
PRODUCT SPECIFICATIONS

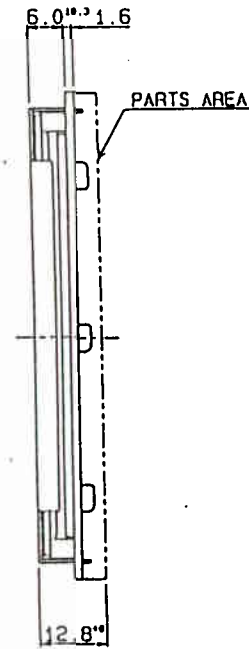
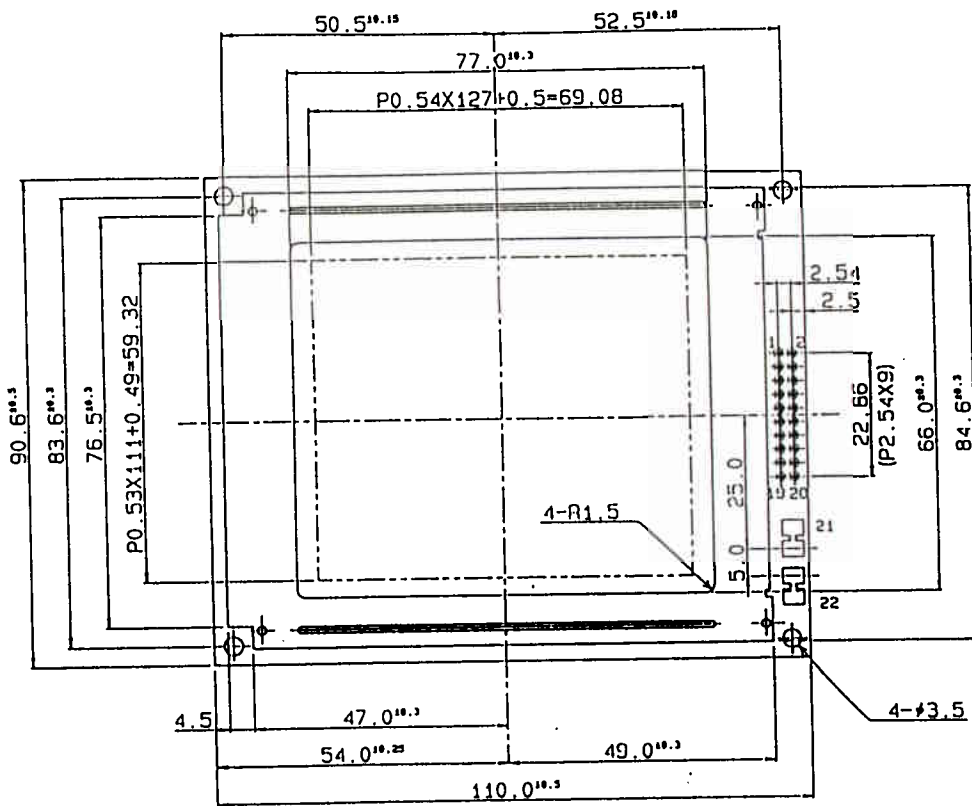
OPTREX TYPE No. : DMF-50268NCU-FW-11

AL 19th

This specification is subject to change.
Please consult OPTREX to verify whether any changes
occur in the specification before starting your production.

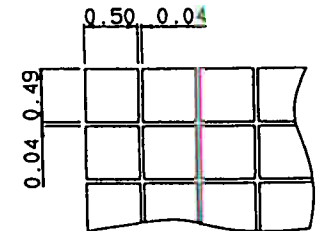
REVISION No. 1 : JAN. 25. '95.

OPTREX CORPORATION



PIN ASSIGNMENT

PIN NO	SYMBOL
1	FG
2	VSS
3	VCC
4	VADJ
5	VEE
6	WR
7	RD
8	CE
9	C/D
10	HALT
11	RESET
12	D0
13	D1
14	D2
15	D3
16	D4
17	D5
18	D6
19	D7
20	NC
21, 22	EL



DOT DETAIL (SCALE 20/1)

NOTE: EL TYPE ONLY

TOLERANCE			
MEASURE	A	B	C
1<16	±0.1	±0.3	±1
16<153	±0.2	±0.5	±1.5
53<1250	±0.3	±0.8	±2
250<1500	±0.5	±1.2	±3
500<11000	±0.8	±2	±4

ANGLE			
ANGLE	130	11	12

				MATERIAL	FINISH	Q'ty	NOTE
				3rd ANGLE PROJECTION	TOLERANCE CLASS: A	SCALE: 1/1	
				APPROVED 1/28.5.19.. M. [Signature]	MODEL	DMF5002N SERIES	
				CHECKED 1/28.12.19. H. Miyano	TITLE	DIMENSIONAL OUTLINE	
				ISSUE DATE	REVISIONS	NAME	CODE
					DESIGNED 1/28.5.24... H. MIYANO	DRAWING No.	UE-35450

OPTREX CORPORATION

3. Electrical Specifications

5.1 Absolute Maximum Rating

$V_{SS} = 0V$

ITEM	SYMBOL	CONDITION	MIN.	MAX.	UNIT
Supply Voltage (Logic)	V_{CC} $- V_{SS}$	-	-0.3	7.0	V
Supply Voltage (LCD Drive)	V_{CC} $- V_{SS}$	-	0	30.0	V
	V_{CC} $- V_{ADJ}$	-	0	29.0	V
Input Voltage	V_I	-	-0.3	V_{CC} +0.3	V

5.2 Electrical Characteristics

$T_a = 25^\circ C, V_{CC} = 5.0V \pm 10\%, V_{SS} = 0V$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage (Logic)	V_{CC} $- V_{SS}$	-	4.5	-	5.5	V
Supply Voltage (LCD Drive)	V_{CC} $- V_{SS}$	-	28.0 (26.0)	-	29.0 (28.0)	V
	V_{CC} $- V_{ADJ}$	-	Shown in 5.1			V
Input Voltage "H" Level	V_{IH}	-	V_{CC} -0.3	-	V_{CC}	V
Input Voltage "L" Level	V_{IL}	-	0	-	0.8	V
Power Supply Current	I_{CC}	-	-	-	20.0	mA
	I_{CC}	-	-	-	15.0	mA
Clock Frequency	f_{CLK}	Duty = 50%	-	-	8.0	MHz

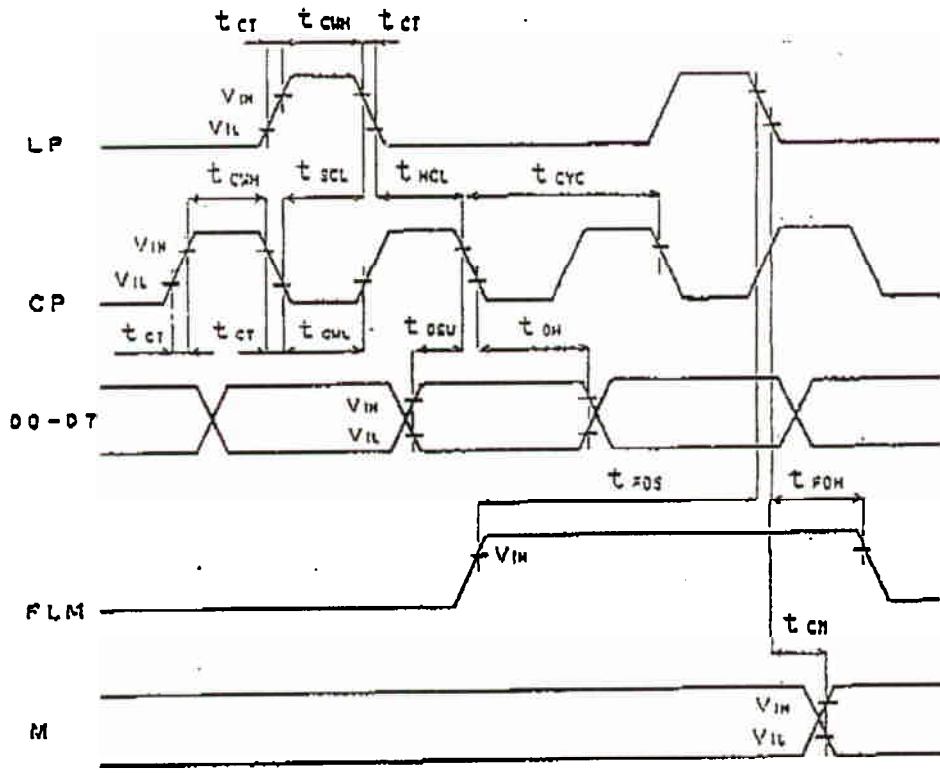
5.3 Timing Characteristics

5.3.1 AC Electrical

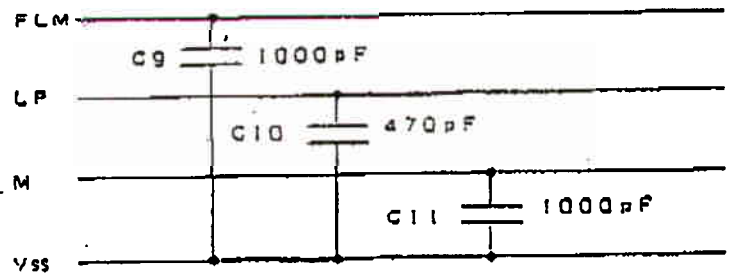
$V_{CC}=5V \pm 10\%$

ITEM	SYMBOL	MIN.	MAX.	UNIT
Clock Cycle Time	t_{cyc}	82	—	ns
Clock High Level Width	t_{cwh}	20	—	ns
Clock Low Level Width	t_{cwl}	20	—	ns
Clock Set Up Time	t_{scu}	15	—	ns
Clock Hold Time	t_{hcl}	15	—	ns
Clock Rise / Fall Time	t_{cr}	—	50	ns
Data Set Up Time	t_{dsu}	15	—	ns
Data Hold Time	t_{doh}	15	—	ns
Frame Data Signal Set Up Time	t_{fdsu}	100	—	ns
Frame Data Signal Hold Time	t_{fdoh}	100	—	ns
H Signal Phase Shift Time	t_{cm}	—	300	ns

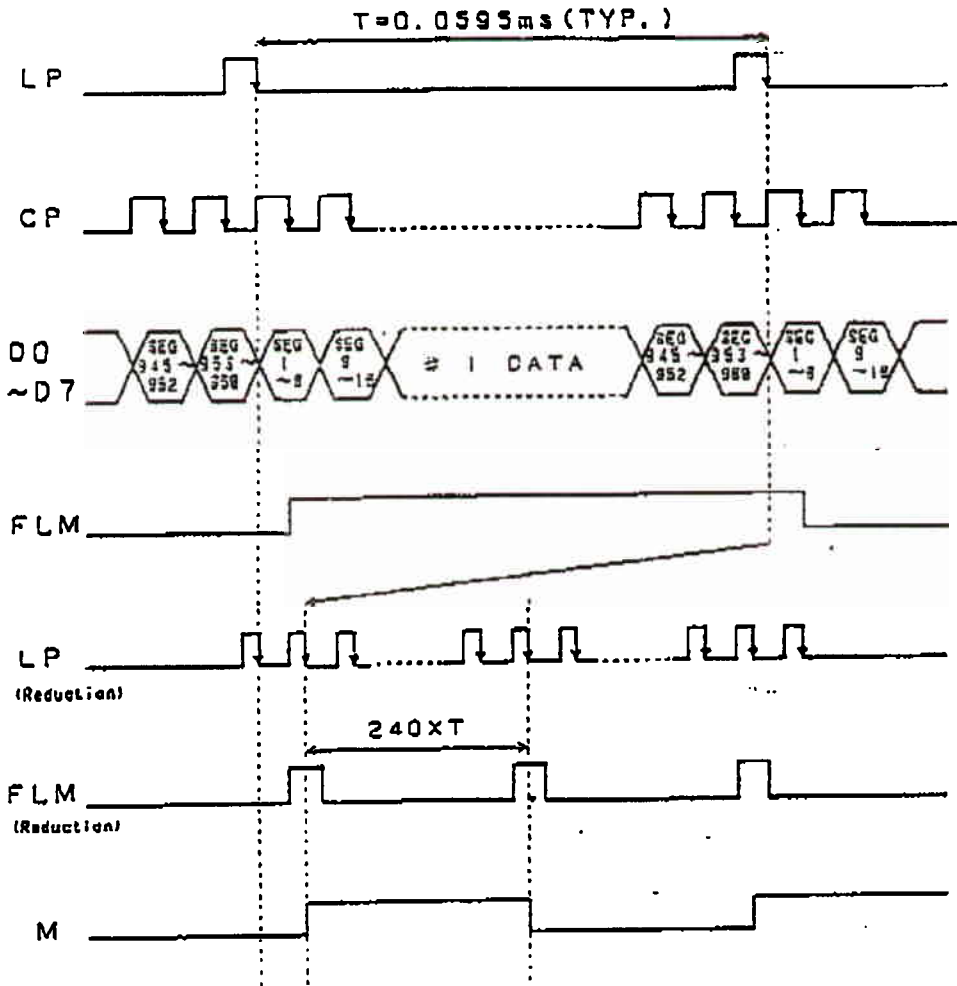
* During Latch-Plus is "H" level, Please make sure to keep Clock Pulse in "L" level.



This Module contain these capacitors. Please be careful about Timing Characteristics.

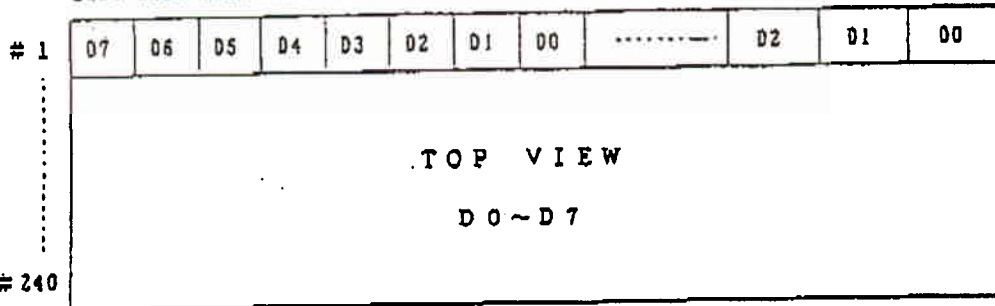


5.3.2 Timing Chart



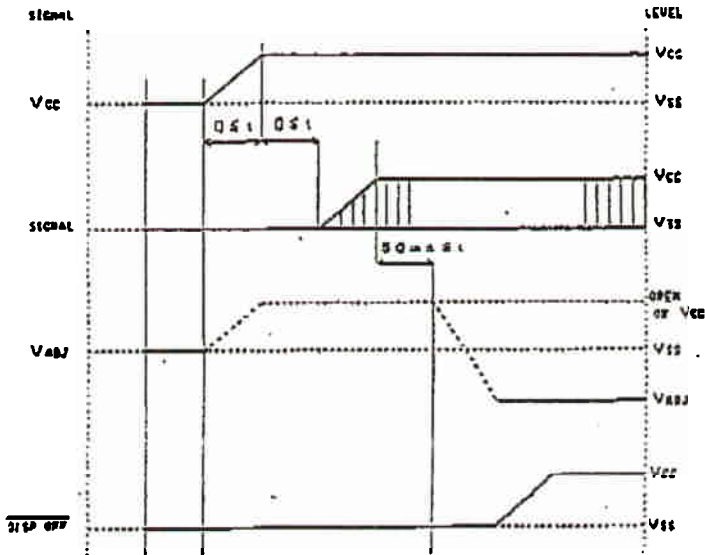
5.3.3 Comparison of Display and Data

(R) (G) (B) (R) (G) (B) (R) (G) (R) (G) (B)
 SEG1 SEG2 SEG3 SEG4 SEG5 SEG6 SEG7 SEG8 SEG958 SEG959 SEG960

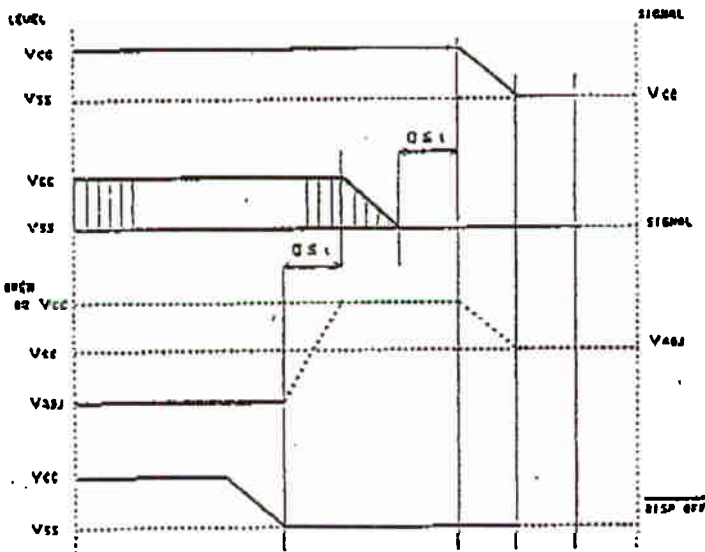


5.4 Power Supply ON/OFF sequence

5.4.1 ON sequence



5.4.2 OFF sequence



Please maintain the above sequence when turning on and off the power supply of the module.

While alternate signal for LCD driving (M signal) is unstable if V_{ABJ} is supplied to the module, DC component will be supplied to the LCD panel.

This may cause damage the LCD module.

5.5 Lighting Specification

5.5.1 CFL Specification

Measurement Condition $T_a=25^{\circ}\text{C}$ after 3 min. power on.

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Lamp Voltage	V_L	-	-	315	-	V_{rms}
Lamp Current	I_L	-	4.7	5.0	5.3	mA_{rms}
Starting Voltage	V_s	-	780	-	-	V_{rms}

5.5.2 Module Surface Brightness

Measurement Condition $T_a=25^{\circ}\text{C}$ after 20 min. power on.

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Surface Brightness	B	$I_L=5.0\text{ mA}$	100	-	-	cd/m^2
Lifetime	L	$I_L=5.0\text{ mA}$	-	10000	-	Hrs

1) Surface brightness is the initial measurement of brightness on the surface of the LCDP. (Measurement point at center of display.)

2) Definition

a. Lifetime

CFL life is defined as the point at which brightness reaches 50%.

Lifetime shall refer to module surface brightness being least 50% of the initial value.

b. Lamp Voltage(V_L)

The voltage to maintain the electric discharge of the lamp V_{rms} is measured at three minutes after the lamp is thuned ON.

c. Lamp Current(I_L)

The lamp current of three minutes after the lamp is turned ON.

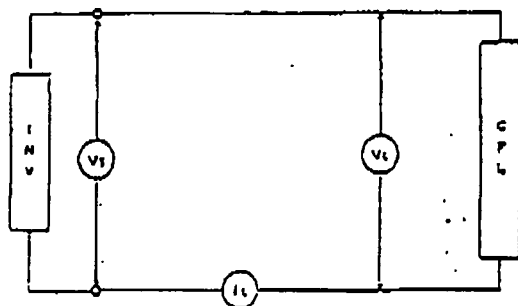
d. Starting Voltage(V_s)

The voltage at starting the electric discharge when the voltage is increased gradually from 0V.

Recommended Inverter : CXA-N10A (Product by TDK)
CXA-N10L (Product by TDK)

Suitable Connector : H60-04-30-110P (Straight type / Product by NITUMI)
H60-04-30-130P (Angle type / Product by NITUMI)

5.5.3 CFL Testing Circuit



6. Optical Specifications

6.1 Optical Specifications

$T_a=25^{\circ}\text{C}$, $V_{CC}-V_{ADJ}=25.0\text{V}$: $\theta=0^{\circ}$, $\phi=-^{\circ}$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
Recommended LCD Driving voltage (1/240 Duty)	$V_{CC}-V_{ADJ}$	$T_a = 10^{\circ}\text{C}$	-	25.5 (24.3)	27.2 (26.0)	V	
		$T_a = 25^{\circ}\text{C}$	-	25.0 (24.1)	-	V	
		$T_a = 40^{\circ}\text{C}$	21.9 (20.7)	24.4 (23.1)	-	V	
Contrast Ratio	CR	Note1	-	20 (17)	-	-	
Chromaticity (at display center)	Red	x	—	0.46	-	-	
		y	—	0.31	-	-	
	Green	x	—	0.25	-	-	
		y	—	0.56	-	-	
	Blue	x	—	0.13	-	-	
		y	—	0.15	-	-	
	White	x	—	0.26	-	-	
		y	—	0.34	-	-	
	Black	x	—	0.19	-	-	
		y	—	0.21	-	-	
Viewing Angle	Shown in 6.2						
Response Time	rise	r r	Note2 $T_a=25^{\circ}\text{C}$	-	240 (190)	360 (290)	ms
	Decay	r d	Note3 $T_a=25^{\circ}\text{C}$	-	220 (170)	330 (260)	ms

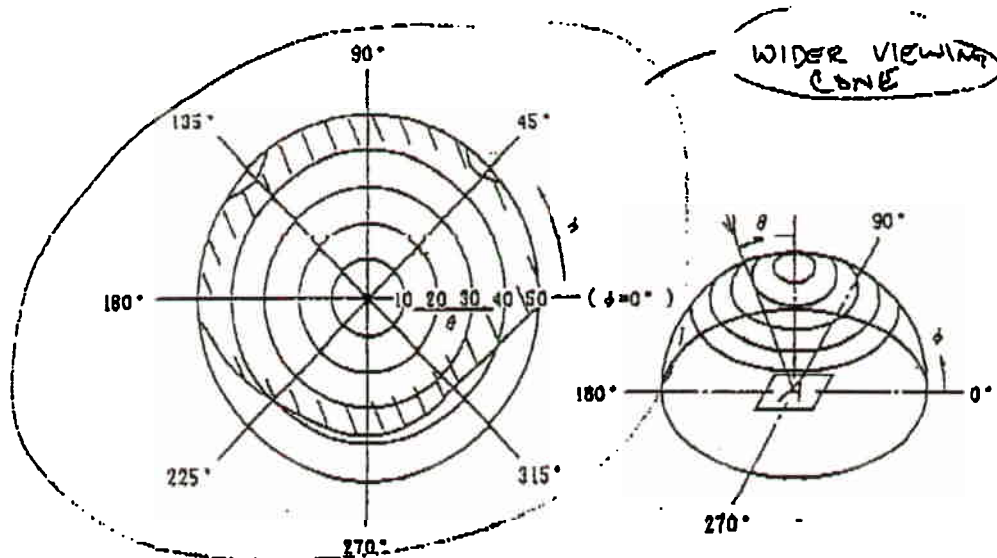
Note1 : Definition of Contrast Ratio
 When brightness of non-selected signal was A and brightness of selected signal was B, contrast ratio defined
 $CR=A/B$ (Positive Case)
 $CR=A/B$ (Negative Case)

Note2 : The time of that the brightness level reaches 90% level of the saturation level from 0% level when ON signal is applied.

Note3 : The time of that the brightness level reaches 10% level of the saturation level from 100% level when OFF signal is applied.

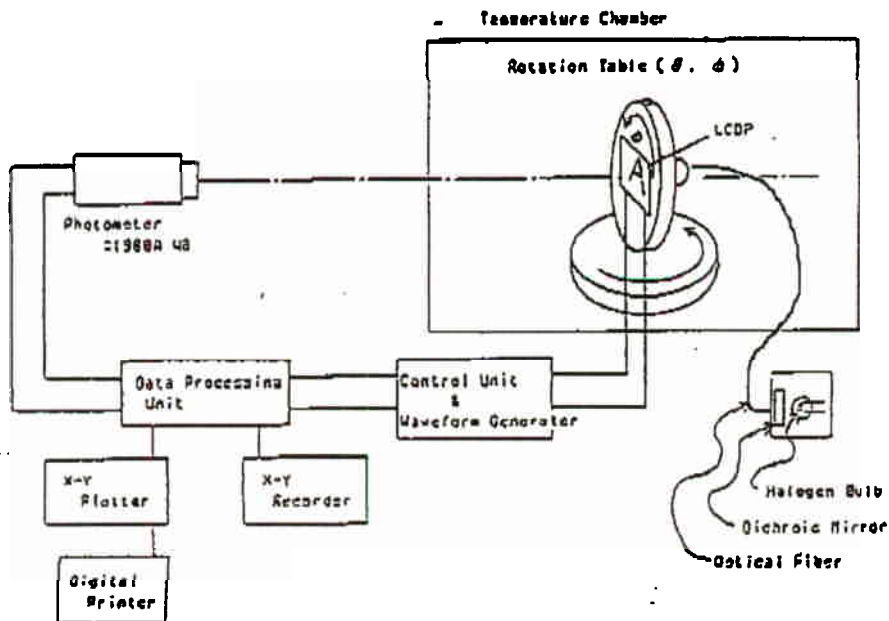
6.2 Definition of Viewing Angle and Optimum Viewing Area

- Point ● show the point where contrast ratio measured. $\therefore \theta = 0^\circ$, $\phi = 0^\circ$
- Driving condition 1/240 Duty, 1/14 Bias, 25.0 Vo-p, 70.0Hz



* Shaded Area Shows TYP. CR ≥ 2

6.3 System Block Diagram



7. I/O Terminal

7.1 Pin Assignment

CN1

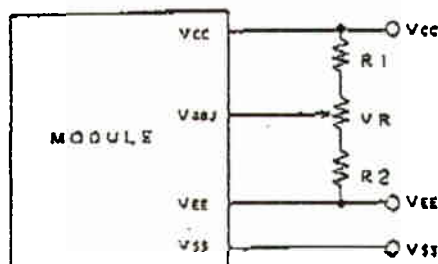
PIN NO.	SYMBOL	LEVEL	FUNCTION
1	FLM	H/L	First Line Marker
2	LP	H→L	Data Latch Signal
3	CP	H→L	Clock Signal for Shifting Data
4	M	H/L	Alternate Signal for LCD Drive
5	V _{adj}	—	Voltage Level for LCD Contrast Adjustment
6	V _{cc}	—	Power Supply for Logic (+5V)
7	V _{ss}	—	Power Supply (0V,GND)
8	V _{ss}	—	Power Supply for LCD Drive
9	D0	H/L	Display Data
10	D1	H/L	Display Data
11	D2	H/L	Display Data
12	D3	H/L	Display Data
13	D4	H/L	Display Data
14	D5	H/L	Display Data
15	D6	H/L	Display Data
16	D7	H/L	Display Data
17	DISP OFF	H/L	H:Display On L:Display Off (22KΩ Pull Up)
18	NC	OPEN	Non-Connection
19	NC	OPEN	Non-Connection
20	NC	OPEN	Non-Connection

H:V_{cc} Level L:V_{ss} Level

CN2, CN3

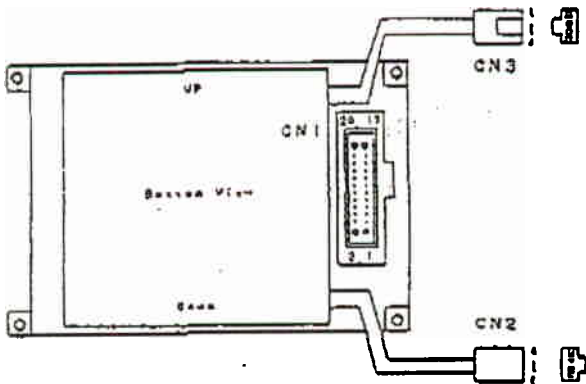
1	CFL(GND)	—	Power supply for CFL (GND)
2	NC	OPEN	Non-Connection
3	NC	OPEN	Non-Connection
4	CFL(HOT)	~	Power supply for CFL (HOT)

7.2 Example of Power Supply



$$R1 + R2 + VR = 10 \sim 20 \text{ k}\Omega$$

7.3 Pin No. Layout



CN1: HIF3FC-20PA-2, 5406A (HRS)
CN2, 3: M83M83-04 (MITUMI)

7.4 Block Diagram

