



CLOVER DISPLAY LTD.

LCD MODULE SPECIFICATION

Model : CV8424A - _ _ - _ _ - _ _ - _

Revision	01
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Date	16 January 2009
Our Reference	ZX4021

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MODE OF DISPLAY**Display mode**

STN : ☐ Yellow green
☐ Grey
☐ Blue (negative)
☐ FSTN positive
☐ FSTN negative

Display condition

☐ Reflective type
☐ Transflective type
☐ Transmissive type
☐ Others

Viewing direction

☐ 6 O' clock
☐ 12 O' clock
☐ 3 O' clock
☐ 9 O' clock

LCD MODULE NUMBER NOTATION:

CV8424A - N N - S R - N 6 - T
| | | | | | |
(1) (2) (3) (4) (5) (6) (7) (8)

*(1)---Model number of standard LCD Modules

*(2)---Backlight type

N – No backlight
E – EL backlight
L – Side-lited LED backlight
M– Array LED backlight
C – CCFL

*(3)---Backlight color

N – No backlight
A – Amber
B – Blue
O– Orange
W–White
Y – Yellow green

*(4)---Display mode

T – TN
V – TN (Negative)
S – STN Yellow green
G – STN Grey
B – STN Blue (Negative)
F – FSTN
N – FSTN (Negative)

*(5)---Rear polarizer type

R – Reflective
F – Transflective
T – Transmissive

*(6)---Temperature range

N – Normal
W– Extended

*(7)---Viewing direction

6 – 6 O'clock
2 – 12 O'clock
3 – 3 O'clock
9 – 9 O'clock

*(8)---Special code for other requirements
(Can be omitted if not used)

GENERAL DESCRIPTION

Display mode : 84 x 24 dots, graphic COB LCD module

Fonts type built in : Chinese Traditional & Simplified, English, Europeans Eastern & Western, Japanese, Korean, Arabic & Symbol

Interface : 4 bits Parallel

Driving method : 1/25 duty, 1/5 bias

Controller IC : RockWorks RW1068 or equivalent
For the detailed information, please refer to the IC specifications.

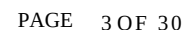
MECHANICAL DIMENSIONS

Item	Dimension	Unit	Item	Dimension	Unit
Outline Dimension	55.0(L)x30.0(W)x6.5(MAX)(H)	mm	Dot Pitch	0.54(L)x0.54(W)	mm
Viewing Area	47.7(L)x16.7(W)	mm	Dot Size	0.50(L)x0.50(W)	mm

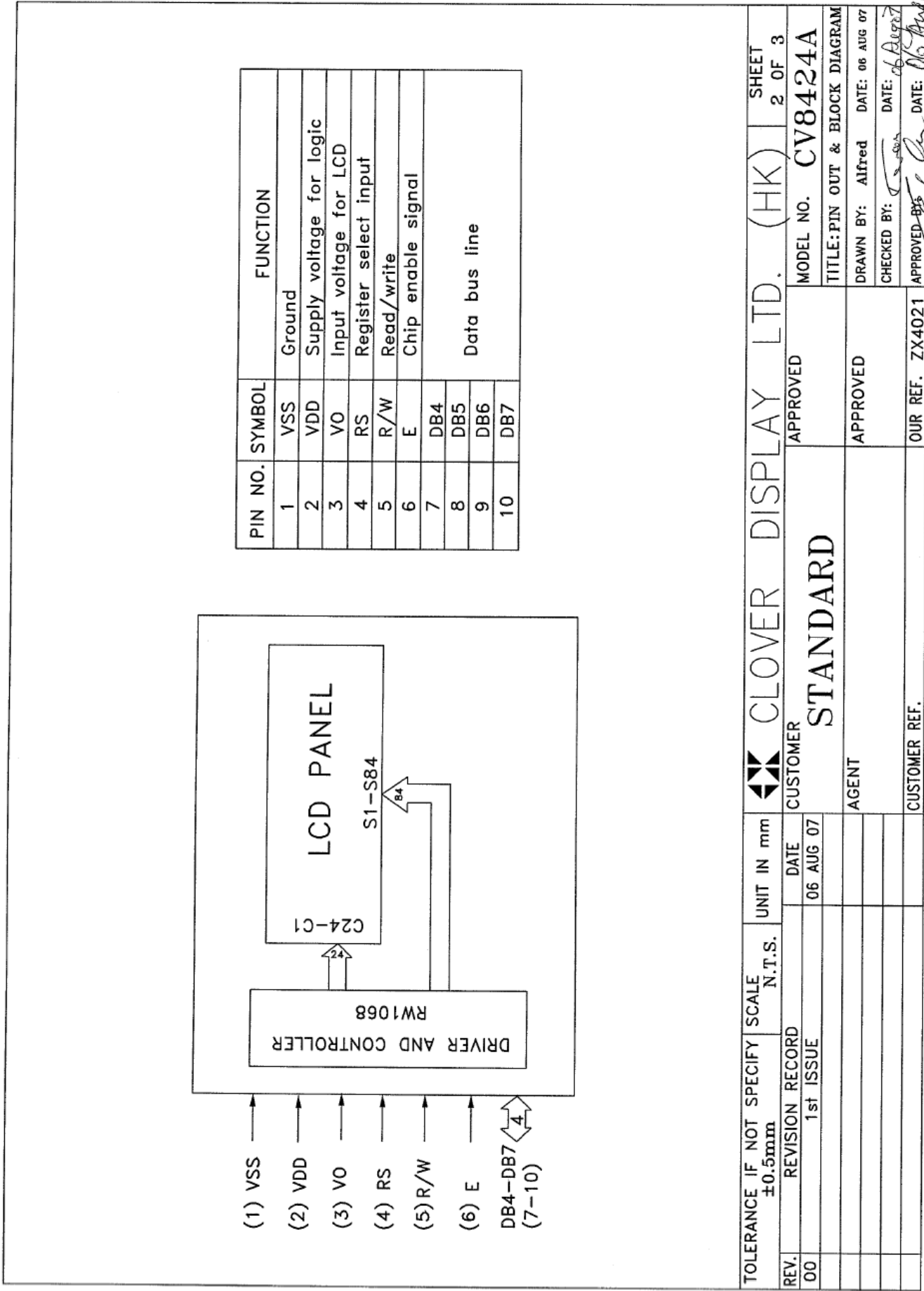
CONNECTOR PIN ASSIGNMENT

PIN NO.	SYMBOL	FUNCTION
1	VSS	Ground
2	VDD	Supply voltage for logic
3	VO	Input voltage for LCD
4	RS	Register select input
5	R/W	Read/write
6	E	Chip enable signal
7	DB4	Data bus line
8	DB5	
9	DB6	
10	DB7	

SPEC. REV.01



COUNTER DRAWING OF PIN OUT & BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

Conditions: VSS=0V, @Ta=25°C

Item	Symbol	MIN.	TYP.	MAX.	Unit	Item	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	VDD	4.75	5.0	5.25	V	“H”Level Input Voltage	VIH	VDD-1	—	VDD	V
Supply Current	IDD	—	0.42	—	mA	“L”Level Input Voltage	VIL	—	—	1.0	V
Operating Voltage for LCD(*)	V0	4.8	5.0	5.2	V	—	—	—	—	—	—
EL Backlight Voltage (VEL)						Backlight Current					
EL (@ Frequency 400Hz)	—	—	—	—	—	—	—	—	—	—	—
Side-lited LED Backlight Forward Voltage (VF)						Side-lited LED Backlight Forward Current (IF)					
White (Current @75mA)	VBL	—	—	—	V	White	IBL	—	—	—	mA
Blue	VBL	—	—	—	V	Blue	IBL	—	—	—	mA
Yellow Green	VBL	—	—	—	V	Yellow Green	IBL	—	—	—	mA

Note(*): The module V0 5.0±0.2V represents operating voltage of LCD for optimum contrast.

ABSOLUTE MAXIMUM RATINGS

Please make sure not to exceed the following maximum rating values under the worst application conditions.

Item	Symbol	Rating (for normal temperature)	Rating (for wide temperature)	Unit
Supply Voltage	VDD	-0.3 to 7.0	-0.3 to 7.0	V
Operating Temperature	Topr	-10 to 50	-20 to 70	°C
Storage Temperature	Tstg	-10 to 70	-30 to 80	°C

INSTRUCTIONS

Instruction	RE	Instruction Code										Description	Execution Time (fosc = 270 kHz)
		RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Clear Display	x	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM, and set DDRAM address to "00H" from AC.	1.53ms
Return Home	0	0	0	0	0	0	0	0	0	1	X	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	1.53ms
Power Down Mode	1	0	0	0	0	0	0	0	0	1	PD	Set power down mode bit. PD = "1" : power down mode set, PD = "0" : power down mode disable.	37 μ s
Entry Mode Set	0	0	0	0	0	0	0	0	1	I/D	S	Assign cursor moving direction. I/D = "1": increment I/D = "0": decrement And display shift enable bit. S = "1": make display shift of the enabled lines by the DS2 - DS1 bits in the Shift Enable instruction. S = "0": display shift disable	37 μ s
	1	0	0	0	0	0	0	0	1	1	BID	Segment bi-direction function. BID = "1": Seg84 → Seg1, BID = "0": Seg1 → Seg84.	
Display ON/OFF Control	0	0	0	0	0	0	0	1	D	C	B	Set display / cursor / blink on/off D = "1": display on, D = "0": display off, C = "1": cursor on, C = "0": cursor off, B = "1": blink on, B = "0": blink off.	37 μ s
Extended Function set	1	0	0	0	0	0	0	1	1	B/W	0	Assign black/white inverting of cursor, B/W = "1": black/white inverting of cursor enable, B/W = "0": black/white inverting of cursor disable	37 μ s

INSTRUCTIONS(CONT.)

Instruction	RE	Instruction Code										Description	Execution Time (fosc = 270 kHz)
		RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Cursor or Display shift	0	0	0	0	0	0	1	S/C	R/L	X	X	Cursor or display shift. S/C = "1" : display shift, S/C = "0" : cursor shift, R/L = "1" : shift to right, R/L = "0" : shift to left.	37 μ s
Shift Enable	1	0	0	0	0	0	1	0	0	DS2	DS1	(when DC = "1") Determine the line for display shift. DS1 = "1/0" : 1st line display shift enable/disable DS2 = "1/0" : 2nd line display shift enable/disable	37 μ s
Code Bank Selection	1	0	0	0	0	0	1	X	X	CB1	CB0	(when DC = "0") (CB1, CB0) = (0, 0) ROM code Bank 0 selected (0, 1) ROM code Bank 1 selected (1, 0) ROM code Bank 2 selected (1, 1) ROM code Bank 3 selected	37 μ s
Function Set	0	0	0	0	0	1	IF	X	RE(0)	DC	REV	Set interface data length (IF = "1": 8-bit, IF = "0": 4-bit), extension register, RE("0"), shift enable. DC = "1": enable display shift per line. DC = "0": enable the selection of code bank. Reverse bit REV = "1": reverse display, REV = "0": normal display.	37 μ s
	1	0	0	0	0	1	IF	X	RE(1)	BE	0	Set IF, RE("1") and CGRAM/SEGRAM blink enable (BE) BE = "1/0": CGRAM/SEGRAM blink enable/disable.	37 μ s

INSTRUCTIONS(CONT.)

Instruction	RE	Instruction Code										Description	Execution Time (fosc = 270 kHz)
		RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Set CGRAM Address	0	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter.	37 μ s
Set SEGRAM Address	1	0	0	0	1	X	X	AC3	AC2	AC1	AC0	Set SEGRAM address in address counter.	37 μ s
Set DDRAM Address	0	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter.	37 μ s
Set Data Length	1	0	0	1	SD6	SD5	SD4	SD3	SD2	SD1	SD0	Set data length for 3 line SPI	37 μ s
Read Busy flag and Address	X	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Can know internal operation is ready or not by reading BF. The contents of address counter can also be read. BF = "1" : busy state, BF = "0" : ready state.	0 μ s
Write Data	X	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM. (DDRAM / CGRAM / SEGRAM).	43 μ s
Read Data	X	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM. (DDRAM / CGRAM / SEGRAM).	43 μ s

- Note : 1. When an MPU program with Busy Flag(DB7) checking is made, 1/2 Fosc (is necessary) for executing the next instruction by the "E" signal after the Busy Flag (DB7) goes to "Low".
2. "X" Don't care

DISPLAY DD RAM AND CHARACTER POSITION

14x2, 1/25 DUTY CYCLE

	1	2		14	DISPLAY POSITION
line 1	40H	41H		4DH	DD RAM ADDRESS
line 2	00H	01H		0DH	

TIMING CHARACTERISTICS

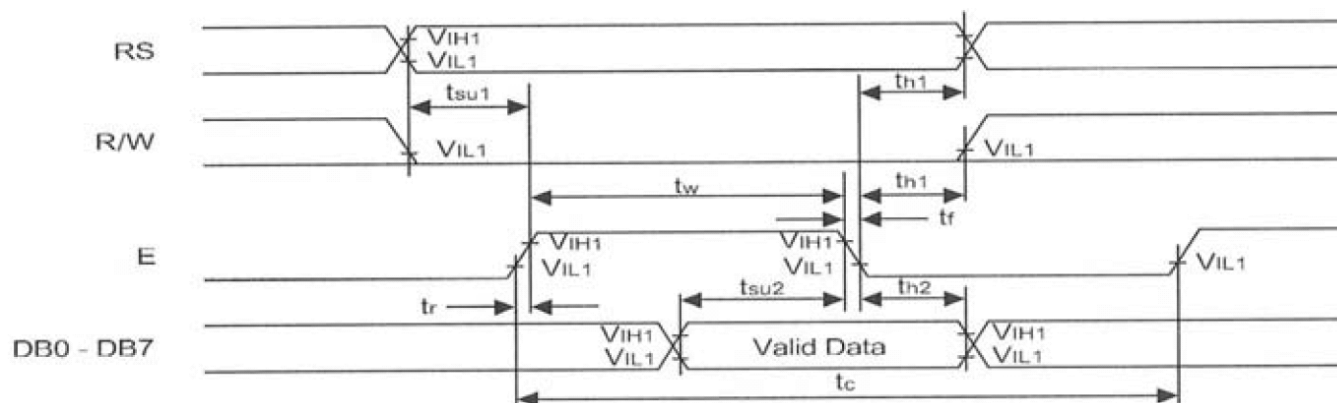


Figure 7 Write mode

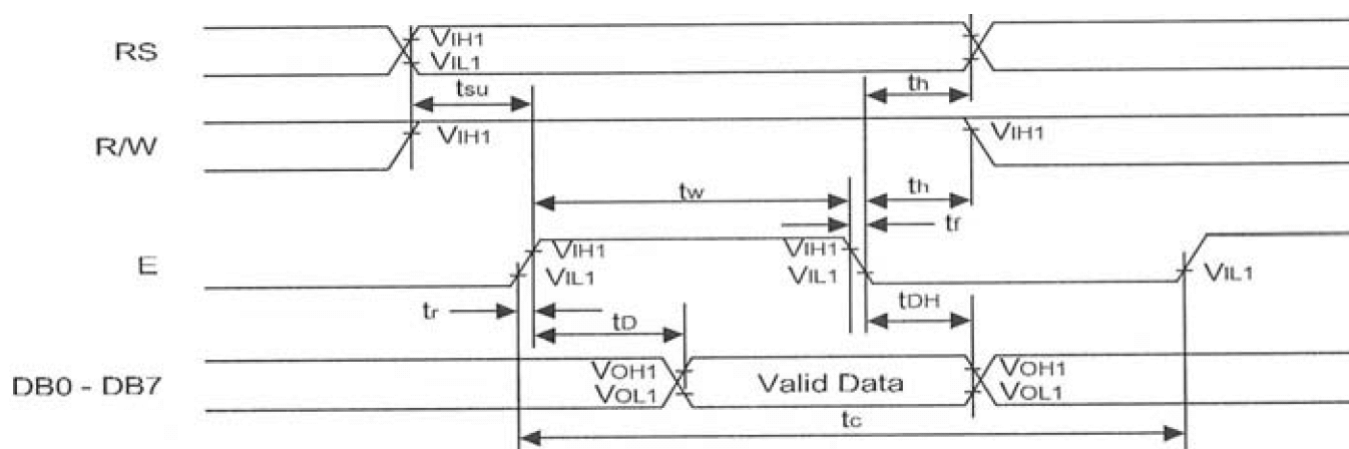
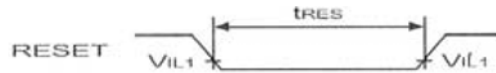


Figure 8 Read mode

Mode	Item	Symbol	Min	Typ	Max	Unit
(4) Write mode (refer to Figure 7)	E cycle time	t_c	TBD	-	-	ns
	E rise/fall time	t_r, t_f	-	-	TBD	
	E pulse width (high, low)	t_w	TBD	-	-	
	R/W and RS setup time	t_{su1}	TBD	-	-	
	R/W and RS hold time	t_{h1}	TBD	-	-	
	Data setup time	t_{su2}	TBD	-	-	
	Data hold time	t_{h2}	TBD	-	-	
(5) Read mode (refer to Figure 8)	E cycle time	t_c	TBD	-	-	ns
	E rise/fall time	t_r, t_f	-	-	TBD	
	E pulse width (high, low)	t_w	TBD	-	-	
	R/W and RS setup time	t_{su}	TBD	-	-	
	R/W and RS hold time	t_h	TBD	-	-	
	Data output delay time	t_D	-	-	TBD	
	Data hold time	t_{DH}	TBD	-	-	μs
(6) Serial interface Mode	Serial clock cycle time	t_c	TBD	-	TBD	ns
	Serial clock rise/fall time	t_r, t_f	-	-	TBD	
	Serial clock width (high, low)	t_w	TBD	-	-	
	Chip select setup time	t_{su1}	TBD	-	-	
	Chip select hold time	t_{h1}	TBD	-	-	
	Serial input data setup time	t_{su2}	TBD	-	-	
	Serial input data hold time	t_{h2}	TBD	-	-	
	Serial output data delay time	t_D	-	-	TBD	
	Serial output data hold time	t_{DH}	TBD	-	-	

RESET TIMING



Item	Symbol	Min	Typ	Max	Unit
Reset low level width (refer to Figure 9)	tRES	10	-	-	ms

THE RESET CIRCUIT

When the power is turned on, RW1068 is initialized automatically by power on reset circuit. During the initialization, the following instructions are executed, and BF (Busy Flag) is kept "High"(busy state) to the end of initialization.

Display Clear Instruction

Write "20H" to all DDRAM

Set Functions Instruction

IF = 1: 8-bit bus mode

RE = 0: Extension register disable

BE = 0: CGRAM/SEGRAM blink OFF

DC = 0: Code bank selection enable

REV = 0: Normal display (Not reversed display)

Control Display ON/OFF Instruction

D = 0: Display OFF

C = 0: Cursor OFF

B = 0: Blink OFF

Set Entry Mode Instruction

I/D = 1: Increment by 1

S = 0: No entire display shift

BID = 0: Normal direction segment port

Set Extension Function Instruction

B/W = 0: Normal cursor (11th line)

Enable Shift Instruction

DS=00

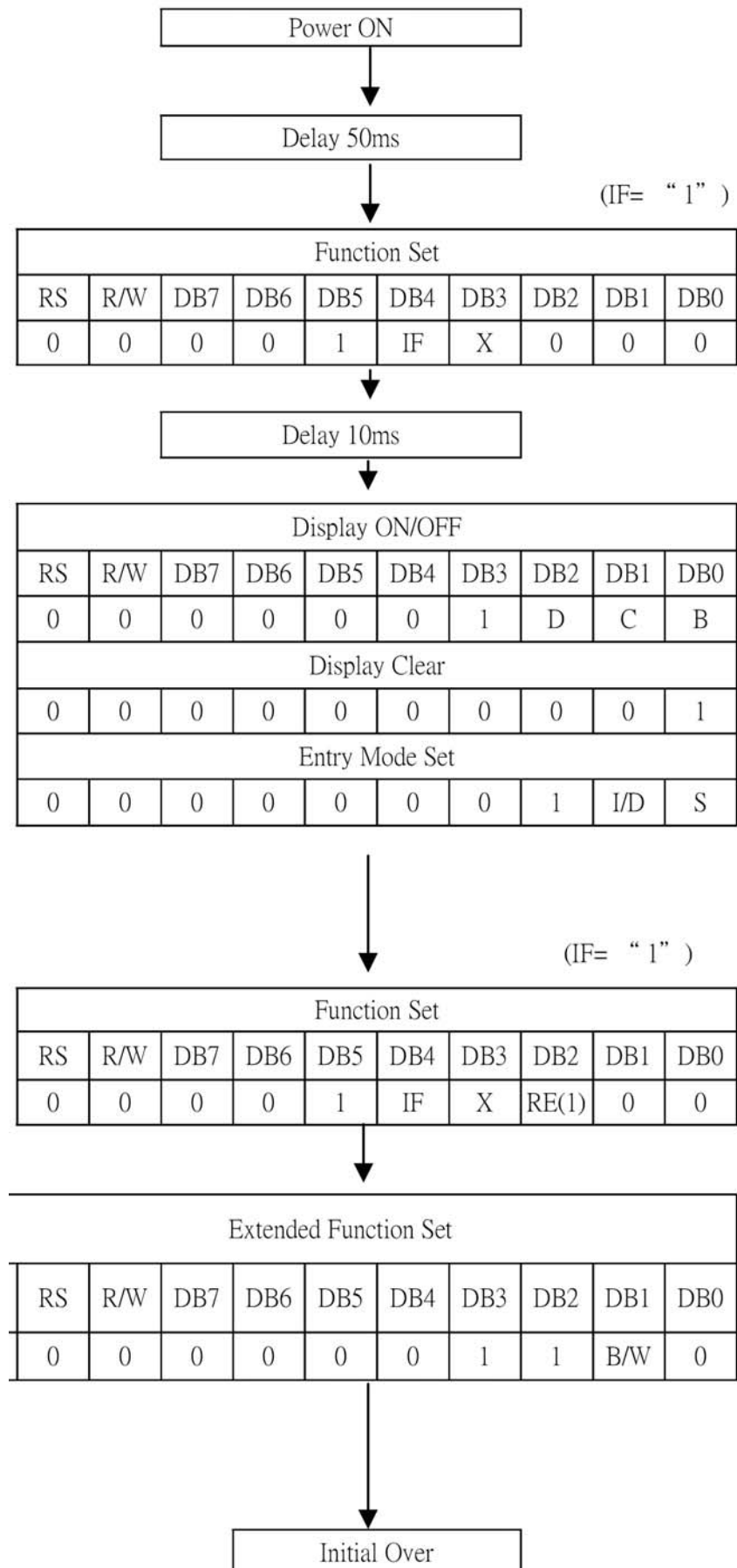
Set data length Instruction

SD = 000000

INITIALIZING BY HARDWARE RESET INPUT

When XRESET pin = "Low", RW1068 can be initialized like the case of power on reset. During the power on reset operation, this pin is ignored.

INITIALIZATION METHOD



CHARACTER CODES AND CHARACTER PATTERN

Code Bank1 (0B-002)

87-84 83-80	0000	0001	0010	0011	0100	0101	0110	0111
0000	正	送	姓	者	下	打	尺	期
0001								
0010	在	第	待	按	情	印	寸	间
0011								
0100	拨	页	重	快	况	较	音	个
0101								
0110	号	传	秒	速	时	浅	铃	人
0111								
1000	已	真	输	钮	应	深	声	化
1001								
1010	连	完	入	出	答	空	编	报
1011								
1100	接	毕	码	现	质	白	辑	告
1101								
1110	发	等	或	以	量	纸	日	高
1111								

Code Bank1 (0B-002)

B7-B4 B3-B0	1000	1001	1010	1011	1100	1101	1110	1111
0000	级	确	控	错	果	添	志	次
0001								
0010	电	认	收	误	调	加	列	每
0011								
0100	话	方	密	修	没	删	表	妻
0101								
0110	线	法	特	不	有	除	选	求
0111								
1000	尝	适	色	响	低	改	择	最
1001								
1010	试	合	前	之	中	悠	频	毫
1011								
1100	隔	面	扫	后	上	的	脉	米
1101								
1110	转	遥	描	如	午	名	冲	处
1111								

Code Bank2 (0B-002)

B7-B4	0000	0001	0010	0011	0100	0101	0110	0111
B3-B0								
0000	裁	被	使	别	准	图	份	小
0001								
0010	数	张	消	功	好	像	复	放
0011								
0100	和	未	稍	能	佳	缓	制	大
0101								
0110	无	指	候	失	模	目	海	实
0111								
1000	记	定	存	败	式	动	镜	双
1001								
1010	住	断	满	路	纯	交	常	倍
1011								
1100	请	开	用	忙	文	换	保	义
1101								
1110	内	取	识	标	字	机	缩	一
1111								

Code Bank2 (0B-002)

B7-B4	1000	1001	1010	1011	1100	1101	1110	1111
B3-B0								
0000	半	彩	节	检	透	立	牙	波
0001								
0010	卡	原	约	测	明	刻	意	俄
0011								
0100	全	始	设	晋	胶	厂	利	档
0101								
0110	从	容	置	通	条	当	荷	到
0111								
1000	计	逐	默	涂	画	英	兰	刺
1001								
1010	算	黑	值	层	水	德	巴	余
1011								
1100	类	墨	语	照	更	西	葡	校
1101								
1110	型	盒	言	片	洗	班	萄	成
1111								

Code Bank3 (0B-002)

B7-B4	0000	0001	0010	0011	0100	0101	0110	0111
B3-B0								
0000								
0001								
0010								
0011								
0100								
0101								
0110								
0111								
1000								
1001								
1010								
1011								
1100								
1101								
1110								
1111								

Code Bank3 (0B-002)

B7-B4	1000	1001	1010	1011	1100	1101	1110	1111
B3-B0								
0000	版	美	装	C	S	i	y	>
0001				D	T	j	z	?
0010	剪	团	然	E	U	k	Ø	!
0011				F	U	l	1	"
0100	贴	并	清	G	W	m	2	#
0101				H	X	n	3	\$
0110	板	全	架	I	Y	o	4	%
0111				J	Z	P	5	&
1000	续	部	固	K	a	q	6	,
1001				L	b	r	7	<
1010	地	源	议	M	c	s	8	>
1011				N	d	t	9	*
1100	分	预	繁	O	e	u	°	+
1101				P	f	U	°	'
1110	钟	热	A	Q	g	W	<	—
1111			B	R	h	X	=	/

Code Bank0(0B-002)

b7~4 b3~0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	
0000	CG RAM [00]	⬆		0	i	P	z	p	o	j	o	o	o	■	↓	ø	
0001	CG RAM [01]	⬆	!	1	A	Q	a	a	1	J	o	o	A	■	←	è	
0010	CG RAM [02]	⬆	"	2	B	R	b	r	2	⬆	*	*	o	■	A	R	
0011	CG RAM [03]	⬆	#	3	C	S	c	s	3	⬆	*	*	t	o	■	i	è
0100	CG RAM [04]	⬆	x	4	D	T	d	t	4	⬆	e	λ	L	■	l	o	è
0101	CG RAM [05]	⬆	%	5	E	U	e	u	5	T	e	o	e	■	f	o	è
0110	CG RAM [06]	⬆	&	6	F	V	f	v	6	"	o	o	e	■	Y	è	
0111	CG RAM [07]	⬆	'	7	G	W	g	w	7	■	i	Y	e	■	Δ	P	
1000	CG RAM [00]	⬆	(	8	H	X	h	x	8	"	o	Z	g	■	i	è	
1001	CG RAM [01]	⬆	)	9	I	Y	i	y	9	"	g	o	g	■	o	è	
1010	CG RAM [02]	⬆	*	:	J	Z	j	z	:	(	P	z	S	■	o	è	
1011	CG RAM [03]	⬆	+	;	K	A	k	a	:	)	o	■	S	R	g	\	
1100	CG RAM [04]	⬆	,	<	L	ö	l	ö	±	o	o	A	i	■	o	è	
1101	CG RAM [05]	⬆	-	=	M	N	m	n	±	z	e	"	z	■	1	o	è
1110	CG RAM [06]	⬆	.	>	N	O	n	o	±	ø	A	B	~	■	↑	o	è
1111	CG RAM [07]	⬆	/	?	O	ø	o	ø	A	~	z	e	o	■	→	o	è

Code Bank0(0E-005)

b7~4 b3~0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM [00]			0	1	A	P	~	P			-	タ	ミ	α	P
0001	CG RAM [01]		!	1	A	Q	a	q			。	ア	チ	△	ã	q
0010	CG RAM [02]		"	2	B	R	b	r			「	イ	ツ	×	フ	θ
0011	CG RAM [03]		#	3	C	S	c	s			」	ウ	〒	エ	ε	×
0100	CG RAM [04]		\$	4	D	T	d	t			ヽ	エ	ト	ト	μ	Ω
0101	CG RAM [05]		%	5	E	U	e	u			・	オ	ナ	ユ	δ	U
0110	CG RAM [06]		&	6	F	V	f	v			ヲ	カ	ニ	ヨ	ρ	Σ
0111	CG RAM [07]		'	7	G	W	g	w			フ	キ	ヌ	ヲ	9	π
1000	CG RAM [00]		<	8	H	X	h	x			イ	ク	ホ	リ	フ	×
1001	CG RAM [01]		>	9	I	Y	i	y			ロ	ケ	ル	ル	・	Y
1010	CG RAM [02]		*	:	J	Z	j	z			エ	コ	ロ	レ	J	〒
1011	CG RAM [03]		+	;	K	I	k	{			オ	サ	ヒ	ロ	×	フ
1100	CG RAM [04]		°	<	L	¥	l	l			ト	シ	フ	ワ	φ	円
1101	CG RAM [05]		-	=	M	I	m	}			ユ	ズ	ハ	フ	ト	÷
1110	CG RAM [06]		・	>	N	^	n	+			ヨ	セ	ホ	°	ñ	
1111	CG RAM [07]		/	?	O	_	o	+			ッ	リ	マ	"	ö	■

Code Bank1(0E-005)

b7-b4 b3-b0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)	±		0	0	P	*	P	9	é	á		í	À	Þ	τ
0001	(2)	≡	!	1	A	Q	a	q	ü	æ	í	ˆ	J	†	Y	ü
0010	(3)	7	"	2	B	R	b	r	é	E	ó	°	ø	§	ö	λ
0011	(4)	¿	#	3	C	S	c	s	ä	ô	ú	˘	Ɔ	¶	E	ψ
0100	(5)	/	*	4	D	T	d	t	ä	ö	ç	˘	4	Π	Σ	Ω
0101	(6)	√	%	5	E	U	e	u	ä	ö	E	½	↑	Δ	η	¶
0110	(7)	¡	&	6	F	V	f	v	ä	ö	¶	¼	↓	Θ	Θ	κ
0111	(8)	¡	'	7	G	W	g	w	9	ü	R	×	→	À	L	≡
1000	(1)	/	<	8	H	X	h	x	è	9	f	÷	←	E	K	¶
1001	(2)	¡	>	9	I	Y	i	y	è	ö	i	≤	Γ	Π	λ	÷
1010	(3)	%	*	:	J	Z	j	z	è	ü	ä	≥	Π	Σ	μ	F
1011	(4)	J	+	:	K	ç	k	ç	i	ä	ä	×	L	†	ü	κ
1100	(5)	=	*	<	L	N	l	l	i	ä	ö	×	⌈	Φ	Σ	□
1101	(6)	≈	-	=	M	I	m	?	i	ä	ö	≠	•	ψ	π	-
1110	(7)	2	*	>	N	^	n	˘	ä	ö	ü	∅	∅	Ω	ρ	Θ
1111	(8)	3	/	?	O	∅	o	Δ	Ä	ö	ø	˘	∅	α	σ	Ω

Code Bank2(0E-005)

b7-b4 b3-b0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)		Э	Э	А	А	С	И		Ф	Б	Ю	Ч	,	Д	К
0001	(2)		О	Э	И	А	С	И		М	Г	Я	Ш	,	О	К
0010	(3)		Э	Р	О	Х	С	Е		Р	Е	Б	Ь	И	Ш	К
0011	(4)		А	О	О	Х	А	А		Б	Ж	В	Ы	И	А	Л
0100	(5)		А	О	А	О	А	А		А	З	Г	Ь	Х	Ф	Б
0101	(6)		А	О	А	А	О	И		С	К	Е	Э	Х	Ч	А
0110	(7)		А	О	А	А	О	И		С	А	Ж	Ю	Х	Ш	А
0111	(8)		К	О	О	М	Р	И		Л	Л	З	Я	И	А	Е
1000	(1)		Е	Г	С	И	О	М		Р	П	М	С	И	А	Е
1001	(2)		Е	А	Х	М	В	Х		У	А	С	Т	А	Х	Е
1010	(3)		Е	О	А	Е	А	С		О	К	А	С	Е	А	Е
1011	(4)		И	И	К	И	С	Б		Ч	А	А	М	С	А	Е
1100	(5)		И	И	К	И	С	Б		Ш	М	М	М	И	И	С
1101	(6)		И	И	И	И	Е	С		Б	Н	С	М	А	С	Е
1110	(7)		А	Е	Т	И	Е	И		М	П	А	А	С	А	Е
1111	(8)		Б	А	С	И	Е	И		З	Т	Е	А	О	А	Е

Code Bank3(0E-005)

b7~4 b3~0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000 CG RAM [00]				ا	ب	ت	ث	ج	د	هـ	و	ز				
0001 CG RAM [01]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط				
0010 CG RAM [02]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي			
0011 CG RAM [03]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك		
0100 CG RAM [04]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	
0101 CG RAM [05]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
0110 CG RAM [06]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
0111 CG RAM [07]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1000 CG RAM [00]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1001 CG RAM [01]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1010 CG RAM [02]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1011 CG RAM [03]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1100 CG RAM [04]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1101 CG RAM [05]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1110 CG RAM [06]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م
1111 CG RAM [07]		ا	ب	ت	ث	ج	د	هـ	و	ز	ح	ط	ي	ك	ل	م

Arabic Alphabet Code

Name of the letter	Last	Middle	First	Independent
alif	ا	ا	ا	ا
	24H	23H	22H	21H
bā'	ب	ب	ب	ب
	28H	27H	26H	25H
tā'	ت	ت	ت	ت
	2CH	2BH	2AH	29H
ṭā'	ث	ث	ث	ث
	30H	2FH	2EH	2DH
jīm	ج	ج	ج	ج
	35H 36H	34H	33H	31H 32H
hā'	ح	ح	ح	ح
	3BH 3CH	3AH	39H	37H 38H
khā'	خ	خ	خ	خ
	41H 42H	40H	3FH	3DH 3EH
dāl	د	د	د	د
	46H	45H	44H	43H
dhāl	ذ	ذ	ذ	ذ
	4AH	49H	48H	47H

Arabic Alphabet Code

Name of the letter	Last	Middle	First	Independent
rā'	ر	ر	ر	ر
	4EH	4DH	4CH	4BH
zā'	ز	ز	ز	ز
	52H	51H	50H	4FH
sīn	س	س	س	س
	59H 5AH	57H 58H	55H 56H	53H 54H
shīm	ش	ش	ش	ش
	61H 62H	5FH 60H	5DH 5EH	5BH 5CH
Ṣād	ص	ص	ص	ص
	69H 6AH	67H 68H	65H 66H	63H 64H
Ḍād	ض	ض	ض	ض
	71H 72H	6FH 70H	6DH 6EH	6BH 6CH
Ṭā'	ط	ط	ط	ط
	76H	75H	74H	73H
Ẓā'	ظ	ظ	ظ	ظ
	7AH	79H	78H	77H
‘ain	ع	ع	ع	ع
	7EH	7DH	7CH	7BH

Arabic Alphabet Code

Name of the letter	Last	Middle	First	Independent
ghain	غ	غ	غ	غ
	82H	81H	80H	7FH
fā'	ف	ف	ف	ف
	86H	85H	84H	83H
qāf	ق	ق	ق	ق
	8AH	89H	88H	87H
kāf	ك	ك	ك	ك
	8FH 90H	8EH	8DH	8BH 8CH
lām	ل	ل	ل	ل
	94H	93H	92H	91H
mīm	م	م	م	م
	98H	97H	96H	95H
nūn	ن	ن	ن	ن
	9CH	9BH	9AH	99H
Ḥā'	ه	ه	ه	ه
	A0H	9FH	9EH	9DH
wāw	و	و	و	و
	A4H	A3H	A2H	A1H

ELECTRO-OPTICAL CHARACTERISTICS

MEASURING CONDITION: POWER SUPPLY = V_{OP} / 64 Hz
TEMPERATURE = 23 ± 5 °C
RELATIVE HUMIDITY = 60 ± 20 %

ITEM	SYMBOL	UNIT	TYP. TN	TYP. STN
RESPONSE TIME	Ton	ms	130	150
	Toff	ms	170	190
CONTRAST RATIO	Cr	-	8	15
VIEWING ANGLE (Cr ≥ 2)	V3:00	°	70	45
	V6:00	°	45	70
	V9:00	°	70	45
	V12:00	°	5	60

THE ELECTRO-OPTICAL CHARACTERISTICS ARE MEASURED VALUE BUT NOT GUARANTEED ONES.

RELIABILITY OF LCD MODULE

ITEM	TEST CONDITION FOR NORMAL TEMPERATURE	TEST CONDITION FOR WIDE TEMPERATURE	TIME
High temperature operating	50°C	70°C	240 hours
Low temperature operating	0°C	-20°C	240 hours
High temperature storage	60°C	80°C	240 hours
Low temperature storage	-10°C	-30°C	240 hours
Temperature-humidity storage	40°C 90% R.H.	60°C 90% R.H.	96 hours
Temperature cycling	-10°C to 60°C 30 Min Dwell	-30°C to 80°C 30 Min Dwell	5 cycle
Vibration Test at LCM Level	Freq 10-55 Hz Sweep rate: 10-55-10 at 1 min Sweep mode Linear Displacement: 2 mm p-p 1 Hour each for X, Y, Z	Freq 10-55 Hz Sweep rate: 10-55-10 at 1 min Sweep mode Linear Displacement: 2 mm p-p 1 Hour each for X, Y, Z	—

QUALITY STANDARD OF LCD MODULE

1.0	Sampling Method		
	Sampling Plan : MIL STD 105 E		
	Class of AQL : Level II/Single Sampling		
	Critical : 0.25% Major 0.65% Minor 1.5%		
2.0	Defect Group	Failure Category	Failure Reasons
	Critical Defect 0.25%(AQL)	Malfunction	Open Short Burnt or dead component Missing part/improper part P.C.B. Broken
	Major Defect 0.65%(AQL)	Poor Insulation	Potential short High current Component damage or scratched or Lying too close improper coating
		Poor Conduction	Damage joint Wrong polarity Wrong spec. part Uneven/intermittent contact Loose part Copper peeling Rust or corrosion or dirt's
	Minor Defect 1.5%(AQL)	Cosmetic Defect	Minor scratch Flux residue Thin solder Poor plating Poor marking Crack solder Poor bending Poor packing Wrong size

HANDLING PRECAUTIONS

(1) CAUTION OF LCD HANDLING & CLEANING

The polarizing plate on the surface of the panel is made from organic substances. Be very careful for chemicals not to touch the plate or it leads the polarizing plate to deteriorate.

If the use of a chemical is unavoidable, wipe the panel lightly with soft materials, such as gauze and absorbent cotton, soaked in a solvent.

*Usable solvent: Alcohol (ethanol, IPA and the like)

*Appropriate solvent: Ketones, ethyl alcohol

Avoid wiping with a dry cloth, since it could damage the surface of the polarizing plate and others.

(2) CAUTION AGAINST STATIC CHARGE

The LCD modules use CMOS LSI drivers, so customers are recommended that any unused input terminal would be connected to V_{DD} or V_{SS} , do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

(3) PACKAGING

Avoid intense shock and falls from a height and do not operate or store them exposed to direct sunshine or high temperature/humidity for long periods.

(4) CAUTION FOR OPERATION

The viewing angle can be adjusted by varying the LCD driving voltage V_O .

Driving voltage should be kept within specified range, excess voltage shortens display life.

Response time increases with decrease in temperature.

Display may turn black or dark Blue at temperature above its operational range; this is however not destructive and the display will return to normal once the temperature falls back to range.

Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured". They will recover once the display is turned off.

Condensation at terminals will cause malfunction and possible electrochemical reaction. Relative humidity of the environment should therefore be kept below 60%.

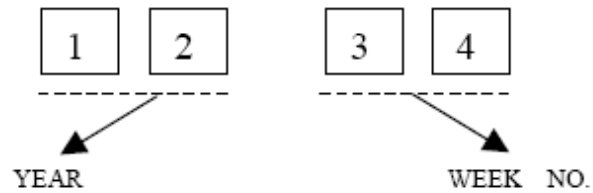
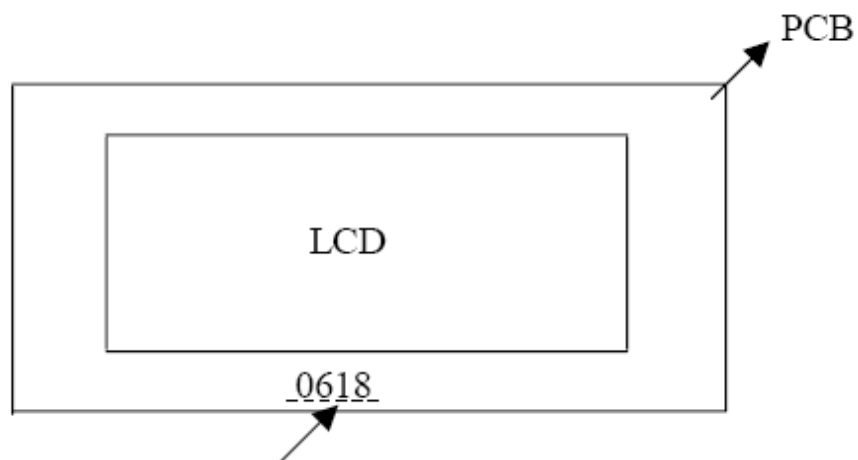
(5) SAFETY

Liquid crystal may leak out of a damaged LCD, it is recommended to wash off the liquid crystal by using solvents such as acetone or ethanol and should be burned up later.

If any liquid leaks out of a damaged glass cell comes in contact with your hands, wash it off with soap and water immediately.

WARRANTY

CLOVER CHINA will replace or repair any of her LCD module in accordance with her LCD specification for a period of one year from date of shipment. The warranty liability of CLOVER CHINA is limited to repair and/or replacement. CLOVER CHINA will not be responsible for any subsequent or consequential event.

APPENDIX**LOT INDICATION OF LCD MODULE****CODING SYSTEM:****4-DIGIT CODE:****LOCATION AS SHOWN BELOW:**

e.g. WEEK 18 OF YEAR 2006