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LCD MODULE SPECIFICATION

Customer: _____

Model Name: ET055FH05-O

Date: 2020/03/11

Version: 01

For Customer's Acceptance

Approved by	Comment

Approved By	Checked By	Prepared By
Lee	CoCo	WG

[illegible]

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1. General Specifications

No.	Item	Specification	Remark
1	LCD size	5.5 inch	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1080(W) RGB x1920(H)	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.063(W) x 0.063(H)mm	
6	Active area	68.04(W) x 120.96(H) mm	
7	Module size	81.04(W) x 137.66(H) ×4(D) mm	Note 1
9	View direction	ALL	O 'clock
10	Surface treatment	Anti-Glare	
11	Color arrangement	RGB-stripe	
12	Interface	MIPI	
13	Lcm power consumption	4.1W	TYP.
14	Drive IC	ILI7807D	

Note 1: Refer to Mechanical drawing.

2. Pin Assignmen

FPC Connector is used for the module electronics interface. The recommended model is BA2E40-0C2108S(母座) .

Pin No	Symbol	I/O	Function	Remark
1	LED_A	P	Power Supply For LED Backlight Anode Input	
2	LED_K	P	Power Supply For LED Backlight Cathode Input	
3	LED_K	P	Power Supply For LED Backlight Cathode Input	
4	GND	P	Ground	
5	DATA2P	I	Positive polarity of low voltage differential data 2 signal	
6	DATA2N	I	Negative polarity of low voltage differential data 2 signal	
7	GND	P	Ground	
8	DATA1P	I	Positive polarity of low voltage differential data 1 signal	
9	DATA1N	I	Negative polarity of low voltage differential data 1 signal	
10	GND	P	Ground	
11	CLK_P	I	Positive polarity of low voltage differential clock signal	
12	CLK_N	I	Negative polarity of low voltage differential clock signal	
13	GND	P	Ground	
14	DATA0P	I	Positive polarity of low voltage differential data 0 signal	
15	DATA0N	I	Negative polarity of low voltage differential data 0 signal	
16	GND	P	Ground	
17	DATA3P	I	Positive polarity of low voltage differential data 3 signal	
18	DATA3N	I	Negative polarity of low voltage differential data 3 signal	
19	GND	P	Ground	
20	NC	-	No Connection	
21	GND	P	Ground	
22	TP_VDD(2.8V)	P	Power Supply For TP	
23	NC	-	No Connection	
24	GND	P	Ground	
25	TP_RST_N	I	TP Reset	
26	TP_INT_N	I	TP Interrupt	
27	GND	P	Ground	
28	TP_I2C_SDA	I	TP Data	
29	TP_I2C_SCL	I	TP Clock	
30	GND	P	Ground	
31	NC	-	No Connection	

32	VSN	P	Power Supply For LCD	
33	NC	-	No Connection	
34	VSP	P	Power Supply For LCD	
35	IOVCC(1.8V)	P	Power Supply For LCD	
36	LCD_ID	P	LCD hardware ID	
37	GND	P	Ground	
38	RST	I	System Reset pin	
39	NC	-	No Connection	
40	FMARK	I	Tearing effect output signal	

Note I: input; O: output; P: Power or Ground(0V).

3. Operation Specifications

3.1. Absolute Maximum Ratings

Test condition: GND=0V, TA=25 °C

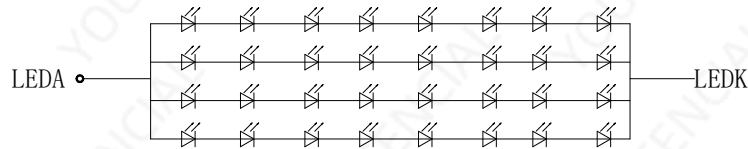
Note1

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	IOVCC	1.6	1.8	2.5	V	Note 1
	VSP	5	5.5	6	V	
	VSN	-6	-5.5	-5		
Input logic high voltage	V _{IH}	0.7 IOVCC	-	IOVCC	V	Note 2
Input logic low voltage	V _{IL}	GND	-	0.3 IOVCC	V	

3.2.1.LED drive conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_L	22.4	24.8	28	V	Note 1
Current for LED Backlight	I_L	-	160	-	mA	
LED life time	-	20,000	-	-	Hr	Note 2

Note1: $V_L=24.8V$, $I_L=160mA$ (Backlight circuit: 8 series connection, 4 parallel connection), the ambient temperature is $25^{\circ}C$.

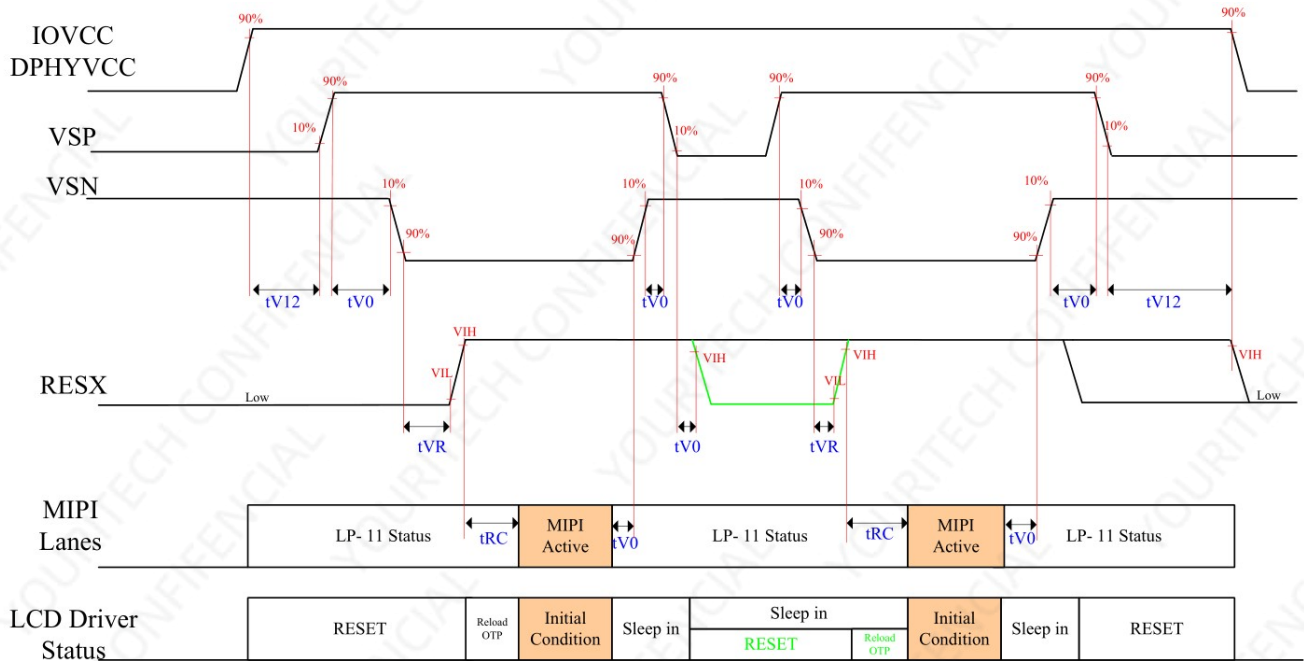


$$VF=24.8V \quad IF=40*4=160mA$$

Fig. 3-1 LED test circuit diagram

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}C$ and 1/2 rated current . The LED lifetime could be decreased if operating I_L is larger than 160 mA.

3.2. Power Sequence



3.3. Reset input timings

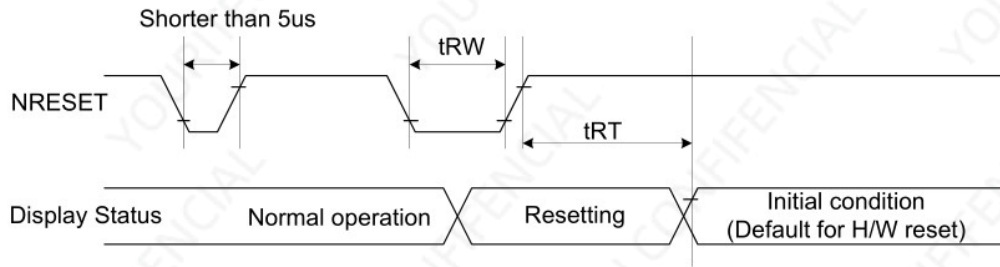


Figure 110 Reset Timing

Table 41 Reset Timing

Signal	Symbol	Parameter	Min	Max	Unit
RESX	t_{RW}	Reset pulse duration	10		us
	t_{RT}	Reset cancel		5(note 1,5) 120 (note 1,6,7)	ms

Note:

1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM to registers. This loading is done every time when there is H/W reset cancel time (t_{RT}) within 5 ms after a rising edge of RESX.
2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the Table 42.

Table 42 Reset Descript

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out mode.). The display remains the blank state in Sleep In mode and then return to Default condition for Hardware Reset.
4. Spike Rejection also applies during a valid reset pulse as shown below:

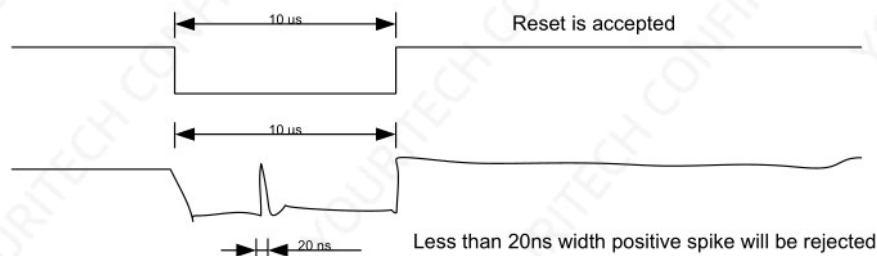


Figure 111 Positive Noise Pulse during Reset Low

5. When Reset is applied during Sleep In Mode.
6. When Reset is applied during Sleep Out Mode.
7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

3.4.High speed mode-rising and falling timing

3.5.1.High speed Mode - Clock channel Timing

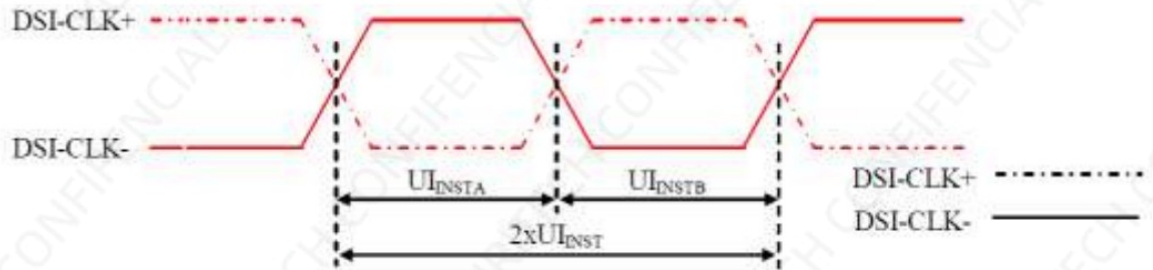


Figure 1177 DSI Clock Channel Timing

Table 47 DSI Clock Channel Timing

Signal	Symbol	Parameter	Min	Max	Unit
DSI-CLK+/-	$2xUI_{INST}$	Double UI instantaneous	1.67	5	ns
DSI-CLK+/-	UI_{INSTA}, UI_{INSTB}	UI instantaneous Half	0.83	2.5	ns

Note: $UI = UI_{INSTA} = UI_{INSTB}$

3.5.2.High speed Mode - Data Clock channel Timing

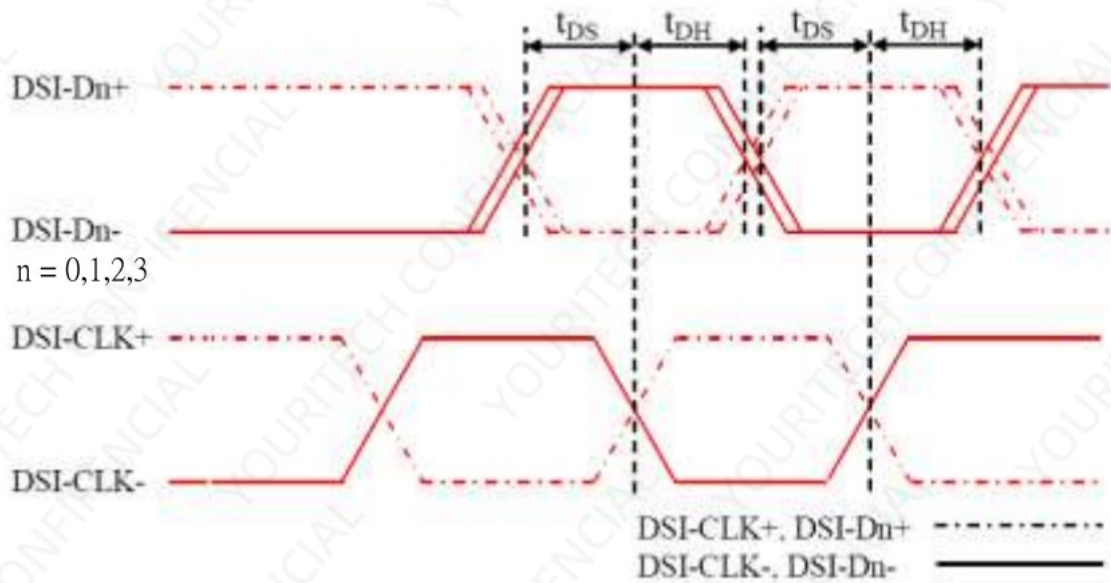


Figure 1188 DSI Data to Clock Channel Timings

Table 48 DSI Data to Clock Channel Timings

Signal	Symbol	Parameter	Min	Max	Note
DSI-Dn+/- , n=0,1,2,3	t_{DS}	Data to Clock Setup time	$0.15 \times UI$	-	BitRate $\leq$ 1Gbps
	t_{DH}	Clock to Data Hold Time	$0.15 \times UI$	-	
DSI-Dn+/- , n=0,1,2,3	t_{DS}	Data to Clock Setup time	$0.2 \times UI$	-	BitRate $>$ 1Gbps
	t_{DH}	Clock to Data Hold Time	$0.2 \times UI$	-	

3.5.3.High speed Mode - Rise and Fall Timing

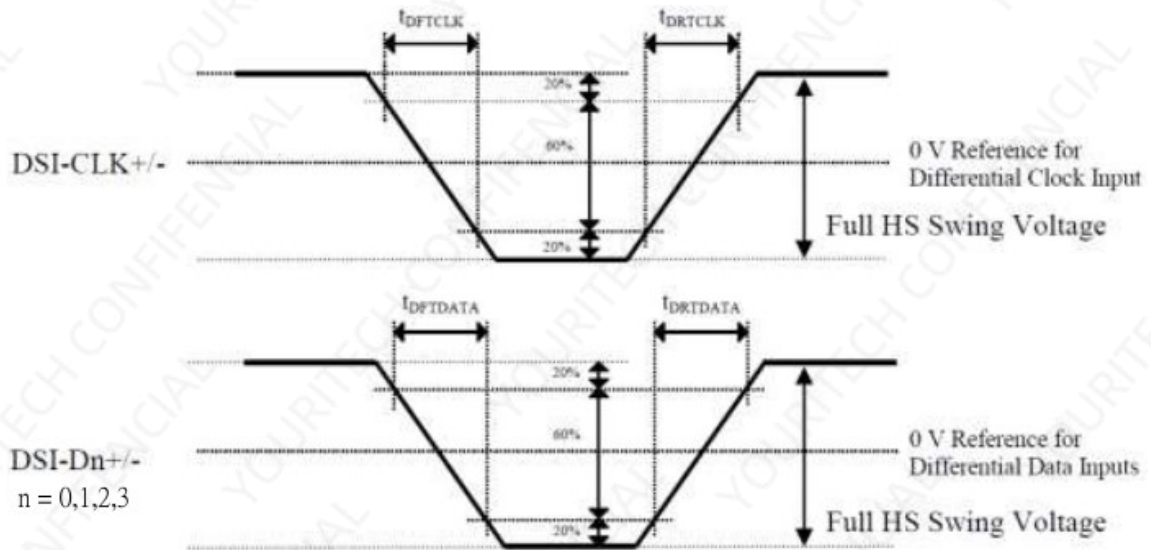


Figure 11919 Rise and Fall Timings on Clock and Data Channels

Table 49 Rise and Fall Timings on Clock and Data Channels

Parameter	Symbol	Condition	Specification		
			Min	Typ	Max
Differential Rise Time for Clock	t_{DRTCLK}	DSI-CLK+/-	150 ps	-	0.3UI (Note)
Differential Rise Time for Data	$t_{DRTDATA}$	DSI-Dn+/- n=0,1,2,3	150 ps	-	0.3UI (Note)
Differential Fall Time for Clock	t_{DFTCLK}	DSI-CLK+/-	150 ps	-	0.3UI (Note)
Differential Fall Time for Data	$t_{DFTDATA}$	DSI-Dn+/- n=0,1,2,3	150 ps	-	0.3UI (Note)

Note:

The display module has to meet timing requirements, what are defined for the transmitter (MPU) on MIPI D-Phy standard.

3.5.Low Speed Mode - Bus Turn Around

Lower Power Mode and its State Periods are illustrated for reference purposes on the Bus Turnaround (BTA) from the MPU to the Display Module (ILI7807D-02) sequence below.

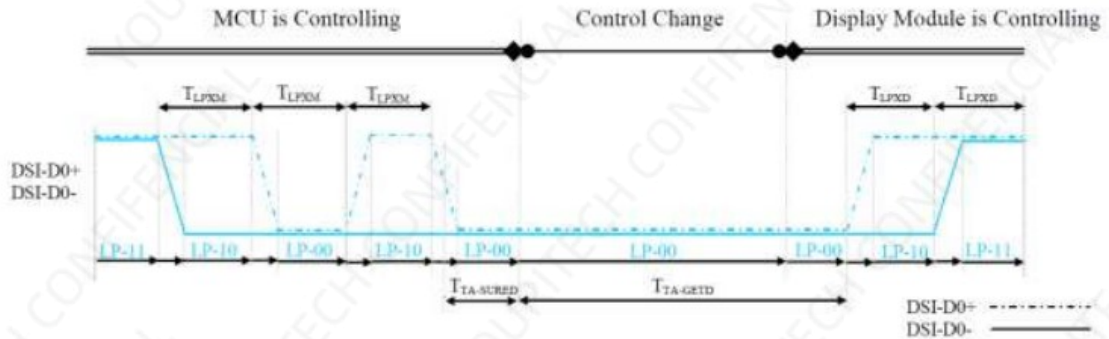


Figure 1200 BTA from the MPU to the Display Module

Lower Power Mode and its State Periods are illustrated for reference purposes on the Bus Turnaround (BTA) from the Display Module (ILI7807D-02) to the MPU sequence below.

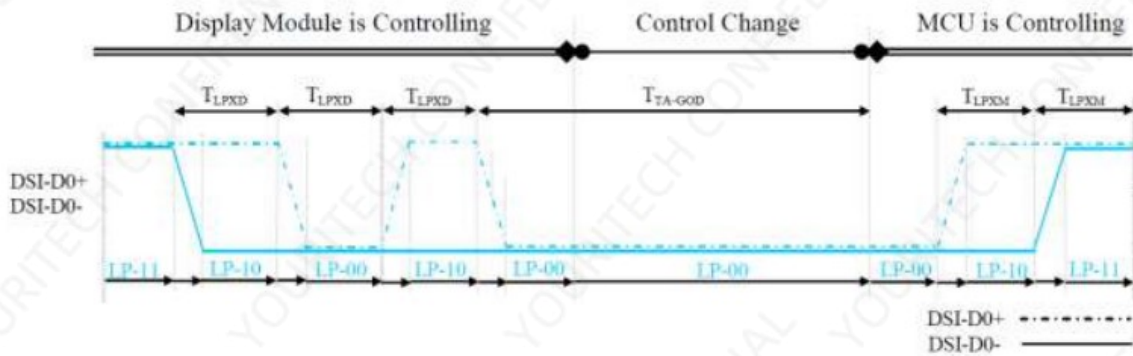


Figure 1211 BTA from the Display Module to the MPU

Table 50 Low Power State Period Timings – A

Signal	Symbol	Description	Min	Max	Unit
DSI-D0+/-	T_{LPXM}	Length of LP-00, LP-01, LP-10 or LP-11 periods MPU → Display Module (ILI7807D-02)	50	75	ns
DSI-D0+/-	T_{LPXD}	Length of LP-00, LP-01, LP-10 or LP-11 periods Display Module (ILI7807D-02) → MPU	50	75	ns
DSI-D0+/-	$T_{TA-SURED}$	Time-out before the Display Module (ILI7807D-02) starts driving	T_{LPXD}	$2 \times T_{LPXD}$	ns

Table 51 Low Power State Period Timings – B

Signal	Symbol	Description	Time	Unit
DSI-D0+/-	$T_{TA-GETD}$	Time to drive LP-00 by Display Module (ILI7807D-02)	$5 \times T_{LPXD}$	ns
DSI-D0+/-	T_{TA-GOD}	Time to drive LP-00 after turnaround request – MPU	$4 \times T_{LPXD}$	ns

4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	-	80	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	-	80	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	-	80	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	-	80	-		
Response time	T_{ON+} T_{OFF}	Normal $\theta=\Phi=0^\circ$	-	35	45	msec	Note 3
Contrast ratio	CR		700	1000	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2
	W_Y		0.28	0.33	0.38	-	Note 5 Note 6
Luminance	L		1200	1400	-	cd/m ²	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 7
Color Gamut	NTSC	CIE1931	60	70	-	%	

The test systems refer to Note 2.

Note 1: Definition of viewing angle range

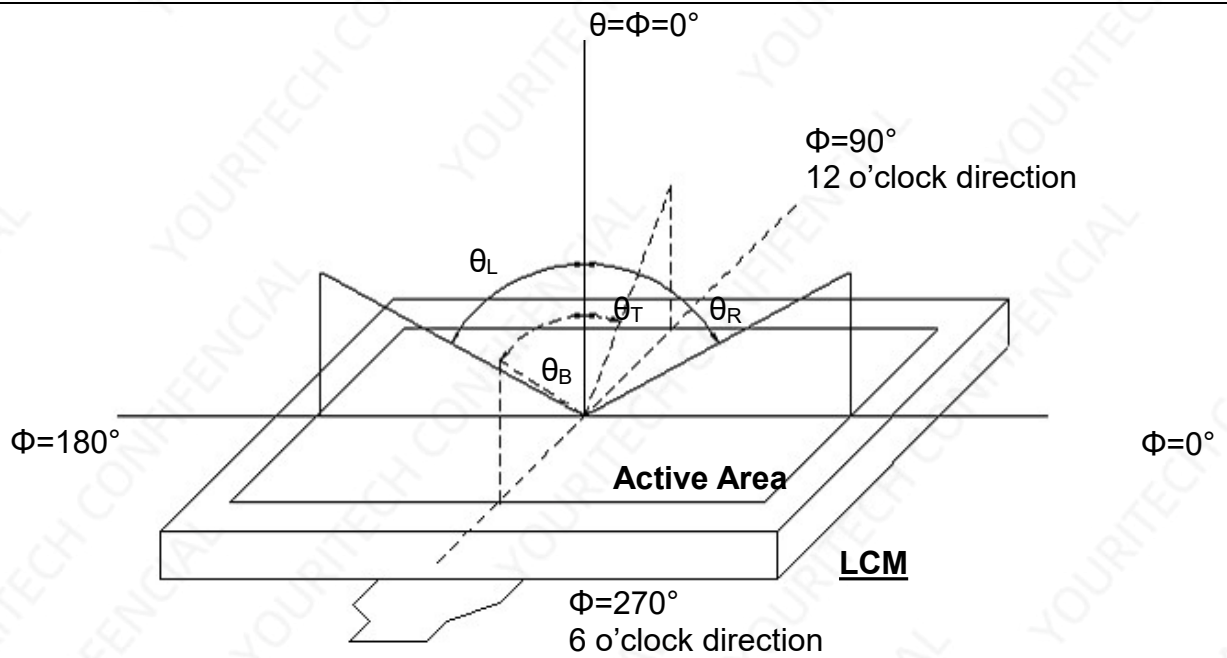


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view: 1° /Height: 500mm.) or CA-210.

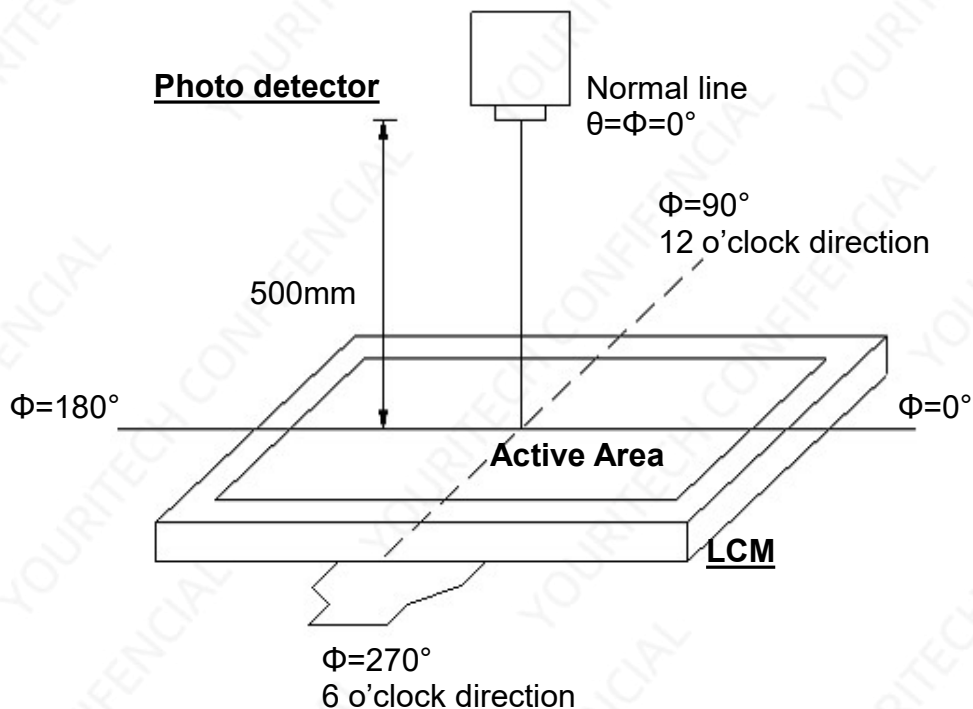


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time

between photo detector output intensity changed from 10% to 90%.

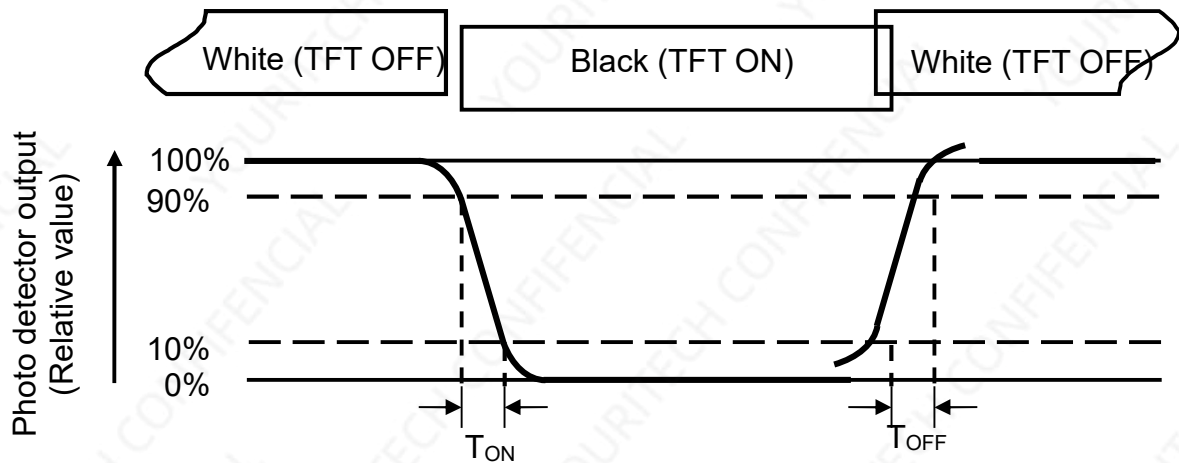


Fig. 4- 3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L=160\text{mA}$.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas(Refer to Fig. 4-4).

Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

L-----Active area length

W----- Active area width

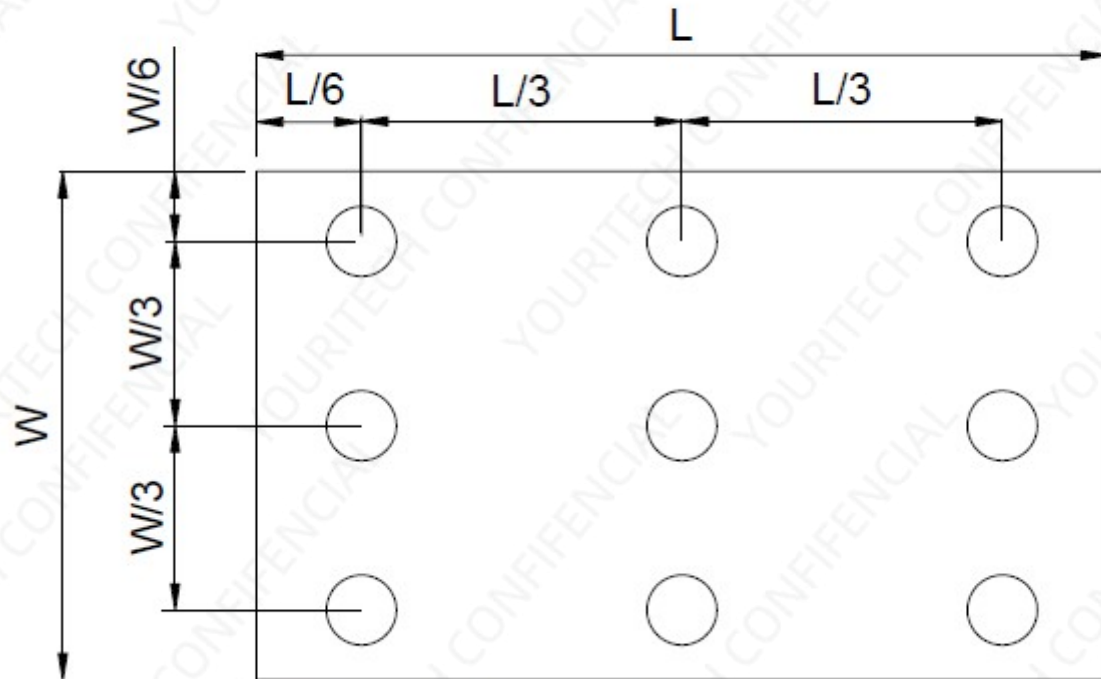


Fig. 4-4 Definition of measuring points

B_{MAX} : The measured maximum luminance of all measurement position.

B_{MIN} : The measured minimum luminance of all measurement position.

5. Reliability Test

Item	Test Conditions	Criterion
High Temperature Storage	Ta = 80℃ 240hrs	A,B,C,D,E
Low Temperature Storage	Ta = -30℃ 240hrs	A,B,C,D,E
High Temperature Operation	Ts = 70℃ 240hrs	A,B,C,D,E
Low Temperature Operation	Ta = -20℃ 240hrs	A,B,C,D,E
Operate at High Temperature and Humidity	+60℃, 90%RH 240hrs	A,B,C,D,E
Thermal Shock(non operation)	-20℃/30 min ~ +70℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	A,B,C,D,E
Vibration Test	Sweep:10Hz~55Hz~10Hz 2G 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	A,B,C,D,E
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	A,B,C,D,E
Electro Static Discharge	Contact=+/-4KV, Air=+/-8KV,(R=330R,C=150pF), 1 sec,9point,10times/point;	A,B,C,D,E

※Criterion:

A.LCM each function is OK,.

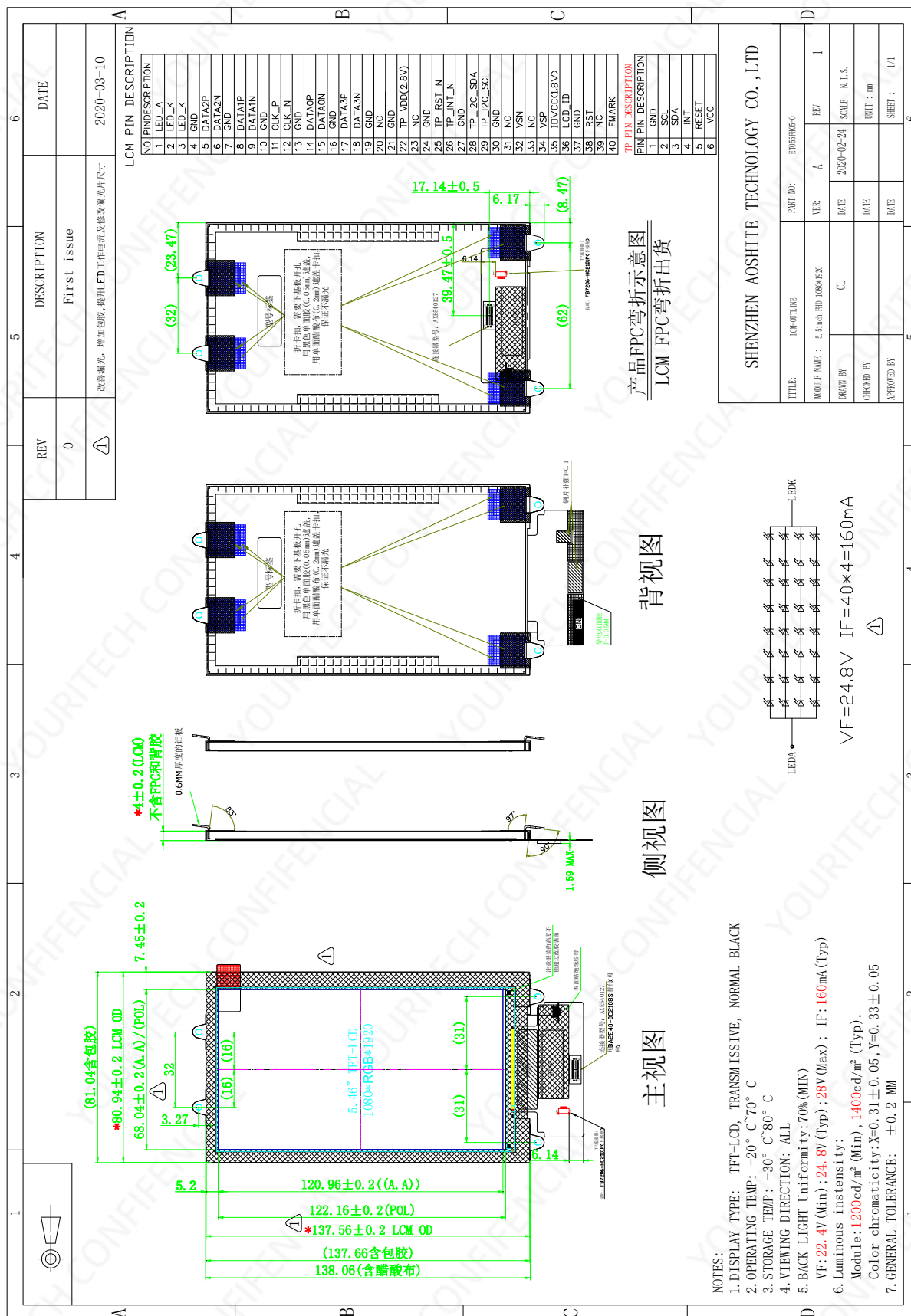
B.LCM appearance inspection without abnormalities (Including scratch, damage, corrosion and serious deformation)

C.LCM brightness above the Min. value of Spec.

D. Luminance uniformity above the Min. value of Spec.

E. Color chromaticity within tolerance range

6. Mechanical Drawing



7. Package Drawing

TBD

8. General Precautions

8.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

8.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

8.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

8.4. Storage

1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

8.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

9. Initialization code

```

REGISTER,FF,3,78,07,01          //Page1

REGISTER,42,1,11                //
REGISTER,43,1,B2                //VGH_CLP = 11.0V
REGISTER,44,1,94                //VGL_CLP = -7.0V

//REGISTER,45,1,28              //VGHO = 10V
//REGISTER,46,1,28              //VGLO = -7.0V

REGISTER,4A,1,15                //Disable VSPR = - 5.8V (Default VSP=VSPR)
REGISTER,4B,1,15                //Disable VSNR = - 5.8V (Default VSN=VSNR)

REGISTER,50,1,73                //GVDDP = 5.3V
REGISTER,51,1,73                //GVDDN = - 5.3V
REGISTER,5A,1,33                //LVD

REGISTER,A0,1,10                //VCOM
REGISTER,A2,1,01                //VCOM1 = - 0.35V
REGISTER,A3,1,22                //VCOM1 = - 0.35V

REGISTER,B3,1,60
REGISTER,B4,1,60

//GIP & SOURCE
REGISTER,FF,3,78,07,01          //Page1
REGISTER,22,1,06                //SS
REGISTER,36,1,00
REGISTER,60,1,0A
//REGISTER,63,1,0A
REGISTER,64,1,08
REGISTER,6C,1,45                //PRC & PRCB
REGISTER,35,1,22

REGISTER,FF,3,78,07,07          //Page 7
REGISTER,37,1,00
REGISTER,12,1,22

//Page 6,8 for GIP
REGISTER,FF,3,78,07,08          //Page8 for GIP
REGISTER,09,1,0e                //

REGISTER,FF,3,78,07,06          //Page6 for GIP
REGISTER,00,1,42
REGISTER,01,1,04
REGISTER,02,1,0B
REGISTER,03,1,03

```

REGISTER,04,1,00
REGISTER,05,1,00
REGISTER,06,1,00
REGISTER,07,1,00
REGISTER,08,1,81
REGISTER,09,1,05
REGISTER,0a,1,70
REGISTER,0b,1,00
REGISTER,0c,1,0B
REGISTER,0d,1,0B
REGISTER,0e,1,03
REGISTER,0f,1,03
REGISTER,10,1,00
REGISTER,11,1,00
REGISTER,12,1,00
REGISTER,13,1,00
REGISTER,14,1,00
REGISTER,15,1,00

REGISTER,31,1,22
REGISTER,32,1,27
REGISTER,33,1,07
REGISTER,34,1,08
REGISTER,35,1,10
REGISTER,36,1,16
REGISTER,37,1,14
REGISTER,38,1,12
REGISTER,39,1,07
REGISTER,3a,1,07
REGISTER,3b,1,07
REGISTER,3c,1,28
REGISTER,3d,1,29
REGISTER,3e,1,2a
REGISTER,3f,1,07
REGISTER,40,1,07

REGISTER,41,1,22
REGISTER,42,1,27
REGISTER,43,1,07
REGISTER,44,1,09
REGISTER,45,1,11
REGISTER,46,1,17
REGISTER,47,1,15
REGISTER,48,1,13
REGISTER,49,1,07
REGISTER,4a,1,07
REGISTER,4b,1,07
REGISTER,4c,1,28
REGISTER,4d,1,29
REGISTER,4e,1,2a
REGISTER,4f,1,07

REGISTER,50,1,07

REGISTER,61,1,22

REGISTER,62,1,27

REGISTER,63,1,07

REGISTER,64,1,09

REGISTER,65,1,13

REGISTER,66,1,15

REGISTER,67,1,17

REGISTER,68,1,11

REGISTER,69,1,07

REGISTER,6a,1,07

REGISTER,6b,1,07

REGISTER,6c,1,28

REGISTER,6d,1,29

REGISTER,6e,1,2a

REGISTER,6f,1,07

REGISTER,70,1,07

REGISTER,71,1,22

REGISTER,72,1,27

REGISTER,73,1,07

REGISTER,74,1,08

REGISTER,75,1,12

REGISTER,76,1,14

REGISTER,77,1,16

REGISTER,78,1,10

REGISTER,79,1,07

REGISTER,7a,1,07

REGISTER,7b,1,07

REGISTER,7c,1,28

REGISTER,7d,1,29

REGISTER,7e,1,2a

REGISTER,7f,1,07

REGISTER,80,1,07

REGISTER,d0,1,01

REGISTER,d1,1,00

REGISTER,d9,1,40

REGISTER,da,1,0c

REGISTER,db,1,40

REGISTER,dc,1,04

REGISTER,dd,1,00

REGISTER,a0,1,13

REGISTER,a1,1,00

REGISTER,a2,1,05

REGISTER,a3,1,20

REGISTER,a6,1,00

REGISTER,a7,1,00

REGISTER,E5,1,03

REGISTER,97,1,22

//====CKH Modulation=====

REGISTER,B2,1,00

REGISTER,B3,1,00

//=====Gamma Start =====

//=====Gamma START=====

REGISTER,FF,03,78,07,02

REGISTER,00,01,00 //255

REGISTER,01,01,30 //255

REGISTER,02,01,00 //254

REGISTER,03,01,4A //254

REGISTER,04,01,00 //252

REGISTER,05,01,6F //252

REGISTER,06,01,00 //250

REGISTER,07,01,8B //250

REGISTER,08,01,00 //248

REGISTER,09,01,A1 //248

REGISTER,0A,01,00 //246

REGISTER,0B,01,B4 //246

REGISTER,0C,01,00 //244

REGISTER,0D,01,C5 //244

REGISTER,0E,01,00 //242

REGISTER,0F,01,D5 //242

REGISTER,10,01,00 //240

REGISTER,11,01,E2 //240

REGISTER,12,01,01 //232

REGISTER,13,01,10 //232

REGISTER,14,01,01 //224

REGISTER,15,01,34 //224

REGISTER,16,01,01 //208

REGISTER,17,01,6D //208

REGISTER,18,01,01 //192

REGISTER,19,01,9A //192

REGISTER,1A,01,01 //160

REGISTER,1B,01,E2 //160

REGISTER,1C,01,02 //128

REGISTER,1D,01,1B //128

REGISTER,1E,01,02 //127

REGISTER,1F,01,1C //127

REGISTER,20,01,02 //95

REGISTER,21,01,52 //95

REGISTER,22,01,02 //63

REGISTER,23,01,8F //63

REGISTER,24,01,02 //47

REGISTER,25,01,B7 //47
REGISTER,26,01,02 //31
REGISTER,27,01,EC //31
REGISTER,28,01,03 //23
REGISTER,29,01,0E //23
REGISTER,2A,01,03 //15
REGISTER,2B,01,3A //15
REGISTER,2C,01,03 //13
REGISTER,2D,01,47 //13
REGISTER,2E,01,03 //11
REGISTER,2F,01,55 //11
REGISTER,30,01,03 //9
REGISTER,31,01,65 //9
REGISTER,32,01,03 //7
REGISTER,33,01,76 //7
REGISTER,34,01,03 //5
REGISTER,35,01,8A //5
REGISTER,36,01,03 //3
REGISTER,37,01,A3 //3
REGISTER,38,01,03 //1
REGISTER,39,01,C4 //1
REGISTER,3A,01,03 //0
REGISTER,3B,01,D1 //0

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REGISTER,3E,01,00 //254
REGISTER,3F,01,4A //254
REGISTER,40,01,00 //252
REGISTER,41,01,6F //252
REGISTER,42,01,00 //250
REGISTER,43,01,8B //250
REGISTER,44,01,00 //248
REGISTER,45,01,A1 //248
REGISTER,46,01,00 //246
REGISTER,47,01,B4 //246
REGISTER,48,01,00 //244
REGISTER,49,01,C5 //244
REGISTER,4A,01,00 //242
REGISTER,4B,01,D5 //242
REGISTER,4C,01,00 //240
REGISTER,4D,01,E2 //240
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REGISTER,4F,01,10 //232
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REGISTER,51,01,34 //224
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REGISTER,55,01,9A //192
REGISTER,56,01,01 //160

REGISTER,57,01,E2 //160
REGISTER,58,01,02 //128
REGISTER,59,01,1B //128
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REGISTER,5B,01,1C //127
REGISTER,5C,01,02 //95
REGISTER,5D,01,52 //95
REGISTER,5E,01,02 //63
REGISTER,5F,01,8F //63
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REGISTER,61,01,B7 //47
REGISTER,62,01,02 //31
REGISTER,63,01,EC //31
REGISTER,64,01,03 //23
REGISTER,65,01,0E //23
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REGISTER,67,01,3A //15
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REGISTER,69,01,47 //13
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REGISTER,6B,01,55 //11
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REGISTER,6D,01,65 //9
REGISTER,6E,01,03 //7
REGISTER,6F,01,76 //7
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REGISTER,71,01,8A //5
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REGISTER,73,01,A3 //3
REGISTER,74,01,03 //1
REGISTER,75,01,C4 //1
REGISTER,76,01,03 //0
REGISTER,77,01,D1 //0

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REGISTER,79,01,01

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REGISTER,02,01,00 //254
REGISTER,03,01,4A //254
REGISTER,04,01,00 //252
REGISTER,05,01,6F //252
REGISTER,06,01,00 //250
REGISTER,07,01,8B //250
REGISTER,08,01,00 //248
REGISTER,09,01,A1 //248
REGISTER,0A,01,00 //246
REGISTER,0B,01,B4 //246

REGISTER,0C,01,00	//244
REGISTER,0D,01,C5	//244
REGISTER,0E,01,00	//242
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REGISTER,11,01,E2	//240
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REGISTER,13,01,10	//232
REGISTER,14,01,01	//224
REGISTER,15,01,34	//224
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REGISTER,17,01,6D	//208
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REGISTER,19,01,9A	//192
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REGISTER,1D,01,1B	//128
REGISTER,1E,01,02	//127
REGISTER,1F,01,1C	//127
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REGISTER,21,01,52	//95
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REGISTER,23,01,8F	//63
REGISTER,24,01,02	//47
REGISTER,25,01,B7	//47
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REGISTER,2D,01,47	//13
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REGISTER,2F,01,55	//11
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REGISTER,31,01,65	//9
REGISTER,32,01,03	//7
REGISTER,33,01,76	//7
REGISTER,34,01,03	//5
REGISTER,35,01,8A	//5
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REGISTER,38,01,03	//1
REGISTER,39,01,C4	//1
REGISTER,3A,01,03	//0
REGISTER,3B,01,D1	//0
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REGISTER,3D,01,30	//255

REGISTER,3E,01,00	//254
REGISTER,3F,01,4A	//254
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REGISTER,43,01,8B	//250
REGISTER,44,01,00	//248
REGISTER,45,01,A1	//248
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REGISTER,47,01,B4	//246
REGISTER,48,01,00	//244
REGISTER,49,01,C5	//244
REGISTER,4A,01,00	//242
REGISTER,4B,01,D5	//242
REGISTER,4C,01,00	//240
REGISTER,4D,01,E2	//240
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REGISTER,4F,01,10	//232
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REGISTER,57,01,E2	//160
REGISTER,58,01,02	//128
REGISTER,59,01,1B	//128
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REGISTER,5B,01,1C	//127
REGISTER,5C,01,02	//95
REGISTER,5D,01,52	//95
REGISTER,5E,01,02	//63
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REGISTER,60,01,02	//47
REGISTER,61,01,B7	//47
REGISTER,62,01,02	//31
REGISTER,63,01,EC	//31
REGISTER,64,01,03	//23
REGISTER,65,01,0E	//23
REGISTER,66,01,03	//15
REGISTER,67,01,3A	//15
REGISTER,68,01,03	//13
REGISTER,69,01,47	//13
REGISTER,6A,01,03	//11
REGISTER,6B,01,55	//11
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REGISTER,6D,01,65	//9
REGISTER,6E,01,03	//7
REGISTER,6F,01,76	//7
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REGISTER,71,01,8A //5
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REGISTER,73,01,A3 //3
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REGISTER,75,01,C4 //1
REGISTER,76,01,03 //0
REGISTER,77,01,D1 //0

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REGISTER,79,01,01

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REGISTER,01,01,30 //255
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REGISTER,03,01,4A //254
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REGISTER,05,01,6F //252
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REGISTER,07,01,8B //250
REGISTER,08,01,00 //248
REGISTER,09,01,A1 //248
REGISTER,0A,01,00 //246
REGISTER,0B,01,B4 //246
REGISTER,0C,01,00 //244
REGISTER,0D,01,C5 //244
REGISTER,0E,01,00 //242
REGISTER,0F,01,D5 //242
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REGISTER,22,01,02 //63
REGISTER,23,01,8F //63
REGISTER,24,01,02 //47
REGISTER,25,01,B7 //47

REGISTER,26,01,02	//31
REGISTER,27,01,EC	//31
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REGISTER,29,01,0E	//23
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REGISTER,2B,01,3A	//15
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REGISTER,2F,01,55	//11
REGISTER,30,01,03	//9
REGISTER,31,01,65	//9
REGISTER,32,01,03	//7
REGISTER,33,01,76	//7
REGISTER,34,01,03	//5
REGISTER,35,01,8A	//5
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REGISTER,3A,01,03	//0
REGISTER,3B,01,D1	//0
REGISTER,3C,01,00	//255
REGISTER,3D,01,30	//255
REGISTER,3E,01,00	//254
REGISTER,3F,01,4A	//254
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REGISTER,41,01,6F	//252
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REGISTER,49,01,C5	//244
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REGISTER,4B,01,D5	//242
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REGISTER,77,01,D1 //0

REGISTER,78,01,01
REGISTER,79,01,01

//=====Gamma END=====

REGISTER,FF,3,78,07,00 //Page0

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REGISTER,FF,3,78,07,00 //Page0

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Delay,120

REGISTER,29,00

Delay,20