



CLOVER DISPLAY LTD.

LCD MODULE SPECIFICATION

Model: CG9162E - _ _ - _ _ - _ _ - _ _

Revision	02
Engineering	Timothy Chan
Date	09 April 2019
Our Reference	9064

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MODE OF DISPLAY**Display mode**

- TN positive
 TN negative
 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:

CG9162E- 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 : 16 characters x 2 lines, COG LCD module

Interface : 4-bit parallel

Driving method : 1/16 duty, 1/5 bias

Controller IC : Sitronix ST7032 or equivalent

For the detailed information, please refer to the IC specifications.

MECHANICAL DIMENSIONS

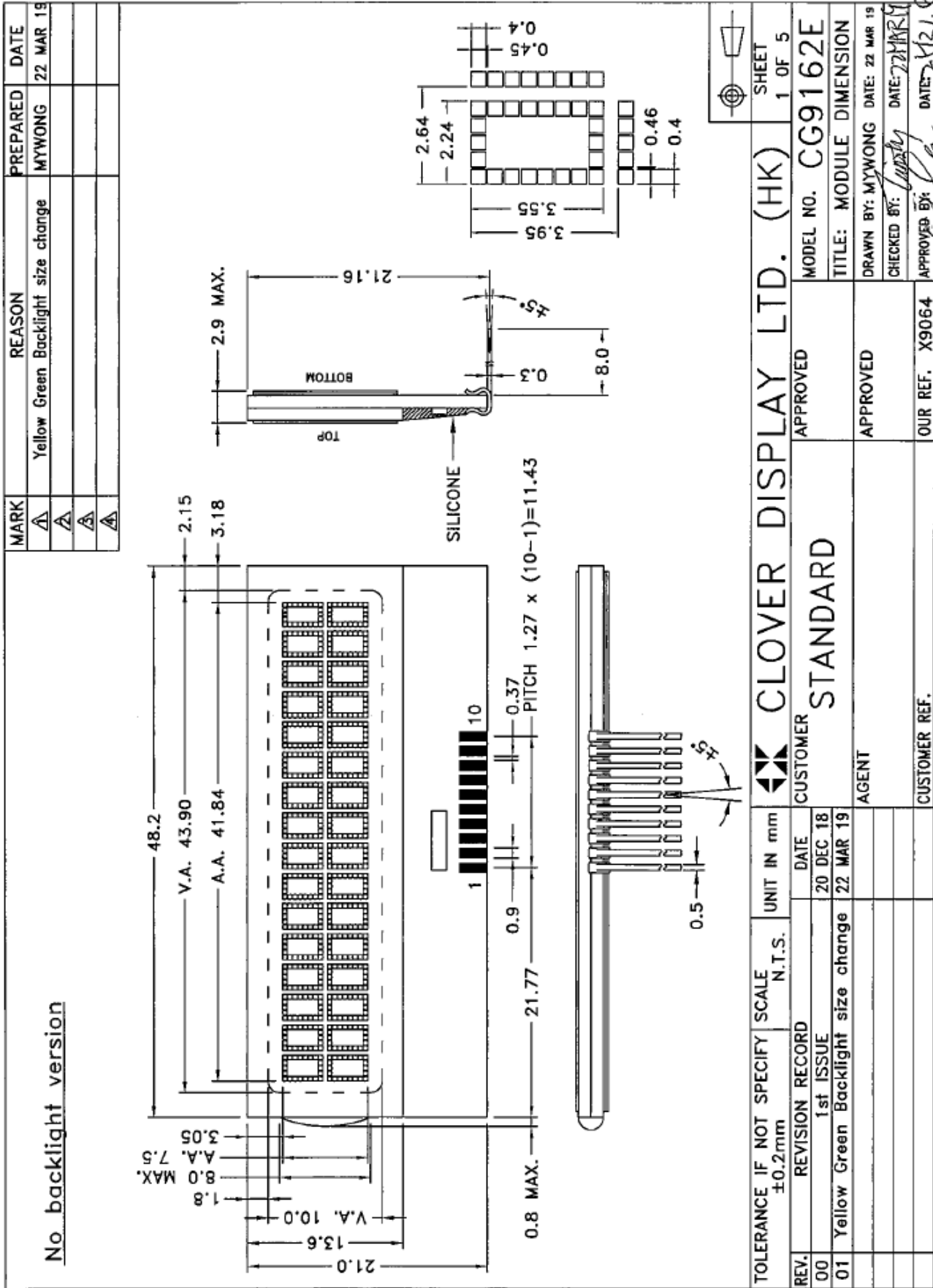
Item	Dimension	Unit	Item	Dimension	Unit
Outline Dimension	-	-	Character Size	2.24(L)x3.55(W)	mm
No Backlight (N)	48.2(L)x21.0(W)x2.9(H)	mm	Character Pitch	2.64(L)x3.95(W)	mm
Yellow green Backlight (L)	48.2(L)x21.0(W)x6.8(H)	mm	Dot Size	0.4(L)x0.4(W)	mm
White/Blue Backlight (L)	54.0(L)x21.0(W)x6.8(H)	mm	Viewing Area	43.9(L)x10.0(W)	mm

CONNECTOR PIN ASSIGNMENT

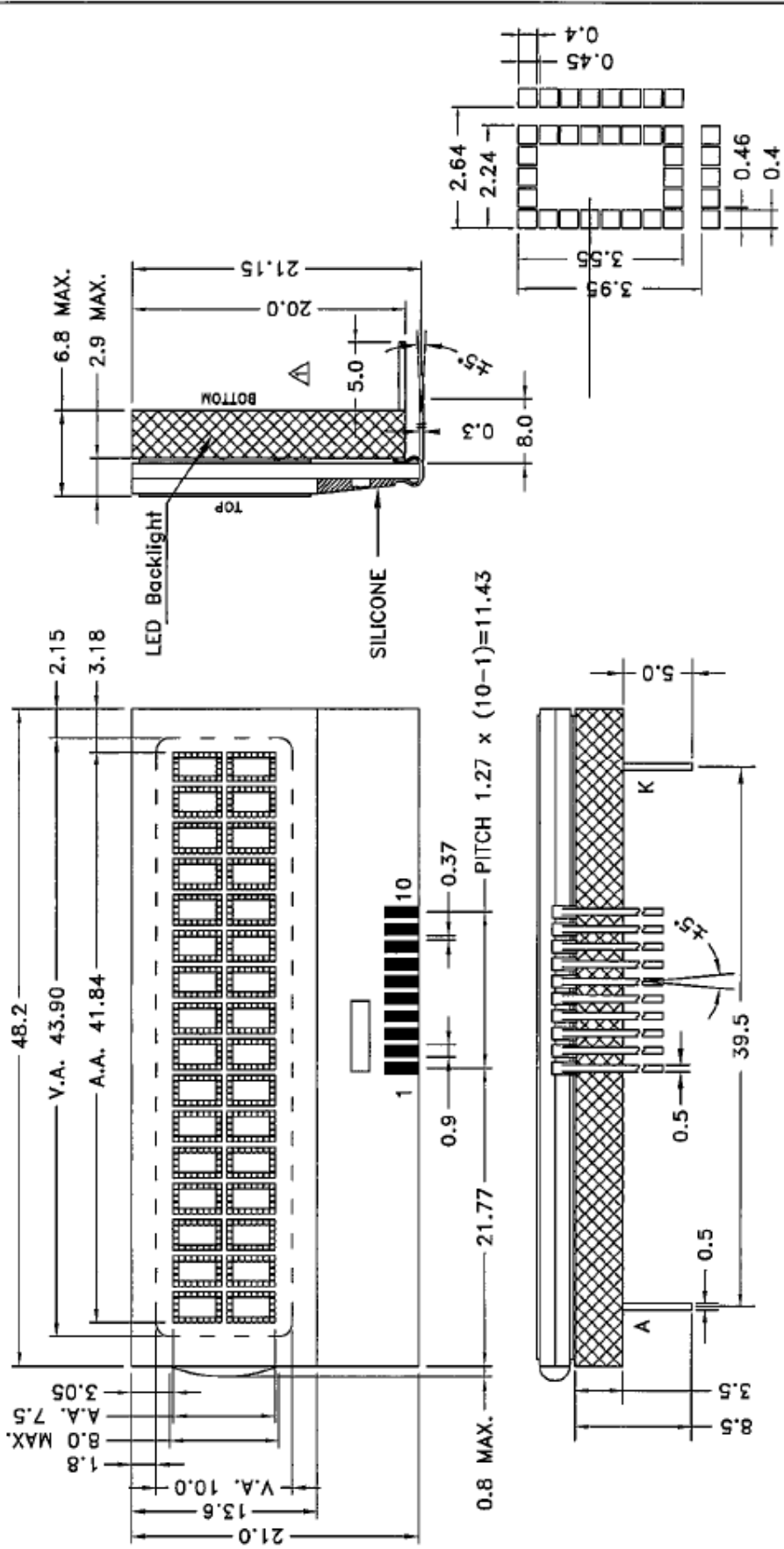
Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	VO	Input Voltage for LCD	7	DB4	Data bus line
2	VDD	Supply Voltage for Logic	8	E	Chip Enable
3	GND	Ground	9	RW	Read / Write Select
4	DB7	Data bus line	10	RS	Register Select
5	DB6		*11	A	Supply Voltage for backlight (+VE)
6	DB5		*12	K	Supply Voltage for backlight (-VE)

(*) Note: Pin 11, 12 are for side-lited LED backlight revision only.

COUNTER DRAWING OF MODULE DIMENSION

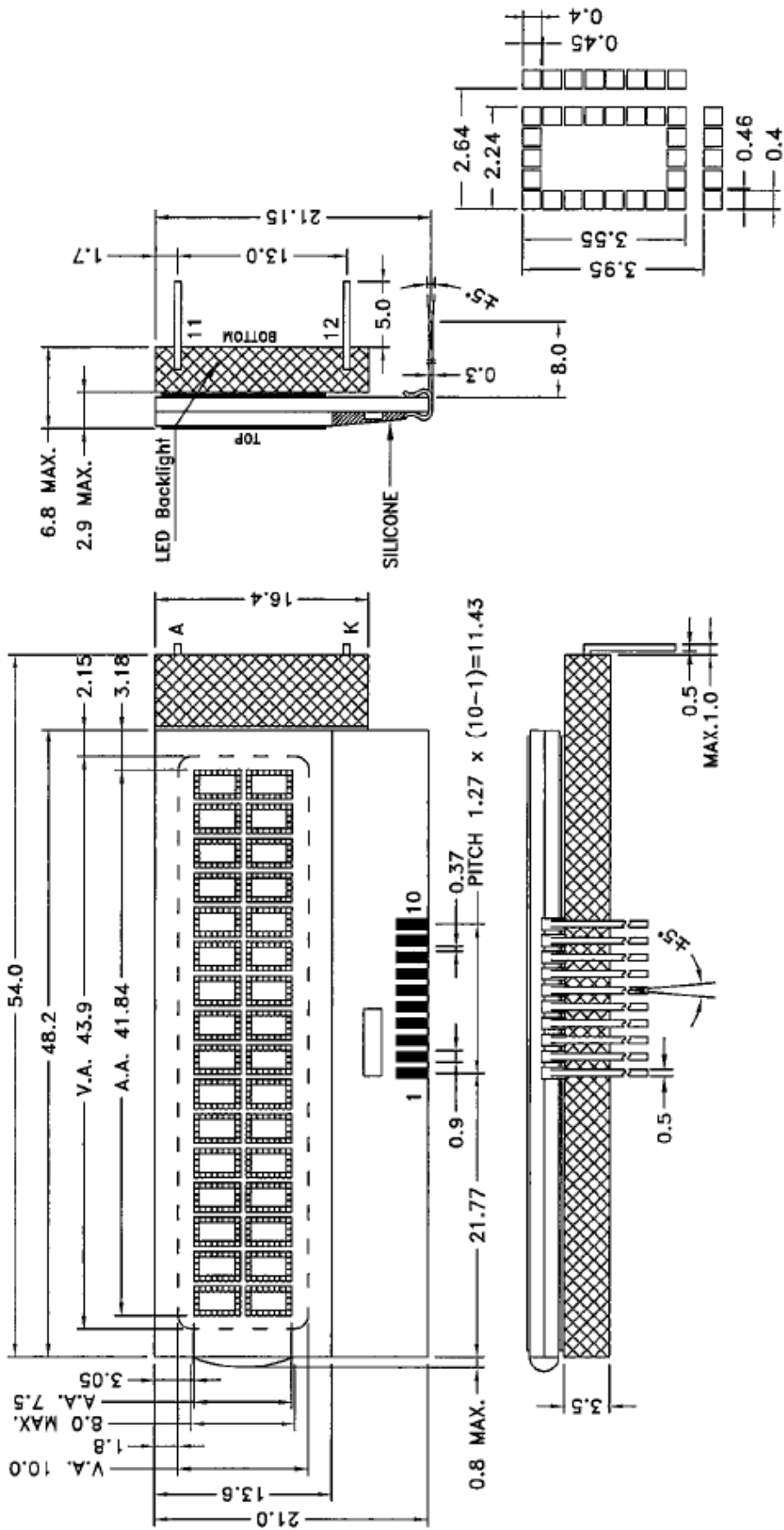


Yellow green color side lited backlight



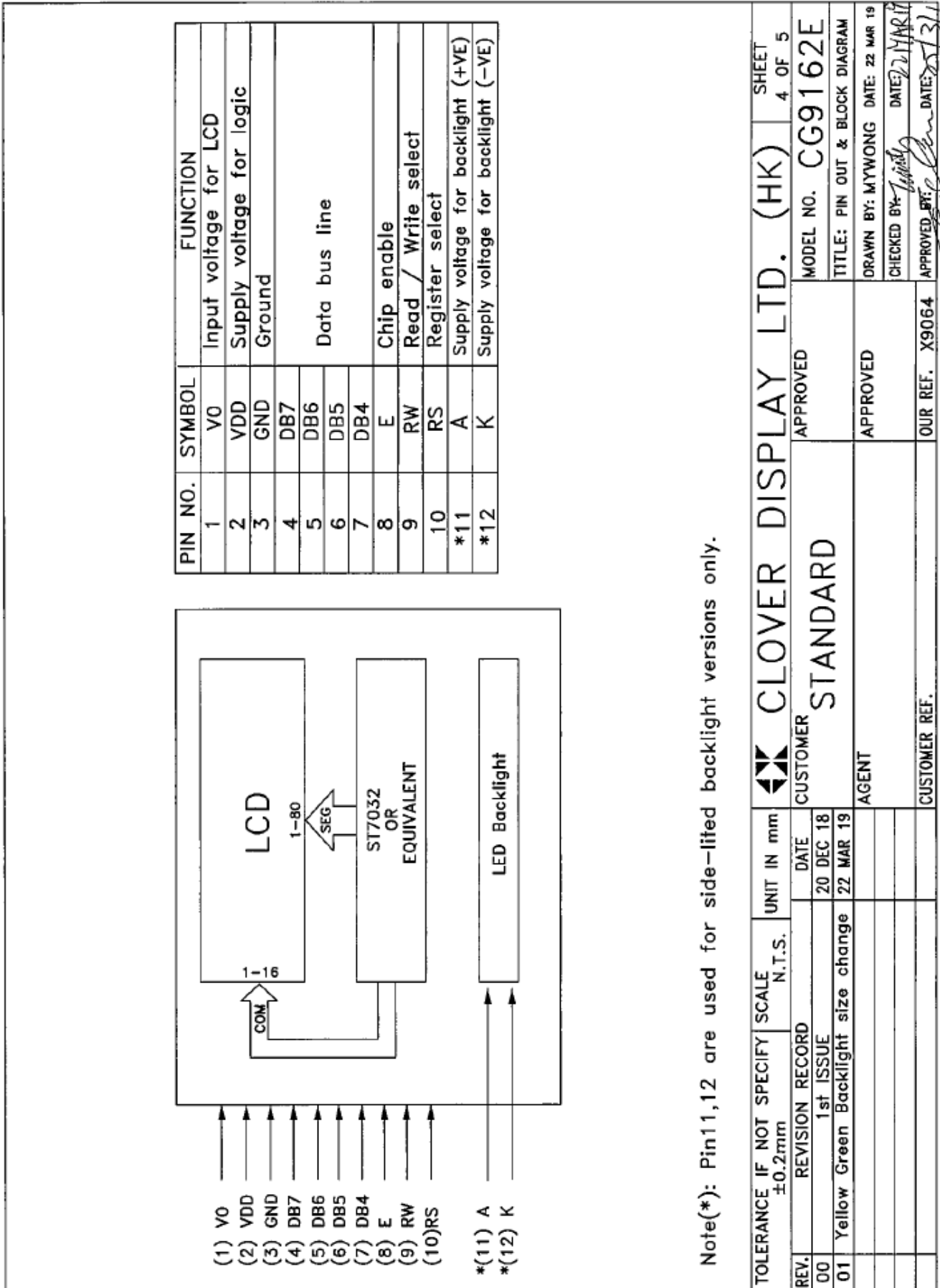
TOLERANCE IF NOT SPECIFY		SCALE	UNIT IN mm	CLOVER DISPLAY LTD. (HK)		SHEET
±0.2mm		N.T.S.				2 OF 5
REV.	REVISION RECORD	DATE	CUSTOMER	APPROVED	MODEL NO.	CG9162E
00	1st ISSUE	20 DEC 18	STANDARD	APPROVED	TITLE:	MODULE DIMENSION
01	Yellow Green Backlight size change	22 MAR 19	AGENT		DRAWN BY: MYWONG	DATE: 22 MAR 19
					CHECKED BY: <i>Wong</i>	DATE: <i>20/4/19</i>
					APPROVED BY: <i>[Signature]</i>	DATE: <i>25/3/18</i>
			CUSTOMER REF.	OUR REF.	X9064	

White / Blue color side lited backlight



CLOVER DISPLAY LTD. (HK)		SHEET 3 OF 5	
MODEL NO. CG9162E		TITLE: MODULE DIMENSION	
DRAWN BY: MYWONG		DATE: 22 MAR 19	
CHECKED BY: <i>Lushy</i>		DATE: 27 MAR 19	
APPROVED BY: <i>Lee</i>		DATE: 13/1/19	
OUR REF. X9064	CUSTOMER REF.	APPROVED	AGENT
STANDARD		CUSTOMER	AGENT
TOLERANCE IF NOT SPECIFY ±0.2mm	SCALE N.T.S.	UNIT IN mm	DATE
			20 DEC 18
			22 MAR 19

COUNTER DRAWING OF PIN OUT & BLOCK DIAGRAM



PIN NO.	SYMBOL	FUNCTION
1	V0	Input voltage for LCD
2	VDD	Supply voltage for logic
3	GND	Ground
4	DB7	Data bus line
5	DB6	
6	DB5	
7	DB4	
8	E	Chip enable
9	RW	Read / Write select
10	RS	Register select
*11	A	Supply voltage for backlight (+VE)
*12	K	Supply voltage for backlight (-VE)

Note(*): Pin11,12 are used for side-lit backlight versions only.

TOLERANCE IF NOT SPECIFY ±0.2mm		SCALE N.T.S.	UNIT IN mm		CLOVER DISPLAY LTD. (HK)		SHEET 4 OF 5	
REV.	REVISION RECORD		DATE		CUSTOMER	APPROVED	MODEL NO.	CG9162E
00	1st ISSUE		20 DEC 18		STANDARD		TITLE:	PIN OUT & BLOCK DIAGRAM
01	Yellow Green Backlight size change		22 MAR 19		AGENT	APPROVED	DRAWN BY:	MYWONG
					CUSTOMER REF.		CHECKED BY:	DATE: 22 MAR 19
							APPROVED BY:	DATE: 22 MAR 19
								DATE: 22 MAR 19
							OUR REF.	X9064

ELECTRICAL CHARACTERISTICS

Conditions: VSS=0V, @Ta=25°C

Item	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	VDD	4.75	5.00	5.25	V
Supply Current	IDD	—	0.43	0.53	mA
Input Voltage for LCD (*)	VO	4.3	4.5	4.7	V
“H”Level Input Voltage	V _{IH}	0.7VDD	—	VDD	V
“L”Level Input Voltage	V _{IL}	-0.3	—	0.5	V

Note (*): There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.

Side Backlight

Constant voltage driving:

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Blue Backlight current	IBL	16	18	20	mA	VBL =3.5V
White Backlight current	IBL	12	14	16	mA	VBL =3.5V

Constant current driving:

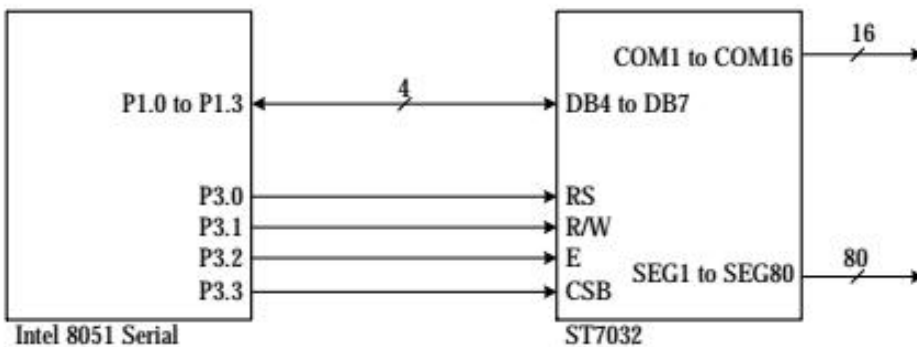
Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Yellow Green Backlight voltage	VBL	—	2.0	2.4	V	IBL = 60 mA

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
Input Voltage	V _T	-0.3 to VDD +0.3	-0.3 to VDD +0.3	V
Operating Temperature	T _{opr}	0 to 50	-20 to 70	°C
Storage Temperature	T _{stg}	-10 to 60	-30 to 80	°C

REFERENCE CIRCUIT EXAMPLE



INSTRUCTIONS

(when "EXT" option pin connect to VSS, the instruction set follow below table)

Instruction	Instruction Code										Description	Instruction Execution Time		
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		OSC=380KHz	OSC=540kHz	OSC=700KHz
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM. and set DDRAM address to "00H" from AC	1.08 ms	0.76 ms	0.59 ms
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.	1.08 ms	0.76 ms	0.59 ms
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	Sets cursor move direction and specifies display shift. These operations are performed during data write and read.	26.3 us	18.5 us	14.3 us
Display ON/OFF	0	0	0	0	0	0	1	D	C	B	D=1:entire display on C=1:cursor on B=1:cursor position on	26.3 us	18.5 us	14.3 us
Function Set	0	0	0	0	1	DL	N	DH	*0	IS	DL: interface data is 8/4 bits N: number of line is 2/1 DH: double height font IS: instruction table select	26.3 us	18.5 us	14.3 us
Set DDRAM address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter	26.3 us	18.5 us	14.3 us
Read Busy flag and address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.	0	0	0
Write data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM/ICONRAM)	26.3 us	18.5 us	14.3 us
Read data from RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM/ICONRAM)	26.3 us	18.5 us	14.3 us

Note *: this bit is for test command , and must always set to "0"

Instruction table 0 (IS=0)

Cursor or Display Shift	0	0	0	0	0	1	S/C	R/L	x	x	S/C and R/L: Set cursor moving and display shift control bit, and the direction, without changing DDRAM data.	26.3 us	18.5 us	14.3 us
Set CGRAM	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter	26.3 us	18.5 us	14.3 us

Instruction table 1 (IS=1)

Internal OSC frequency	0	0	0	0	0	1	BS	F2	F1	F0	BS=1:1/4 bias BS=0:1/5 bias F2~0: adjust internal OSC frequency for FR frequency.	26.3 us	18.5 us	14.3 us
Set ICON address	0	0	0	1	0	0	AC3	AC2	AC1	AC0	Set ICON address in address counter.	26.3 us	18.5 us	14.3 us
Power/ICON control/Contrast set	0	0	0	1	0	1	Ion	Bon	C5	C4	Ion: ICON display on/off Bon: set booster circuit on/off C5,C4: Contrast set for internal follower mode.	26.3 us	18.5 us	14.3 us
Follower control	0	0	0	1	1	0	Fon	Rab2	Rab1	Rab0	Fon: set follower circuit on/off Rab2~0: select follower amplified ratio.	26.3 us	18.5 us	14.3 us
Contrast set	0	0	0	1	1	1	C3	C2	C1	C0	Contrast set for internal follower mode.	26.3 us	18.5 us	14.3 us

RECOMMENDED INITIAL SETTINGS

```
delay_ms(40);           //wait for power on  default 40
TR_CMD(0x29);          //function set
delay_ms(5);           // delay 5 ms
TR_CMD(0x29);          //function set
delay_ms(5);           // delay 5 ms
TR_CMD(0x29);          //function set
delay_ms(5);           // delay 5 ms
TR_CMD(0x10);          //Bias selection/Internal OSC frequency adjust
delay_ms(5);           // delay 5 ms
TR_CMD(0x70);          //Contrast set(low byte)
delay_ms(5);           // delay 5 ms
TR_CMD(0x50);          //Power/ICON control/Contrast set(high byte)
delay_ms(5);           // delay 5 ms
TR_CMD(0x68);          //Follower control           1+Rb/Ra=3
delay_ms(200);         // delay 200 ms
TR_CMD(0x01);          //CLR DISPLAY
delay_ms(5);           // delay 5 ms
TR_CMD(0x0c);          //DISPLAY ON ,00001DCB ,D=1:Display on; 0:off
delay_ms(5);           // delay 5 ms
```

DISPLAY DATA RAM

➤ **2-line display (N = 1) (Figure 10)**

Case 1: When the number of display characters is less than 40 , 2 lines, the two lines are displayed from the head. Note that the first line end address and the second line start address are not consecutive. See Figure 10.

Display Position										
	1	2	3	4	5	6	.....	38	39	40
DDRAM Address (hexadecimal)	00	01	02	03	04	05	.....	25	26	27
	40	41	42	43	44	45	.....	65	66	67

Figure 10. 2-Line Display

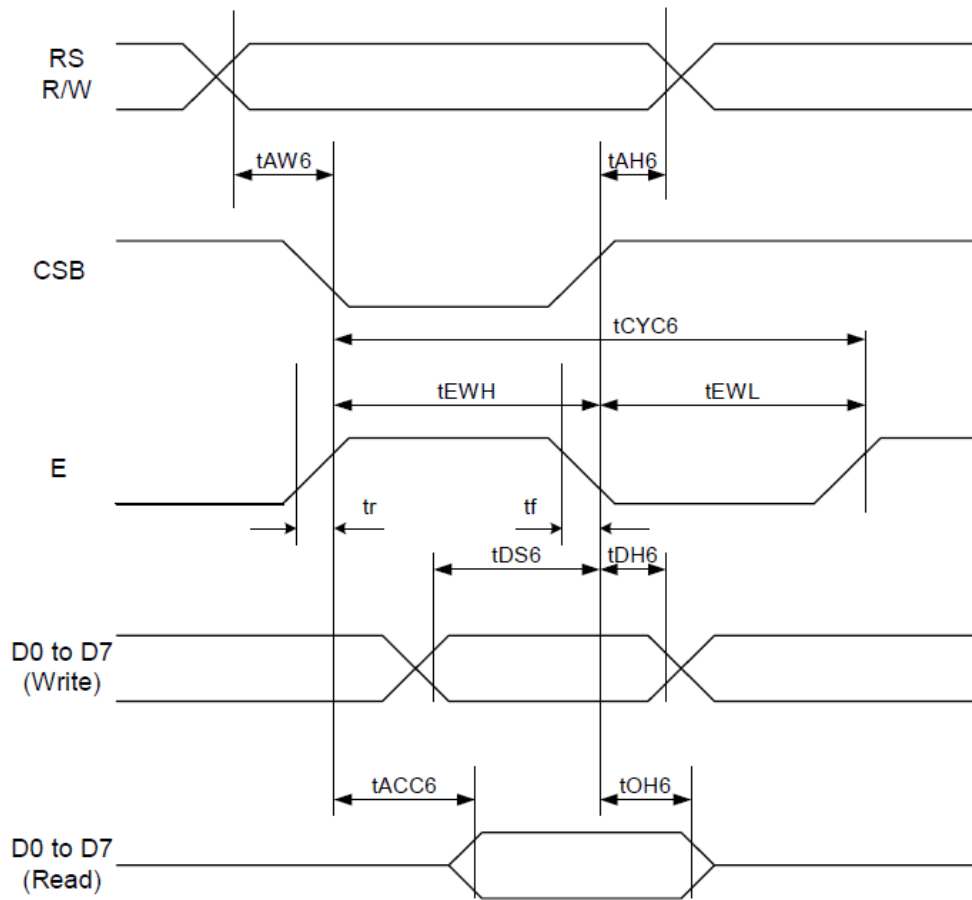
Case 2: For a 16-character , 2-line display See Figure 11.

When display shift operation is performed, the DDRAM address shifts. See Figure 11.

Display Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DDRAM Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
For Shift Left	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10
	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F	50
For Shift Right	27	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E
	67	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E

Figure 11. 2-Line by 16-Character Display Example

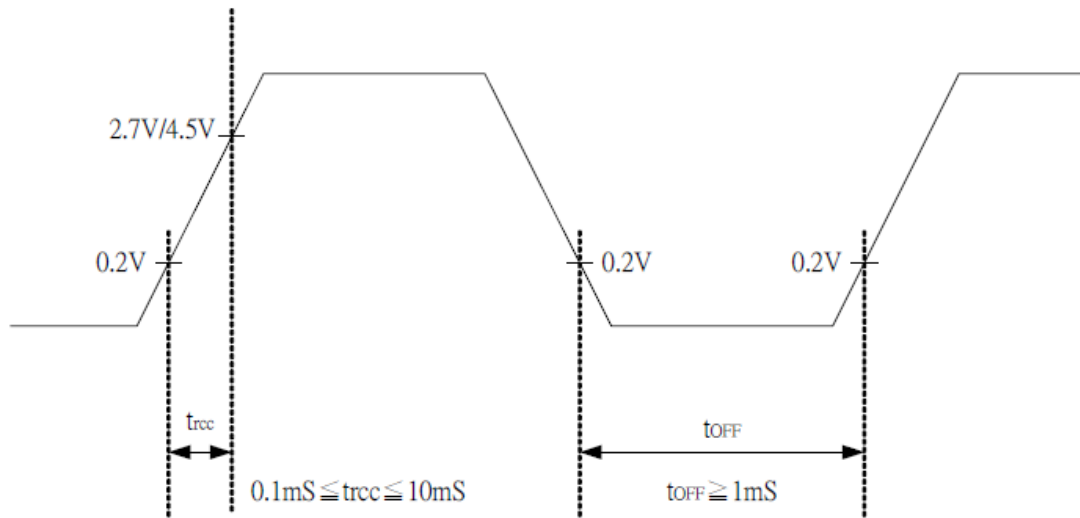
INTERFACE TIMING DIAGRAM & CHARACTERISTICS



(Ta = 25°C)

Item	Signal	Symbol	Condition	VDD=2.7 to 4.5V Rating		VDD=4.5 to 5.5V Rating		Units
				Min.	Max.	Min.	Max.	
Address hold time	RS	tAH6	—	20	-	20	-	ns
Address setup time	RS	tAW6		20	-	20	-	
System cycle time	RS	tCYC6	—	400	-	280	-	ns
Data setup time	D0 to D7	tDS6	—	100	-	80	-	ns
Data hold time	D0 to D7	tDH6		40	-	20	-	
Access time	D0 to D7	tACC6	CL = 100 pF	-	500	-	400	ns
Output disable time	D0 to D7	tOH6		300	-	150	-	
Enable Rise/Fall time	E	tr,tf	—	-	20	-	20	ns
Enable H pulse time	E	tEWH	—	200	-	120	-	ns
Enable L pulse time	E	tEWL	—	150	-	130	-	ns

Note: All timing is specified using 20% and 80% of VDD as the reference.

RESET TIMING**● Internal Power Supply Reset****Notes:**

- t_{OFF} compensates for the power oscillation period caused by momentary power supply oscillations.
- Specified at 4.5V for 5V operation, and at 2.7V for 3V operation.
- If 2.7V/4.5V is not reached during 3V/5V operation, internal reset circuit will not operate normally.

THE RESET CIRCUIT

Initializing by Internal Reset Circuit

An internal reset circuit automatically initializes the ST7032 when the power is turned on. The following instructions are executed during the initialization. The busy flag (BF) is kept in the busy state (BF = 1) until the initialization ends. The busy state lasts for 40 ms after VDD rises to stable.

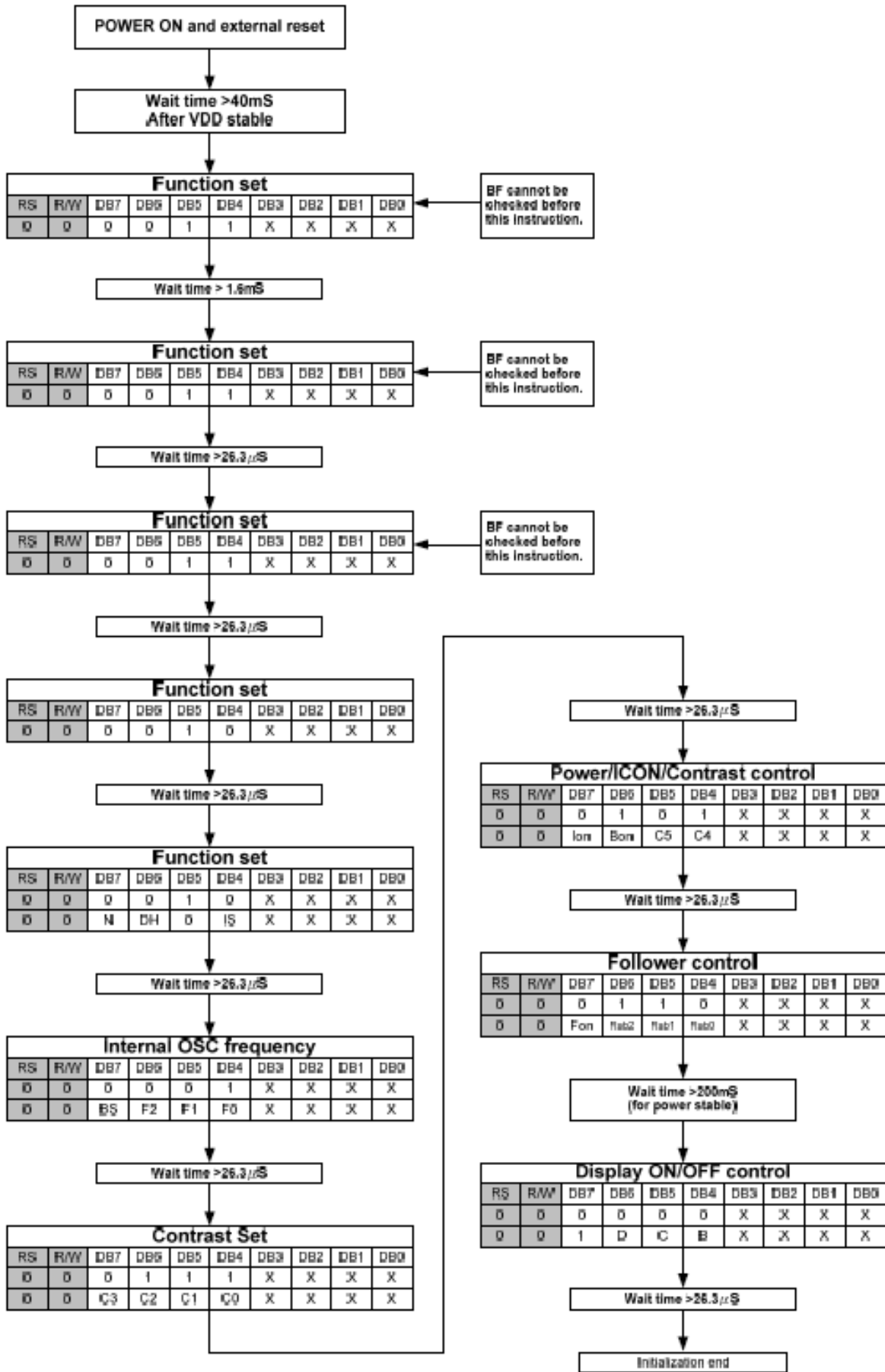
1. Display clear
2. Function set:
 - DL = 1; 8-bit interface data
 - N = 0; 1-line display
 - DH=0; normal 5x8 font
 - IS=0; use instruction table 0
3. Display on/off control:
 - D = 0; Display off
 - C = 0; Cursor off
 - B = 0; Blinking off
4. Entry mode set:
 - I/D = 1; Increment by 1
 - S = 0; No shift
5. Internal OSC frequency
 - (F2,F1,F0)=(1,0,0)
6. ICON control
 - Ion=0; ICON off
7. Power control
 - BS=0; 1/5bias
 - Bon=0; booster off
 - Fon=0; follower off
 - (C5,C4,C3,C2,C1,C0)=(1,0,0,0,0,0)
 - (Rab2,Rab1,Rab0)=(0,1,0)

Note:

If the electrical characteristics conditions listed under the table Power Supply Conditions Using Internal Reset Circuit are not met, the internal reset circuit will not operate normally and will fail to initialize the ST7032.

When internal Reset Circuit not operate, ST7032 can be reset by XRESET pin from MPU control signal.

INITIALIZING WITH THE BUILT-IN POWER SUPPLY CIRCUITS



CHARACTER CODES AND CHARACTER PATTERN

ST7032-0D (ITO option OPR2,OPR1=(0,0))

b7-b4 b3-b0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	Replaced By CGRAM Pattern	Q	W	0	P	^	R	E	E		-	3	E	A		
0001		+	!	1	A	Q	a	9	Q	e	.	7	3	A	I	
0010		S	"	2	B	R	b	R	E	E	T	Y	U	X	S	*
0011		M	#	3	C	S	c	S	A	A	.	U	T	E	Q	^
0100		n	\$	4	D	T	d	t	A	A	.	T	T	T	C	^
0101		A	%	5	E	U	e	u	A	A	.	T	T	T	E	B
0110		0	&	6	F	V	f	v	A	A	.	T	T	T	T	U
0111		A	'	7	G	W	g	w	S	U	.	T	T	T	T	X
1000	Replaced By CGRAM Pattern	E	<	B	H	X	H	X	E	G	.	T	T	T	T	T
1001		T	>	9	I	Y	i	y	E	O	.	T	T	T	T	T
1010		Z	*	.	J	Z	z	z	E	O	.	T	T	T	T	T
1011		T	+	.	K	L	k	l	I	R	.	T	T	T	T	T
1100		0	,	<	L	M	l	m	I	R	.	T	T	T	T	T
1101		W	-	=	N	I	n	^	I	E	.	T	T	T	T	T
1110		0	.	>	N	^	n	^	A	E	.	T	T	T	T	T
1111		0	/	?	O	L	o	e	A	C	.	T	T	T	T	T

ELECTRO-OPTICAL CHARACTERISTICS

MEASURING CONDITION: POWER SUPPLY = $V_{OP} / 64 \text{ Hz}$
 TEMPERATURE = $23 \pm 5 \text{ }^\circ\text{C}$
 RELATIVE HUMIDITY = $60 \pm 20 \%$

ITEM	SYMBOL	UNIT	TYP. STN
RESPONSE TIME	T_{on}	ms	150
	T_{off}	ms	190
CONTRAST RATIO	Cr	-	15
	V3:00	°	45
VIEWING ANGLE (6 O'clock)	V6:00	°	70
	V9:00	°	45
	$Cr \geq 2$	V12:00	°	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	—

SAMPLING METHOD

SAMPLING PLAN : ANSI/ASQ Z1.4
 CLASS OF AQL : LEVEL II / SINGLE SAMPLING
 MAJOR – 0.65% MINOR – 1.5%

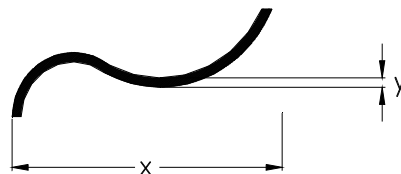
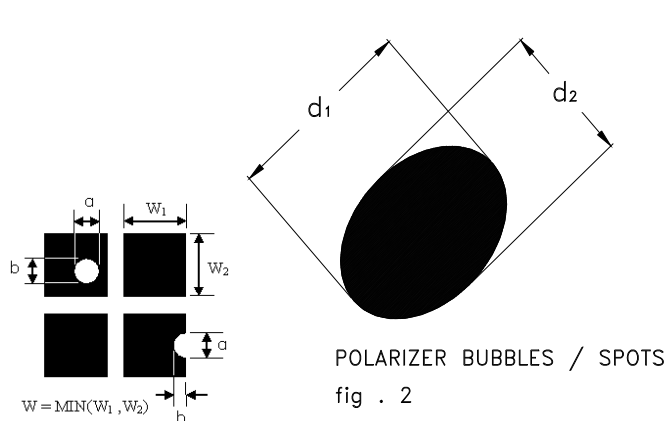
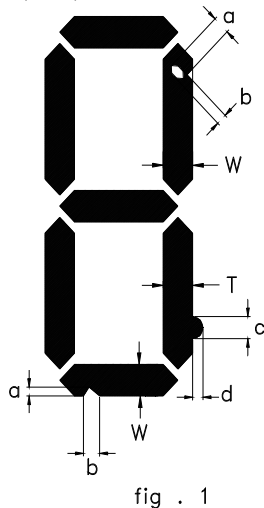
QUALITY STANDARD

DEFECT	CRITERIA	TYPE	FIGURE
SHORT CIRCUIT	-	MAJOR	-
MISSING SEGMENT	-	MAJOR	-
UNEVEN / POOR CONTRAST	-	MAJOR	-
CROSS TALK	-	MAJOR	-
PIN HOLE	$MAX(a,b) \leq 1 / 4 W$ DOT MATRIX: IF $0.6 \leq W$, $MAX(a,b) < 0.3 N.A.**$ IF $0.4 \leq W < 0.6$, $MAX(a,b) < 0.25 N.A.**$ IF $W < 0.4$, $MAX(a,b) < 0.2 N.A.**$	MINOR	1
EXCESS SEGMENT	$MAX(c,d) \leq 1 / 4 T$	MINOR	1
BUBBLES	$d^* \geq 0.2$ QTY=0	MINOR	2
SPOTS	$d \leq 0.3$ N.A.** $0.3 < d \leq 0.4$ QTY ≤ 1 $0.4 < d$ QTY=0	MINOR	2
LINE SCRATCHES	$x \geq 0.7$ $y \geq 0.05$ QTY=0	MINOR	3
BLACK LINE	$x \geq 0.7$ $y \geq 0.05$ QTY=0	MINOR	3

*d = MAX (d₁,d₂)

** N. A . = NOT APPLICABLE

DEFECT TABLE : B



QUALITY STANDARD (CONT.)

DEFECT		CRITERIA	TYPE	FIGURE
CHIPS	CONTACT EDGE	$e \leq 1/2T$ $f \leq 1/3W$ $g \leq 3.5$	MINOR	4
	BOTTOM GLASS	$p \leq 1.0$ $q \leq 3.5$ $r \leq 1/2T$		4
	CORNER	$a \leq 1.5$ $b \leq W$		4
	TOP GLASS	$a \leq 3.0$ $b \leq 1/2T$ $c \leq 1/3W$		5
GLASS PROTRUSION		$a \leq 1/4 W$	MINOR	6
RAINBOW		-	MINOR	-

UNLESS STATE OTHERWISE , ALL UNIT ARE IN MILLIMETER .

DEFECT TABLE : B

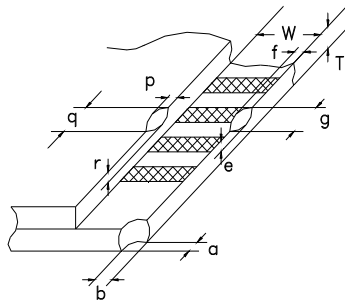


fig . 4

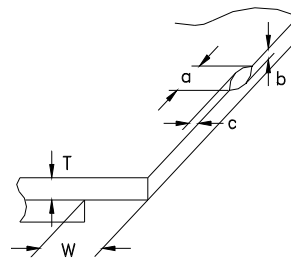


fig . 5

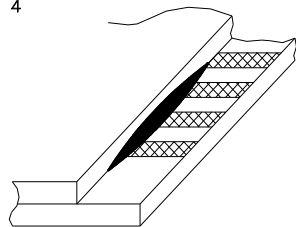


fig . 6

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.

Do not expose to direct sunlight or fluorescent light for a long time

(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) ESD PRECAUTION

Inputs and outputs are protected against electrostatic discharge in normal handling. However, to be totally safe, it is recommended to take normal precautions appropriate to handling LCM module. For example: product surface grounding.

Always take ESD precaution when handling the *LCD Module*. Components are exposed for direct finger touches and can be damaged unless ESD precaution is taken.

(4) 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.

(5) 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%.

(6) 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 leak out of a damaged glass cell comes in contact with your hands, wash it off with soap and water immediately.

WARRANTY

CLOVER 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 is limited to repair and/or replacement. Clover will not be responsible for any subsequent or consequential event.