CARVER

Powerful • Musical • Accurate

SD/A-410
COMPACT DISC PLAYER
SERVICE MANUAL

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CARVER Corporation

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■ SAFETY INFORMATION

WARNING.

Any person performing the procedures described in this manual will be exposed to hazardous voltages and the risk of electric shock.

Carver Corporation assumes that any person who removes the cover from the unit has been properly trained in protecting against avoidable injury and shock.

Therefore, the procedures described here are to be performed by qualified electronics service personnel only.

We recommend that the unit be tested only when line isolation is provided by an isolation transformer. The line cord of the unit must be disconnected and the power supply fully discharged before any components are replaced. Failure to do so may result in severe damage to the unit and the risk of electric shock.

The safety tests described below must be performed properly.

CAUTION:

Before returning the unit to the customer, one of the following safety tests must be performed.

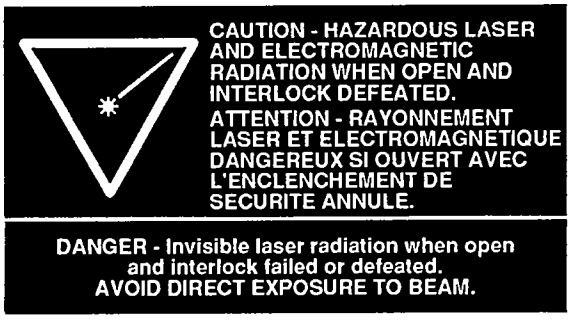
1. Check the leakage current. Connect the unit to 120 VAC supply and turn the power switch "ON". Using an ammeter, measure the current between the neutral side of the AC supply and chassis ground of the unit under test. If leakage current exceeds 0.5mA, the unit is defective.

   Reverse the polarity of the AC supply and repeat.

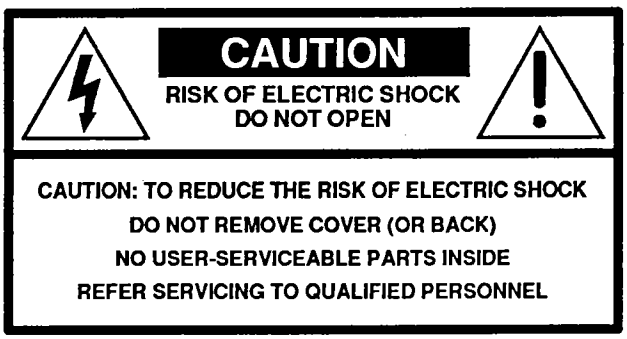
2. Measure the resistance from either side of the linecord to chassis ground. If it is less than 500k ohms, the unit is defective.

WARNING - DO NOT return the unit to the customer if it fails one of these tests until the problem is located and corrected.

1. **CLASS 1 LASER PRODUCT**
   This compact disc player is classified as a CLASS 1 laser product.
2. **LASER BEAM WARNING**
   When servicing this product, do not approach the LASER exit with the eye too closely. In case it is necessary to confirm LASER beam emission, be sure to observe from a distance of more than 30 cm from the surface of the objective lens on the optical pick-up block.



CAUTION



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

■ SPECIFICATIONS

Frequency Response:	20Hz to 20kHz (+/- 0.2dB)
Signal-to-Noise Ratio:	102dB (A-weighted)
Total Harmonic Distortion:	0.005%
Channel Separation:	85dB (nominal, at 1kHz) 65dB (limit, 100Hz - 10kHz)
Wow and Flutter:	Unmeasureable
D/A Conversion:	1-bit linear, two channel
Search Time:	4.5 sec.
Dynamic Range:	96dB
Line Output Level at 0dB:	2.0 V rms (+/- 1dB), into 100 kilohms
Output Impedance:	1 kilohm
Maximum Headphone Output:	0.7Vrms into 60 ohms (8.2mW) 1.4Vrms into 600 ohms (3.3mW)
Error Correction System:	CIRC type
Laser:	Semiconductor laser
Material:	AlGaAs
Wavelength:	760-800 nm
Emission duration:	Continuous
Classification:	CLASS 1
Laser Output:	0.2mW, measured at a distance of 1.6mm from the objective lens surface on the optical pick-up block.
Power Requirements:	115VAC/60Hz (USA and Canada) Other voltages as required for export
Power Consumption:	10W
Dimensions (H x W x D):	3.75" x 19.0" x 10.25" (11.5 overall) 95mm x 483mm x 260mm (295mm overall)
Net Weight:	7.25 lbs. (3.3 kg)
Shipping Weight:	9.85 lbs (4.5 kg)

Features and specifications are subject to change without notice.

■ SERVICING NOTES

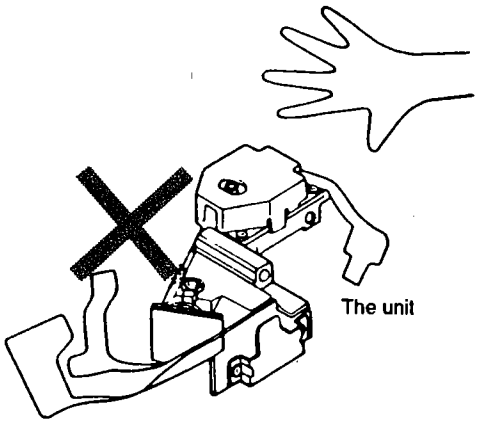
1. Prevent shock hazard by unplugging power supply cord before opening cabinet.
2. Avoid repairing under direct sunshine and heat which may cause the cabinet to warp, or transistor and IC malfunction.
3. Use a soft cotton swab moistened with warm water or neutral cleaner when parts of unit need to be cleaned.
4. When replacing parts tagged with safety symbols in this manual, be sure to use specified parts with the same specs only.
5. Avoid repairing the set near TV or any other magnetic forces.
6. Immediately disconnect the plug from wall socket during an electric storm to reduce the risk of damage.
7. Be careful of electrostatic discharge when working on this unit.
8. Be sure not to separate the pick-up head from the pick-up unit assembly.

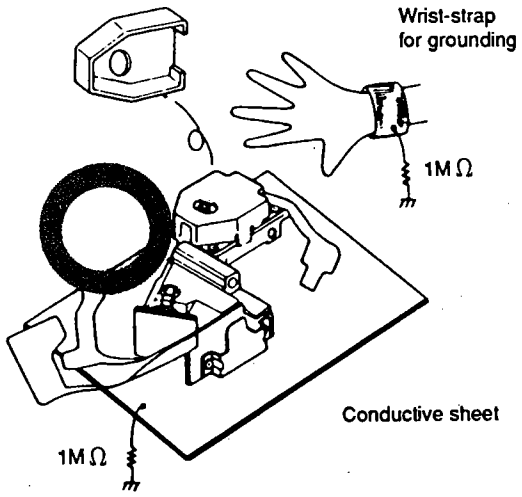
HANDLING THE OPTICAL PICK-UP

The laser diode in the optical pick-up may suffer electrostatic breakdown because of potential static electricity from clothing and your body.

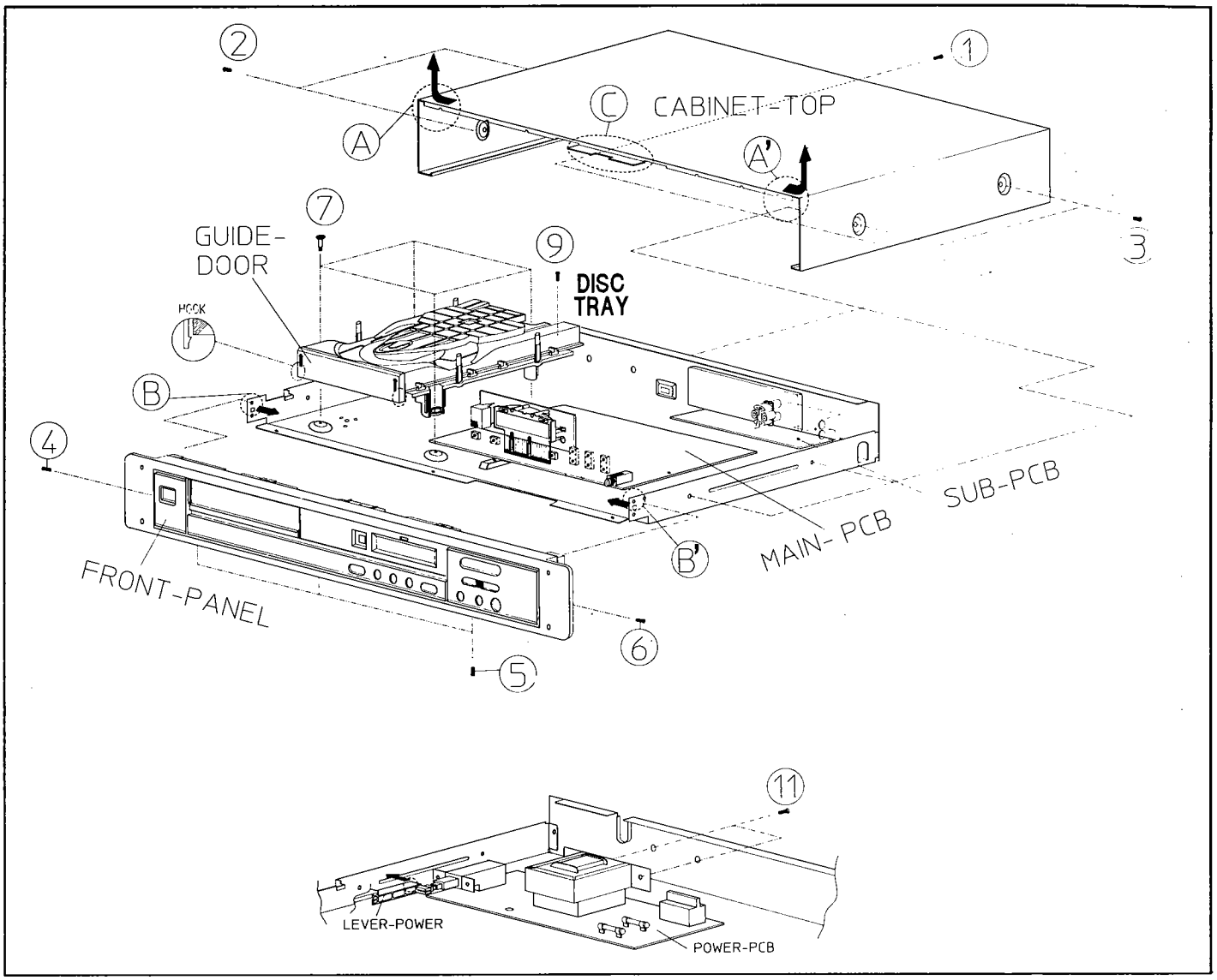
The following procedure is recommended.

1. Place a conductive mat on the work bench. Ground the mat to earth ground.
2. Place the unit on the conductive mat so that the chassis is grounded to the mat.
3. Put on a wrist strap grounded to the mat. If a wrist strap is unavailable, at the very least place your hands on the conductive mat. This gives them the same ground potential as the mat.
4. Remove the optical pick-up block.
5. Perform work on top of the conductive mat.
   Be careful not to let your clothes or any other static source touch the unit.





■ DISASSEMBLY INSTRUCTIONS



* Be sure to unplug the power cord before disassembling the unit.

1. CABINET TOP

1) Remove a screw (①) and 4 screws (② , ③).
2) Take the cabinet by the side (Ⓐ , Ⓐ') and pull up.
3) Lift up the cabinet (Ⓒ) approximately 45 degrees and pull back towards the unit.

2. DISC TRAY and GUIDE DOOR

1) DISC TRAY
   (1) Remove one screw (⑨).
   (2) Lift the Disc Clamp up and pull the tray out. (⇦)

3. PANEL FRONT

1) Remove 3 screws (⑤).
2) Remove one screw (④) and one screw (⑥).
3) Take cabinet by side (Ⓑ , Ⓑ') and apply pressure inward.
4) Remove front panel from chassis.

4. CD DECK ASSEMBLY

1) Remove 4 screws (⑦).
2) Lift CD deck assembly upwards.

■ CIRCUIT DESCRIPTION

1. PIN FUNCTION DESCRIPTION

● CXD 1167Q or KS9210 (DIGITAL SIGNAL PROCESSOR) : IC401

* I/O : INPUT/OUTPUT

Pin No.	Symbol	I/O	Description
1	SMEF	O	Pin 1 output is switched constant when output filter of the spindle motor is energized.
2	SMON	O	ON/OFF control for spindle motor.
3	SMPD	O	Spindle motor drive. Provides rough control during CLV-S mode and phase control during CLV-P mode.
4	SMSD	O	Spindle motor drive. Controls speed during CLV-P mode.
5	EFMZ	I	EFM signal from RF amplifier.
6	EFMO	O	Controls slice level of the EFM signal.
7	LOCK	O	The output of pin 7 reflects the status of the GFS signal which is sampled at PBFR/16. When the GFS signals is "H", but, when the signal has remained "L" for at least 8 samples, the output of pin 7 is "L".
8	VCOO	O	VCO output. The frequency is f = 8.6436MHz, when locked by the DBFR signal.
9	VCOI	I	VCO input.
10	TEST	I	(0V).
11	PHAS	O	The output of Pin11 provides phase comparison of EFM signal and VCO/2.
12	Vss	—	GND (0V).
13	MCK	I	Pin 13 provides serial transmission clock from the CPU. Data is latched on the leading edge of the clock.
14	MLT	I	Pin 14 provides latch input from the CPU. 8-bit shift register data (serial data received from the CPU) is latched in each of the registers.
15	MDAT	I	Serial data from the CPU.
16	XRST	I	System reset ("L").
17	TRCK	I	Tracking pulse input.
18	ISTAT	O	Output reflecting internal condition as designated by address.
19	MUTE	I	Muting input. MUTE is "L" when ATTM of internal register A is "L" (normal condition). MUTE is "H" when muting condition is set.
20	SQOK	O	Output the results CRC check of subcode Q.
21	SBCK	I	Clock input for subcode serial output.
22	SDAT	O	Serial output of subcode.
23	SQDT	O	Output of subcode Q.
24	S0S1	O	Output of subcode sync S0 + S1.
25	SQCK	I/O	Clock for reading subcode Q.
26	SQEN	I	Input for selecting SQCK (L; SQCK is output, H; SQCK is input)
27	D OUT	O	Output of digital audio signal
28	LKFS	O	Display output for frame sync lock status.
29	DB8	I/O	Data pin for external RAM. DATA8 (MSB) in test mode. Hi-Z in normal
30	DB7	I/O	Data pin for external RAM. DATA7 in test mode. Hi-Z in normal
31	DB6	I/O	Data pin for external RAM. DATA6 in test mode. Hi-Z in normal
32	DB5	I/O	Data pin for external RAM. DATA5 in test mode. Hi-Z in normal

Pin No.	Symbol	I/O	Description
33	V_{DD}	—	Power supply (+ 5V).
34	DB4	I/O	Data pin for external RAM. DATA4 in test mode. Hi-Z in normal
35	DB3	I/O	Data pin for external RAM. DATA3 in test mode. Hi-Z in normal
36	DB2	I/O	Data pin for external RAM. DATA2 in test mode. Hi-Z in normal
37	DB1	I/O	Data pin for external RAM. DATA1 (LSB) in test mode. Hi-Z in normal
38	AD01	O	(LSB)
39	AD02	O	In normal mode (TEST = 'L', SRAM = 'H'), these pins are High impedance (Hi-Z) In test mode (TEST = 'H', SRAM = 'L'), these pins are Output address of external RAM
40	AD03	O	
41	AD04	O	
42	AD05	O	
43	AD06	O	
44	AD07	O	
45	AD08	O	
46	AD09	O	
47	AD10	O	
48	AD11	O	(MSB)
49	WE	I/O	In normal mode, this is WE output. In test mode, write enable input.
50	CE	I/O	In normal mode, this is CE output. In test mode, chip enable input.
51	4MCK	O	Divider output for crystal. f = 4.2336MHz
52	Vss	—	GND (0V)
53	XIN	I	Input to crystal oscillator circuit. Depending on the mode the frequency is either f = 8.4672 or 16.9344MHz.
54	XOUT	O	Output from crystal oscillator circuit. Depending on the mode the frequency is either f = 8.4672 or 16.9344MHz.
55	SEL1	I	Mode selection input 1.
56	SEL2	I	Mode selection input 2.
57	SEL3	I	Mode selection input 3.
58	SEL4	I	Mode selection input 4. Code switch input for audio data output. 2's complement output when "L", offset binary output when "H".
59	SEL5	I	Mode selection input 5. Code switch input for audio data output. Serial output when "L", parallel output when "H".
60	APTR	O	Output for aperture compensation. "H" when R-ch.
61	APTL	O	Output for aperture compensation. "H" when L-ch.
62	C1F1	O	Monitor output reporting status of error correction for C1 decoder. When SEL5 = 'L', DA01 (LSB of parallel audio data) is output when SEL5 = 'H'.
63	C1F2	O	Monitor output reporting status of error correction for C1 decoder when SEL5 = 'L', DA02 is output when SEL5 = 'H'.
64	C2F1	O	Monitor output reporting status of error correction for C2 decoder when SEL5 = 'L', DA03 is output when SEL5 = 'H'.
65	C2F2	O	Monitor output reporting status of error correction for C2 decoder when SEL5 = 'L', DA04 is output when SEL5 = 'H'.
66	C2FL	O	When SEL5 = 'L', output of status condition. C2FL is set 'H' when the C2 sequence. Presently being corrected becomes impossible to correct. DA05 is output when SEL5 = 'H'.
67	C2PO	O	Display output of the C2 pointer when SEL5 = 'L', DA06 is output when SEL5 = 'H'.

Pin No.	Symbol	I/O	Description
68	XTFR	O	When SEL5 = 'L', output of read frame dock which is 7.35KHz of the crystal system. DA07 is output when SEL5 = 'H'.
69	PBFR	O	When SEL5 = 'L', output of write frame clock which is 7.35KHz when locked by the crystal system. DA08 is output when SEL5 = 'H'.
70	$\overline{PBCK}$	O	When SEL5 = 'L', output of VCO/2 (f = 4.3218MHz when locked by the EFM signal). DA09 is output when SEL5 = 'H'.
71	FSDW	O	When SEL5 = 'L', output for unprotected frame sync patterns. DA10 is output when SEL5 = 'H'.
72	ULKFS	O	Output for display of status of frame sync protection when SEL5 = 'L', DA11 is output when SEL5 = 'H'.
73	V_{DD}	—	Power supply (+ 5V).
74	$\overline{JIT}$	O	When SEL5 = 'L', output for display of either RAM overflow or underflow for +4 frame jitter absorption. DA12 is output when SEL5 = 'H'.
75	ZWDCK	O	When SEL5= 'L', output for strobe signal (352.8KHz when DF is ON, 176.4KHz when DF is OFF). DA13 is output when SEL5 = 'H'.
76	$\overline{BLCK}$	O	When SEL5 = 'L', inverse output of BLCK. DA14 is output when SEL5 = 'H'.
77	BLCK	O	When SEL5 = 'L', bit clock output (4.2336MHz when DF is ON, 2.1168MHz when DF is OFF) DA15 is output when SEL5 = 'H'.
78	DATA	O	Serial data output of audio signal when SEL5 = 'L'. DA16 is output when SEL5 = 'H'.
79	WDCK	O	Strobe signal output. Output is 176.4KHz when DF is on. Output is 88.2KHz when DF is off.
80	CHCK	O	Strobe signal output. Output is 88.2KHz when DF is on. Output is 44.1KHz when DF is off.

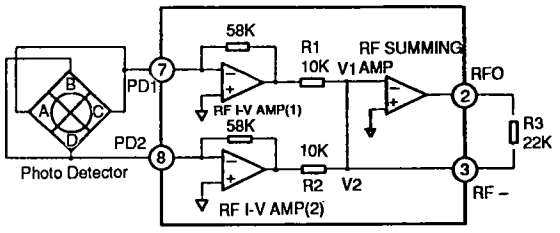
2) KA830 (Servo Signal Processor) : IC201

Pin No.	Symbol	Descriptions
1	CV	Center voltage.
2	HFGD	Reduce high frequency gain with capacitor connected between pin 2 and pin 3.
3	FS	High frequency gain of focus servo can be changed by switching FS3 on or off.
4	LFR	Rising low frequency bandwidth of focus loop.
5	FSEO	Focus servo error output.
6	FSEI	Inverting input pin for focus amplifier.
7	FSCH	Time constant external pin to generate focus search waveform.
8	RTG	Time constant external pin to switch the tracking gain of high frequency.
9	TG	Provide time constant to change the high frequency tracking gain.
10	AVcc	Analog positive power supply.
11	TKEO	Tracking error output.
12	TKEI	Inverting input pin for tracking amplifier.
13	SLEN	Non-inverting input pin for tracking amplifier.
14	SLEO	Sled output.
15	SLEI	Inverting input pin for sled amplifier.
16	STOP	Pin for detecting a signal for the on/off limit switch of the innermost part of the disc.
17	FSET	Setting the peak frequency of the focus, tracking phase compensation and to fo the CLV LPF.

Pin No.	Symbol	Descriptions
18	SENS	Output pin for FZC, AS, TZC, STOP and BUSY by command from CPU.
19	AV_{EE}	Analog negative power supply.
20	CNO	Track number count output.
21	DRCT	Control pin for one track jump.
22	REST	Reset input pin, reset at "L".
23	SDATA	Serial data input.
24	SLOAD	Latch input.
25	SCLK	Serial data transfer clock.
26	DGND	Digital ground.
27	BPF	Provide time constant for the loop filter.
28	DPI	Input pin for detected phase.
29	ISET	Current is input, determining the peaks of focus search, track jump, and sled kick.
30	FVC	External resistor to adjust free running frequency of VCO.
31	3.5V	Regulated output voltage
32	864M	Output pin of 8.64MHz VCO.
33	LOCK	Pin for the operation of the sled runaway prevention circuit at "L".
34	MDP	Pin for connecting the DSP.
35	MON	Pin for connecting the DSP.
36	FSW	Providing an external LPF time constant the CLV servo.
37	DVcc	Digital positive power supply.
38	SPDLI	Inverting input for spindle servo amplifier.
39	SPDLO	Spindle servo error output.
40	WDCK	Clock input for auto-sequence.
41	FOK	Focus ok signal input pin.
42	MRR	Mirror signal input pin.
43	DV_{EE}	Digital negative power supply.
44	DFT	Defect signal input pin.
45	TKE	Tracking error signal input pin.
46	TZC	Input pin for the zero cross tracking comparator.
47	ATS	Input pin for detect ATSC.
48	FCE	Input pin for focus error signal.

2. BASIC CIRCUIT OPERATION

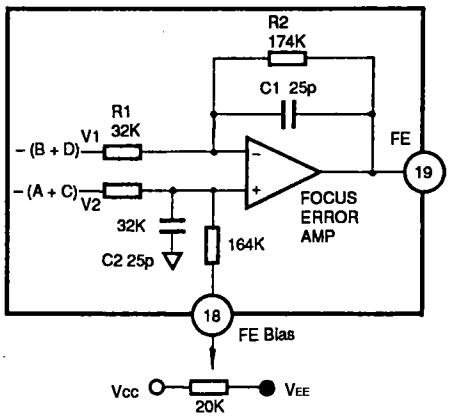
1) RF AMPLIFIER (KA9201) : IC301



RF I-V AMP(1) and RF I-V AMP(2) are converted into voltage from current signal of PD1 (A + C) and PD2(B + D) through the 58Kohm internal resistor. Furthermore, it is added in RF summing amplifier, this signal (A + B + C + D) is output at RFO (pin 2). The RF output voltage (low frequency) is as follow.

V_{RF} = –R3* (iPD1 + iPD2)
= –R3* (V1/R1 + V2/R2)
= –22K* (V1/10K + V2/10K)
= –2.2* (V1 + V2)

2) FOCUS ERROR AMPLIFIER (KA9201) : IC301



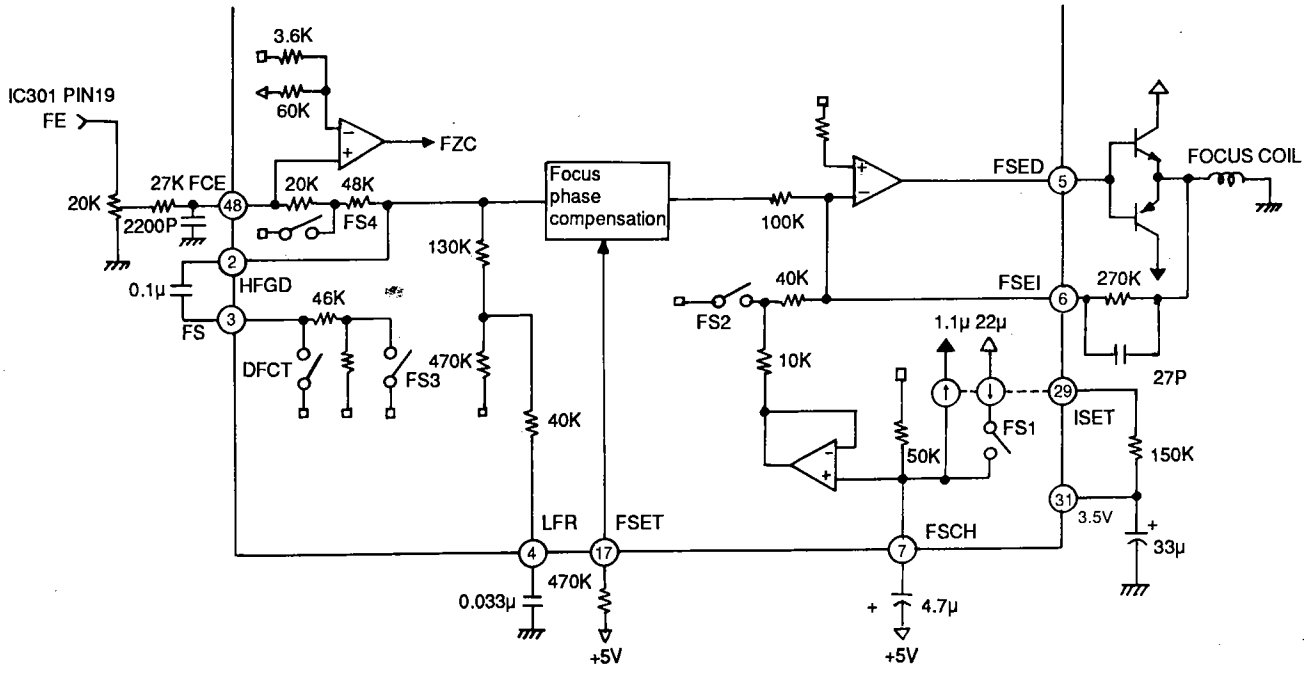
The Focus Error AMP is the difference between RF I-V AMP (1) output (A + C) and RF I-V AMP(2) output (B + D). These two [– (A + C), –(B + D)] signals are each applied to the (–) and (+) input of Focus Error AMP.
As the result of differential voltage, Focus Error signal is output at FE pin (pin 19).
This FE output voltage (low frequency) become [(A + C) – (B + D)], as follow.

V_{FE} = R2/R1* (V2–V1)
= 5.4 (V2 – V1)

The focus error voltage is directed to the focus servo circuit, to maintain optimum focusing at all times.

3) FOCUS SERVO SYSTEM (KA8309) : IC201

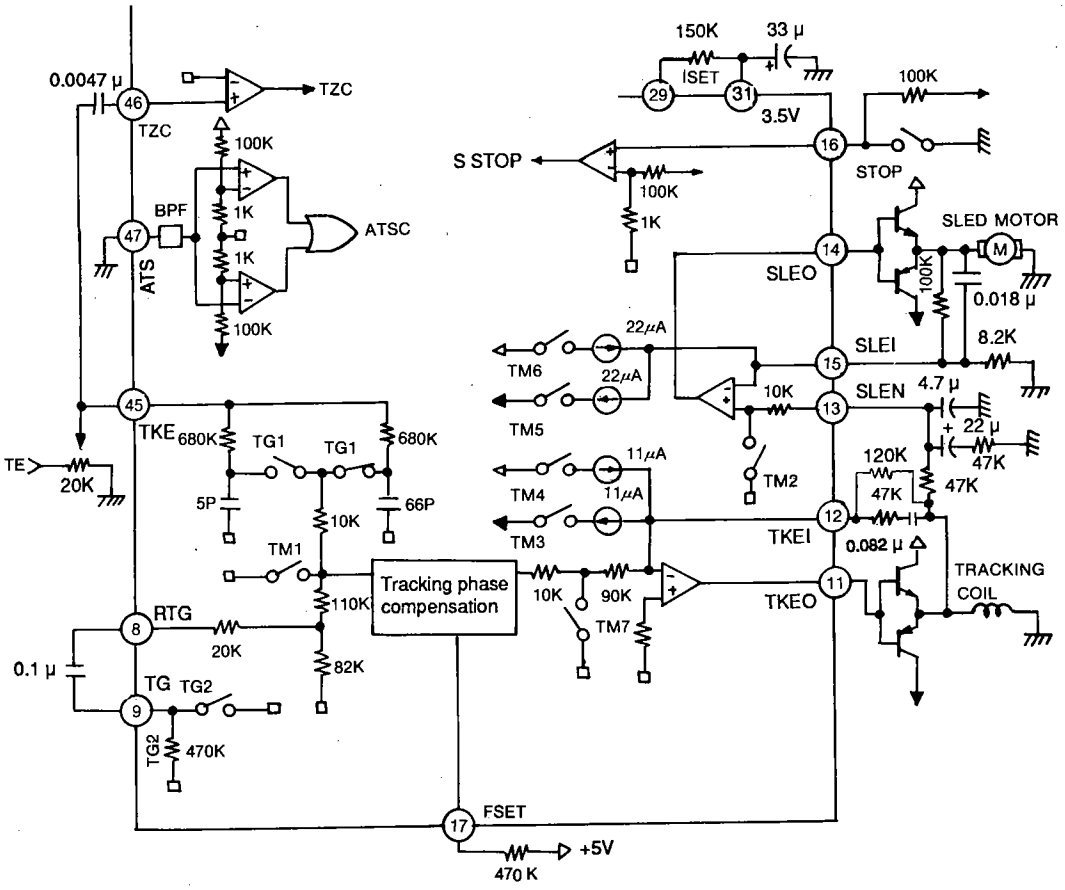
Below is a block diagram of the focus servo system.
When FS3 is switched on, the high frequency gain can be reduced by forming a low frequency time constant through a capacitor connected across pins 2 and 3 and the internal resistor.
The capacitor across pin 4 and GND has a time constant to raise the low frequency response.
The peak frequency of the focus phase compensation is inversely proportional to the resistor connected to pin 17 (about 1. 2KHz when the resistor is 470 kΩ).



The focus search peak becomes about ± 1.1 Vp-p with above constant. The peak is inversely proportional to the resistor connected across the pins 29 and 31. However, when this resistor is varied, the peaks of track jump and sled kick also vary.
The FZC comparator invert input is set to 5.7% of the difference between the reference voltage Vcc and Vc (Pin 1) : 5.7% x (Vcc – Vc).

4) TRACKING SLED SERVO SYSTEM (KA8309) : IC201

The below 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 470KΩ).
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:
Track jump peak voltage = TM3 (TM4) current value x feedback resistor value

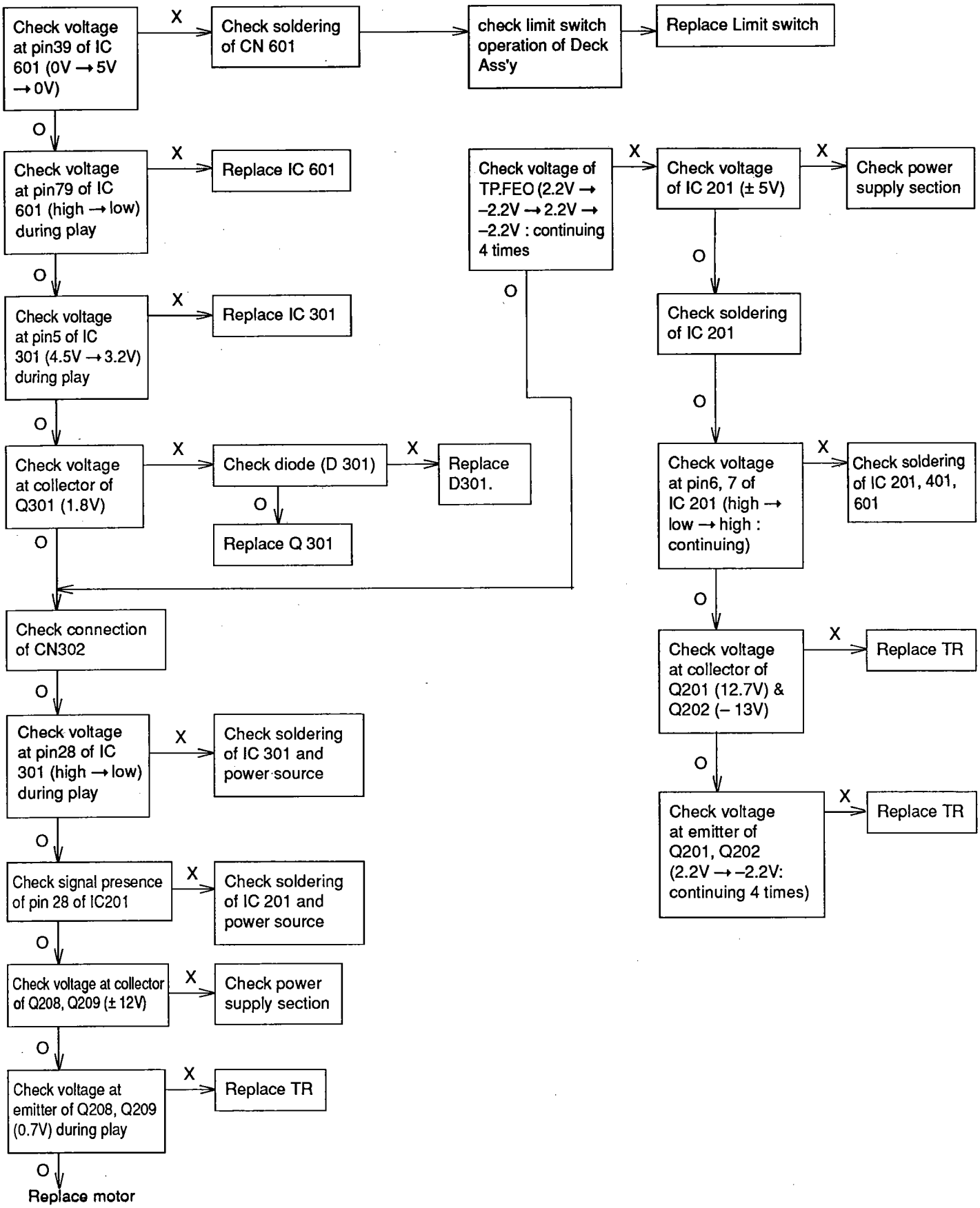


The FWD or REV sled kick is done by setting TM5 or TM6 ON. At this time, the peak voltage added to the sled motor is determined by the TM5 or TM6 current value and the feedback resistor from pin 15.
Sled jump peak voltage = TM5 (TM6) current value x feedback resistor value.
Each SW current value is determined by the resistor connected to pins 29 and 31.
When the resistor is at about 150KΩ ,
TM3 or TM4 is + 11 μA and TM5 or TM6 is + 22 μA.
This current value is almost inversely proportional to the resistor, variable within a range of about 5 to 40 μA for TM3.
STOP is the ON/OFF detection signal for the limit SW or the sled motor's innermost circumference.

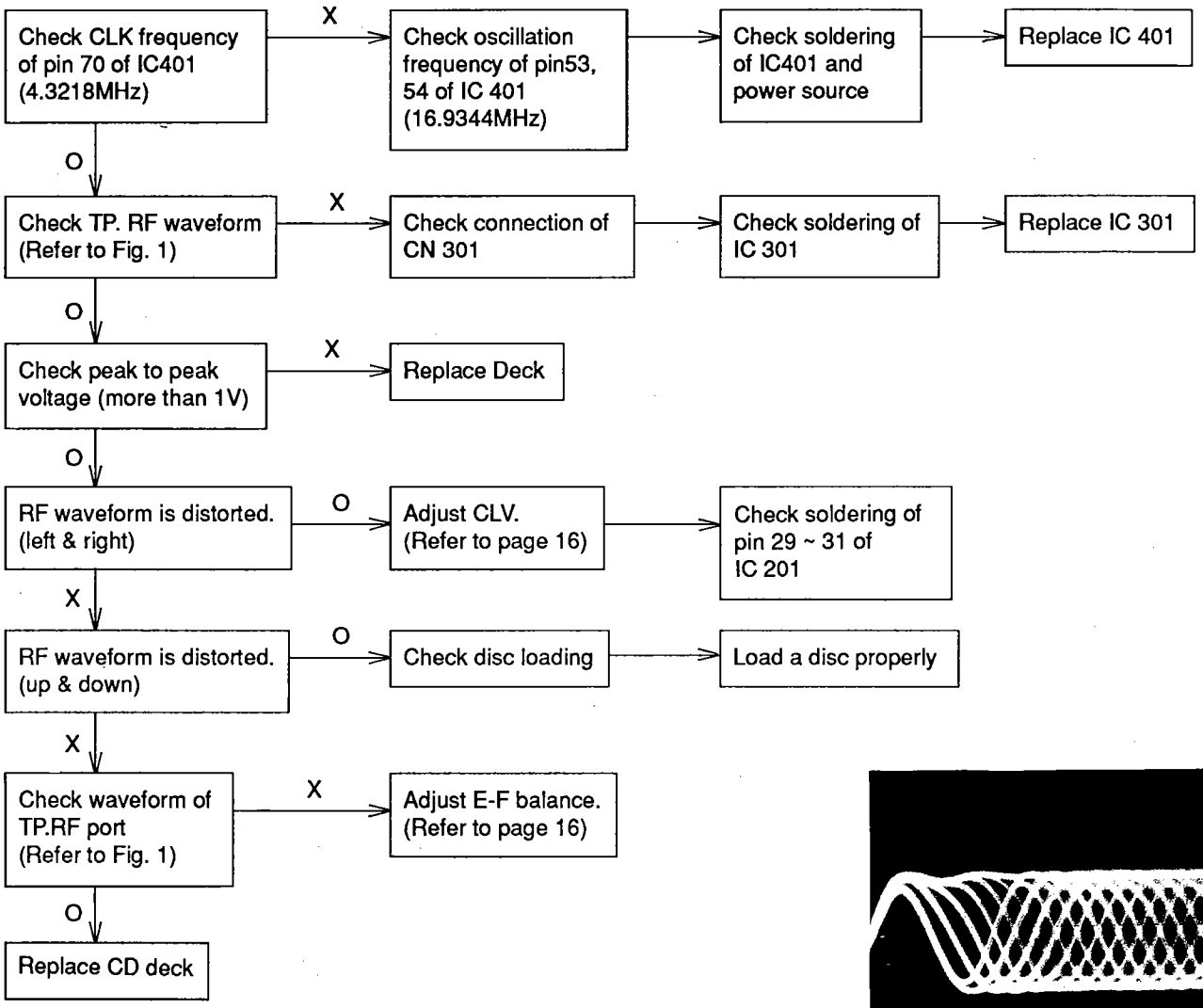
■ TROUBLESHOOTING GUIDE

* Be sure not to use a warped or dirty disc in troubleshooting.

1. DISC DOESN'T ROTATE



2. LEAD IN NOT WORKING



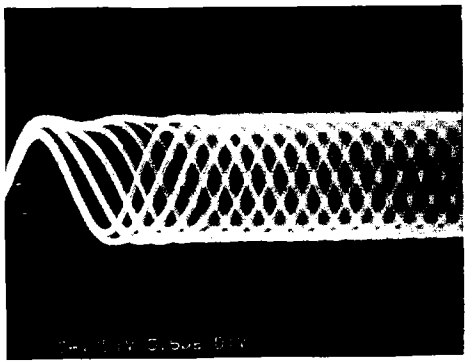
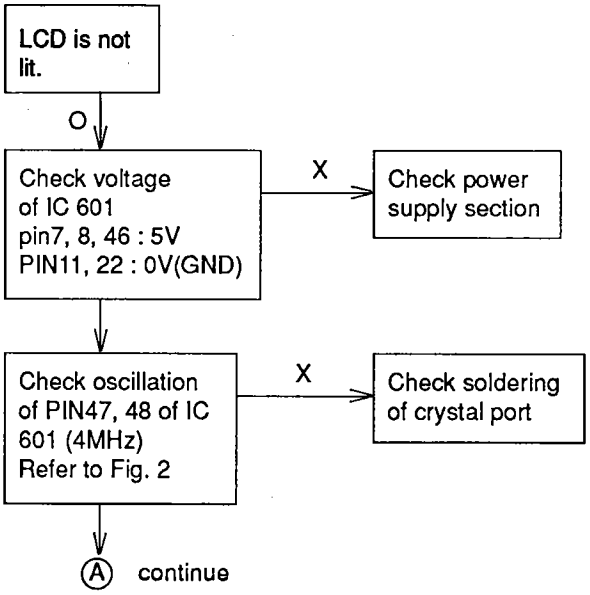


Fig. 1

3. DISPLAY NOT WORKING



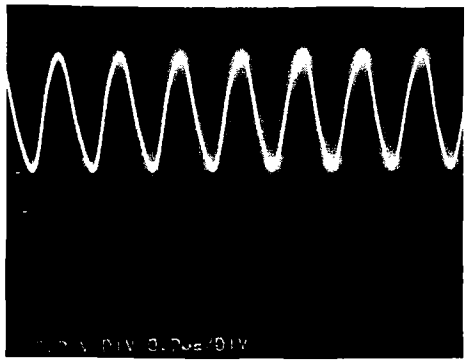
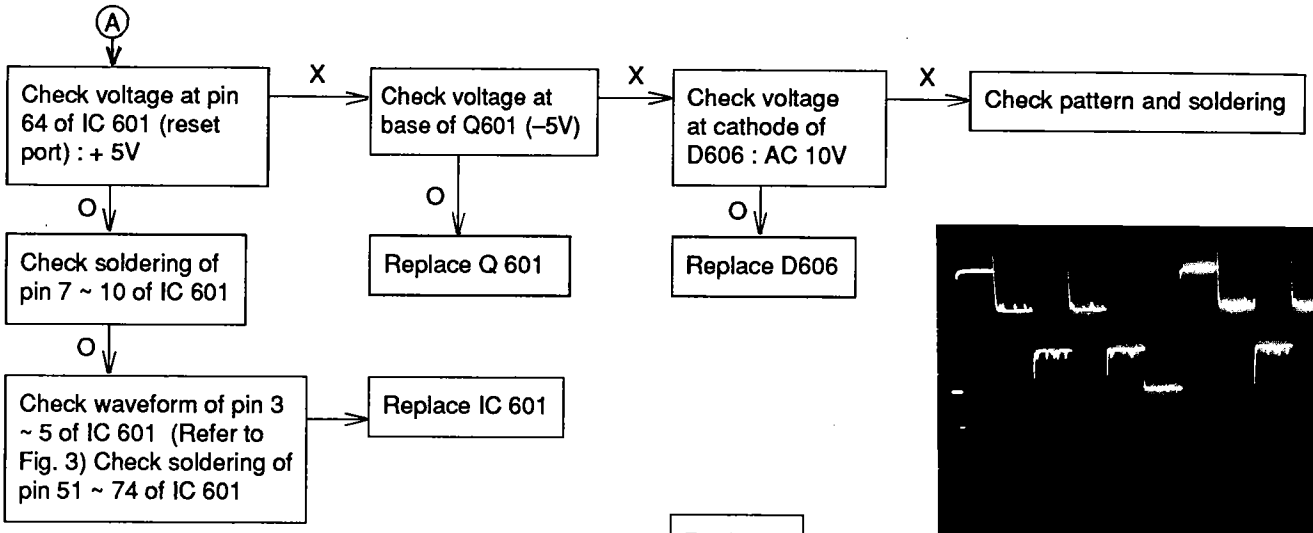


Fig. 2



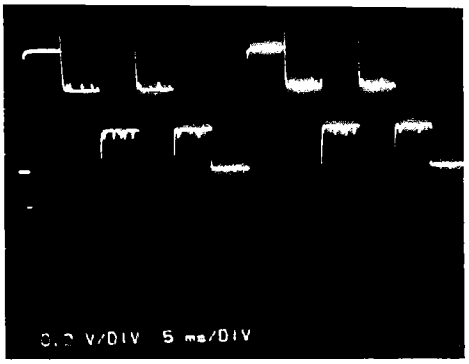
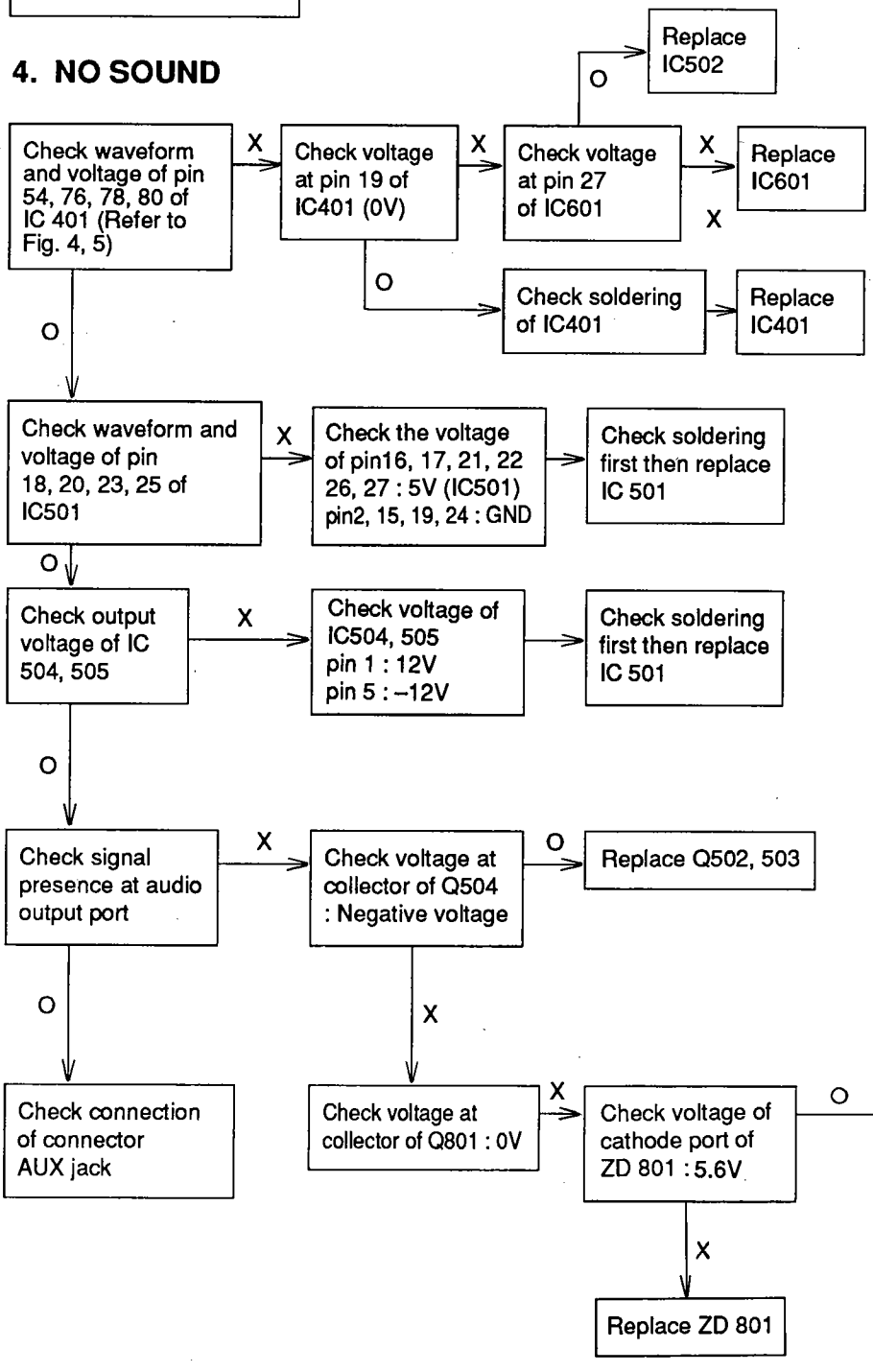


Fig. 3 NORMAL

4. NO SOUND



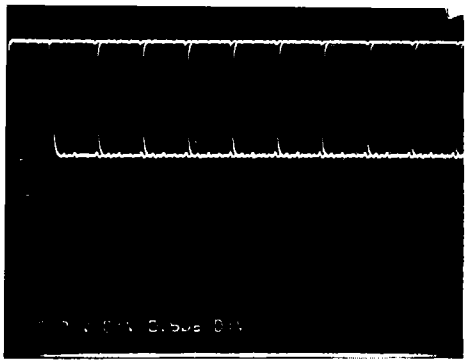


Fig. 4 (Pin 78) NORMAL

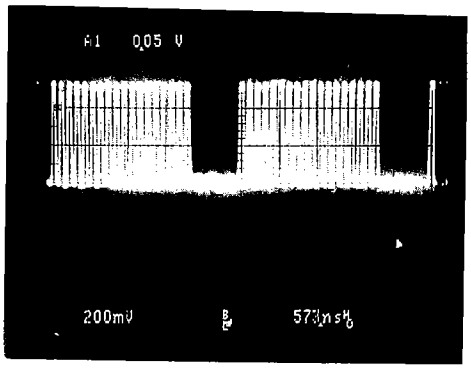


Fig. 5 (Pin 76) NORMAL

■ ALIGNMENT PROCEDURE

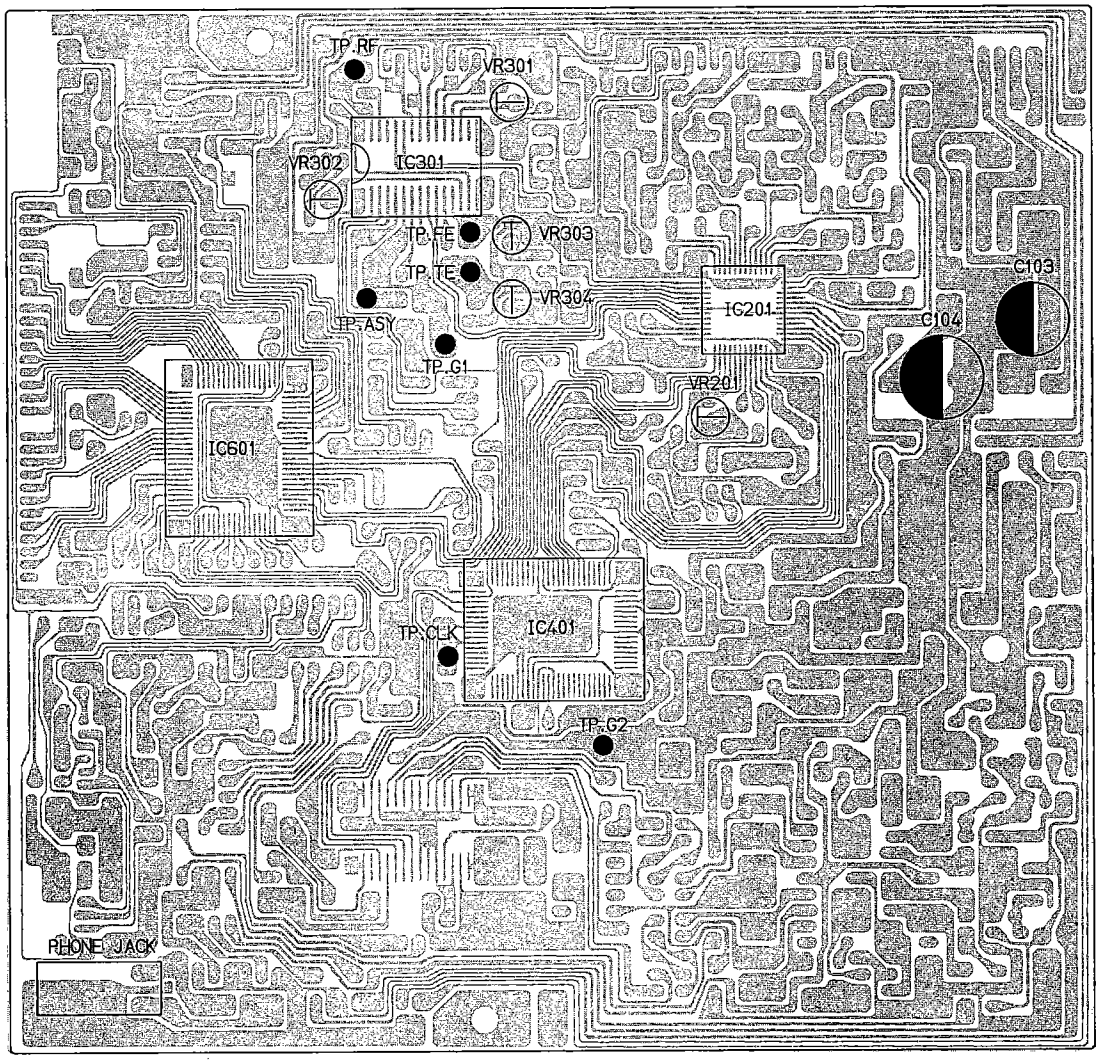
1. MEASURING INSTRUMENT

1) Oscilloscope (100MHz≧Frequency)
2) Probe (10 : 1)
3) Frequency counter

2. IMPORTANT POINTS

1) Trim pot (VR) positions can vary from unit to unit from those shown in the Adjustment Procedure.
2) Be sure not to use a warped or dirty disc in troubleshooting.
3) When adjusting, use plastic screw driver.

3. LOCATION OF ADJUSTMENTS (COMPONENTS SIDE)



VR201	:	CLV adjustment
VR301	:	E-F balance adjustment
VR303	:	Focus gain adjustment
VR302	:	Focus bias adjustment
VR304	:	Tracking gain adjustment

TP.FE	:	To oscilloscope signal port
TP.TE	:	To oscilloscope signal port
TP. CLK	:	To oscilloscope signal port
TP.G1	:	To oscilloscope GND port
TP.G2	:	To oscilloscope GND port

4. ADJUSTMENT PROCEDURE

1) CLV ADJUSTMENT
   (1) Turn power on and load a disc.
   (2) Frequency counter connection
   (+) terminal ; TP. CLK
   (–) terminal ; TP. G2
   (3) Connect TP.ASY to TP. G1
   (4) Adjust VR201 so the frequency counter reads 4.50MHz. (Adjust in stop mode)
   (5) Disconnect TP.ASY from TP.G1

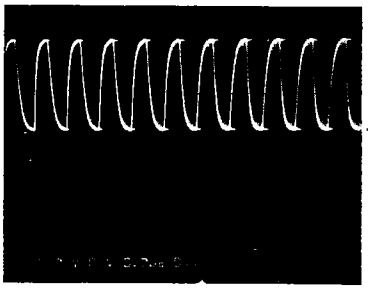
2) E-F BALANCE ADJUSTMENT
   (1) Turn power on and load a disc.
   (2) Press play.
   (3) Oscilloscope setting and connection
   { VOLT/DIV ; 50mV { (+) terminal ; TP.TE
   { TIME/DIV ; 5mS { (–) terminal ; TP. GI
   (4) Adjust VR304 fully counter clockwise
   (5) Adjust VR301 so the waveform is as shown in the picture.
   (6) Set VR304 back to the place it was before adjustment.

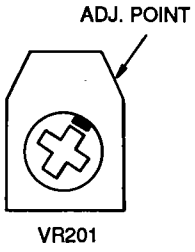
3) TRACKING GAIN ADJUSTMENT
   (1) Turn power on and load a disc.
   (2) Press play.
   (3) Oscilloscope setting and connection
   { VOLT/DIV ; 50mV { (+) terminal ; TP.TE
   { TIME/DIV ; 1mS { (–) terminal ; TP. GI
   (4) Adjust VR304 so the peak to peak waveform is as shown in the picture.

4) FOCUS BIAS ADJUSTMENT
   (1) Turn power on and load a disc.
   (2) Oscilloscope setting and connection
   { VOLT/DIV ; 10mV { (+) terminal ; TP.FE
   { TIME/DIV ; 20 µS { (–) terminal ; TP. GI
   (3) Adjust VR302 so the waveform is as shown in picture. (Adjust in stop mode)

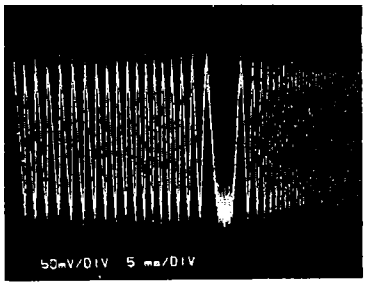
5) FOCUS GAIN ADJUSTMENT
   (1) Turn power on and load a disc.
   (2) Press play.
   (3) Oscilloscope setting and connection
   { VOLT/DIV ; 10mV { (+) terminal ; TP.FE
   { TIME/DIV ; 2mS { (–) terminal ; TP. GI
   (4) Adjust VR303 so the peak to peak waveform is as shown in the picture.

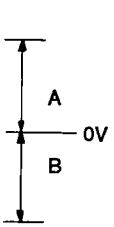
CLV



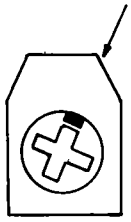


E-F BALANCE

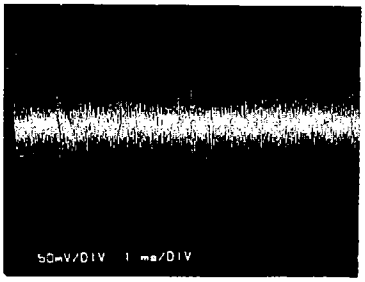


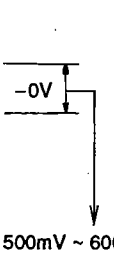


* A = B

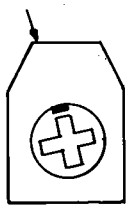


TRACKING GAIN

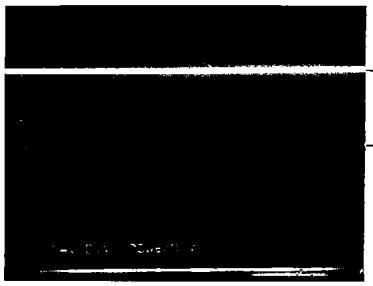


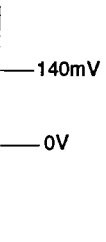


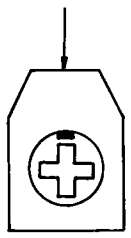
500mV ~ 600mV



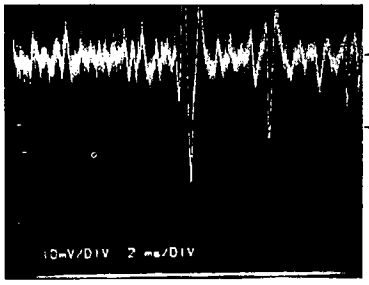
FOCUS BIAS

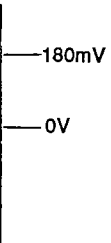


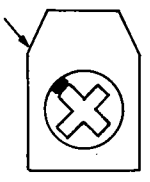




FOCUS GAIN

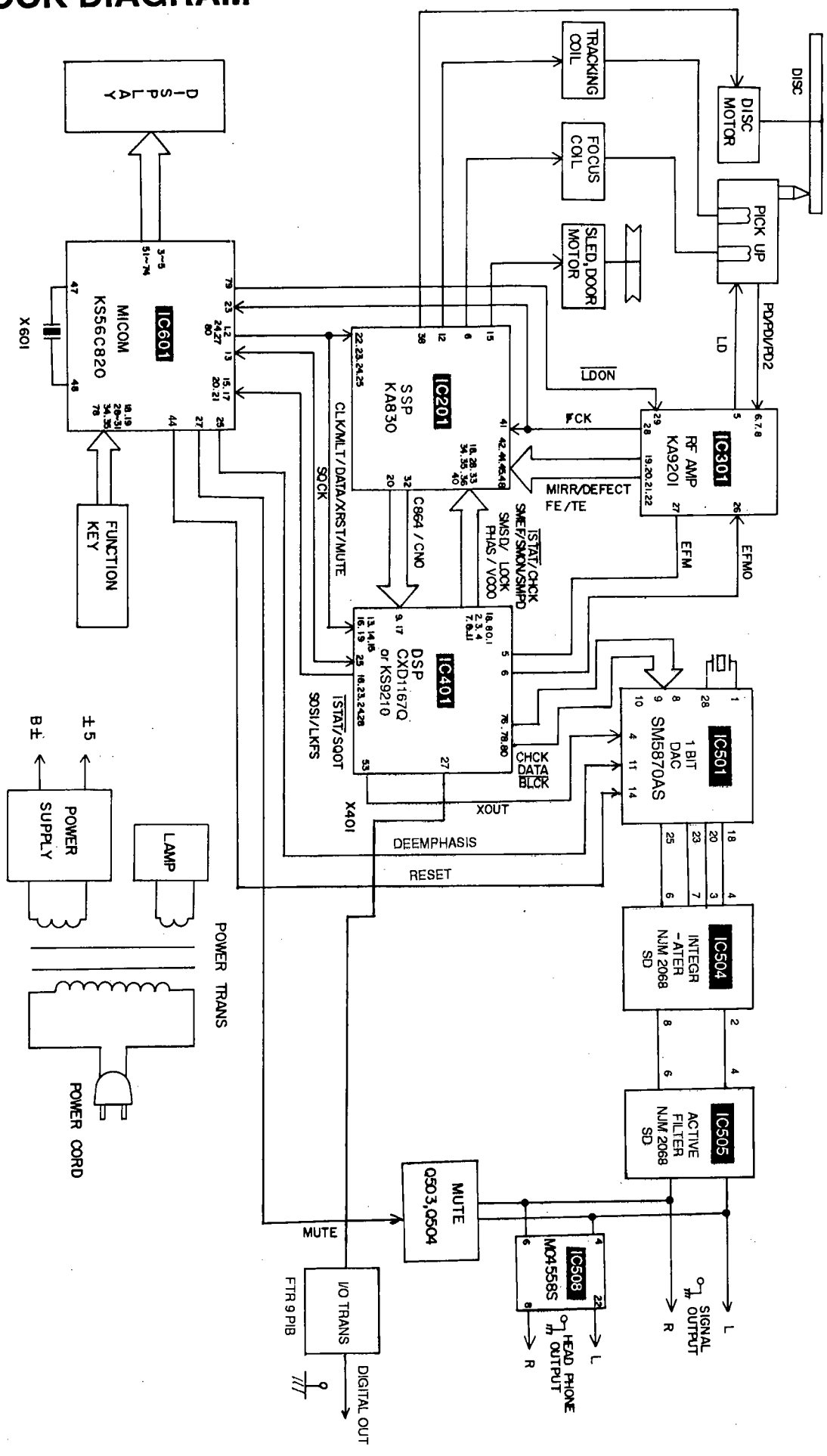






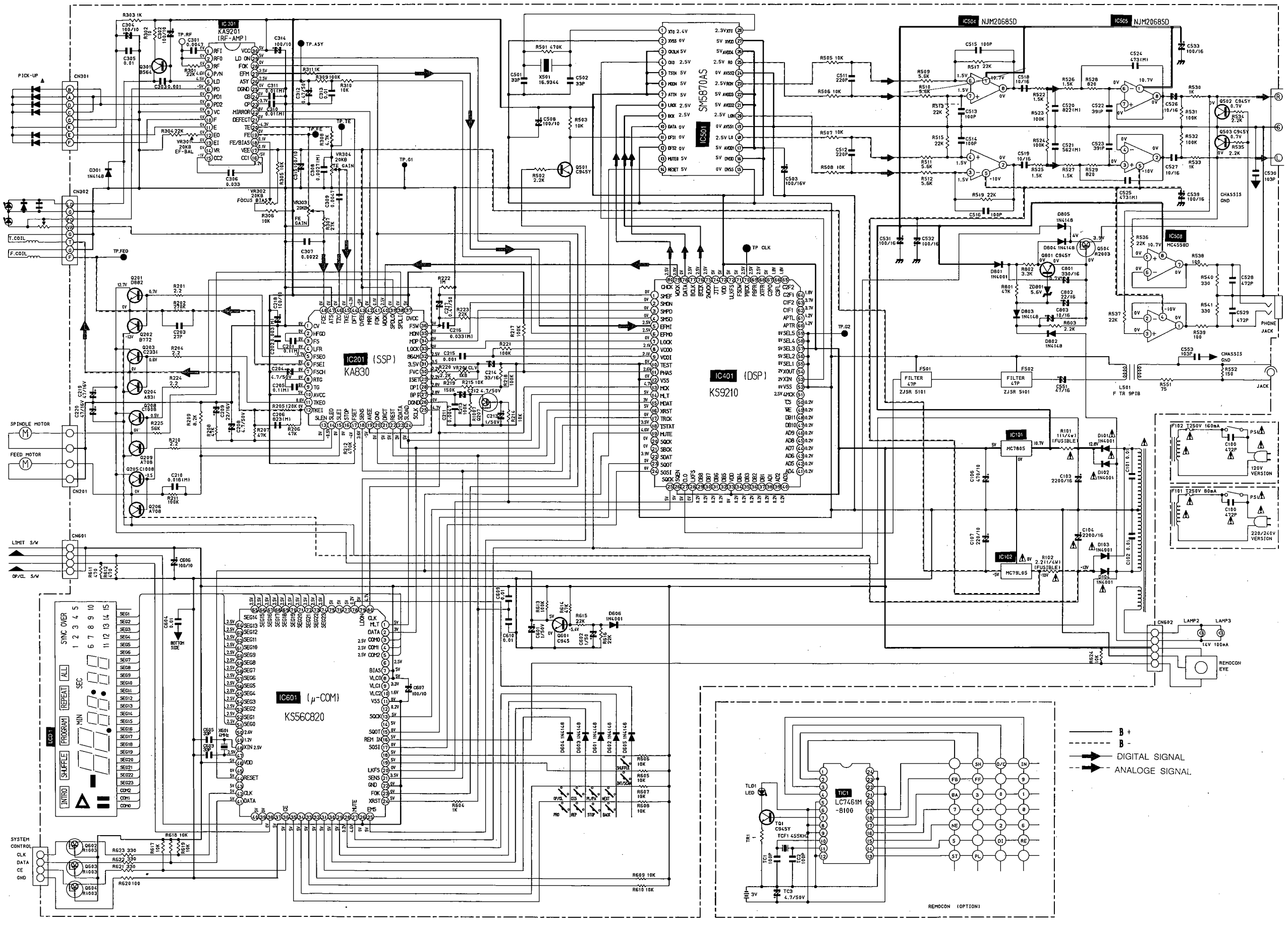
10 : 1 DAMPING PROBE WAS USED

■ BLOCK DIAGRAM



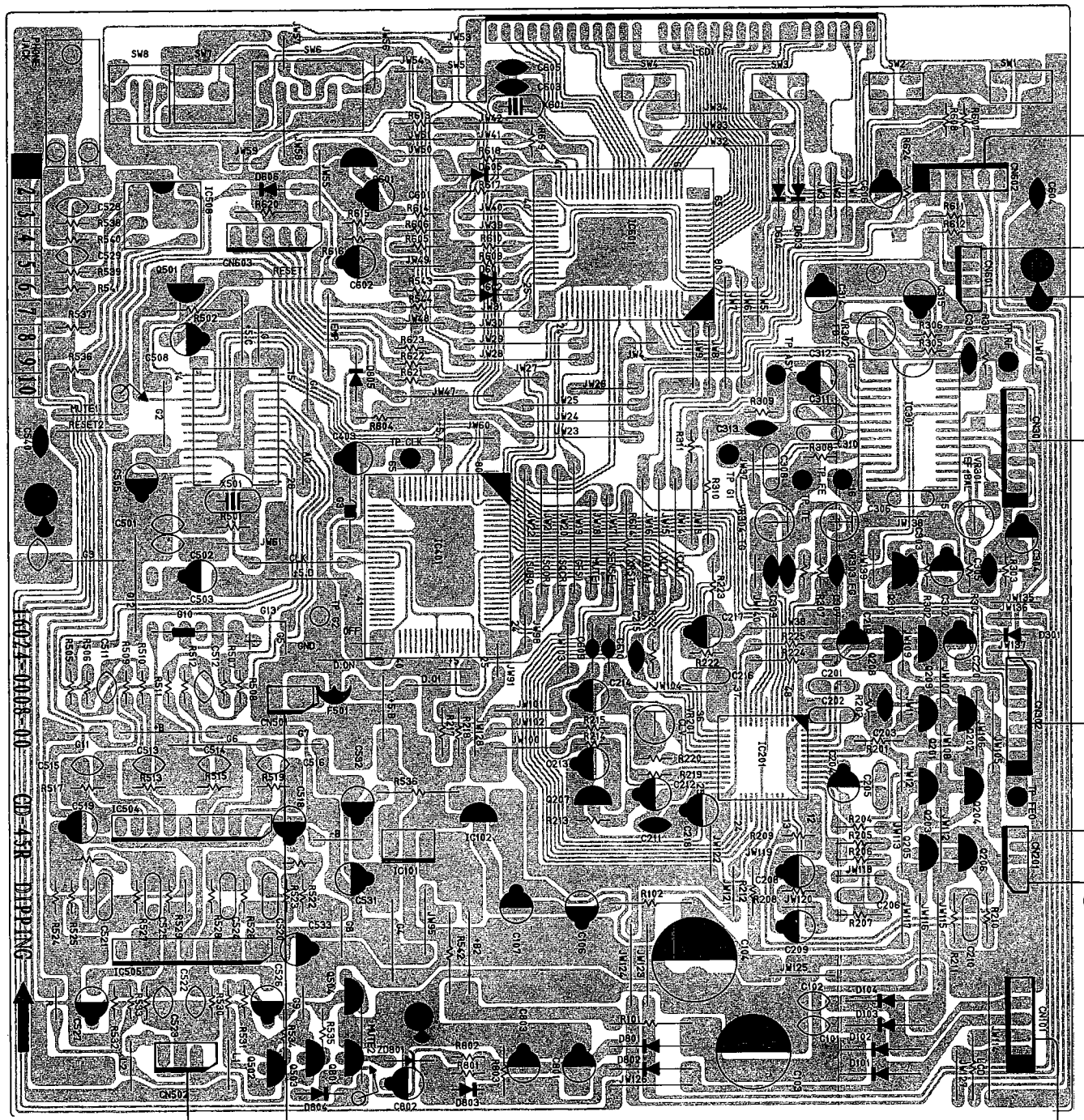
SCHEMATIC DIAGRAM

1. The unit of all resistors is Ω unless otherwise stated. (K : K Ω , M : M Ω) All resistors are 1/4W or 1/8W unless otherwise stated.
2. The unit of all capacitors is μF unless otherwise stated. (P : PF)
3. The schematic diagram is subject to change upon improvement without prior notice.
4. ⚠ indicates parts for circuit safe guarding purposes. Therefore, when replacing, be sure to use specified parts only.

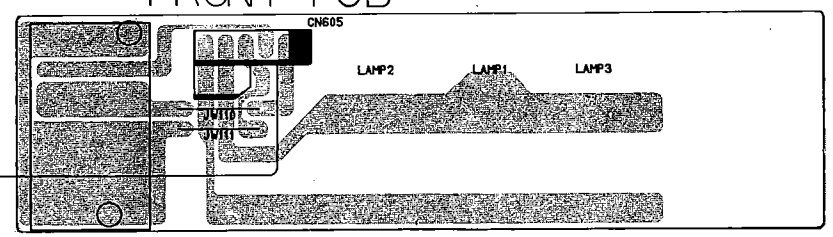


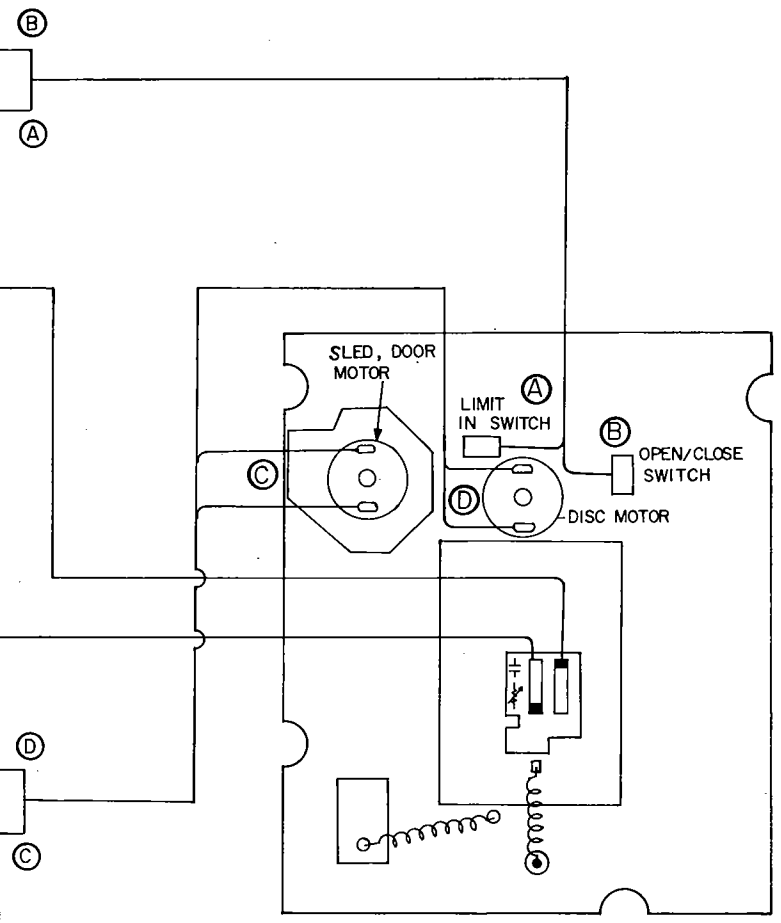
■ WIRING DIAGRAM (COMPONENT)

MAIN PCB



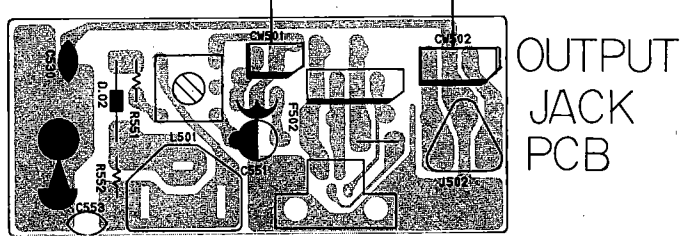
FRONT PCB





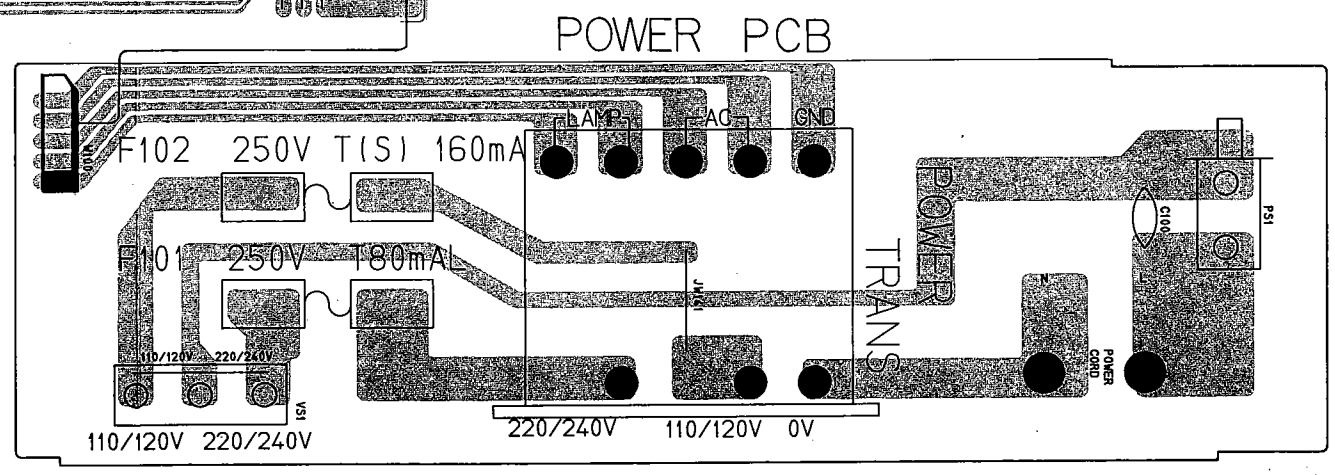
CD DECK ASS'Y

(BOTTOM SIDE)



OUTPUT JACK PCB

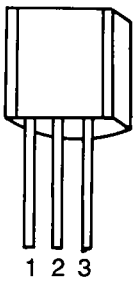
POWER PCB



IC & TR INTERNAL DIAGRAMS

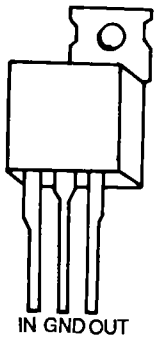
- TR & DIODE

1.

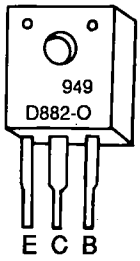


TR	1	2	3
KSA931, KSC2331, KSR2003 KSR1003, KSR1007	E	C	B
KSA708, KSB564, KSC945 KSC1008	E	B	C
MC79L05	G	IN	OUT

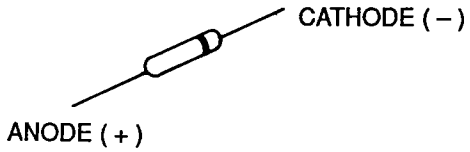
2. MC7805C



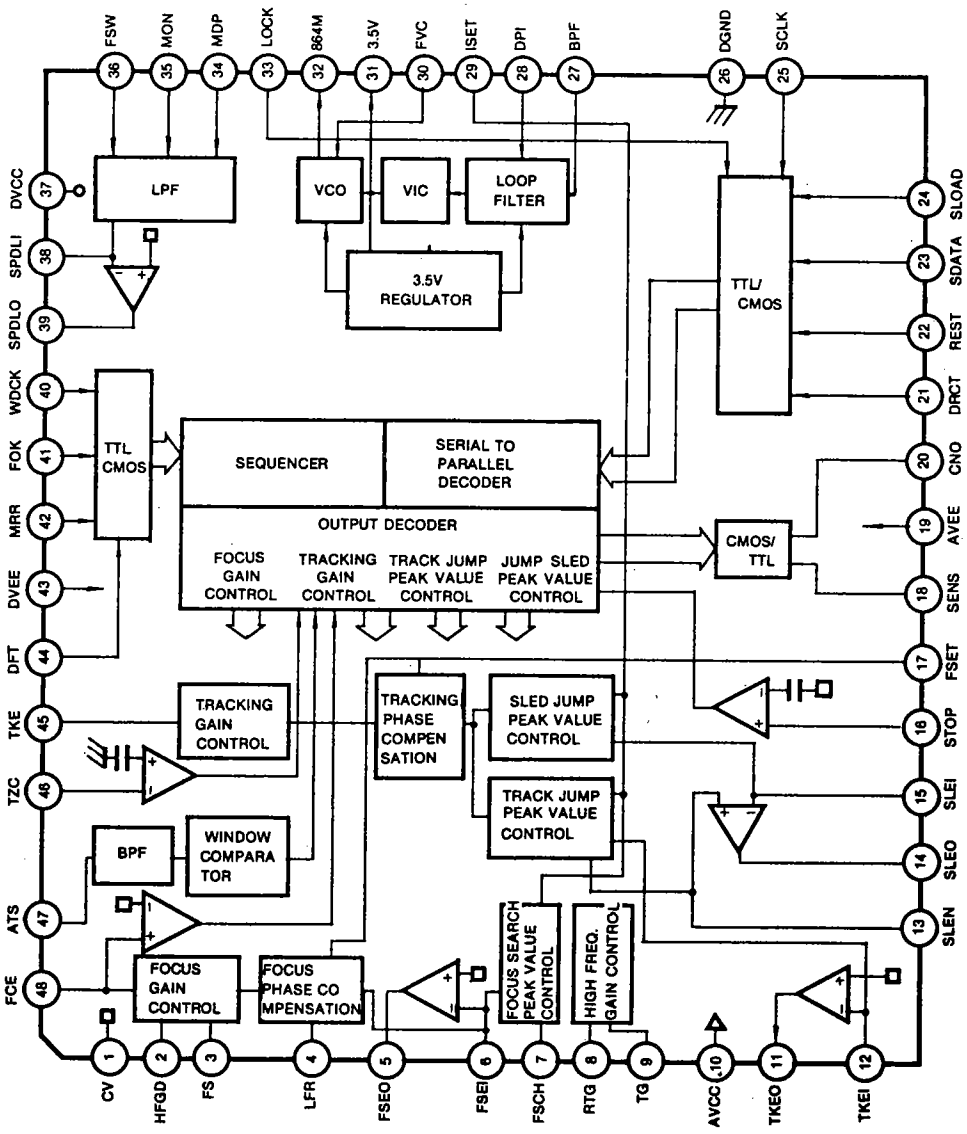
3. KSD882, KSB772



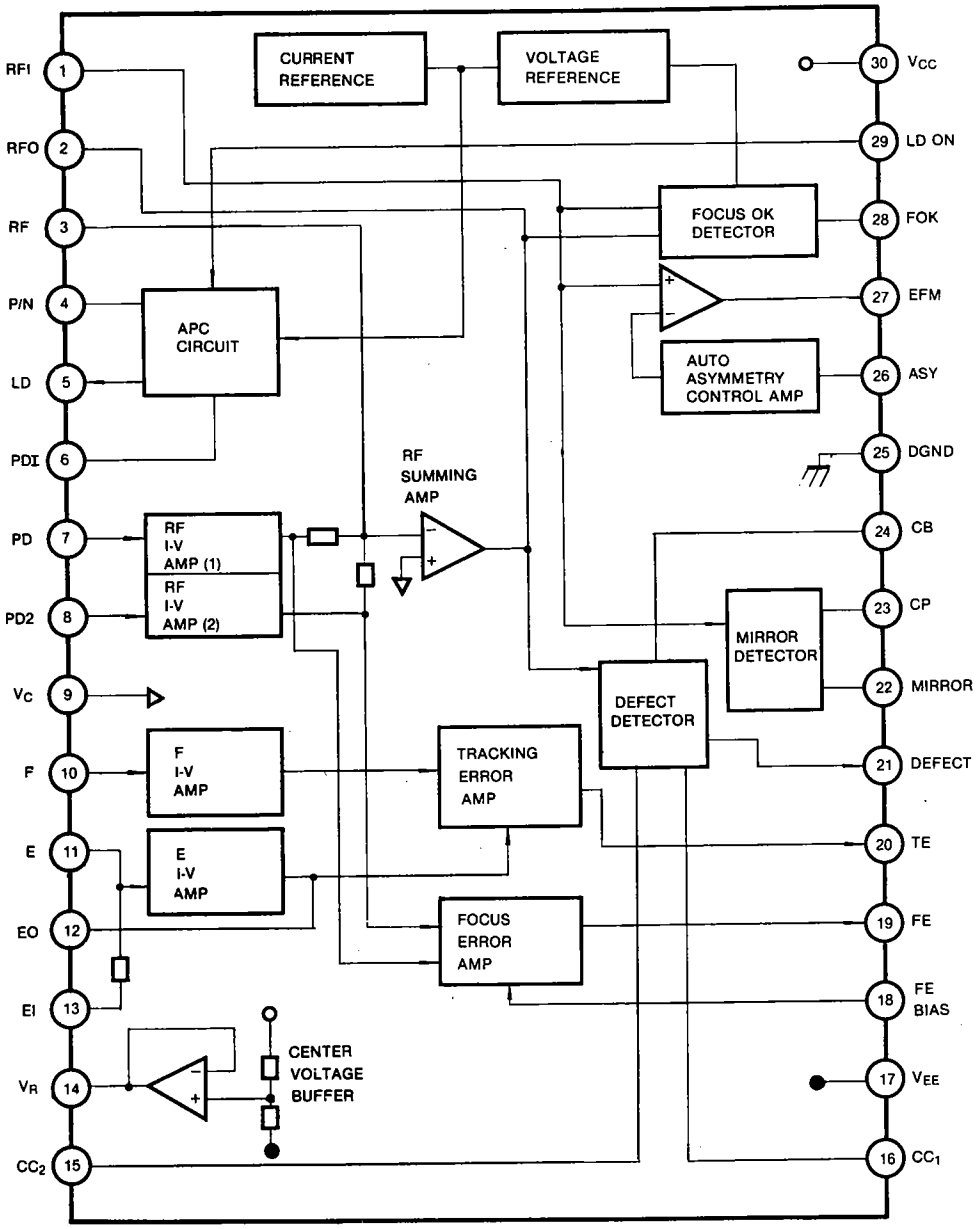
4. IN4148M, IN4001, 1SS53, ZENER DIODE



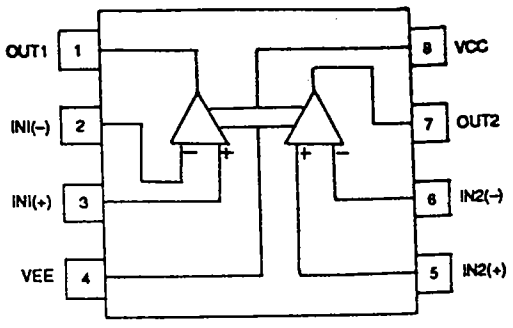
- KA830 (IC-SS PROCESSOR) : IC201



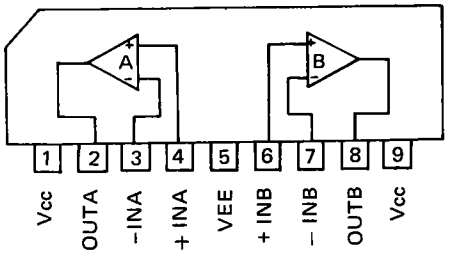
- KA9201 (RF AMP) : IC301



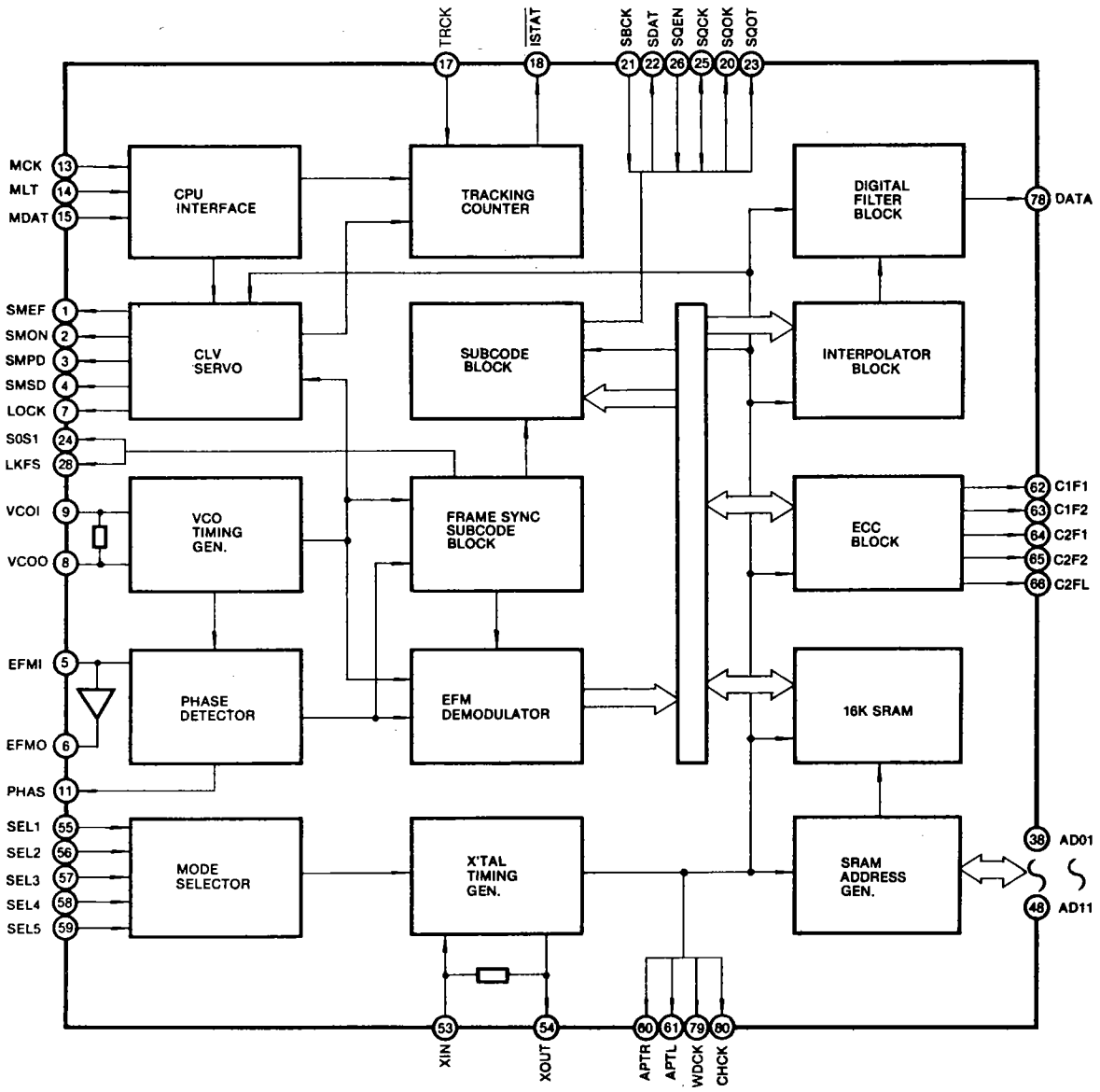
- MC4558D(OP AMP) : IC508



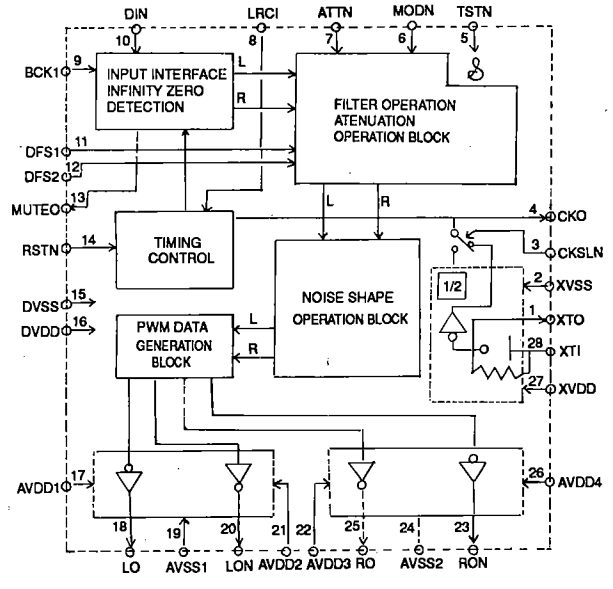
- NJM2068SD (OP AMP) : IC504, 505



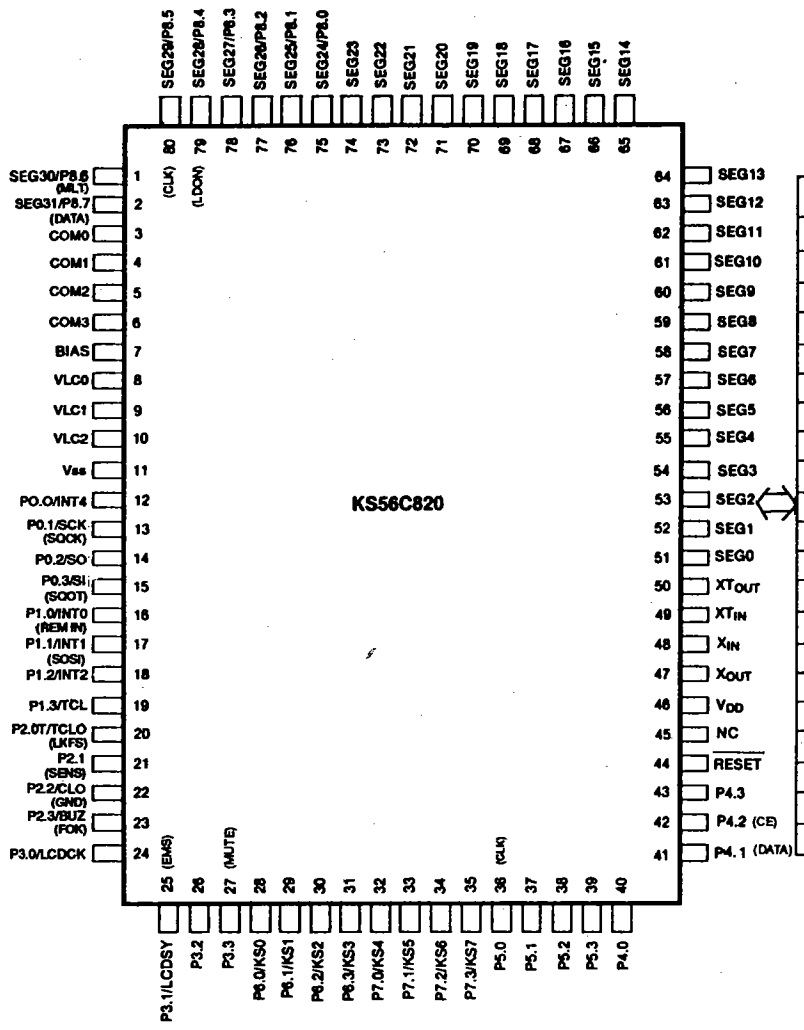
• CXD1167Q or KS9210 (DIGITAL SIGNAL PROCESSOR) : IC401



SM5870AS (D/A CONVERTER IC) : IC501

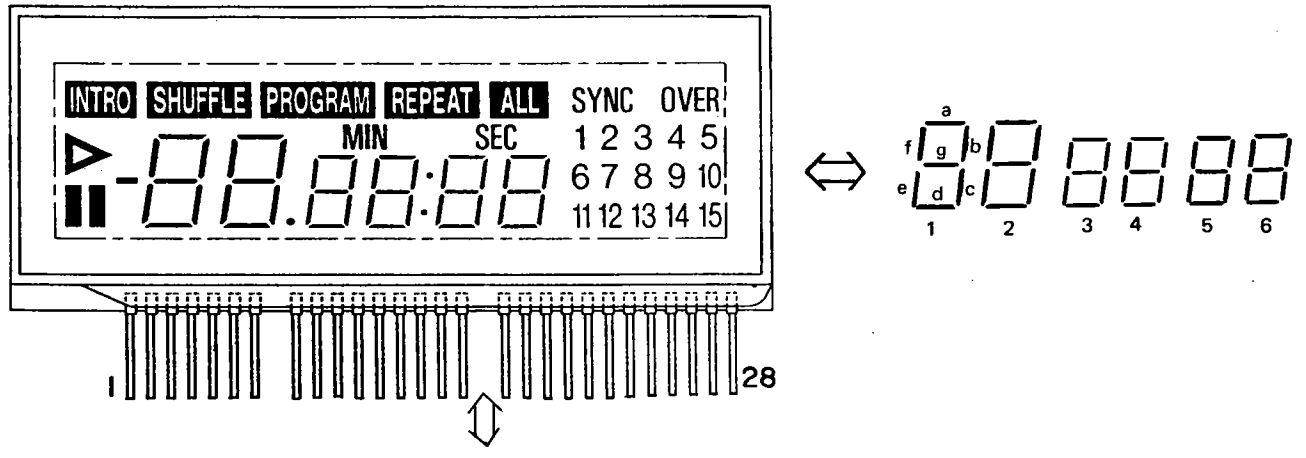


• KS56C820 (MICOM) : IC601



Pin Name	Pin description
P1.0-P1.3	4-bit Input
P2, P7	4-bit Input/Output
P3, P6	I/O mode selectable in 1-bit unit by software
P4, P5	4-bit input/output, N-ch open drain
P8.0-P8.7	Outputs in 1-bit unit (shared with segment outputs)
SEG0-SEG23	Segment output for LCD display
SEG24-SEG31	Segment output for LCD display (shared with Port 8)
COM0-COM3	Common signal output for LCD display
VLC0-VLC2	LCD power supply pin
BIAS	LCD power supply control pin for 3/5V operating
LCDCK	LCD clock output for display expansion
LCDSY	LCD sync. clock output for display expansion
TCL	Timer/Counter external clock input
TCLO	Timer/Counter clock output
INT0, 1, 2, 4	External interrupt input
CLO	Clock output
BUZ	2KHz clock output for buzzer
KS0-KS7	Semi-interrupt input detecting external falling edge
SCK, SI, SO	SCK: serial clock, SI: serial input, SO: serial output
XIN, XOUT	Crystal/Ceramic or RC clock I/O for Main-system clock
XTIN, XTOUT	Crystal clock I/O for sub-system clock

• HLC9918 or LB0609AR LCD) : LCD1

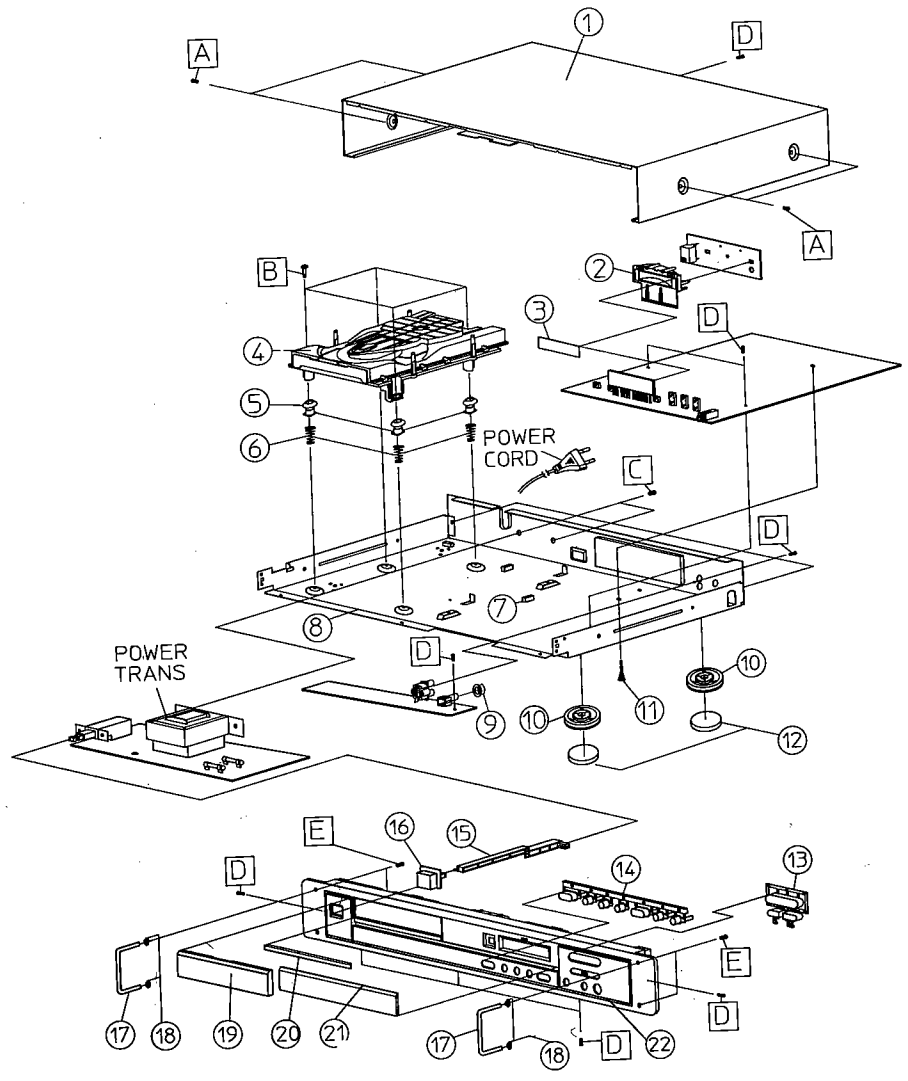


No.	COM. 1	COM. 2	COM. 3	No.	COM. 1	COM. 2	COM. 3	No.	COM. 1	COM. 2	COM. 3
1	COM.1			11	PROGRAM	3f	3e	20	SYNC	6f	6e
2		COM. 2		12	3 a	3g	3d	21	6 a	6g	6d
3			COM. 3	13	MIN	3b	3c	22	OVER	6b	6c
4	INTRO	▷	▮▮	14	REPEAT	4f	4e	23	1	6	11
5	—	1f	1e	15	4 a	4g	4d	24	2	7	12
6	1 a	1g	1d	16	:	4b	4c	25	3	8	13
7		1b	1c	17	ALL	5f	5e	26	4	9	14
8	SHUFFLE	2f	2e	18	5 a	5g	5d	27	5	10	15
9	2 a	2g	2d	19	SEC	5b	5c	28	N C		
10	•	2b	2c								

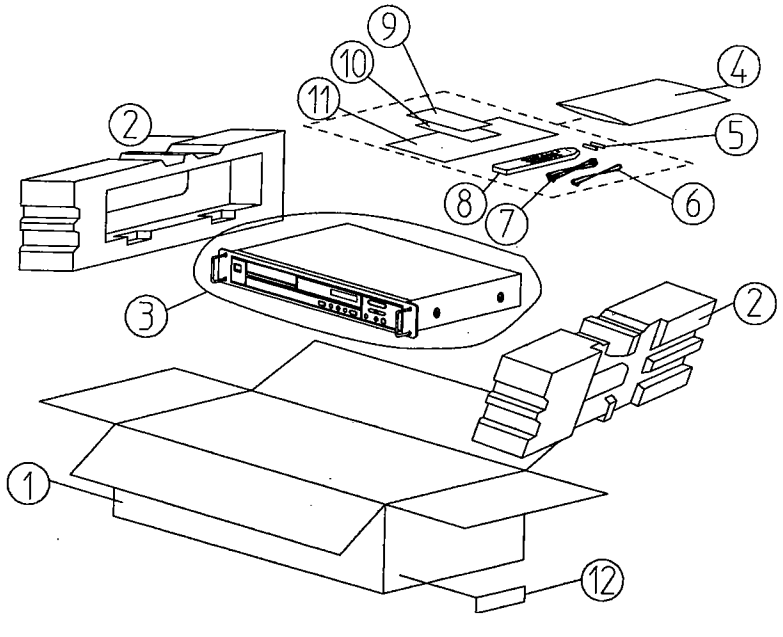
EXPLODED VIEW & PARTS LIST

1. MAIN SECTION

● EXPLODED VIEW



● PACKING VIEW



● MECHANICAL PARTS

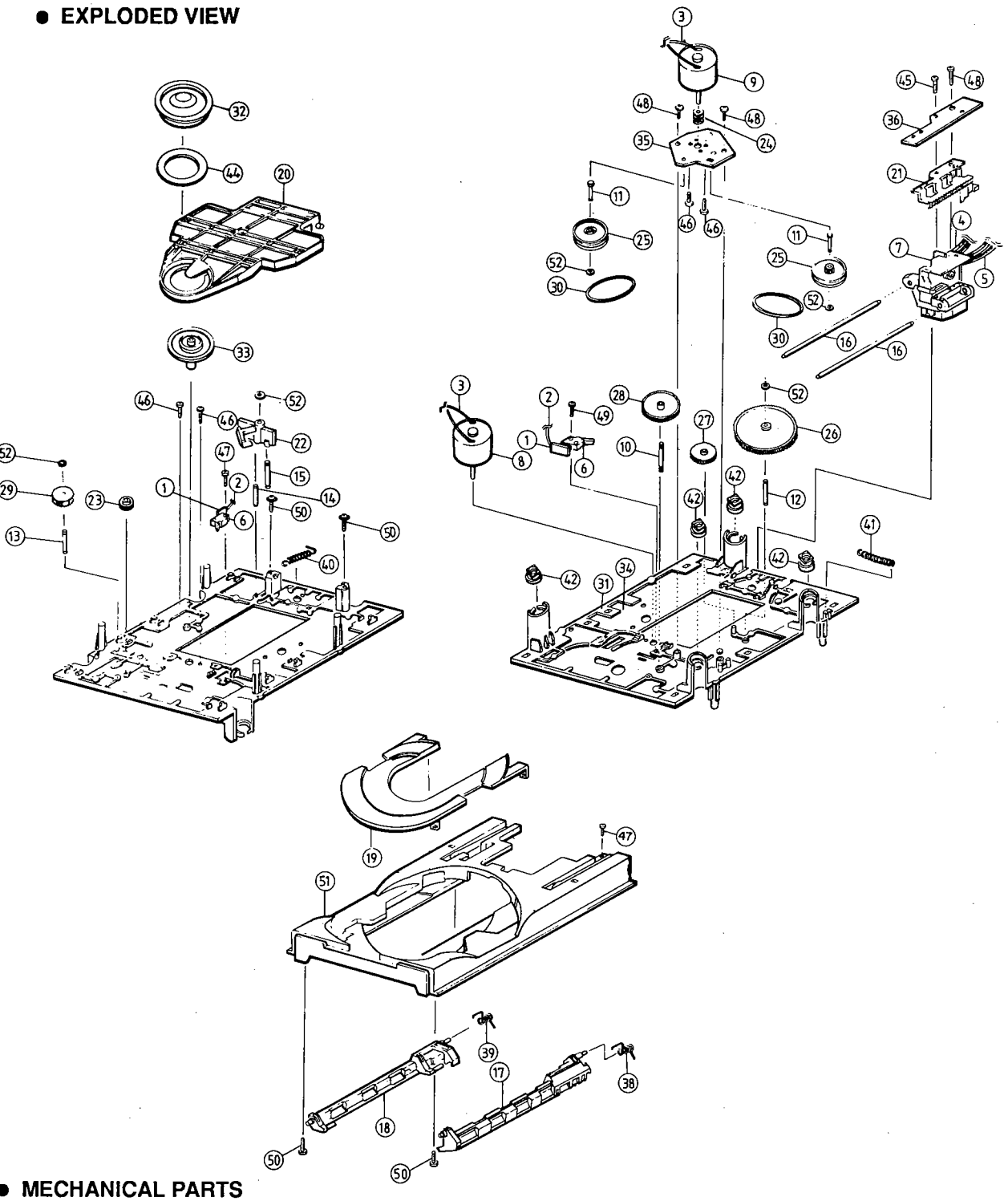
No.	PART No.	DESCRIPTION & SPECIFICATION	Q'TY	REMARK
1	16102-506-510	CABINET-TOP ; VINYL STEEL BLK 0.75T	1	
2	16602-503-510	HOLDER-LCD ; ABS WHT	1	
3	17654-564-320	FILTER-LCD ; PET T0.1 W25.5/L70.5 CD45R/CARVER	1	
4	14929-421-010	DECK-CD(DRAW) ; CMS-55/A	1	
5	16804-517-820	RUBBER-DECK ; BUTYL SCM7550	4	
6	16674-570-320	SPRING-DECK(B) ; STSW # 27	4	
7	16804-520-110	CUSHION-PCB ; EVA	3	
8	16121-504-060	CABINET-BOTTOM ; SECC 0.8T CD45R/CARVER	1	
9	16154-508-320	CAP-JACK ; RUBBER BLK CD45R/CARVER	1	
10	16072-500-120	FOOT-1 ; ABS 94HB BLK K860 QUE	4	
11	16604-531-010	LOCKING-SPACER ; DALS-10N, NYLON66	1	
12	16173-500-010	FOOT-RUBBER ; HR-WRT 60HR (CD-1200)	4	
13	17623-595-710	KNOB-PLAY ; ABS 94HB BLK, CD45R/CARVER	1	
14	17623-595-810	KNOB-FUNCTION ; ABS 94HB BLK, CD45R/CARVER	1	
15	15253-503-710	LEVER-POWER ; ABS BLK	1	
16	17624-645-810	KNOB-POWER ; ABS 94HB BLK, CD45R/CARVER	1	
17	17824-527-010	HANDLE-BAR ; AL ROD PI7 BLK, CD45R/CARVER	2	
18	15114-507-910	HANDLE-BAR CAP ; AL	4	
19	17623-595-910	GUIDE-DOOR ; ABS 94HB H/STAMP, CD45R/CARVER	1	
20	17824-526-910	INLAY-DOOR ; AL 0.5T BLK, CD45R/CARVER	1	
21	17653-538-210	WINDOW-LCD ; ACRYL 2.0T CLR, CD45R/CARVER	1	
22	16001-518-510	PANEL-FRONT ; ABS 94HB H/STAMP CD45R/CARVER	1	
A	17128-640-083	SCREW-TAP, TH ; 3S-4 x 8 FE FZB	4	
B	17094-504-310	SCREW-STUD(B) ; TAP 2S-3 x 8	4	
C	17128-540-083	SCREW-TAP TH ; 2S-4 x 8 FE FZB	2	
D	17458-130-081	SCREW-TAP TITE, BH ; B-3 x 8 FE FZY	11	
E	17128-540-123	SCREW-TAP, TH ; 2S-4 x 12 FE FZB	4	

● PACKING PARTS

No.	PART No.	DESCRIPTION & SPECIFICATION	Q'TY	REMARK
1	15003-0001-00	PACKING-CASE ; DW-1 A T7/W350/L516/H164	1	
2	18712-524-230	CUSHION-MAIN ; EPS0.02 CLR, CD45R/CARVER	1	
3	18654-520-340	NITRON PE-BAG SET 4 ; HI +EPE 690 x 550	1	
4	18654-101-050	PE-BAG ; PE FILM 0.05T, 240 x 320	1	
5	14719-306-040	BATTERY-DRY ; R03 AAM 1.5V	2	
6	13339-524-050	JACK-RCA 1P ; S155B (1P)	1	
7	13324-500-310	PLUG-PHONO ; CONNECTOR 120MM GRAY	1	
8	14909-501-440	REMOCON-ASSY ; SMALL TYPE CD45/CARVER	1	
9	18124-532-710	WARRENTY-CARD ASSY ; DV5800N/CARVER	1	
10	18124-532-910	WARRENTY-CARD ASSY ; DV5800N/CARVER	1	
11	14709-0015-00	INSTRUCTION ; WHT PAPER 100G W190 x L260	1	
12	18154-531-734	LABEL-SERIAL, DHHS ; ART-PAPER 55 x 13 WHT	1	

2. CD ASS'Y SECTION

● **EXPLODED VIEW**



● **MECHANICAL PARTS**

No.	PART No.	DESCRIPTION & SPECIFICATION	Q'TY	REMARK
	14929-421-010	DECK-CD(DRAW) ; CMS-55/A	1	
1	13014-582-500	PCB-MICRO SW ; IVO	2	
2	13029-041-130	CONNECTOR ; 4PIN(SW)	1	
3	13029-041-230	CONNECTOR ; 4PIN (MOTOR)	1	
4	13052-901-040	CONNECTOR ; 8PIN(SHIELD)	1	
5	13079-618-125	CONNECTOR ; 8PIN	1	
6	13579-901-010	MICRO-S/W ; SSCTL1217A	2	
7	14239-101-110	SAMSUNG OPTICAL HEAD ; SOH89T1	1	
8	14769-057-240	MOTOR-SPINDLE ; RF-310T(SHAFT 18.9)	1	
9	14769-057-250	MOTOR-FEED ; RF-310T(SHAFT 10.9)	1	
10	15104-531-010	SHAFT-GEAR(C) ; SUM24L(SERRATION)SCM7550	1	
11	15104-531-110	SHAFT-GEAR(D) ; SUM24L SCM7550L	2	
12	15104-531-210	SHAFT-GEAR(A) ; SUM24L SCM7550L	1	
13	15104-531-220	SHAFT-GEAR(B) ; SUM24L SCM7550L	1	
14	15104-531-310	SHAFT-LEVER(A) ; SUM24L SCM7550	1	
15	15104-531-410	SHAFT-LEVER(B) ; SUM24L SCM7550	1	
16	15104-531-510	SHAFT-PU ; SUS 420J2 SCM7550	2	
17	15252-501-110	LEVER-LIFTER(R) ; P.B.T G15% SCM7550	1	
18	15252-501-210	LEVER-LIFTER(L) ; P.B.T G15% SCM7550	1	
19	15252-501-310	LIFTER-DISC ; ABS BLK SCM7550	1	
20	15252-501-410	COVER-DISC ; P.B.T G15% SCM7550	1	
21	15253-503-310	GUIDE-PU ; P.O.M SCM7550	1	
22	15253-503-410	LEVER-MAIN ; P.O.M SCM7550	1	
23	15254-509-110	GEAR-DOOR SLIDING(A) ; P.A NTR SCM7550	1	
24	15254-513-610	GEAR-MOTOR ; P.O.M SCM7550	1	
25	15254-513-710	GEAR-PU(A) ; P.O.M SCM7550	2	
26	15254-513-810	GEAR-PU(B) ; P.O.M SCM7550	1	
27	15254-513-910	GEAR-PU(C) ; P.O.M SCM7550	1	
28	15254-514-010	GEAR-DOOR(A) ; P.O.M SCM7550	1	
29	15254-514-310	GEAR-DOOR(C) ; P.O.M SCM7550	1	
30	15274-501-520	BELT-MOTOR ; NEOPLENE 1.2T SCM7550	2	
31	16021-504-710	BRKT MAIN(M) ; E. G T1.6+POM SCM7550	1	
32	16604-538-310	PLATE CHUCK ; P.O.M SCM7550	1	
33	16604-538-410	TURN-TABLE ; P.C G20% SCM7550	1	
34	16622-502-810	BRKT MAIN(P) ; E. G T1.6	1	
35	16624-571-410	BRKT-MOTOR ; EG 1.2T SCM7550	1	
36	16624-571-910	BRKT-P/U ; SECC 1.0T SCM7550	1	
38	16674-560-510	SPRING-LIFTER R ; STSW #27 SCM7550	1	
39	16674-560-610	SPRING-LIFTER L ; STSW #27 SCM7550	1	
40	16674-560-710	SPRING-COVER ; STSW #27 SCM7550	1	
41	16674-560-810	SPRING-LEVER ; STSW #27 SCM7550	1	
42	16804-517-820	RUBBER-DECK ; BUTYL SCM7550	4	
44	16844-520-210	SHEET-CHUCK ; HYMERON T0.5 SCM7550	1	
45	17008-120-063	SCREW-PH ; +M2X6 FE FZB CFSW510	1	
46	17098-120-032	SCREW-BH ; +M2X3 FE FZW	4	
47	17108-520-063	SCREW-TAP PH ; 2S-2X6 FE FZB	1	
48	17148-526-081	SCREW-TAP, RH ; 2S-2.6X8 FE FZY	3	
49	17158-220-103	SCREW-TAP, BH ; 2-2X10 FE FZB	2	
50	17558-230-081	SCREW-TAP TITE SPEC ; S-3 X 8FZY	4	
51	17641-500-810	DOOR-DISC ; ABS BLK	1	
52	18314-500-810	RING-O ; POLY SLIDER PI1.2 SCM7550	5	

■ ELECTRICAL PARTS LIST

⚠ indicates parts for circuit safe guarding purpose. Therefore, when replacing, be sure to use specified parts only.

● MAIN SECTION

LOCATION No.	PART No.	DESCRIPTION & SPECIFICATION	Q'TY	REMARK
R101	11058-277-109	R-FUSIBLE ; RF 1/4T 1-J	1	⚠
R102	11058-277-229	R-FUSIBLE ; RF 1/4T 2.2-J	1	⚠
VR201	11249-002-130	VR-SEMI, FIXED ; VZ068TLT 2KB HDK H TYPE	1	
VR301, 302, 303, 304	11249-102-044	VR-SEMI TAPE-H ; DVN-DJA A03B24 (20K)	4	
C103, 104	11607-103-222	C-ELECTROLYTIC ; MC SMS 16V 2200M (12.5 x 25)/F	2	⚠
C218, 302, 304, 314, 315, 606	11608-102-104	C-ELECTROLYTIC ; SMS T 10V 100M (5 x 11)	9	
C403, 505, 508				
C106	11608-102-471	C-ELECTROLYTIC ; SMS T 10V 470M (8 x 11.5)	1	
C518, 519, 526, 527, 803	11608-103-103	C-ELECTROLYTIC ; SMS T 16V 10M (5 x 11)	5	
C107	11608-103-221	C-ELECTROLYTIC ; SMS T 16V 220M (8 x 11.5)	1	
C209, 802	11608-103-223	C-ELECTROLYTIC ; SMS T 16V 22M (5 x 11)	2	
C801	11608-103-331	C-ELECTROLYTIC ; SMS T 16V 330M (8 x 11.5)	1	
C214	11608-103-333	C-ELECTROLYTIC ; SMS T 16V 33M (5 x 11)	1	
C219, 220, 551	11608-103-473	C-ELECTROLYTIC ; SMS T 16V 47M (5 x 11)	3	
C531, 532, 533	11608-104-104	C-ELECTROLYTIC ; SMS T 25V 100M (6.3 x 11)	3	
C213, 601, 602	11608-106-102	C-ELECTROLYTIC ; SMS T 50V 1M (5 x 11)	3	
C217, 312	11608-106-471	C-ELECTROLYTIC ; SMS T 50V 0.47M (5 x 11)	2	
C204, 208, 212	11608-106-472	C-ELECTROLYTIC ; SMS T 50V 4.7M (5 x 11)	3	
LAMP1	12059-821-400	LAMP-PILOT ; 14V 100MA T-4.2 AMBER	2	
IC501	12109-303-280	IC-IBITDAC ; SM5870AS	1	
IC601	12109-303-690	IC-MICOM ; KS56C820-06	1	
IC102	12109-401-750	IC REGULATOR ; MC79L05	1	
IC301	12119-203-790	IC-RF AMP ; KA9201	1	
IC201	12119-203-840	IC-SS PROCESSOR ; KA830 DUAL VOLTAGE	1	
IC508	12119-401-170	IC-OP AMP ; MC4558C	1	
IC504, 505	12119-401-760	IC-OP AMP ; NJM2068SD/UPC4570HA	2	
IC101	12119-601-770	IC-REGULATOR ; MC7805	1	
Q206, 209	12149-101-560	TRANSISTOR ; KSA708-Y, TAPE	2	
Q204	12149-101-590	TRANSISTOR ; KSA931-Y, TAPE	1	
Q202	12149-201-480	TRANSISTOR ; KSB 772-Y	1	
Q301	12149-202-050	TRANSISTPR ; KSB564A-Y	1	
Q501, 502, 503, 601, 801	12149-301-900	TRANSISTOR ; KSC 945-Y, TAPE	5	
Q203	12149-301-910	TRANSISTOR ; KSC2331-Y, TAPE	1	
Q205, 208	12149-301-930	TRANSISTOR ; KSC1008-Y, TAPE	2	
Q504	12159-301-330	TR-DIGITAL ; KSR2003, TAPE	1	
Q207	12159-301-800	TR-DIGITAL ; R1007/108M/124XS	1	
D606, 801, 802, 101 ~ 104	12169-201-080	DIODE-RECTIFIER ; 1N 4001, TAPE	7	
D301, 601 ~ 605	12169-301-400	DIODE-SWITCH ; 1N4148M ROHM (SMALL)	9	
D803, 804, 805				
ZD801	12169-404-790	DIODE ZENER ; 500MW UZ-5.6BSB TAP	1	
	12199-101-130	REMOCON EYE ; SV06C	1	
LCD1	12339-104-730	LCD-SAMSUNG ; LB-0609AP	1	
L501	12450-302-831	COIL-DIGITAL I/O TTRANS ; FTR9PIB	1	
PJ1	13339-118-010	JACK PHONE ; SOQ9478-01-010	1	
J502	13339-407-050	JACK-RCA BOARD ; S-450 2P	1	
J501	13339-524-050	JACK-RCA 1P ; S155B (1P)	1	
SW1, 2, 3, 4, 5	13559-102-010	SWITCT-TACT ; JIP1236A 160G	5	
SW6, 7, 8	13559-901-130	TACT SWITCH ; SKHT27006	3	
PS1	13599-902-040	SW-POWER ; SDDL1PCH L011	1	
X601	14534-504-040	CERAMIC-RESONATOR ; CSA4.00MG	1	
X501	14539-401-050	X-TAL ; HC 18U 16.9344MHz	1	
IC401	A4012-0051	IC-LINEAR ; CXD1167Q QFP 240-300-0003	1	OPTIONAL
IC401	A4014-0002	IC-DSP ; KS9210 QFP	1	OPTIONAL
Q201	A4050-0037	TR-GENERAL ; KTC4369 Y 15W 3A 100MHz 30V	1	
PCB-MAIN	16024-0024-00	PCB MAIN 1V-O 1.6T W163/L247	1	
P/T	12869-221-700	TRANS-POWER ; 48 x 20MM CD42R 120V	1	⚠
	12869-221-510	TRANS-POWER ; 48 x 20MM CD45R 230V	1	OPTIONAL
F102	13164-101-913	CLIP-FUSE ; PBP 3-1/2H T0.3 SN	2	⚠
F102	14709-341-080	FUSE ; UL.CSA 51T 250V 0.16A	1	⚠
P/CORD	14709-241-420	FUSE ; T250V 80MA 20EUR	1	OPTIONAL
	A60C6-0081	POWER CORD ; EP2 KJ10/SPT-1 # 18 1.80MT BLK W/S	1	⚠
	A6006-0082	POWER CORD ; KKJ-1004A/KJO201 1.80MT BLK W/S	1	⚠

● REMOTE CONTROL SECTION

LOCATION No.	PART No.	DESCRIPTION & SPECIFICATION	Q'TY	REMARK
ASSY	14909-501-440	REMOCON-ASSY	1	OPTIONAL
TR1	11018-877-109	R-CARBON ; RN 1/8T 1-J	1	
TC1, 2	11449-518-101	CONDENSER AXIAL-LEAD ; 50V UP050 B100-K	2	
TC3	11608-106-472	C-ELECTROLYTIC ; CE04W T 50V 4.7M	1	
TIC1	12109-401-180	IC-REMOCON ; LC7461M-8100	1	
TQ1	12149-401-150	TRANSISTOR ; KSD471-Y, TAPE	1	
TLD1	12309-101-700	LED-INFRARED ; EL1	1	
	14539-504-030	CERAMIC-RESONATOR ; CSB455EBL	1	

PARTS ORDERING

Please provide the Model numbers of the units involved when ordering genuine CARVER replacement parts. Also provide the CARVER part number and the generic part number to confirm the correct part needed.

The Carver Parts Department is open Monday thru Friday, 7:00 a.m.to 4:45 p.m. PST.
The following phone number is to be used for part orders only!
Technical assistance is not available on this line.

1-800-433-0547

Or if you prefer to FAX in your part order, please use the following FAX number:

1-206-775-9180

From time to time, when it is necessary, we may make a substitution for the original part ordered, due to circuit revisions or part availability.

Random deviation from the original CARVER designated part is not recommended!
Complete PCB replacement is not recommended. You must have prior approval for warranty repair should PCB replacement be necessary.

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