深圳市拓普微科技开发有限公司
SHENZHEN TOPWAY TECHNOLOGY CO., LTD.

TWM337AAW

LCD Module User Manual

Prepared by:	Checked by:	Approved by:
dong		
Date: 2014-07-14	Date:	Date:

Rev.	Descriptions	Release Date
0.1	Preliminary Release	2008-07-26
0.2	Renew Driving Logics and Pin out	2008-11-15
0.3	Typing Correction on Display Mapping	2009-03-20
0.4	Typing Correction on AC Characteristics	2009-04-08
0.5	Update terminal definition	2014-07-14

Table of Content

1. Basic Specifications

1.1 Display Specifications

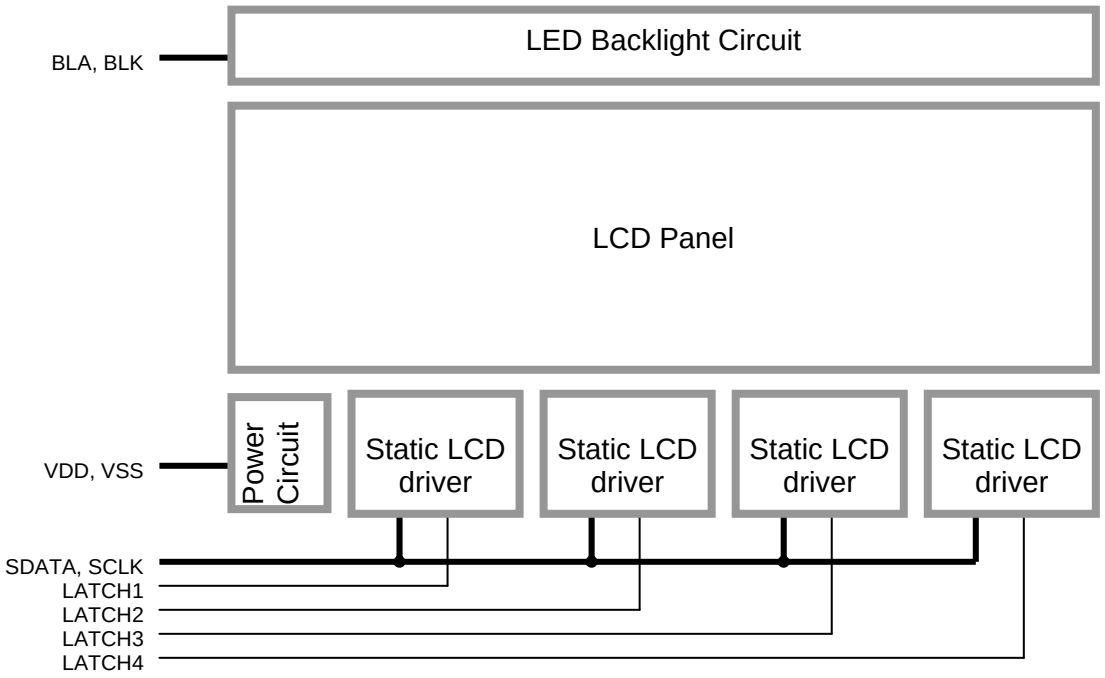
1) LCD Display Mode : TN, Positive, Transflective
2) Display Color : Display Data = “1” : Black (*1)
: Display Data = “0” : White (*2)
3) Viewing Angle : 12 H
4) Driving Method : Static
5) Backlight : White LED backlight

Note:
*1. Color tone may slightly change by Temperature and Driving Condition.
*2. The Color is defined as the inactive / background color

1.2 Mechanical Specifications

1) Outline Dimension : 200.0 x 76.0 x 12.3 MAX (exclude terminal header)
see attached Outline Drawing for details

1.3 Block Diagram



1.4 Terminal Functions

Pin No.	Pin Name	I/O	Descriptions
1	NC	-	No connection, leave open
2	NC	-	No connection, leave open
3	NC	-	No connection, leave open
4	VDD	Power	Positive Power Supply
5	VSS	Power	Negative Power Supply, Ground
6	SDATA	Input	Serial Data
7	SCLK	Input	Serial Data clock
8	LATCH1	Input	Latch Signal for sending the buffer data to display (chip1) Positive plus trigger
9	LATCH2	Input	Latch Signal for sending the buffer data to display (chip2) Positive plus trigger
10	LATCH3	Input	Latch Signal for sending the buffer data to display (chip3) Positive plus trigger
11	LATCH4	Input	Latch Signal for sending the buffer data to display (chip4) Positive plus trigger
12	NC	-	No connection, leave open
13	BLA	Power	Positive LED backlight supply
14	BLK	Power	Negative LED backlight supply

2. Absolute Maximum Ratings

Items	Symbol	Min.	Max.	Unit	Condition
Supply Voltage	V_{DD}	-0.3	5.5	V	V_{SS} = 0V
Input Voltage	V_{IN}	V_{SS}-0.3	V_{DD}+0.3	V	V_{SS} = 0V
Operating Temperature	T_{OP}	-20	70	°C	No Condensation
Storage Temperature	T_{ST}	-30	80	°C	No Condensation

Cautions:
Any Stresses exceeding the Absolute Maximum Ratings may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

3. Electrical Characteristics

3.1 DC Characteristics

V_{SS}=0V, V_{DD} =5.0V, T_{OP} =25°C

Items	Symbol	MIN.	TYP.	MAX.	Unit	Applicable Pin
Operating Voltage (*1)	V_{DD}	4.5	5.0	5.5	V	VDD
Input High Voltage	V_{IN}	0.8xVDD	-	VDD	V	DATA, /RD, /WR, /CS
Input Low Voltage	V_{IN}	VSS	-	0.5	V	DATA, /RD, /WR, /CS
Operating Current (*2)	I_{DD}	-	0.1	1.0	mA	VDD

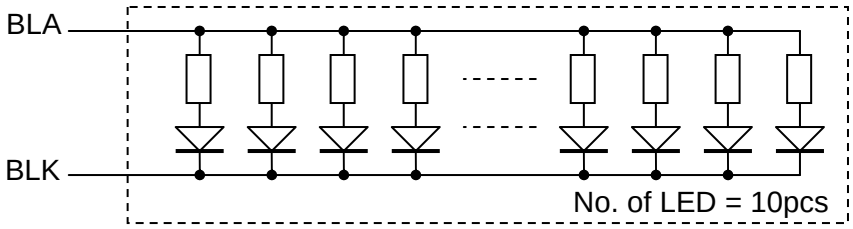
Note:
*1. The variation of Operating Voltage may affect the LCD display contrast.
*2. No Data transfer.

3.2 LED Backlight Circuit Characteristics

BLK=0V, If_{BLA}=170mA, T_{OP} =25°C

Items	Symbol	MIN.	TYP.	MAX.	Unit	Applicable Pin
Forward Voltage	Vf_{BLA}	-	5.0	-	V	BLA
Forward Current	If_{BLA}	-	170	200	mA	BLA

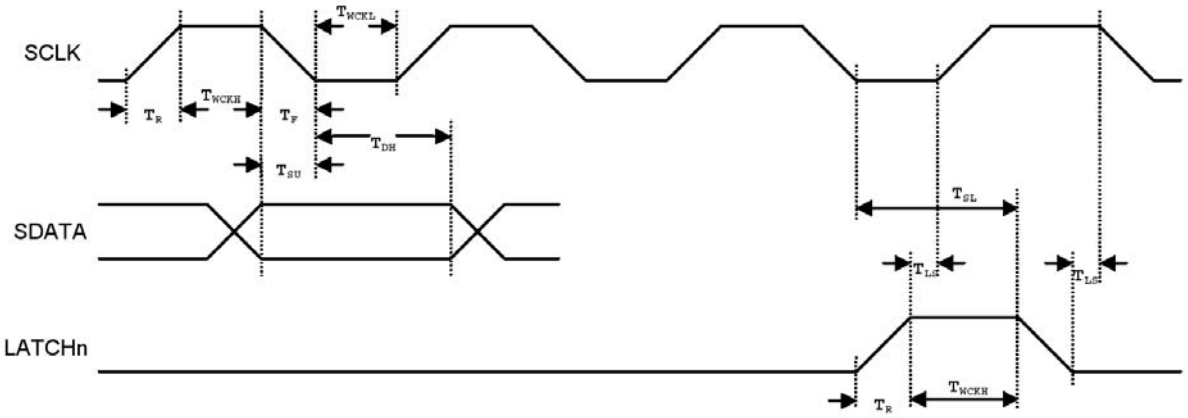
Cautions:
Exceeding the recommended driving current could cause substantial damage to the backlight and shorten its lifetime.



3.3 AC Characteristics

V_{SS}=0V, V_{DD} =5.0V, T_{OP} =25°C

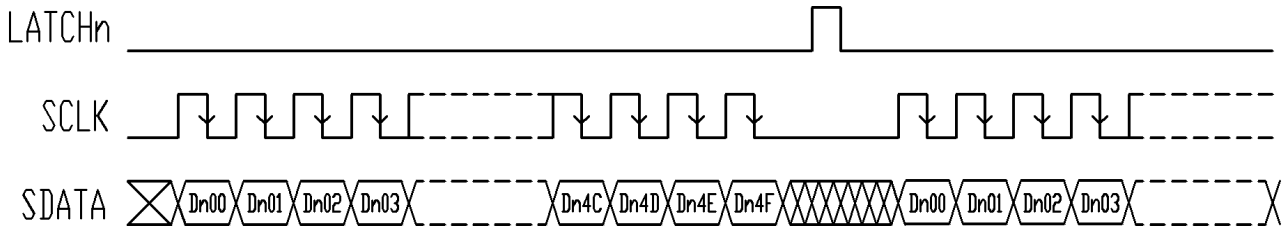
Symbol	MIN.	TYP.	MAX.	Unit	Descriptions
FCL	-	-	400	kHz	Data Shift Freq
TWCKH	1000	-	-	ns	Clcok High Level Width
TWCKL	1000	-	-	ns	Clock Low Level Width
TSL	625	-	-	ns	Clock Setup Time
TLS	625	-	-	ns	Latch Setup Time
TR/TF	-	-	160	ns	Signal Rise/Fall Time
TSU	375	-	-	ns	Data Setup Time
TDH	375	-	-	ns	Data Hold Time



4. Function Specifications

4.1 Data format and timing

The LCD module contains four serial to parallel buffers (80bit).
The four buffers share the same SCLK and SDATA as clock and data respectively.
After the input data shift into the buffer by SCLK falling edge,
The inputted data will be latched into to LCD driver n by the toggle on LATCHn.
Then the corresponding LCD segment will be display accordingly.
(please see the display mapping for details)



Timing Diagram of Write Data Mode

4.2 Display Maping

LCD driver 1, (accessed by Latch1)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
D10x	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D11x	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D12x	--	6C	6B	6A	6F	6G	6E	6D	DP6	5C	5B	5A	5F	5G	5E	5D
D13x	DP5	4C	4B	4A	4F	4G	4E	4D	DP4	3C	3B	3A	3F	3G	3E	3D
D14x	DP3	2C	2B	2A	2F	2G	2E	2D	DP2	1C	1B	1A	1F	1G	1E	1D

LCD driver 2, (accessed by Latch2)

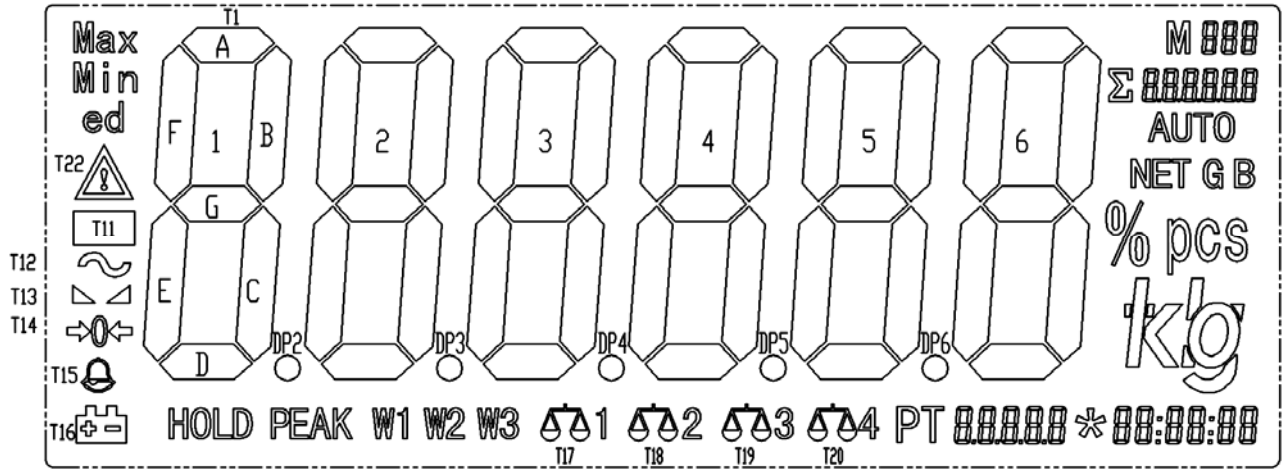
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
D20x	--	--	--	--	--	--	--	--	--	9C	9B	9A	9F	9G	9E	9D
D21x	--	8C	8B	8A	8F	8G	8E	8D	--	7C	7B	7A	7F	7G	7E	7D
D22x	--	10C	10B	10A	10F	10G	10E	10D	DP10	11C	11B	11A	11F	11G	11E	11D
D23x	DP11	12C	12B	12A	12F	12G	12E	12D	DP12	13C	13B	13A	13F	13G	13E	13D
D24x	DP13	14C	14B	14A	14F	14G	14E	14D	DP14	15C	15B	15A	15F	15G	15E	15D

LCD driver 3, (accessed by Latch3)

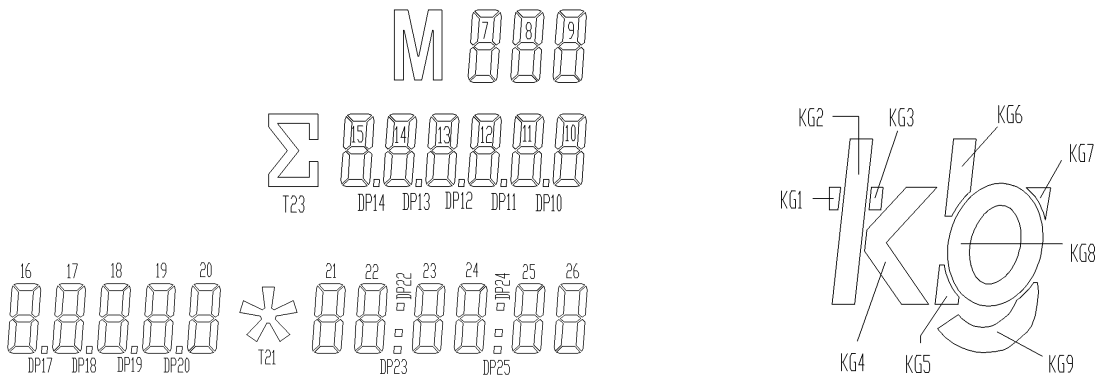
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
D30x	M	T23	Max	Min	e	d	T22	T11	T12	T13	T14	T15	T16	HOLD	PEAK	W1
D31x	W2	W3	T17	T18	T19	T20	P	T	KG6	KG7	KG8	KG9	KG5	KG4	T21	KG2
D32x	KG1	KG3	PCS	%	B	G	NET	AUTO	--	20C	20B	20A	20F	20G	20E	20D
D33x	DP20	19C	19B	19A	19F	19G	19E	19D	DP19	18C	18B	18A	18F	18G	18E	18D
D34x	DP18	17C	17B	17A	17F	17G	17E	17D	DP17	16C	16B	16A	16F	16G	16E	16D

LCD driver 4, (accessed by Latch4)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
D40x	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D41x	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D42x	--	26C	26B	26A	26F	26G	26E	26D	--	25C	25B	25A	25F	25G	25E	25D
D43x	DP25	24C	24B	24A	24F	24G	24E	24D	DP24	23C	23B	23A	23F	23G	23E	23D
D44x	DP23	22C	22B	22A	22F	22G	22E	22D	DP22	21C	21B	21A	21F	21G	21E	21D



Segment Keys



Segment Keys Details

5. Design and Handling Precaution

1. The LCD panel is made by glass. Any mechanical shock (eg. dropping form high place) will damage the LCD module.
2. Do not add excessive force on the surface of the display, which may cause the Display color change abnormally.
3. The polarizer on the LCD is easily get scratched. If possible, do not remove the LCD protective film until the last step of installation.
4. Never attempt to disassemble or rework the LCD module.
5. Only Clean the LCD with Isopropyl Alcohol or Ethyl Alcohol. Other solvents (eg. water) may damage the LCD.
6. When mounting the LCD module, make sure that it is free form twisting, warping and distortion.
7. Ensure to provide enough space (with cushion) between case and LCD panel to prevent external force adding on it, or it may cause damage to the LCD or degrade the display result.
8. Only hold the LCD module by its side. Never hold LCD module by add force on the heat seal or TAB.
9. Never add force to component of the LCD module. It may cause invisible damage or degrade of the reliability.
10. LCD module could be easily damaged by static electricity. Be careful to maintain an optimum anti-static work environment to protect the LCD module.
11. When peeling off the protective film from LCD, static charge may cause abnormal display pattern. It is normal and will resume to normal in a short while.
12. Take care and prevent get hurt by the LCD panel sharp edge.
13. Never operate the LCD module exceed the absolute maximum ratings.
14. Keep the signal line as short as possible to prevent noisy signal applying to LCD module.
15. Never apply signal to the LCD module without power supply.
16. IC chip (eg. TAB or COG) is sensitive to the light. Strong lighting environment could possibly cause malfunction. Light sealing structure casing is recommend.
17. LCD module reliability may be reduced by temperature shock.
18. When storing the LCD module, avoid exposure to the direct sunlight, high humidity, high temperature or low temperature. They may damage or degrade the LCD module