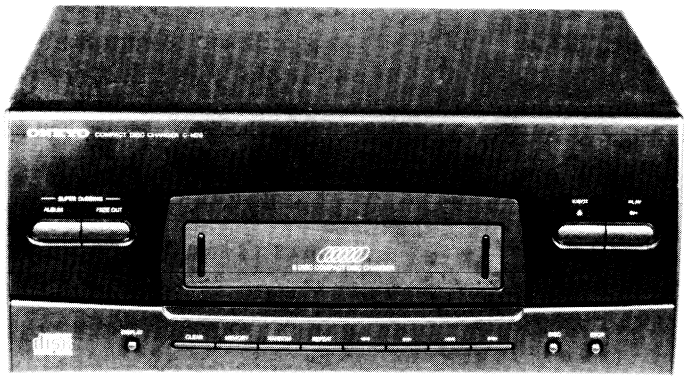
Ref. No.3435

ONKYO® SERVICE MANUAL

COMPACT DISC PLAYER
MODEL C-M70



Silver and Black models

UD, UDN, UDC, BHUD, BHUDN, BHUDC	120V AC, 60Hz
UP, UPV, UPF, BHUP, BHUPV, BHUPF	230V AC, 50Hz
UW, BHUW	120/220V AC, 50/60Hz
UQA, BHUQA	240V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

SPECIFICATIONS

Signal readout system:	Optical non-contact
Reading rotation:	About 500~200 r.p.m. (constant linear velocity)
Linear velocity:	1.2~1.4m/s
Error correction system:	Cross interleave readsolomon code
D/A converter:	1 bit PWM
Sampling frequency:	352.8kHz (8 times oversampling)
Number of channels:	2 (Stereo)
Frequency response:	5Hz~20kHz
Total harmonic distortion:	0.004% (at 1kHz)
Dynamic range:	96dB
Signal to noise ratio:	96dB
Channel separation:	90dB (at 1kHz)
Wow and Flutter:	Below threshold of measurability
Power consumption:	11 watts
Output level:	2 volts r.m.s.
Dimensions (W×H×D):	275×115×304mm 10-13/16"×4-9/16"×12"
Weight:	4.2kg. 9.3 lbs.

Specifications are subject to change without notice.

ONKYO®
AUDIO COMPONENTS

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NOTE ON COMPACT DISC

- **Holding Compact Discs**

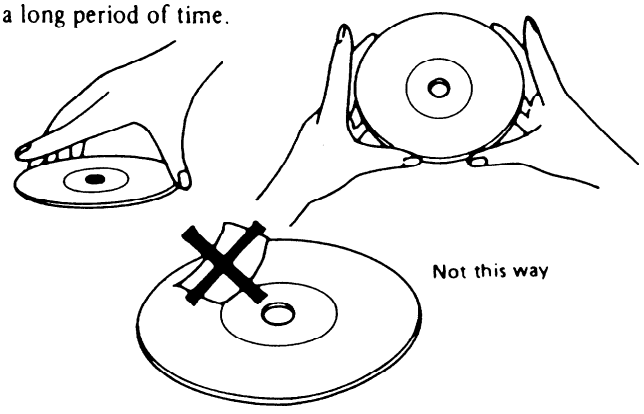
Hold Compact Discs by the edges so that you do not touch the surface of disc. Remember that the side of the disc with the "rainbow" reflection is the side containing the audio information.

Do not attach tape or paper to the label side of the disc and always be careful not to leave fingerprints on the side that is played.

- **Storing Compact Discs**

Store Compact Discs in a location protected from direct sunlight, high heat and humidity and extremely high and low temperatures. Discs should never be left in the trunk or interior of an automobile in the sun since the temperature can become very high in such a closed environment.

Always store Compact Discs in the holders in which they were sold. Never leave a disc in the player's disc holder for a long period of time.



SERVICE PROCEDURES

1. Safety-check out

After correcting the original service problem,perform the following safety check before releasing the set to the customer:

Connect the insulating-resistance tester between the plug of power supply cord and chassis.

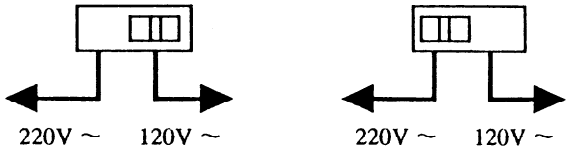
Specifications:More than 10Mohm at 500V.

2. Voltage Selector (Back panel)

Worldwide models are equipped with a voltage selector to conform with local power supplies.Be sure to set this switch to match the voltage of the power supply in user's area before turning the power switch on.

Voltage is changed by sliding the groove in the switch with a screw driver to the right or left.

Confirm that the switch has been moved all the way to the right or left before turning the power switch on.



at AC120V at AC220V

- **Cleaning Compact Discs**

Before playing a disc wipe off the playing surface with a soft cloth to remove dust and other soil. Wipe the surface in straight lines from the center of the disc outward, not in a circular motion as you would with a phonograph record.

Do not use benzene, chemical cleansers or phonograph record cleaning solutions to clean Compact Discs. Also avoid static electricity prevention solutions since they can damage the surface of Compact Discs.

Problems Caused by Dew

Dew can form inside a Compact player when it is brought from a cold environment into a warm room, when a room is rapidly heated and if a player is left in a humid environment.

This dew can prevent the laser pickup from reading the data contained in the pits in the disc surface. If the player does not operate properly because of dew, remove the disc and leave the player's power switch on for about one hour to remove all moisture.

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

WARNING!!

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMMISION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

Laser Diode Properties

- Material: GaAS/GaAlAs
- Wavelength: 780nm
- Emission Duration: continuous
- Laser output: max. 0.5mW*

  *This output is the value measured at a distance about 1.8mm from the objective lens surface on the Optical Pick-up Block.

LASER WARNING LABEL

The label shown below are affixed.

1. **Warning lable**
   This label is located on the arm of mechanism.

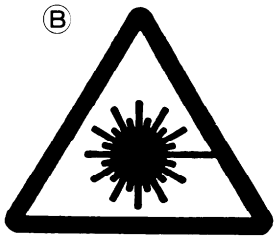
Ⓐ

DANGER —INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK FAILED OR DEFEATED. AVOID DIRECT EXPOSURE TO BEAM

CAUTION —HAZARDOUS LASER AND ELECTROMAGNETIC RADIATION WHEN OPEN AND INTERLOCK DEFEATED

ATTENTION —RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT AVEC L'ECLENCHEMENT DE SECURITE ANNULE.

Ⓑ



Ⓒ

ADVARSEL: USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDER ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.

Ⓓ

VARO! AVATAESSA OLET ALTTINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

Ⓔ

VARNING – OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. STRÅLEN ÄR FARLIG.

Ⓐ : Danger label
Ⓑ : Except 120V model
Ⓒ : Except 120V model
Ⓓ,Ⓔ: Only 230V model

2. **Certification label (120V model)**
   This label is located on the back panel.

PRODUCT IS CERTIFIED BY THE MANUFACTURER TO COMPLY WITH DHHS RULES 21 CFR SUBCHAPTER J APPLICABLE AT THE DATE OF MANUFACTURE.

MANUFACTURED

3. **Class 1 label (Except 120V model)**
   This label is located on the back panel.

"CLASS 1 LASER PRODUCT"

ADVARSEL

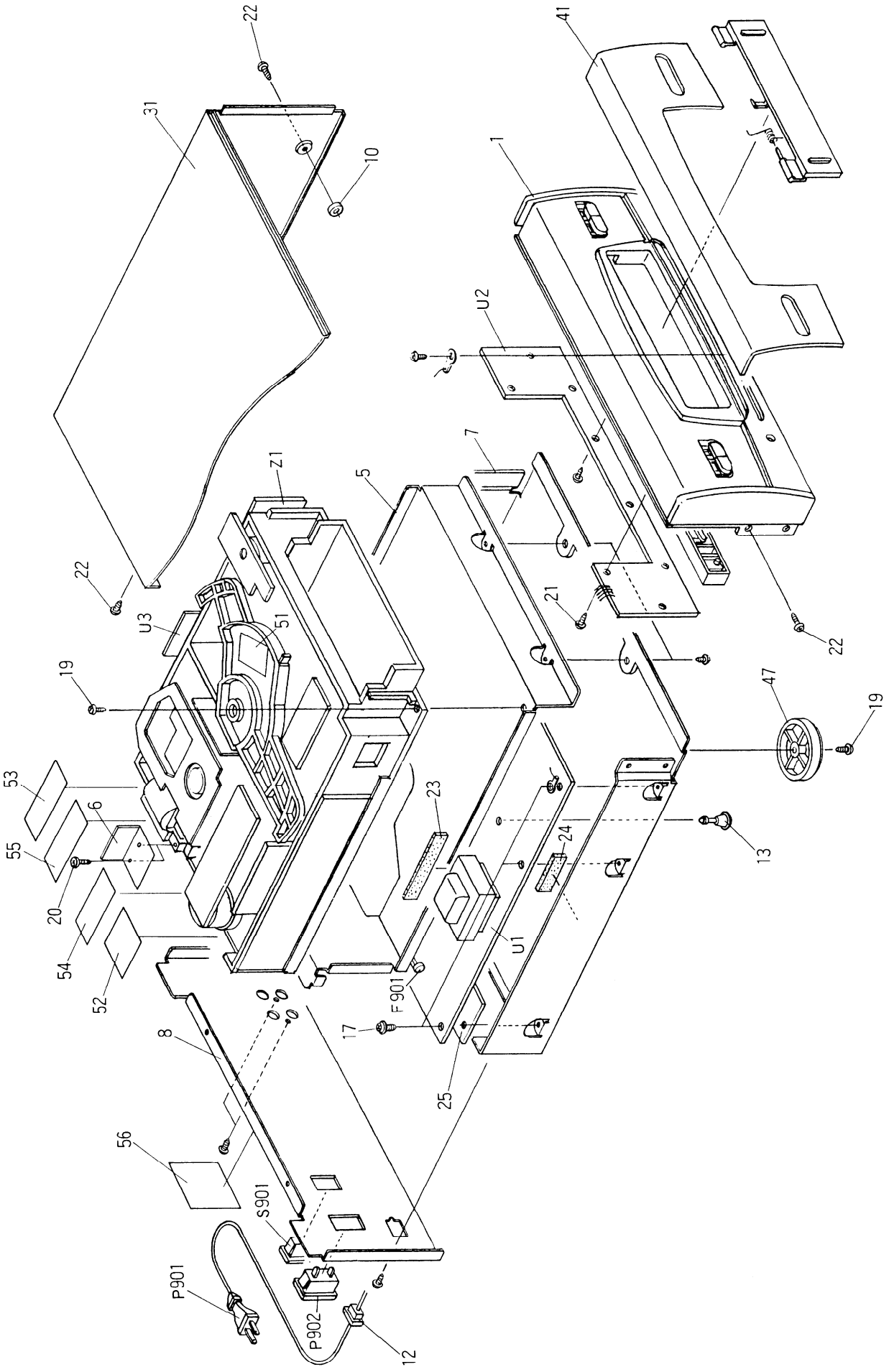
Denne mærkning er anbragt på apparatets højre side og indikerer, at apparatet arbejder med laserstråler af klasse 1, hvilket betyder, at der anvendes laserstråler af svageste klasse, og at man ikke på apparatets yderside kan blive udsat for utilladelig kraftig stråling.

APPARATET BØR KUN ÅBNES AF FAGFOLK MED SÆRLIGT KENDSKAB TIL APPARATER MED LASERSTRÅLER!

Indvendigt i apparatet er anbragt den her gengivne advarselsmærkning, som advarer imod at foretage sådanne indgreb i apparatet, at man kan komme til at udsætte sig for laserstråling.

VAROITUS! Laite sisältää laserdiodin, joka lähettää (näkymätöntä) silmille vaarallista lasersäteilyä.

CHASSIS-EXPLODED VIEW



PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
1	27110732	Front bracket <S>
	27110733	Front bracket <B>
5	27130703	Bracket
6	27141576	Bracket
7	27100263A	Chassis
8	27121630	Back panel <D>
	27121631	Back panel <P>
	27121632	Back panel <W>
	27121633	Back panel <Q>
10	27270212	Spacer
12	27300750	⚠ Bushing cord
13	27190428	KGLS-10RT,Holder
16	833430080	3TTP+8P(BC),Self-tapping screw
17	831130088	3TTW+8B,Self-tapping screw
19	834430088	3TTS+8B(BC),Self-tapping screw
20	834430068	3TTS+6B(BC),Self-tapping screw
21	838426088	2.6TTB+8B(BC),Self-tapping screw
22	838430088	3TTB+8B(BC),Self-tapping screw
23	28141136	Cushion
24	28140955	Cushion
26	28175147	Shield plate
27	28175200	Shield plate <P/W/Q>
31	28184524	Top cover
41	27211440	Front panel <S>
	27211441	Front panel <B>
47	27175252-1AY	Leg
51	29360807	Label,danger
52	29361218	Label laser <P/W/Q>
53	29360811A	Label <PV>
54	29361342A	Label <PV>
55	29361298A	Label <PV>
56	29360687	Label class 1 <P/W/Q>
57	260208	Binder
58	2061112140	Cord ass'y

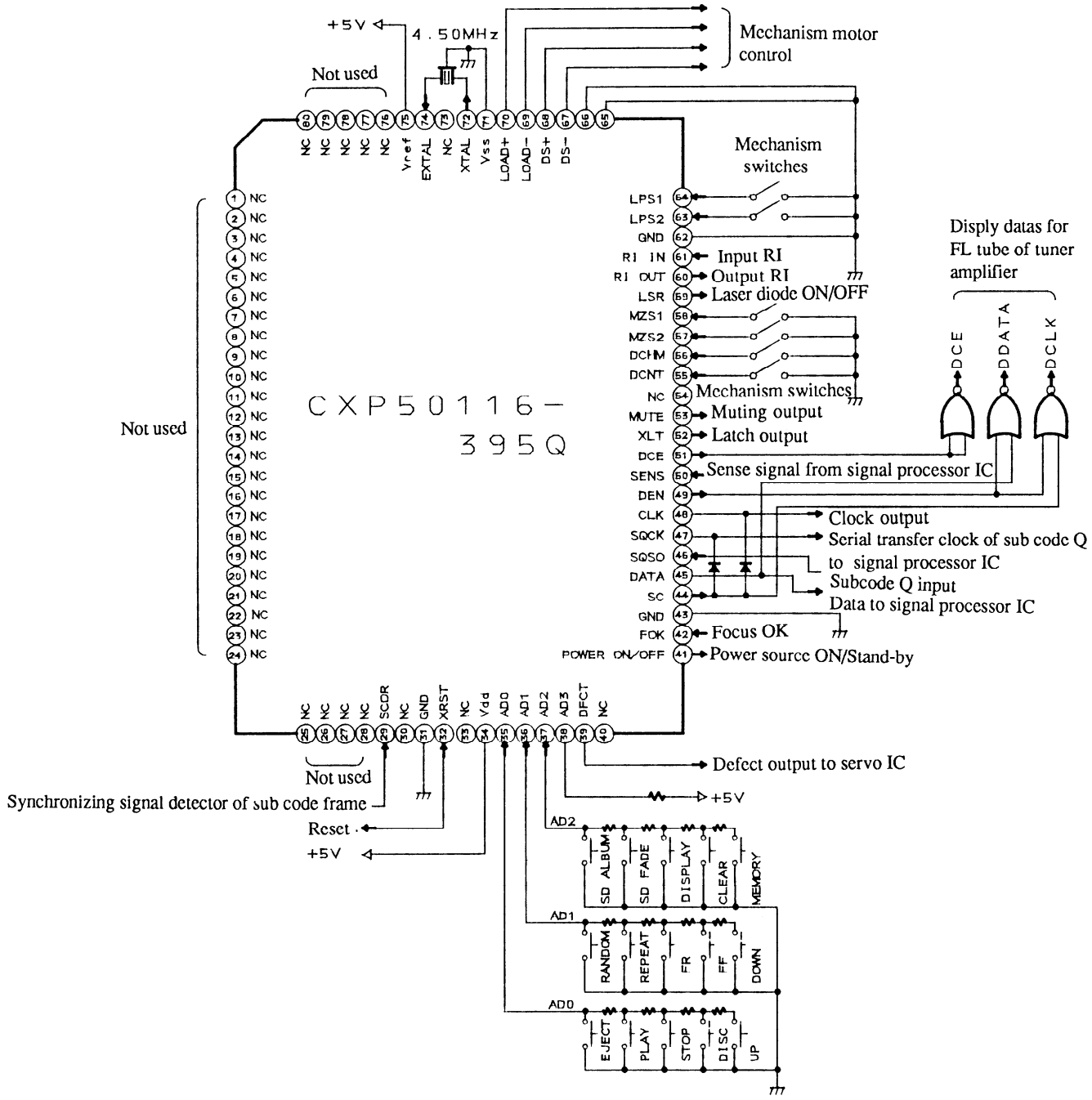
REF.NO.	PART NO.	DESCRIPTION
F901	252075	⚠ 2.5A-SE-EAK,AC outlet fuse <P>
P901	253142A	⚠ AS-UC7#18,Power supply cord <D>
	253164Y or	⚠ AS-CEE 250V 2.5A,
	253149	⚠ Power supply cord <P/W>
	253170	⚠ AS-SAA,Power supply cord <Q>
P902	25050290	⚠ NSCT-2P118T,AC outlet <D>
	25050337	⚠ NSCT-2P164,AC outlet <P/W>
	25050346	⚠ NSCT-2P173,AC outlet <Q>
S901	25065340	⚠ NSS-0001,Power switch
U1	1H208559-1	NAAR-4559-1,Main circuit pc board ass'y <D>
	1H208559-1A	NAAR-4559-1A,Main circuit pc board ass'y <P>
	1H208559-1B	NAAR-4559-1B,Main circuit pc board ass'y <W>
	1H208559-1C	NAAR-4559-1C,Main circuit pc board ass'y <Q>
U2	1H208560-1	NASW-4560-1,Operation switch pc board ass'y
U3	1H208576-1	NAETC-4576-1,Terminal pc board ass'y
Z1	24506982	NCD-105P-C,Mechanism ass'y

NOTE: <D>:120V model only
<P>:230V model only
<PV>:230V model only except Germany model
<W>:Worldwide model only
<Q>:240V model only
<S>:Silver model only
<B>:Black model only

NOTE:
THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

MICROPROCESSOR CONNECTION VIEW

CXP50116-395Q (MICROPROCESSOR)

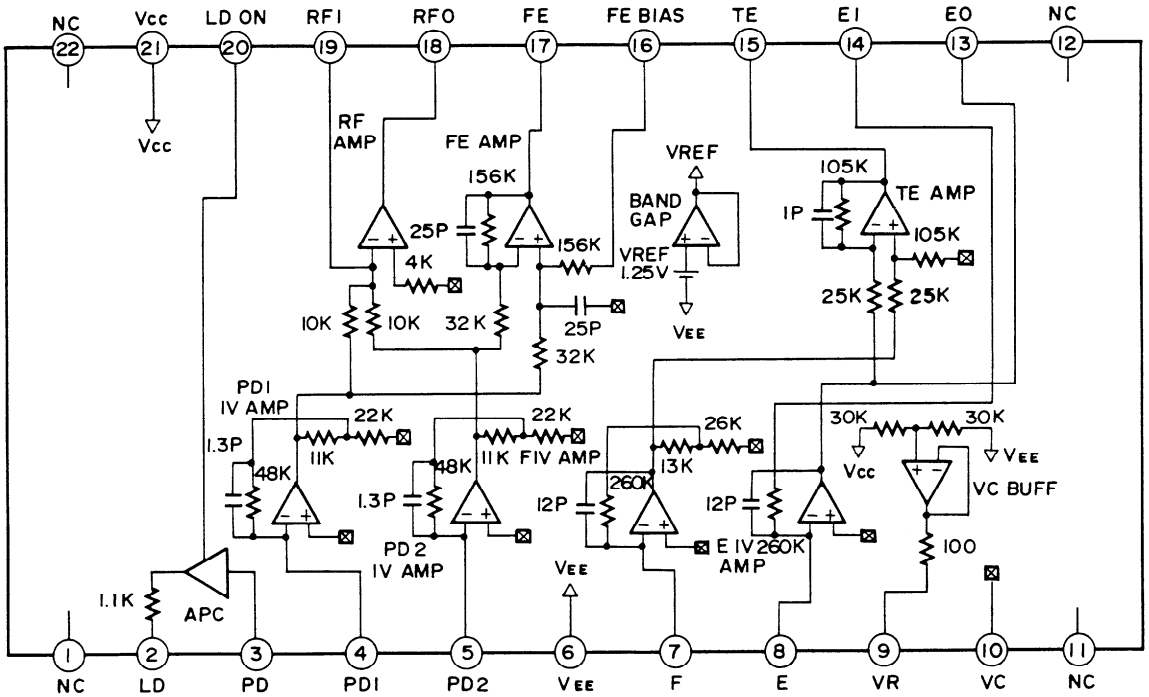


Terminal Description

Pin No.	Symbol	I/O	Description
1~28	NC		Not used.
29	SCOR	I	Synchronizing signal detection input terminal for sub code frame.
30	NC		Not used.
31	GND		Ground terminal
32	XRST	I/O	Reset input terminal.Reset at the high level.
33	NC		Not used.
34	VDD		Power supply terminal (+5V)
35~37	AD0~AD2	I	Operation key connection terminals.
38	AD3	I	Not used.
39	DFCT	O	Defect circuit operation inhibit signal output terminal.L:Inhibit
40	NC		Not used.
41	POWER ON/OFF	O	Power source control output.H:ON L:OFF
42	FOK	I	Focus OK input terminal
43	GND		Ground terminal.
44	SC	O	Clock supply terminal of serial transmitter
45	DATA	O	Serial data output terminal of command to the signal processor IC.
46	SQSO	I	Serial data input terminal of sub code Q from the signal processor IC.
47	SQCK	O	Serial transfer clock output terminal of sub code Q to the signal processor IC.
48	CLK	O	Serial transfer clock output terminal of command to the signal processor IC.
49	DEN	O	Enable output terminal of display clock output.L:Inhibit
50	SENS	I	Sense signal input terminal from the signal processor IC.
51	DCE	O	Display enable signal output terminal
52	XTL	O	Serial transfer latch signal output terminal to the signal processor IC.
53	MUTE	O	Muting control output terminal.H:ON
54	NC		Not used.
55	DCNT	I	Disc selector stop position detection switch input.L:STOP
56	DCHM	I	Disc position 1 detection switch input.L:DISC 1
57	MZS2	I	Magazine discrimination switch input.L:One piece magazine
58	MZS1	I	Magazine insertion detection switch input.L:Insertion
59	LSR	O	Optical pickup control output.L:ON
60	RI OUT	O	Output terminal of control signal RI
61	RI IN	I	Input terminal of control signal RI
62	GND		Ground terminal
63	LPS2	I	Switch input of the finish of chucking.L:Eject and clamp
64	LPS1	I	Tray position detection input terminal.L:Clamp and loading
65,66	GND		Ground terminal
67	DS-	O	Disc selector motor control terminals: H/H =STOP, L/H =OUT, H/L =IN
68	DS+	O	
69	LOAD-	O	Loading motor control terminal: H/H =STOP, L/H =EJECT, H/L =LOADING
70	LOAD+	O	
71	Vss		Ground terminal
72	XTAL	O	System clock output terminal
73	NC		Not used.
74	EXTAL	I	System clock input terminal.Connect the 4.5MHz ceramic resonator.
75	Vref	I	Reference voltage supply terminal.
76~80	NC		Not used.

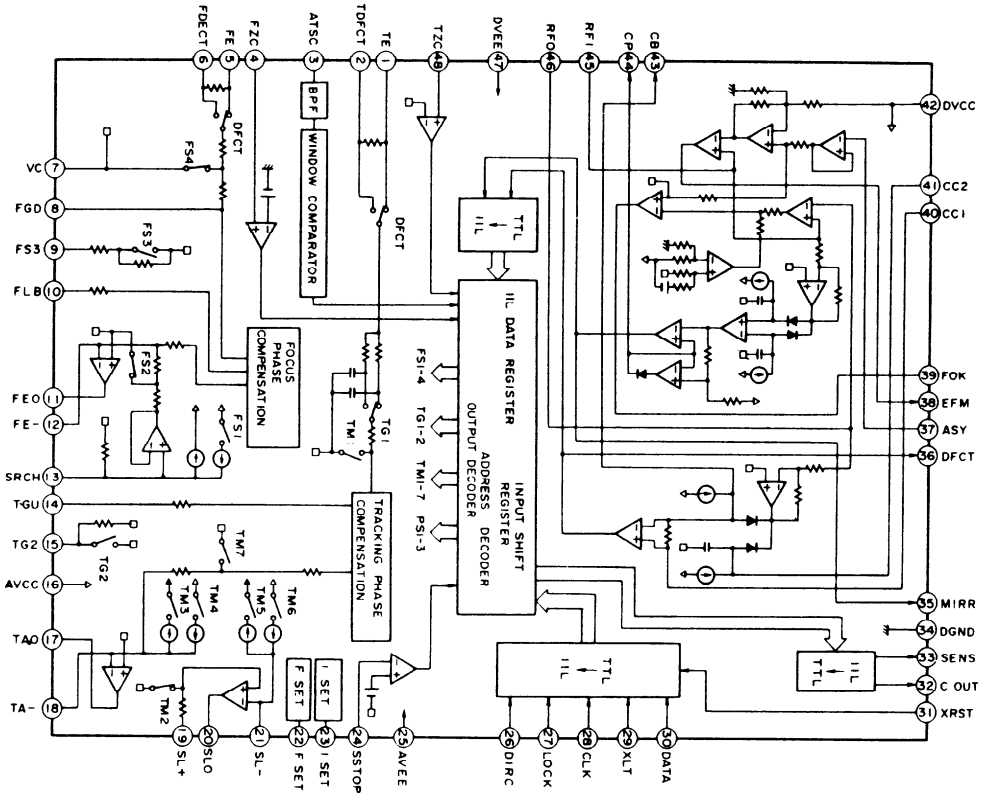
IC BLOCK DIAGRAMS AND DESCRIPTIONS

CXA1471S (RF amplifier)



Pin No.	Symbol	Description
2	LD	Output terminal of APC LD amplifier APC:Automatic power control LD:Laser diode
3	PD	Input terminal of APC PD amplifier PD:Pin diode
4	PD1	Inversion input terminal of RF I-V amplifier (1).Connect to A+C of pin diodes.
5	PD2	Inversion input terminal of RF I-V amplifier (2).Connect to B+D of pin diodes.
6	VEE	Negative power supply terminal
7	F	Inversion input terminal of F I-V amplifier.Connect to F of pin diode.
8	E	Inversion input terminal of E I-V amplifier.Connect to E of pin diode.
9	VR	DC voltage output terminal of (VCC+VEE)/2.
10	VC	Ground terminal
13	EO	Output terminal of E I-V amplifier
14	EI	Feedback Input terminal of E I-V amplifier.Gain adjustment input of E I-V amplifier.
15	TE	Output terminal of tracking error amplifier
16	FE BIAS	Non-inversion bias terminal of focus error amplifier for CRM adjustment of focus error amplifier.
17	FE	Output terminal of focus error amplifier
18	RFO	Output terminal of RF summing amplifier
19	RFI	Input terminal of output signal of RF summing amplifier via the coupling capacitor
20	LD ON	ON/OFF control terminal of laser diode
21	VCC	Positive power supply terminal

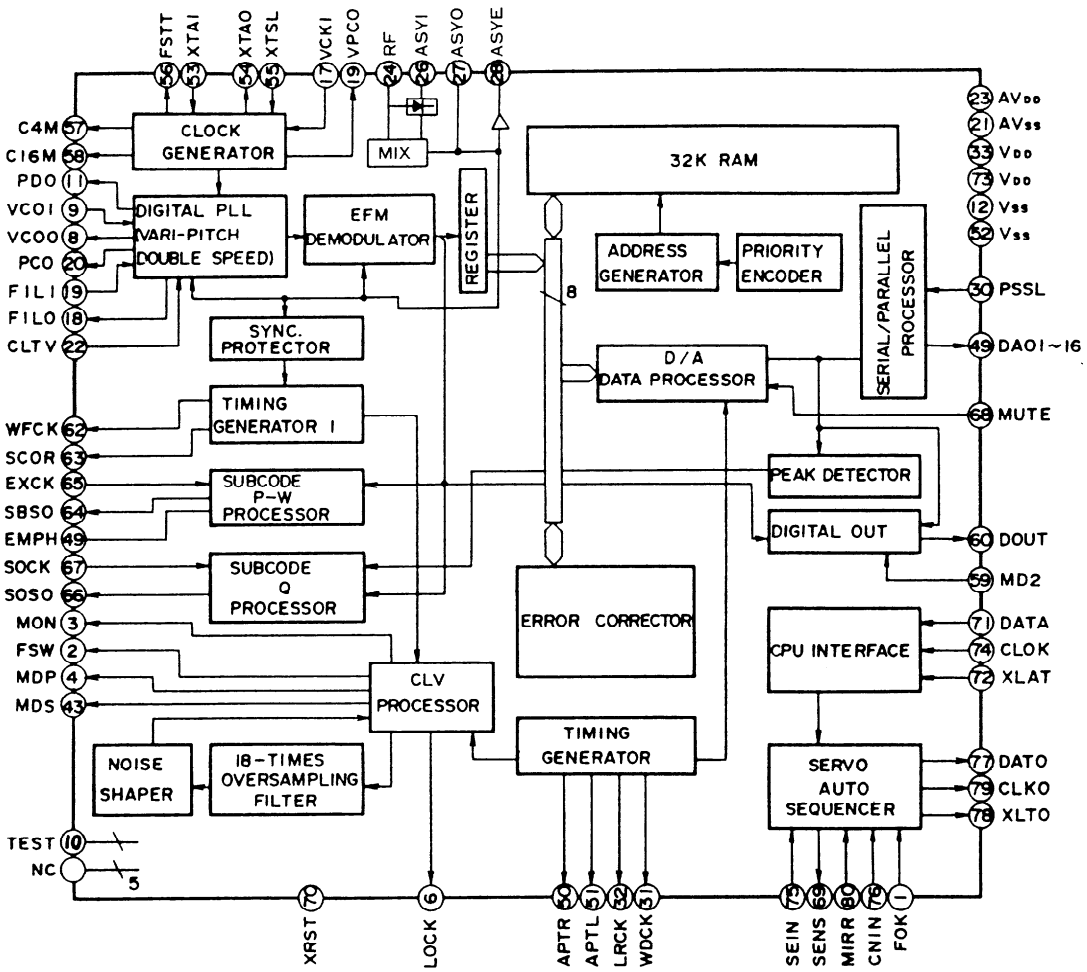
CXA1372S (Servo Signal Processor)



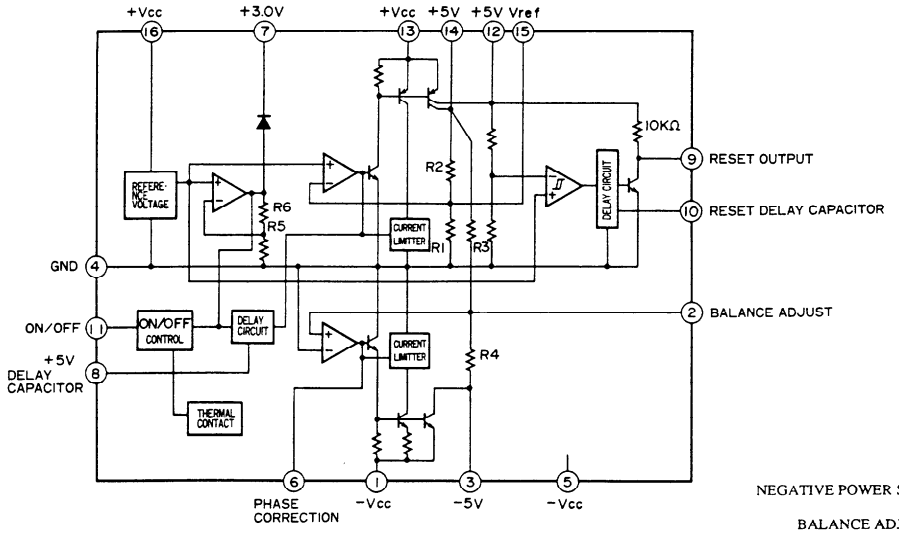
PIN. NO.	SYMBOL	I/O	DESCRIPTION
1	TE	I	Tracking error input terminal.
2	TDFCT	I	Capacitor connection terminal for time constant when defect.
3	ATSC	I	Window comparator input terminal for ATSC detection.
4	FZC	I	Focus zero-cross comparator input terminal.
5	FE	I	Focus error input terminal.
6	FDFCT	I	Capacitor connection terminal for time constant when detect.
7	VC	I	Mid-point voltage input terminal
8	FGD	I	Connect the capacitor between pin 9 and this pin when the high frequency gain of focus servo is dropped.
9	FS3	I	Focus servo high frequency gain changeover input terminal.
10	FLB	I	Input terminal for the low frequency boost of focus servo.
11	FEO	O	Focus drive output terminal.
12	FE-	I	Inversion input terminal of focus amplifier.
13	SRCH	I	Time constant terminal to make the focus search waveform.
14	TGU	I	Tracking high frequency gain changeover input terminal.
15	TG2	I	Tracking high frequency changeover input terminal.
17	TAO	O	Tracking drive output terminal.
18	TA-	I	Inversion input terminal of tracking amplifier.
19	SL+	I	No-inversion input terminal of sled amplifier.
20	SLO	O	Sled(slide) drive output terminal.
21	SL-	I	Inversion input terminal of sled amplifier.

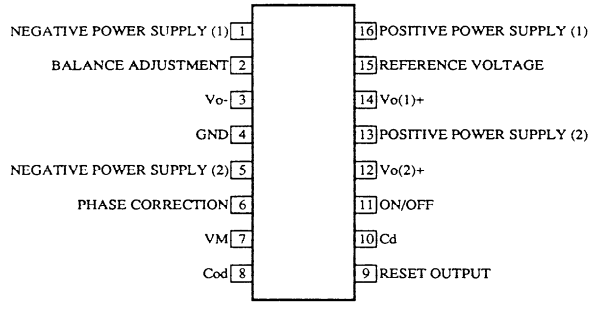
PIN. NO.	SYMBOL	I/O	DESCRIPTION
22	FSET	I	Peak setting input of phase correction of focus tracking.
23	ISET	I	This terminal is flowed the current so that the focus search, tracking jump, and sled kick height is decided.
24	SSTOP	I	Inner switch selection input terminal.
26	DIRC	I	This terminal is used when a track jump.
27	LOCK	I	The sled runaway prevention circuit operates at the low level.
28	CLK	I	Serial data transfer clock input from microprocessor.
29	XLT	I	Latch input from microprocessor.
30	DATA	I	Serial data input from microprocessor.
31	XRST	I	Reset input terminal. Active low.
32	C. OUT	O	Signal output to count the track numbers.
33	SENS	O	This terminal outputs FZC, and SSTOP to according command from microprocessor.
35	MIRR	O	Mirror comparator output terminal.
36	DFCT	O	Defect comparator output terminal.
37	ASY	I	Auto asymmetry control input terminal.
38	EFM	O	EFM comparator output terminal.
39	FOK	O	Focus OK comparator output terminal.
40	CC1	O	Defect bottom hold output terminal.
41	CC2	I	Defect bottom hold input terminal from CC1.
43	CB	I	Defect bottom hold capacitor connection terminal.
44	CP	I	Mirror hold capacitor connection terminal.
45	RFI	I	RF summing amplifier input terminal.
46	RFO	O	RF summing amplifier output terminal.
48	TZC	I	Tracking zero-cross comparator input terminal.

CXD2500AQ (Digital Signal Processor)



M5294P (SYSTEM RESET AND ±5V POWER SUPPLY)





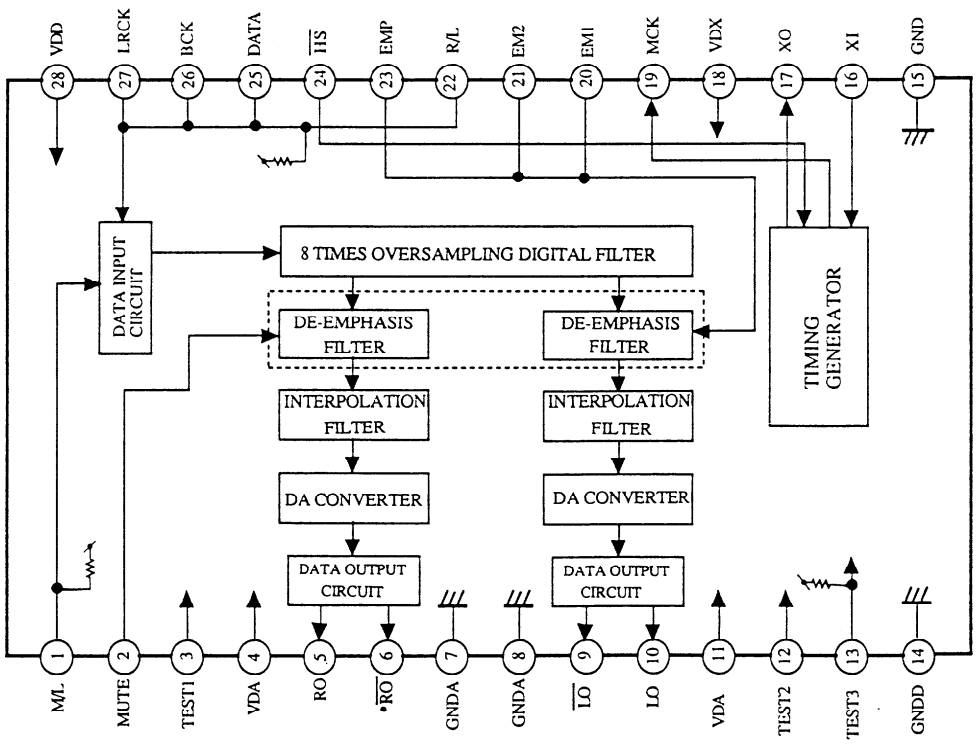
NO.	SYMBOL	I/O	DESCRIPTION
1	FOK	I	Focus OK input
2	FSW	O	Output filter changeover output of spindle motor
3	MON	O	Spindle motor control output
4	MDP	O	Spindle motor servo control
5	MDS	O	Spindle motor servo control
6	LOCK	O	H when GFS is high
7	NC		
8	VCOO	O	Oscillation circuit output for analog FEM PLL
9	VCOI	I	Oscillation circuit input for analog EFM PLL (8.6436MHz)
10	TEST	I	Test terminal
11	PDO	O	Charge pump output for analog EFM PLL
12	Vss		Ground terminal
13-15	NC		
16	VPCO	O	PLL charge pump output for variable pitch
17	VCKI	I	Clock input for variable pitch from VCO (16.934MHz)
18	FILO	O	Filter output for master PLL
19	FILI	I	Filter input for master PLL
20	PCO	O	Charge pump output for master PLL
21	AVss		Analog ground
22	CLTV	I	VCO control voltage input for master
23	AVDD		Analog section power supply (+5V)
24	RF	I	EFM signal input
25	BIAS	I	Asymmetry circuit constant current input.
26	ASYI	I	Asymmetry comparator voltage input.
27	ASYO	O	EFM full swing output
28	ASYE	I	Asymmetry control circuit.
29	NC		
30	PSSL	I	Audio data output mode changeover input. Serial data at L and paraller data at H.
31	WDCK	O	D/A interface for 48 bits slot. Word clock f=2Fs.
32	LRCK	O	D/A interface for 48 bits slot. LR clock f=Fs.
33	VDD		Power supply terminal (+5V)
34-49			Data output terminals

			PSSL=1	PSSL=0
34	DA16	O	DA16	Serial data of 48 bits slot
35	DA15	O	DA15	Bit clock of 48 bits slot
36	DA14	O	DA14	Serial data of 64 bits slot
37	DA13	O	DA13	Bit clock of 68 bits slot
38	DA12	O	DA12	LR clock of 68 bits slot
39	DA11	O	DA11	GTOP output
40	DA10	O	DA10	XUGF output
41	DA09	O	DA09	XPLCK output

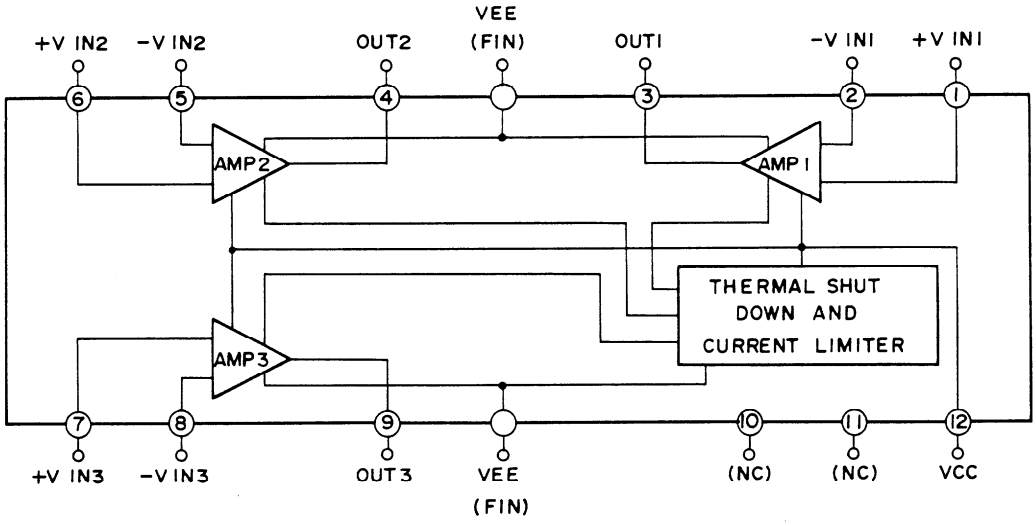
NO.	SYMBOL	I O	DESCRIPTION	
42	DA08	O	DA08	GFS output
43	DA07	O	DA07	RFCK output
44	DA06	O	DA06	C2P0 output
45	DA05	O	DA05	XRAOF output
46	DA04	O	DA04	MNT3 output
47	DA03	O	DA03	MNT2 output
48	DA02	O	DA02	MNT1 output
49	DA01	O	DA01	MNT0 output
50	APTR	O	Control output for aperture correction. H when Rch.	
51	APTI	O	Control output for aperture correction. H when Lch.	
52	Vss		Ground	
53	XTAI	I	Crystal oscillation circuit input of 16.9344MHz or 33.8688MHz input	
54	XTAO	O	Crystal oscillation circuit output of 16.9344MHz	
55	XTSL	I	Crystal selection input terminal. L when 16.9344MHz. H when 33.8688MHz.	
56	FSTT	O	2/3 divided output of pins 53 & 54	
57	C4M	O	4.2336MHz output	
58	C16M	O	16.9344MHz output	
59	MD2	I	Digital output control input. On at H & Off at L.	
60	DOUT	O	Digital output	
61	EMPH	O	Emphasis control output. Active H.	
62	WFCK	O	Write frame clock output	
63	SCOR	O	Sub-code detection output. H when is detected S0 or S1.	
64	SBSO	O	Serial output of sub code (P~W)	
65	EXCK	I	Clock input for read out SBSO	
66	SQSO	O	Sub Q 80 bits, PCM peak, and level data 16 bits output	
67	SQCK	I	Clock input for read out SQSO	
68	MUTE	O	Muting control output. Active H.	
69	SENS	-	Sens output. Output to microprocessor	
70	XRST	I	System reset. Rest at low level.	
70	DATA	I	Serial data input from microprocessor	
72	XLTA	I	Latch input from microprocessor. Latch the serial data at trailing.	
73	VDD		Power supply	
74	CLOK	I	Serial data transfer clock input from microprocessor	
75	SEIN	I	Sens input from SSP	
76	CNCI	I	Track jump numbers count signal input	
77	DATO	O	Serial data output to SSP	
78	XLTO	O	Serial data latch output to SSP. Latch at trailing.	
79	CLKO	O	Serial data transfer clock output to SSP	
80	MIRR	I	Mirror signal input	

Note:SSP:Q102 CXA1372S

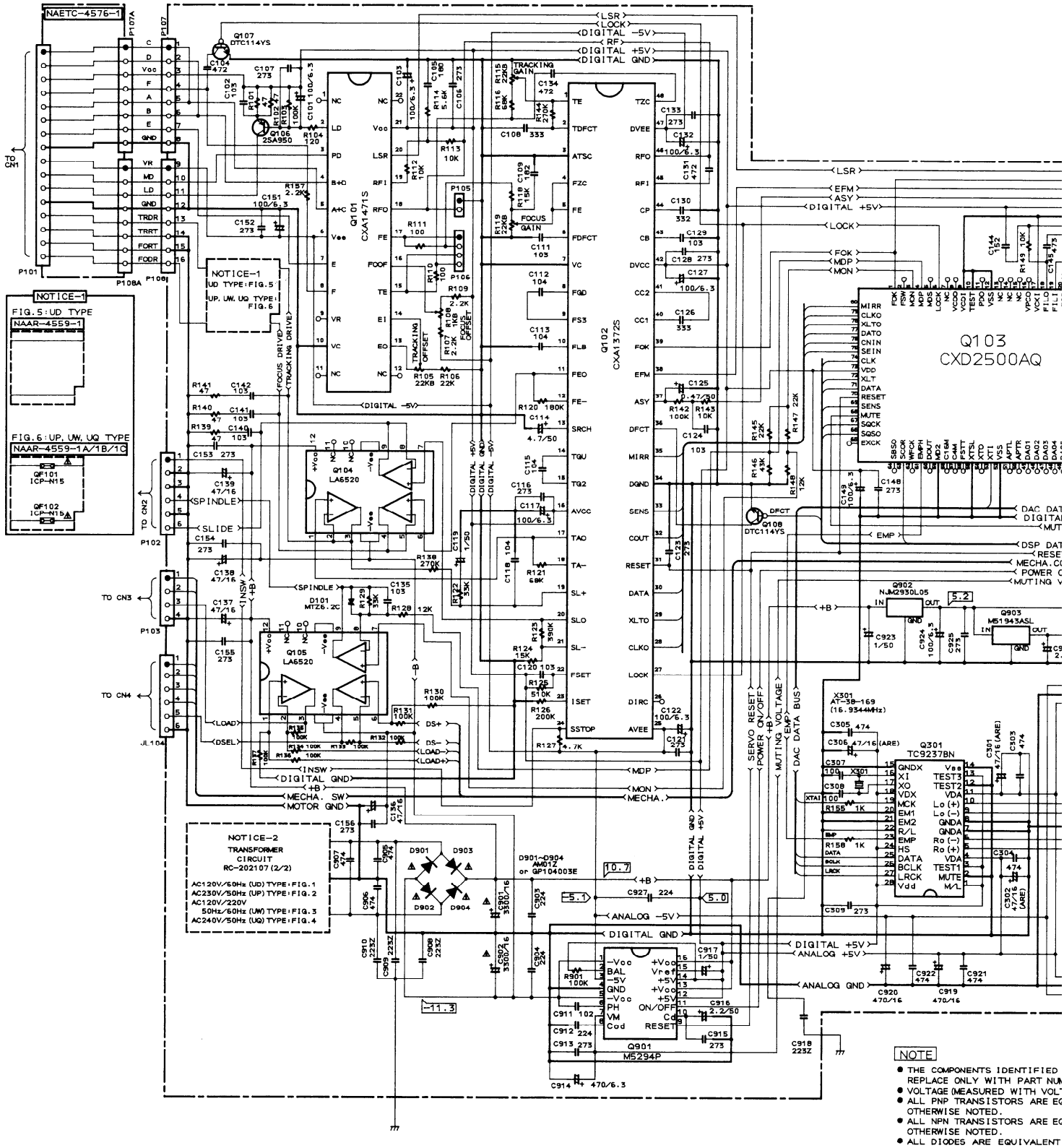
TC9237BN



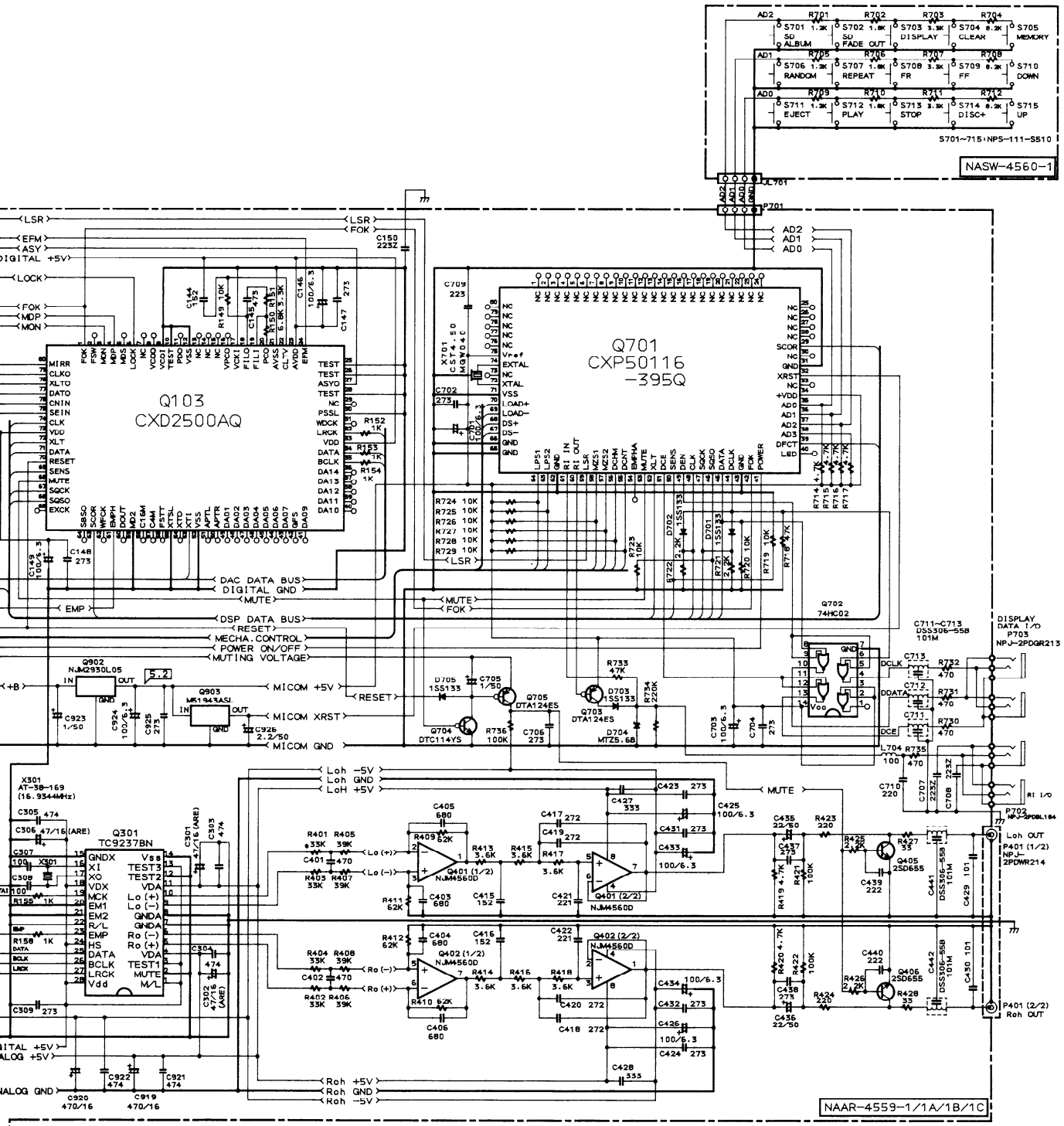
LA6520 (Operational Amplifier)



SCHEMATIC DIAGRAM



D E F G H



NOTE

- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE (MEASURED WITH VOLTMETER) ☐ IS DC VOLTAGE. (NO INPUT SIGNAL)
- ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SA1015-GR UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS OTHERWISE NOTED.
- ALL DIODES ARE EQUIVALENT TO 1SS133 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (-#-) ARE IN μF/WV.
- ALL CAPACITORS ARE IN pF/50WV UNLESS OTHERWISE NOTED. EX)030→3pF, 330→33pF, 331→330pF, 333→0.033μF
- ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
- THE THICK LINES ON PC BOARD ARE THE PRINTING SIDE OF THE PARTS. EX) ▬▬ ↙PRINTING SIDE
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

SCHEMATIC DIAGRAM

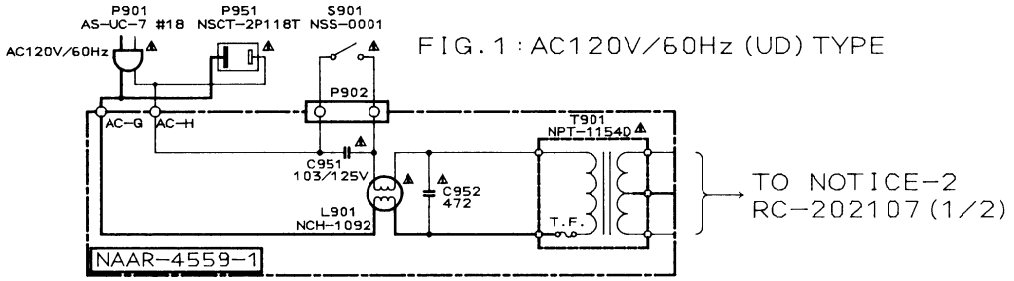


FIG.1 : AC120V/60Hz (UD) TYPE

→ TO NOTICE-2
RC-202107(1/2)

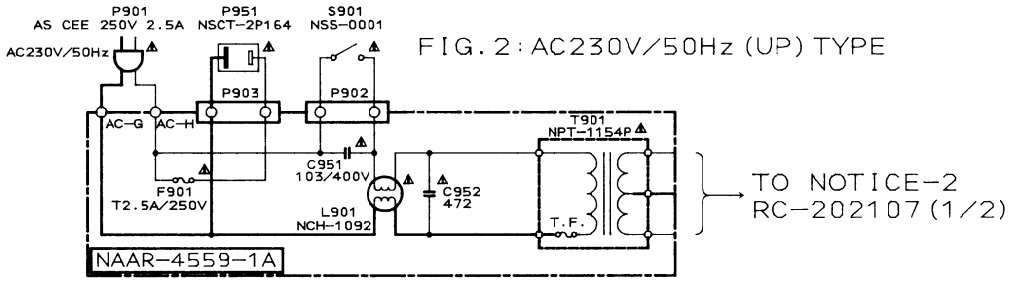


FIG.2 : AC230V/50Hz (UP) TYPE

→ TO NOTICE-2
RC-202107(1/2)

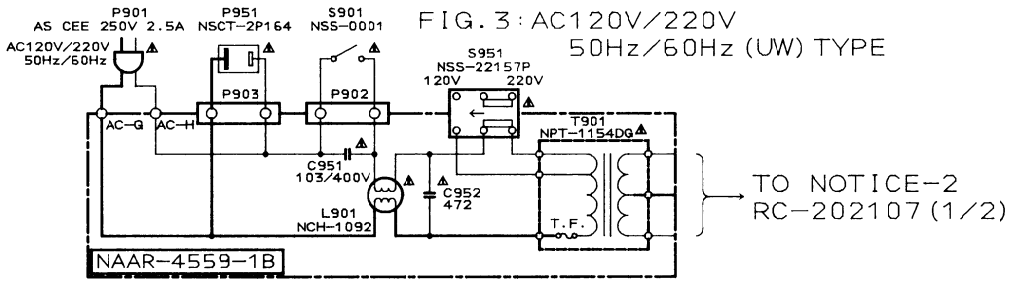


FIG.3 : AC120V/220V
50Hz/60Hz (UW) TYPE

→ TO NOTICE-2
RC-202107(1/2)

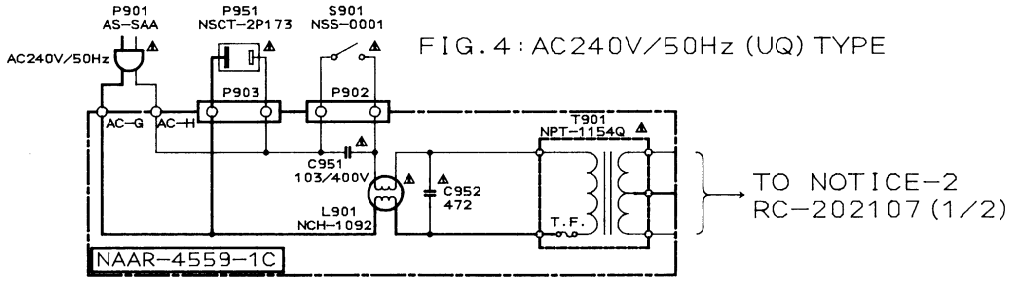
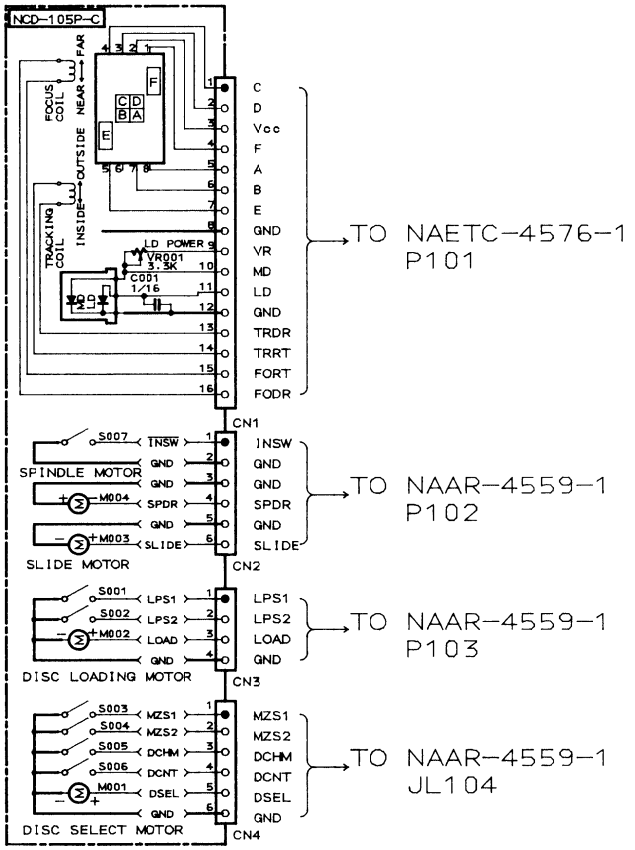


FIG.4 : AC240V/50Hz (UQ) TYPE

→ TO NOTICE-2
RC-202107(1/2)

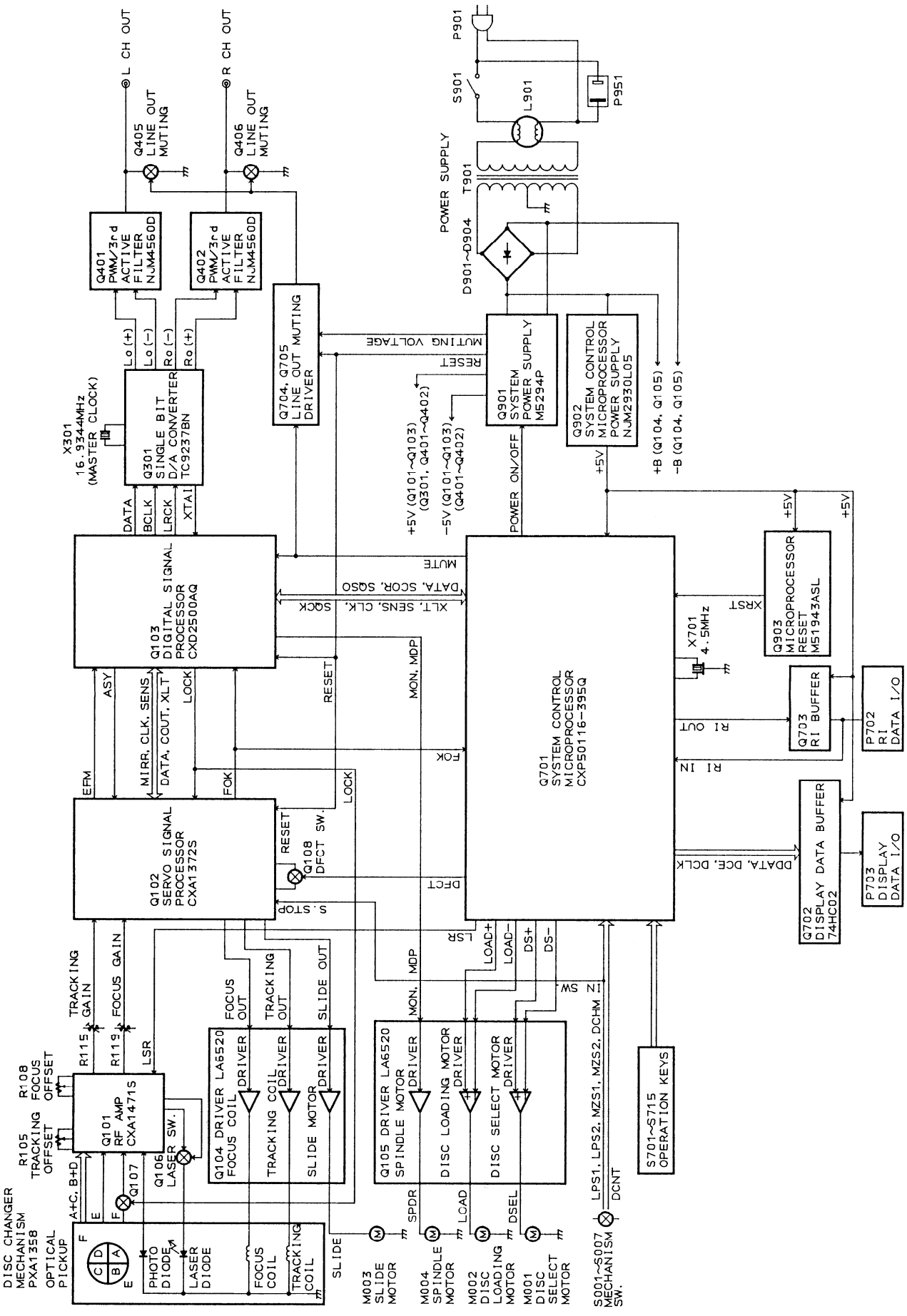


	LPS1	LPS2
CLAMP	L	L
LOADING	L	H
HOME	H	H
EJECT	H	L

MAGAZINE		MZS1	MZS2
IN	OUT	H	*
	MALTI	L	H
	SINGLE	L	L

	DCNT	DCHM
2~6DISC	L	H
HOME	L	L
SELECTING	H	H

BLOCK DIAGRAM



PRINTED CIRCUIT BOARD-PARTS LIST

MAIN CIRCUIT PC BOARD (NARF-4559-1/1A/1B/1C)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q101	22240618	CXA1471S
Q102	22240366	CXA1372S
Q103	22240487	CXD2500AQ
Q104,Q105	22240620	LA6520
Q301	22240535	TC9237BN
Q401,Q402	222579	NJM4560D
Q701	22240637	CXP50116-395Q
Q702	222740025	74HC02P
Q901	22240391	M5294P
Q902	22240622	NJM2930L05
Q903	22240018	M51943ASL
	Transistors	
Q106	2211503 or	2SA950-O or
	2211504	2SA950-Y
Q107,Q108	221281 or	DTC114YS or
Q704	2213570	RN1207
Q403,Q404	2211705 or	2SD655-E or
	2211706	2SD655-F
Q703,Q705	2212600 or	DTA124ES or
	2213580	RN2203
	Diodes	
D101	224450623	MTZ6.2C
D701-D703	223163 or	1SS133 or
D705	223205	1SS270A
D704	224450562	MTZ5.6B
D901-D904	22380046 or	⚠ AM01Z or
	22380035	⚠ GP104003E
	Core	
L704	230906	BL02RN2-R62
	Power transformer	
T901	2300844	⚠ NPT-1154D <D>
	2300845	⚠ NPT-1154P <P>
	2300846	⚠ NPT-1154DG <W>
	2300847	⚠ NPT-1154Q <Q>
	Coil	
L901	231051	⚠ NCH-1092
	Oscillators	
X301	3010159	AT-38-169,X'tal
X701	3010188	CST4.50MGW040,Ceramic
	Filters	
C441,C442	3030002	DSS306-55B101M
C711-C713	3030002	DSS306-55B101M

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C101,C103	393321017	100 μF,6.3V,Elect.
C104	374624724	4700pF±5%,50V,Plastic
C106,C107	374622734	0.027 μF±5%,50V,Plastic
C108,C126	374623334	0.033 μF±5%,50V,Plastic
C109	374621824	1800pF±5%,50V,Plastic
C111	374621034	0.01 μF±5%,50V,Plastic
C112,C113	374621044	0.1 μF±5%,50V,Plastic
C114	393380477	4.7 μF,50V,Elect.
C115,C118	374621044	0.1 μF±5%,50V,Plastic
C116,C121	374622734	0.027 μF±5%,50V,Plastic
C117,C122	393321017	100 μF,6.3V,Elect.
C119	393380107	1 μF,50V,Elect.
C120,C124	374621034	0.01 μF±5%,50V,Plastic
C123,C128	374622734	0.027 μF±5%,50V,Plastic
C125	393384797	0.47 μF,50V,Elect.
C127,C132	393321017	100 μF,6.3V,Elect.
C129,C135	374621034	0.01 μF±5%,50V,Plastic
C130	374623324	3300pF±5%,50V,Plastic
C131,C134	374624724	4700pF±5%,50V,Plastic
C133	374622734	0.027 μF±5%,50V,Plastic
C136-C139	393344707	47 μF,16V,Elect.
C144	374621524	1500pF±5%,50V,Plastic
C145	374624734	0.047 μF±5%,50V,Plastic
C146,C149	393321017	100 μF,6.3V,Elect.
C147,C148	374622734	0.027 μF±5%,50V,Plastic
C151	393321017	100 μF,6.3V,Elect.
C152-C156	374622734	0.027 μF±5%,50V,Plastic
C301,C302	393044707	47 μF,16V,Elect.
C303-C305	374724744	0.47 μF±5%,50V,Plastic
C306	393044707	47 μF,16V,Elect.
C309	374622734	0.027 μF±5%,50V,Plastic
C415,C416	374721524	1500pF±5%,50V,Plastic
C417-C420	374722724	2700pF±5%,50V,Plastic
C423,C424	374622734	0.027 μF±5%,50V,Plastic
C425,C426	393321017	100 μF,6.3V,Elect.
C427,C428	374723334	0.033 μF±5%,50V,Plastic
C431,C432	374622734	0.027 μF±5%,50V,Plastic
C433,C434	393321017	100 μF,6.3V,Elect.
C435,C436	393382207	22 μF,50V,Elect.
C437,C438	374622734	0.027 μF±5%,50V,Plastic
C439,C440	374622224	2200pF±5%,50V,Plastic
C701,C703	393321017	100 μF,6.3V,Elect.
C702,C704	374622734	0.027 μF±5%,50V,Plastic
C705	393380107	1 μF,50V,Elect.
C706	374622734	0.027 μF±5%,50V,Plastic

CIRCUIT NO.	PART NO.		DESCRIPTION
	Capacitors		
C901,C902	393143327	⚠	3300 μ F,16V,Elect.
C903,C904	374722244		0.22 μ F±5%,50V,Plastic
C905-C907	374724744		0.47 μ F±5%,50V,Plastic
C911	374621024		1000pF±5%,50V,Plastic
C912	374722244		0.22 μ F±5%,50V,Plastic
C913,C915	374622734		0.027 μ F±5%,50V,Plastic
C914	393324717		470 μ F,6.3V,Elect.
C916,C926	393380227		2.2 μ F,50V,Elect.
C917,C923	393380107		1 μ F,50V,Elect.
C919,C920	393324717		470 μ F,6.3V,Elect.
C921,C922	375524744		0.47 μ F±5%,50V,Plastic
C924	393321017		100 μ F,6.3V,Elect.
C925	374622734		0.027 μ F±5%,50V,Plastic
C927	374722244		0.22 μ F±5%,50V,Plastic
C951	3500065A	⚠	DE7150FZ103PAC400V/125V,IS
C952	3500077	⚠	DE7150F472M,IS
	Semi-fixed resistors		
R105	5210066		N06HR22KBD,Tracking offset
R108	5210058		N06HR1KBD,Focus offset
R115	5210066		N06HR22KBD,Tracking gain
R119	5210066		N06HR22KBD,Focus gain
	Plugs		
P102	25055444		NPLG-6P426
P103	25055442		NPLG-4P424
P105	25055038		NPLG-2P29
P106	25055045		NPLG-4P33
P107,P108	25055410		NPLG-8P392
	Terminals		
P401	25045371		NPJ-2PDWR214
P702	25045330		NPJ-2PDBL184
P703	25045370		NPJ-2PDGR213
	Socket		
P701	25050526		NSCT-4P349
	IC protectors		
QF101,QF102	252112	⚠	ICP-N15-0.6A <P/W/Q>
	Fuse		
F901	252075	⚠	2.5A-SE-EAK <P>
	Fuseholders		
F901a	25050065	⚠	YSH403T <P>
	Cover		
C951a	27301216	⚠	SB1925A
	Switch		
S951	25065437	⚠	NSS-22157P,Voltage selector <W>

OPERATION SWITCH PC BOARD (NASW-4560-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S701-S715	25035548	NPS-111-S510,Push switches

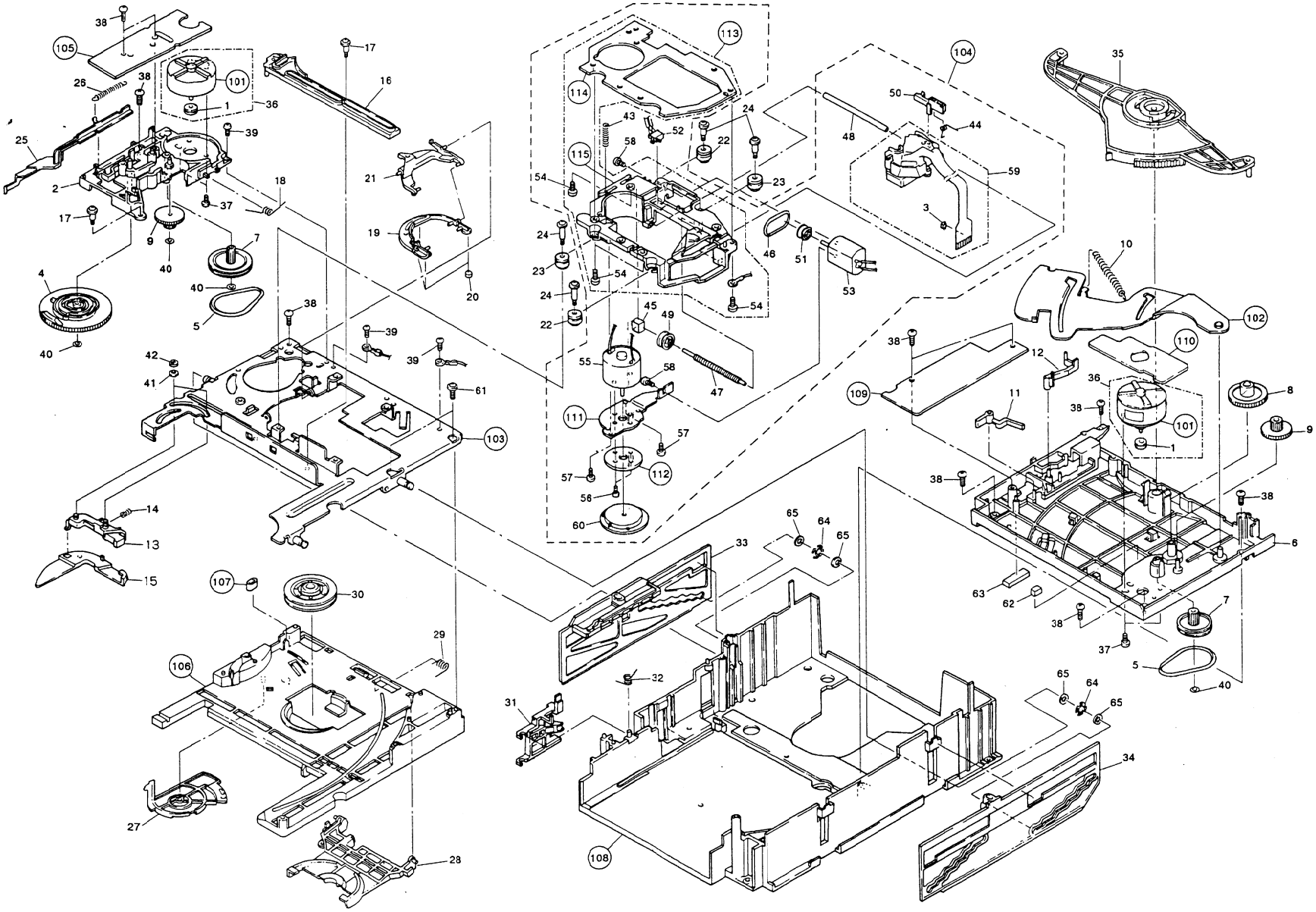
TERMINAL PC BOARD (NAETC-4576-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Sockets	
P101	25050828, 25050835 or 25050880	NSCT-16P623, NSCT-16P630 or NSCT-16P675
P107A,P108A	25050676	NSCT-8P480

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

Note : [D]: Only 120v model
[P]: Only 230v model
[W]: Worldwide model
[Q]: Only 240v model

MECHANISM-EXPLODED VIEW



PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
2	24840023	Gear holder
4	24810013	Cam gear
5	24816006	Belt
6	24840024A	Top guide
7	24810014	Gear pulley
8	24810015	Gear S
9	24810016	Gear L
10	24820009	Eject spring
11	24840025	Switch lever
12	24840026	Seven bar
13	24840027	Lever
14	24820010	Lever spring
15	24840028	Lever
16	24840029	Drive plate
17	801516	Motor mounting screw
18	24820011	Spring
19	24840030	Disc holder
20	28140978	Cushion A
21	24840031	Holder lever
22	24509400	Floating rubber
23	24818005	Floating rubber
24	801517	Floating screw
25	24840032	Lever
26	24820012	Spring
27	24840033	Cam,clamper
28	24840034	Holder,clamper
29	24820013	Spring,clamper
30	24824002	Clamper
31	24840035	Lock lever
32	24820014	Lock spring
33	24840036	Steerer L
34	24840037	Steerer R
35	24840038	Synchonizing lever
36	24804006	Motor ass'y
37	82112604	2.6P+4F,Pan head screw
38	833130080	3TTP+8P,Self-tapping screw
39	838130068	3TTB+6B,Self-tapping screw
40	24834007	Washer
41	24834008	Washer
42	8390251S	ES-2.5S,E ring
61	831130080	3TTW+8P,Self-tapping screw
62	24818006	Spacer
63	24818007	Spacer
64	24834009	Ring
65	24834010	Washer
102	24840046	Eject lever
103	24802006A	Upper chassis
104	24800005	Servo mechanism ass'y

REF.NO.	PART NO.	DESCRIPTION
1	24810018	Motor pulley
43	24820015	Spring GND
44	24820016	Spring
45	24820017	Spring
46	24602506	Belt
47	24810019	Screw
48	24828005	Guide bar
49	24506838	Pulley
50	24040044	Half nut
52	24840045	Push switch
53	24804007	Motor,carriage
54	833130088	3TTB+8B,Self-tapping screw
55	24804008	Motor,spindle
56	82912004	2N+4F,Screw
57	801423	Screw
58	82112003	2P+3F,Screw
59	24110014	Optical pickup
60	24806001	Disc table
66	24804009	DC motor
111	24840047	Motor base
112	24830002	Yoke M
113	24802009	Mechanism base ass'y
114	24802010	Mechanism base
115	24802011	Mechanism chassis
105		Loading pc board ass'y
	24840039	Push switch
	24840040	Connector
106	24802007A	Sub chassis
107	24818008	Rubber tube
108	24802008A	Main chassis
109		Selector pc board ass'y
	24840039	Push switch
	24840041	Lead wire
110		Motor pc board ass'y
	24840042	Connector
	24840043	Pc board

ADJUSTMENT PROCEDURES

Instruments required

Dual trace oscilloscope, Frequency counter, AF oscillator, Test disc (SONY YEDS-18), AC voltmeter, and Socket P4(Part no. 25050138)

1. Focus offset adjustment

Load the test disc YEDS-18 on the tray and play the track 2.
Connect the oscilloscope to terminal P106.
Adjust R108 until RF waveform as shown photo 1 becomes maximum.
When the amount of RF Signal is broad, set R108 to mechanical center.

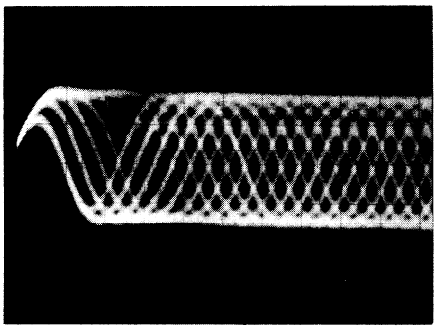
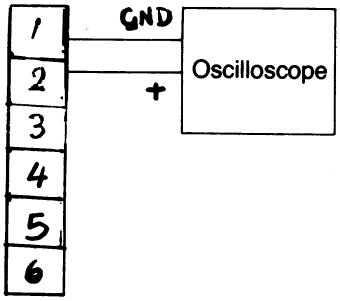


Photo 1



Oscilloscope range
Vertical : 0.5V/div.
Holizontal : 0.2 μs/div.
DC, Ground: Center

2. Tracking offset adjustment

Load the test disc YEDS-18 on the tray and play the track 2.
Turn R115 to minimum position.(Counter clockwise)
Connect the oscilloscope between pin 5 (TR) of P106 and pin 1 (GND)
Adjust R105 until the center of tracking error signal on the oscilloscope becomes GND level.
Turn R115 to the mechanical center.
After adjustment, disconnect the oscilloscope.

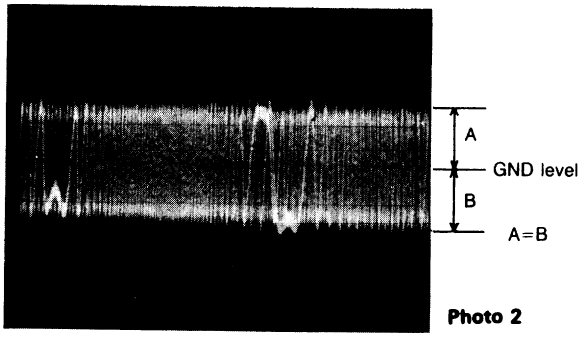
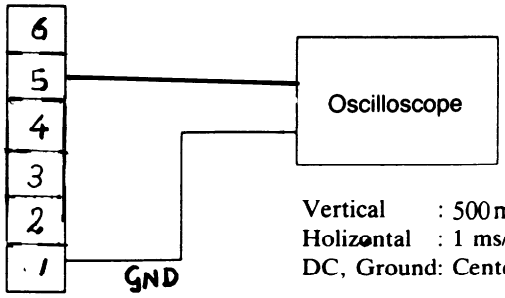


Photo 2



Vertical : 500mV/div.
Holizontal : 1 ms/div.
DC, Ground: Center

3. Focus gain adjustment

Set the output of AF oscillator to 800Hz, 1~1.5Vp-p.
Play the track 2 of test disc.
Connect the oscilloscope and the AF oscillator as shown below.

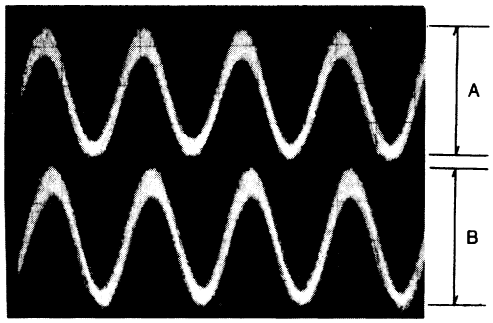
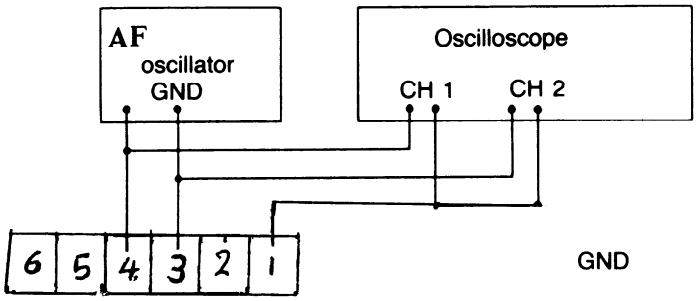


Photo 3



Vertical : 0.2V/div.
Holizontal: 0.5 ms/div.

Adjust R119 until 800Hz components of channels 1 and 2 on oscilloscope become same level.
After adjustment, disconnect the AF oscillator and the oscilloscope.

4. Tracking gain adjustment

Set the output of AF oscillator to 1.2kHz, 1~1.5Vp-p.
Play the track 2 of test disc.
Connect the oscilloscope and the AF oscillator as shown below.

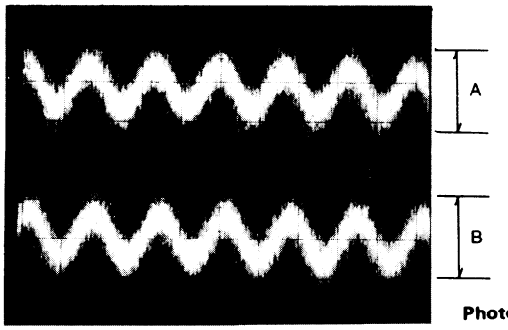
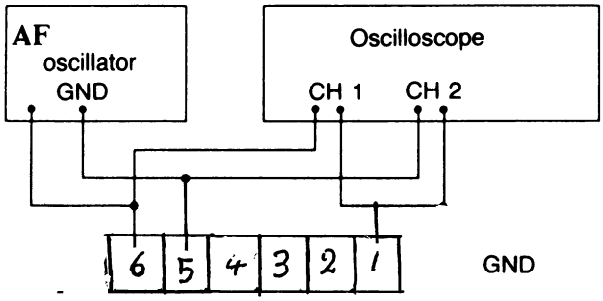


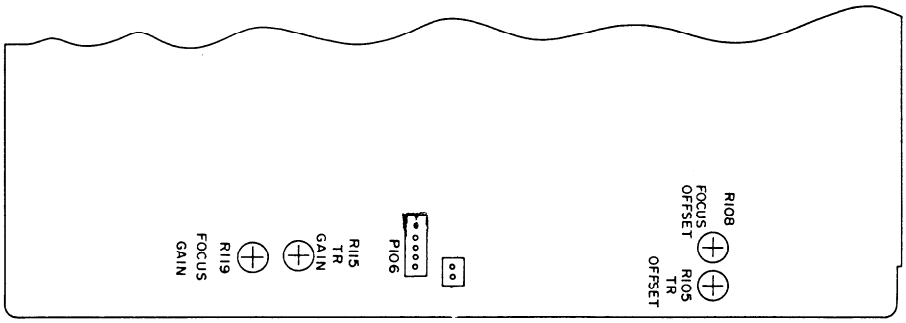
Photo 4



Vertical : 0.2V/div.
Holizontal: 0.5 ms/div.

Adjust R115 until 1.2kHz components of channels 1 and 2 on oscilloscope become same level.
After adjustment, disconnect the AF oscillator and the oscilloscope.

After adjustment, confirm that the center of tracking error signal becomes GND level.



5. Grating adjustment

WHEN REPLACING THE OPTICAL PICKUP ASS'Y (PART NO. 24110014), IT IS NECESSARY TO CHECK THE GRATING ADJUSTMENT ON THE NEW PICKUP.

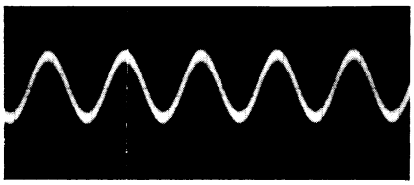
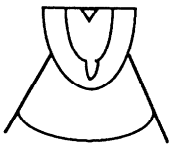


Photo 5

1.After replacing the optical pickup ass'y,disconnect the blue and green wires from connector P102 (P102 is located in the back right corner of the main PCB when the unit is viewed from the front.) Connect these 2 wires to a 1 1/2 volt battery (Blue + Green -) or 1 1/2 volt D.C. power supply.These wires go to the sled motor and now the optical pickup ass'y will begin to move. When the grating adjustment screw appears in the center of the oval slot on top of the mechanism (see Figure 5-1) stop the sled motor by disconnecting your battery or power supply. Leave the blue and green wires disconnected for now.



Adjustment Range

Fig. 5-3

2.Per figure 5-2 connect a low pass filter consisting of a 39 kohm resistor and 0.001 μ F capacitor to pin 4 of P106 and pin 2 of P105. Connect a oscilloscope probe to this filter per figure 5-2.

3.Turn the power switch on and load a disc.(use SONY Test disc YEDS 18).

The disc will start spinning. Adjust the grating screw for maximum amplitude of the waveform on the scope (3 to 4 Vp-p). The adjustment range is very small so turn the screw driver slowly. The entire adjustment range is less than 1/2 of a screw turn. (See photo 5 for waveform)

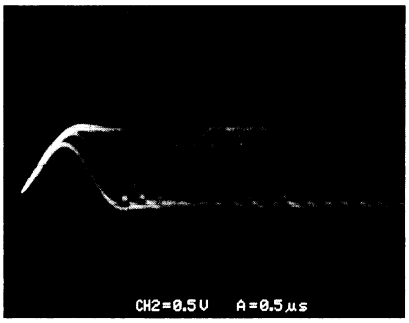


Photo 6

4.Press the EJECT button to stop the disc. Reconnect the blue and green wires to P102 (Blue is the outermost pin and green 2nd in from the end.)

5.Play a disc. (NOTE: If the unit will not read the TOC then repeat steps 1 thru 4). If the grating adjustment is incorrect the optical pickup will produce an excessive amount of mechanical noise while the disc is playing. Disconnect your scope and filter from P106 and P105.

6.Reconnect the scope (no filter) to P105,probe to pin 1 RF and ground to pin 2 GND. While playing the last track of outermost edge of a TEST disc,using a 1.5 mm HEX wrench adjust the tangential adjustment screw for the clearest EYE PATTERN. See Photo 6 for waveform and Figure 5-4 for adjustment.

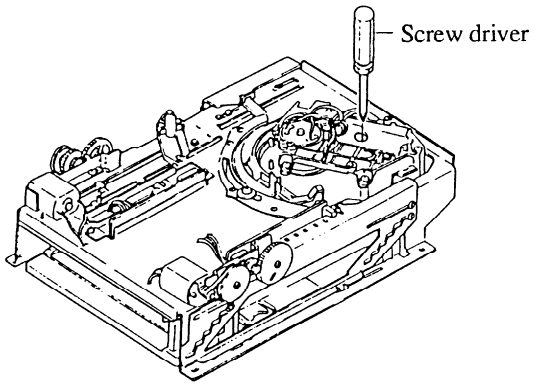
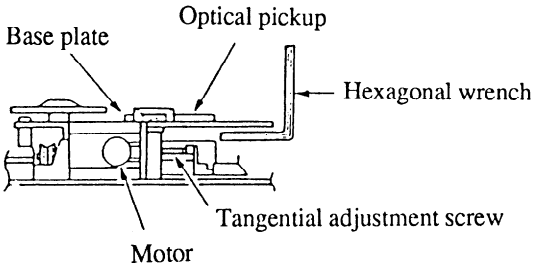


Fig. 5-1



In the figure below, the top and bottom is opposite to that of the actual product.

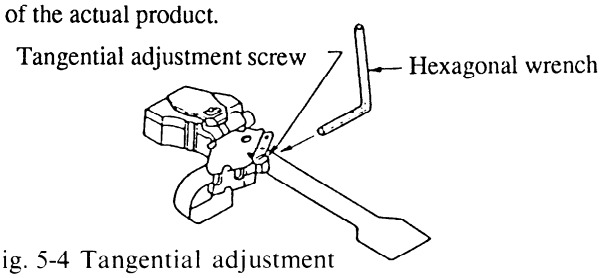


Fig. 5-4 Tangential adjustment

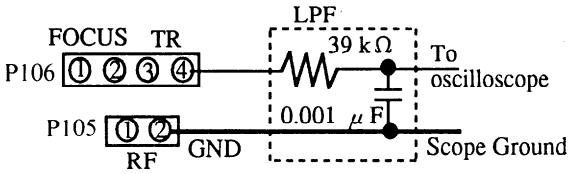
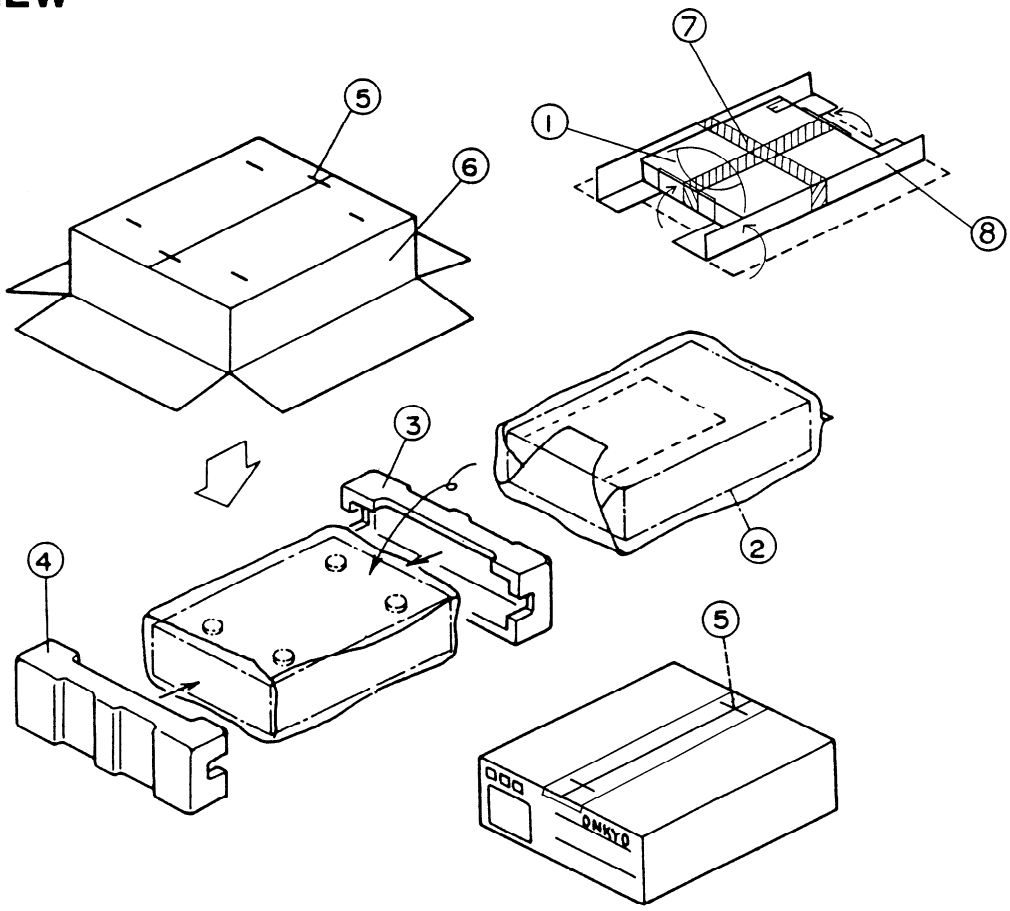


Fig. 5-2

PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	24506790A	KC-M6,CD magazine
2	29100037A	Styrene bag
3	29091592A	Pad F
4	29091593A	Pad B
5	282301	Sealing hook
6	29052479	Master carton box <S>
	29052480	Master carton box <B>
7	262002	Adhesive tape
8	29095657	Pad sheet
9	29110071	Tape PP
	29100097	Bag for instruction manual <C/P>
	29341768	Instruction manual <C/P>

NOTE: <S>:Silver model only
<B>:Black model only
<C>:Canadian model only
<P>:230V model only

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