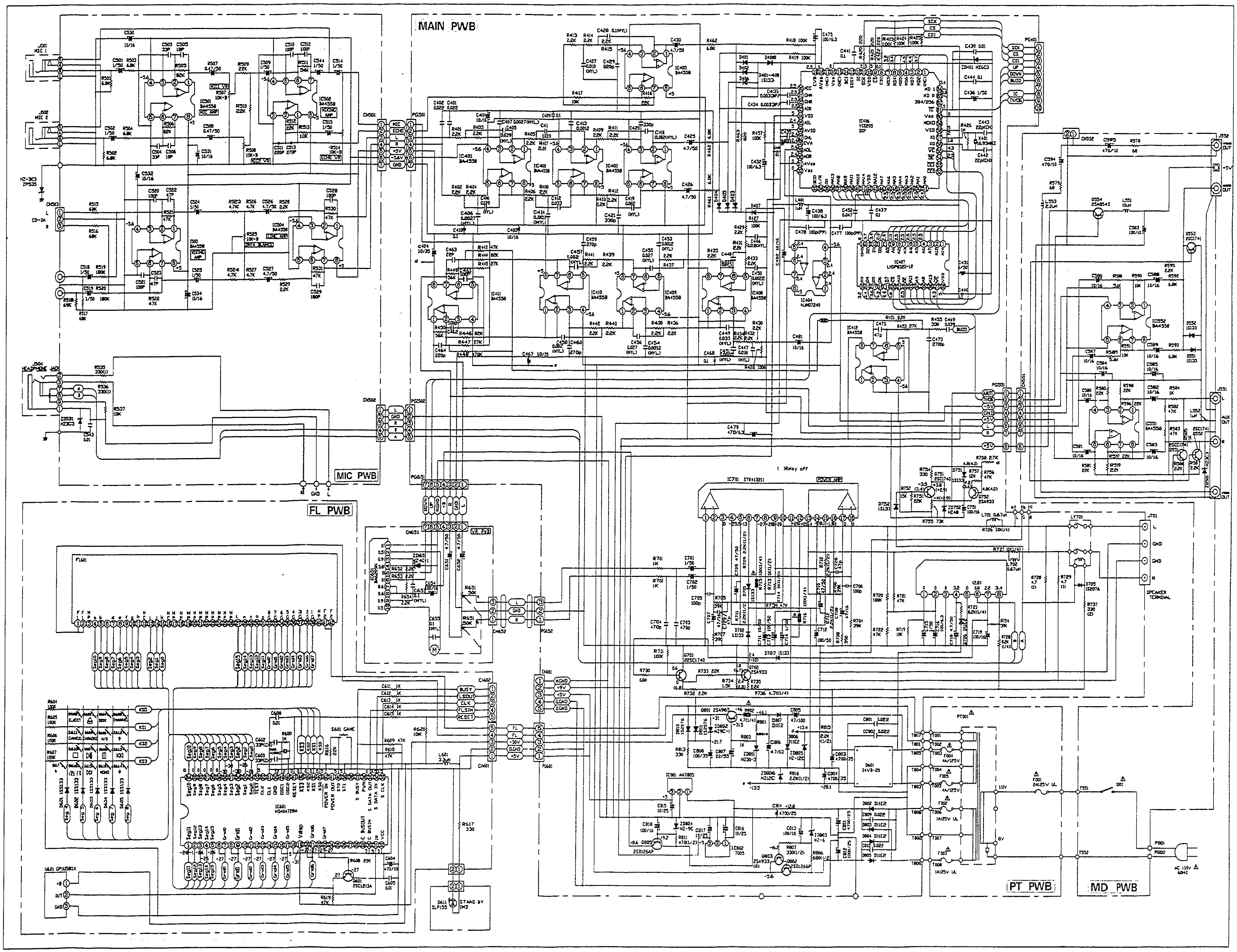
CD PWB FOR W

CD PWB FOR T

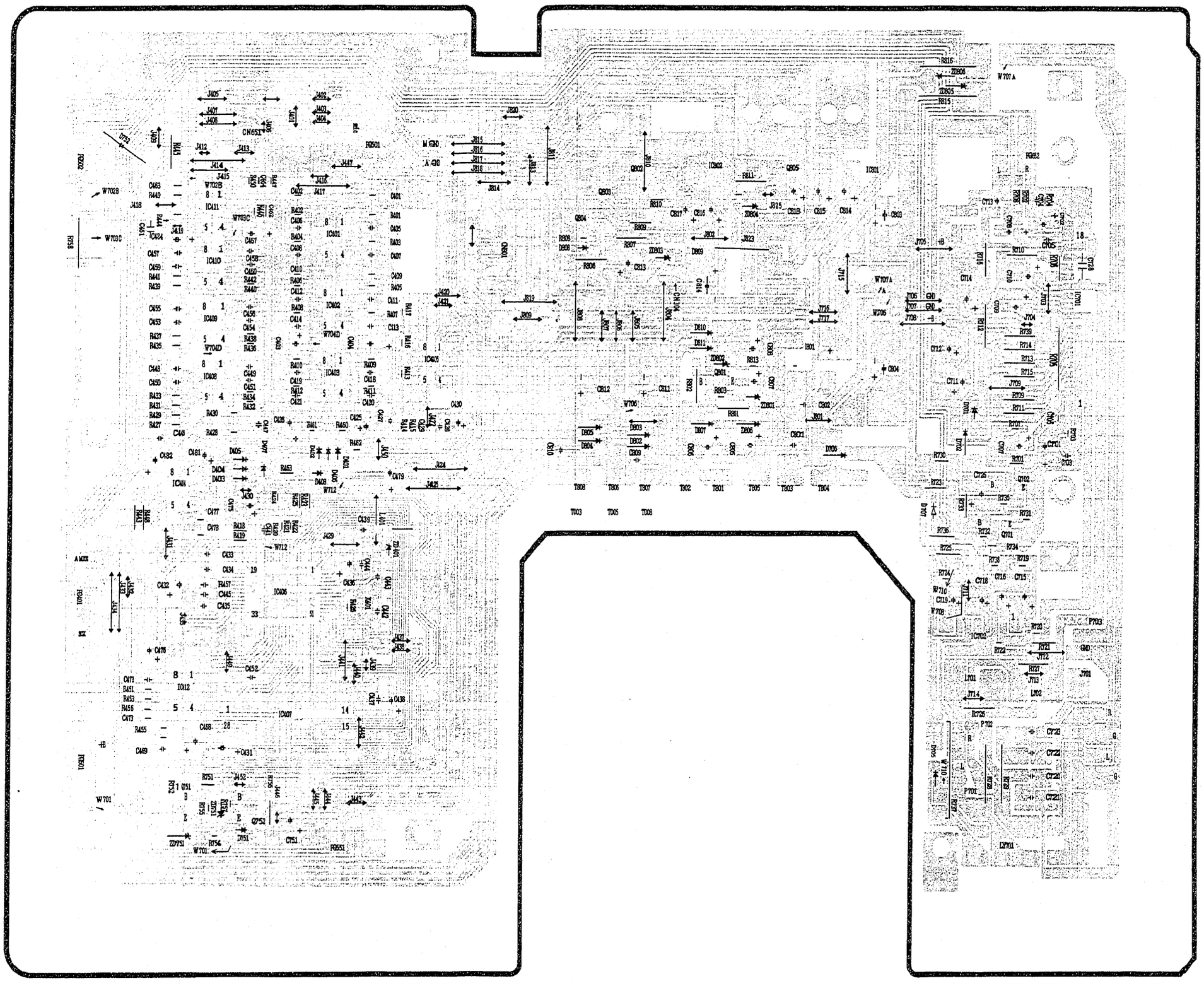
FOR W



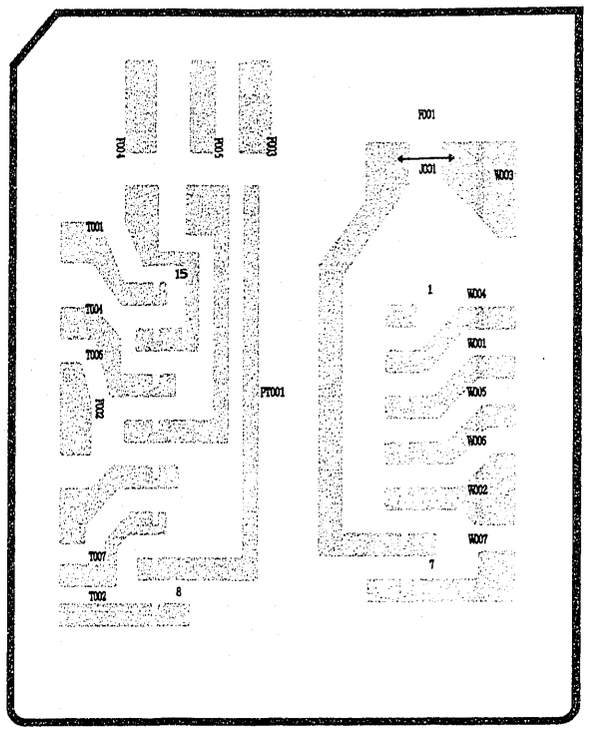
FOR T


MAIN PWB
MIC PWB
FL PWB
PT PWB
MD PWB
POWER AMP
SPEAKER TERMINAL

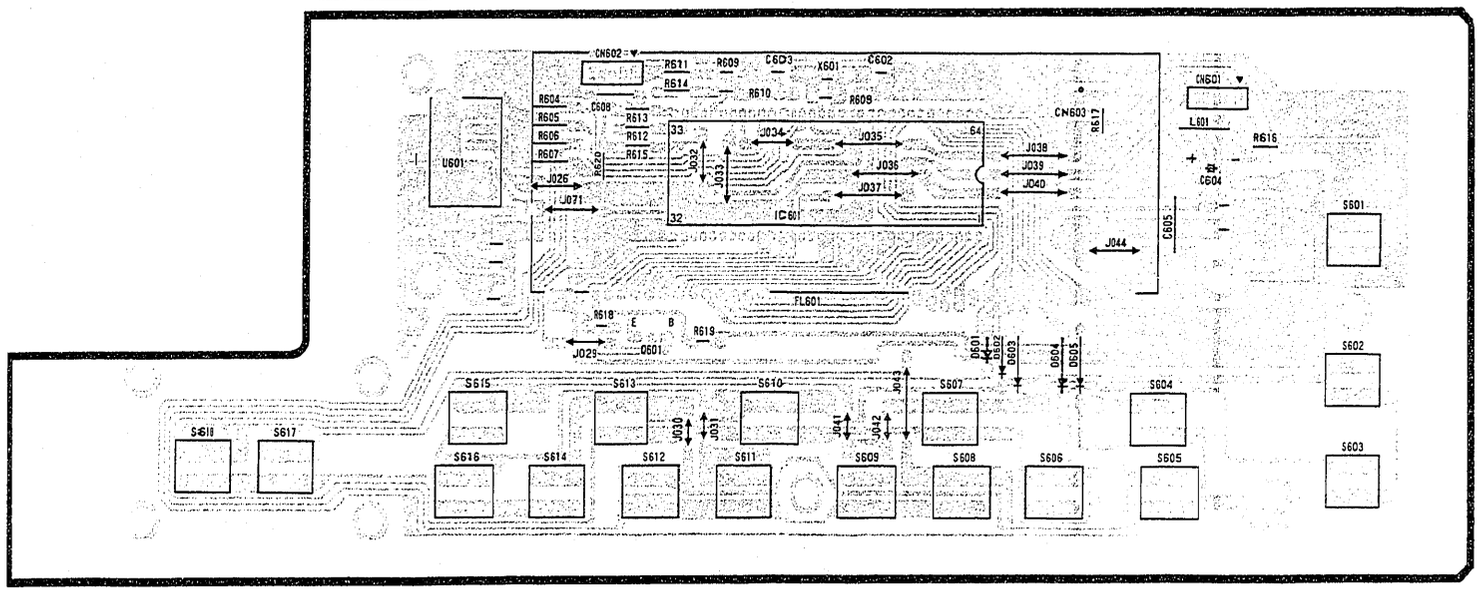
MAIN PWB



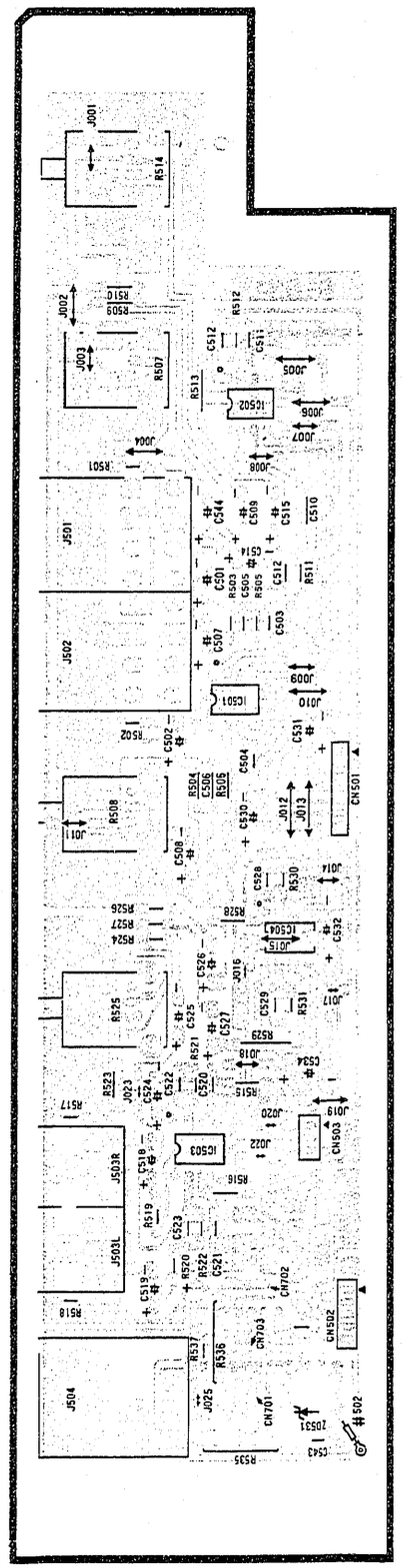
PT PWB



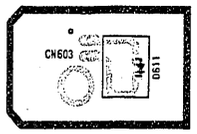
FL PWB



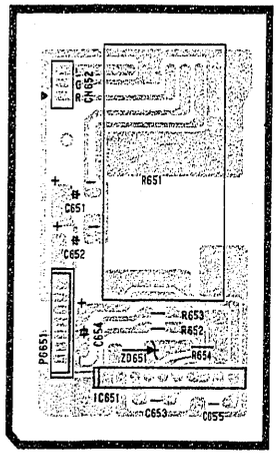
MIC PWB



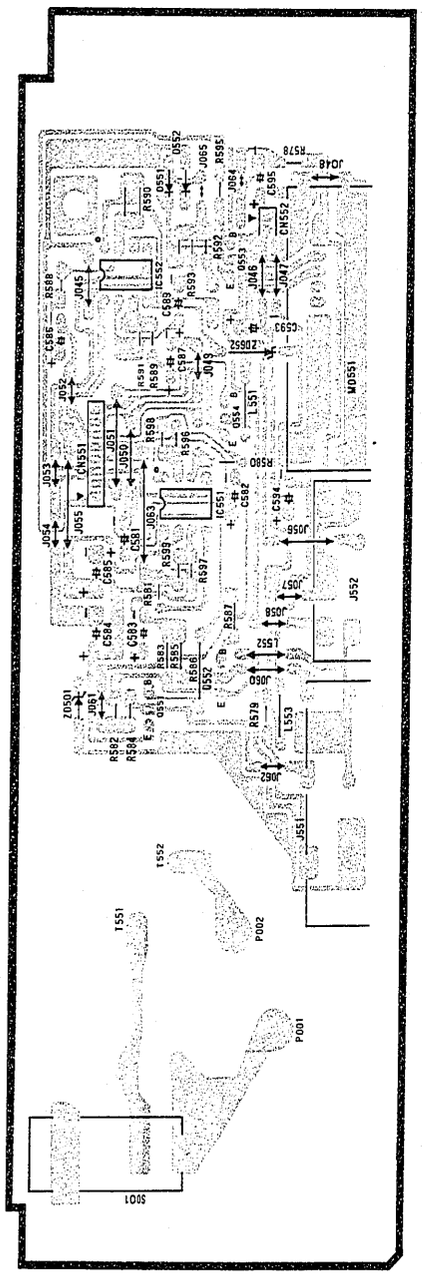
LED PWB



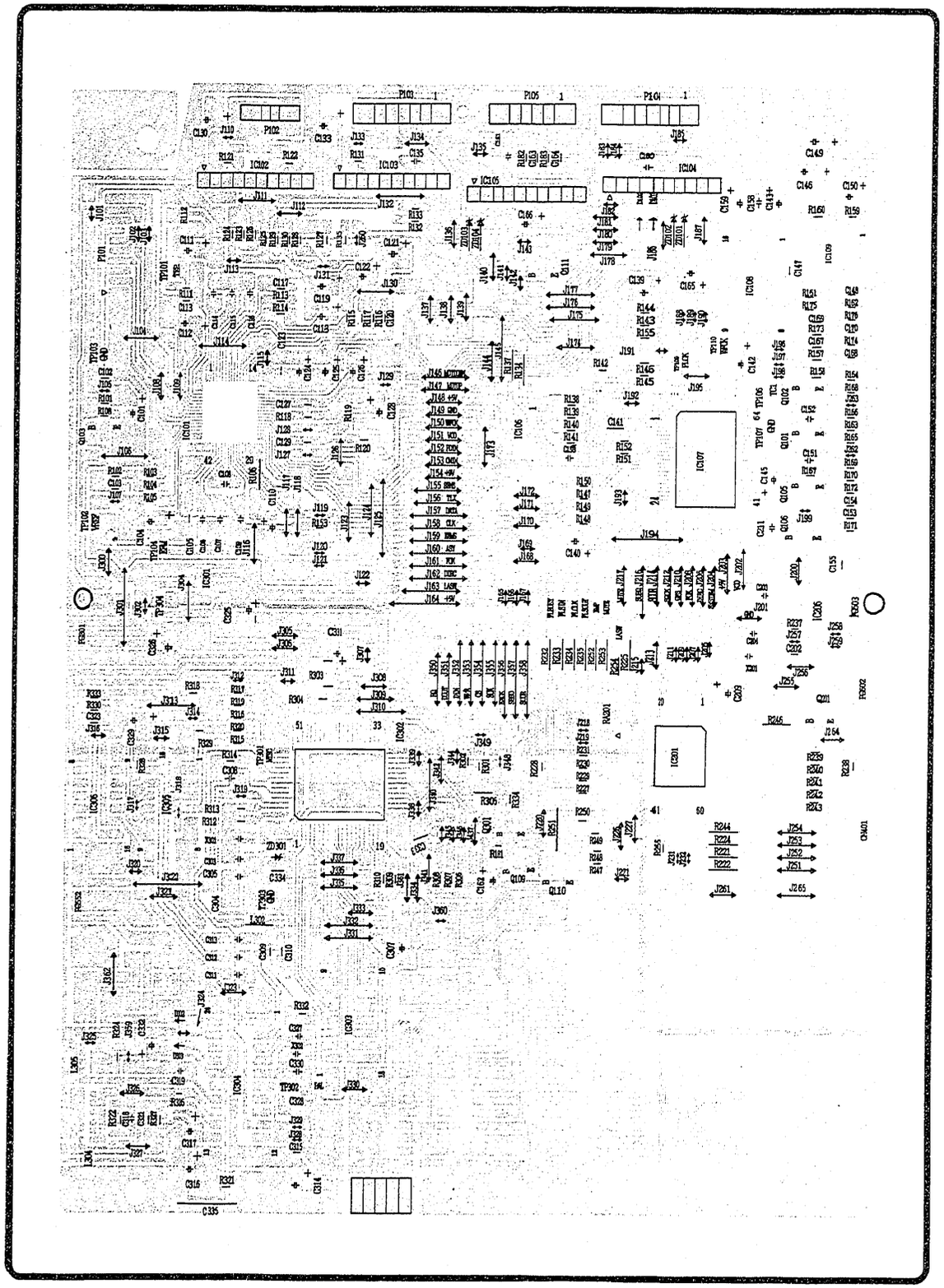
VR PWB



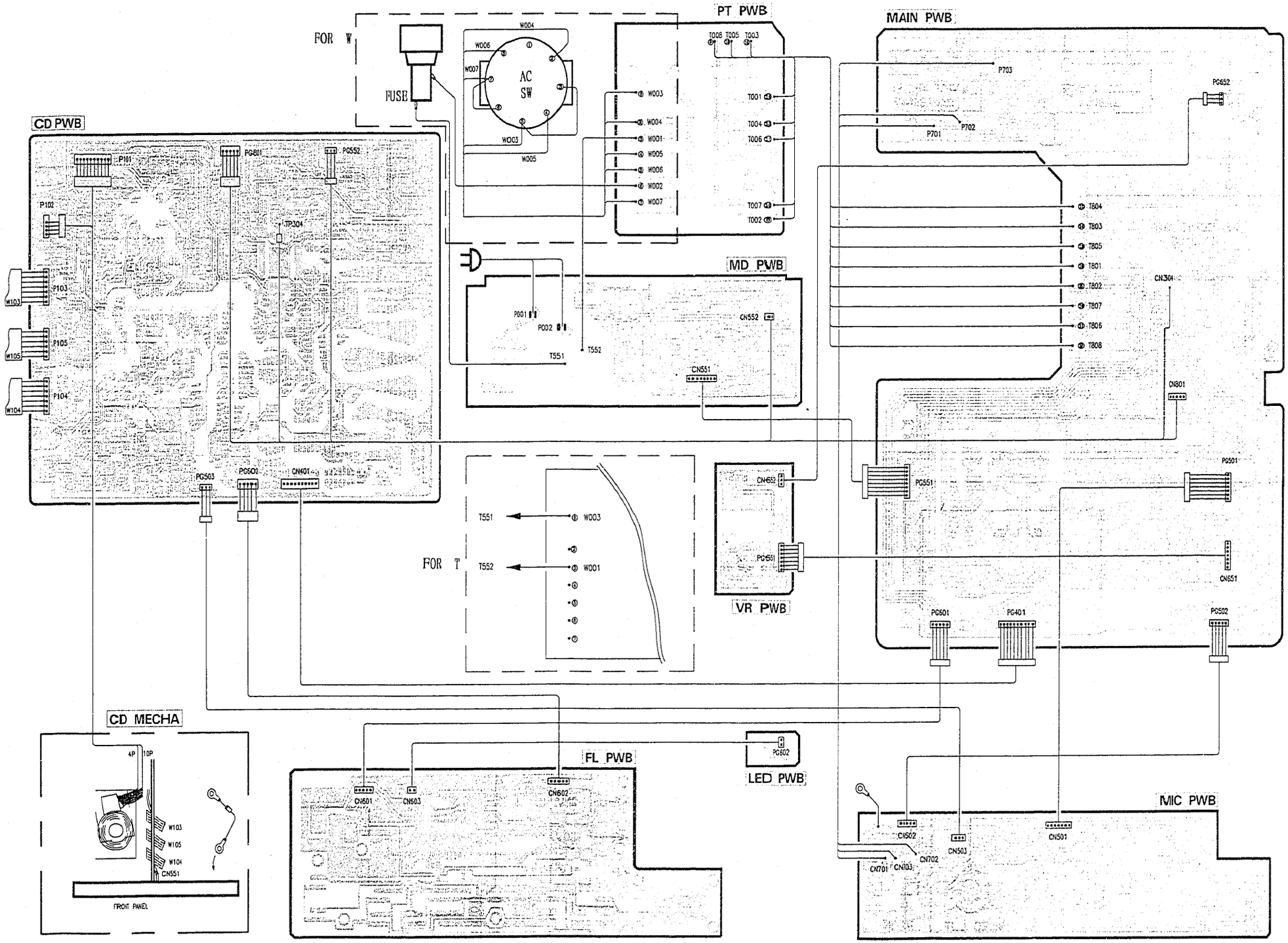
MD PWB



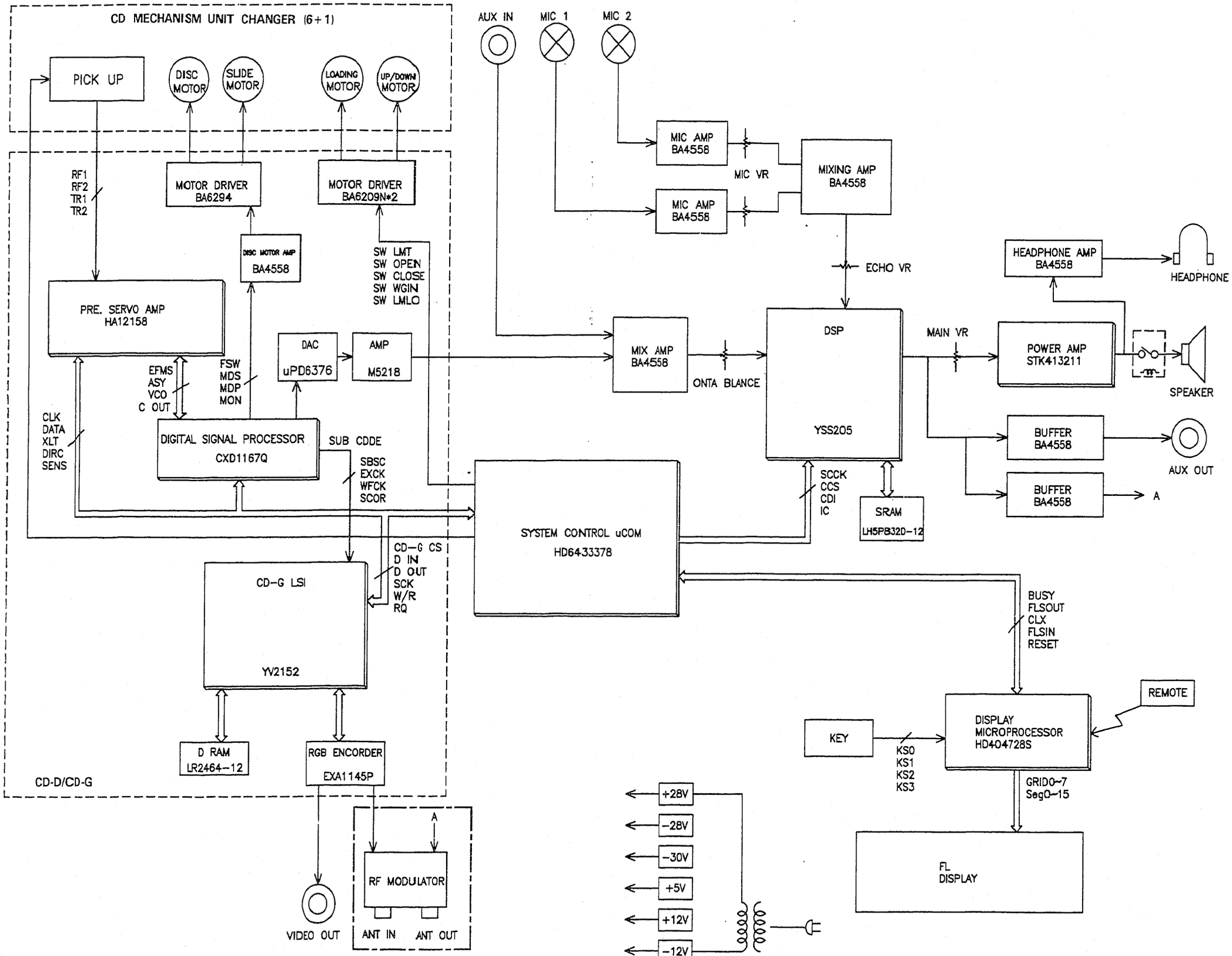
CD PWB



WIRING DIAGRAM 連線圖

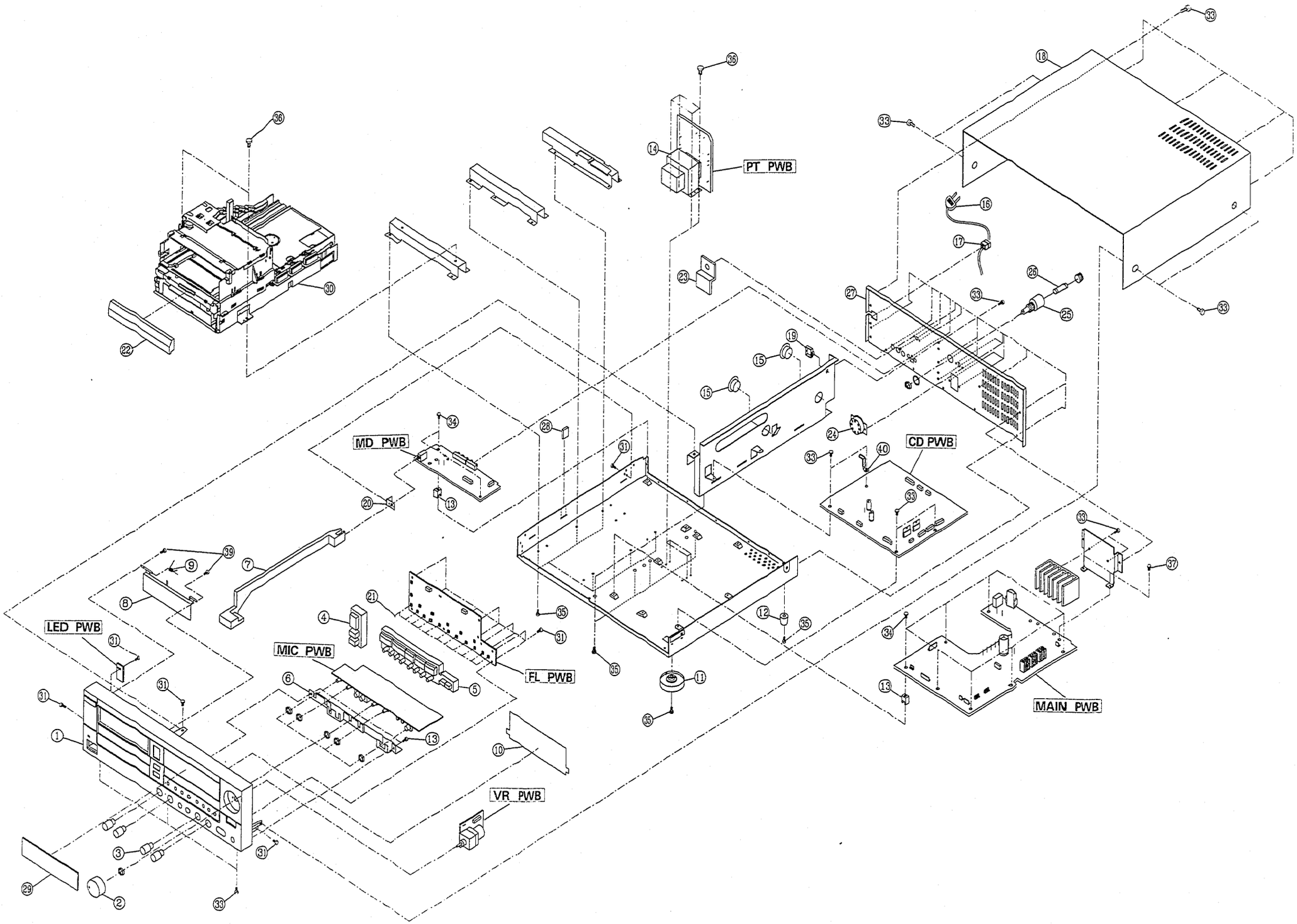


BLOCK DIAGRAM



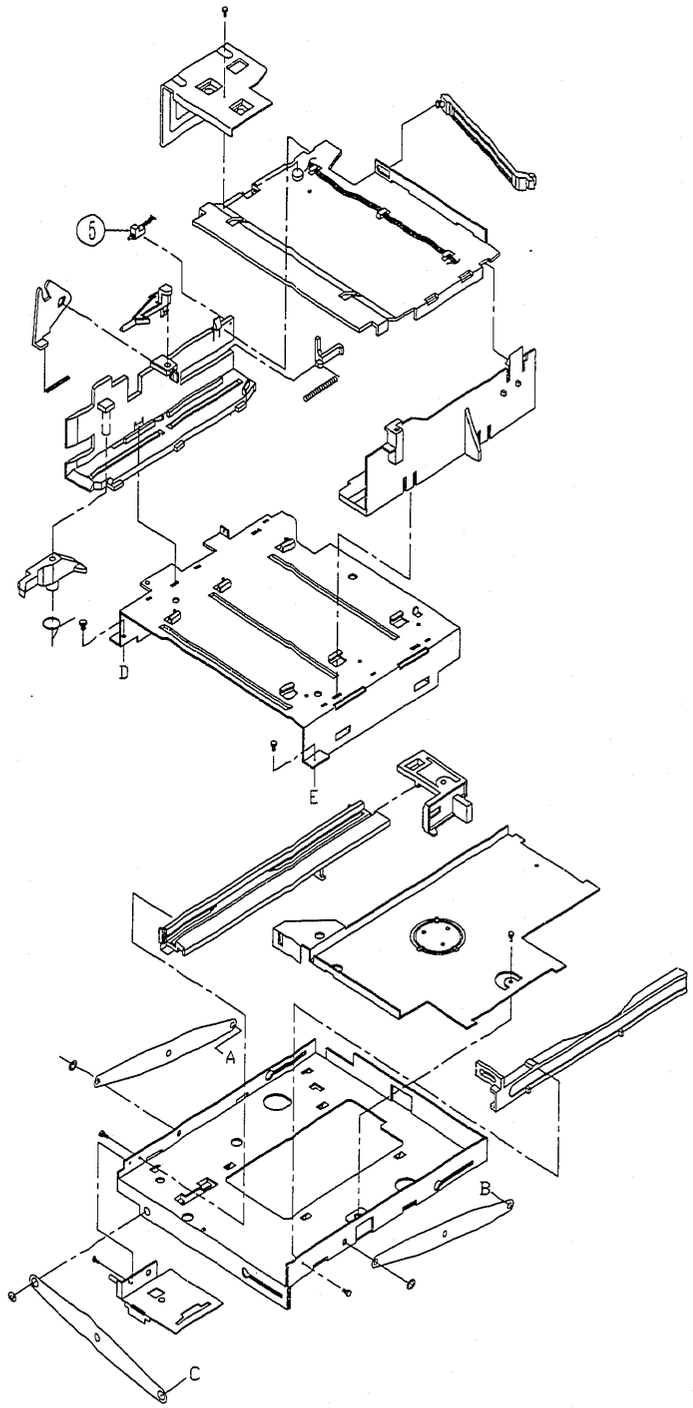
EXPLODED VIEW *爆炸圖*

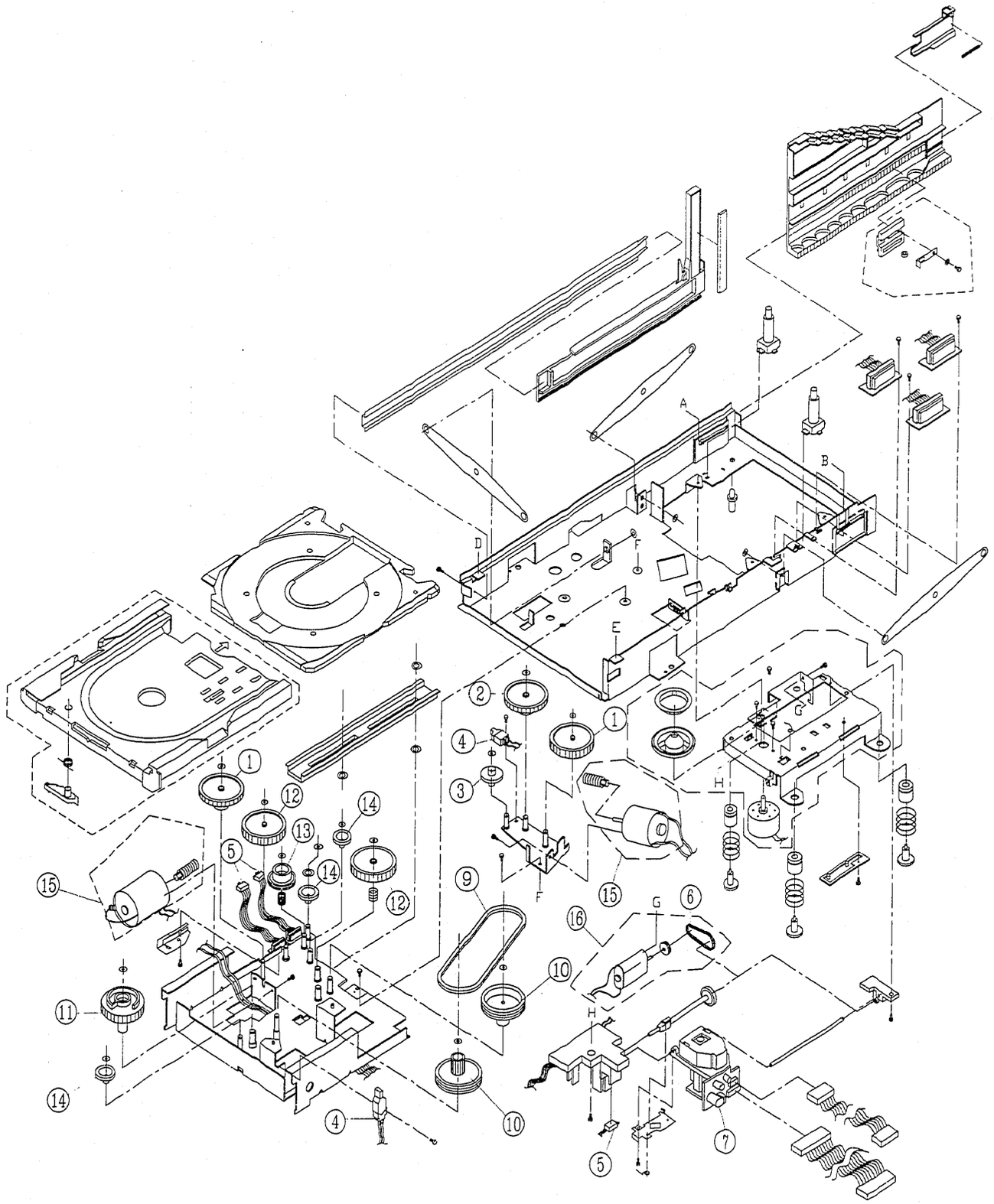
CABINET *主 機*



EXPLODED VIEW *爆炸圖*

CD UNIT MECHANISM CHANGER *銪射碟機架*





REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

ABBREVIATIONS

Capacitors..... CD:Ceramic disk; PF:Polyester film; EL:Electrolytic; PP:Polypropylene; PR:Paper; TA:Tantalum; TM:Trimmer.

Resistors..... CF:Carbon film; CC:Carbon composition; MF:Metal oxide film. VR:Variable resistor; WW:Wire would; FR:Fuse resistor; MG:Metal glazed.

Semiconductors.... TR:Transistor; DI:Diode; ZD:Zener diode; VA:Varistor; TH:Thermistor. IC:Integrated circuit.

SYMBOL NO.	PART NO.	DESCRIPTION
		CAPACITORS
C101	0800038	EL 47MF 6.3V
C102	0890043	CD 0.01MF 16V +-20%
C103	0890019	CD 68 PF +-5% 50V
C104	0800015	EL 10MF 16V
C105	0240054	CD 2700PF +-20% 16V
C106	0880013	PF 0.033MF +-10% 50V
C107	0880011	PF 0.015MF +-10% 50V
C108	0880011	PF 0.015MF +-10% 50V
C109	0880054	PF 0.056MF +-10% 50V
C110	0800047	EL 100MF 6.3V
C111	0800047	EL 100MF 6.3V
C112	0800001	EL 0.47MF 50V
C113	0890033	CD 680PF +-10% 50V
C114	0880054	PF 0.056MF +-10% 50V
C115	0880013	PF 0.033MF +-10% 50V
C116	0880017	PF 0.15MF +-10% 50V
C117	0890029	CD 390PF +-10% 50V
C118	0800003	EL 1MF 50V
C119	0800015	EL 10MF 16V
C120	0240058	CD 5600PF +-20% 16V
C121	0252807 2	EL 0.68MF +-20% 50V
C122	0252807 2	EL 0.68MF +-20% 50V
C123	0890043	CD 0.01MF 16V +-20%
C124	0800047	EL 100MF 6.3V
C125	0800015	EL 10MF 16V
C126	0800015	EL 10MF 16V
C127	0890034	CD 820PF +-10% 50V
C128	0800047	EL 100MF 6.3V
C129	0890043	CD 0.01MF 16V +-20%
C130	0800041	EL 47MF 16V
C133	0800041	EL 47MF 16V
C135	0890036	CD 1500PF +-20% 16V
C138	0880013	PF 0.033MF +-10% 50V
C139	0800001	EL 0.47MF 50V
C140	0800001	EL 0.47MF 50V
C141	0890043	CD 0.01MF 16V +-20%
C142	0800047	EL 100MF 6.3V
C143	0800047	EL 100MF 6.3V
C145	0800056	EL 220MF 6.3V
C146	0800015	EL 10MF 16V
C147	0890017	CD 47PF +-5% 50V
C148	0890017	CD 47PF +-5% 50V
C149	0800003	EL 1MF 50V
C150	0800003	EL 1MF 50V
C151	0880013	PF 0.033MF +-10% 50V
C152	0880013	PF 0.033MF +-10% 50V
C153	0890031	CD 470PF +-10% 50V
C154	0890031	CD 470PF +-10% 50V
C155	0890044	CD 0.022MF +80-20% 25V
C158	0890043	CD 0.01MF +-20% 16V
C159	0800056	EL 220MF 6.3V
C160	0880016	PF 0.1MF +-10% 50V
C161	0880016	PF 0.1MF +-10% 50V
C162	0800001	EL 0.47MF 50V
C163	0890044	CD 0.022MF +80-20% 25V
C164	0890044	CD 0.022MF +80-20% 25V
C165	0800041	EL 47MF 16V
C166	0800041	EL 47MF 16V
C167	0240054	CD 2700PF +-20% 16V
C168	0240054	CD 2700PF +-20% 16V
C169	0890035	CD 1000PF +-10% 50V
C170	0890035	CD 1000PF +-10% 50V
C202	0890043	CD 0.01MF +-20% 16V
C203	0890115	CD 12PF +-5% 50V
C204	0890116	CD 15PF +-5% 50V
C209	0800047	EL 100MF 6.3V
C211	0890121	CD 33PF +-5% 50V
C303	0890118	CD 22PF +-5% 50V
C304	0283201	TM 10PF (FOR T)
C305	0890117	CD 18PF +-5% 50V (FOR T)
C305	0890118	CD 22PF +-5% 50V (FOR W)
C307	0800343	EL 330MF 10V
C308	0890033	CD 680PF +-10% 50V (FOR T)
C309	0890022	CD 100PF +-10% 50V (FOR T)
C310	0890031	CD 470PF +-10% 50V (FOR T)
C311	0240224	CD 0.1MF +-10% 25V
C312	0240224	CD 0.1MF +-10% 25V
C313	0240224	CD 0.1MF +-10% 25V
C314	0800352	EL 470MF 10V
C315	0890044	CD 0.022MF +80-20% 25V
C316	0800015	EL 10MF 16V
C317	0800015	EL 10MF 16V
C318	0240224	CD 0.1MF +-10% 25V
C319	0240224	CD 0.1MF +-10% 25V
C321	0890019	CD 68PF +-5% 50V (FOR W)
C321	0890025	CD 180PF +-10% 50V (FOR T)
C323	0890023	CD 120PF +-10% 50V (FOR W)
C325	0800051	EL 100MF 25V
C327	0890119	CD 27PF +-5% 50V (FOR W)
C328	0283203	TM 50PF (FOR W)
C329	0800003	EL 1MF 50V (FOR W)
C330	0890052	CD 2PF +-0.25% 50V (FOR W)
C331	0800362	EL 1000MF 25V
C332	0800048	EL 100MF 10V
C333	0890027	CD 270PF +-10% 50V
C334	0890043	CD 0.01MF 16V +-20%
C335	0890043	CD 0.01MF 16V +-20%
C401	0890044	CD 0.022MF +80-20% 25V
C402	0890044	CD 0.022MF +80-20% 25V
C403	0800015	EL 10MF 16V
C404	0800015	EL 10MF 16V
C405	02750342	MYLAR,FILM 0.039MF +-10% 50V
C406	02750342	MYLAR,FILM 0.039MF +-10% 50V
C407	02740332	MYLAR,FILM 2700PF +-10% 50V
C408	02740332	MYLAR,FILM 2700PF +-10% 50V
C409	0245553M	CK CON 0.1MF +80-20% 50V
C410	0245553M	CK CON 0.1MF +80-20% 50V
C411	0880013	PF 0.033MF +-10% 50V
C412	0880013	PF 0.033MF +-10% 50V
C413	02740312	MYLAR,FILM 1200PF +-10% 50V
C414	02740312	MYLAR,FILM 1200PF +-10% 50V
C418	02750362	PF 82000PF 50V
C419	02750362	PF 82000PF 50V
C420	0890028	CD 330PF +-10% 50V
C421	0890028	CD 330PF +-10% 50V
C424	0800018	EL 10MF 50V
C425	0800012	EL 4.7MF 50V
C426	0800012	EL 4.7MF 50V
C427	02750322	MYLAR,FILM 0.018MF +-10% 50V
C428	0880016	PF 0.1MF +-10% 50V
C429	0890034	CD 820PF +-10% 50V
C430	0800012	EL 4.7MF 50V
C431	0800003	EL 1MF 50V

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SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
C432	0800047	EL 100MF 6.3V	C534	0800015	EL 10MF 16V
C433	0279324	MYLAR,FILM 3300PF +-5% 100V	C543	0890043	CD 0.01MF +-20% 16V
C434	0279324	MYLAR,FILM 3300PF +-5% 100V	C544	0800003	EL 1MF 50V
C435	0279324	MYLAR,FILM 3300PF +-5% 100V	C580	0800015	EL 10MF 16V
C436	0800003	EL 1MF 50V	C581	0800015	EL 10MF 16V
C437	0245553M	CK CON 0.1MF +80-20% 50V	C582	0800015	EL 10MF 16V
C438	0800047	EL 100MF 6.3V	C583	0800015	EL 10MF 16V
C439	0890043	CD 0.01MF 16V +-20%	C584	0800015	EL 10MF 16V
C440	0245553M	CK CON 0.1MF +80-20% 50V	C585	0800015	EL 10MF 16V
C441	0245553M	CK CON 0.1MF +80-20% 50V	C586	0800015	EL 10MF 16V
C442	0890118	CD 22PF +-5% 50V	C587	0800015	EL 10MF 16V
C443	0890118	CD 22PF +-5% 50V	C588	0800015	EL 10MF 16V
C444	0245553M	CK CON 0.1MF +80-20% 50V	C589	0800015	EL 10MF 16V
C445	0245553M	CK CON 0.1MF +80-20% 50V	C593	0800048	EL 100MF 10V
C446	02750322	MYLAR,FILM 0.018MF +-10% 50V	C594	0800352	EL 470MF 10V
C447	02750322	MYLAR,FILM 0.018MF +-10% 50V	C595	0800352	EL 470MF 10V
C448	0880013	PF 0.033MF +-10% 50V	C596	0890043	CD 0.01MF 16V +-20%
C449	0880013	PF 0.033MF +-10% 50V	C602	0246482	CD 33PF +-10% 50V
C450	0880005	PF 2200PF +-10% 50V	C603	0246482	CD 33PF +-10% 50V
C451	0880005	PF 2200PF +-10% 50V	C604	0800352	EL 470MF 10V
C452	0245552M	CD 8PF +-5% 50V	C605	0890043	CD 0.01MF 16V +-20%
C453	02740312	MYLAR,FILM 1200PF +-10% 50V	C608	0890043	CD 0.01MF 16V +-20%
C454	02740312	MYLAR,FILM 1200PF +-10% 50V	C651	0800012	EL 4.7MF 50V
C455	02750332	MYLAR,FILM 0.027MF +-10% 50V	C652	0800012	EL 4.7MF 50V
C456	02750332	MYLAR,FILM 0.027MF +-10% 50V	C653	0880016	PF 0.1MF +-10% 50V
C457	02750362	MYLAR,FILM 0.082MF +-10% 50V	C654	0800049	EL 100MF 16V
C458	02750362	MYLAR,FILM 0.082MF +-10% 50V	C655	0880016	PF 0.1MF +-10% 50V
C459	0890027	CD 270PF +-10% 50V	C701	0800003	EL 1MF 50V
C460	0890027	CD 270PF +-10% 50V	C702	0800003	EL 1MF 50V
C461	0890022	CD 100PF +-10% 50V	C703	0890031	CD 470PF +-10% 50V
C462	0890022	CD 100PF +-10% 50V	C704	0890031	CD 470PF +-10% 50V
C463	0890026	CD 220PF +-10% 50V	C705	0890022	CD 100PF +-10% 50V
C464	0890026	CD 220PF +-10% 50V	C706	0890022	CD 100PF +-10% 50V
C467	0800018	EL 10MF 50V	C707	0800041	EL 47MF 16V
C468	0245553M	CK CON 0.1MF +80-20% 50V	C708	0800041	EL 47MF 16V
C469	02750342	MYLAR,FILM 0.039MF +-10% 50V	C709	0800044	EL 47MF 50V
C471	0890017	CD 47PF +-10% 50V	C710	0800044	EL 47MF 50V
C473	0240054	CD 2700PF +-20% 50V	C711	0800018	EL 10MF 50V
C475	0800047	EL 100MF 6.3V	C712	0800053	EL 100MF 50V
C476	0800015	EL 10MF 16V	C713	0252425	EL 100MF 50V
C477	H279348	PF 100PF +-5% 100V	C714	0800003	EL 1MF 50V
C478	H279348	PF 100PF +-5% 100V	C715	0800003	EL 1MF 50V
C479	0800351	EL 470MF 6.3V	C716	0800047	EL 100MF 6.3V
C481	0800015	EL 10MF 16V	C718	0800012	EL 4.7MF 50V
C482	0800015	EL 10MF 16V	C719	0800326	EL 100MF 16V
C501	0800003	EL 1MF 50V	C720	0880016	PF 0.1MF +-10% 50V
C502	0800003	EL 1MF 50V	C721	0880016	PF 0.1MF +-10% 50V
C503	0890015	CD 33PF +-20% 50V	C722	0880016	PF 0.1MF +-10% 50V
C504	0890015	CD 33PF +-20% 50V	C723	0880016	PF 0.1MF +-10% 50V
C505	0890012	CD 18PF +-20% 50V	C727	0890017	CD 47PF +-20% 50V
C506	0890012	CD 18PF +-20% 50V	C728	0890017	CD 47PF +-20% 50V
C507	0800001	EL 0.47MF 50V	C751	0800049	EL 100MF 16V
C508	0800001	EL 0.47MF 50V	C801	0244173	CD 0.022MF +80%-20 50V
C509	0800003	EL 1MF 50V	C802	0244173	CD 0.022MF +80%-20 50V
C510	0890022	CD 100PF +-10% 50V	C803	0284595	EL 4700MF 35V
C511	0890026	CD 220PF +-10% 50V	C804	0284595	EL 4700MF 35V
C512	0890022	CD 100PF +-10% 50V	C805	0258127	EL 47MF 100V
C513	0890027	CD 270PF +-10% 50V	C806	0800045	EL 47MF 63V
C514	0800003	EL 1MF 50V	C807	0800026	EL 22MF 50V
C515	0800003	EL 1MF 50V	C808	0800328	EL 100MF 35V
C518	0800003	EL 1MF 50V	C809	0244173	CD 0.022MF +80%-20 50V
C519	0800003	EL 1MF 50V	C810	0244173	CD 0.022MF +80%-20 50V
C520	0890022	CD 100PF +-10% 50V	C811	0284596	EL 4700MF 25V
C521	0890022	CD 100PF +-10% 50V	C812	0800362	EL 1000MF 25V
C522	0890017	CD 47PF +-20% 50V	C813	0800326	EL 100MF 16V
C523	0890017	CD 47PF +-20% 50V	C814	0284596	EL 4700MF 25V
C524	0800003	EL 1MF 50V	C815	0800016	EL 10MF 25V
C525	0800003	EL 1MF 50V	C816	0800016	EL 10MF 25V
C526	0800012	EL 4.7MF 50V	C817	0800016	EL 10MF 25V
C527	0800012	EL 4.7MF 50V	C818	0800049	EL 100MF 16V
C528	0890025	CD 180PF +-10% 50V			
C529	0890025	CD 180PF +-10% 50V			
C530	0800015	EL 10MF 16V			
C531	0800015	EL 10MF 16V			
C532	0800015	EL 10MF 16V			

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SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
		RESISTORS	R221	0700041	CF 1K OHM +-5% 1/16W
			R222	0700041	CF 1K OHM +-5% 1/16W
R101	0700041	CF 1K OHM +-5% 1/16W	R224	0700032	CF 220 OHM +-5% 1/16W
R102	0700039	CF 820 OHM +-5% 1/16W	R226	0700032	CF 220 OHM +-5% 1/16W
R103	0700056	CF 15K OHM +-5% 1/16W	R227	0700032	CF 220 OHM +-5% 1/16W
R104	0700047	CF 3.3K OHM +-5% 1/16W	R228	0700032	CF 220 OHM +-5% 1/16W
R105	0700055	CF 12K OHM +-5% 1/16W	R229	0700032	CF 220 OHM +-5% 1/16W
R106	0700054	CF 10K OHM +-5% 1/16W	R230	0700032	CF 220 OHM +-5% 1/16W
R108	0700054	CF 10K OHM +-5% 1/16W	R231	0700032	CF 220 OHM +-5% 1/16W
R111	0700058	CF 22K OHM +-5% 1/16W	R232	0700032	CF 220 OHM +-5% 1/16W
R112	0189102	VR 10K OHM	R233	0700032	CF 220 OHM +-5% 1/16W
R113	0700066	CF 82K OHM +-5% 1/16W	R234	0700032	CF 220 OHM +-5% 1/16W
R114	0700055	CF 12K OHM +-5% 1/16W	R235	0700032	CF 220 OHM +-5% 1/16W
R115	0700069	CF 150K OHM +-5% 1/16W	R237	0700051	CF 5.6K OHM +-5% 1/16W
R116	0700039	CD 820 OHM +-5% 1/16W	R238	0700032	CF 220 OHM +-5% 1/16W
R117	0700023	CD 47 OHM +-5% 1/16W	R239	0700032	CF 220 OHM +-5% 1/16W
R118	0700047	CF 3.3K OHM +-5% 1/16W	R240	0700032	CF 220 OHM +-5% 1/16W
R119	0189082	VR 2.2 KOHM	R241	0700032	CF 220 OHM +-5% 1/16W
R120	0700041	CF 1K OHM +-5% 1/16W	R242	0700032	CF 220 OHM +-5% 1/16W
R121	0700061	CF 33K OHM +-5% 1/16W	R243	0700032	CF 220 OHM +-5% 1/16W
R122	0700058	CF 22K OHM +-5% 1/16W	R244	0700041	CF 1K OHM +-5% 1/16W
R123	0700058	CF 22K OHM +-5% 1/16W	R246	0700032	CF 220 OHM +-5% 1/16W
R124	0700061	CF 33K OHM +-5% 1/16W	R247	0700032	CF 220 OHM +-5% 1/16W
R125	0700061	CF 33K OHM +-5% 1/16W	R248	0700032	CF 220 OHM +-5% 1/16W
R126	0700058	CF 22K OHM +-5% 1/16W	R249	0700032	CF 220 OHM +-5% 1/16W
R127	0700058	CF 22K OHM +-5% 1/16W	R250	0700032	CF 220 OHM +-5% 1/16W
R128	0700061	CF 33K OHM +-5% 1/16W	R251	0700032	CF 220 OHM +-5% 1/16W
R129	0700058	CF 22K OHM +-5% 1/16W	R252	0700032	CF 220 OHM +-5% 1/16W
R130	0700061	CF 33K OHM +-5% 1/16W	R253	0700032	CF 220 OHM +-5% 1/16W
R131	0700061	CF 33K OHM +-5% 1/16W	R254	0700032	CF 220 OHM +-5% 1/16W
R132	0700044	CF 1.8K OHM +-5% 1/16W	R255	0700063	CF 47K OHM +-5% 1/16W
R133	0700067	CF 100K OHM +-5% 1/16W	R301	0700063	CF 47K OHM +-5% 1/16W
R134	0700061	CF 33K OHM +-5% 1/16W	R302	0700063	CF 47K OHM +-5% 1/16W
R135	0700058	CF 22K OHM +-5% 1/16W	R303	0700063	CF 47K OHM +-5% 1/16W
R137	0700072	CF 220K OHM +-5% 1/16W	R304	0700063	CF 47K OHM +-5% 1/16W
R138	0700072	CF 220K OHM +-5% 1/16W	R305	0700063	CF 47K OHM +-5% 1/16W
R139	0700072	CF 220K OHM +-5% 1/16W	R306	0700063	CF 47K OHM +-5% 1/16W
R140	0700058	CF 22K OHM +-5% 1/16W	R307	0700063	CF 47K OHM +-5% 1/16W
R141	0700072	CF 220K OHM +-5% 1/16W	R308	0700063	CF 47K OHM +-5% 1/16W
R142	0700058	CF 22K OHM +-5% 1/16W	R309	0700063	CF 47K OHM +-5% 1/16W
R143	0700058	CF 22K OHM +-5% 1/16W	R310	0700063	CF 47K OHM +-5% 1/16W
R144	0700056	CF 15K OHM +-5% 1/16W	R312	0700041	CF 1K OHM +-5% 1/16W
R145	0700054	CF 10K OHM +-5% 1/16W	R313	0700081	CF 1.0M OHM +-5% 1/16W
R146	0700056	CF 15K OHM +-5% 1/16W	R314	0700034	CF 330 OHM +-5% 1/16W (FOR T)
R147	0700076	CF 470K OHM +-5% 1/16W	R315	0700027	CF 100 OHM +-5% 1/16W
R148	0700046	CF 2.7K OHM +-5% 1/16W	R316	0700027	CF 100 OHM +-5% 1/16W
R149	0700076	CF 470K OHM +-5% 1/16W	R317	0700027	CF 100 OHM +-5% 1/16W
R150	0700049	CF 4.7K OH +-5% 1/16W	R318	0187056	CF 430 OHM +-5% 1/16W
R151	0700067	CF 100K OHM +-5% 1/16W	R319	0187056	CF 430 OHM +-5% 1/16W
R152	0700054	CF 10K OHM +-5% 1/16W	R320	0187056	CF 430 OHM +-5% 1/16W
R153	0700054	CF 10K OHM +-5% 1/16W	R321	0174602	MF 27K OHM +-1% 1/16W
R155	0700081	CF 1.0M OHM +-5% 1/16W	R322	0700041	CF 1K OHM +-5% 1/16W
R157	0700049	CF 4.7K OHM +-5% 1/16W	R324	0700041	CF 1K OHM +-5% 1/16W
R158	0700049	CF 4.7K OHM +-5% 1/16W	R325	0700014	CF 10 OHM +-5% 1/16W
R159	0700054	CF 10K OHM +-5% 1/16W	R326	0700041	CF 1K OHM +-5% 1/16W
R160	0700055	CF 12K OHM +-5% 1/16W	R327	0700041	CF 1K OHM +-5% 1/16W
R161	0700062	CF 39K OHM +-5% 1/16W	R328	0700041	CF 1K OHM +-5% 1/16W (FOR W)
R162	0700062	CF 39K OHM +-5% 1/16W	R329	0187054	CF 360 OHM +-5% 1/16W (FOR W)
R163	0700042	CF 1.2K OHM +-5% 1/16W	R330	0700069	CF 150K OHM +-5% 1/16W (FOR W)
R164	0700042	CF 1.2K OHM +-5% 1/16W	R332	0700056	CF 15K OHM +-5% 1/16W (FOR W)
R165	0700036	CF 470 OHM +-5% 1/16W	R333	0700058	CF 22K OHM +-5% 1/16W (FOR W)
R166	0700036	CF 470 OHM +-5% 1/16W	R334	0700054	CF 10K OHM +-5% 1/16W
R167	0700081	CF 1.0M OHM +-5% 1/16W	R401	0700045	CF 2.2K OHM +-5% 1/16W
R168	0700081	CF 1.0M OHM +-5% 1/16W	R402	0700045	CF 2.2K OHM +-5% 1/16W
R169	0700041	CF 1K OHM +-5% 1/16W	R403	0700045	CF 2.2K OHM +-5% 1/16W
R170	0700041	CF 1K OHM +-5% 1/16W	R404	0700045	CF 2.2K OHM +-5% 1/16W
R171	0700067	CF 100K OHM +-5% 1/16W	R405	0700045	CF 2.2K OHM +-5% 1/16W
R172	0700067	CF 100K OHM +-5% 1/16W	R406	0700045	CF 2.2K OHM +-5% 1/16W
R173	0700061	CF 33K OHM +-5% 1/16W	R407	0700045	CF 2.2K OHM +-5% 1/16W
R174	0700061	CF 33K OHM +-5% 1/16W	R408	0700045	CF 2.2K OHM +-5% 1/16W
R175	0700058	CF 22K OHM +-5% 1/16W	R409	0700045	CF 2.2K OHM +-5% 1/16W
R176	0700058	CF 22K OHM +-5% 1/16W	R410	0700045	CF 2.2K OHM +-5% 1/16W
R181	0700027	CF 100 OHM +-5% 1/16W	R411	0700045	CF 2.2K OHM +-5% 1/16W
R182	0700032	CF 220 OHM +-5% 1/16W	R412	0700045	CF 2.2K OHM +-5% 1/16W
R183	0700032	CF 220 OHM +-5% 1/16W	R413	0700045	CF 2.2K OHM +-5% 1/16W

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SYMBOL NO.	PART NO.	DESCRIPTION
R414	0700045	CF 2.2K OHM +-5% 1/16W
R415	0700045	CF 2.2K OHM +-5% 1/16W
R416	0700058	CF 22K OHM +-5% 1/16W
R417	0700054	CF 10K OHM +-5% 1/16W
R418	0700067	CF 100K OHM +-5% 1/16W
R419	0700067	CF 100K OHM +-5% 1/16W
R420	0700032	CF 220 OHM +-5% 1/16W
R421	0700032	CF 220 OHM +-5% 1/16W
R422	0700032	CF 220 OHM +-5% 1/16W
R423	0700067	CF 100K OHM +-5% 1/16W
R424	0700067	CF 100K OHM +-5% 1/16W
R425	0700067	CF 100K OHM +-5% 1/16W
R426	0700081	CF 1.0M OHM +-5% 1/16W
R427	0700067	CF 100K OHM +-5% 1/16W
R428	0700067	CF 100K OHM +-5% 1/16W
R429	0700045	CF 2.2K OHM +-5% 1/16W
R430	0700045	CF 2.2K OHM +-5% 1/16W
R431	0700045	CF 2.2K OHM +-5% 1/16W
R432	0700045	CF 2.2K OHM +-5% 1/16W
R433	0700045	CF 2.2K OHM +-5% 1/16W
R434	0700045	CF 2.2K OHM +-5% 1/16W
R435	0700045	CF 2.2K OHM +-5% 1/16W
R436	0700045	CF 2.2K OHM +-5% 1/16W
R437	0700045	CF 2.2K OHM +-5% 1/16W
R438	0700045	CF 2.2K OHM +-5% 1/16W
R439	0700045	CF 2.2K OHM +-5% 1/16W
R440	0700045	CF 2.2K OHM +-5% 1/16W
R441	0700045	CF 2.2K OHM +-5% 1/16W
R442	0700045	CF 2.2K OHM +-5% 1/16W
R443	0700076	CF 470K OHM +-5% 1/16W
R444	0700066	CF 82K OHM +-5% 1/16W
R445	0700059	CF 27K OHM +-5% 1/16W
R446	0700066	CF 82K OHM +-5% 1/16W
R447	0700059	CF 27K OHM +-5% 1/16W
R448	0700076	CF 470K OHM +-5% 1/16W
R449	0700064	CF 56K OHM +-5% 1/16W
R450	0700064	CF 56K OHM +-5% 1/16W
R451	0700053	CF 8.2K OHM +-5% 1/16W
R453	0700058	CF 22K OHM +-5% 1/16W
R455	0700061	CF 33K OHM +-5% 1/16W
R457	0700067	CF 100K OHM +-5% 1/16W
R460	0700052	CF 6.8K OHM +-5% 1/16W
R461	0700052	CF 6.8K OHM +-5% 1/16W
R462	0700052	CF 6.8K OHM +-5% 1/16W
R463	0700039	CF 820 OHM +-5% 1/16W
R501	0700052	CF 6.8K OHM +-5% 1/16W
R502	0700052	CF 6.8K OHM +-5% 1/16W
R503	0700052	CF 6.8K OHM +-5% 1/16W
R504	0700052	CF 6.8K OHM +-5% 1/16W
R505	0700066	CF 82K OHM +-5% 1/16W
R506	0700066	CF 82K OHM +-5% 1/16W
R507	0154423	VR 10K OHM
R508	0154423	VR 10K OHM
R509	0700058	CF 22K OHM +-5% 1/16W
R510	0700058	CF 22K OHM +-5% 1/16W
R511	0700064	CF 56K OHM +-5% 1/16W
R512	0700058	CF 22K OHM +-5% 1/16W
R513	0700054	CF 10K OHM +-5% 1/16W
R514	0154423	VR 10K OHM
R515	0700065	CF 68K OHM +-5% 1/16W
R516	0700065	CF 68K OHM +-5% 1/16W
R517	0700065	CF 68K OHM +-5% 1/16W
R518	0700065	CF 68K OHM +-5% 1/16W
R519	0700071	CF 180K OHM +-5% 1/6W
R520	0700071	CF 180K OHM +-5% 1/6W
R521	0700063	CF 47K OHM +-5% 1/16W
R522	0700063	CF 47K OHM +-5% 1/16W
R523	0700049	CF 4.7K OHM +-5% 1/16W
R524	0700049	CF 4.7K OHM +-5% 1/16W
R525	0154422	VR 10K OHM
R526	0700049	CF 4.7K OHM +-5% 1/16W
R527	0700049	CF 4.7K OHM +-5% 1/16W
R528	0700045	CF 2.2K OHM +-5% 1/16W
R529	0700045	CF 2.2K OHM +-5% 1/16W
R530	0700063	CF 47K OHM +-5% 1/16W
R531	0700063	CF 47K OHM +-5% 1/16W
R535	0110133	MF 330 OHM +-5% 1W
R536	0110133	MF 330 OHM +-5% 1W
R537	0700054	CF 10K OHM +-5% 1/16W
R578	0700025	CF 68 OHM +-5% 1/16W (FOR T)
R578	0700041	CF 1K OHM +-5% 1/16W (FOR W)
R579	0700025	CF 68 OHM +-5% 1/16W
R580	0700058	CF 22K OHM +-5% 1/16W
R581	0700058	CF 22K OHM +-5% 1/16W
R582	0700063	CF 47K OHM +-5% 1/16W
R583	0700063	CF 47K OHM +-5% 1/16W
R584	0700041	CF 1K OHM +-5% 1/16W
R585	0700041	CF 1K OHM +-5% 1/16W
R586	0700045	CF 2.2K OHM +-5% 1/16W
R587	0700045	CF 2.2K OHM +-5% 1/16W
R588	0700051	CF 5.6K OHM +-5% 1/16W
R589	0700051	CF 5.6K OHM +-5% 1/16W
R590	0700054	CF 10K OHM +-5% 1/16W
R591	0700054	CF 10K OHM +-5% 1/16W
R592	0700052	CF 6.8K OHM +-5% 1/16W
R593	0700052	CF 6.8K OHM +-5% 1/16W
R595	0700045	CF 2.2K OHM +-5% 1/16W
R596	0700058	CF 22K OHM +-5% 1/16W
R597	0700058	CF 22K OHM +-5% 1/16W
R598	0700058	CF 22K OHM +-5% 1/16W
R599	0700058	CF 22K OHM +-5% 1/16W
R604	0700067	CF 100K OHM +-5% 1/16W
R605	0700067	CF 100K OHM +-5% 1/16W
R606	0700067	CF 100K OHM +-5% 1/16W
R607	0700067	CF 100K OHM +-5% 1/16W
R608	0700081	CF 1.0M OHM +-5% 1/16W
R609	0700063	CF 47K OHM +-5% 1/16W
R610	0700063	CF 47K OHM +-5% 1/16W
R611	0700041	CF 1K OHM +-5% 1/16W
R612	0700041	CF 1K OHM +-5% 1/16W
R613	0700041	CF 1K OHM +-5% 1/16W
R614	0700041	CF 1K OHM +-5% 1/16W
R615	0700041	CF 1K OHM +-5% 1/16W
R616	0700058	CF 22K OHM +-5% 1/16W
R617	0700034	CF 330 OHM +-5% 1/16W
R618	0700058	CF 22K OHM +-5% 1/16W
R619	0700063	CF 47K OHM +-5% 1/16W
R620	0700054	CF 10K OHM +-5% 1/16W
R651	0157901	VR 50K OHM
R652	0700045	CF 2.2K OHM +-5% 1/16W
R653	0700045	CF 2.2K OHM +-5% 1/16W
R654	0700045	CF 2.2K OHM +-5% 1/16W
R701	0700041	CF 1K OHM +-5% 1/16W
R702	0700041	CF 1K OHM +-5% 1/16W
R703	0700062	CF 39K OHM +-5% 1/16W
R704	0700062	CF 39K OHM +-5% 1/16W
R705	0700062	CF 39K OHM +-5% 1/16W
R706	0700062	CF 39K OHM +-5% 1/16W
R707	0700035	CF 390 OHM +-5% 1/16W
R708	0700035	CF 390 OHM +-5% 1/16W
R709	01133622	CF 2.2K OHM +-5% 1/2W
R710	01133622	CF 2.2K OHM +-5% 1/2W
R711	01133622	CF 2.2K OHM +-5% 1/2W
R712	01133622	CF 2.2K OHM +-5% 1/2W
R713	01133652	CF 1K OHM +-5% 1/2W
R714	01133652	CF 1K OHM +-5% 1/2W
⚠R715	1110621	FR 100 OHM +-5% 1/4W
⚠R716	1110621	FR 100 OHM +-5% 1/4W
R719	0700054	CF 10K OHM +-5% 1/16W
R720	0700067	CF 100K OHM +-5% 1/16W
R721	0700063	CF 47K OHM +-5% 1/16W
R722	0700063	CF 47K OHM +-5% 1/16W
R723	0129623	CF 8.2K OHM +-5% 1/4W
R724	0700062	CF 39K OHM +-5% 1/16W
R725	0129623	CF 8.2K OHM +-5% 1/4W
R726	0129531	CF 10 OHM +-5% 1/4W
R727	0129531	CF 10 OHM +-5% 1/4W
R728	1119029	MF 4.7 OHM +-10% 1W
R729	1119029	MF 4.7 OHM +-10% 1W
R730	0700065	CF 68K OHM +-5% 1/16W

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SYMBOL NO.	PART NO.	DESCRIPTION
R731	0700067	CF 100K OHM +-5% 1/16W
R732	0700045	CF 2.2K OHM +-5% 1/16W
R733	0700058	CF 22K OHM +-5% 1/16W
R734	0700043	CF 1.5K OHM +-5% 1/16W
R735	0700045	CF 2.2K OHM +-5% 1/16W
R736	0129617	CF 4.7K OHM +-5% 1/4W
R737	1119527	MF 330 OHM +-10% 2W
R739	0700063	CF 47K OHM +-5% 1/16W
R751	0700058	CF 22K OHM +-5% 1/16W
R752	0700062	CF 39K OHM +-5% 1/16W
R754	0700034	CF 330 OHM +-5% 1/16W
R755	0700061	CF 33K OHM +-5% 1/16W
R756	0700063	CF 47K OHM +-5% 1/16W
R757	0700055	CF 12K OHM +-5% 1/16W
R758	0700046	CF 2.7K OHM +-5% 1/16W
R801	0114173	CF 3.3K OHM +-5% 1/4W
R802	1118445	FR 4.7 OHM +-5% 1/4W
R803	0700041	CF 1K OHM +-5% 1/16W
R806	01132972	CF 680 OHM +-5% 1/2W
R807	01132932	CF 330 OHM +-5% 1/2W
R811	01132952	CF 470 OHM +-5% 1/2W
R813	0700061	CF 33K OHM +-5% 1/16W
R815	01133622	CF 2.2K OHM +-5% 1/2W
R816	01133622	CF 2.2K OHM +-5% 1/2W

ICS

IC101	2010681U	IC HA12158 (LINEAR)
IC102	2003701	IC BA6294 (LINEAR)
IC103	2003701	IC BA6294 (LINEAR)
IC104	23017012	IC BA6209N
IC105	23017012	IC BA6209N
IC106	2388302	IC BA4558HT
IC107	2018321	IC CXD1167Q
IC108	2005311	IC UPD6376CX (CMOS)
IC109	2387304	IC M5218AP
IC201	2011531U	IC HD6433378
IC206	2005421	IC S8054ALR (CMOS)
IC301	2366361	IC AN7805
IC302	2013151	IC YVZ152-F
IC303	2382765	IC LH2464-12
IC304	2004891	IC CXA1145P
IC305	2917081	IC TC74HC4053AP (FOR W)
IC306	2362352	IC HD74LS123P (FOR W)
IC401	2388302	IC BA4558HT
IC402	2388302	IC BA4558HT
IC403	2388302	IC BA4558HT
IC404	23002212	IC NJM072D
IC405	2388302	IC BA4558HT
IC406	2013141	IC YS205
IC407	2007791	IC LH5P832D-12
IC408	2388302	IC BA4558HT
IC409	2388302	IC BA4558HT
IC410	2388302	IC BA4558HT
IC411	2388302	IC BA4558HT
IC412	2388302	IC BA4558HT
IC501	2388302	IC BA4558HT
IC502	2388302	IC BA4558HT
IC503	2388302	IC BA4558HT
IC504	2388302	IC BA4558HT
IC551	2388302	IC BA4558HT
IC552	2388302	IC BA4558HT
IC601	2001594	IC HD404728A
IC651	23017012	IC BA6209N
IC701	2378231	IC STK4132MK2
IC702	2387582	IC UPC1237HA
IC801	2366361	IC AN7805
IC802	2366361	IC AN7805

TRANSISTORS

Q101	2315111	TR DTC 143TS
Q102	2315111	TR DTC 143TS
Q103	2326871	TR DTC 124ES
Q105	2326861	TR DTA 124ES
Q106	2326871	TR DTC 124ES
Q109	2326861	TR DTA124ES
Q110	2326871	TR DTC 124ES
Q111	2326871	TR DTC 124ES
Q201	2326871	TR DTC 124ES
Q301	2326871	TR DTC 124ES
Q551	2329316	TR 2SC1741QR
Q552	2329316	TR 2SC1741QR
Q553	2329316	TR 2SC1741QR
Q554	2325701	TR 2SA854S
Q601	2320663	TR 2SC1213AC
Q701	2318303	TR 2SC1740(S)
Q702	2325713	TR 2SA933S(R)
Q751	2318303	TR 2SC1740(S)
Q752	2325713	TR 2SA933S(R)
Q801	2317792	TR 2SA965(Y)
Q802	2317803	TR 2SD1266(P)
Q803	2325713	TR 2SA933S(R)
Q805	2317803	TR 2SD1266(P)

DIODES

D102	2397421	DI 1SS133T
D103	2397421	DI 1SS133T
D302	2397421	DI 1SS133T
D303	2397421	DI 1SS133T
D401	2397421	DI 1SS133T
D402	2397421	DI 1SS133T
D403	2397421	DI 1SS133T
D404	2397421	DI 1SS133T
D405	2397421	DI 1SS133T
D406	2397421	DI 1SS133T
D407	2397421	DI 1SS133T
D408	2397421	DI 1SS133T
D551	2397421	DI 1SS133T
D552	2397421	DI 1SS133T
D601	2397421	DI 1SS133T
D602	2397421	DI 1SS133T
D603	2397421	DI 1SS133T
D604	2397421	DI 1SS133T
D605	2397421	DI 1SS133T
D611	2338835 2	LED SLP-155B-81
D701	2397421	DI 1SS133T
D702	2397421	DI 1SS133T
D705	2337151 2	DI 1S2076A
D706	2398781	DI 11E2
D707	2397421	DI 1SS133T
D751	2397421	DI 1SS133T
D752	2397421	DI 1SS133T
D801	2337461 2	DI S4VB20
D802	2398781	DI 11E2
D803	2398781	DI 11E2
D804	2398781	DI 11E2
D805	2398781	DI 11E2
D806	2398781	DI 11E2
D807	2398781	DI 11E2
D810	2337151 2	DI 1S2076A
D811	2337151 2	DI 1S2076A
ZD101	2331815	ZD HZ-7B2
ZD102	2331798	ZD HZ-5C2
ZD103	2331792	ZD HZ-5A2
ZD104	2331782	ZD HZ-4A2
ZD301	2331809	ZD HZ-6C3
ZD401	2331809	ZD HZ-6C3
ZD501	2337619	ZD HZ-3C3 (FOR W)
ZD531	2337619	ZD HZ-3C3
ZD535	2337619	ZD HZ-3C3
ZD651	2331787	ZD HZ4(C)1
ZD752	2331858	ZD HZ-4B
ZD801	2337186 2	ZD HZ-30-3
ZD802	2331827	ZD HZ-9C1
ZD803	2339032	ZD HZ-S6C-2

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SYMBOL NO.	PART NO.	DESCRIPTION
ZD804	2331827	ZD HZ-9C1
ZD805	2331847	ZD HZ-12C1
ZD806	2331847	ZD HZ-12C1
		FUSES
⚠F001	2727893	FUSE 2A (FOR T)
⚠F002	2727742	FUSE T1A 250V (FOR W)
⚠F002	2727895	FUSE 1A 125V (FOR T)
⚠F003	2727742	FUSE T1A 250V (FOR W)
⚠F003	2727895	FUSE 1A 125V (FOR T)
⚠F004	2727748	FUSE 4A 250V (FOR W)
⚠F004	2727894	FUSE 4A 125V (FOR T)
⚠F005	2727748	FUSE 4A 250V (FOR W)
⚠F005	2727894	FUSE 4A 125V (FOR T)
		COMPOUND COMPONENTS
MD551	2406231	RF MODULATOR (FOR W)
		COILS
L302	2227922	CHOKE COIL 22MH (FOR T)
L304	2150951	LC FILTER
L305	2150851	LC FILTER (FOR T)
L305	2150971	LC FILTER (FOR W)
L401	2228196	CHOKE COIL 1UH
L551	2227905	CHOKE COIL 10MH
L552	2228196	CHOKE COIL 1UH
L553	2227912	CHOKE COIL 2.2MH
L601	2227914	CHOKE COIL 3.3MH
L701	2227361	AUDIO TRAP COIL 0.67UH
L702	2227361	AUDIO TRAP COIL 0.67UH
LY701	2641341	RELAY QSA-SS-212DM3
		SWITCHS
⚠S001	2600551	POWER SWITCH
S601	2639682	TACT SWITCH
S602	2639682	TACT SWITCH
S603	2639682	TACT SWITCH
S604	2639682	TACT SWITCH
S605	2639682	TACT SWITCH
S606	2639682	TACT SWITCH
S607	2639682	TACT SWITCH
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S613	2639682	TACT SWITCH
S614	2639682	TACT SWITCH
S615	2639682	TACT SWITCH
S616	2639682	TACT SWITCH
S617	2639682	TACT SWITCH
S618	2639682	TACT SWITCH
		MISCELLANEOUS
LY701	2641341	RELAY
FL601	2358542	FLURESCENCE DISPLAY TUBE
J501	2679015	MIC JACK
J502	2679015	MIC JACK
J503L	2673901	JACK
J503R	2673902	JACK
J504	2679016	HEADPHONE JACK
J551	2672802	JACK 3P
J552	2673911	JACK 3P VIDEO JACK (FOR T)
J701	2693681	TERMINAL 4P

SYMBOL NO.	PART NO.	DESCRIPTION
RA201	0189061	RESISTOR ARRAY 47K OHM X8
U601	2574841	IRU-GP1U581X
W103	2975202	7P FLAT CABLE
W104	2975202	7P FLAT CABLE
W105	2975201	6P FLAT CABLE
X201	2949151	CRYSTAL 16.93MHZ
X301	2168812	CRYSTAL 14.218MHZ (FOR W)
X301	2168851	CRYSTAL 14.31818MHZ (FOR T)
X302	2784802	CRYSTAL 4MHZ (FOR W)
X401	2949151	CRYSTAL 16.93MHZ
X601	2155323	CERAMIC OSCI (4.19MHZ)
#601	3804117	FL SPACER
#611	3960403	LED HOLDER
#703	8671408	SCREW 3X8 DT BIND (FOR HEAT SINK)
#705	8691408	TAPPING SCREW 3X8 BIND (FOR HEAT SINK)
		CABINET CHASSIS
1	4898962	FRONT PANEL ASS'Y
2	3270862	VOLUME KNOB
3	3309163	BALANCE VOLUME KNOB
4	3273281	GAME SWITCH
5	3273292	MAIN SWITCH
6	4490791	SWITCH BRACKET
7	3273271	POWER BUTTON
8	3821641	MAGAZINE DOOR
9	3392461	DOOR SPRING
10	3827681	FL FILTER
11	3830343	LEG 51
12	3830301	LEG 21
13	3802972	PWB HOLDER
14	2216072	POWER TRANSFORMER (FOR W)
	2216073	POWER TRANSFORMER (FOR T)
15	3875991	PROTECTOR
16	2706584	POWER CORD
17	3872271	AC CORD BUSHING
18	3471471	TOP COVER
19	3716742	PLASTIC HOLDER
20	4491361	PSW BRACKET
21	4407129	FIBER WASHER
22	3821651	SINGLE DOOR
23	4490871	RFM SUPPORT
24	2618053	VOLTAGE SWITCH (FOR W)
25	2727671	FUSE HOLDER
26	2727742	FUSE 1A 250V
27	3490502	REAR PANEL (FOR W)
	3490503	REAR PANEL (FOR T)
28	3804118	SPACER
29	3827671	BLIND
30	3372471	TN-2500-106 CD MECHA ASS'Y
31	8671408	SCREW 3X8 DT BIND
32	8671608	SCREW 4X8 DT BIND
33	8679408	SCREW 3X8 DT BIND
34	8671414	SCREW 3X14 DT BIND
35	8794440	TAPPING SCREW 3X10 BIND
36	4522881	SCREW 3X8 CE KNURLED
37	8671416	SCREW 3X16 DT BIND
38	8671412	SCREW 3X12 DT BIND
39	4159427	SCREW 3X10 WITH WASHER
40	3909995	WIRE CLAMP
		TN-2500-106 CD MECHA. ASS'Y
1	3010-02-10	E GEAR B
2	3010-02-11	E GEAR C
3	3010-02-12	E GEAR D
4	6401-01-204	REAF SW
5	6402-04-03	PUSH SW
6	3005-07-14	FEED M BELT
7	6901-16-01	PICK UP
8	3005-07-305	T/T BASE ASSY

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SYMBOL NO.	PART NO.	DESCRIPTION
9	3010-04-11	P BELT
10	3010-04-03	P GEAR A
11	3010-04-04	P GEAR B
12	3010-05-15	FE GEAR C
13	3010-05-06	FE GEAR D
14	3010-05-16	FE GEAR E
15	3010-02-301	E MOTOR ASS'Y
16	3005-07-306	FEED MOTOR ASS'Y
		ACCESSORIES
1	2573843	REMOTE CONTROL TRANSMITTER
2	6901-02-01	MAGAZINE ASSY
3	2733231	MIC
4	2727893	FUSE 2A
5	2713223	VIDEO CORD
6	2977871	RF CABLE
7	2667922	SEAMENS PLUG

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