DISPLAYTRONIC

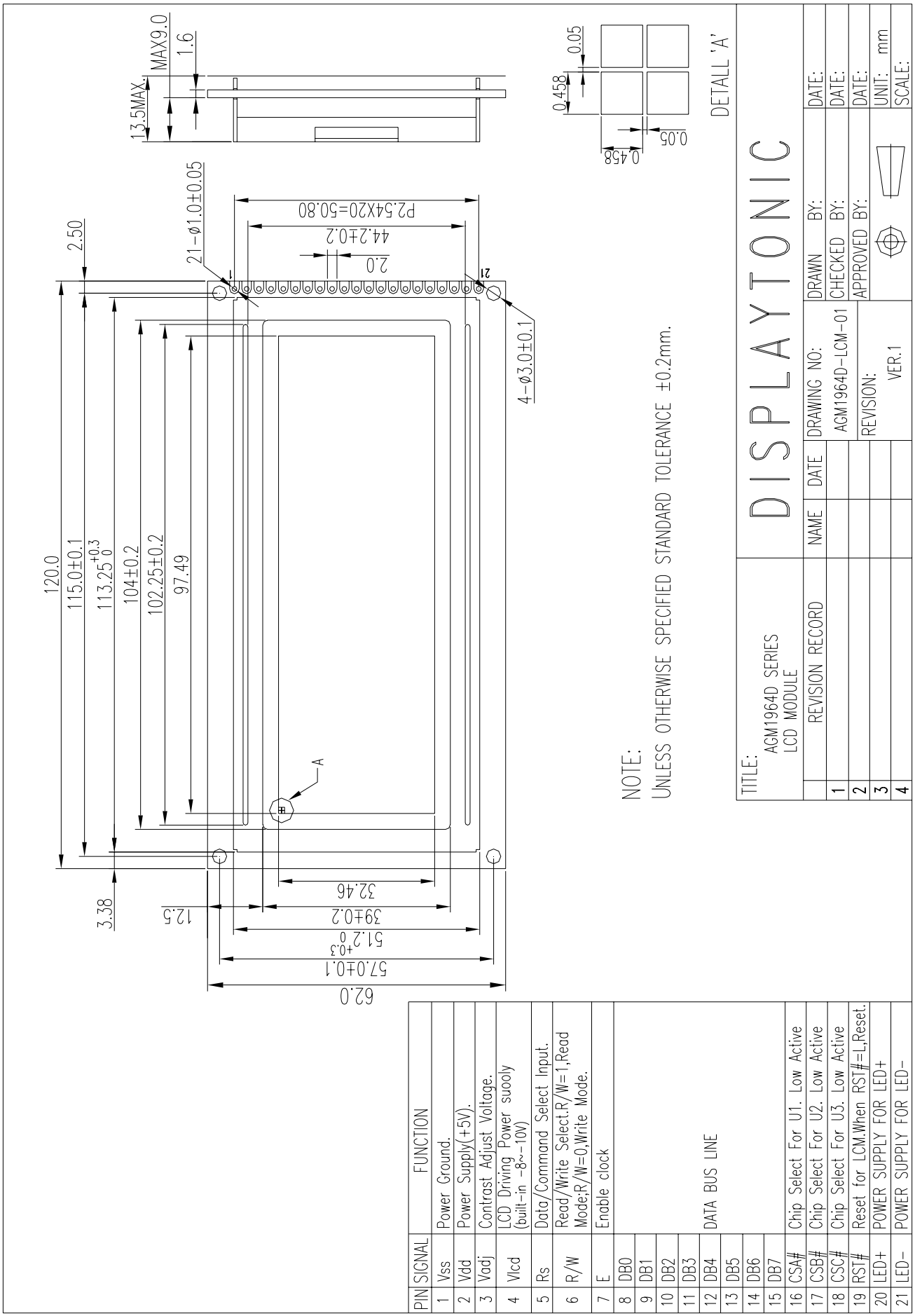
A DIVISION OF ZE XIAMEN CO., LTD.

SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER: **AGM 1964D SERIES**

DATE: **April.18. 2005**

1.0 MECHANICAL DIAGRAM



PIN	SIGNAL	FUNCTION
1	Vss	Power Ground.
2	Vdd	Power Supply(+5V).
3	Vadj	Contrast Adjust Voltage.
4	Vlcd	LCD Driving Power suooly (built-in -8~-10V)
5	Rs	Data/Command Select Input.
6	R/W	Read/Write Select.R/W=1,Read Mode;R/W=0,Write Mode.
7	E	Enable clock
8	DB0	DATA BUS LINE
9	DB1	
10	DB2	
11	DB3	
12	DB4	
13	DB5	
14	DB6	
15	DB7	
16	CSA#	Chip Select For U1. Low Active
17	CSB#	Chip Select For U2. Low Active
18	CSC#	Chip Select For U3. Low Active
19	RST#	Reset for LCM.When RST#=L,Reset.
20	LED+	POWER SUPPLY FOR LED+
21	LED-	POWER SUPPLY FOR LED-

2.0 GENERAL SPECIFICATION

1. Overall Module Size	120.0mm(W) x 62.0mm(H) x max 13.5mm(D) for LED backlight version
2. Dot Size	0.458 x 0.458mm
3. Dot Pitch	0.508 x 0.508mm
4. Duty	1/64 DUTY, 1/9 BIAS
5. Controller IC	KS0108 or Compatible
6. LC Fluid Options	STN /YELLOW-GREEN
7. Polarizer Options	Reflective, Transflective, Transmissive
8. Backlight Options	LED
9. Temperature Range Options	Operating: -20°C ---- +70°C Storage: -30°C ---- +80°C
10. View Angle	6 Clock
11.Active Area	97.49 x 32.46mm
12. View Size	104.0 x 39.0mm

3.0 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Typ	Max	Unit
Operating temperature (Wide temperature)	Top	-20	-	70	ºC
Storage temperature (Wide temperature)	Tst	-30	-	80	ºC
Input voltage	Vin	-0.3	-	Vdd+0.3	V
Supply voltage for logic	Vdd- Vss	-0.3	-	6.0	V
Supply voltage for LCD drive	Vdd- V0	8	-	17.0	V

4.0 ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit
Power Supply	V_{DD}-V_{SS}		4.5	5.0	5.5	V
Input voltage (high)	Vih	H level	0.8 V_{DD}	-	V_{DD} +0.3	V
Input voltage (low)	Vil	L level	0	-	0.2 V_{DD}	V
Recommended LC Driving Voltage	Vdd -Vo	-20ºC	12.8	13.3	13.8-	V
		0ºC	12.0	12.5	13.0	
		50ºC	11.0	11.5	12.0	
		70ºC	10.3	10.8	11.0	
Power Supply Current	Idd	Vdd=5.0V	-		12.0	mA
LED Power Supply Voltage	V_{LED}+ - V_{LED}-	-	4.4	5.0	5.8	V
Y-G LED Power Supply Current	I_{BL}	RL=4Ω	150	200	400	
White LED Power Supply Current	I_{BL}	RL=12Ω	120	160	320	mA

5.0 OPTICAL CHARACTERISTICS

Item / Mode		Cr (Contrast Ratio)		θ (Viewing Angle)		ϕ (Viewing Angle)	
		25ºC		25ºC		25ºC	
		MIN.	TYP.	MIN	TYP.	MIN	TYP.
R	A						
	B	7.10	7.70	80°	85°	-	35°
	C	-	-	-	-	-	-
S	A						
	B	7.05	7.55	80°	85°	-	35°
	C	-	-	-	-	-	-

Note:

R: Reflective

S: Transflective

A: STN Gray

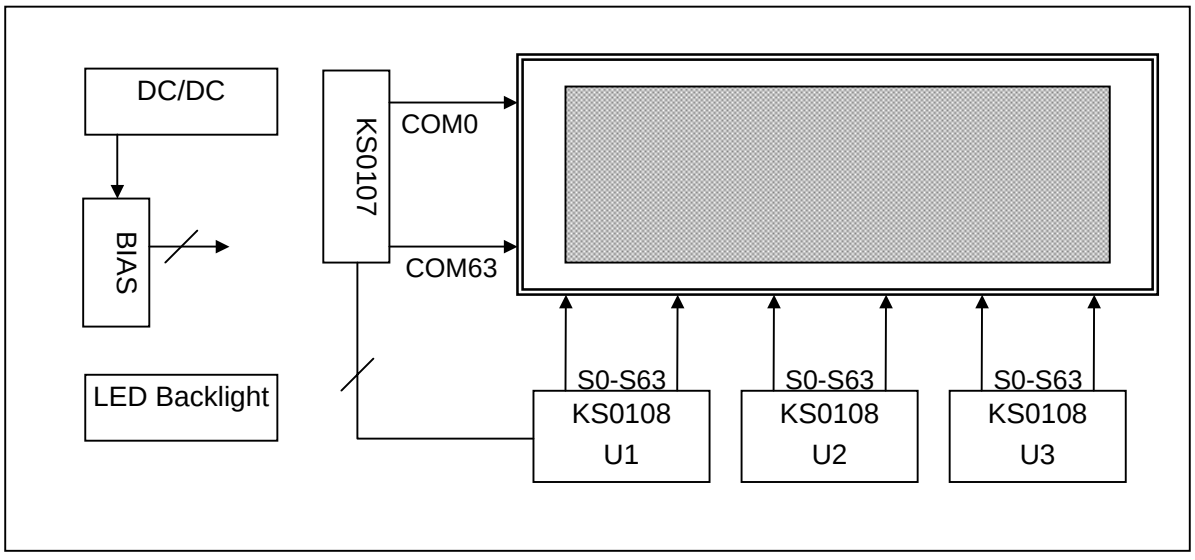
B: STN Yellow

C: FSTN

At: ϕ =0°, θ =0°

Item	**Symbol**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Response time (rise)	Tr	25 ºC	-	120	250	ms
Response time (fall)	Tf	25ºC	-	130	250	ms

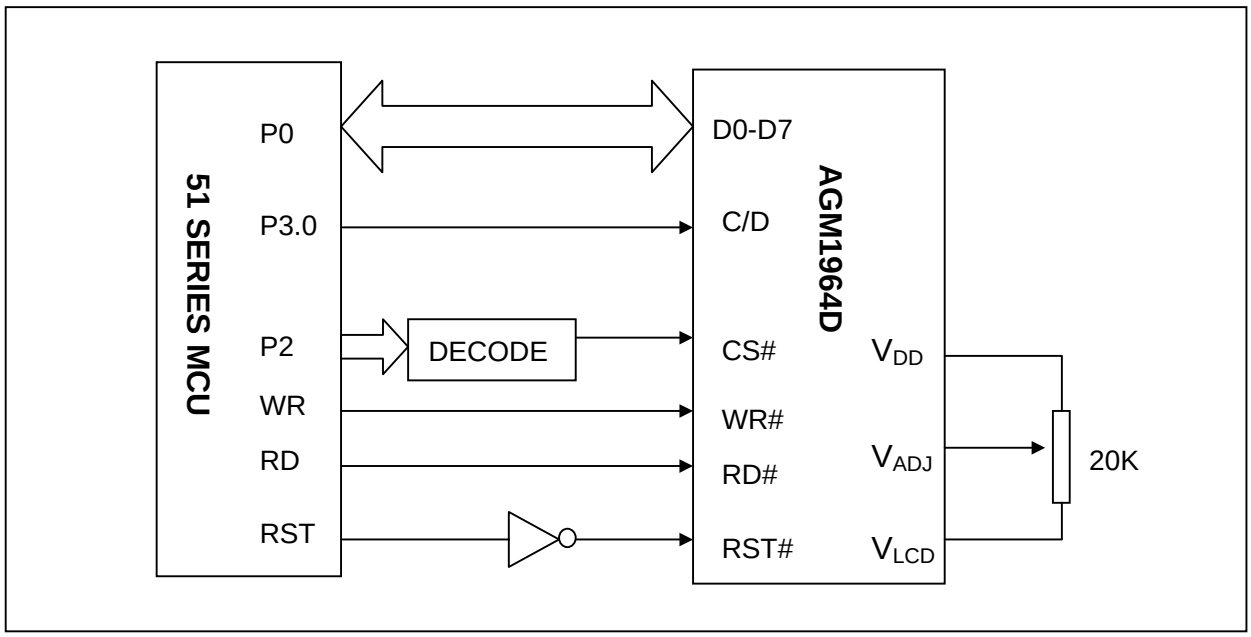
6.0 BLOCK DIAGRAM



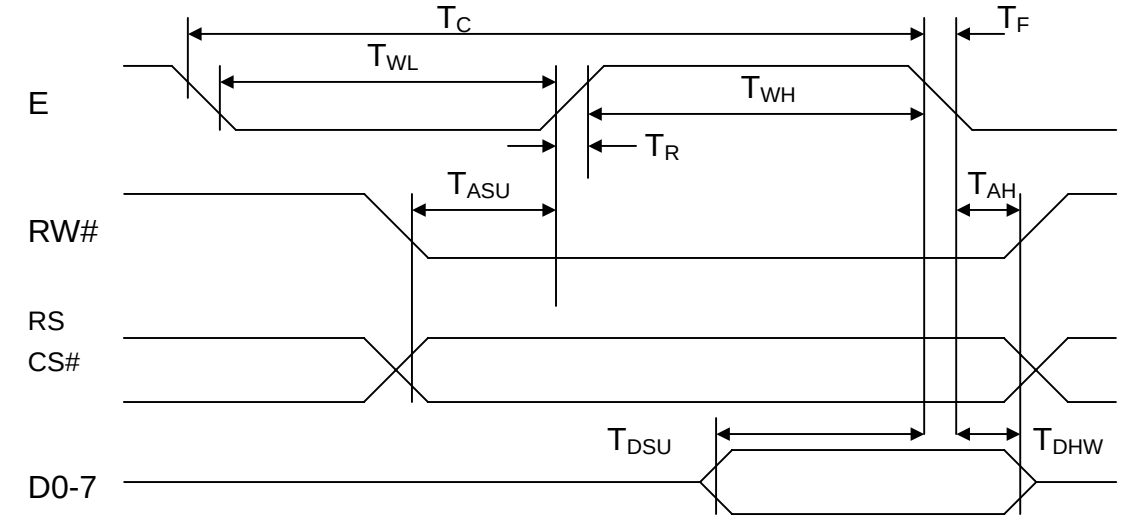
7.0 PIN ASSIGNMENT

Pin No.	Symbol	Function	Level
1	VSS	Power Ground.	-
2	VDD	Power Supply. (+5V)	-
3	VADJ	Contrast Adjust Voltage.	-
4	VLCD	LCD Driving Power supply (-8 ~ -10V)	
5	RS	Data/Command Select Input.	-
6	R/W	Read/Write Select. R/W=1,Read Mode; R/W=0,Write Mode.	
7	E	Enable clock	
8	DB0	Data bit 0	H/L
9	DB1	Data bit 1	H/L
10	DB2	Data bit 2	H/L
11	DB3	Data bit 3	H/L
12	DB4	Data bit 4	H/L
13	DB5	Data bit 5	H/L
14	DB6	Data bit 6	H/L
15	DB7	Data bit 7	H/L
16	CSA#	Chip Select for U1. Low Active.	
17	CSB#	Chip Select for U2. Low Active.	
18	CSC#	Chip Select for U3. Low Active.	
19	RST#	Reset for LCM. When RST#=L, Reset.	
20	LED+	Power supply for LED+	
21	LED-	Power supply for LED-	

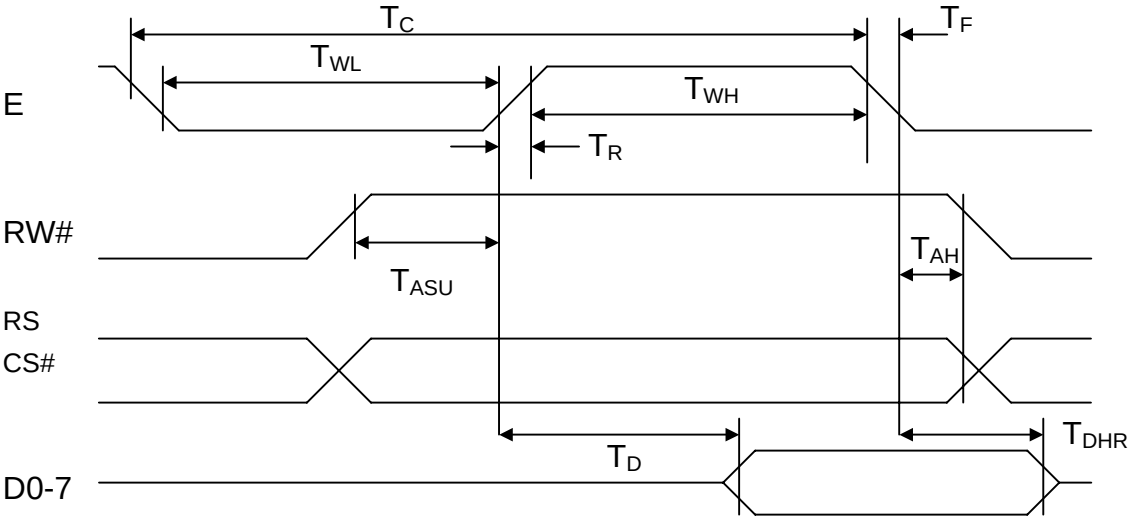
8.0 APPLICATION



9.0 TIMING CHARACTERISTICS



6800 MCU Writing



6800 MCU Reading

Condition:（VDD=5.0±10%,VSS=0V,Ta=-10～+60°C）

ITEM	SYMBLE	MIN	MAX	UNIT
E Clock Cycle	T_C	1000	—	ns
E Clock Pulse High Width	T_{WH}	450	—	ns
E Clock Pulse Low Width	T_{WL}	450	—	ns
E Rising Time	T_R	—	25	ns
E Falling Time	T_F	—	25	ns
Address Setup Time	T_{ASU}	140	—	ns
Address Hold Time	T_{AH}	10	—	ns
Data Setup Time	T_{DSU}	200	—	ns
Data Delay Time	T_D	—	320	ns
Data Hold Time (Write)	T_{DHW}	10	—	ns
Data Hold Time (Read)	T_{DHR}	20	—	ns

10.0 RELIABILITY TEST

Content	Conditions	Evaluations and Assessment*			
		Current Consumption	Oozing	Contrast	Other Appearances
Operation at low temperature	-20ºC 240hrs	Twice initial value or less		More than 80% of initial value	No abnormality
Operation at high temperature and humidity	70ºC,90% RH,240hrs	Twice initial value or less	none	More than 80% of initial value	No abnormality
High temperature storage	80ºC, 240hrs	Twice initial value or less	none	More than 80% of initial value	No abnormality
Low temperature storage	-30ºC, 240hrs	Twice initial value or less		More than 80% of initial value	No abnormality

*Evaluations and assessment to be made two hours after returning to room temperature (25ºC±5ºC).

*The LCDs subjected to the test must not have dew condensation.

11.0 INSTRUCTION DESCRIPTION (KS0108)

Command	RS	R/W	D7	D6	D5	D4	D3	D2	D1	D0	Function
Display ON/OFF	0	0	0	0	1	1	1	1	1	1/0	To control the display ON or OFF. The internal status and display RAM data are not affected. 0:OFF, 1:ON
Set address (Y address)	0	0	0	1	Y address (0~63)						To set the Y address in the Y address counter.
Set page (X address)	0	0	1	0	1	1	1	Page(0~7)			To set the X address at the X address register.
Display Start Line	0	0	1	1	Display Start Line(0~63)						To indicate the display data RAM displayed at the top of the screen.
Status Read	0	1	Busy	0	ON/OFF	Reset	0	0	0	0	To read status of the LCD controller IC: Busy 0:Ready, 1: In operation ON/OFF: 0:Display ON, 1:Display OFF Reset: 0:Normal, 1:Reset
Write display data	1	0	Write Data								To write data into display data RAM. Y address is increased by 1 after this command.
Read Display data	1	1	Read Data								To read data from display data RAM to the data bus.

12.0 DISPLAY RAM ADDRESS

Page	Line	RAM Y address(Y0 ~Y63)													Data
1st page(X=0)	Line 0→	0	1	1	1	0	0	·····	0	0	1	0	0	0	←DB0(LSB)
	Line 1→	1	0	0	0	1	0	·····	0	0	1	1	0	0	←DB1
	Line 2→	1	0	0	0	1	0	·····	0	0	1	0	1	0	←DB2
	Line 3→	1	0	0	0	1	0	·····	0	0	1	0	1	0	←DB3
	⋮	1	1	1	1	1	0	·····	0	0	1	0	0	0	←DB4
	⋮	1	0	0	0	1	0	·····	1	1	1	0	0	0	←DB5
	⋮	1	0	0	0	1	0	·····	1	1	1	0	0	0	←DB6
	Line 7→	0	0	0	0	0	0	·····	0	0	0	0	0	0	←DB7(MSB)
2nd page(X=1)	Line 8→	1	1	1	1	0	0	·····	0	1	1	1	0	0	←DB0(LSB)
	Line 9→	1	0	0	0	1	0	·····	0	1	0	0	1	0	←DB1
	Line 10→	1	0	0	0	1	0	·····	0	1	0	0	1	0	←DB2
	⋮	1	1	1	1	0	0	·····	1	1	1	0	1	0	←DB3
	⋮	1	0	0	0	1	0	·····	0	1	0	0	1	0	←DB4
	⋮	1	0	0	0	1	0	·····	0	1	0	0	1	0	←DB5
	⋮	1	1	1	1	0	0	·····	0	1	1	1	0	0	←DB6
	Line 15→	0	0	0	0	0	0	·····	0	0	0	0	0	0	←DB7(MSB)
	⋮							·····							
8th page(X=7)	Line 56→	1	0	0	0	1	0	·····	0	0	0	0	0	0	←DB0(LSB)
	⋮	1	0	0	0	1	0	·····	0	0	0	0	0	0	←DB1
	⋮	1	0	0	0	1	0	·····	0	1	0	0	1	0	←DB2
	⋮	1	1	1	1	1	0	·····	1	0	1	0	1	0	←DB3
	⋮	1	0	0	0	1	0	·····	1	0	0	1	0	0	←DB4
	⋮	1	0	0	0	1	0	·····	1	0	0	1	0	0	←DB5
	Line 62→	1	0	0	0	1	0	·····	0	1	1	0	1	0	←DB6
	Line 63→	0	0	0	0	0	0	·····							←DB7(MSB)