Stoneitech STWI043WT Intelligent TFT LCD Instruction Manual

Contents

Stoneitech

Stoneitech STWI043WT Intelligent TFT LCD

Product Information

Specifications

- **Model:** STWI043WT-01
- **Release Date:** 05/2021
- **Manufacturer:** Stoneitech

Introduction

- The STWI043WT-01 is an Intelligent TFT-LCD Module used as an Equipment TFT display and touch controller. It is equipped with a processor, control program, TFT driver, flash memory, UART port, touch screen, power supply, and more. The module supports Json Code & Hex Code instruction sets, allowing it to be controlled by any MCU.
- The STWI043WT-01 offers a wide range of basic functions, including Vector font display, image display, curve display, touch function, video & audio function, and more. The User Interface is highly customizable, and the flash memory can store various data such as configuration files, image files, font files, video files, and audio files.

Warranty

All products purchased from Stoneitech are guaranteed to be in good repair for 3 years. If any quality problems (excluding human error) occur within the warranty period, the company will provide free maintenance and replace the broken product unconditionally.

Product Usage Instructions

Application Area

The STWI043WT-01 Intelligent TFT-LCD Module can be used in various applications such as industrial control systems, automation equipment, medical devices, consumer electronics, and more.

Working Principle

The module utilizes its processor, control program, and TFT driver to process and display visual content on the TFT-LCD screen. The touch screen allows users to interact with the displayed content. The module also supports video and audio playback.

Operation Processing

To operate the STWI043WT-01 module, follow these steps:

1. Ensure that the module is properly connected to the power supply and any required peripherals.
2. Power on the module by pressing the designated power button or by supplying power through the UART port.
3. Wait for the module to initialize and display the User Interface on the TFT-LCD screen.
4. Interact with the displayed content using the touch screen. Follow any on-screen instructions or prompts for specific operations.
5. To access additional features or settings, navigate through the User Interface using the provided controls or touch gestures.
6. To power off the module, either press the designated power button or disconnect the power supply.

Software Operation
The STWI043WT-01 module can be controlled and configured using compatible software. Follow the software's instructions for installation and usage. The module supports Json Code & Hex Code instruction sets, enabling communication with any MCU.

FAQ

- **Where can I find additional information about Intelligent Products?**
  You can find comprehensive additional information on Intelligent Products through STONE's Online services:
  - **Official website:** https://www.stoneitech.com/
  - **Official forum:** https://forum.stoneitech.com/
  - **Telephone:** 0086-10-84351669
- **Who should I contact for technical queries?**
  For technical queries, please contact STONE representatives in the subsidiaries and branches responsible for your area.
- **What are the registered trademarks of STONE?**
  The registered trademarks of STONE are:
  - STONE
  - STONE TECH
  - Intelligent HMI
  - Intelligent TFT-LCD Module
  - Smart TFT-LCD Module

Preface

This equipment manual is part of our Intelligent TFT-LCD Module documentation. It provides the information in regards of operation, installation, configuration, function, system as well as its technical design and working principle.

Customer Online Services

Customer Support offers comprehensive additional information of Intelligent Products through its Online services as follows:

- **Official website:**
  - **https://www.stoneitech.com/**
  - **https://www.stone-hmi.com**
- **Official forum:** https://forum.stoneitech.com/
- **Telephone:** 0086-10-84351669

Other support
In need of technical queries, please contact STONE representatives in the subsidiaries and branches responsible for your area.

Trademarks
STONE registered trademarks are as below:

- STONE
- STONE TECH
- Intelligent HMI
- Intelligent TFT-LCD Module
- Smart TFT-LCD Module

Abbreviations
The abbreviation table in this equipment manual is as below:

- **LED** Light Emitting Diode
- **CPU** Central Processing Unit
- **ESD** Electrostatic Sensitive Device
- **HMI** Human Machine Interface
- **IF** Interface
- **LCD** Liquid Crystal Display
- **UART** Universal Asynchronous Receiver/Transmitter
- **COM** Commercial
- **DIN** Data Input
- **DOUT** Data Output
- **VIN** Voltage Input
- **GND** Ground
- **TP** Touch Panel

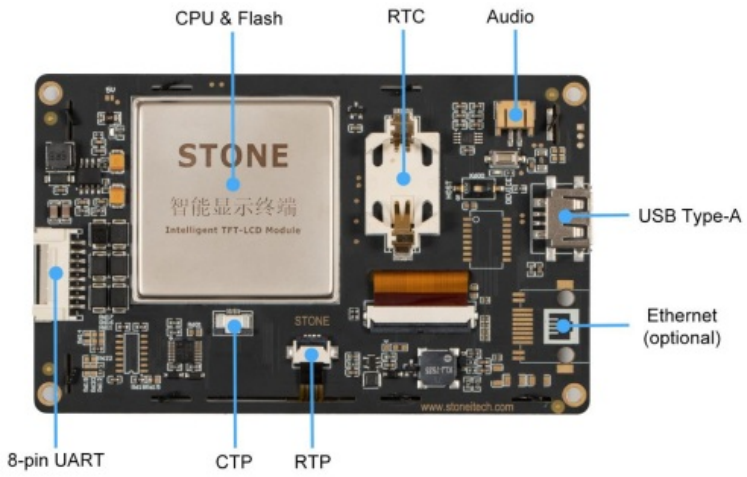
  A list of all the technical terms together with their explanations is provided in the glossary at the end of this manual.

Introduction

This chapter contains general information of:

- Brief Introduction

- Warranty
- Product Characteristics
- Application Area
- Working principle
- Operation Processing
- Software Operation



Brief Introduction

- The STWI043WT-01 has been used as Equipment TFT dispaly & Touch controller. It includes processor, control program, TFT driver, flash memory, UART port, touch screen, power supply etc., and the important is it can supply the Json Code & Hex Code instruction sets, so that it can be controlled by Any MCU.
- The STWI043WT-01 can perform all basic functions, such as Vector font display, image display, curve display as well as touch function, Video & Audio function etc. The User Interface can be more abundant and various. And the flash memory can store your data, configuration files, image file, font file, video file and audio file etc.

Warranty
All products purchased from our company are guaranteed to keep in good repair for 3 years. If quality problems (except human error) happen in guarantee period, our company will maintain for free to replace the broken one unconditionally.

Product Characteristics

- With Cortex A8 CPU / 256MB Flash / TFT Driving device
- Controlled by any MCU via Json & Hex Code Instruction
- Display Image / Text / Curve / Video
- 262K (18bit) colour TFT display

- With / without Touch Screen
- RS232 / RS422 / RS485 / TTL UART Interface & USB port Downloading
- Ethernet port / WIFI Remote Control
- Wide voltage range / Strong Working Temperature
- Easy to use! Powerful function! Saving Much Development cost and time!

Application Area
Widely used in various industrial field

- Medical & Beauty Equipment
- Engineering Machinery and Vehicle Equipment
- Electronic Instrument
- Industrial Control System
- Electric Power Industry
- Civil Electronic Equipment
- Automation Equipment
- Traffic Field
- New energy project
- IOT applications

Working Principle
The Intelligent TFT-LCD Module communicates with the Customer's MCU / CPU / FPGA / PLC via JSON Code and HEX Code Instructions, then the MCU can control its connected equipment to work according to the received instructions.

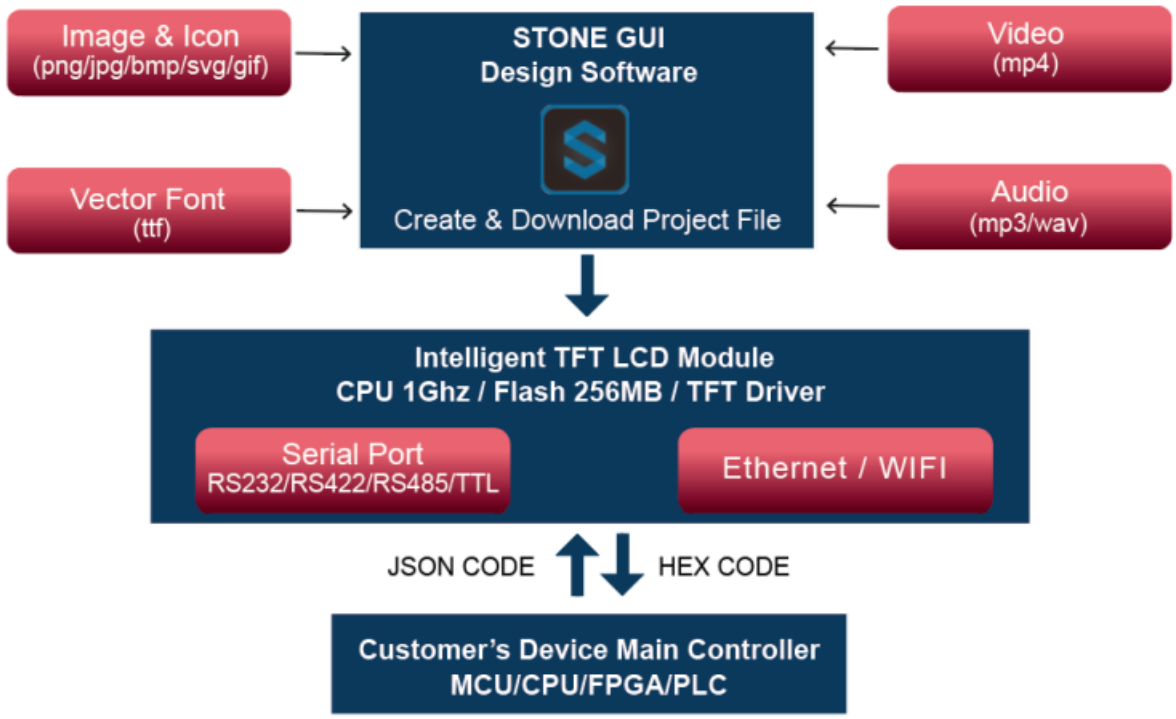


Figure 1.3-1 Configuration and process control phase

Operation Processing
Only 3 steps to operate our TFT-LCD Module:

- Build a new project by STONE GUI Design Software.
- Connect with customer's MCU through RS232,RS422,RS485,TTL directly, Plug & Play.
- Write a simple program for MCU to control the TFT-LCD Module via Instruction Sets.

The communication protocol is built with 2 parts:

1. Initiative Instruction – JSON Code (MCU TFT-LCD Module)

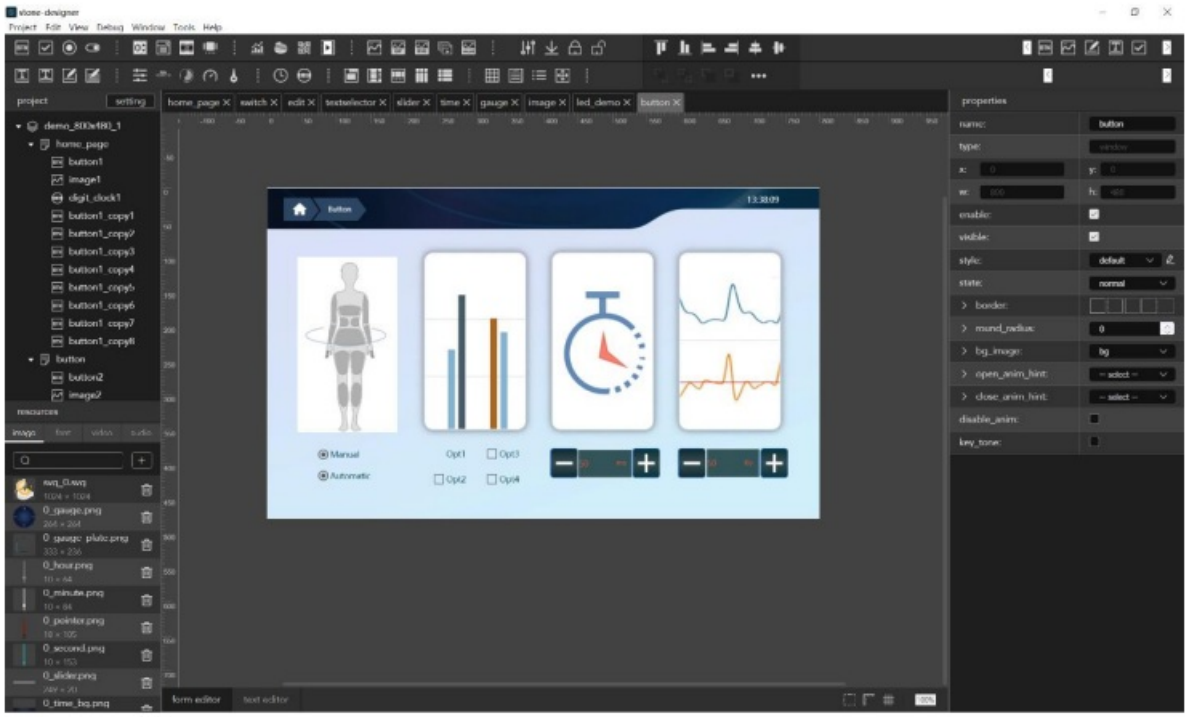
Frame header	instruction code	widget type	widget name	data	Frame tail
ST<	{"cmd_code":"set_value","type":"label","widget":"label2","value":5}				>ET

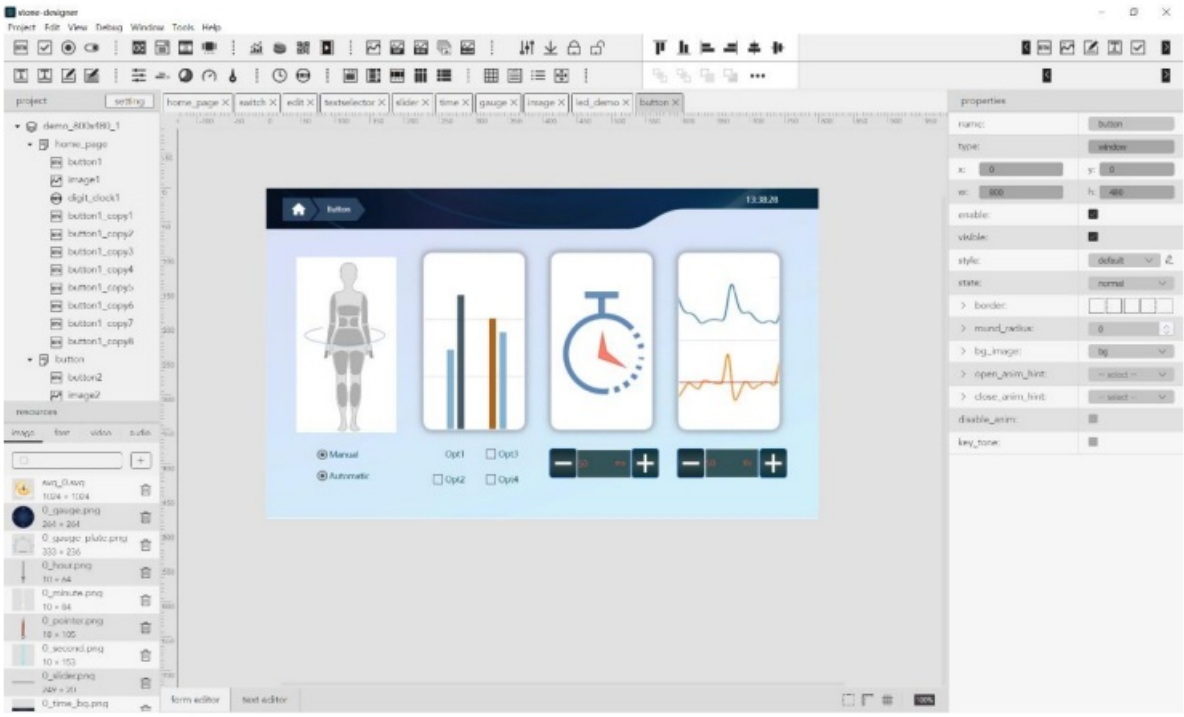
2. Passive Instruction – HEX Code (TFT-LCD Module MCU)

Frame header	CMD	LEN	DATA	Frame tail	CRC16
53 54 3C	10 62	00 09	6C 61 62 65 6C 3F A1 47 AE	3E 45 54	6C 8B

More information, please refer to the document of Instruction Sets.

Software Operation
We will offer a simple & powerful "Stone GUI design Software" to help you to design the new project for Intelligent TFT-LCD Module basic on Windows system or MacOS system.





Technical Parameters

This chapter contains technical data on:

- **Physical Parameter**
  - **Size** 4.3 inch
  - **Resolution** 480×RGB×272
  - **Pixel Spacing** 0.066(W) × 0.198(H) mm
  - **Color** 262,144 colors (18 bit)
  - **Viewing Area** 95.04(W) × 53.86(H) mm
  - **Display Dimension** 106.5mm×68.2mm
  - **Overall Dimension**
    - 121.9mm×74.7 mm×15.5mm (T) (Standard type)
    - 121.9mm×74.7 mm× 21.65mm (T) (with Ethernet port)
  - **Net Weight** 155g(T)
- **Display**
  - **Backlight Type** LED
  - **Brightness** 500cd/m2 (Brightness can be adjustable in 100 levels)
  - **Contrast** 500:1
  - **Backlight Life** 30,000 hours
  - **Viewing Angle** 70°/70°/50°/70°(L/R/U/D)
  - **TFT Panel** A Class Industry Panel
  - **Touch Screen** 4 Wire Resistance Touch /Capacitive Touch / Without Touch Screen
  - **Screen Mode** Digital
- **Processor**
  - CPU Cortex A8
  - Refresh Rate 1G Hz

- Max Frame Rate 60 FPS

- **Memory**
  - **Flash Memory** Standard 256MB, Extension 1GB or 2GB
  - **Memory Amount for Image** According to the capability of the image, Suggest “JPG, BMP, PNG, SVG, GIF” format.
- **Interface**
  - **Serial Interface** RS232 / RS422 / RS485 / TTL level
  - **Ethernet Interface** 10M/100M (Optional)
  - **Wireless Interface** WIFI
  - **Project File Downloading** USB2.0 port or U storage Disk
- **Power Supply**
  - **Rated Voltage** +12V DC or +5V DC
  - **Permissible Voltage Range** +7V DC…+28V DC or +5V DC
  - **Max. Permissible Transients** +28V
  - **Time between Two Transients** 50 sec minimum
  - **Internal Fuse** 2A self-recovery fuse
  - **Power Consumption** 1.0 W
  - **Electric Current** 2A
- **Electrical Characteristics**

Parameter	Condition	Min	Type	Max
Supply Current	VIN=12V (Max brightness)		145mA	
	VIN=12V (close brightness)		80mA	
Baud Rate			115200 bps	
Signal				

- **Ambient Conditions**
  - **Max. Permissible Ambient Temperature**
    - **Operation** -30 +80
    - **Storage** -40 +85
  - **Relative Humidity**
    - **Operation** 55℃℃,85%
    - **Storage** 60℃℃,90%
  - **Shock Loading**
    - **Operation** 15 g/11 msec
    - **Storage** 25 g/6 msec
  - **Vibration**
    - **Operation** 0.035 mm (10 – 58 Hz)/ 1 g (58 – 500 Hz)
    - **Storage** 3.5 mm (5 – 8,5 Hz)/ 1 g (8.5 – 500 Hz)
  - **Barometric Pressure**
    - **Operation** 706 to 1030 hPa

    - **Storage** 581 to 1030 hPa
- **Noise Immunity**
    - **Static Discharge (contact discharge/air discharge)** EN 61000-4-2 6 kV/8 kV
    - **RF Irradiation** EN 61000-4-3
        - 10 V/m, 80% AM
        - 1 kHz
    - **Pulse Modulation** ENV 50204
        - 900 MHz 5 MHz
        - 10 V/meff., 50% ED, 200 Hz
    - **RF Conduction** EN 61000-4-6
        - 150 kHz – 80 MHz
        - 10 V, 80% AM, 1 kHz
    - **Burst Interference** EN 61000-4-4
        - **Supply Lines** 2kV
        - **Process Data Lines** 2kV
        - **Signal Lines 1**kV
- **Radio Interference**
    - **Radio Interference Level Complying to EN 55011** Class A
- **Support Device**
    - **UART Port** Support RS232 / RS422 / RS485 / TTL
    - **Network Port** Support Ethernet Port / WIFI
    - **Flash Memory** Support Standard 256MB, Extend 1GB or 2GB
    - **Buzzer** Support
    - **RTC** Support
    - **USB Type A Port** Support Online Download By USB Cable
    - **U Storage Disk Interface** Support. Offline Download or Copy User Data
    - **Touch Screen** 4 Wire Resistance / Capacitive
    - **Vector Font** Standard TTF Format
    - **Image** Support JPG/BMP/PNG/SVG/GIF Format
    - **Video Interface**
        - Support AVI / mp4
        - Support encode H264 720p
    - **Audio Interface**
        - Support WAV / mp3 format
        - The length of single audio file is not limited, theoretically up to 4096 audio files, speaker power is 8 ohms 2 watts or 4 ohms 3 watts
    - **Command Set** Unified Simplified Command Sets

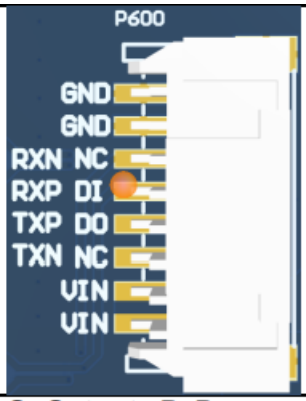
Interface Description

This chapter contains the description of the interfaces:

- VVC

- NC
- DOUT
- DIN
- GND

Communication Interface Definition



Pin Name	Pin NO.	Pin Type	Interpret
GND	1,2	P	Power Ground
DIN	4	I	Data Input
DOUT	5,	O	Data Output
NC	3,6		None
VCC	7,8	P	Power Supply Input

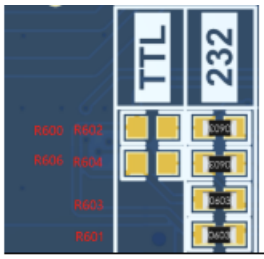
I: Input O: Output P: Power

Note A: 1. Adopting the 8 Pin 2mm spacing socket. Model Code: A2008WR-S-8P.
2. Direction of the signal was defined with TFT-LCD Module;
"I" refers to the signal from the user's MCU transmitted to the TFT-LCD Module.
3. Pins with the same definition are connected together in the module inside.
4. RS232, RS422, RS485, TTL port can be default which need to point out in the order.

Note B: The selection of Baud rate for the serial interface:

Baud rate (bps)	1200	2400	4800	9600	19200	38600	57600	115200	921600	1500000

Serial Port Defind:



Note A: RS232 area connect, TTL area disconnect.
TTL area connect, RS232 area disconnect.
Note B: The resistance are 0 Ω with 0603 standard package.
Note C: The welding pad of STWI035WT-01 is on the back of the PCB, and the black frame needs to be removed .

Accessories

This chapter contains the accessories:

- Double 8-pin Connect Cable
- 8-pin Socket
- Type A USB Cable
- Converter: USB ⇌ RS232 / RS422 / RS485 / TTL
- IP65 Plastic Box (optional)
- Metal Bezel (optional)

Accessory Name	Model	Note	Picture
Double 8-pinCable	L8	Optional： 10cm/20cm/35cm/65cm	
8-pin Socket	S8	SMD-8 2.0mm with Lock Model:A2008WR-S-8P	
Type A USB Cable	LU	Double USB Port Cable Online Downloading	
Converter	UR2.0 UR4.0 UR1.0	USB to RS232 USB to RS422 / RS485 USB to TTL	
U Storage Disk		Offline USB Batch Downloading Function	
IP65 Plastic Box (optional)	IP65-043 IP65-050 IP65-056 IP65-070 IP65-080 IP65-104	For: 4.3”, 5”, 5.6”, 7”, 8”,10.4”	
Metal Bezel (optional)	MB-035 MB-043 MB-050 MB-056 MB-070 MB-080 MB-101 MB-104	For: 3.5”, 4.3”, 5”, 5.6”, 7”, 8”,10.1”,10.4” Colour: Silver & Black	

Physical Dimensions

This chapter contains the information of Physical Dimensions.

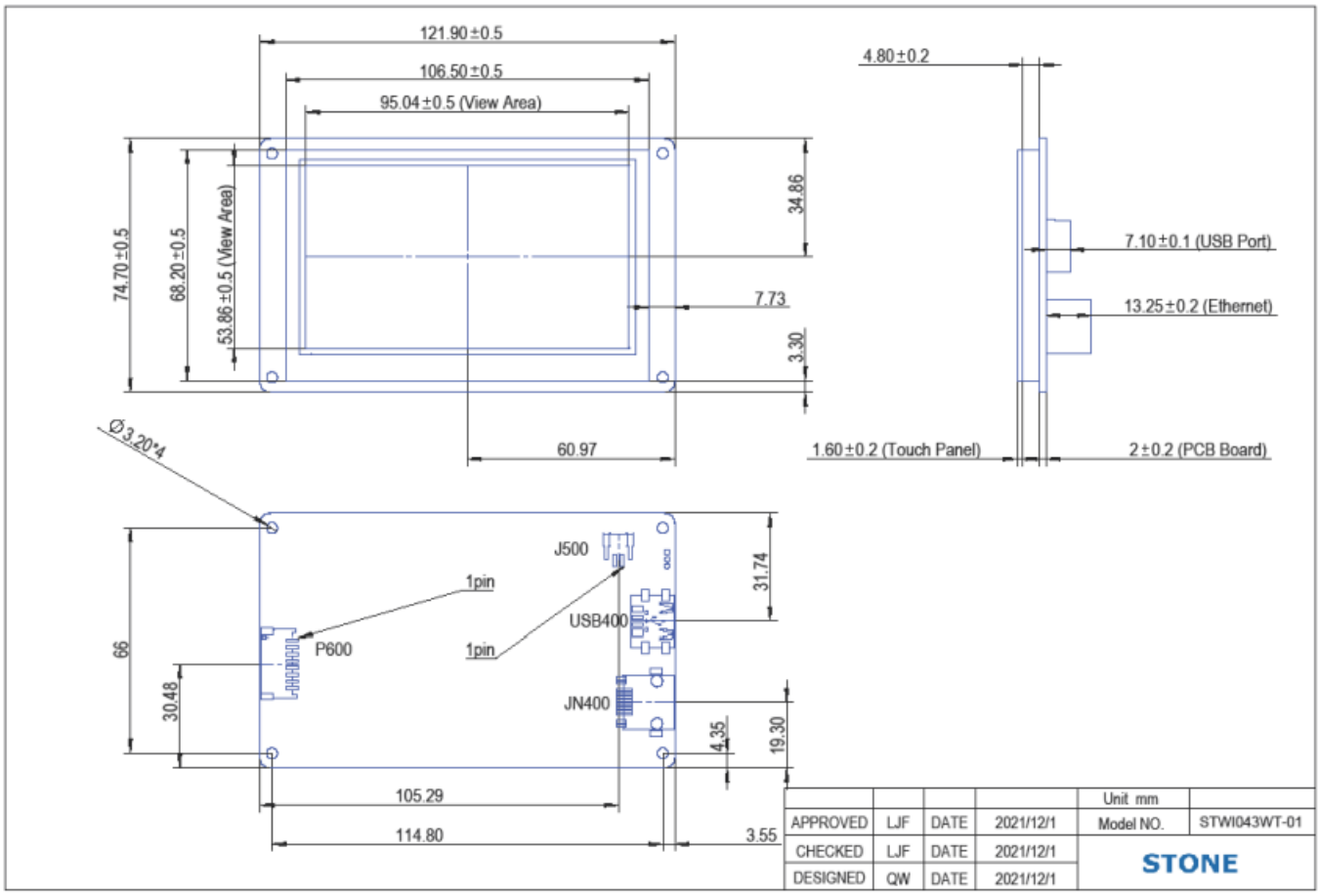


Figure 5-1 STWI043WT-01 dimension

Electrical Components

This chapter contains the brands of the components:

- TFT Panel
- Touch Screen
- CPU
- LCD Controller
- Flash memory
- Connecter
- Capacitance
- IC

Components	Supplier
TFT Panel	INNOLUX, AUO, CHIMEI 奇美實業, SHARP 夏普
CPU	Texas Instruments, ST, nuvoTon
LCD Controller	ALTERA
Touch Screen	FUJITSU, AMT
Flash Memory	TOSHIBA, winbond
Connector	molex, Tyco Electronics, OMRON
Capacitance	SAMSUNG, TDK, muRata, UniOhm
IC	SAMSUNG, ISSI, LINEAR TECHNOLOGY, Texas Instruments

Naming Rule

This chapter contains the naming rule:

As sample STWI070WT-01E

Code	Explain
ST	Company Code
W	The third version product
I	I=Industrial Type ; A=Advanced Type; C=Civil Type
070	TFT Panel Dimension: 7 inch
W	W=Wide Voltage (+7V to +28V) L=Low Voltage (+5V)
T	T=With Resistive Touch Screen C=With Capacitive Touch Screen N=Without Touch Screen
0	0=RS232 4=RS422 / RS485 1=TTL Level
1	Hardware Code
E	E=Ethernet W=WIFI

International Certification

This chapter contains the certification we passed:

- CE Certificate
- ROHS Certificate
- FCC Certificate
- ISO9001:2008 Quality System

CE Certificate


Shenzhen Global Test Service Co., Ltd.

Certification of Conformity

Certification number: GTS20220422006-1-2

Issue date: Apr. 26, 2022

In accordance with the following Applicable Directives:

2014/30/EU

Electromagnetic Compatibility

The test results are traceable to the international or national standards.

Applicant: STONE(BJ)Technology Co.,Ltd.
1905 of Building D, Yuanyang International Center, East Fourth Ring Middle Road 82, Chaoyang District, Beijing, China

Manufacturer: STONE(BJ)Technology Co.,Ltd.
1905 of Building D, Yuanyang International Center, East Fourth Ring Middle Road 82, Chaoyang District, Beijing, China

Equipment under test: TFT LCD MODULE

Trade Mark: N/A

Series models: N/A

Applied Standards and Test Reports	
EN 55032: 2015 + A11: 2020 EN 55035: 2017 + A11: 2020	GTS20220422006-1-2

Laboratory Name: Shenzhen Global Test Service Co., Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

Http://www.gtscert.com E-mail: gts_sz@gtscert.com

Note:

Authorized by:

FCC Certificate


Certificate of Conformity

SUPPLIER'S DECLARATION OF CONFORMITY

Applicant: Beijing Stone Technology Co., Ltd.

Manufacturer: Beijing Stone Technology Co., Ltd.

Product: TFT LCD Display Module

Trade Name: STONE

FCC Part 15 subpart B Class B(2017),
Measurement Procedure ANSI C63.4:2014.

Jun. 14, 2022

Shenzhen ZTS Testing Service Co., Ltd.

RoHS Certificate


Dongguan Universal Testing Technology Co., Ltd.

CERTIFICATE OF CONFORMITY

CERTIFICATE No.: UTLR22065892C01

Page 1 of 1

Applicant: Beijing Stone Technology Co., Ltd.

Sample Information: Below sample and sample information are provided by client

Sample Name: TFT LCD Display Module

TEST REQUIREMENTS	CONCLUSION(S)
Heavy metals and flame retardants content-European Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment(RoHS)	PASS
Phthalates content-European Council Directive 2015/863 on revising the restricted substances in European Council Directive 2011/65/EU(RoHS)	PASS

RoHS

ISO9001:2008


ISO 9001

Certificate

This is to certify that the Quality Management System of

Beijing STONE Technology Co.,Ltd.

Room 1905, Building D, Yuanyang International Center,
Chaoyang District, Beijing, China

Has been audited to conform to the following Quality Management System standard

GB/T 19001-2016/ISO 9001:2015

This Quality Management System is valid for the

Design, development and production of
industrial color LCD module

Issued by:

EACC IAF CNAS

APPENDIX

ESD Guidelines

What does ESD mean?

- Virtually all present-day modules incorporate highly integrated MOS devices or components. For technological reasons, these electronic components are very sensitive to overvoltages and consequently therefore to electrostatic discharge:
- These devices are referred to in German as Elektrostatisch Gefährdeten
- Bauelemente/ Baugruppen: ºEGBº
- The more frequent international name is: ºESDº (E lectrostatic Sensitive Device)
- The following symbol on plates on cabinets, mounting racks or packages draws attention to the use of electrostatic sensitive devices and thus to the contact sensitivity of the assemblies concerned:
- ESDs may be destroyed by voltages and energies well below the perception threshold of persons. Voltages of this kind occur as soon as a device or an assembly is touched by a person who is not electrostatically discharged . Devices exposed to such overvoltages cannot immediately be detected as defective in the majority of cases since faulty behavior may occur only after a long period of operation.

Precautions against electrostatic discharge

- Most plastics are capable of carrying high charges and it is therefore imperative that they be kept away from sensitive components.
- When handling electrostatic sensitive devices, make sure that persons, workplaces and packages are properly grounded.

Handling ESD assemblies

- A general rule is that assemblies should be touched only when this cannot be avoided owing to the work that has to performed on them. Under no circumstances should you handle printed-circuit boards by touching device pins or circuitry.
- You should touch devices only if
    - you are grounded by permanently wearing an ESD wrist strap or
    - you are wearing ESD shoes or ESD shoe-grounding protection straps in conjunction with an ESD floor.
- Before you touch an electronic assembly, your body must be discharged. The simplest way of doing this is to touch a conductive, grounded object immediately beforehand ± for example, bare metal parts of a cabinet, water pipe etc.
- Assemblies should not be brought into contact with charge-susceptible and highly insulating materials such as plastic films, insulating table tops and items of clothing etc. containing synthetic fibers.
- Assemblies should be deposited only on conductive surfaces (tables with an ESD coating, conductive ESD cellular material, ESD bags, ESD shipping containers).
- Do not place assemblies near visual display units, monitors or television sets (minimum distance to screen > 10 cm).

Measuring and modifying ESD assemblies
Perform measurements on ESD assemblies only when

- the measuring instrument is grounded ± for example, by means of a protective conductor± or

- the measuring head has been briefly discharged before measurements are made with a potential-free measuring instrument ± for example, by touching a bare metal control cabinet.
  When soldering, use only grounded soldering irons.

Shipping ESD assemblies

- Always store and ship assemblies and devices in conductive packing ± for example, metallized plastic boxes and tin cans.
- If packing is not conductive, assemblies must be conductively wrapped before they are packed. You can use, for example, conductive foam rubber, ESD bags, domestic aluminum foil or paper (never use plastic bags or foils).
- With assemblies containing fitted batteries, make sure that the conductive packing does not come into contact with or short-circuit battery connectors. If necessary, cover the connectors beforehand with insulating tape or insulating material.

Glossary

- **B**
  - **Baud rate**
    Rate of speed at which data is downloaded. Baud rate is specified in Bit/s.
  - **Boot**
    A loading process which downloads the operating system in the working memory of the operating unit.
- **C**
  - **Command Set**
    Hex Code, the MCU can control the TFT Module via the command set.
  - **Configuration file**
    It can be created by the softwares.
- **D**
  - **Download**
    Download the image, configuration files and data through mini USB port or USB port.
  - **Download mode**
    Through mini USB port or USB port.
- **F**
  - **Flash memory**
    Programmable memory which can be electrically deleted and written to again segment-by-segment.
- **H**
  - **Half Brightness Life**
    The period of time after which the brightness tube only achieves 50% of the original value.
- **I**
  - **Input field**
    Enables the user to enter values which are subsequently sent to the MCU.
- **M**
  - **MCU**
    Micro Control Unit, it is widely used in the industrial control.

- **N**
  - **Normal operation**
    Operating unit operating mode in which messages are displayed and screens can be operated.
- **O**
  - **Output field**
    Displays current values from the MCU on the operating unit.
- **P**
  - **Process screen**
    The display of process values and process progress on the operating unit in the form of screens, which may contain graphics, texts and values.
- **R**
  - **RS485**
    Standard interface for serial data transfer at a very high transmission rate.
- **S**
  - **Screen**
    A screen displays all the logically related process data on the operating unit, whereby the individual values can be modified.
- **T**
  - **Touch panel**
    This is an operating unit without a keyboard. The touch panel (abbreviated to TP) is operated via the contact-sensitive screen elements.

Documents / Resources

	Stoneitech STWI043WT Intelligent TFT LCD [pdf] Instruction Manual STWI043WT Intelligent TFT LCD, STWI043WT, Intelligent TFT LCD, TFT LCD, LCD

References

- in in
- industrial industrial
- technical technical
- LCD Display, LCD Module, TFT Display, LCD Display Manufacturers, HMI Display
- STONE-LCD Display, LCD Module, TFT Display, LCD Display Manufacturers, HMI Display,TFT LCD