# ONKYO® SERVICE MANUAL

COMPACT DISC PLAYER
MODEL DX-6540
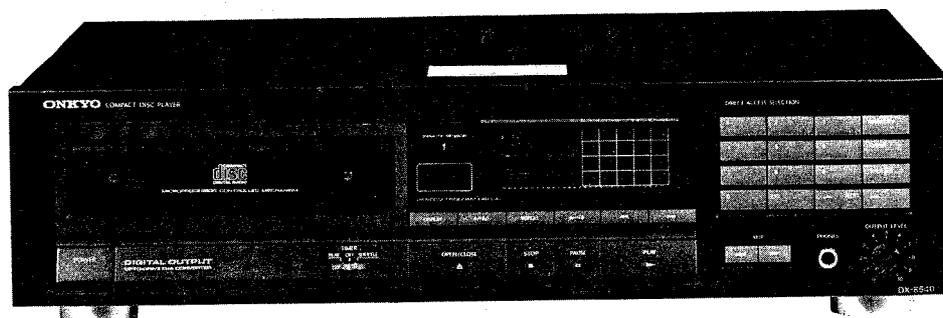
SAFETY-RELATED COMPONENT WARNING!!

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 PARTS 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
Decoded bits:	16 bits linear
Sampling frequency:	352.8kHz (8 times oversampling)
Number of channels:	2 (Stereo)
Frequency response:	2Hz~20kHz
Total harmonic distortion:	0.003% (at 1kHz)
Dynamic range:	96dB
Signal to noise ratio:	100dB
Channel separation:	96dB (at 1kHz)
Wow and Flutter:	Below threshold of measurability
Power consumption:	16 watts
Output level:	2 volts r.m.s.
Dimensions (W×H×D):	435×118×312 mm
	17-1/8″×4-5/8″×12-1/4″
Weight:	5.0kg, 11.0 lbs.

Specifications are subject to change without notice.

ONKYO
AUDIO COMPONENTS

TABLE OF CONTENTS

SERVICE PROCEDURES

1. How to Release the Transport Lock

To protect the optical assembly including the laser pickup from
vibration related damage during shipping, this unit is equipped
with a transport lock lever located on the base.
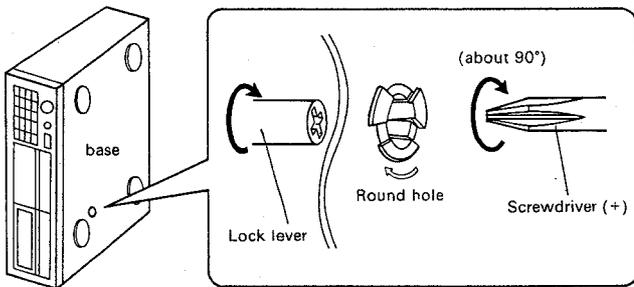
- Use a screwdriver to turn the lock lever in the round hole in the
  direction of the arrow (⌣ about 90°).
- Before transporting the unit, turn the lock lever in the opposite
  direction.

2. 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 cable and chassis.
Specifications: more than 10Mohm at 500V.

CAUTION ON REPLACEMENT OF OPTICAL PICKUP

The laser diode in the optical pickup block is so sensitive to static electricity, surge current and etc. that the components are liable to be broken down or its reliability remarkably deteriorated.

During repair, carefulley take the following precautions. (The following precautions are included in the service parts).

PRECAUTIONS

1. **Ground for the work-desk.**
   Place a conductive sheet such as a sheet of copper (with impedance lower than $10^6 \Omega$) on the work-desk and place the set on the conductive sheet so that the chassis.

2. **Grounding for the test equipment and tools.**
   Test equipments and toolings should be grounded in order that their ground level is the same the ground of the power source.

3. **Grounding for the human body.**
   Be sure to put on a wrist-strap for grounding whose other end is grounded.
   Be particularly careful when the workers wear synthetic fiber clothes, or air is dry.

4. **Select a soldering iron that permits no leakage and have the tip of the iron well-grounded.**

5. **Do not check the laser diode terminals with the probe of a circuit tester or oscilloscope.**

Care should be taken with the optical pickup.

The optical pickup is sensitive to static electricity, surge currents, and other high electrical noise, and because there is the possibility of damage to performance, in the handling of the pickup, the utmost care must be taken, particularly with regard to static electricity.

1. When checking the laser terminal, avoid making connections using the probes of a tester or oscilloscope, or an ordinary power supply.

2. When replacing the optical pickup, first short the LD terminals and remove the connector. Also, when attaching the new optical pickup, after attaching the connector, unsolder the LD terminals.

LD terminals
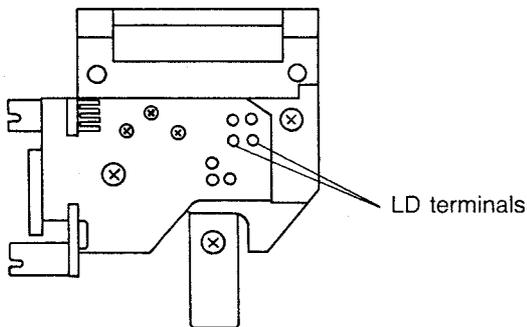
PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

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 WARNING LABEL

The label shown below are affixed.

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

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.
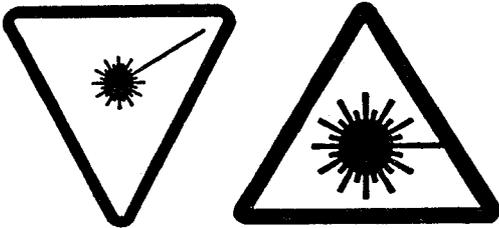
2. Class 1 label
This label is located on the back panel.

"CLASS 1 LASER PRODUCT"
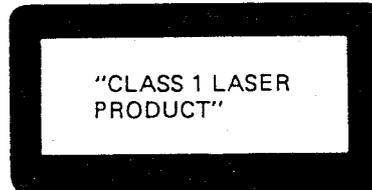
DANGER —INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK FAILED OR DEFEATED. AVOID DIRECT EXPOSURE TO BEAM.

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.   SN29360911

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

ADVARSEL

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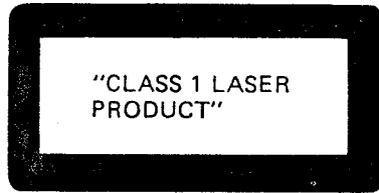
Denne mærkning er anbragt på apparatets højre side og indikerer, at apparatet arbejder med laserstråler af klasse 1, hvilket betyder, at der anvendes laserstråler af svageste klasse, og at man ikke på apparatets yderside kan blive udsat for utilladelig kraftig stråling.

APPARATET BØR KUN ÅBNES AF FAGFOLK MED SÆRLIGT KENDSKAB TIL APPARATER MED LASERSTRÅLER!
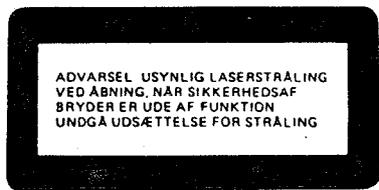
Indvendigt i apparatet er anbragt den her gengivne advarselsmærkning, som advarer imod at foretage sådanne indgreb i apparatet, at man kan komme til at udsætte sig for laserstråling.

ADVARSEL USYNLIG LASERSTRÅLING
VED ÅBNING. NÅR SIKKERHEDSAF
BRYDER ER UDE AF FUNKTION
UNDGÅ UDSÆTTELSE FOR STRÅLING

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

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.

Not this way
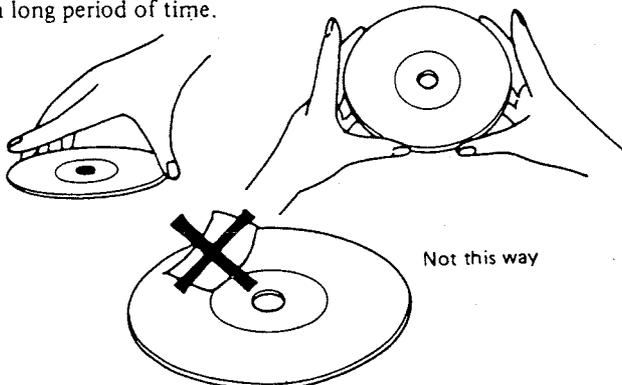
● **Cleaning Compact Discs**

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.
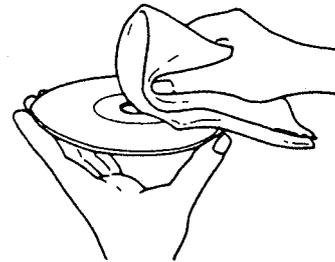
Problems Caused by Dew

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.

CHASSIS-EXPLODED VIEW

A501
A17
A16
A312
A801
A508
A301
A14
U3
U4
A310
A5
U2
A30
A16
U1
A16
A18
A802
A26
A312
A313
A316
A16
A11
U6
A315
A21
A10
A12
A2
A17
A15
A7
A20
T901
A1
A9
A19
A18
U5
P921
A4
A16

PARTS LIST

| REF. NO.	PART NO.	DESCRIPTION
A1	27100181A	Chassis
A2	27121210	Back panel
A4	27300750	△ Strainrelief
A5	27190266	Holder
A7	27273112	Joint, power
A9	27270214A	Spacer
A10	27141331	Bracket L
A11	27141309A	Bracket
A12	27175011C	Leg(Cushion)
A14	28140265	20×40×8, Cushion
A15	830440109	4TTC+10C(BC), Tapping screw
A16	834430088	3TTS+8B(BC), Tapping screw
A17	833430080	3TTP+8P(BC), Tapping screw
A18	831130088	3TTW+8B, Tapping screw
A19	834230108	3TTS+10B(Ni), Nickel screw
A20	834430108	3TTS+10B(BC), Tapping screw
A21	834430068	3TTS+6B(BC), Tapping screw
A26	27110458A	Front bracket ass'y ⟨B⟩
	27110462A	Front bracket ass'y ⟨S⟩
A30	28133216	Back plate
A301	28184429	Top cover ⟨B⟩
	28184430	Top cover ⟨S⟩
A302	28140932	50×50×5t, Cushion for top cover
A310	28191492	Clear plate
A312	28140928	25×25×4t, Cushion
A313	27175153	Leg
A315	27267578	Guide
A316	27270255	Spacer
A501	1H065121	Front panel ass'y ⟨B⟩
	1H067121	Front panel ass'y ⟨S⟩
A508	27211057	Tray panel ass'y ⟨B⟩
	27211040	Tray panel ass'y ⟨S⟩
A801	28323571	Knob LEVEL ⟨B⟩
	28323600	Knob LEVEL ⟨S⟩
A802	28323152-1	Knob MODE ⟨B⟩
	28323435-1	Knob MODE ⟨S⟩
P921	253148 or 253150	△ AS-CEE, Power supply cord

REF. NO.	PART NO.	DESCRIPTION
T901	2300385A	△ NPT-1015G, Power transformer
U1	1H064585-2A	NAAR-3485-2A, Main circuit pc board ass'y
U2	1H064547-2	NADIS-3447-2, Display circuit pc board ass'y
U3	1H064548-2	NAAF-3448-2, Headphone amplifier pc board ass'y
U4	1H064549-2	NAAF-3449-2, Headphone terminal pc board ass'y
U5	1H064550-2	△ NAPS-3450-2, Power switch pc board ass'y
U6	1H064551-2	NAETC-3451-2, Terminal pc board ass'y
	260208	Binder

NOTE: ⟨B⟩: Only Black model
⟨S⟩: Only Silver model

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

MECHANISM-EXPLODED VIEW
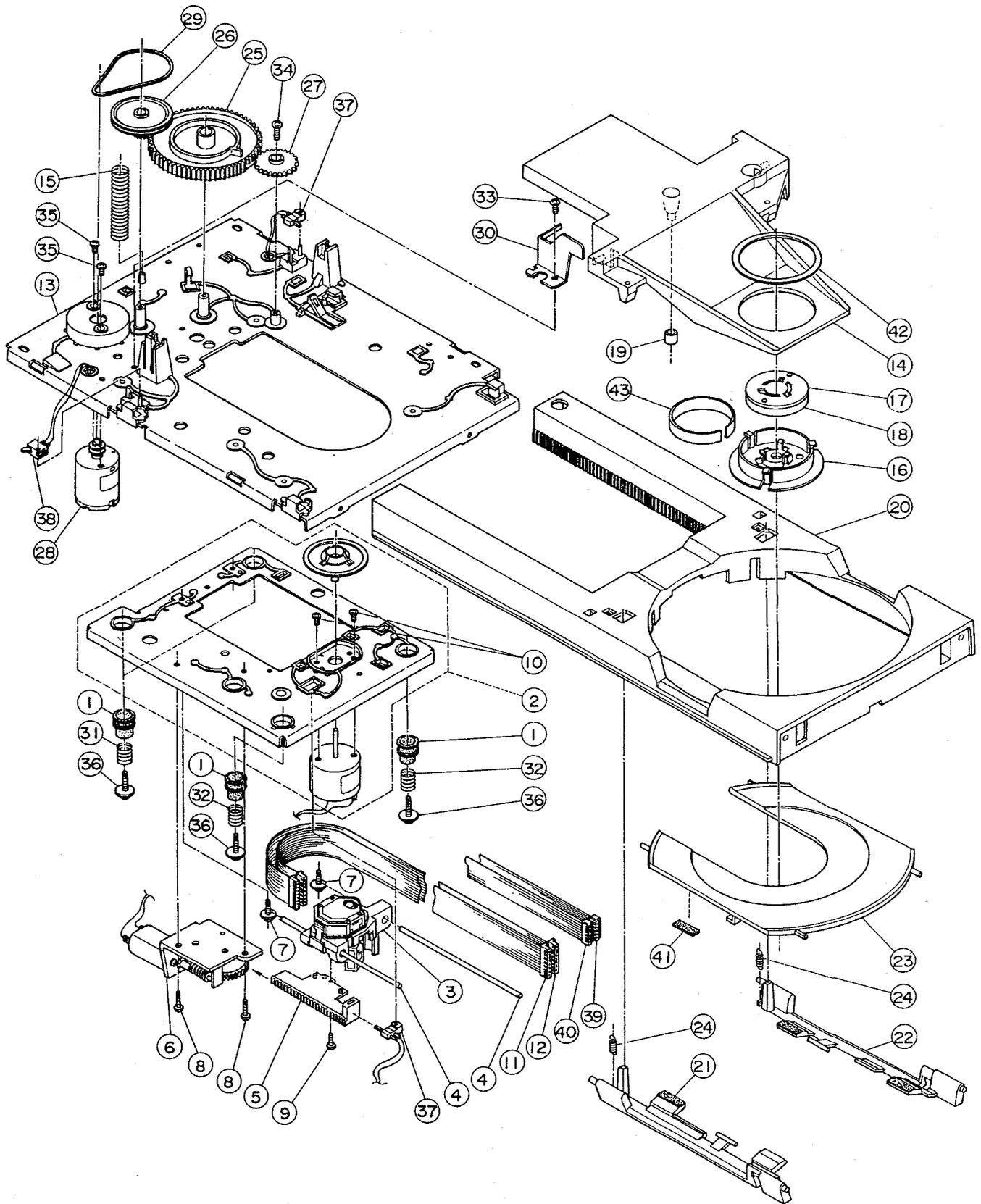
PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	27301158A	Cushion rubber	26	27300943	Pulley gear
2	1H057901	Spindle motor ass'y	27	27300944A	Gear
3	24110004	TOPH7833-A, Pick-up	28	1H025901	Tray motor ass'y
4	27260222	Shaft	29	27301079	Rubber belt
5	27300939	Rack PU	30	27141230	Bracket, holder
6	1H025902	Slide motor ass'y	31	27180414A	Spring
7	831430100	3TTW+10P(BC), Tapping screw	32	27180425	spring
8	834430088	3TTS+8B(BC), Tapping screw	33	834430068	3TTS+6B(BC), Tapping screw
9	82542006	2B+6F(BC), Binding screw	34	831126060	2.6TTW+6B(BC), Tapping screw
10	82142003	2P+3F(BC), Pan head screw	35	82143004	3P+4FN(BC), Pan head screw
11	2000951	NSAS-8P903, Socket	36	801414	W=11, Special screw
12	2000952	NSAS-8P904, Socket	37	25065321	NMS-1113, Microswitch(Black)
13	27100174A	Chassis L	38	25065322	NMS-1214, Microswitch(Green)
14	27301154A	Arm	39	2000733B	NSAS-6P689, Socket ass'y for tray motor
15	27180341A	Spring			
16~18	1H057902	Cap CH ass'y	40	2000734B	NSAS-6P690, Socket ass'y
16	27301132B	Cap CH	41	28140922	Cushion
17	27301133	York CH	42	27270282	Spacer
18	28181019A	Magnet CH	43	27270283	Spacer, cap
19	27301189	Cap, arm	44	28140931	Cushion PU
20	27301112C	Disc tray			
21	27301114A	Disc lifter L			
22	27301115A	Disc lifter R			
23	27301151	Disc plate			
24	27180400	Spring			
25	27300942C	Cam gear			

LUBRICATION

FLOIL G902S (Part No. 260447)
Engaged section of cap, arm (19) and cam gear (25)
Engaged section of disc tray (20) and chassis L (13)
Engaged section of disc tray (20) and disc lifters (21, 22)
Shaft of cam gear (25), pulley gear (26) and gear (27)

DISASSEMBLING PROCEDURES
Method for removing the tray
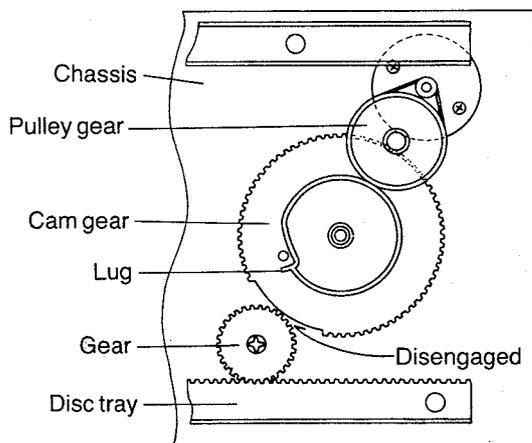
1. Set the position so that the cam gear and gear are disengaged.
2. Pull the tray to the front.
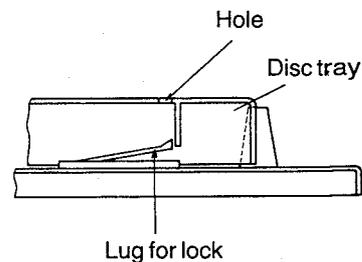
3. Insert a small flat-bladed screw driver into the hole section of the right side of the back of the tray, and push the lug used for locking the tray to bring the tray to the front.

CAUTION: When inserting the tray, the cam gear and gear parts are not in the meashing position.

IC BLOCK DIAGRAM AND DESCRIPTIONS

CXA1081M (RF Amp)
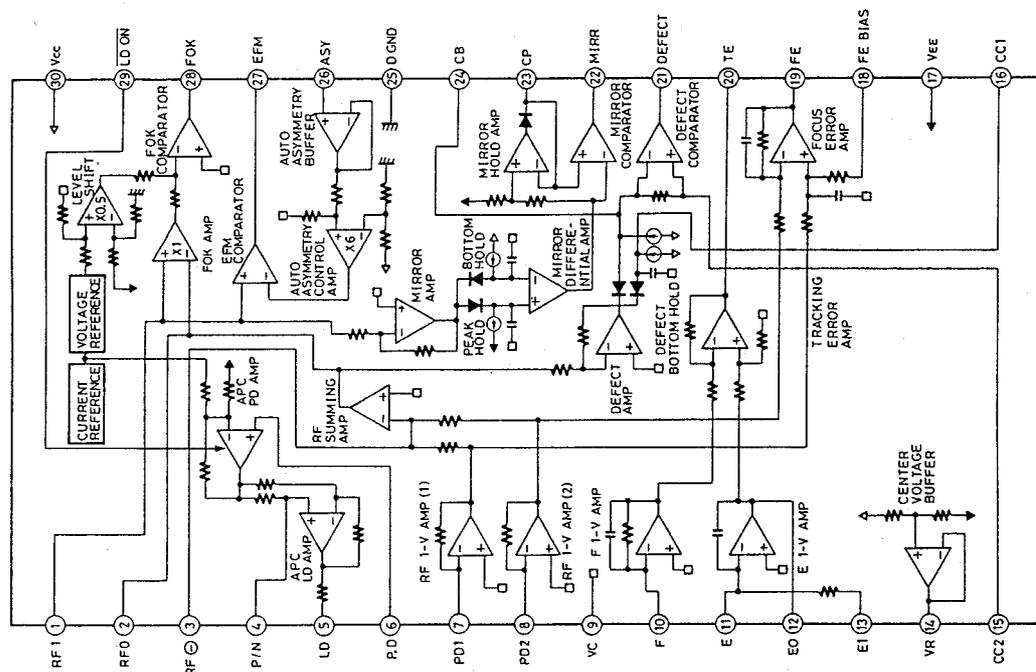
| Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	RFI	Input terminal of output signal of RF summing amplifier via the coupling capacitor	16	CC1	Defect bottom hold output terminal
2	RFO	Output terminal of RF summing amplifier	17	V_{EE}	Negative power supply terminal
3	RF−	Input terminal of RF summing amplifier feedback	18	FE BIAS	Non-inversion bias terminal of focus error amplifier CMR adjustment of focus error amplifier
4	P/N	Switching terminal of P-SUB/N-SUB of LD (laser diode)	19	FE	Output terminal of focus error amplifier
5	LD	Output terminal of APC LD amplifier	20	TE	Output terminal of tracking error amplifier
6	PD	Input terminal of APC PD (Pin diode) amplifier	21	DEFECT	Output terminal of defect comparator
7	PD1	Inversion input terminal of RF I-V amplifier (1) Connect to A+C of PIN diodes.	22	MIRR	Output terminal of mirror comparator
8	PD2	Inversion input terminal of RF I-V amplifier (2) Connect to B+D of PIN diodes.	23	CP	Connection terminal of capacitor for mirror hold Non-inversion input of mirror comparator
9	VC	Connect to GND.	24	CB	Connection terminal of capacitor for defect bottom hold
10	F	Inversion input terminal of F I-V amplifier Connect to F of PIN diode.	25	DGND	Connect to GND
11	E	Inversion input terminal of E I-V amplifier Connect to E of PIN diode.	26	ASY	Auto asymmetry control input terminal
12	E0	Output terminal of E I-V amplifier	27	EFM	Output terminal of EFM comparator
13	E1	Feedback input terminal of E I-V amplifier Gain adjustment of E I-V amplifier	28	FOK	Output terminal of FOK comparator
14	VR	DC voltage output terminal of $(Vcc + V_{EE})/2$	29	$\overline{LD\ ON}$	ON/OFF switching terminal of laser diode
15	CC2	Input terminal from defect bottom hold output signal via the coupling capacitor	30	Vcc	Positive power supply

CXA1082BQ (Servo Signal Processor)
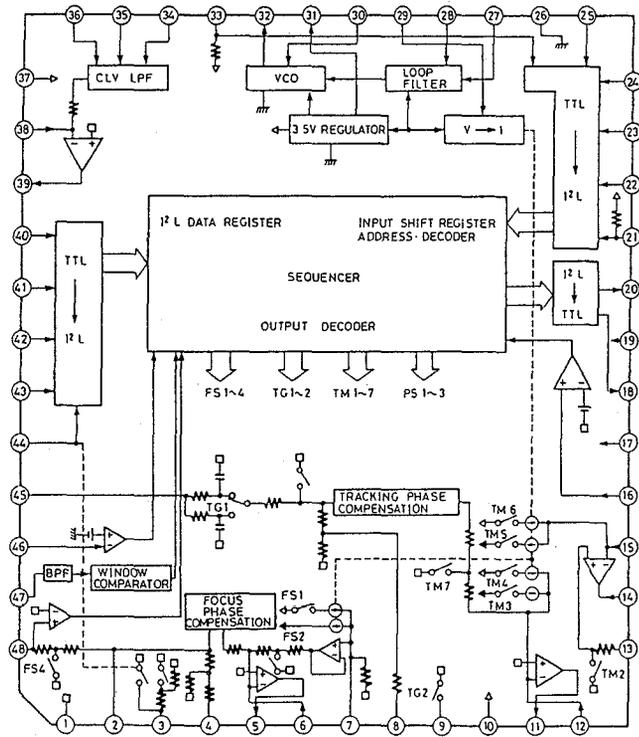
Pin No.	Symbol	Function	Pin No.	Symbol	Function
2	FGD	Insert the capacitor between this terminal and pin 3 when drop the high frequency gain of focus servo	28	PDI	Input terminal of phase comparator output PDO
3	FS3	Switching terminal of high frequency gain of focus servo	21 22 23 24 25 33	DIRCT XRST DATA XTL CLK LOCK	Input terminals for microcomputer and interface
4	FLB	Time constant switching terminal when raise the low frequency gain of focus servo			
5 11 14 39	FEO TAO SLO SPDLO	Operation amplifier output terminals for power transistor drive	29	ISET	Flow the current to decide the focus search, track jump, and kick height
			30	VCOP	VCO free run frequency is proportion to resistor value between pins 30 and 31
6	FE−	Inversion input terminal of focus amplifier	32	C864	VCO (8.64MHz) output terminal
7	SRCH	Time constant terminal to make the focus search waveform	34	MDP	Connection terminal to terminal MDP of CXD1125Q
8	TGU	Time constant terminal for high frequency gain switching of tracking	35	MON	Connection terminal to terminal MON of CXD1125Q
9	TG2	Time constant terminal for high frequency gain switching of tracking	36	FSW	LPF time constant terminal of CLV servo error signal
12	TA−	Inversion input terminal of tracking amplifier	38	SPDL−	Inversion input terminal of spindle drive amplifier
13	SL+	Non-inversion input terminal of sled amplifier	40 41 42 44	WDCK FOK MIRR DFCT	Input terminals for microcomputer and interface
15	SL−	Inversion input terminal of sled amplifier			
16	SSTOP	Limit switch ON/OFF detector signal terminal for disc innermost position detector	45	TE	Tracking error signal input terminal
17	FSET	Terminal of peak of phase compensation of focus tracking and of setting of LPF	46	TZC	Tracking zero cross comparator input terminal
18 20	SENS C.OUT	Output terminals for microcomputer and interface	47	ATSC	Window comparator input terminal for ATSC detection
27	BW	Time constant terminal of loop filter	48	FE	Focus error signal input terminal

CXK5816MS-15 etc. (Q110) (Static RAM)
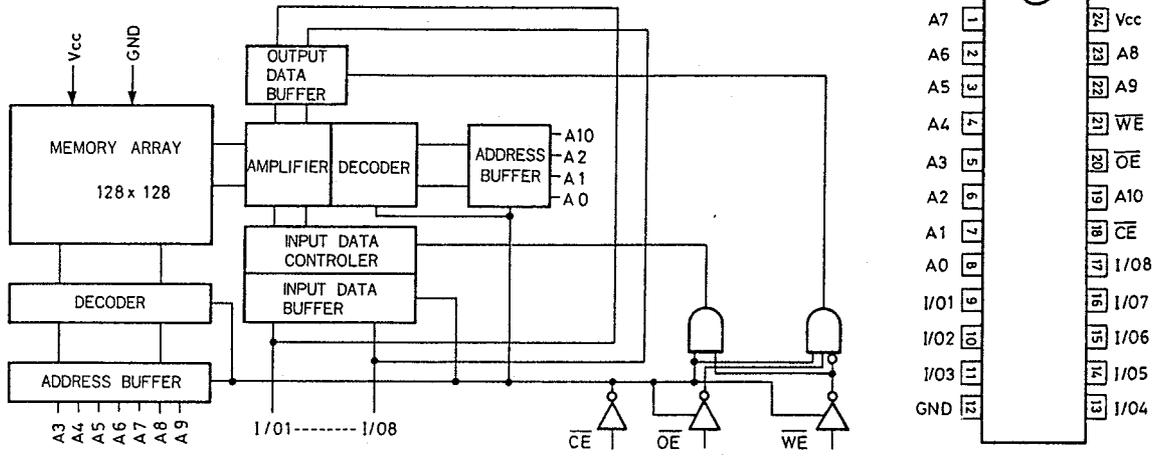
CXD1125Q (Digital signal processor)
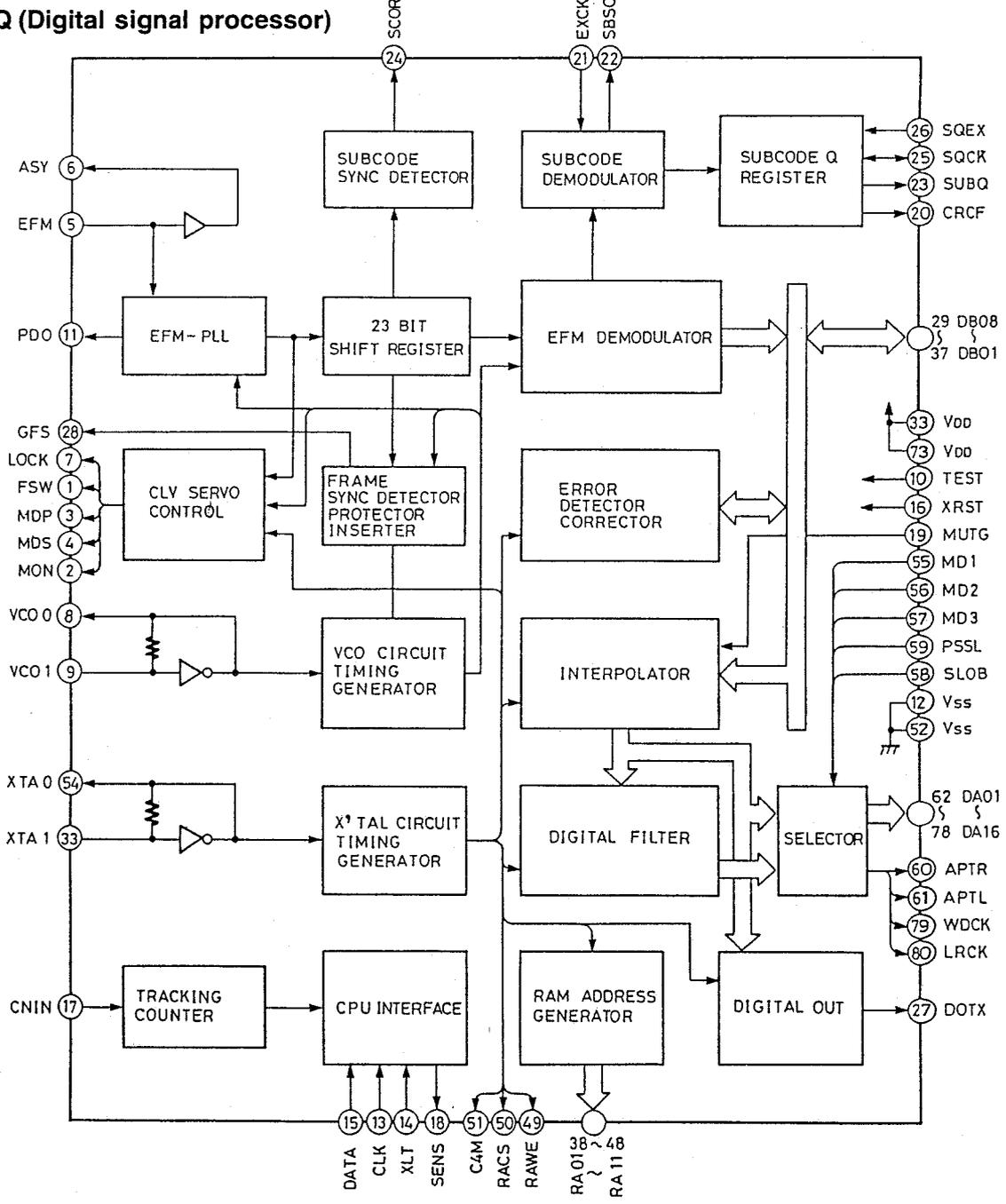
Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	FSW	Time constant switching output terminal of output filter of spindle motor	49	RAWE	Write enable signal output to external RAM
			50	RACS	Chip selector signal output to external RAM
2	MON	ON/OFF control output terminal of spindle motor	51	C4M	Divider output of crystal. f=4.2336MHz
3	MDP	Drive output terminal of spindle motor. Rough control when mode CLV-S and phase control when mode CLV-P	52	Vss	Ground
			53	XTAI	Input terminal of crystal oscillator
4	MDS	Drive output terminal of spindle motor. Speed control when mode CLV-P	54	XTAO	Output terminal of crystal oscillator
5	EFM	EFM signal input terminal from RF amplifier	55 57	MD1 ∤ MD3	Mode switching input terminals
6	ASY	Output terminal to control the slice level of EFM signal	58	SLOB	Code switching input of audio data output.
7	LOCK	GFS sampling terminal	59	PSSL	Mode switching input of audio data output. Serial output at low level. Parallel output at high level
8	VCOO	VCO output terminal. 8.6436MHz when lock to EFM signal			
9	VCOI	VCO input terminal	60	APTR	Control output for aperture correction. High level when Rch.
10	TEST	0V	61	APTL	Control output for aperture correction. High level when Lch.
11	PDO	Phase comparator output terminal of EFM signal and VCO/2	62	DA01	DA01 (LSB of parallel sound output) output when PSSL = H. C1F1 output when PSSL = L
12	Vss	Ground			
13	CLK	Serial data transmitter clock input terminal from microcomputer	63	DA02	DA02 output when PSSL = H. C1F2 output when PSSL = L.
14	XLT	Latch input terminal from microcomputer	64	DA03	DA03 output when PSSL = H. C2F1 output when PSSL = L.
15	DATA	Serial data input terminal from microcomputer	65	DA04	DA04 output when PSSL = H. C2F2 output when PSSL = L.
16	XRST	System rest input terminal. Reset at low level.	66	DA05	DA05 output when PSSL = H. C2FL output when PSSL = L.
17	CNIN	Tracking pulse input terminal	67	DA06	DA06 output when PSSL = H. C2PO output when PSSL = L.
18	SENS	Inner condition output terminal correspond to address			
19	MUTG	Muting input terminal	68	DA07	DA07 output when PSSL = H. RFCK output when PSSL = L.
20	CRCF	CRC check output terminal of subcode Q	69	DA08	DA08 output when PSSL = H. WFCK output when PSSL = L.
21	EXCK	Clock input terminal for serial output of subcode	70	DA09	DA09 output when PSSL = H. PLCK output when PSSL = L.
22	SBSO	Serial output terminal of subcode			
23	SUBQ	Subcode Q output terminal	71	DA10	DA10 output when PSSL = H. UGFS output when PSSL = L.
24	SCOR	Subcode sink S0 + S1 output terminal	72	DA11	DA11 output when PSSL = H. GTOP output when PSSL = L.
25	SQCK	Clock terminal to read the subcode Q	73	Vᴅᴅ	Power supply (5V)
26	SQEX	Selector input terminal of SQCK	74	DA12	DA12 output when PSSL = H. RAOV output when PSSL = L.
27	DOTX	Digital output terminal			
28	GFS	Indicator output of lock condition of frame sync	75	DA13	DA13 output when PSSL = H. C4LR output when PSSL = L.
29 ∤ 32	DB08 ∤ DB05	Data terminals of external RAM	76	DA14	DA14 output when PSSL = H. C210 output when PSSL = L.
			77	DA15	DA15 output when PSSL = H. C210 output when PSSL = L.
33	Vᴅᴅ	+5V			
34 ∤ 37	DB04 ∤ DB01	Data terminals of external RAM	78	DA16	DA16 (MSB of parallel sound output) output when PSSL = H. DATA output when PSSL = L
38 ∤ 48	RA01 ∤ RA11	Address output terminals of external RAM	79	WDCK	Strobe signal output. 176.4kHz when DF is on. 88.2kHz when DF is off.
			80	LRCK	Strobe signal output. 88.2kHz when DF is on. 44.1kHz when DF is off.

CXP5058H-174Q (Microprocessor)
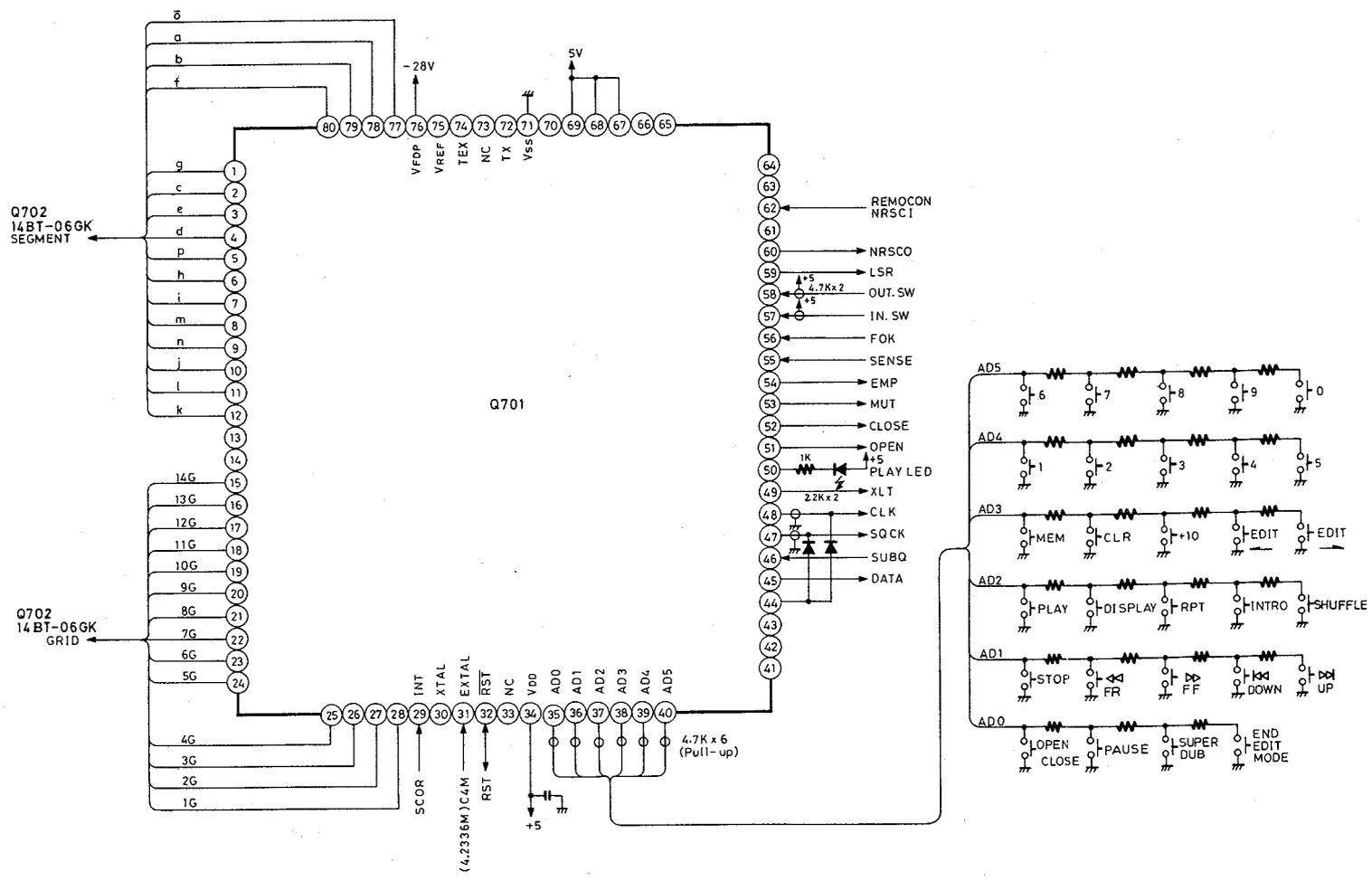
STA341M (Transistor Array)
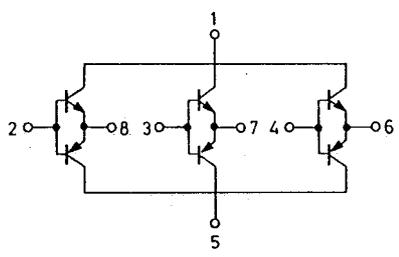
LA6510 (Power OP Amp)
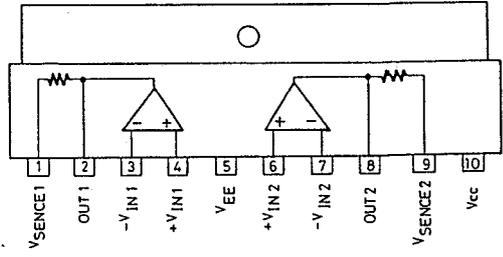
Pin No.	Terminal	I/O	Description
1~12	c, b, e, g, h~ñ, p	O	Fluorescent tube segment drive output terminals.
15~28	1G~14G	O	Output terminals for grid of fluorescent tube.
29	SCOR	I	Input terminal for sub code sink SQ+SI.
31	C4M	I	Clock input terminal from X'tal (4.2336MHz).
32	XRST		Reset input terminal.
34	V_{DD}		Power supply terminal (+5V).
35~40	AD-0~AD-5	I	Input terminal from operaton keies.
45	DATA	O	Serial data signal output terminal.
46	SUBQ	I	Sub code Q input terminal.
47	SQCK	I/O	Read clock of sub code Q
48	CLK	O	Serial data transmission clock
49	XLT	O	Output terminal for command execution.
50	LED	O	Output terminal for PLAY indicator.
51	OPEN	O	L level during the tray closes.
52	CLOSE	O	L level during the tray opens.
53	MUT	O	Muting switching signal output, Active H.
54	EMP	O	Emphasis switching signal output. Active H.
55	SENSE	I	Interface of signal processor IC and microprocessor.
56	FOK	I	Focus OK input terminal. Focus OK at high level.
57	INSW	I	L level at the arm down.
58	OUT SW	I	L level at the tray open.
59	LSR	O	L level when the laser turns on.
60	NRSCO	O	Remote control signal output terminal.
62	NRSCI	I	Remote control signal input terminal.
68	TIMER PLAY	I	Connect to the alternate switch.
69	TIMER SHUFFLE	I	Connect to the alternate switch.
76	VFDP		Power supply terminal. (−28V)
77~80	a, b, f, o	O	Fluorescent tube segment drive output terminals.

PCM-56P−L (D/A Converter)
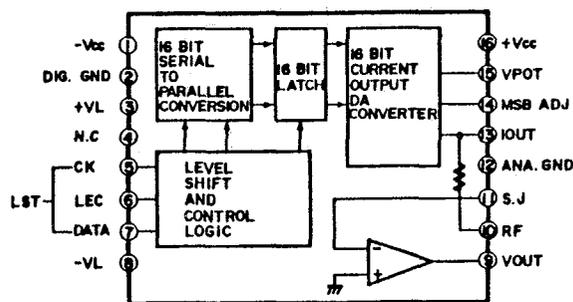
1	−Vcc	Analog power supply(−)
2	DIG GND	Digital ground
3	+VL	Logic voltage (+)
4	N.C	Not used
5	CK	Clock input
6	LEC	Latch enable input
7	DATA	Data input
8	−VL	Logic voltage (−)
9	VOUT	Output
10	RF	Feedback register
11	SJ	Operation amplifier input
12	ANA GND	Analog ground
13	IOUT	Current output
14	MSB ADJ	MSB adjustment terminal
15	VPOT	Meter terminal
16	+Vcc	Analog power supply (+)

14BT-06GK (Fluorecent indicator tube)
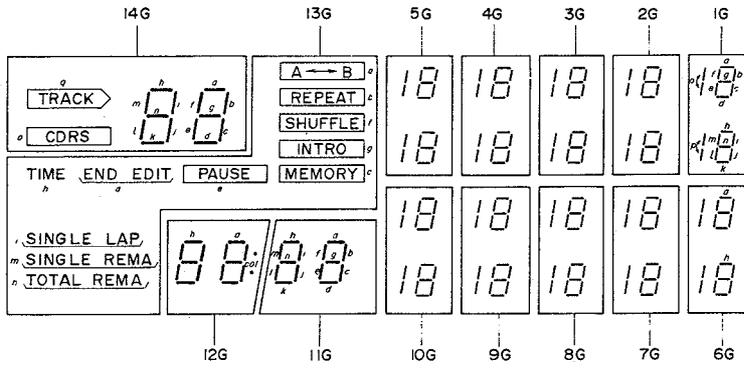
PIN CONNECTION

PIN No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CONNECTION	F1	F1	NP	NP	q	o	a	b	f	g	c	e	d	p	h	i	m	n	j
PIN No.	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
CONNECTION	l	k	14G	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G	NP	F2	F2

74HC04P (Hex inverters)
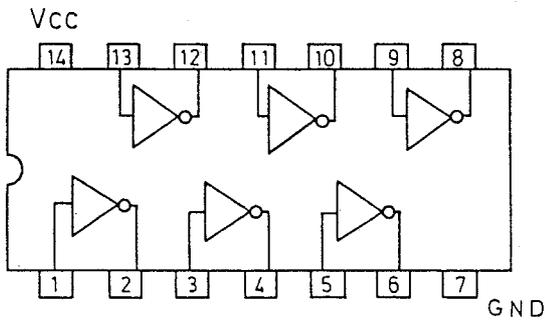
M51943ASL (System reset)
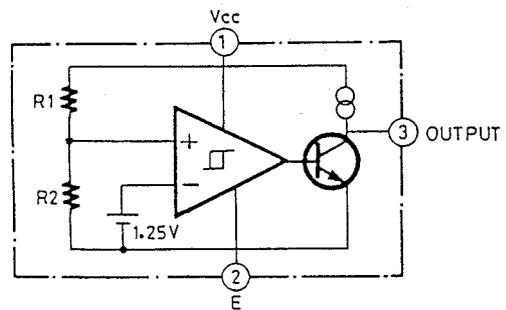
NJM4556S (Operation amp.)
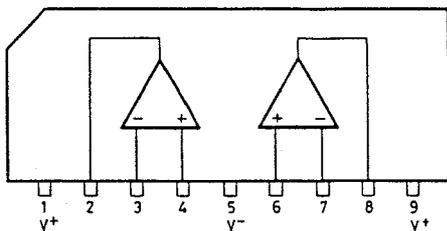
LB1630 (Motor Drive)

Pin6:NC
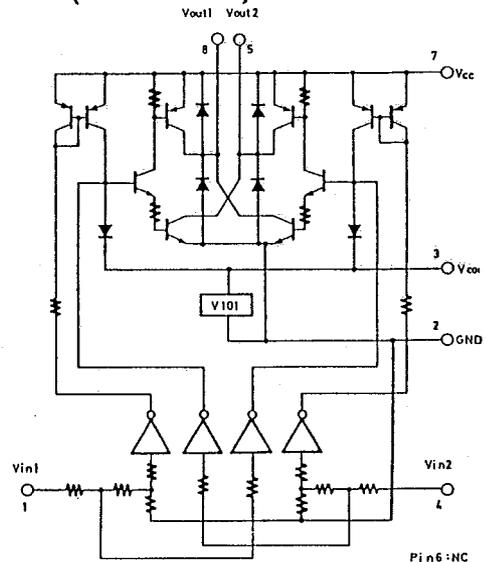
YM3414 (Eight times over sampling digital filter)
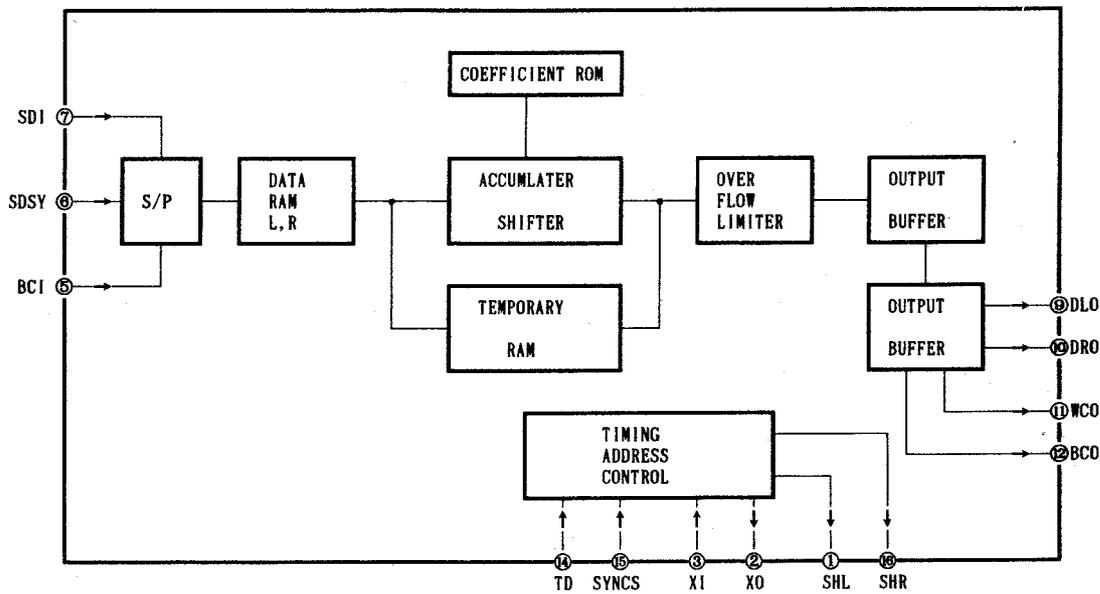
| PIN NO.	TERMINAL	I/O	DESCRIPTION
1	SHL	O	When one DAC(TD=L):Deglitching signal of left channel (when four times) When two DAC(TD=H):Deglitching signal of left and right channels(when eight times)
2 3	XO XI	O I	Connect the x'tal oscillator between XI and XO. The clock frequency is 384×Fs.
4	VDD2		+5V:Power supply terminal for x'tal oscillator and deglitching signal.
5 6 7	BCI SDSY SDI	I I I	Bit clock input terminal. Clock shown L/Rch division of input data and input timing. 16 bits serial data input terminal.
8	VDDI		+5V:Power supply terminal for digital signal.
9	DLO	O	When one DAC(TD=L):Output terminal for L/R channel data (When four times) When two DAC(TD=H):Output terminal for L channel data (when eight times)
10 11 12	DRO WCO BCO	O O O	R channel data output terminal. Word clock of output data DLO/DRO. Bit clock of output data.
13	VSS		Ground terminal
14	TD	I	1DAC/2DAC selector terminal: 1DAC at low. 2DAC at high.
15	SYNCS	I	Asynchronous input jitter absorption synchronous signal. Synchronous input at high level. SDSY inhibiting at low level.
16	SHR	O	R channel deglitching signal when one DAC.

CIRCUIT DESCRIPTIONS
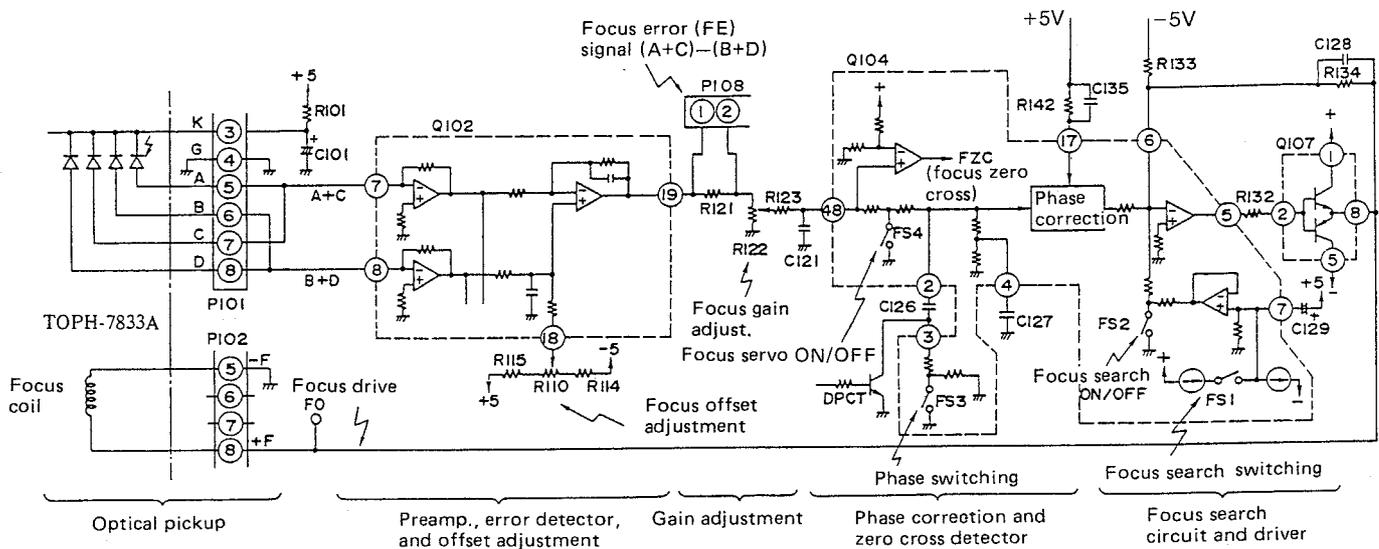
Fig. 1 Focus servo circuit

1. Focus servo circuit

From the optical pickup objective lens, the emitted laser beam is focused on the disc reflecting surface, an this circuit controls the movement of the lens up and down.

1-1. Error detecting circuit

The error is detected by means of the astigmatic aberration method and obtains its focus error signal from the optical pickup output signal (A+C)−(B+D).

The individual signals (A+B) and (C+D) input to pins 7 and 8 of Q102 are subtracted by means of the IC internal op amp, and from pin 19, the F.E. signal is output. Also, in order to eliminate the focus error, offset adjustment is carried out by the semi-fixed resistor R110 of pin 18 of Q102.

1-2. Phase correction and driver circuit

By means of the semi-fixed resistor R122, the gain adjusted F.E. signal passes by way of the phase correction circuit from pin 48 of Q104, and from pin 5 of Q104 to the driver Q107, and is feedback to the coil used for driving the optical pickup TOPH-7833A objective lens. In addition, there are the FS4 servo ON/OFF switch and FS3 phase characteristic selector switch.

1-3. Focus zero cross circuit and focus search circuit

In order to have mandatory drive of the objective lens in the capture range of only 10μm at the focus point it is necessary to turn off the above mentioned FS4 and close the servo loop. The timing diagram for that operation is shown in Fig. 2 .

The triangular wave generated by means of the focus search circuit internal to Q104 shifts the objective lens up/down direction, and at the correct focus point, the fall of F.E. signal is detected by the focus zero cross (FZC) circuit to close the servo loop. At this time, it is necessary that the focus OK (FOK) signal be in the high level. In Fig. 2, the dotted line is the waveform of the focus capture failure.
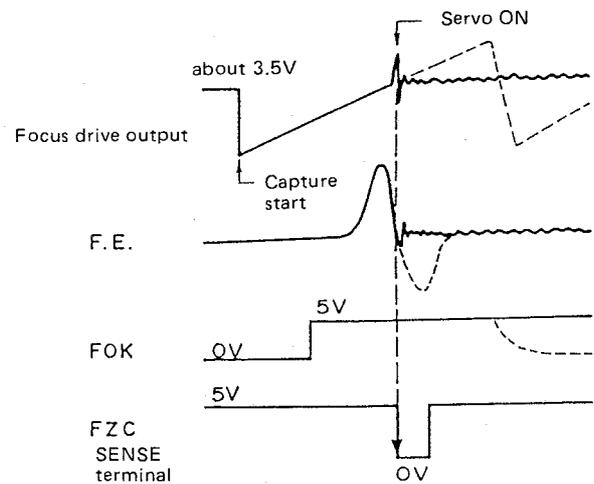

Fig. 2 Capture operation of focus
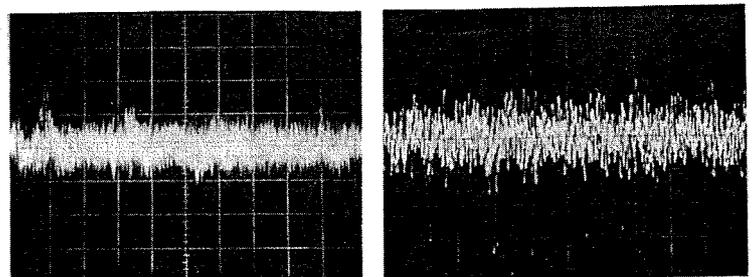
Focus signal	Focus signal
P108 pin 1	Q107 pin 2
V: 10mV/div	V: 50mV/div
H: 0.5ms/div	H: 0.5ms/div

Photo 1

−18−
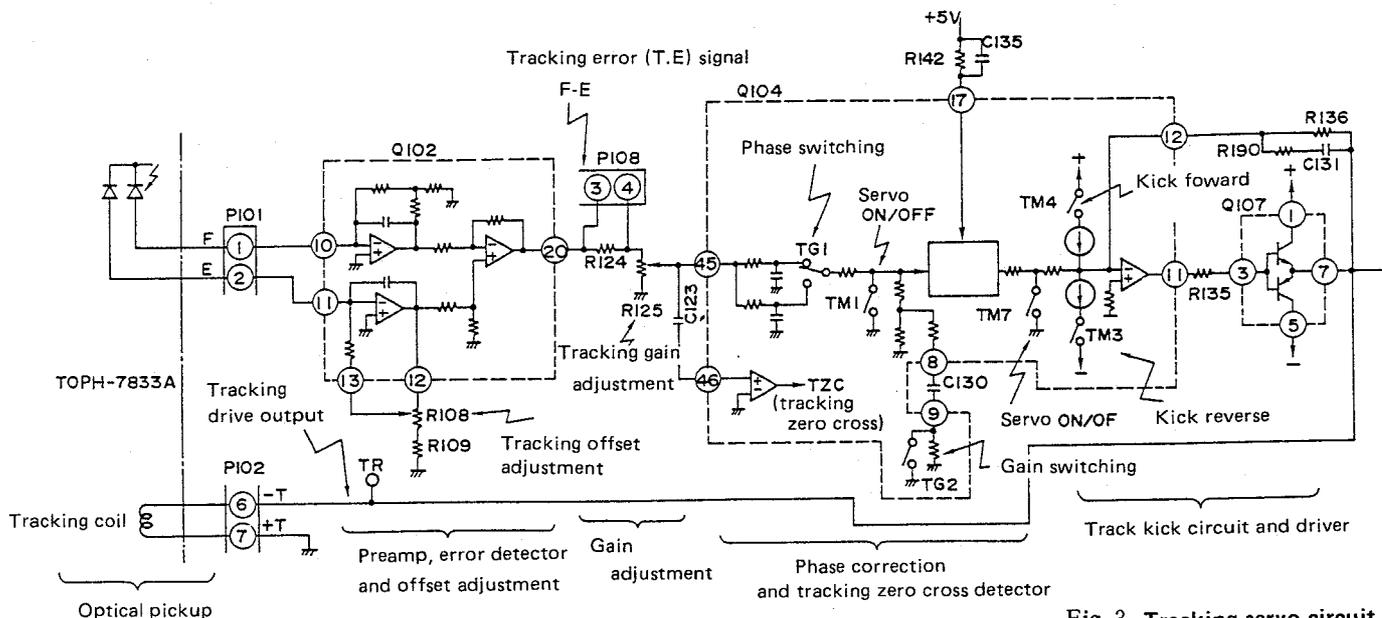
Fig. 3 **Tracking servo circuit**

2. Tracking servo circuit

On the disc at a pitch of 1.6μm, the laser beam accurately traces the center of the pits cut into the disc, and this is the control circuit that shifts the objective lens in the radial direction.

2-1. Error detection circuit

The F-E is obtained from the tracking error (T.E.) signal by means of a 3 beam method. The F.E. signal input to pins 10 and 11 of Q102 is subtracted internally, and is output as the T.E. signal from pin 20. R108 is the semi-fixed resistor control for tracking offset.

2-2. Phase correction and driver circuit

The T.E. signal adjusted for gain by means of the semi-fixed resistor R125 passes through the phase correction circuit from pin 45 of Q104, and from pin 11 by way of driver Q107 objective lens. TM1 and TM7 are used as the tracking servo ON/OFF switches, and TG1 and TG2 respectively are used as the phase selector and gain selector switches.

2-3. Tracking zero cross and track kick circuit

At the time the head comes out and when there is manual fast forward, in the event that is it necessary to skip over the track being traced, the T.E. signal receives a kick pulse, and by mens of this, shifting of the objective lens can be achieved.

TM3 and TM4 respectively are the switches for providing the forward and reverse direction kick pulses. Also, the tracking zero cross (TZC) circuit counts the number of tracks skipped over and produces the signal in order to determine the timing of the servo ON/OFF.

The ON/OFF command for these switches is output from the microcomputer.

Tracking signal
P108 pin 4
V: 20mV/div
H: 0.5ms/div
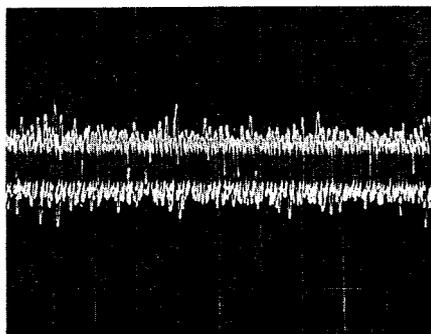
Tracking signal
Q107 pin 3
V: 0.1V/div
H: 0.5ms/div

Photo 2
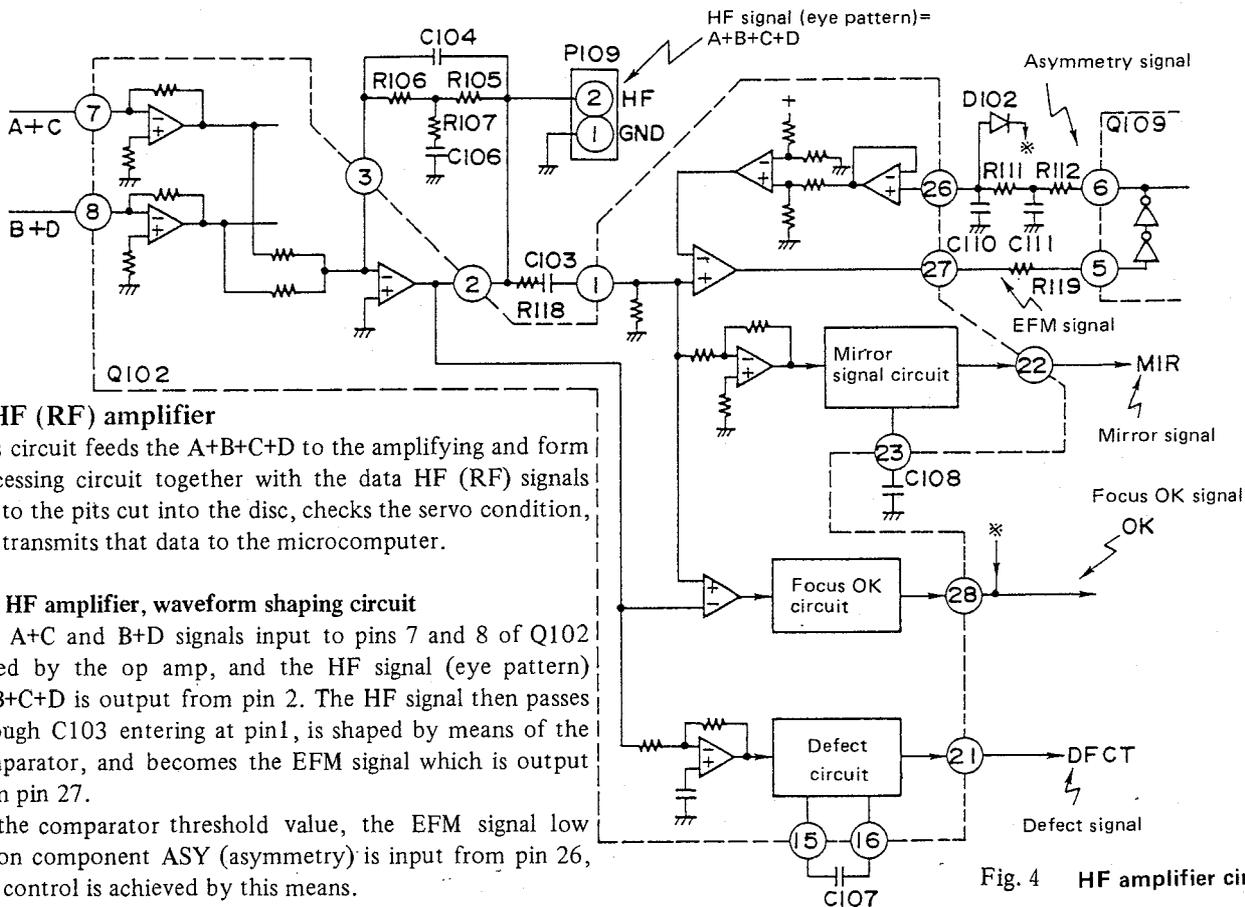
Fig. 4 HF amplifier circuit

3. HF (RF) amplifier

This circuit feeds the A+B+C+D to the amplifying and form processing circuit together with the data HF (RF) signals due to the pits cut into the disc, checks the servo condition, and transmits that data to the microcomputer.

3-1. HF amplifier, waveform shaping circuit

The A+C and B+D signals input to pins 7 and 8 of Q102 added by the op amp, and the HF signal (eye pattern) A+B+C+D is output from pin 2. The HF signal then passes through C103 entering at pin1, is shaped by means of the comparator, and becomes the EFM signal which is output from pin 27.

In the comparator threshold value, the EFM signal low region component ASY (asymmetry) is input from pin 26, and control is achieved by this means.

3-2. MIR circuit, FOK circuit, and DFCT circuit

After the HF signal is processed the detection, shaping, etc, respectively the MIR, FOK, and DFCT signals are output from pins 22, 28, and 21.

3-2-1. MIR (mirror) signal

When the head is extended, at the time the signal becomes high at the disc track and between tracks, the number of tracks is counted, and this is used for determining the timing for the ON/OFF of the servo.

3-2-2. FOK (focus OK) signal

This signal goes high at the time the focus servo is required. (Refer to 1—3)

3-2-3. DFCT (defect) signal

If there is a defect (scratch, dirt, etc.) in the disc, this signal goes high, the servo and gain are controlled, and the circuit prevents a sound outburst.

4. APC circuit

By means of feedback from the monitor, this circuit controls the light output due to a bad condition resulting from the temperature characteristic of the laser diode.

For the pin 29 LDON (laser diode ON) signal, when the APC ON/OFF control signal is LOW, the laser is emitted.

5. CLV servo circuit

In the compact disc there is a CLV system (constant linear velocity), and at the replay position, because the disc rotary speed varies, the clock is taken out of the HF signal, and
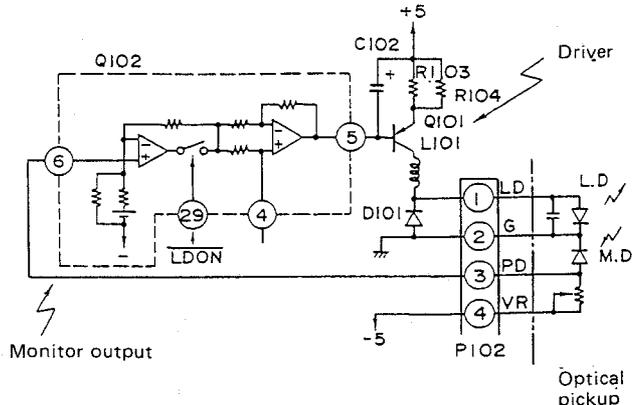
Fig. 5 APC circuit
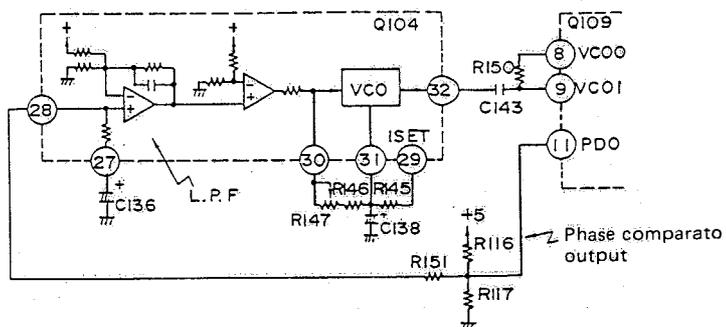
Fig. 6 PLL circuit

the PLL circuit and its clock must be synchronized to control the spindle motor.

5-1. PLL circuit

As shown in Fig. 6, for the phase comparator, in Q109 the LPF and VCO are each built into Q104. The semi-fixed resistor R147 is the control for adjusting the 8.6436 MHz free run frequency (WFCK = 7.35 KHz).

5-2. Spindle motor control circuit

The output of the phase comparator (MDP) and frequency comparator (MDS) from pins 3 and 4 of Q109 is fed to pins 34 and 36 of Q104. Also, the spindle motor ON/OFF signal (MON) from pin 2 of Q109, and the phase selector signal (FSW) from pin 1, are output and fed to pin 36 of Q104. After these signals are processed in Q104, they are passed from pin 39 through the driver Q108, and are supplied to the spindle motor.
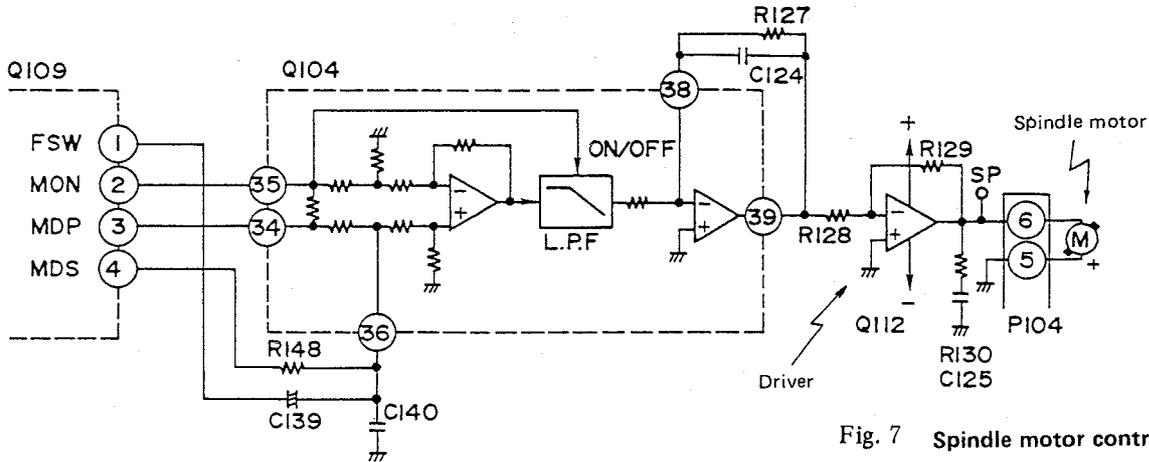
Fig. 7   **Spindle motor control circuit**
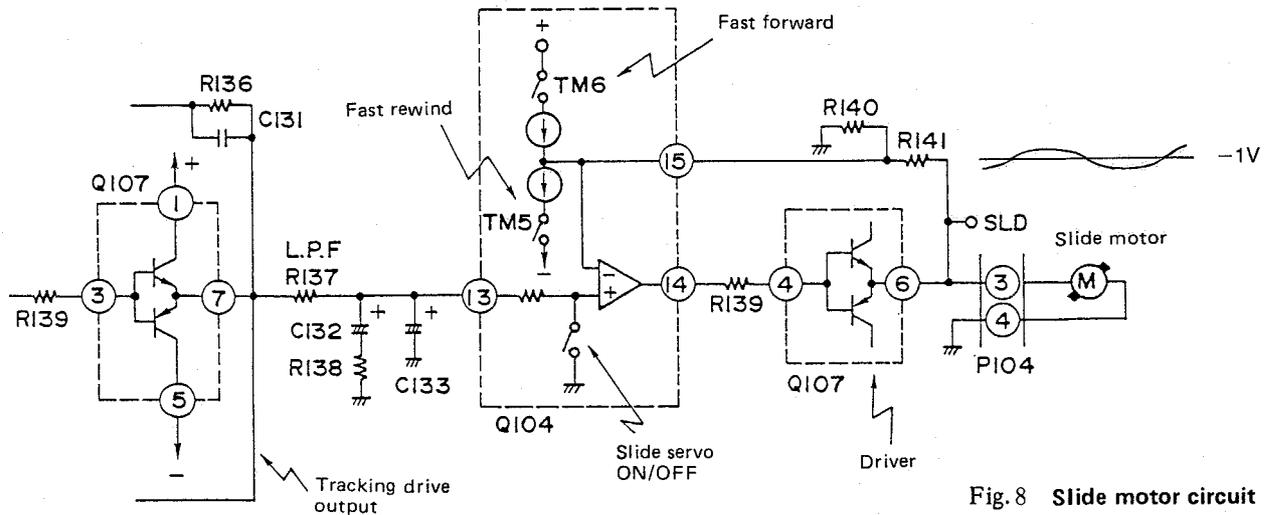
Fig. 8   **Slide motor circuit**

6. Slide motor circuit

This circuit controls the slide motor which is used for moving the optical pickup from inside the disc to the outside. In the normal playback time, the low region component of the tracking driver output is amplified and fed to the motor, but when the head is extended, switches TM5 and TM6 internal to Q104 control the ON/OFF.
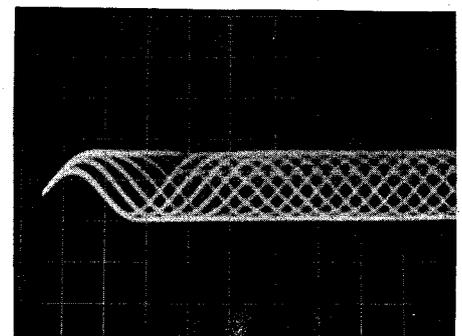
RF signal
P109 pin2 (HF)
Vertical : 0.5V/div.
Holizontal: 0.5 μs/div.

ADJUSTMENT PROCEDURES

Instruments required

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

1. VCO frequency adjustment

Connect the frequency counter to terminal P110.

Turn the power switch to ON.(No load the disc.)

Adjust R147 until the frequency counter reading becomes 4322 ±5kHz.

After adjustment, disconnect the frequency counter.

2. Focus offset adjustment

Load the test disc YEDS-18 on the tray and play the track 2.

Connect the oscilloscope or jitter meter to terminal P109.

(Oscilloscope)

Adjust R110 until a clear trace of waveform pattern as shown photo 1 appear on the oscilloscope.

When the amount of jitter is broad, set R110 to mechanical center.

(Jitter meter)

Adjust R110 until the jitter meter reading becomes minimum.(Less than 10ns.)

After adjustment, disconnect the oscilloscope or jittter meter.

Photo 1

P110 — PLCK + — Frequency counter — 2 1 GND

P109 — HF + — Oscilloscope — 1 2 GND

Oscilloscope range
Vertical : 0.5V/div.
Holizontal : 0.2 μs/div.
AC

HF — 4.7k — Jitter meter — 1 2 GND — 0.047μF
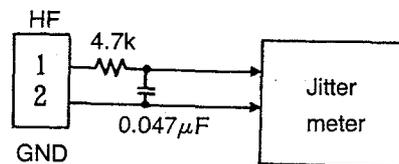
3. Tracking offset adjustment

Load the test disc YEDS-18 on the tray and play the track 2.

Turn R125 to minimum position.(Counter clockwise)

Connect the oscilloscope between pin 3 (TR) of P108 and pin 2 (GND) of P109.

Adjust R108 until the center of tracking error signal on the oscilloscope becomes GND level.

Turn R125 to the mechanical center.

After adjustment, disconnect the oscilloscope.

A
GND level
B
A=B

Photo 2

P108 — 1 2 TR 3 4 — Oscilloscope

P109 — 1 2 GND
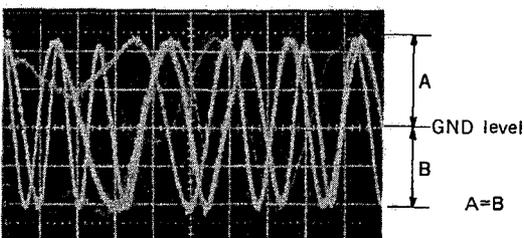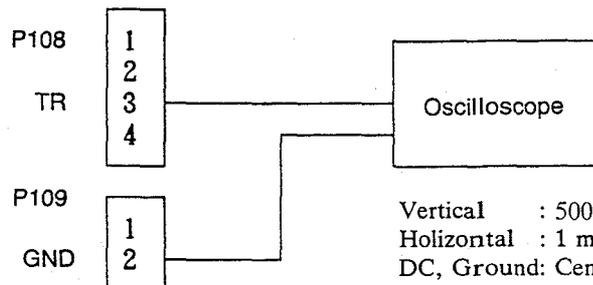
Vertical : 500mV/div.
Holizontal : 1 ms/div.
DC, Ground: Center

4. 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.
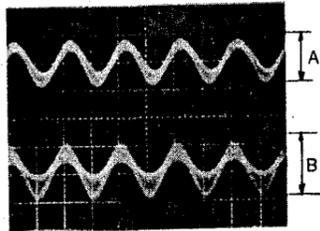
Photo 3
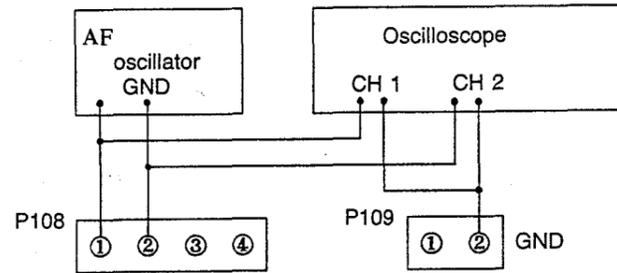
Vertical : 0.2V/div.
Holizontal: 0.5 ms/div.

Adjust R122 until 800Hz components of channels 1 and 2 on oscilloscope become same level.
After adjustment, disconnect the AF oscillator and the oscilloscope.

5. 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.
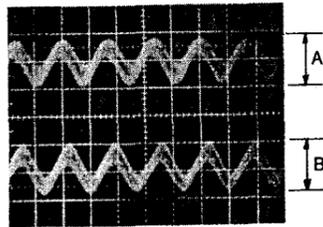
Photo 4
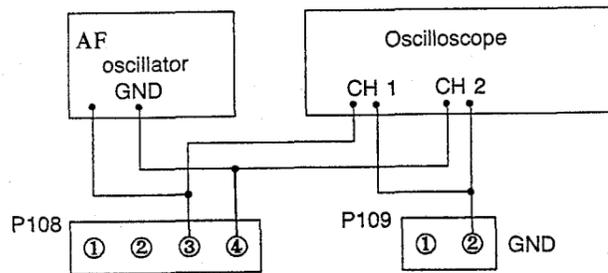
Vertical : 0.2V/div.
Holizontal: 0.5 ms/div.

Adjust R125 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.

6. Audio circuit adjustment

Connect the AC voltmeter to output terminal of left channel (right channel).
Load the test disc and play the track 2.
Next, play the track 17.
Adjust R425 (R426) so that the output discrepancy between track 2 and track 17 is 60±0.25dB.
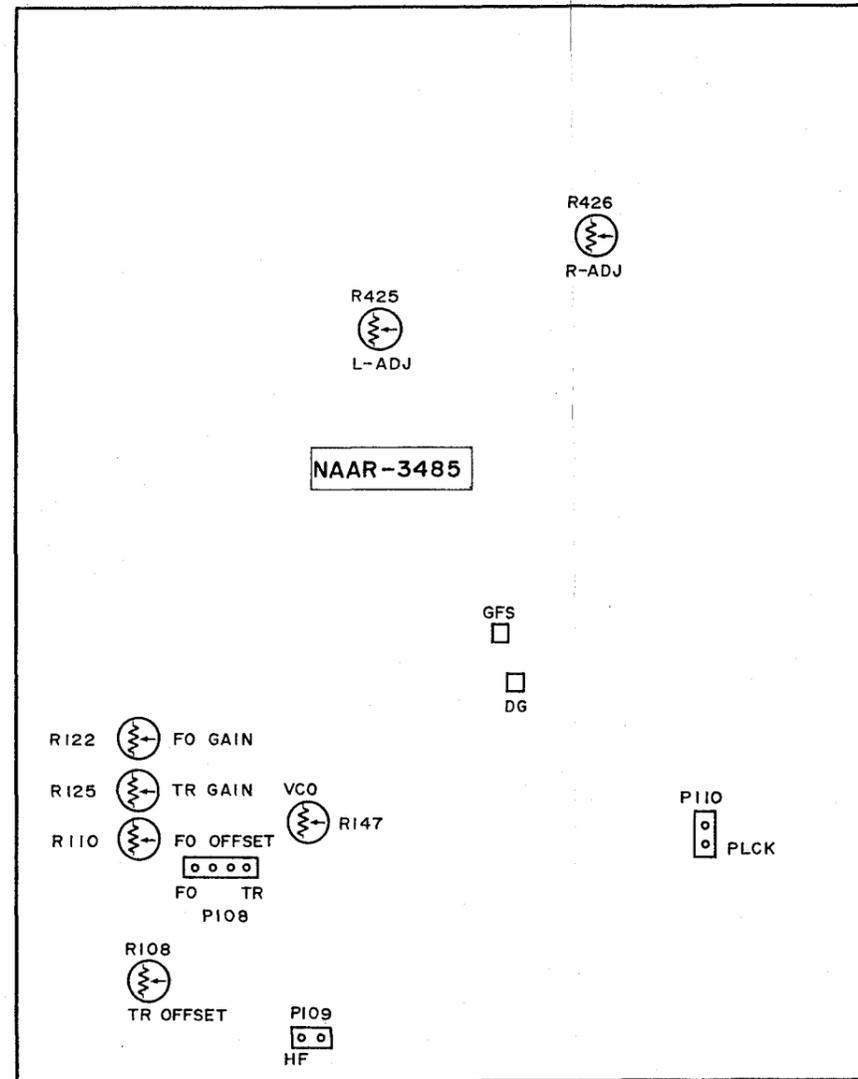
Adjustment Point

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE
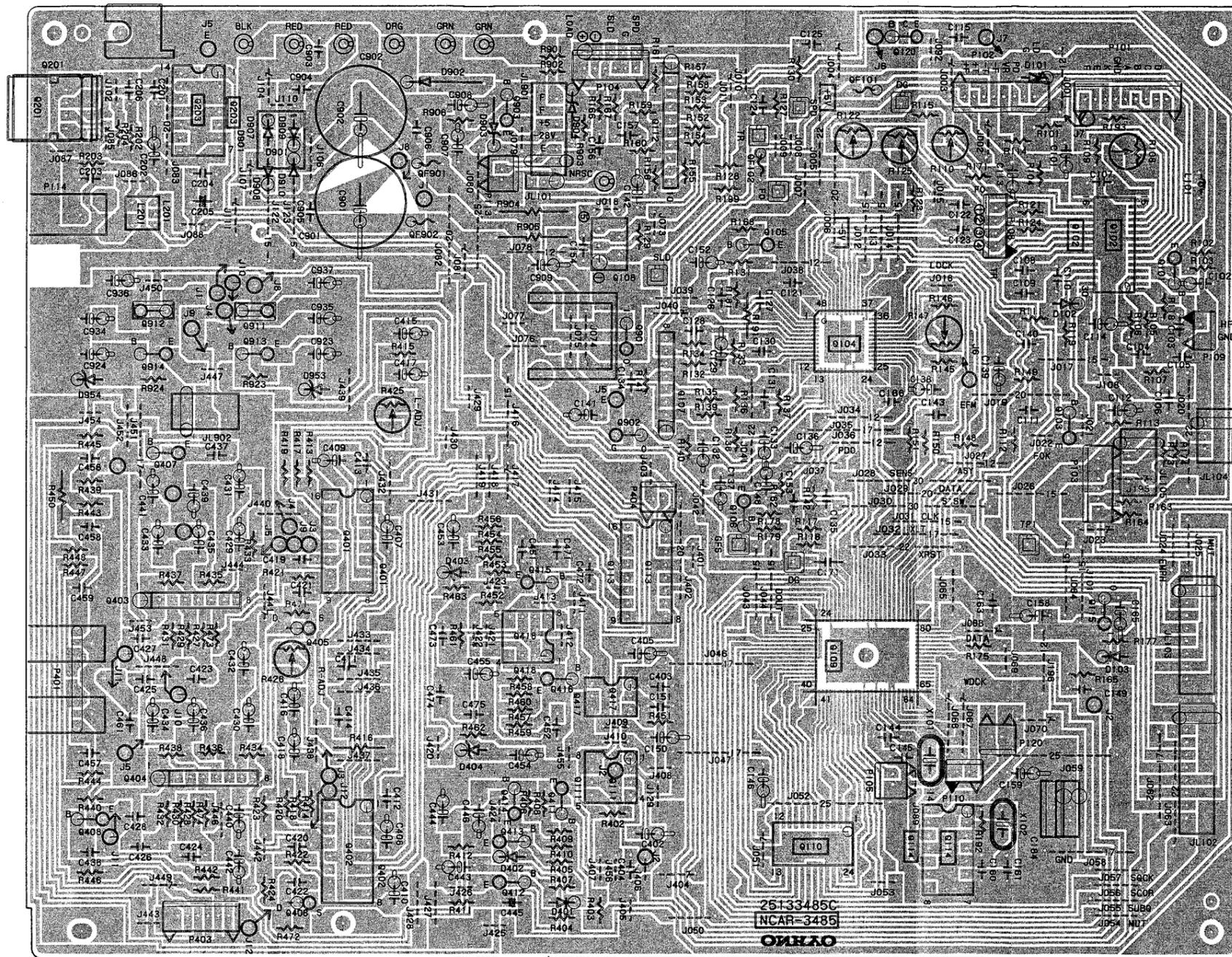
MAIN CIRCUIT PC BOARD
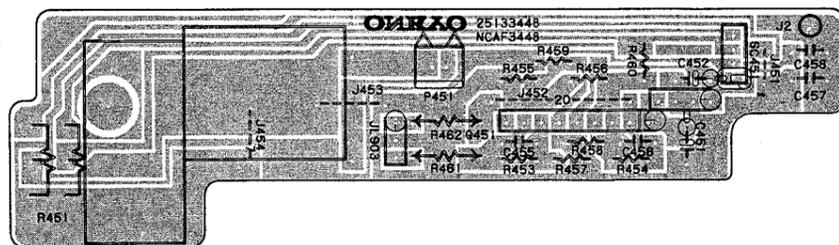
HEADPHONE AMPLIFIER PC BOARD

**HEADPHONE TERMINAL
PC BOARD**

PRINTED CIRCUIT BOARD – PARTS LIST

MAIN CIRCUIT PC BOARD (NAAR-3485-2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q102	22240029	CXA1081M
Q104	22240223	CXA1082BQ
Q107	22240036	STA341M
Q109	22240130	CXD1125Q
Q110	22240142,	CXK5816MS-15,
	22240203,	LH5116N-15,
	22240233,	LC3517BM-15
	222990 or	CXK5816M-15 or
	22240032	LC3517M-15
Q111	226027	HCPL-2601
Q112	22240034	LA6510
Q113	22240176	YM3414
Q114	222755	74HCU04P
Q115	22240018	M51943ASL
Q203	222755	74HCU04P
Q401, Q402	22240096	PCM56P-L
Q403, Q404	222652	M5218L
Q417	24120012	PC713V
Q418	222465	NJM4558D
Q901	222780052	78M05
Q902	222790053	79L05
Q911	222780085MIT	M5F78M08L
Q912	222790085MIT	M5F79M08L
	Transistors	
Q101, Q416	2211503 or	2SA950-O or
Q903, Q914	2211504	2SA950-Y
Q120	221281	DTC114YS
Q405, Q406	2212524 or	2SK363-GR or
	2212525	2SK363-BL
Q407, Q408	2211705 or	2SD655-E or
	2211706	2SD655-F
Q411, Q412	2211254 or	2SC1815-Y or
	2211255	2SC1815-GR
Q413, Q414	2211454 or	2SA1015-Y or
	2211455	2SA1015-GR
Q415, Q913	2211163 or	2SC2120-O or
	2211164	2SC2120-Y
	Diodes	
D101, D102	223163	1SS133
D401, D402	223163	1SS133
D901	223892	DF02M
D902	223880 or	GP101N4003 or
	223896	1N4003F
D903	224653302 or	HZ33EB2 or
	224453302	MTZ33B
D904	224650511 or	HZ5.1EB1 or
	224450511	MTZ5.1A
D953, D954	224650562 or	HZ5.6EB2 or
	224450562	MTZ5.6B
	Photo coupler	
Q201	24120014	DF-1111/T
	X'tal	
X102	3010112	KD6586FFB
	Coils	
L101	231023	NCH1062
L201	232143 or	NSRF-2047 or
	232136	NSRF-2046
	Capacitors	
C101, C113	354742209	22µF, 16V, Elect.
C102	354721019	100µF, 6.3V, Elect.
C103, C107	371121034	0.01µF±5%, 50V, Mylar
C108	371124724	4700pF±5%, 50V, Mylar
C109, C111	371121034	0.01µF±5%, 50V, Mylar
C110	371122224	2200pF±5%, 50V, Mylar
C114	354722219	220µF, 6.3V, Elect.

POWE SWITCH PC BOARD
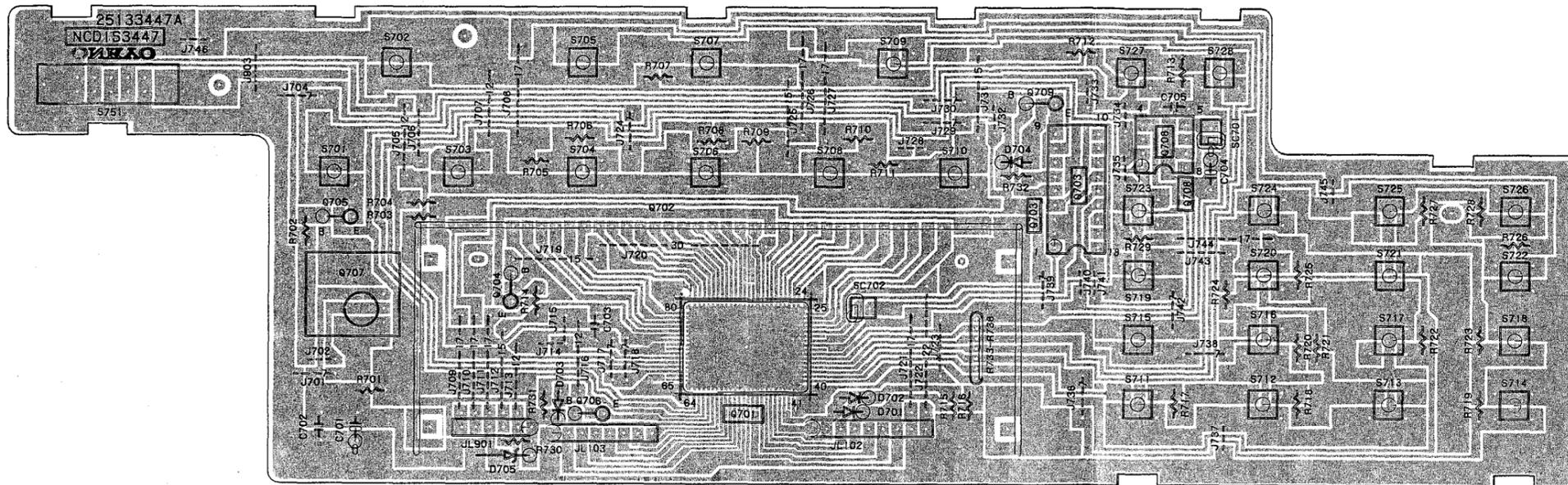
DISPLAY CIRCUIT PC BOARD

DISPLAY CIRCUIT PC BOARD (NADIS-3447-2)
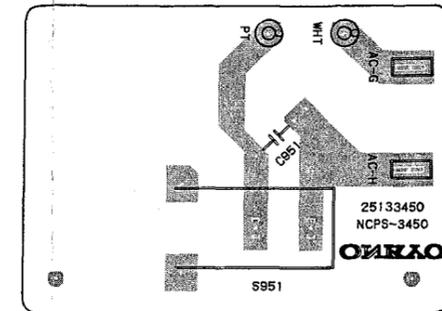
CIRCUIT NO.	PART NO.	DESCRIPTION
C115	371121034	0.01μF±5%, 50V, Mylar
C121	371122224	2200pF±5%, 50V, Mylar
C122	371121024	1000pF±5%, 50V, Mylar
C123	371122234	0.022μF±5%, 50V, Mylar
C125-C127	371121044	0.1μF±5%, 50V, Mylar
C129	354780479	4.7μF, 50V, Elect.
C130, C140	371123334	0.033μF±5%, 50V, Mylar
C131	352980106	1μF, 50V, Non-polar elect.
C132, C138	354744709	47μF, 16V, Elect.
C133, C136	354780109	1μF, 50V, Elect.
C135	371121034	0.01μF±5%, 50V, Mylar
C139	354782299	0.22μF, 50V, Elect.
C141, C142	354744709	47μF, 16V, Elect.
C146, C148	354744709	47μF, 16V, Elect.
C150, C152	354744709	47μF, 16V, Elect.
C153	371123334	0.033μF±5%, 50V, Mylar
C157	371121044	0.1μF±5%, 50V, Mylar
C158, C159	354744709	47μF, 16V, Elect.
C202, C405	354744709	47μF, 16V, Elect.
C205	352942206	22μF, 16V, Non-polar elect.
C407-C410	354744709	47μF, 16V, Elect.
C415-C418	354742209	22μF, 16V, Elect.
C419, C420	373301514	150pF±5%, 125V, PP
C421, C422	371123934	0.039μF±5%, 50V, Mylar
C423, C424	371121524	1500pF±5%, 50V, Mylar
C425, C426	373302214	220pF±5%, 125V, PP
C427, C428	371123924	3900pF±5%, 50V, Mylar
C429-C436	391242207	22μF, 16V, Elect.
C437, C438	371122224	2200pF±5%, 50V, Mylar
C439-C442	354744709	47μF, 16V, Elect.
C443	354780479	4.7μF, 50V, Elect.
C444	354724719	470μF, 6.3V, Elect.
C445	352981096	0.1μF, 50V, Non-polar elect.
C446	354783399	0.33μF, 50V, Elect.
C451, C452	371121034	0.01μF±5%, 50V, Mylar
C453, C454	354744709	47μF, 16V, Elect.
C455, C481	391241017	100μF, 16V, Elect.
C456-C459	373305614	560pF±5%, 125V, PP
C901, C902	352742229	2200μF, 16V, Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION
C907	354784709	47μF, 50V, Elect.
C908	354762209	22μF, 35V, Elect.
C909	354744709	47μF, 16V, Elect.
C923, C924	354741009	10μF, 16V, Elect.
C934, C935	354744709	47μF, 16V, Elect.
Resistors		
R108	5210066	N06HR22KBD, Semi-fixed
R110	5210060	N06HR2.2KBD, Semi-fixed
R122, R125	5210066	N06HR22KBD, Semi-fixed
R147	5210058	N06HR1KBD, Semi-fixed
R425, R426	5210070	N06HR100KBD, Semi-fixed
R904	441621504	15Ω, 1W, Metal oxide film
Themistors		
R456, R460	4000099	TD5-C230D
Plugs		
P101	25055153	NPLG-9P137
P102	25055152	NPLG-8P136
P103, P104	25055150	NPLG-6P134
P105	25055146	NPLG-2P130
P108	25055045	NPLG-4P33
P109, P110	25055038	NPLG-2P29
P403	25055150	NPLG-6P134
Sockets		
JL102	25050273	NSCT-9P101
JL103	25050272	NSCT-8P100
JL901	25050270	NSCT-6P98
JL902	25050268	NSCT-4P96
Terminals		
P114	25045220	NPJ-1PDOR97
P401	25045201	NPJ-4PDBL82
Radiator		
	27160211-1	RAD68B
Screw		
	82143006	3P+6FN(BC), Pan head
fuses		
QF101, QF102	252112	ICPN15, IC protector

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q701	22240212	CXP5058H-174Q
Q703	22240173	LC6527H-3722
Q708	222963	LB1630
Fluorescent tube		
Q702	212046	14BT-06GK
Remote sensor		
Q707	24130001	GP1U501S
Transistors		
Q704	2212132 or	2SC2021-R or
	2212133	2SC2021-S
Q706, Q709	2212600	DTA124ES
Diodes		
D701-D704	223163	1SS133
D705	224650562 or	HZ5.6EB2 or
	2243152	MTZ5.6B
Capacitors		
C701	354721019	100μF, 6.3V, Elect.
C704	354744709	47μF, 16V, Elect.
Resistors		
R733-R738	49163472406	4.7k×6, 1/10W, Network
Switches		
S701-S728	25035548	NPS-111-S510
S751	25065325	NSS-23128
Sockets		
SC701	2000893	NSAS-4P-849
SC702	2000732	NSAS-4P-688
Holder		
	27190567B	Display

HEADPHONE AMPLIFIER PC BOARD (NAAF-3448-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q451	222887	NJM4556S, IC
C451, C452	354744709	47μF, 16V, Elect. capacitors
R451	5104247	N16RGM20KB25F, Variable resistor

CIRCUIT NO.	PART NO.	DESCRIPTION
R461, R462	442521014	100Ω, 1/2W, Metal oxide film resistors
SC451	2000956	NSAS-10P-908, Socket
P451	25055146	NPLG-2P130, Plug

HEADPHONE TERMINAL PC BOARD (NAAF-3449-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
P451	25045139	HLJ-0540-01-010, Heaphone terminal

POWER SWITCH PC BOARD (NAPS-3450-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
C951	3500065A	DE715OFZ103PCSA(400V/125V), Capacitor IS
P951	25035558	NPS-111-L520P, Power switch
	27300601	Cover for C951
	25060092	NTM-1S33, Terminals

TERMINAL PC BOARD (NAETC-3451-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
P191	25045172	HSJ1003-01-020, Terminal
JL101	25050267	NSCT-3P95, Socket

TROUBLESHOOTING GUIDE

Symptom: Defective reading (No RF signal emitted)

Load the disc on the tray, press OPEN/CLOSE key and close the tray. But, the total number of tunes are not indicated on the fluorescent indicator tube.

1. Remove the top cover.
2. Does the disc turn clockwise? ...... Yes ...... Next page
   No .... Remove the bracket holder and arm ass'y. Check the following when turning on power without the disc.

····· Confirm that the slide motor runs smoothly with the tester (ohm range) or 1V DC applied to both ends of the motor.
····· Bring the pickup to the outermost circumference.
After power source is applied to SLD terminal, is the voltage −2V to 4V?
Yes ... Slide motor defective
No .... Q104 pin 14 (check at leads of R139); when low, Q104 is defective, if pulse emitted at CLK (J031), XTL (J032), DATA (J029) and when not emitted at Q104, Q107 is defective.

DATA (J029) STOP:0V
XTL (J032) STOP:5V
CLK (J031) STOP:5V

The disc is not chucked to normal.
Chucking mechanism
Chucking limit switch (IN switch S002)

Check rack PU movement
Slide motor circuit
S003: Start switch
Q701→Q104→Q107

Method for checking S003
Connect oscilloscope to pin 3 of P103, does it momentarily go to 0V.

Optical pickup (Q101 ON, pickup ON with collector at 2V
APC circuit (pin 8 of Q101 LSR 0V, Q101 base low check). P102 socket insertion defective.

When the START switch is ON continuously, the laser is lit continuously, and the focusing coil does not go up and down sides. Check the gear meching.

Does a search voltage of −2V ~3V output at the focus drive output test point FO?

Optical pickup defective P102 socket insertion defective

Q104,7 focus search circuit

NOTE: There is the possibility that the pickup lens is so dirty that it is impossible to read. Clean with a lens cleaner.

● Use the high impedance probe. (10:1)
● Play the track 2 of test disc. (YEDS-18)

Tracking signal P108 pin 4 (HF) V: 20mV/div H: 0.5mS/div
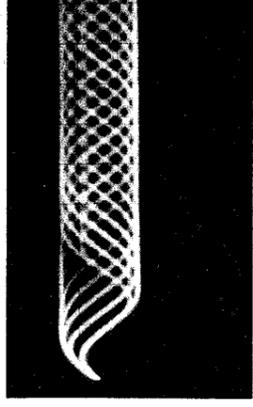
RF signal P109 pin 2 (HF) V: 50mV/div H: 0.5μS/div

Focus servo circuit or adjustment miss optical pickup

Does pin 26 of Q102 turn at high level?

Q109 or Q104 trouble

Does pin 2 of Q109 turn at high level?

Spindle motor control circuit trouble

Does pin 56 of Q701 turn at high level?

Tracking servo circuit trouble or adjustment miss

Confirm the HF signal (eye pattern) or tracking singal.

Is the tracking OK?

HF waveform sharp circuit trouble

Does pin 26 of Q102 turn at high level?

Rotation speed of disc

Higher speed or lower speed

PLL circuit trouble

Does tray open for some time?
Does pickup returned to innermost?
Is the S003 start switch ON?
Does laser light?
Does the object lens move to up and down sides?
Does the disc start to turn clockwise?
Does the test point GFS turn at the high level?

Q107 or Q109 trouble

−29−   −30−

SCHEMATIC DIAGRAM

- Use the high impedance probe. (10:1)
- Play the track 2 of test disc. (YEDS-18)

CXD1125Q

Q109

Q110

CXK581 6XS-15
CXK581 6M-15
LC3517M-15
LH5116N-15
or

Q120
DTC114

X101
KD658GFFB
16.9344MHz

X101
16.9344MHz

Q114
74HCU04P

T901

NAPS-3450

NPS-111-520P S951

C951
0.01/400V

AS-CEE

R191
470

P191

NAETC-3451

NAAR-3485-2

P105

JL902

R142 560K   R162 4.7K

C153 0.033

C150 47/16

C151 0.022

C166 470

EMP
MUT

Q115
M51943ASL

Q914 2SA950   D954   D953   Q913 2SC2120

R924 10/16   R923 1K

C924 47/16   C923 47/16

C934 47/16   C935 47/16

EMPHASIS

Q912 1N   Q911 1N

79L05   78M05   79M05   78M05

C909   C142 47/16

C902 2200/16   C901 2200/16

C905 0.022   C906 0.022

D901 DF02M

D902 1N4003

C904 0.022   C903 0.022

R903 47K   R902 470   R901 470

Q411 2SC1815

R403 10K   R407 4.7K   R408 22K

D401 1S133   D402 2SA1015

C443 4.7/50   C444 470/6.3

R404 10K   R405 4.7K   R406 47K

R409 1K   R410 1K

C445 0.1/50

C412 0.33/50

Q414 2SA1015

R411 470K

R412 470K

R175 100

P110

GND

PLCK

C149 100P

R165 470

C161 22P

C169 47/16

R177 1M

C162 22P

+VDD 14

GND 7   8

16.9344MHz

—EMPHASIS
—B
+B
—ANALOG +8V
—ANALOG —8V
—ANALOG +5V
—ANALOG GND
—ANALOG —5V
—MUTING

BCLK
DATA
WCK
DIGITAL GND
DIGITAL OUT
MASTER CLOCK 16.9344MHz
DIGITAL +5V

DOTX

V : 0.1V/div
H : 0.5mV/div

V : 0.2V/div
H : 0.1μS/div

V : 0.2V/div
H : 0.1μS/div

V : 0.2V/div
H : 0.05μS/div

DX-654
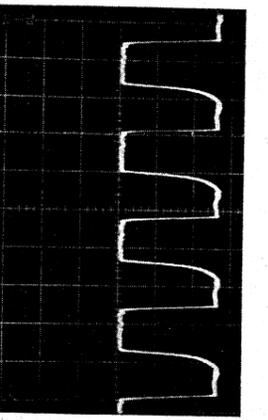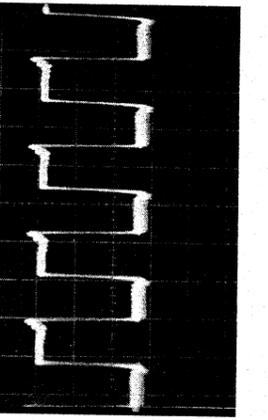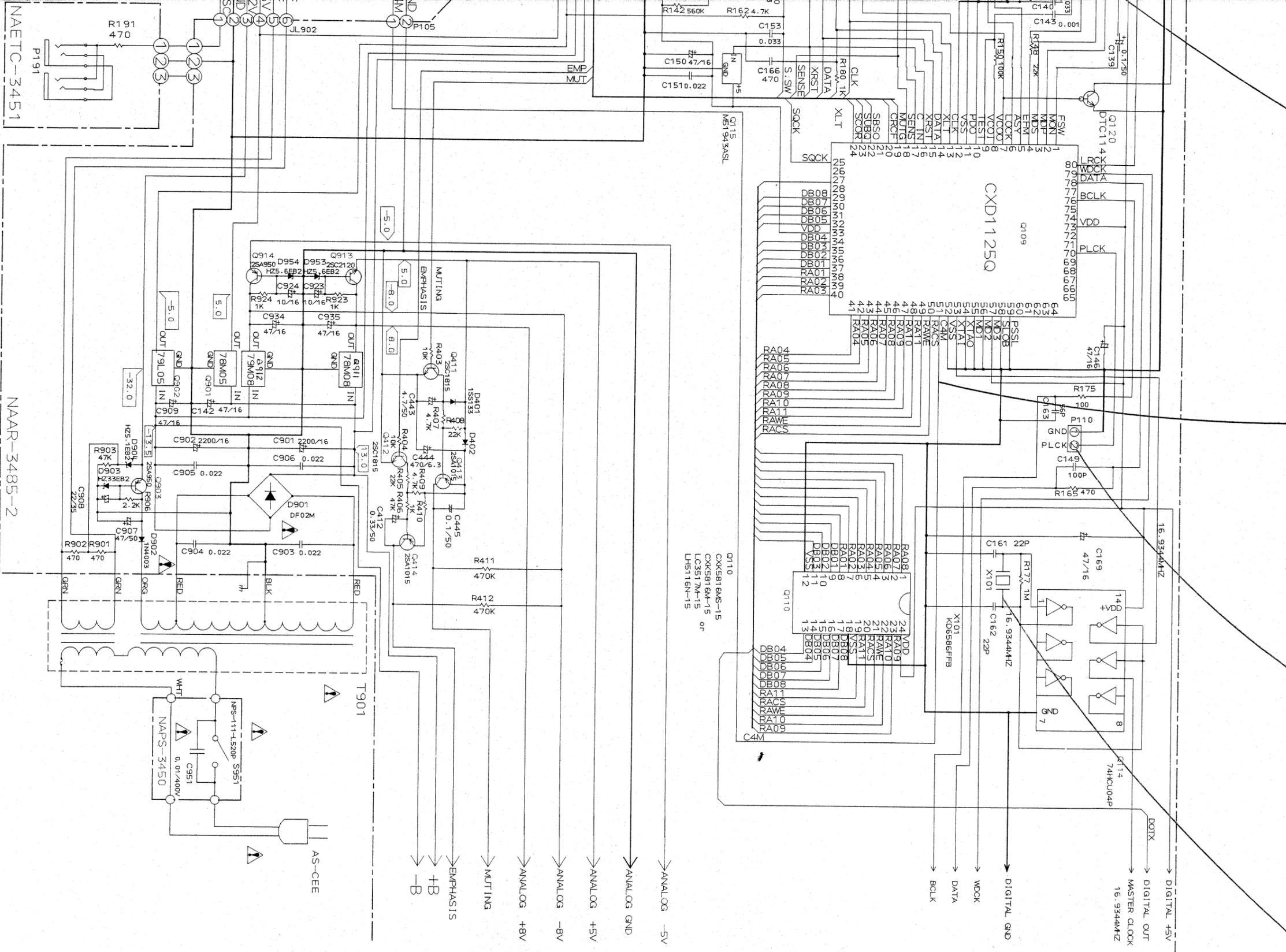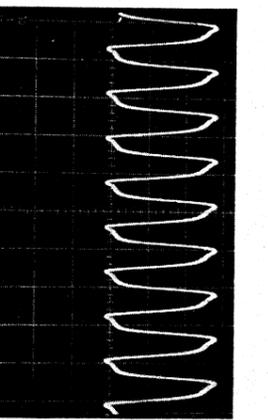
SCHEMATIC DIAGRAM
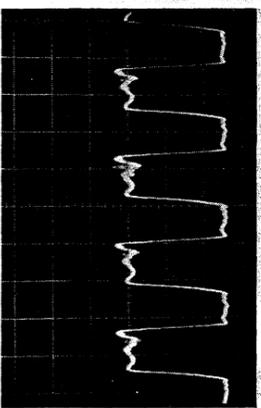
V : 0.2V/diV
H : 0.05μS/diV
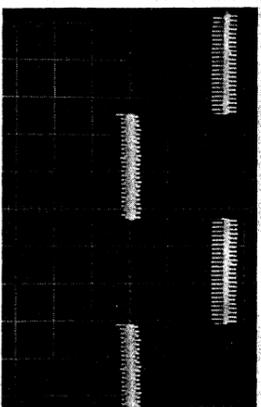
V : 0.2V/diV
H : 1μS/diV
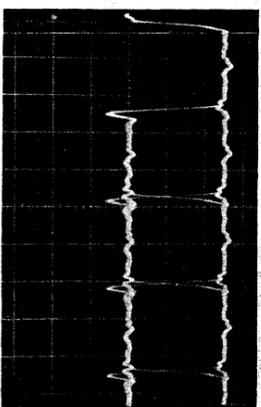
V : 0.2V/diV
H : 0.05μS/diV
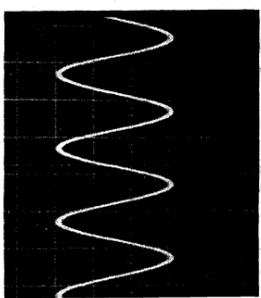
V : 0.2V/diV
H : 0.5mS/diV

• Use the high impedance probe. (10:1)
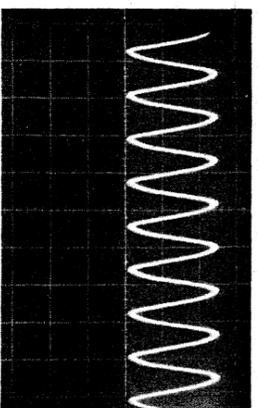
V : 0.2V/diV
H : 0.05μS/diV
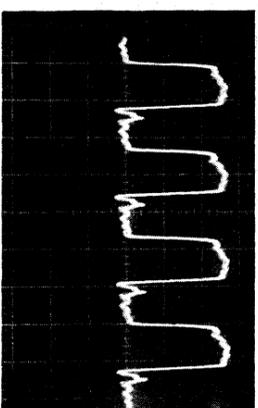
V : 0.2V/diV
H : 0.05μS/diV
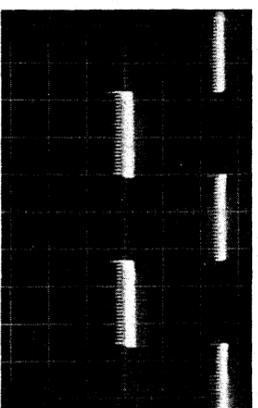
V : 0.2V/diV
H : 5μS/diV
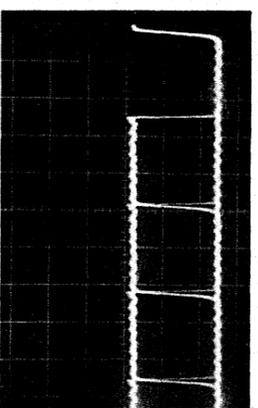
V : 0.2V/diV
H : 0.2μS/diV
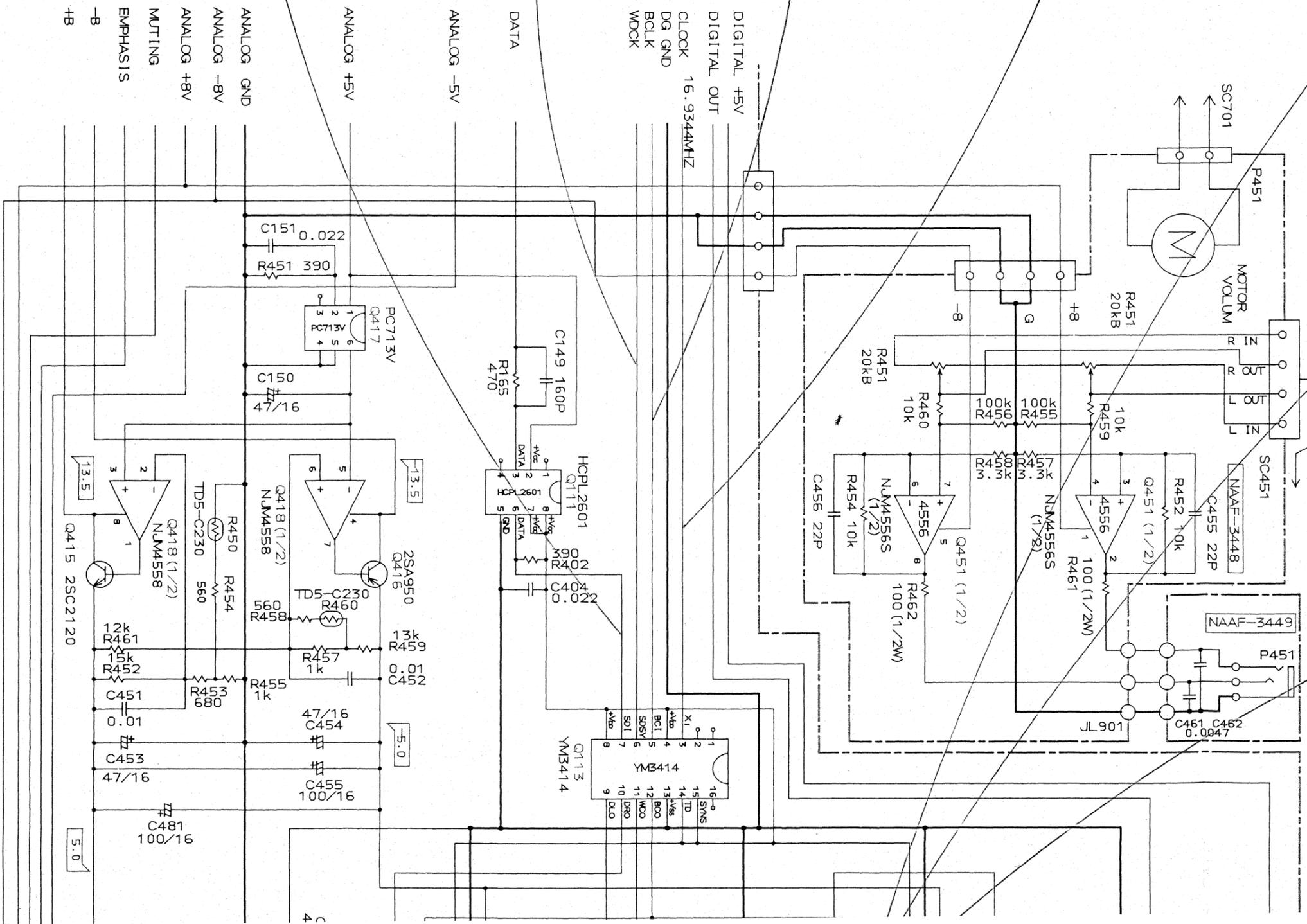
DX-6540   DX-65

ONKYO CORPORATION

V : 0.2V/diV
H : 0.5mS/diV

V : 0.2V/diV
H : 0.1μS/diV

V : 50mV/diV
H : 0.5mS/diV

V : 0.2V/diV
H : 0.1μS/diV

5

6

7

8
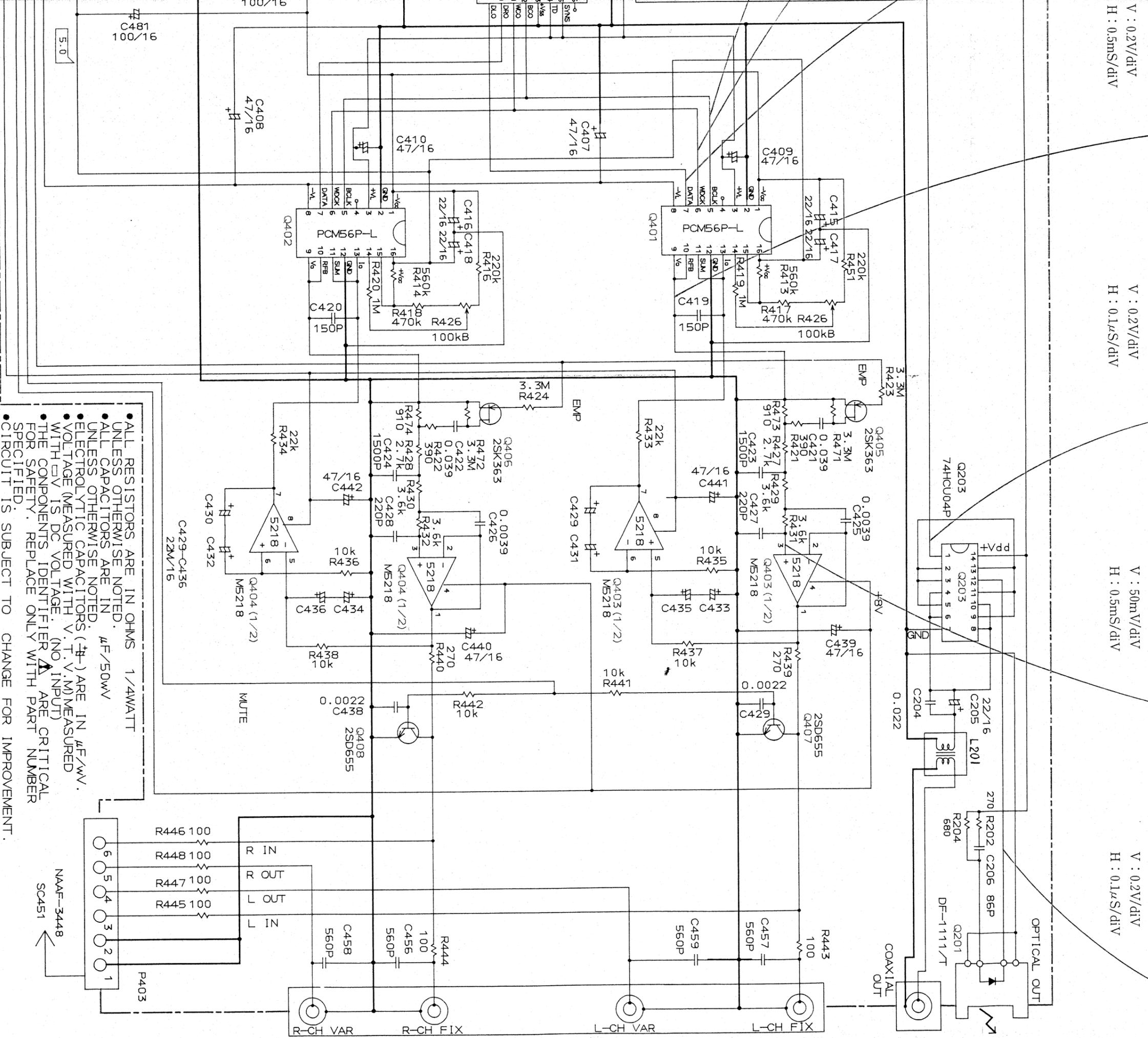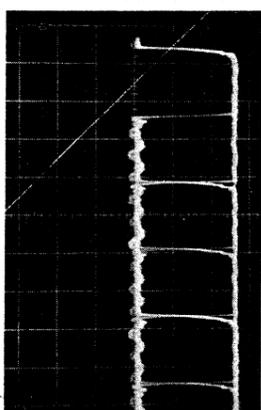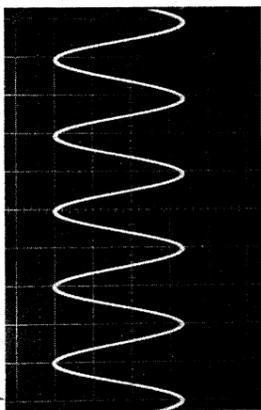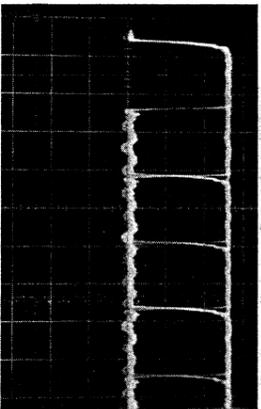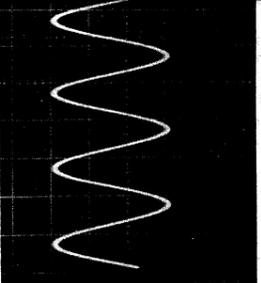
- ALL RESISTORS ARE IN OHMS 1/4WATT
  UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF/50wV
  UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (+) ARE IN μF/wV.
- VOLTAGE (MEASURED WITH V.T.V.M) MEASURED
  WITH ▽ IS DC VOLTAGE.
- ▽ IS DC VOLTAGE (NO INPUT)
  THE COMPONENTS IDENTIFIER ⚠ ARE CRITICAL
  FOR SAFETY. REPLACE ONLY WITH PART NUMBER
  SPECIFIED.
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

C481 100/16
5.0
C408 47/16
C410 47/16
C407 47/16
C409 47/16

Q402 PCM56P-L
Q401 PCM56P-L

C416 C418 22/16 22/16
C415 C417 22/16 22/16

R420 1M R416 220k R414 560k
R419 1M R413 560k R451 220k

C420 150P
C419 150P

R418 470k R426 100kB
R417 470k R426 100kB

EMP R423 3.3M
R424 3.3M EMP

Q406 2SK363 R434 22k
Q405 2SK363 R433 22k

R474 R428 R430 910 2.7k 3.6k
R422 390 R472 3.3M C422 0.039 C424 1500P

R473 R427 R429 910 2.7k 3.6k
R421 390 R471 3.3M C421 0.039 C423 1500P

C442 47/16
C441 47/16

C428 220P C427 220P

C430 C432
C429 C431

5218 5218
M5218 M5218

R432 3.6k R431 3.6k

C426 0.0039 C425 0.0039

Q404 (1/2) M5218 Q403 (1/2) M5218

R436 10k R435 10k
C436 C434 C435 C433

R438 10k R437 10k

C440 47/16 C439 47/16
R440 270 R439 270

R441 10k
R442 10k
0.0022 C438 0.0022 C429

Q408 2SD655 Q407 2SD655

MUTE

Q203 74HCU04P
Q203
+Vdd
GND
C204
C205 22/16
0.022
L201

R202 C206 86P 270
R204 680

Q201 DF-1111/T

COAXIAL OUT
OPTICAL OUT

NAAF-3448 SC451

R446 100
R448 100 R IN
R447 100 R OUT
R445 100 L OUT
           L IN

P403

C458 560P C456 560P
R444 100
C459 560P C457 560P
R443 100

R-CH VAR R-CH FIX L-CH VAR L-CH FIX

OPERATION WHEN POWER IS TURNED ON
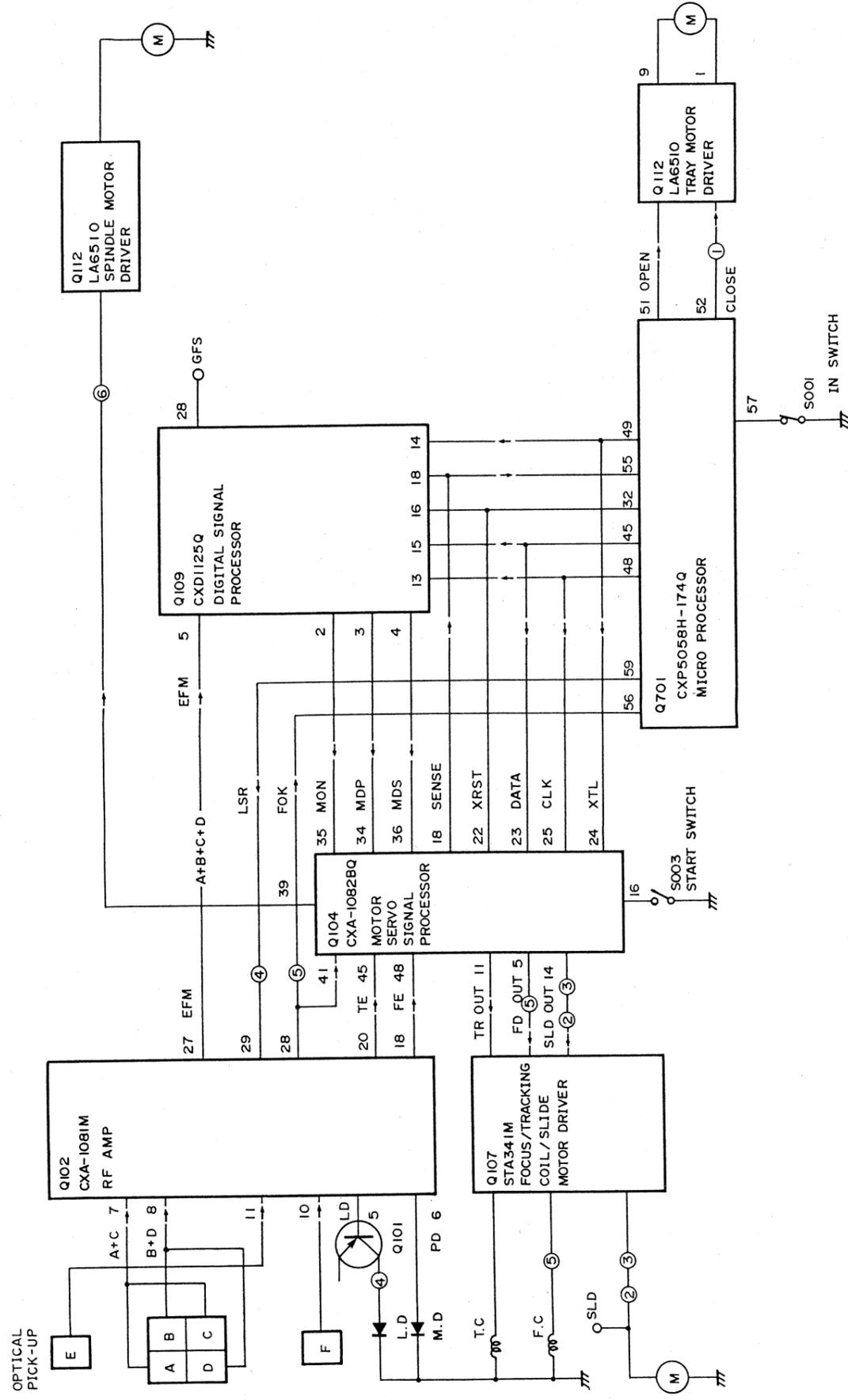
Fig.25

1. Close the tray (even if the tray is shut, the operation is the same).
About 1 second after power is turned ON, the Q701 close terminal goes low, Q112 pin 1 goes high (4V), pin 9 goes low, and the tray IN switch turns ON.

2. Optical pickup return to innermost circumference
When Q701 receives the data of the IN switch being ON, the command is given from Q701 (XTL, CLK, DATA) to Q104 to return the pickup to the inner circumference, SLD terminal goes low (−5V), the slide motor turns ON, the pickup returns to the innermost circumference, and the start switch turns ON.
XTL: Command execution CLK: Clock for command
DATA: Command content

3. Return of optical pickup to top area
The S.SW terminal interprets the data of the start switch going ON, and in order to return the pickup to the top area, the SLD OUT terminal goes high momentarily, the slide motor goes ON when the SLD OUT becomes high, the pickup returns to the top area, and the start switch goes OFF. This data is transmitted to Q701 sense terminal from Q104.

4. Optical pickup light emission
The LSR terminal goes from 5V to 0V, the APC circuit operates, the Q101 collector goes to 2V, and the pickup emits light.

5. In order to confirm the existence or non-existence of a disc, the focus coil moves up and down 3 times.
The moment the pickup emits light, a command is given from Q701 to Q104 to move the focus coil, 3 triangular wave pulse are issued from the FO OUT terminal, 3 triangular wave pulses are issued from the Q107 FO terminal, and the focus coil moves up and down 3 times. (When there is no disc, the operation ends.)
When there is a disc, with the A + C and B + D and signals internal to the IC of Q102, addition and subtraction are carried out, and at the point that is obtained for focus, FOK goes high, and that data is given to Q701 from Q102.

6. Making spindle motor rotate
Next, when the command is given from Q701 to Q109 to make the spindle rotate, the MDS terminal goes high, the SPD OUT terminal goes high (+4V), the spindle begins to rotate, the tracking servo and PLL lock, CLV starts, and TOC is read from the HF signal.
(GFS terminal goes high: 5V)
When the TOC is read, the display use data (sub codes) is fed from Q109 to Q701, the entire number of musical selections and the entire performance time is displayed.

−31−   −32−

BLOCK DIAGRAM

PACKING VIEW
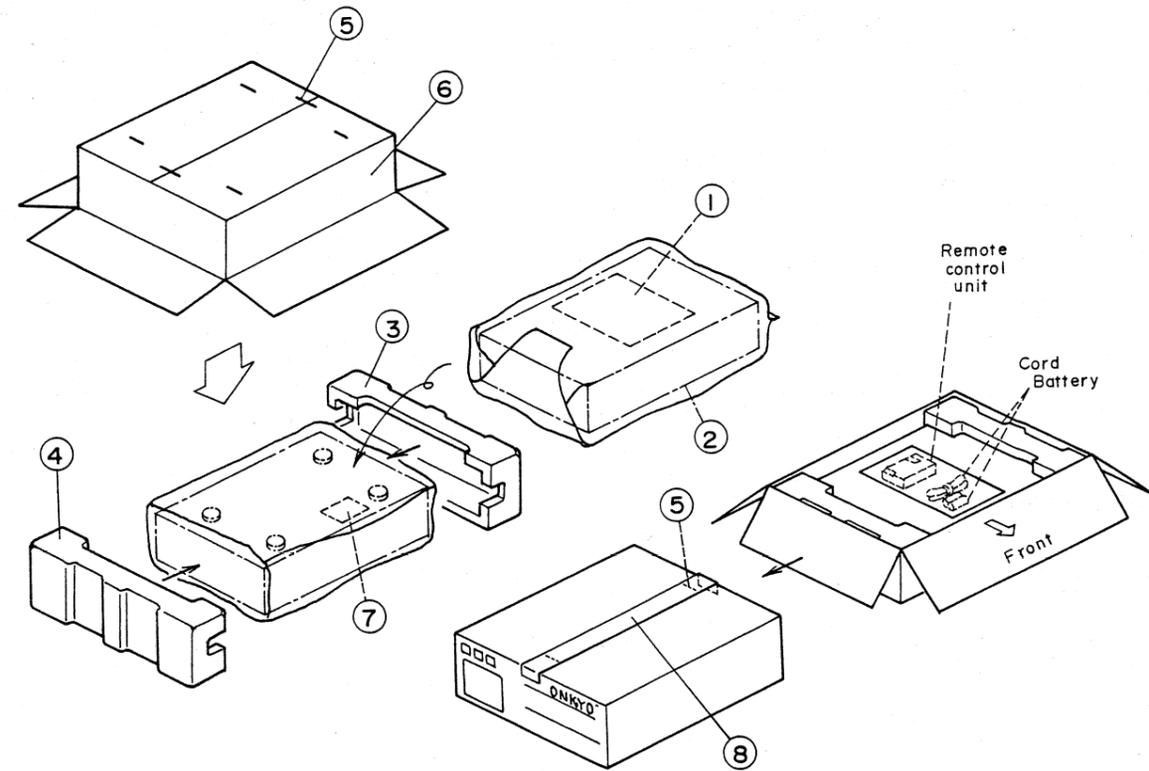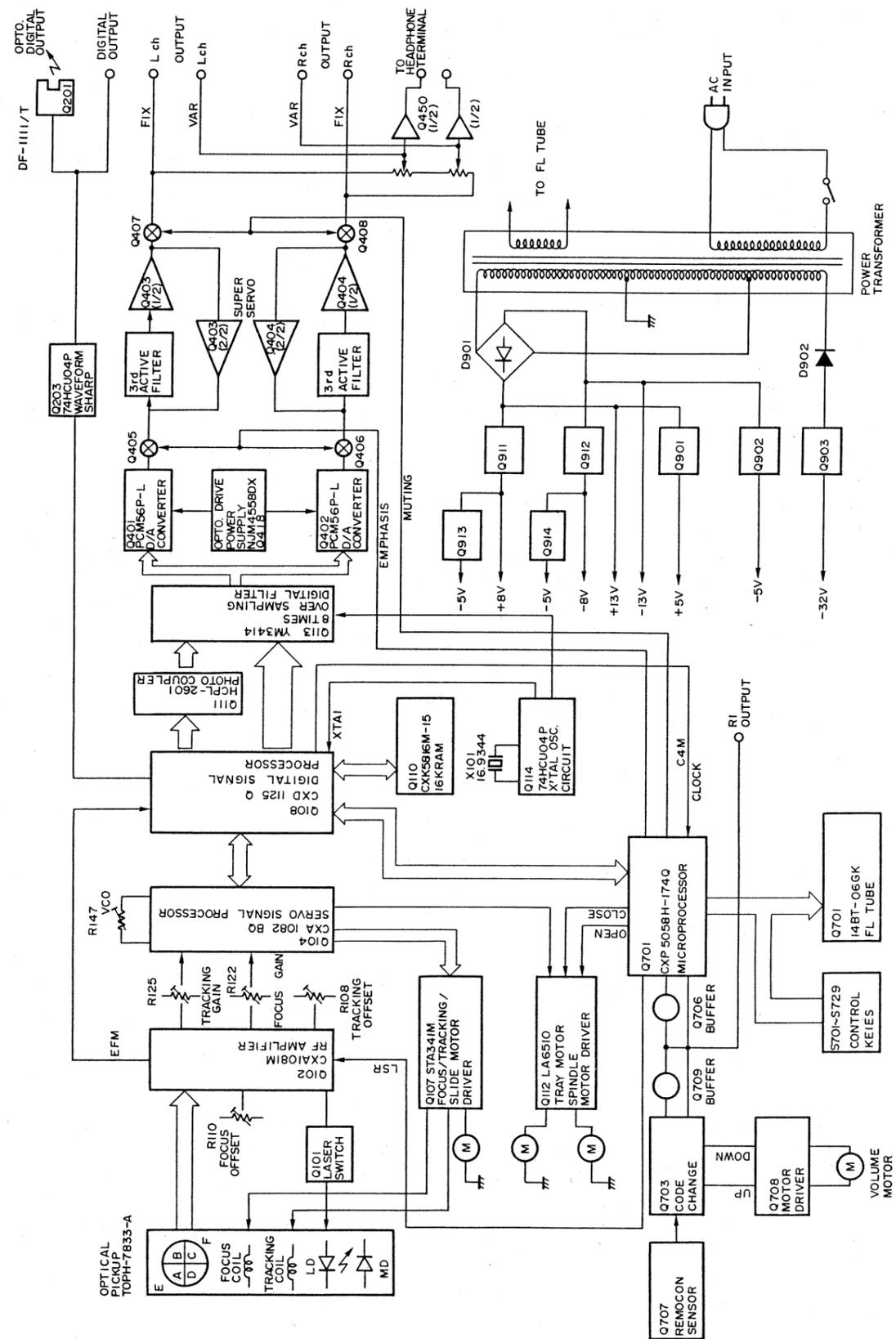
REF.NO.	PART NO.	DESCRIPTION
1	29361109	Caution sheet
2	29100037A	500×650mm, Poly-vinyl bag
3	29091304	Pad R
4	29091303	Pad L
5	282301	Sealing hook
6	29051840	Master carton box (Black model)
	29051841	Master carton box (Silver model)
7	29361110	Caution label
8	260012	50×500mm, Damplon tape
9	**Accessary bag ass'y**	
	2010097	Connection cord
	24140121	RC-121C, Remote control unit
	3010054	UM-3, Two batteries
	29341357	Instruction manual
	29100097	350×250mm, Poly-vinyl bag
	2010169	Connection cord for remote control
	29365020	Warranty card
	29100094A	Poly-vinyl bag for warranty card