

# ER-DBTM090-2

## MCU 8051 Development Board & Kit User Guide



## EastRising Technology Co., Limited

Attention:

- A. Some specifications of IC are not listed in this datasheet. Please refer to the IC datasheet for more details.
- B. The related documents for interfacing, demo code, ic datasheet are all available, please download from our web.

REV	DESCRIPTION	RELEASE DATE
1.0	Preliminary Release	Dec-08-2015

# CONTENTS

<b>1. ORDERING INFORMATION .....</b>	<b>03</b>
<b>2. QUICK START .....</b>	<b>04</b>
<b>3. BUTTONS DEFINITIONS .....</b>	<b>05</b>
<b>4. SPECIFICATION .....</b>	<b>06</b>
<b>5. OUTLINE DRAWING .....</b>	<b>07</b>
<b>6. HOW TO MAKE A CUSTOM DEMONSTRATION .....</b>	<b>08</b>
<b>7. METHODS FOR USING IN SYSTEM PROGRAMMING .....</b>	<b>08</b>
<b>8. CARE AND HANDLING PRECAUTIONS .....</b>	<b>14</b>

## 1. ORDERING INFORMATION

### 1.1 Order Number

Part Number(Order Number)	Description
ER-DBTM090-2	8051 Microcontroller Development Board & Kit

### 1.2 What's included in the package

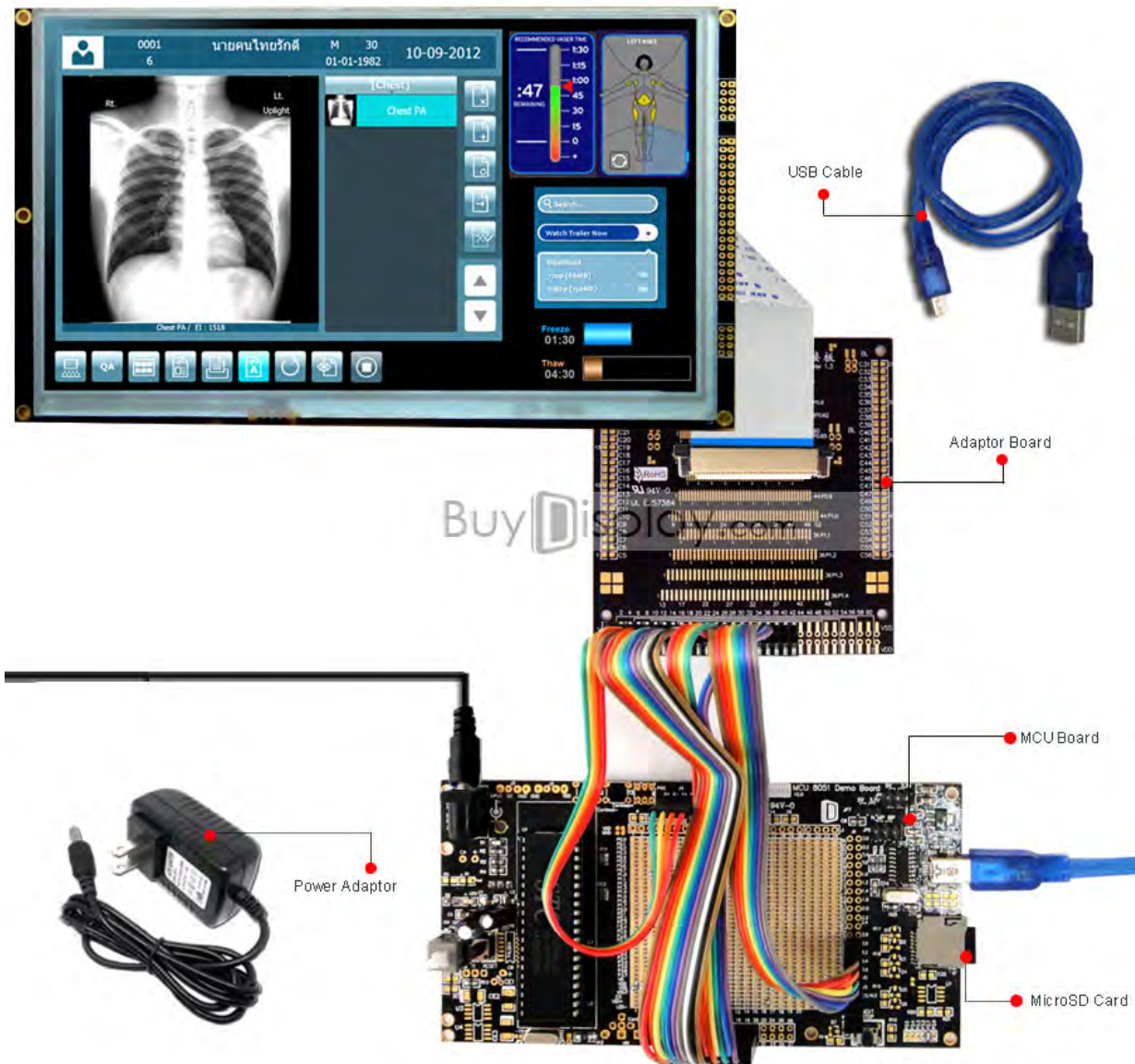
No	Standard Accessory Name	Quantity
1	MCU Board	1
2	Adaptor Board	1
3	Power Adaptor (6.5V/2A)	1
4	MicroSD Memory Card Loaded with Images	1
5	USB Cable	1

### 1.3 Compatible with following displays:

Part Number(Order Number)	Description
ER-TFTM090-2	9" TFT LCD Display with RA8875 Controller Board

## 2. QUICK START

2-1 Simply plug the power adaptor into an AC outlet and plug FFC(Cable) of lcd display into the ZIF connector of adaptor board as the below image shows.

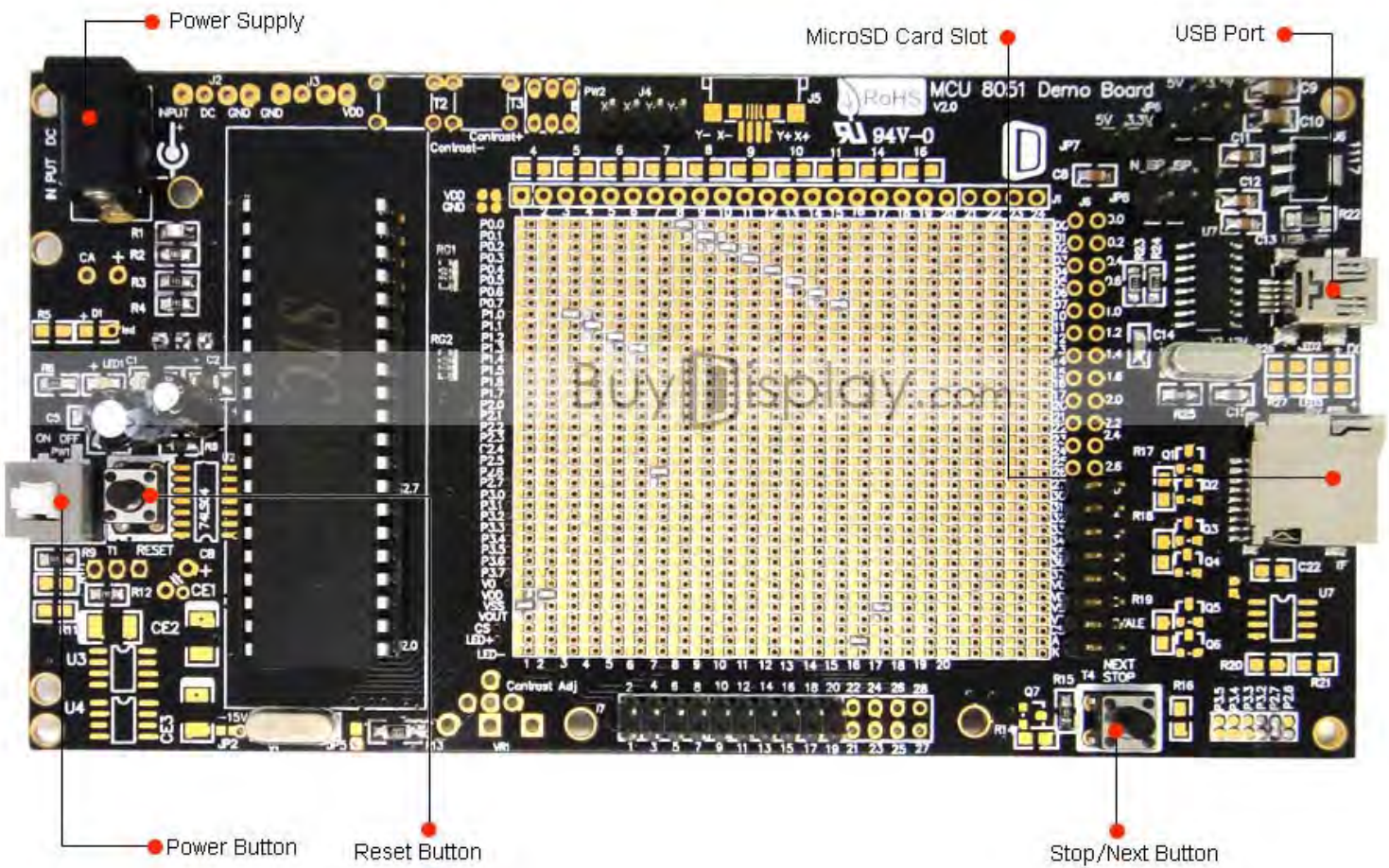


2-2 Press the power button to run the demonstration program.

### 3. BUTTONS DEFINITIONS

Button Name	Description
*Stop/Next Button	Stop or Next the Image Slideshows
Reset Button	Restart to Initialized State
Power Button	Press On or Press Off

\*For color display, this button is used to next the image slideshows.  
 For mono display, this button is used to stop the image slideshows.



## 4. SPECIFICATION

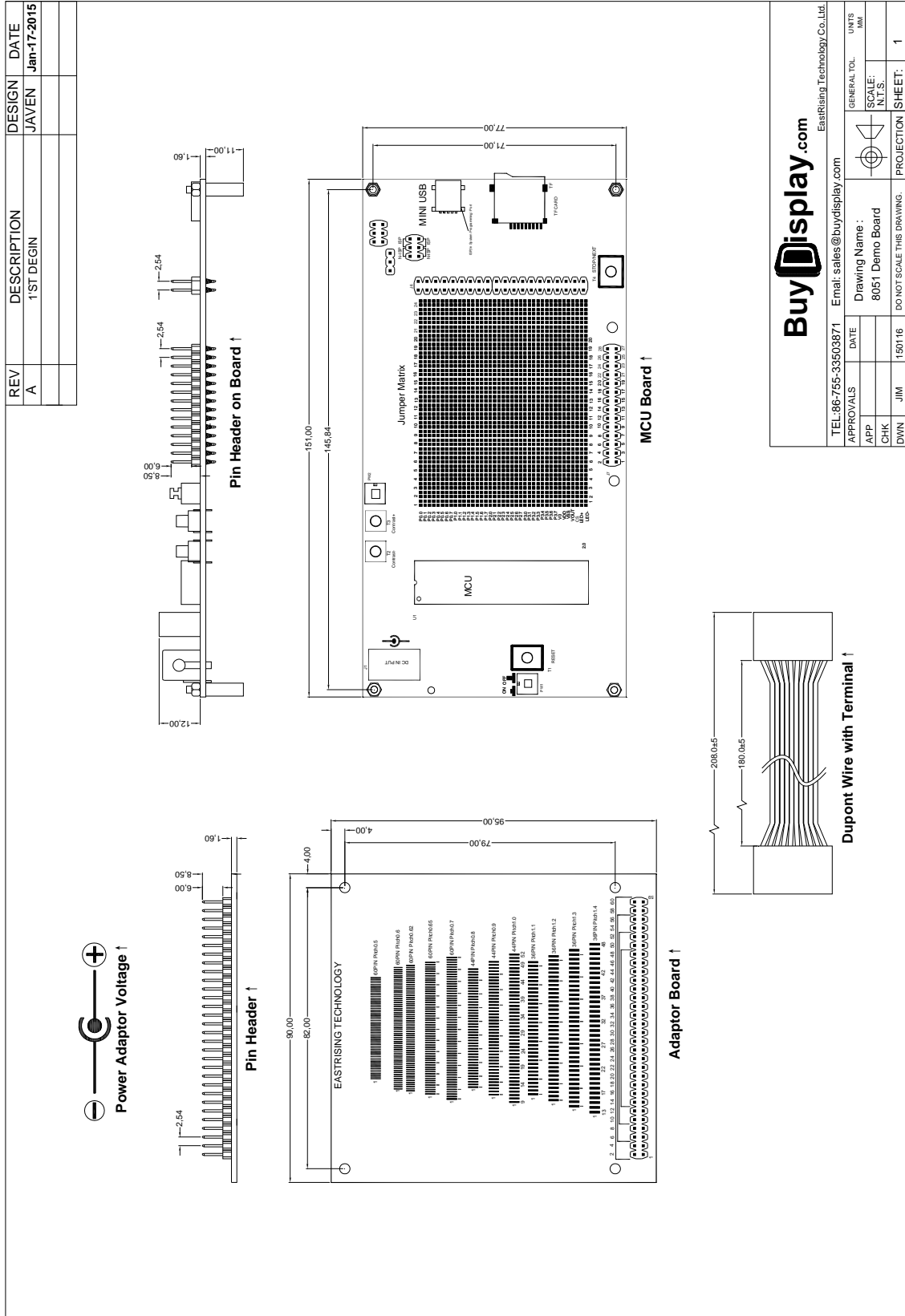
### 4.1 Mechanical Specification

ITEM	STANDARD VALUE	UNIT
MCU Board Outline Dimension	151.00×77.00	mm
Adaptor Board Outline Dimension	90.00×95.00	mm
Gross Weight for Whole Demo Kit	0.40	kg

### 4.2 Electrical Specification

ITEM	STANDARD VALUE	UNIT
Microcontroller	STC12LE5A60S2	--
Interface	8080 8/16-bit,6800 8/16-bit Parallel,3/4-Wire,I2C Serial	--
Power Supply Voltage	6.5	V

5. OUTLINE DRAWING



## 6. HOW TO MAKE A CUSTOM DEMONSTRATION

By using the software of LCD Font Maker or Image2LCD and ISP(In System Programming) to customize the demonstration that includes your own bitmap images, personalized fonts, symbols, icons and burn sketches. The large capacity of the MicroSD card allows you to store more fonts or images. We also prepare the demo code, interfacing document (download from each product page) and schematic MCU datasheet (download from each 8051 microcontroller development board page) for your further study.

LCD Font Maker: <http://www.buydisplay.com/download/software/LCDFontMaker.zip>

Image2LCD: <http://www.buydisplay.com/download/software/Image2Lcd.zip>

## 7. METHODS FOR USING IN SYSTEM PROGRAMMING

7-1 Hardware Preparation

7-1-1 Please power off the development board,

7-1-2 No power supply is connecting with 8051 development board,

7-7-3 The jumpers on JP8 is on ISP position as below image shows



7-2 Install the USB to RS232 Driver

<http://www.buydisplay.com/download/software/USB-TO-RS232-DRIVER.rar>





7-3 Connecting the 8051 development board to computer by USB Cable and you should find the new port USB-SERIAL CH340 in Computer-System Properties-Device Manager as below image shows and remember the COM number that would be used in Step7-4.



7-4 Install STC 8051 Microcontroller ISP(In System Programming)Software

<http://www.buydisplay.com/download/software/STC-ISP-V4.86-NOT-SETUP-ENGLISH.zip>

7-5 Open ISP and Select COM Port that should be the same with the step 7-2 you see from Device Manager.



7-6 Select MCU part number that should be the same with your purchased one.  
(Refer to 4.2 Electrical Specification)

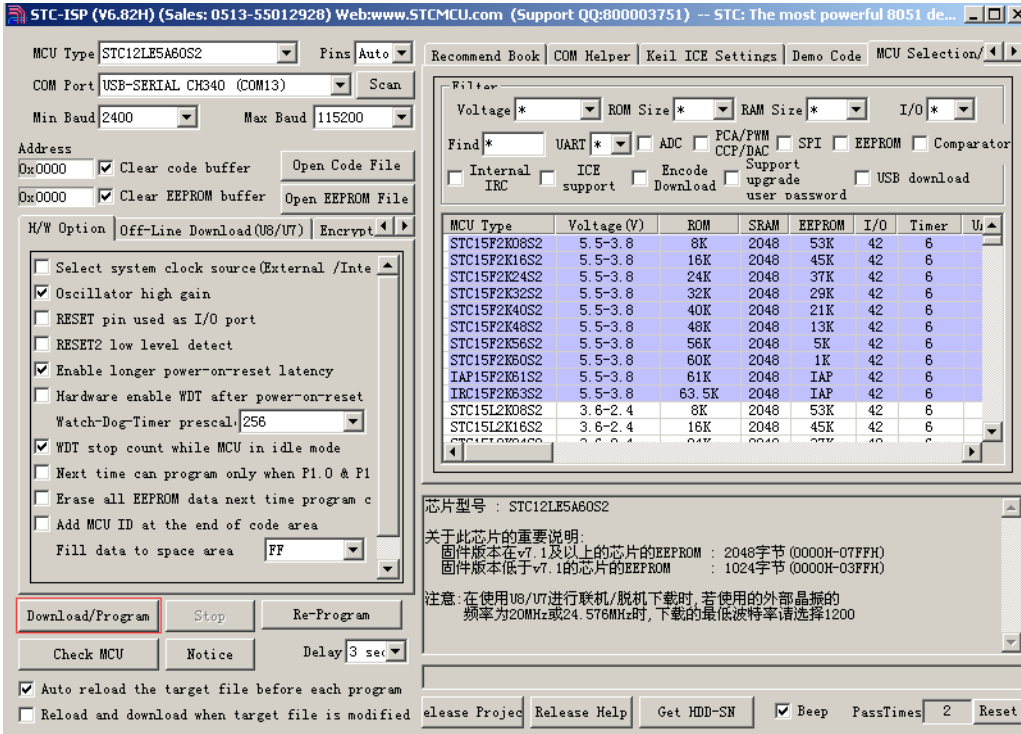


7-7 Open target “.hex” file by clicking open code file



## 7-8 Programming

### 7-8-1 Click Download/Program



STC-ISP (V6.82H) (Sales: 0513-55012928) Web:www.STCMCU.com (Support QQ:800003751) -- STC: The most powerful 8051 de...

MCU Type: STC12LE5A60S2 Pins: Auto

COM Port: USB-SERIAL CH340 (COM13) Scan

Min Baud: 2400 Max Baud: 115200

Address: 0x0000 Clear code buffer Open Code File

0x0000 Clear EEPROM buffer Open EEPROM File

H/W Option: Off-Line Download (US/U7) Encrypt

Select system clock source (External / Inte

Oscillator high gain

RESET pin used as I/O port

RESET2 low level detect

Enable longer power-on-reset latency

Hardware enable WDT after power-on-reset

Watch-Dog-Timer prescal: 256

WDT stop count while MCU in idle mode

Next time can program only when P1.0 & P1

Erase all EEPROM data next time program c

Add MCU ID at the end of code area

Fill data to space area: FF

Download/Program Stop Re-Program

Check MCU Notice Delay: 3 sec

Auto reload the target file before each program

Reload and download when target file is modified

Release Project Release Help Get HDD-SN  Beep PassTimes: 2 Reset

Recommend Book COM Helper Keil ICE Settings Demo Code MCU Selection/

File: Voltage \* ROM Size \* RAM Size \* I/O \*

Find \* UART \* ADC PCA/PWM CCP/DAC SPI EEPROM Comparator

Internal ICE support  ICE support  Encode Download  Support upgrade user password  USB download

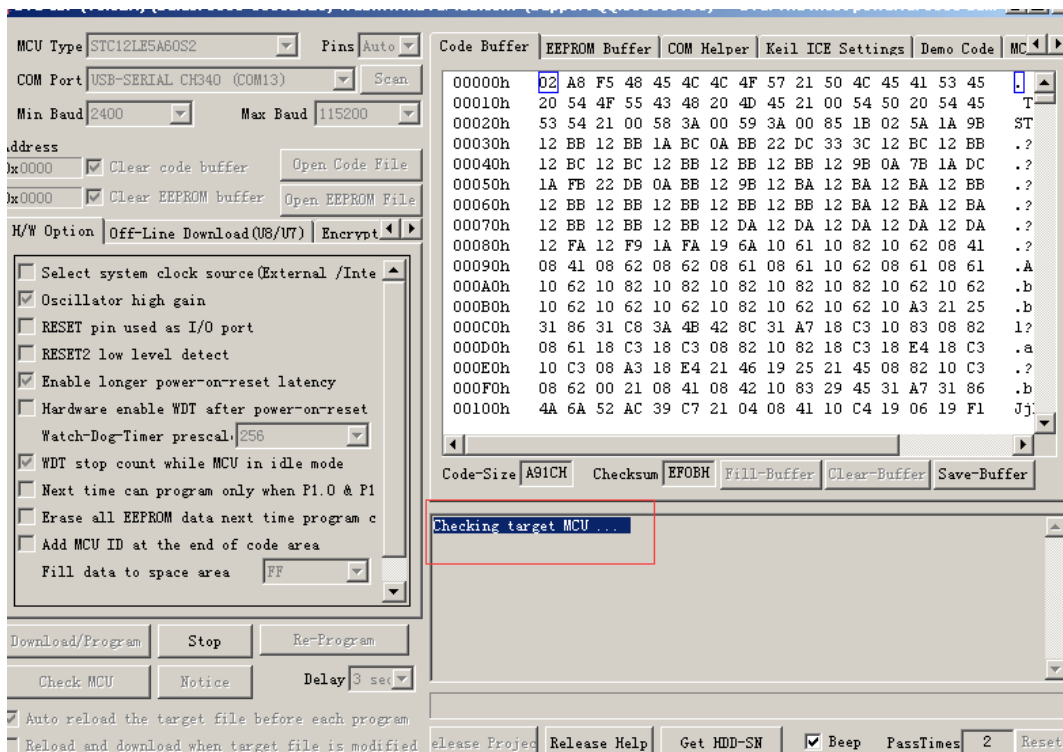
MCU Type	Voltage (V)	ROM	SRAM	EEPROM	I/O	Timer	U
STC15F2K06S2	5.5-3.8	8K	2048	53K	42	6	
STC15F2K16S2	5.5-3.8	16K	2048	45K	42	6	
STC15F2K24S2	5.5-3.8	24K	2048	37K	42	6	
STC15F2K32S2	5.5-3.8	32K	2048	29K	42	6	
STC15F2K40S2	5.5-3.8	40K	2048	21K	42	6	
STC15F2K48S2	5.5-3.8	48K	2048	13K	42	6	
STC15F2K56S2	5.5-3.8	56K	2048	5K	42	6	
STC15F2K60S2	5.5-3.8	60K	2048	1K	42	6	
IAP15F2K61S2	5.5-3.8	61K	2048	IAP	42	6	
IRC15F2K63S2	5.5-3.8	63.5K	2048	IAP	42	6	
STC15L2R06S2	3.6-2.4	8K	2048	53K	42	6	
STC15L2K16S2	3.6-2.4	16K	2048	45K	42	6	
STC15L2K24S2	3.6-2.4	24K	2048	37K	42	6	
STC15L2K32S2	3.6-2.4	32K	2048	29K	42	6	
STC15L2K40S2	3.6-2.4	40K	2048	21K	42	6	
STC15L2K48S2	3.6-2.4	48K	2048	13K	42	6	
STC15L2K56S2	3.6-2.4	56K	2048	5K	42	6	
STC15L2K60S2	3.6-2.4	60K	2048	1K	42	6	
STC15L2K61S2	3.6-2.4	61K	2048	IAP	42	6	
STC15L2K63S2	3.6-2.4	63.5K	2048	IAP	42	6	

芯片型号: STC12LE5A60S2

关于此芯片的重要说明:  
 固件版本在v7.1及以上的芯片的EEPROM: 2048字节 (0000H-07FFH)  
 固件版本低于v7.1的芯片的EEPROM: 1024字节 (0000H-03FFH)

注意: 在使用US/U7进行联机/脱机下载时, 若使用的外部晶振的频率为20MHz或24.576MHz时, 下载的最低波特率请选择1200

### 7-8-2 Then you will see "Checking target MCU...."



MCU Type: STC12LE5A60S2 Pins: Auto

COM Port: USB-SERIAL CH340 (COM13) Scan

Min Baud: 2400 Max Baud: 115200

Address: 0x0000 Clear code buffer Open Code File

0x0000 Clear EEPROM buffer Open EEPROM File

H/W Option: Off-Line Download (US/U7) Encrypt

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Erase all EEPROM data next time program c

Add MCU ID at the end of code area

Fill data to space area: FF

Download/Program Stop Re-Program

Check MCU Notice Delay: 3 sec

Auto reload the target file before each program

Reload and download when target file is modified

Release Project Release Help Get HDD-SN  Beep PassTimes: 2 Reset

Code Buffer EEPROM Buffer COM Helper Keil ICE Settings Demo Code MC

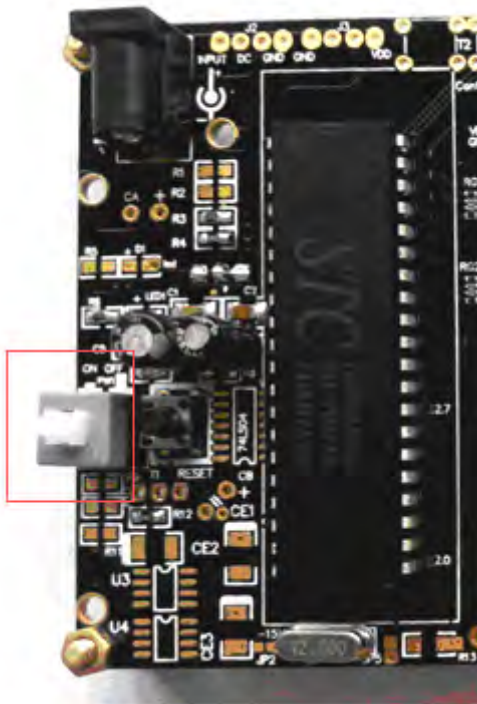
```

000000h 02 A8 F5 48 45 4C 4C 4F 57 21 50 4C 45 41 53 45 .
00010h 20 54 4F 55 43 48 20 4D 45 21 00 54 50 20 54 45 T
00020h 53 54 21 00 58 3A 00 59 3A 00 85 1B 02 5A 1A 9B ST
00030h 12 BB 12 BB 1A BC 0A BB 22 DC 33 3C 12 BC 12 BB .?
00040h 12 BC 12 BC 12 BB 12 BB 12 BB 12 9B 0A 7B 1A DC .?
00050h 1A FB 22 DB 0A BB 12 9B 12 BA 12 BA 12 BA 12 BB .?
00060h 12 BB 12 BB 12 BB 12 BB 12 BB 12 BA 12 BA 12 BA .?
00070h 12 BB 12 BB 12 BB 12 DA 12 DA 12 DA 12 DA 12 DA .?
00080h 12 FA 12 F9 1A FA 19 6A 10 61 10 82 10 62 08 41 .?
00090h 08 41 08 62 08 62 08 61 08 61 10 62 08 61 08 61 .A
000A0h 10 62 10 82 10 82 10 82 10 82 10 82 10 62 10 62 .b
000B0h 10 62 10 62 10 62 10 82 10 62 10 62 10 A3 21 25 .b
000C0h 31 86 31 C8 3A 4B 42 8C 31 A7 18 C3 10 83 08 82 1?
000D0h 08 61 18 C3 18 C3 08 82 10 82 18 C3 18 E4 18 C3 .a
000E0h 10 C3 08 A3 18 E4 21 46 19 25 21 45 08 82 10 C3 .?
000F0h 08 62 00 21 08 41 08 42 10 83 29 45 31 A7 31 86 .b
00100h 4A 6A 52 AC 39 C7 21 04 08 41 10 C4 19 06 19 F1 Jj
  
```

Code-Size: A91CH Checksum: EFOBH Fill-Buffer Clear-Buffer Save-Buffer

Checking target MCU....

7-8-3 Power on the development board by pressing the white power button



7-8-4 Now you could see the process of programming

```
000E0h  10 C3 08 A3 18 E4 21 46 19 25 21 45 08 82 10 C3  .?  
000F0h  08 62 00 21 08 41 08 42 10 83 29 45 31 A7 31 86  .b  
00100h  4A 6A 52 AC 39 C7 21 04 08 41 10 C4 19 06 19 F1  Jj
```

Code-Size A91CH Checksum EFOBH Fill-Buffer Clear-Buffer Save-Buffer

. MCU type: STC12LE5A60S2  
F/W version: 6.2I

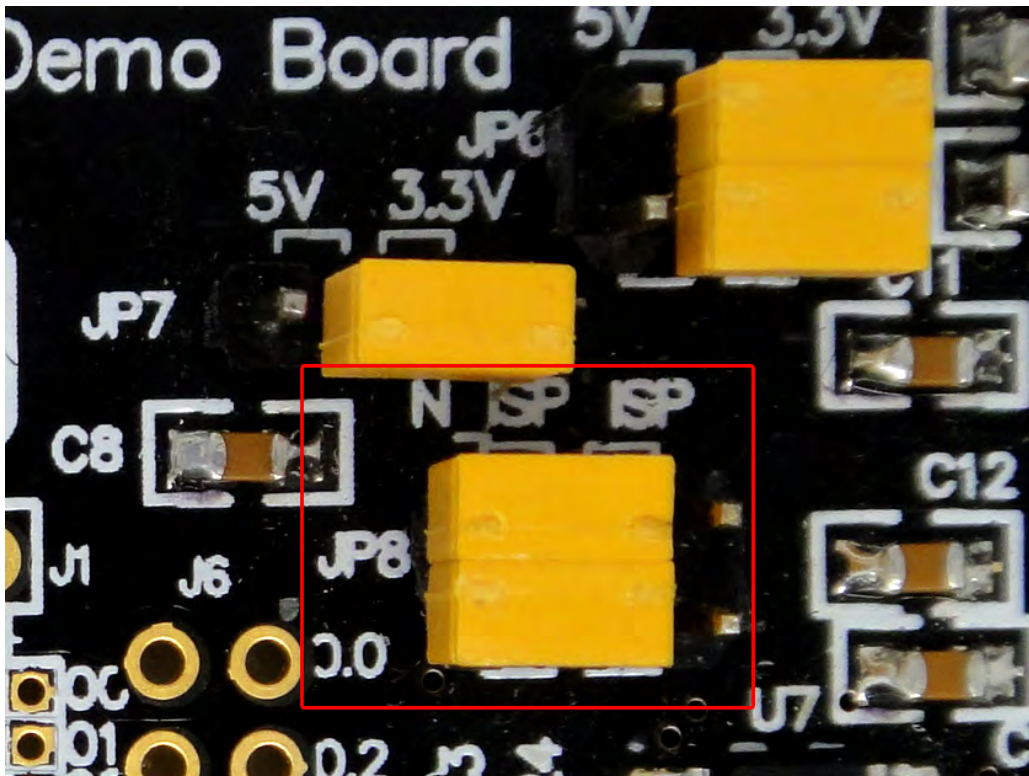
Re-handshaking ... Successful [0.609"]  
Current Baudrate: 57600  
Erasing MCU flash ... OK ! [2.562"]  
MCU ID : 000300B00C325F  
Programming user code ...

Release Project Release Help Get HDD-SN  Beep PassTimes 2 Reset

7-8-5 Progamming Finished



8 Please move the jumpers on JP8 from ISP to N\_ISP as below image shows.



## **8. CARE AND HANDLING PRECAUTIONS**

The kit is sold with a module mounted on it. If you attempt to modify the board to work with other modules, the warranty is void. For optimum operation of the module and demonstration board and to prolong their life, please follow the precautions below.

### **8.1 ESD (Electro-Static Discharge)**

The circuitry is industry standard CMOS logic and susceptible to ESD damage. Please use industry standard antistatic precautions as you would for any other PCB such as expansion cards or motherboards.

### **8.2 Avoid Shock, Impact, Torque and Tension**

- ◇ Do not expose the module to strong mechanical shock, impact, torque, and tension.
- ◇ Do not drop, toss, bend, or twist the module.
- ◇ Do not place weight or pressure on the module.

### **8.3 LCD&OLED Display Glass**

- ◇ The exposed surface of the LCD "glass" is actually a polarizer laminated on top of the glass. To protect the soft plastic polarizer from damage, the module ships with a protective film over the polarizer. Please peel off the protective film slowly. Peeling off the protective film abruptly may generate static electricity.
- ◇ The polarizer is made out of soft plastic and is easily scratched or damaged. When handling the module, avoid touching the polarizer. Finger oils are difficult to remove.
- ◇ If the LCD panel breaks, be careful not to get the liquid crystal fluid in your mouth or eyes. If the liquid crystal fluid touches your skin, clothes, or work surface, wash it off immediately using soap and plenty of water.
- ◇ Be very careful when you clean the polarizer. Do not clean the polarizer with liquids. Do not wipe the polarizer with any type of cloth or swab (for example, Q-tips). Use the removable protective film to remove smudges (for example, fingerprints) and any foreign matter. If you no longer have the protective film, use standard transparent office tape. If the polarizer is dusty, you may carefully blow it off with clean, dry, oil-free compressed air.

#### 8.4 Operation

- ◇ Use only the included AC adapter to power the board.
- ◇ Observe the operating temperature limitations: from -20°C minimum to +70°C maximum with minimal fluctuations. Operation outside of these limits may shorten the life and/or harm the display.
  - At lower temperatures of this range, response time is delayed.
  - At higher temperatures of this range, display becomes dark. (You may need to adjust the contrast.)
- ◇ Operate away from dust, moisture, and direct sunlight.

#### 8.5 Storage and Recycling

- ◇ Store in an ESD-approved container away from dust, moisture, and direct sunlight.
- ◇ Observe the storage temperature limitations: from -30°C minimum to +80°C maximum with minimal fluctuations. Rapid temperature changes can cause moisture to form, resulting in permanent damage.
- ◇ Do not allow weight to be placed on the modules while they are in storage.
- ◇ Please recycle your outdated displays at an approved facility.