



**EASTRISING TECHNOLOGY CO., LTD.**  
**旭日东方科技有限公司**

# **ERC1602GS-1**

## **LCD Module User Manual**

EastRising Technology Co., Ltd

<b>REV</b>	<b>Descriptions</b>	<b>Release Date</b>
0.1	Prelimiay release	2008-11-24

## Table of Content

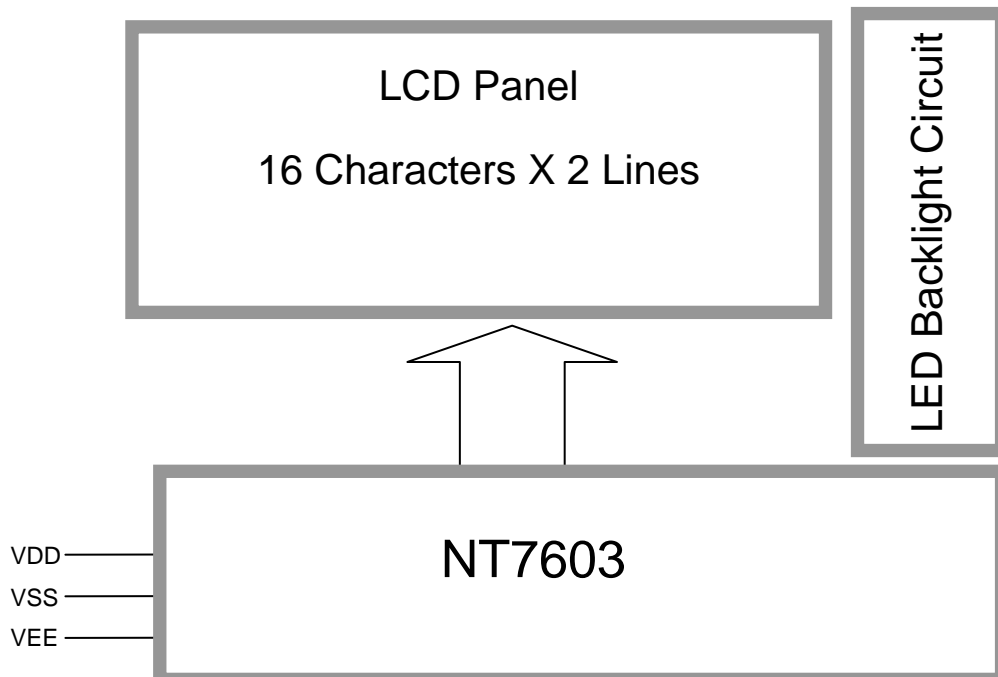
<b>1. Basic Specifications.....</b>	<b>3</b>
1.1 Display and Mechanical Specifications.....	3
1.2 Block Diagram.....	3
1.3 Terminal Functions.....	4
1.4 Mechanical Drawing .....	5
<b>2. Absolute Maximum Ratings.....</b>	<b>6</b>
<b>3. Electrical Characteristics.....</b>	<b>7</b>
<b>4. IC Contents Attachment.....</b>	<b>7</b>
<b>5. LCM Numbering System.....</b>	<b>8</b>
<b>6. Design and Handling Precaution.....</b>	<b>9</b>

## 1.0 Basic Specification

### 1.1 Display and Mechanical Specification

ITEM	STANDARD VALUE	UNIT
Display Type	16 Characters X 2 Lines	--
LCD Type	STN(Gray) / Transflective / Positive	--
LCD Duty	1/16	--
LCD Bias	1/5	Bias
Viewing Direction	6:00	Clock
Backlight Type	Edge LED Backlight with white color	--
Interface	Parallel Interface	--
Driver IC	NT7603 (Gold Bump Chip)	--
IC Package	COG	--
Module Dimension	66.0(W) × 27.7(H) × 5.0(T) (MAX)	mm
Visual Area	61.0(W) × 15.7(H)	mm
Dot size	0.57 × 0.60	mm
Dot Pitch	0.60 × 0.65	mm
Operating Temperature	0 ~ 50	°C
Storage Temperature	-20 ~ 60	°C

### 1.2 Block Diagram



### 1.3 Terminal Functions

Pin No.	Pin Name	I/O	Descriptions
1	GND	P	GND: 0V
2	V5	P	Power supply for LCD driver
3	VDD	P	VDD: +5V
4	RS	I	Register select signal 0: Instruction register(write). Busy flag, address counter(read) 1: Data register(write, read)
5	R/W	I	Read / Write control signal 0: Write 1: Read
6	E	I	Read / Write start signal
7	DB0	I/O	Lower 4 tri-state bi-directional data bus for transmitting data between MPU and NT7603. Not used during 4-bit operation.
8	DB1		
9	DB2		
10	DB3		
11	DB4	I/O	Higher 4 tri-state bi-directional data bus for transmitting data between MPU and NT7603. DB7 is also used as busy flag.
12	DB5		
13	DB6		
14	DB7		



## 2. Absolute Maximum Ratings

Items	Symbol	Min	Max.	Unit	Condition
Supply Voltage (Logic)	$V_{DD}-V_{SS}$	0	+3.5	V	$V_{SS}=0V$
Supply Voltage (LCD Driver)	$V_{DD}-V_{EE}$	0	16.5	V	$V_{SS}=0V$
Input Voltage	$V_{IN}$	0	$V_{DD}+0.3$	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

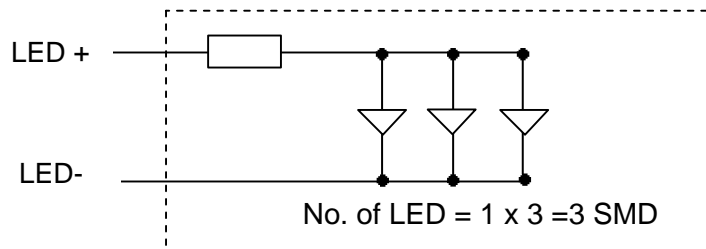
Items	Symbol	Min	Typ.	Max.	Unit	Condition
Supply Voltage (Logic)	$V_{DD}-V_{SS}$	3.0	3.5	4.0	V	
Supply Voltage (LCD Driver)	$V_{DD}-V_{EE}$	8.9	9.5	10.2	V	-20°C
		8.2	8.8	9.4		25°C
		7.5	8.0	8.6		70°C
Input Voltage	$V_{IH}$	$V_{SS}+2.0$	--	$V_{DD}$	V	--
	$V_{IL}$	$V_{SS}8$	--	$V_{SS}+0.8$		
Logic Supply Current	$I_{DD}$	--	0.9	--	°C	$V_{DD}-V_{SS}=3.5V$

### 3.2 LED Backlight Circuit Characteristics

Items	Symbol	MIN	TYP.	MAX.	Unit	Application pin
Forward Voltage	$V_{fLED+}$	-	3.0	-	V	LED+
Forward Current	$I_{fLED+}$	-	-	45	mA	LED+

Cautions:

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



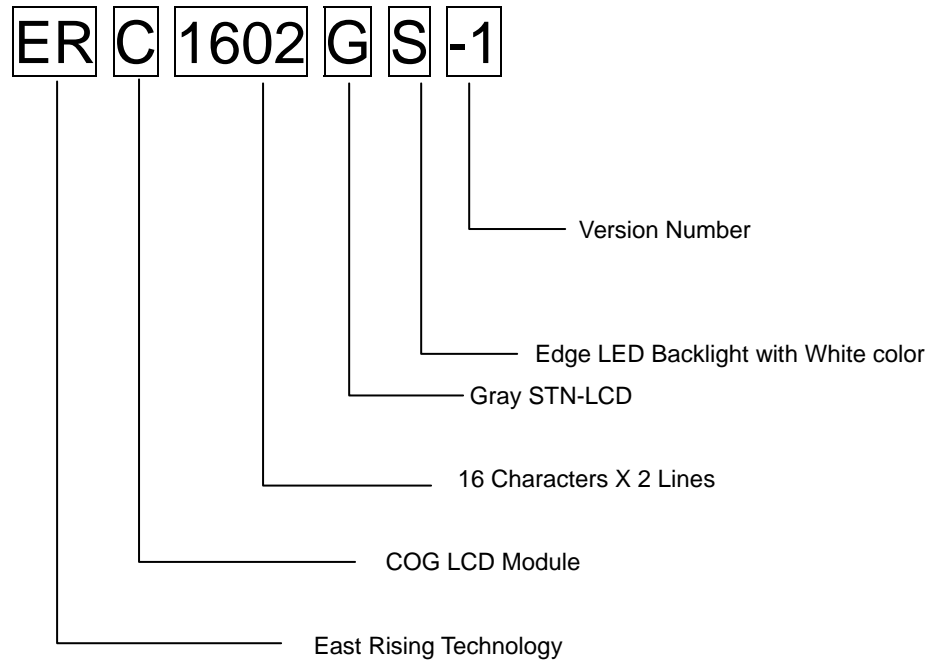
#### 4. IC Contents Attachment:

Reference Documents From NOVATEK NT7630 LCD Driver with

### Contents

<b>NT7630 (Version 0.5 )</b>	<b>Page</b>
<b>1. General Description.....</b>	<b>P1</b>
<b>2. BLOCK DIAGRAM .....</b>	<b>P3</b>
<b>3. DECRIPITON OF FUCTIONS.....</b>	<b>P5</b>
<b>4. TIMING CHARACTRISTICS.....</b>	<b>P9</b>
<b>5. COMMAND DECRIPITON.....</b>	<b>P14</b>

## 5. LCM Numbering System





## 6. Design and Handling Precaution

- 1.0 The LCD panel is made by glass. Any mechanical shock (eg. dropping from high place) will damage the LCD module.
- 2.0 Do not add excessive force on the surface of the display, which may cause the Display color change abnormally.
- 3.0 The polarizer on the LCD is easily get scratched. If possible, do not remove the LCD protective film until the last step of installation.
- 4.0 Never attempt to disassemble or rework the LCD module.
- 5.0 Only Clean the LCD with Isopropyl Alcohol or Ethyl Alcohol. Other solvents (eg. water) may damage the LCD.
- 6.0 When mounting the LCD module, make sure that it is free from twisting, warping and distortion.
- 7.0 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.
- 8.0 Only hold the LCD module by its side. Never hold LCD module by adds force on the heat seal or TAB.
- 9.0 Never add force to component of the LCD module. It may cause invisible damage or degrade of the reliability.
- 10.0 LCD module could be easily damaged by static electricity. Be careful to maintain an optimum anti-static work environment to protect the LCD module.
- 11.0 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.
- 12.0 Take care and prevent get hurt by the LCD panel sharp edge.
- 13.0 Never operate the LCD module exceed the absolute maximum ratings.
- 14.0 Keep the signal line as short as possible to prevent noisy signal applying to LCD module.
- 15.0 Never apply signal to the LCD module without power supply.
- 16.0 IC chip (eg. TAB or COG) is sensitive to the light. Strong lighting environment could Possibly cause malfunction. Light sealing structure casing is recommend.
- 17.0 LCD module reliability may be reduced by temperature shock.
- 18.0 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