Differences between MEGA-CD2/SEGA-CD2 (FUNAI) and MEGA-CD2/SEGA-CD2 (SONY)

● Electrical Components

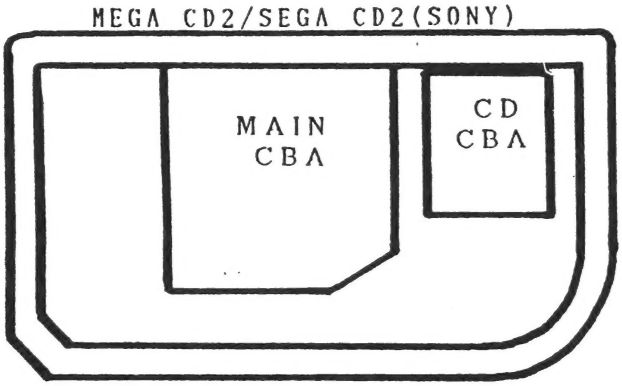
Note: For components marked (※), components equivalent to those listed and made by other companies can also be used.

Component	MCD2/SCD2 (FUNAI)	NCD2/SCD2 (SONY)	Remarks
MAIN CPU	MC68HC000FN12 (※)	Same as on left (※)	
GAME PROCESSOR	CUSTOM CHIP MCE3	Same as on left	
PCM SOUND SOURCE	CUSTOM CHIP RF5C164A	Same as on left	
BOOT ROM (OS)	1M bit	Same as on left	The SONY ROM can be used in SONY and FUNAI units, but FUNAI ROM is exclusively for FUNAI units.
MEMORY FOR MAIN CPU'S PROGRAM	UPD424270LE-8 0 (※)	Same as on left (※)	
VOLTAGE DETECTOR	MB3790	Same as on left	
MEMORY FOR PROGRAM IN MEGA DRIVE/GENESIS AND CD GRAPHIC PROCESSING	TC511664BJ-80 SOJ (※)	Same as on left (※)	
MEMORY FOR CD ROM DECODER	CXK5864CM-70 (※)	Same as on left (※)	
MEMORY FOR PCM SOUND SOURCE	LH5P832-N-10 (※)	Same as on left (※)	
BACKUP MEMORY	MB8464A-10LL	Same as on left	
CD ROM DECODER	LC89515	Same as on left	
D/A (DIGITAL-TO-ANALOG) CONVERTER	LC7883KM	Same as on left	
	LC78815M	Same as on left	
OP AMP	NJM3403	Same as on left	
	NJM3404	Same as on left	
REGULATOR IC	UPC2405HF	Same as on left	
OSCILLATOR FOR CD DRIVE UNIT OPERATION	XTAL OSC 16.9344MHZ-HC49U	Same as on left	
	CER OSC 4.19MHZ	Built into CD drive unit.	
OSCILLATOR FOR DIGITAL UNIT OPERATION	XTAL OSC 50MHz JXO-7	Same as on left	
DIGITAL SIGNAL IC	CXD1167Q	CXD2500BQ	
MECHANISM CONTROL μP	UPD75006	CXP5084-580Q	
SERVO SIGNAL IC	CXA1082	Built into CD drive unit.	
SERVO DRIVE IC	AN8388	Built into CD drive unit.	
RESET IC FOR CD DRIVE UNIT	PST529E MM3P	Same as on left	
RF AMP	CXA1081	Built into CD drive unit.	
PCM BOARD	Yes	Built into MAIN board	

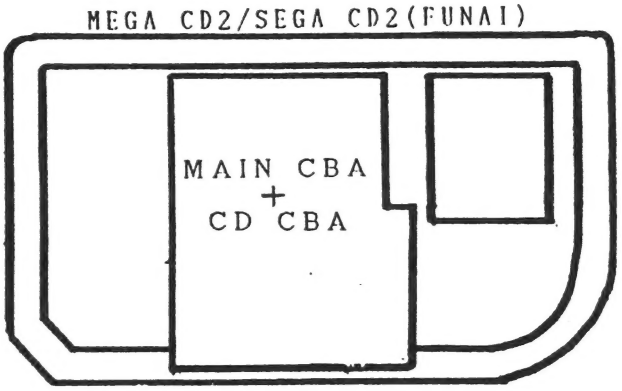
MK

● Configuration of Circuit Boards

MEGA CD2/SEGA CD2(SONY)



MEGA CD2/SEGA CD2(FUNAI)



MODEL MK4102A
HAA-2912A

MK4102

Differences between MEGA-CD/SEGA-CD and MEGA-CD2/SEGA-CD2 (FUNAI) (1/2)

● Electrical Components

Note: For components marked (※), components equivalent to those listed and made by other companies can also be used.

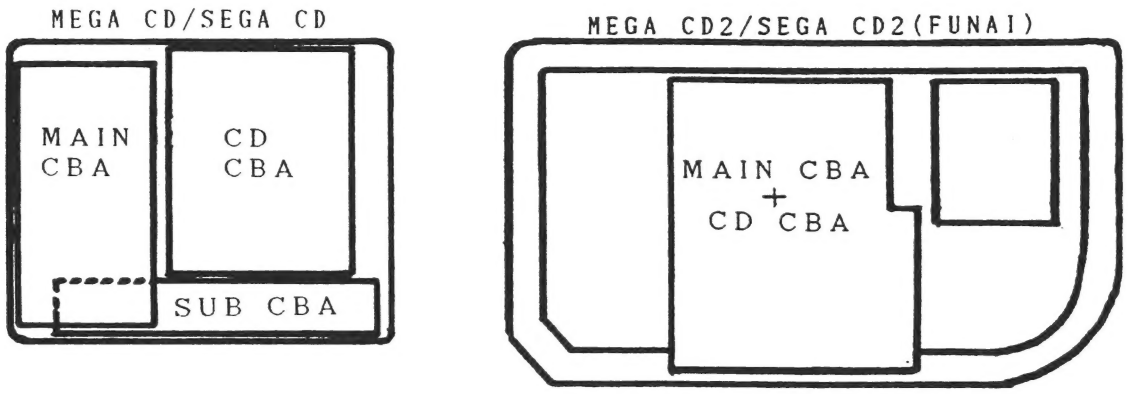
Component	MCD/SCD	MCD2/SCD2 (FUNAI)	Remarks
MAIN CPU	MC68HC000FN12 (※)	Same as on left (※)	
GAME PROCESSOR	CUSTOM CHIP MCE2	CUSTOM CHIP MCE3	MCE3 is used in 50,000 MEGA-CD units
PCM SOUND SOURCE	CUSTOM CHIP RF5C164A	Same as on left	
BOOT ROM (OS)	1M bit	Same as on left	Only the program details are different.
MEMORY FOR MAIN CPU'S PROGRAM	UPD424270LE-10 (※)	Same as on left (※)	
VOLTAGE DETECTOR	MB3790	Same as on left	
MEMORY FOR PROGRAM IN MEGA DRIVE/GENESIS AND CD GRAPHIC PROCESSING	TC511664BZ-80 ZIP (※)	TC511664BJ-80 SOJ (※)	Package changed.
MEMORY FOR CD ROM DECODER	TC51832FL-10 (※)	CXK5864BM-70 (※)	
MEMORY FOR PCM SOUND SOURCE		LH5P832N-10 (※)	
BACKUP MEMORY	MB8464A-10LL	Same as on left	
CD ROM DECODER	LC8951	LC89515	
D/A (DIGITAL-TO-ANALOG) CONVERTER	LC7883KM	Same as on left	
	LC7881M-C	LC78815M	
OP AMP	UPC844G2 (3 ICs)	NJM3403AM (2 ICs) NJM3404AM (1 IC)	
REGULATOR IC	UPC2405HF	Same as on left	
OSCILLATOR FOR CD DRIVE UNIT OPERATION	Built into CD drive unit.	XTAL OSC 16.9344 MHZ HC-49U CER OSC 4.19 MHz	
OSCILLATOR FOR DIGITAL UNIT OPERATION	XTAL OSC 50MHz	XTAL OSC 50MHz JXO-7	
DIGITAL SIGNAL IC	Built into CD drive unit.	CXD1167Q	
MECHANISM CONTROL μP		UPD75006	
SERVO SIGNAL IC	Built into CD drive unit.	CXA1082	
RF AMP		CXA1081	
SERVO DRIVE IC		AN8388	
RESET IC FOR CD DRIVE UNIT		PST529F MMP3P	
PCM BOARD	No	Yes	

Differences between MEGA-CD/SEGA-CD and MEGA-CD2/SEGA-CD2 (FUNAI) (2/2)

● Features

Item	MCD/SCD	MCD2/SCD2 (FUNAI)	Remarks
CD LOADING	Front loading	Top loading	
DC JACK	Yes	Yes	
MIXING JACK	Yes	Yes	
LINE OUT	Yes	Yes	
READY INDICATOR	Yes	No	
ACCESS INDICATOR	Yes	Yes	
AC ADAPTER	1.2 A	1.2 A	Completely the same.

● Configuration of Circuit Boards

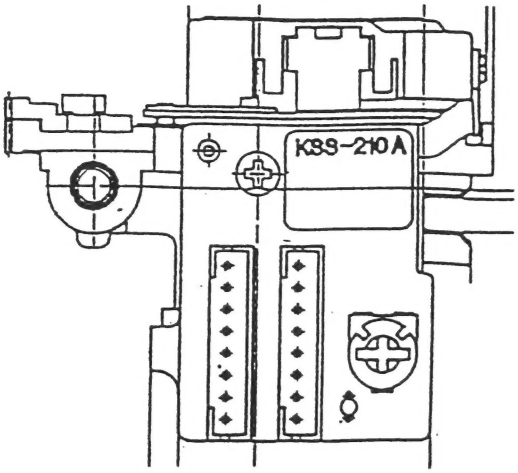


MEGA-CD2/SEGA-CD2 PICKUP UNITS

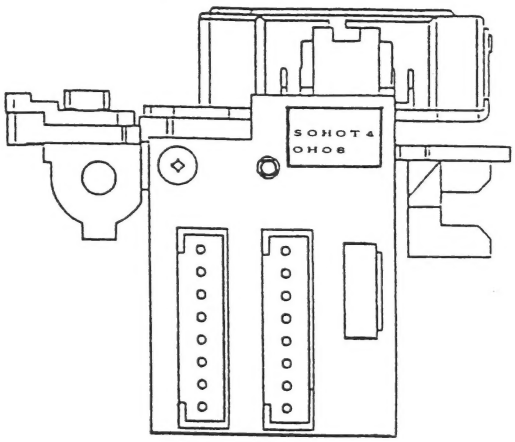
1) MEGA-CD2/SEGA-CD2 pickup units.
   ① KSS-210A
   ② SOHOT4

2) How to discriminate
   Check the label indication to discriminate the pickup units (see the figure below).

①KSS－210A



②SOHOT4



3) Differences of electrical parts between KSS-210A and SOHOT4
   The KSS-210A and SOHOT4 use the different electrical parts (see Table below).

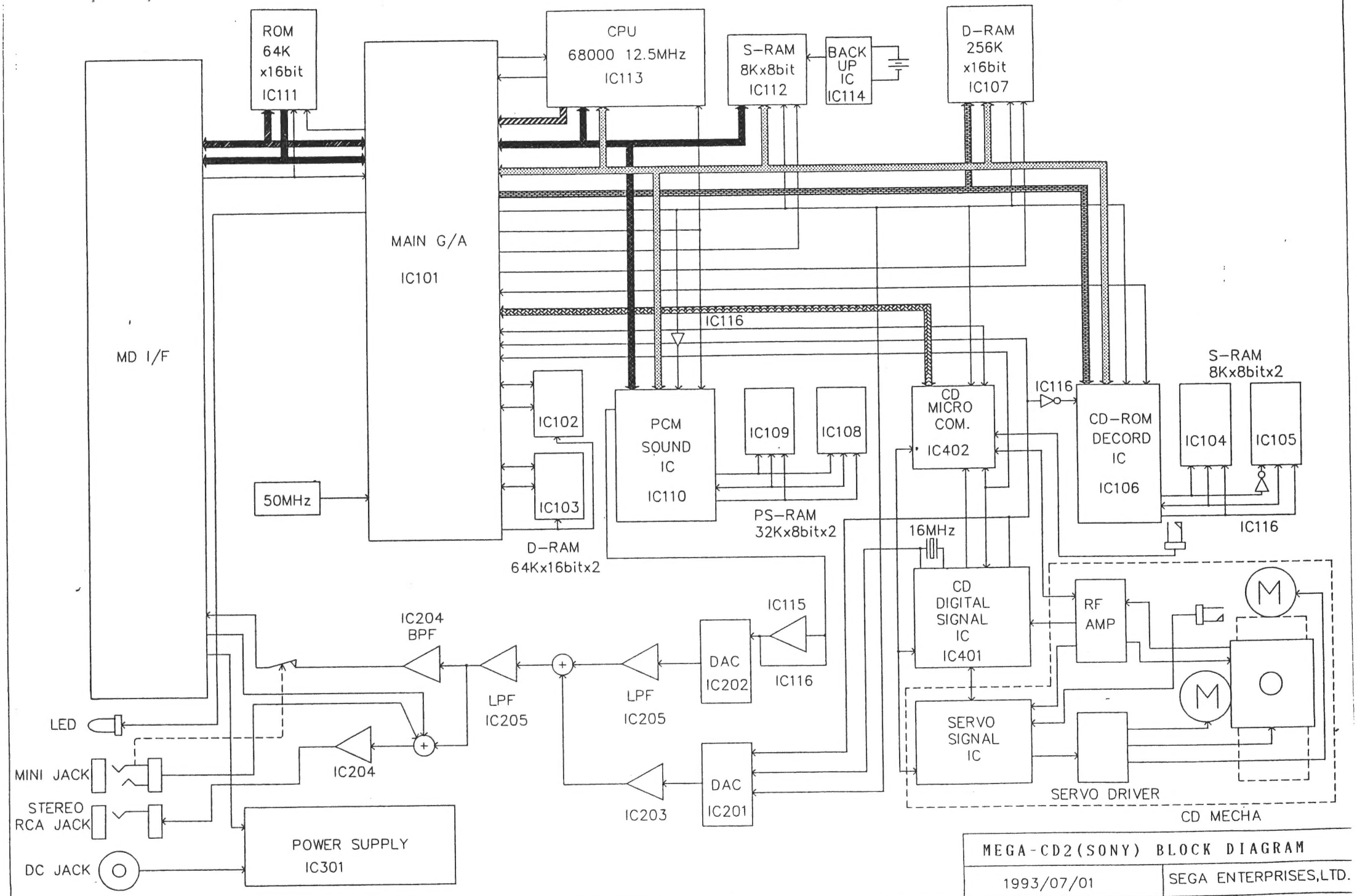
Circuit No.	① KSS-210A	② SOHOT4
Chip Resistors		
R414	1.8 kohm	2.2 kohm
R421	220 kohm	87 kohm
R422	150 kohm	Not used
R423	220 kohm	270 kohm
R424	15 kohm	20 kohm
R426	4.7 kohm	3.3 kohm
R448	91 ohm	82 ohm
R449	10 kohm	0 ohm
R450	33 kohm	Not used
R491	150 kohm	180 kohm
Chip Capacitors		
C428	0.056 µF	Not used
C451	15 pF	8 pF
Electrolytic Capacitor		
C412	22 µF/6.3 V	47 µF/6.3 V
Mechanism Assembly	CD-775	CD-776
IC900 Heat Sink	Heat Sink 2 MEGA CD2	Heat Sink SPL 1

4) Tracking gain adjustment value
   The KSS-210A and SOHOT4 have different tracking gain adjustment values (see Table below).

	KSS-210A	SOHOT4
Tracking gain adjustment value	1 kHz/0 dB	800 Hz/0 dB

Differences in MEGA-CD2/SEGA-CD2 between Works in China and Japan

Item	Works in Japan	Works in China
Package size of all chiip resistors and capacitors	1.6 x 0.8 mm	2 x 1.25 mm
PCM board	Yes	Integrated with main board
IC952 (74 AC 74)	No	Yes
C951	No	Yes
C952	No	Yes



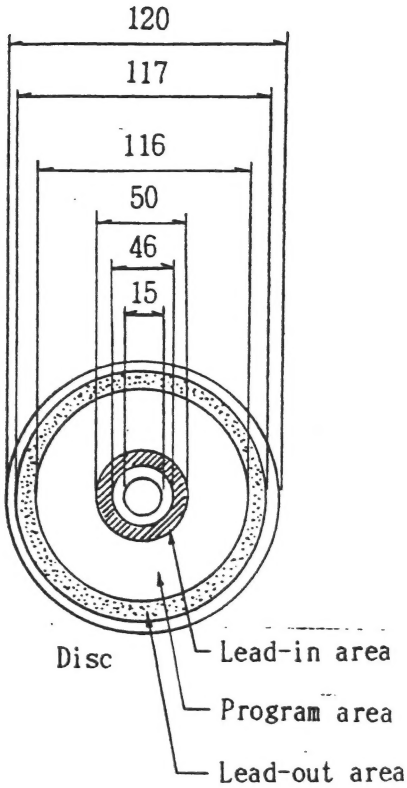
MEGA-CD2(SONY) BLOCK DIAGRAM

1993/07/01 | SEGA ENTERPRISES,LTD.

Main parameters :

(1)	playing time single side, 2 channels	approx. 60 min.
(2)	scanning velocity (2 channels)	1.2 - 1.4 m/s
(3)	sense of rotation seen from reading side	counter clockwise
(4)	track pitch	1.6 µm
(5)	diameter of the disc	120 mm
(6)	thickness of the disc	1.2 mm
(7)	diameter of centre hole	15 mm
(8)	starting diameter of program area	50 mm
(9)	number of channels	2 and/or 4 simultaneously sampled
(10)	sampling frequency	44.1 KHz
(11)	quantization	16 bits linear/channel 2's complement
(12)	channel bit rate	4.3218 Mb/s VCO
(13)	pre emphasis	no or 50/15 µs

DISC SPECIFICATION



1. Outer diameter

1.1. outer diamter of disc	120 ± 0.3 mm

2. Centre hole

2.1. diameter	$15^{+0.1}_{-0}$ mm

RECORDED AREA

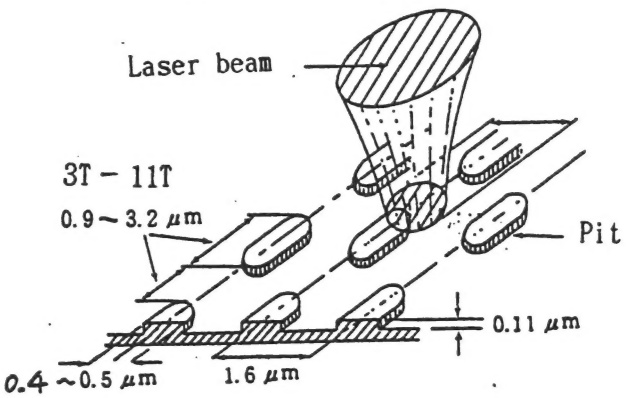
3. Recorded area

3.1. starting diameter of program area	$50^{+0}_{-0.2}$ mm
3.2. max. diameter of program area	116 mm
3.3. max. starting diameter of lead-in area	46 mm
3.4. min. outer diameter of lead out area	outer diameter of program area plus 1 mm

4. Track pitch

4.1. track pitch	1.6 ± 0.1 μm
pit width	0.4 ~ 0.5 μm
pit depth	110 nm

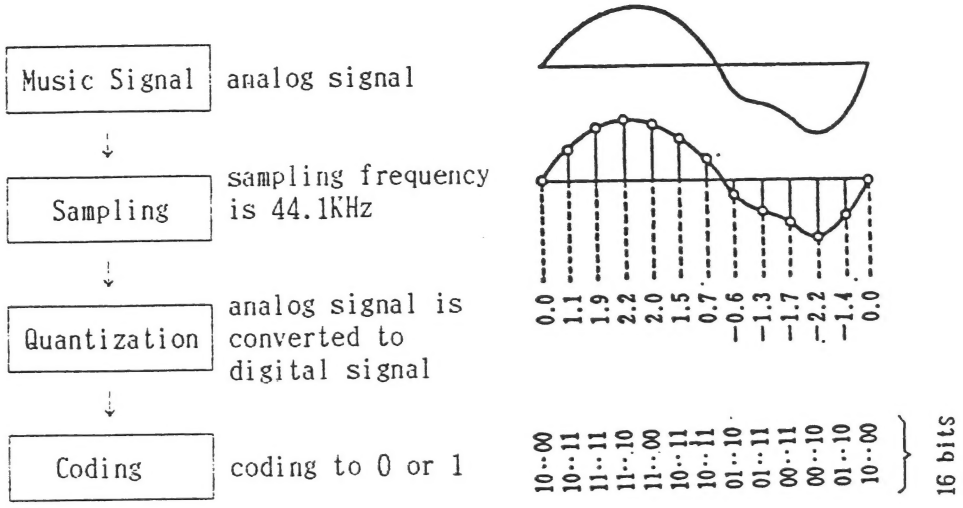
$$T = \frac{1.25 \times 10^{6}\ (\mu m/s)}{4.3218 \times 10^{6}\ (Hz)} \fallingdotseq 0.29\ (\mu m)$$

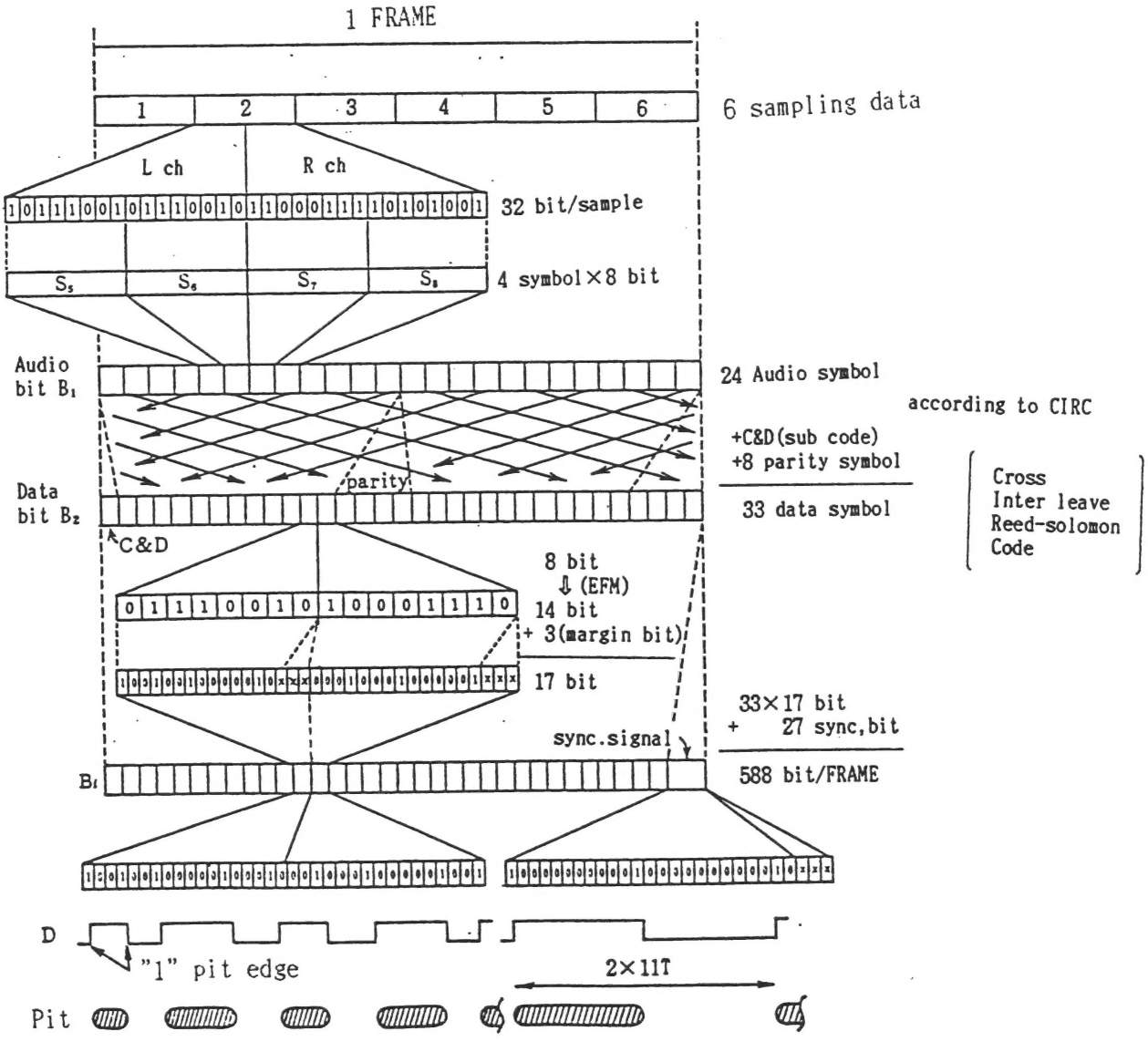


5. Rotation

5.1. sense of rotation	counter clockwise
5.2. scanning velocity	1.20 - 1.40 m/s

6. max. vert. deviation	± 0.5 mm
7. max eccentricity of track radius	± 70 μm

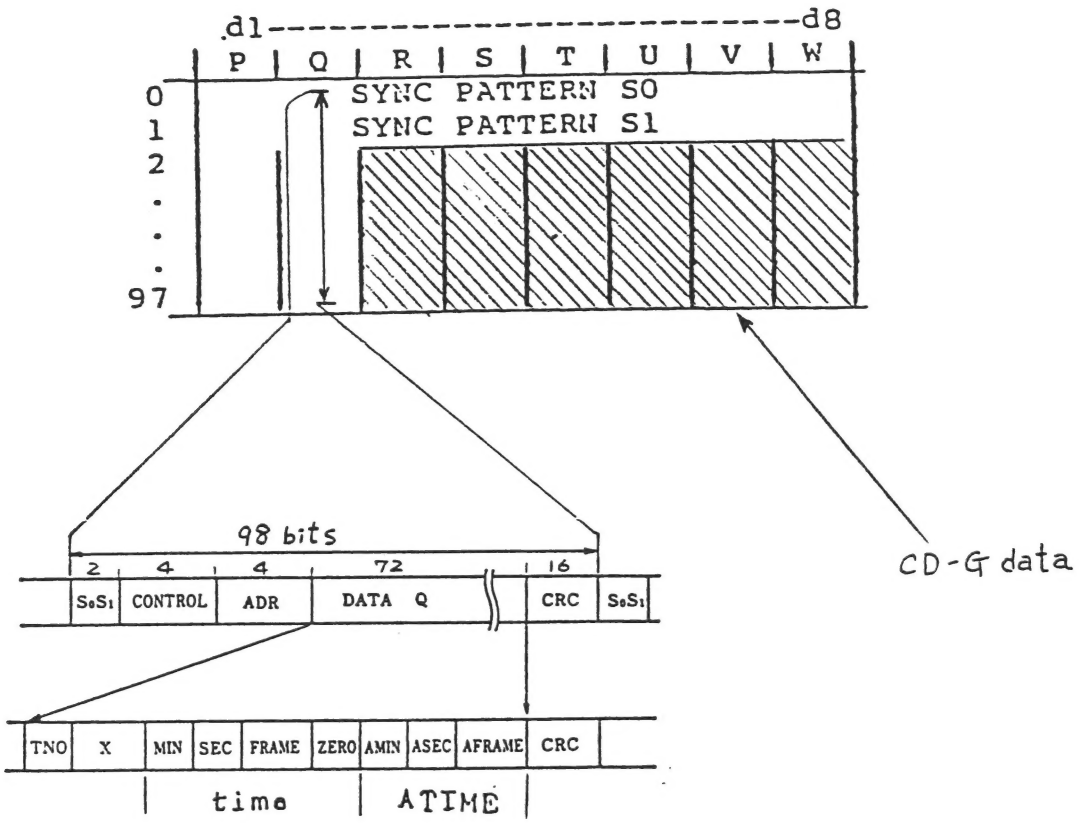




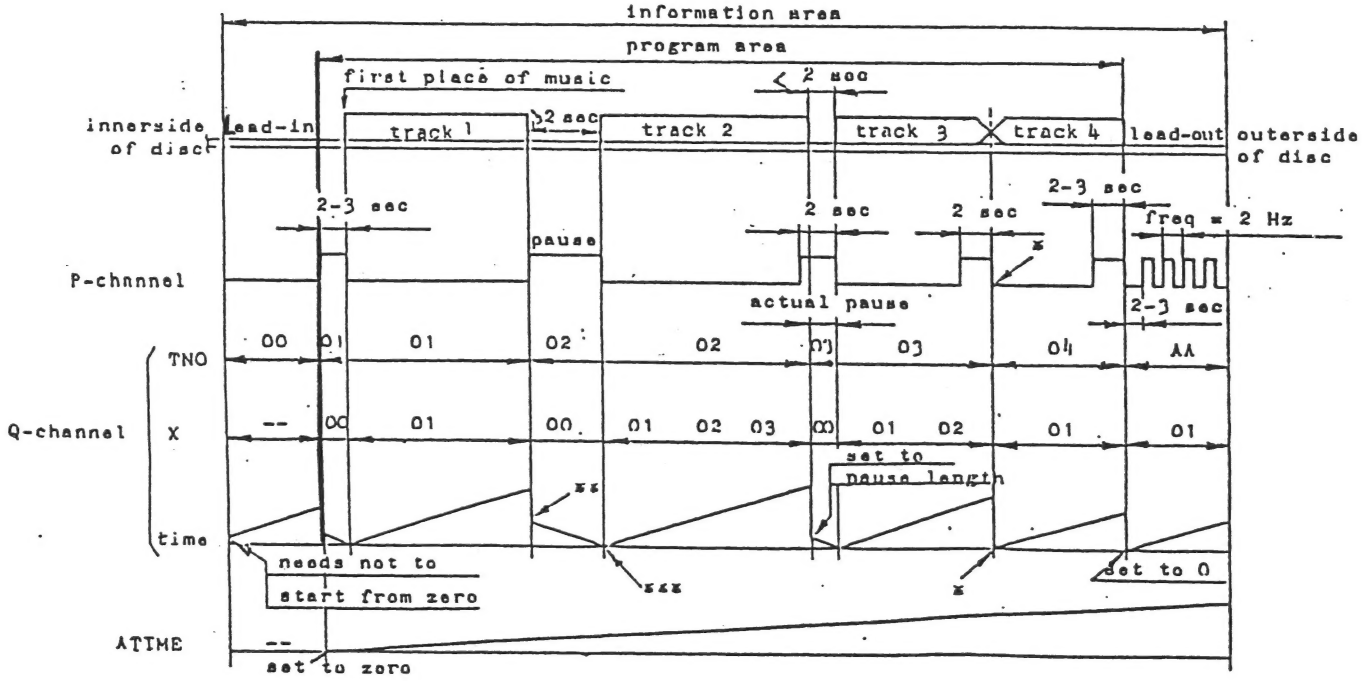
Frame format

CONTROL AND DISPLAY SYSTEM.

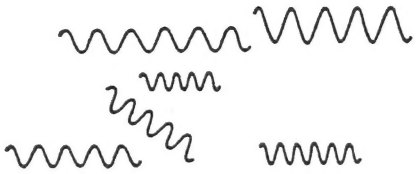
subcoding block



EXAMPLE OF ENCODING IN CHANNEL P AND Q



Because of using Laser ray



wave length within several scores cm

1. general ray



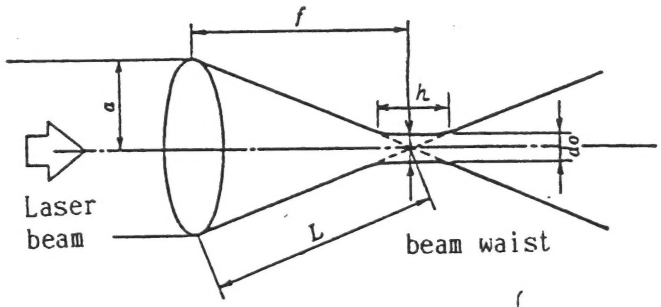
wave continues

2. Laser ray

(1) The wave length is constant.

(2) The wave continues.

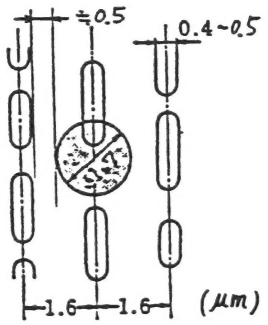
The diameter of the beam spot and focal depth



f : focal distance NA=a/L { N : numerical A : aperfure

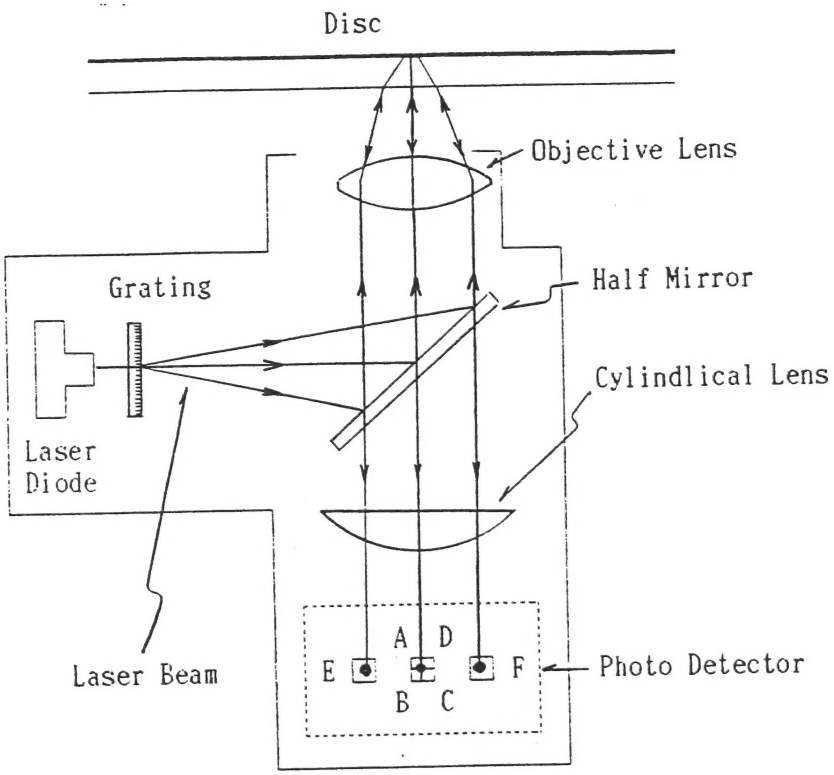
Diameter of the beam spot $d_0 \fallingdotseq \frac{\lambda}{NA} = \frac{0.78}{0.45} \fallingdotseq 1.7\mu m$

Focal depth $h \fallingdotseq \frac{\lambda}{(NA)^2} = \frac{0.78}{(0.45)^2} \fallingdotseq 3.8\mu m \ (\pm 1.9\mu m)$

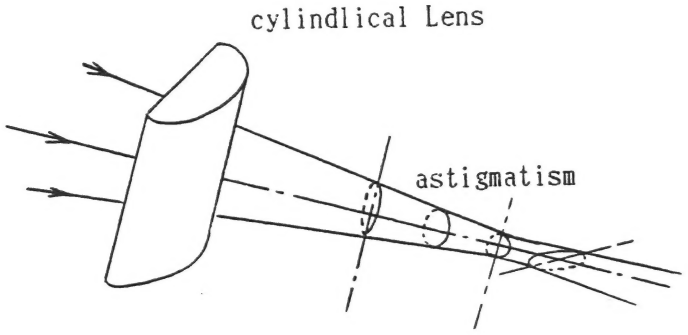


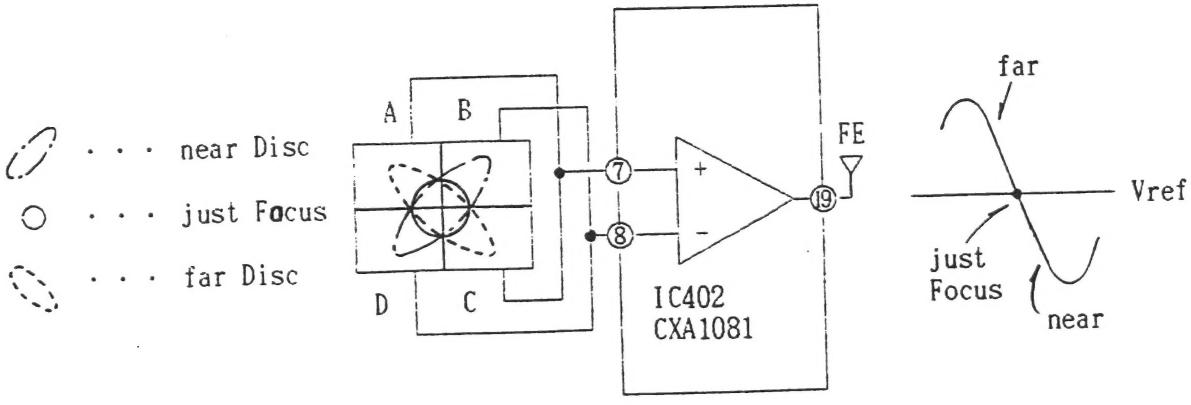
track pitch and diameter of the beam spot

3-Beam Pick Up Unit

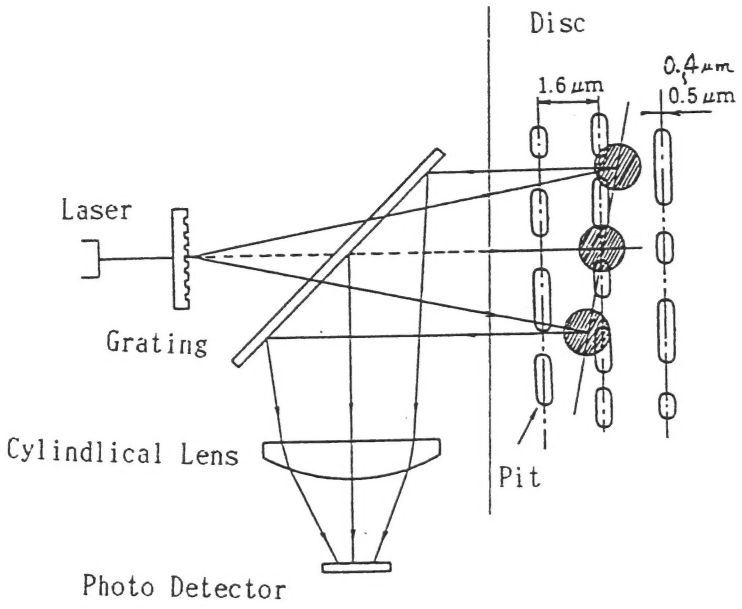


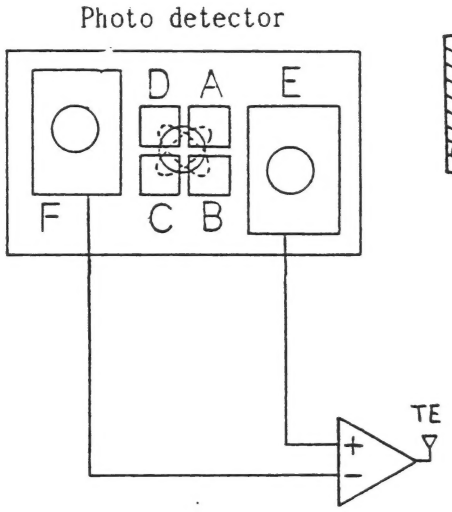
(1) Focus Error Detection

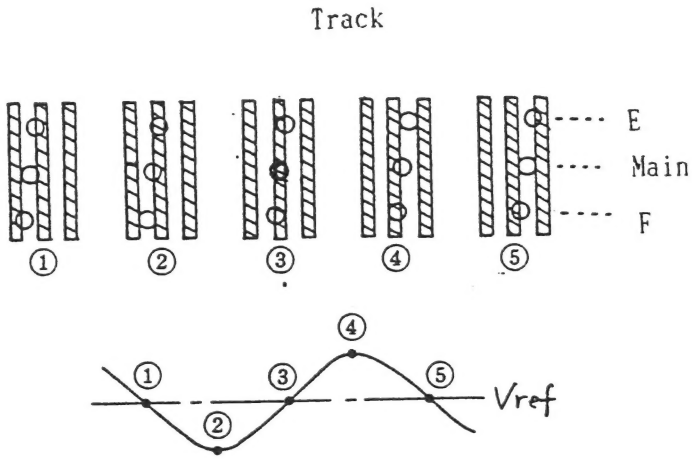




(2) Tracking Error Detection

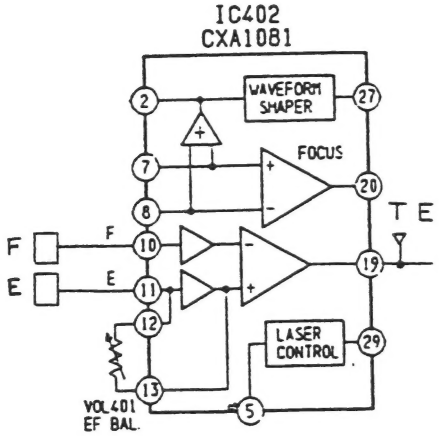


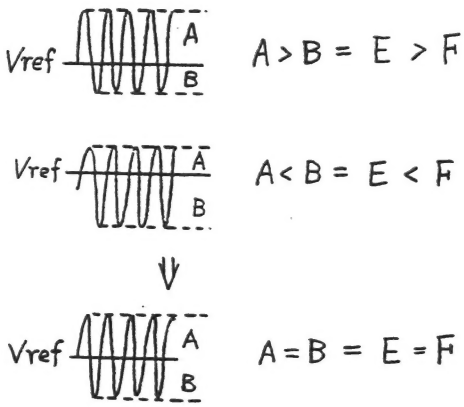


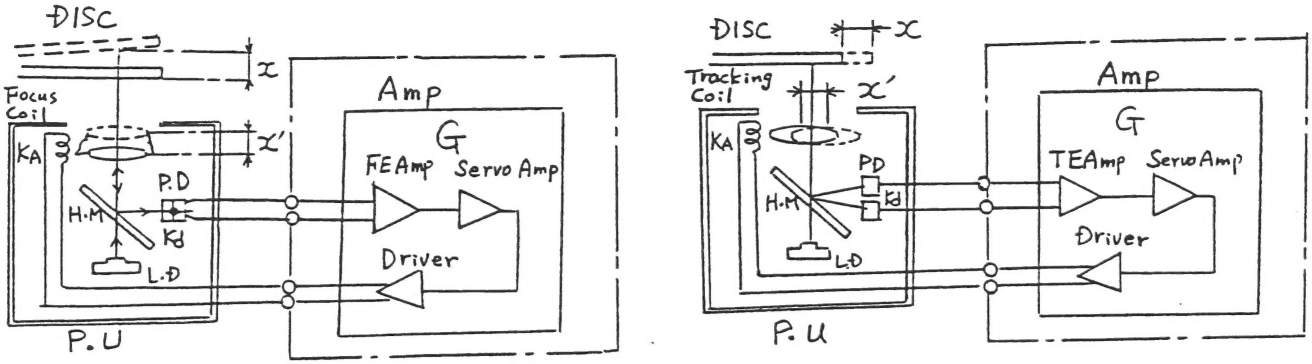


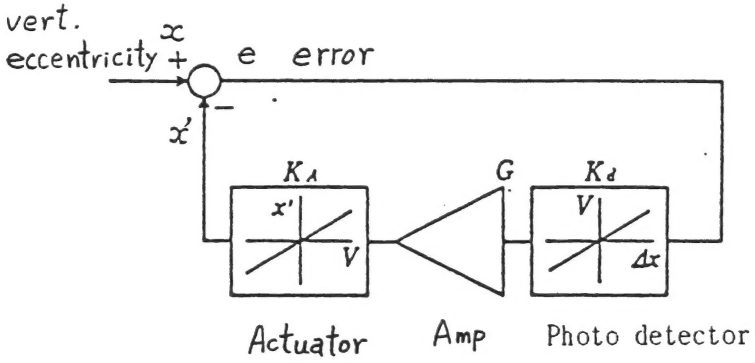
Tracking Error Signal (TE)

EF balance adjustment









(1) Focus servo

focal depth ±1.9 μm ⟹ error < ±1.0 μm

(2) Tracking servo

pit width ±0.2 μm ⟹ error < ±0.1 μm