SPECIFICATION

YM160160C

LCD Module Specification

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Version 1.0

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RECORDS OF REVISION

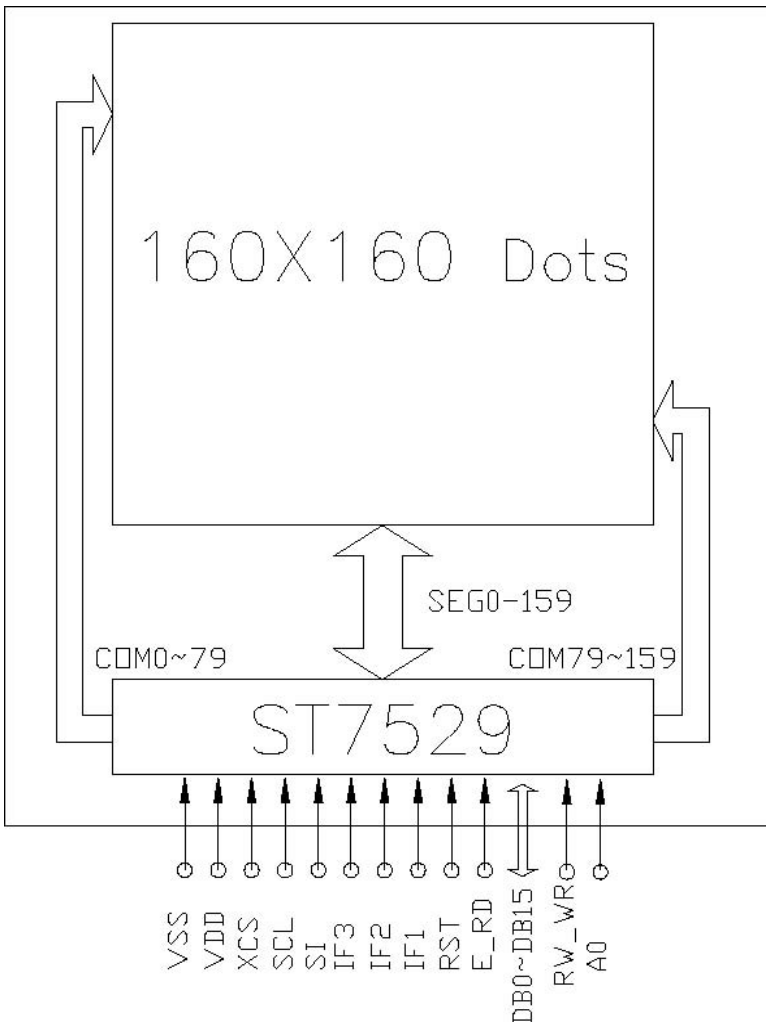
DATE	REVISED NO.	REVISED DESCRIPTIONS	PREPARED	CHECKED	APPROVED
AUG-28-2006	1.00	FIRST ISSUE	tfb		

1.0 Basic Specification

1.1 Display and Mechanical Specification

ITEM	STANDARD VALUE	UNIT
Display Type	160 x160 dots	-
LCD Type	■FSTN, Transflective, Position	-
LCD Duty	1/160	-
LCD Bias	1/13	-
Viewing Direction	6:00	-
Backlight Type	■LED/EL (White)	-
Interface	6800/8080 series or Serial Interface	-
Driver IC	ST7529	-
Module Dimension	54.0(W) X60.0(H) X6.0/2.9 (MAX)(T)	mm
Effective Display Area	43.98(W) X42.38(H)	mm
Dot Size	0.255 (W) X 0.245 (H)	mm
Dot Pitch	0.275 (W) X 0.265 (H)	mm

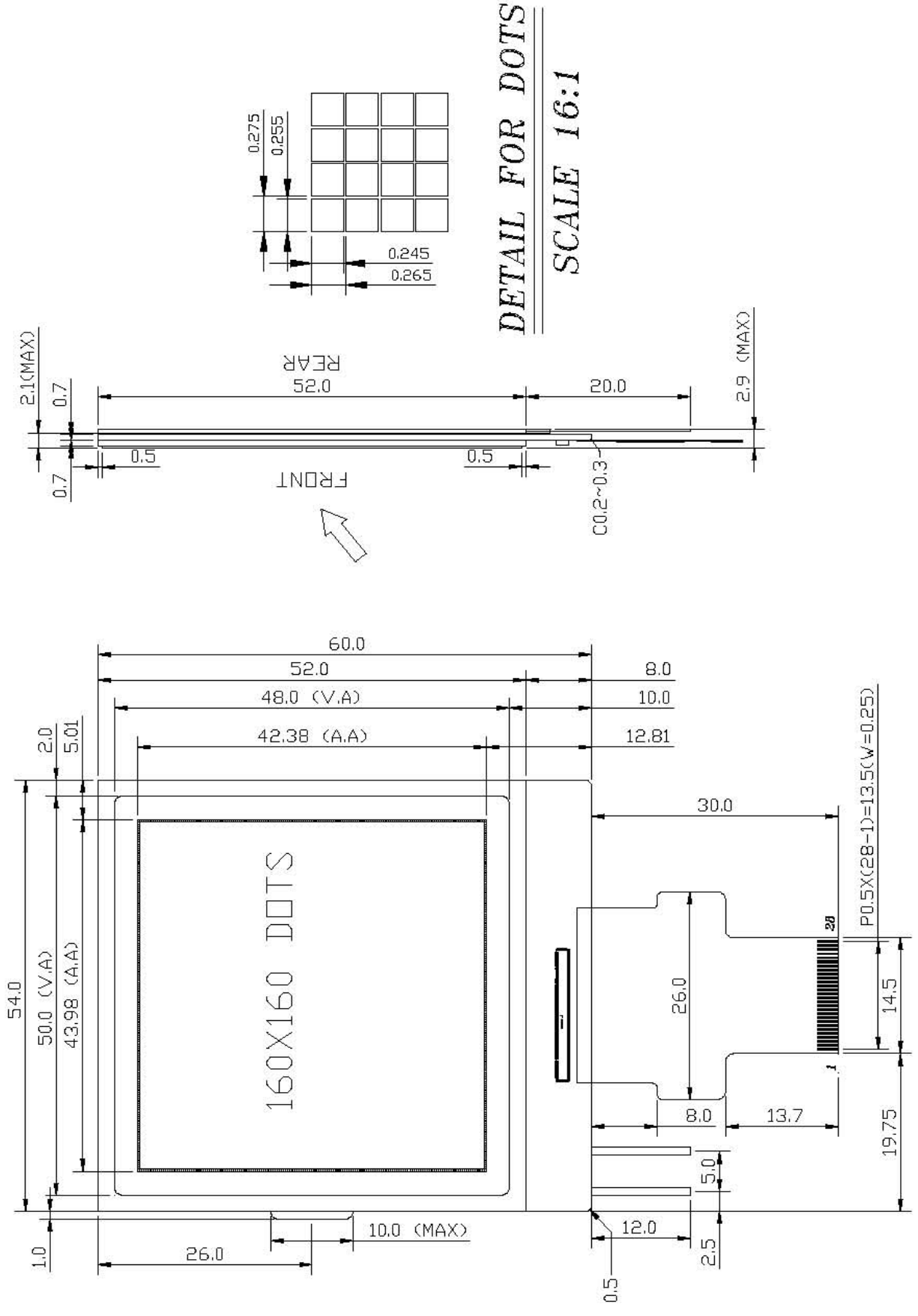
1.2 Block Diagram



1.3 Terminal Functions

<table>
<tr><th>PIN</th><th>SYMBOL</th><th>I/O</th><th>FUNCTION</th></tr>
<tr><td>1</td><td>VSS</td><td>I</td><td>Ground</td></tr>
<tr><td>2</td><td>VDD</td><td>I</td><td>Power supply(3.0~3.3).</td></tr>
<tr><td>3</td><td>XCS</td><td>I</td><td>Chip select input pins Data/Instruction I/O is enabled only when XCS is “L”. When chip select is non-active, DB0 DB15 may be high impedance.</td></tr>
<tr><td>4</td><td>SCL</td><td>I</td><td>This pin is used to input serial clock when the serial interface is selected. The data is latched at the rising edge. (3 line and 4 line)</td></tr>
<tr><td>5</td><td>SI</td><td>I</td><td>This pin is used to input serial data when the serial interface is selected. (3 line and 4 line)</td></tr>
<tr><td>6</td><td>IF3</td><td>I</td><td rowspan="3">Parallel / Serial data input select input
<table>
<tr><th>IF1</th><th>IF2</th><th>IF3</th><th>MPU interface type</th></tr>
<tr><td>H</td><td>H</td><td>H</td><td>80 series 16-bit parallel</td></tr>
<tr><td>H</td><td>H</td><td>L</td><td>80 series 8-bit parallel</td></tr>
<tr><td>H</td><td>L</td><td>L</td><td>68 series 16-bit parallel</td></tr>
<tr><td>L</td><td>H</td><td>H</td><td>68 series 8-bit parallel</td></tr>
<tr><td>L</td><td>L</td><td>H</td><td>9-bit serial (3 line)</td></tr>
<tr><td>L</td><td>L</td><td>L</td><td>8-bit serial (4 line)</td></tr>
</table></td></tr>
<tr><td>7</td><td>IF2</td><td>I</td></tr>
<tr><td>8</td><td>IF1</td><td>I</td></tr>
<tr><td>9</td><td>RST</td><td>I</td><td>Reset input pin When RST is “L”, initialization is executed.</td></tr>
<tr><td>10</td><td>E_RD</td><td>I</td><td>Read / Write execution control pin
<table>
<tr><th>MPU Type</th><th>E_RD</th><th>Description</th></tr>
<tr><td>6800-scrics</td><td>E</td><td>Read / Write control input pin
– RW = “H”: When E is “H”, DB0 to DB15 are in
output status.
– RW = “L”: The data on DB0 to DB15 are latch
the falling edge of the E signal.</td></tr>
<tr><td>8080-series</td><td>/RD</td><td>Read enable clock input pin
When /RD is “L”, DB0 to DB15 are in an output</td></tr>
</table></td></tr>
<tr><td>11-26</td><td>DB15-DB0</td><td>I/O</td><td>They connect to the standard 8-bit or 16-bit MPU bus via the 8/16 –bit bi-directional bus. When the following interface is selected and the XCS pin is high, the following pins become high impedance, which should be fixed to VDD or VSS. 1. 8-bit parallel: DB15~DB8 are 2. Serial interface: DB15~DB0 are in the state of high impedance</td></tr>
<tr><td>27</td><td>RW_WR</td><td>I</td><td>Read / Write execution control pin
<table>
<tr><th>MPU type</th><th>RW_WR</th><th>Description</th></tr>
<tr><td>6800-series</td><td>RW</td><td>Read / Write control input pin
RW = “H” : read
RW = “L” : write</td></tr>
<tr><td>8080-series</td><td>/WR</td><td>Write enable clock input pin
The data on DB0 to DB15 are latched at the rising edge of the /WR signal.</td></tr>
</table></td></tr>
<tr><td>28</td><td>A0</td><td>I</td><td>Register select input pin A0=’H’: DB0 to DB15 or SI are display data A0=’H’: DB0 to DB15or SI are control data</td></tr>
</table>

1.4 Mechanical Drawing



2. Absolute Maximum Ratings

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY FOR LOGIC	VDD	Ta=25℃	-0.5	—	4.0	V
POWER SUPPLY VOLTAGE	VLCDINOUT		-0.5		+20	V
INPUT VOLTAGE	VIN	Ta=25℃	-0.5	—	VDD+0.5	V
Module OPERATION TEMPERATURE	TOPR	---	-20	—	+70	℃
Module STORAGE TEMPERATURE	TSTG	---	- 30	—	+80	℃
Storage Humidity	HD	Ta < 40 °C	-		90	%RH

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

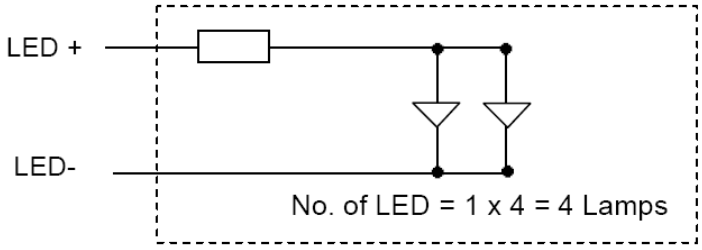
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Voltage (logic)	VDD-VSS	-	2.4	3.0	3.3	V
Supply Voltage (LCD)	VDD-V0	Ta= +25℃	-	17.5	-	V
Input signal voltage	V-IH	“H” level	0.7 VDD	-	VDD	V
	V-IL	“L” level	VSS	-	0.3 VDD	V
Output signal voltage	V-OH	“H” level	-	-	-	V
	VOL	“H” level	-	-	-	V
Supply Current (logic)	IDD	VDD=3.0V	-	460	600	μA
Backlight Voltage	V-BL	EL (White)	-	110	-	V
Backlight Current	I-BL	EL (White)	-	-		mA
Backlight Driver Wave				400		Hz
Backlight Brightness						
Backlight Life Time						

3.2 LED Backlight Circuit Characteristics

Items	Symbol	MIN	TYP.	MAX.	Unit	Application pin
Forward Voltage	Vf_{LED+}	-	3.0	-	V	LED+
Forward Current	If_{LED+}	-	-	60	mA	LED+

Cautions:

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



4. IC Contents Attachment:

Reference Datasheet From SITRONIX LCD Driver: ST7529

5.RELIABILITY

Content of Reliability Test

Environmental Test				
No.	Test Item	Content of Test	Test Condition	Applicable Standard
1	High temperature storage	Endurance test applying the high storage temperature for a long time.	80 ℃ 200 hrs	
2	Low temperature storage	Endurance test applying the low storage temperature for a long time.	-30 ℃ 200 hrs	
3	High temperature operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70 ℃ 200 hrs	
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time.	-20 ℃ 200 hrs	
5	High temperature Humidity storage	Endurance test applying the high temperature and high humidity storage for a long time.	50 ℃ , 90 RH 96 hrs	MIL-202E-103B JIS-C5023
6	High temperature Humidity operation	Endurance test applying the electric stress (Voltage & Current) and temperature humidity stress to the element for a long time.	50 ℃ , 90 RH 96 hrs	MIL-202E-103B JIS-C5023
7	Temperature cycle	Endurance test applying the low and high temperature cycle.	-20℃ -70℃ 10 cycles	
Mechanical Test				

8	Vibration test	Endurance test applying the vibration during transportation and using.	10-22Hz→1.5mmp-p 22-500Hz →1.5G Total 0.5hrs	MIL-202E-201A JIS-C5025 JIS-C7022-A-10
9	Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G half sign wave 1l msedc 3 times of each direction	MIL-202E-213B
10	Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115 mbar 40 hrs	MIL-202E-105C
Others				
11	Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V, RS=1.5 k CS=100 pF 1 time	MIL-883B-3015.1

*** Supply voltage for logic system = 3V. Supply voltage for LCD system = Operating voltage at 25℃.

Failure Judgement Criterion

Criterion Item	Test Item No.											Failure Judgment Criterion
	1	2	3	4	5	6	7	8	9	10	11	
Basic specification												Out of the Basic Specification
Electrical characteristic												Out of the DC and AC Characterstic
Mechanical characterstic												Out of the Mechanical Specification Color change : Out of Limit Apperance Specification
Optical characterstic												Out of the Apperance Standard

6. QUALITY GUARANTEE

Acceptable Quality Level

Each lot should satisfy the quality level defined as follows.

- Inspection method : MIL-STD-105E LEVEL II Normal one time sampling
- AQL

Partition	AQL	Definition
A: Major	0.4%	Functional defective as product
B: Minor	1.5%	Satisfy all functions as product but not satisfy cosmetic standard

Definition of 'LOT'

One lot means the delivery quantity to customer at one time.

Conditions of Cosmetic Inspection

Environmental condition

The inspection should be performed at the 1cm of height from the LCD module under 2 pieces of 40W white fluorescent lamps (Normal temperature 20~25℃and normal humidity 6o±15%RH).

Inspection method

The visual check should be performed vertically at more than 30cm distance from the LCD panel.

Driving voltage

The VO value which the most optimal contrast can be obtained near the specified VO in the specification. (Within ±0.5V of typical value at 25℃.).