

**BMduino-Shield
2.8" TFT-LCD Display**

BMD58T280 User Guide

Revision: V1.10 Date: June 20, 2024

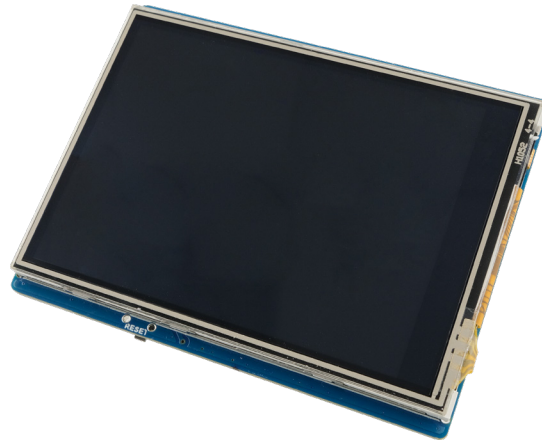
www.bestmodulescorp.com

Contents

Introduction	3
Features	3
Block Diagram.....	4
Pin Description	4
Technical Specifications	6
Recommended Operation Conditions	6
Timing Specification	6
Hardware Overview	7
Power Supply	7
Communication Interface	8
Slide Switch.....	8
SD Card Read and Write Function.....	8
Application Circuit.....	9
Dimensions	10

Introduction

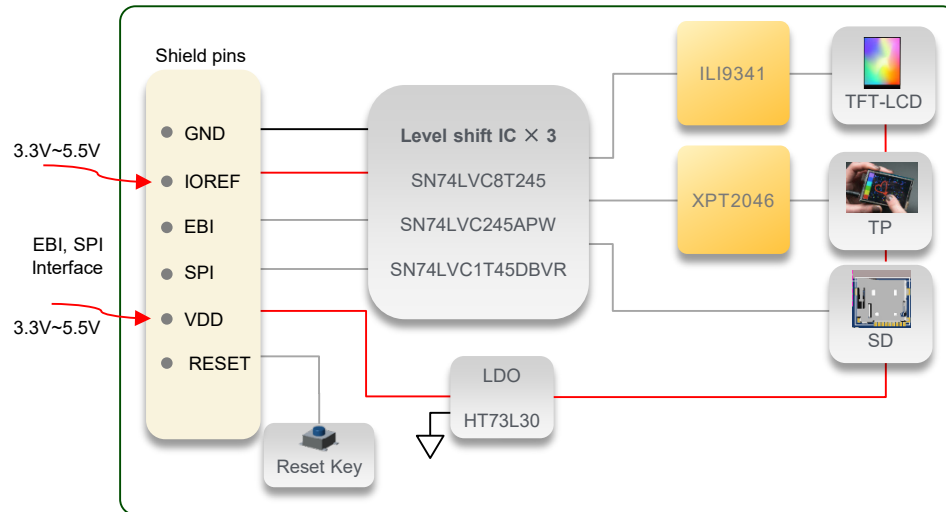
The Best Modules BMD58T280 is a shield board for TFT-LCD display function, which is developed by using driver a IC TFT-LCD, the ILI9341 and a resistive touch IC, the XPT2046. It is equipped a 2.8" color TFT-LCD resistive touch screen with a 320×240 resolution, the screen has the characteristics of good brightness, high contrast, strong layering and bright color. The shield also has a Micro SD card slot, which can read BMP pictures in the storage card and display them. The shield can be directly plugged in-and-out of the BMduino UNO development board, to implement the pictures and characters displaying, touching as well as other functions using the EBI or SPI communication method. The shield is suitable for use in applications such as writing pad, digital photo frame.



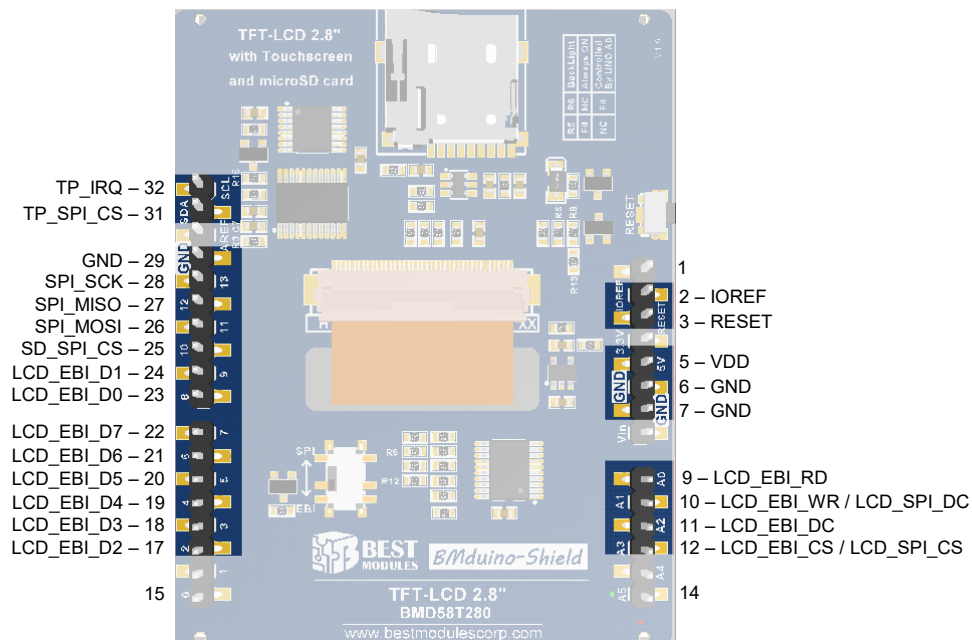
Features

- Operating voltage: 3.3V~5.5V
- Operating current: <120mA
- TFT-LCD driver IC: ILI9341
- Resistive touch IC: XPT2046
- Shield characteristics:
 - ◆ 2.8" color TFT-LCD with resolution of 240×320
 - ◆ Micro SD card slot can read BMP files in the storage card
 - ◆ Resistive touch screen can realize touch function
- Communication interfaces:
 - ◆ The BMduino interface can be directly plugged in-and-out of the BMduino UNO development board for use
 - ◆ Communication method: SPI or EBI
- Provides Arduino Library support
- Board size: 54.66mm×69.98mm×12.33mm

Block Diagram



Pin Description



BMduino-Shield Pins:

Pin	Function	BMduino Pin	Description
2	IOREF	IOREF	Communication logic power supply
3	RESET	RESET	RESET pin
5	VDD	5V	Positive power supply, 3.3V~5.5V
6	GND	GND	Negative power supply, ground
7	GND	GND	Negative power supply, ground

Pin	Function	BMduino Pin	Description
9	LCD_EBI_RD	A0	LCD_EBI read signal (RD)
10	LCD_EBI_WR/ LCD_SPI_DC	A1	LCD_EBI write signal (WR); LCD_SPI data or command signal (DC)
11	LCD_EBI_DC	A2	LCD_EBI data or command signal (DC)
12	LCD_EBI_CS/ LCD_SPI_CS	A3	LCD_EBI chip select signal (CS); LCD_SPI chip select signal (CS)
17	LCD_EBI_D2	D2	LCD_EBI data line (E_D2)
18	LCD_EBI_D3	D3	LCD_EBI data line (E_D3)
19	LCD_EBI_D4	D4	LCD_EBI data line (E_D4)
20	LCD_EBI_D5	D5	LCD_EBI data line (E_D5)
21	LCD_EBI_D6	D6	LCD_EBI data line (E_D6)
22	LCD_EBI_D7	D7	LCD_EBI data line (E_D7)
23	LCD_EBI_D0	D8	LCD_EBI data line (E_D0)
24	LCD_EBI_D1	D9	LCD_EBI data line (E_D1)
25	SD_SPI_CS	D10	SD card chip select signal
26	SPI_MOSI	D11	SPI master output and slave input data line
27	SPI_MISO	D12	SPI master input and slave output data line
28	SPI_SCK	D13	SPI clock line
29	GND	GND	Negative power supply, ground
31	TP_SPI_CS	SDA	Touch screen chip select signal
32	TP_IRQ	SCL	Touch screen PENIRQ signal

Technical Specifications

Recommended Operation Conditions

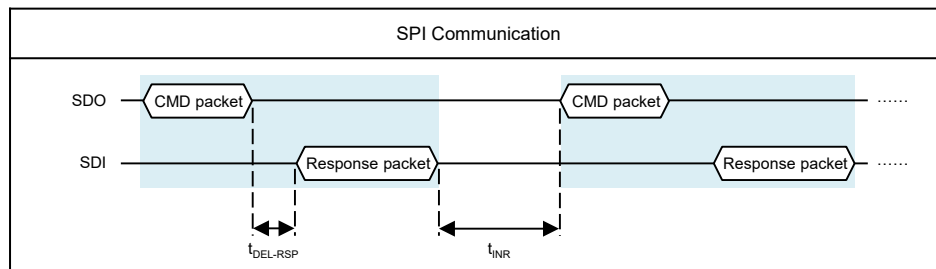
Ta=25°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{DD}	Operating Voltage	—	3.3	—	5.5	V
I _{DD}	Operating Current	V _{DD} =5V	—	55	—	mA
I _{STB}	Standby Current	V _{DD} =5V	—	—	30	μA

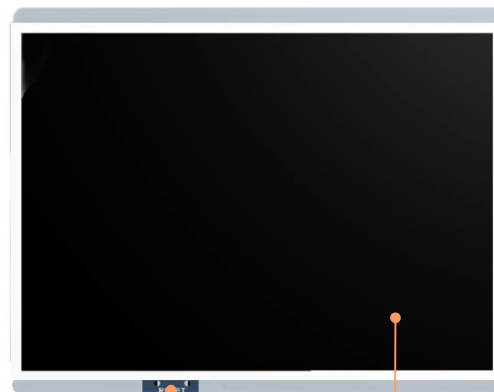
Timing Specification

Ta=25°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{DEL-RSP}	Response Delay Time	V _{DD} =3.3V	—	10	—	ms
t _{INR}	Interval Time	V _{DD} =3.3V	—	10	—	ms

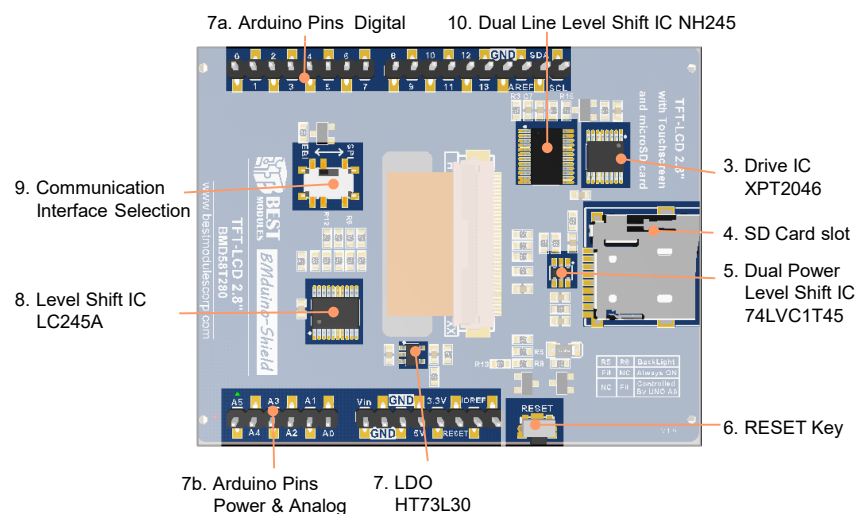


Hardware Overview



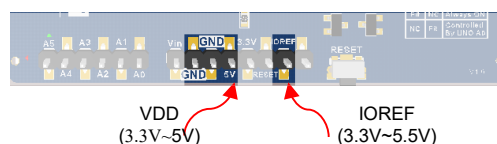
1. RESET Key 2. TFT-LCD

PCBA Front View



PCBA Back View

Power Supply



- BMduino-Shield pin: provided by the IOREF input, 3.3V~5.5V; provided by the VDD input, 3.3V~5.5V

Communication Interface

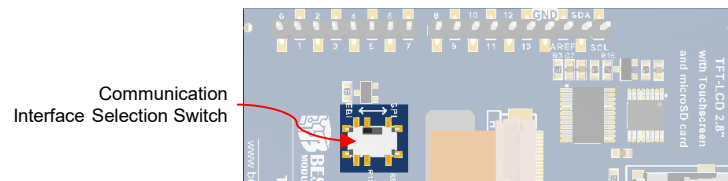
- Communication method:
 - ◆ TFT-LCD screen: SPI or EBI (Select by sliding switch)

Communication mode between the SD card and the touch screen is SPI

- SPI communication speed: $\leq 60\text{MHz}$
- Communication logic reference voltage: $3.3\text{V}\sim 5.5\text{V}$
- Communication Protocol:
 - ◆ Refer to the XPT2046 datasheet
 - ◆ Refer to the ILI9341 datasheet

Slide Switch

Slide Switch	Communication Mode of TFT-LCD Screen
Switch to the SPI port	SPI
Switch to the EBI port	EBI

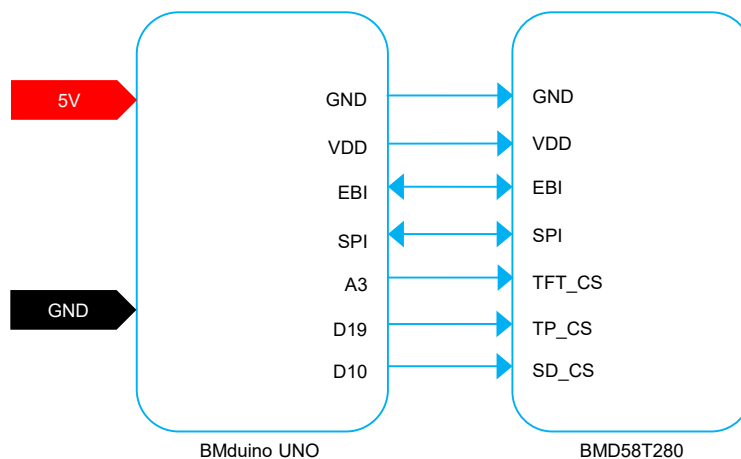


SD Card Read and Write Function

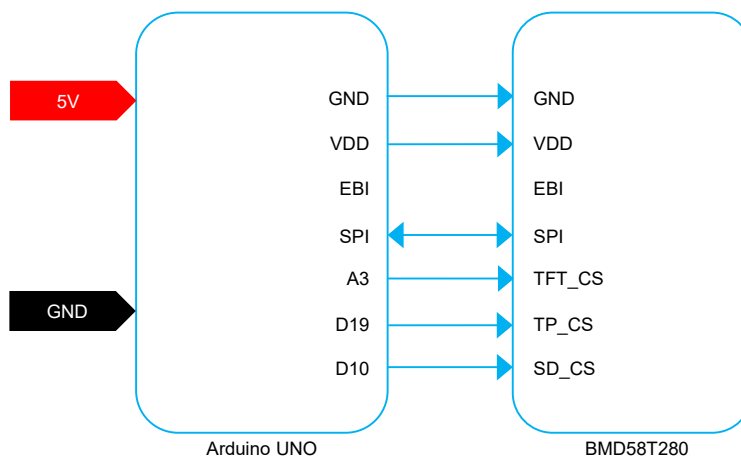
The BMD58T280 is equipped with a Micro SD card slot to control the SD card through the SPI interface. Users can save the picture data to the SD card, read the picture data from the SD card through MCU and transmit it to TFT-LCD to display.

- (1) Users need to convert pictures in other formats into 24-bit bitmap BMP format through applications such as small artists for subsequent expansion board reading and display.
- (2) The picture resolution can't exceed 240×320 , otherwise the LCD will only display partial mapping

Application Circuit



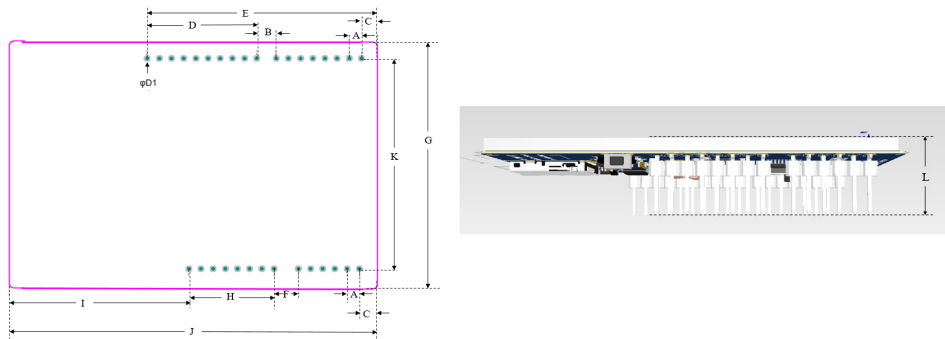
EBI Connection Diagram



SPI Connection Diagram

Pin diagram of EBI and SPI for details see pin description

Dimensions



Dimension Information

No.	Unit	mm	inch
A		2.540	0.100
B		4.064	0.160
C		5.612	0.220
D		22.86	0.900
E		44.70	1.760
F		5.080	0.200
G		54.66	2.150
H		17.78	0.700
I		28.78	1.133
J		69.98	2.755
K		48.26	1.900
ΦD1		0.850	0.033
L		12.33	0.485

Dimension List

Copyright© 2023 by BEST MODULES CORP. All Rights Reserved.

The information provided in this document has been produced with reasonable care and attention before publication, however, BEST MODULES does not guarantee that the information is completely accurate. The information contained in this publication is provided for reference only and may be superseded by updates. BEST MODULES disclaims any expressed, implied or statutory warranties, including but not limited to suitability for commercialization, satisfactory quality, specifications, characteristics, functions, fitness for a particular purpose, and non-infringement of any third-party's rights. BEST MODULES disclaims all liability arising from the information and its application. In addition, BEST MODULES does not recommend the use of BEST MODULES' products where there is a risk of personal hazard due to malfunction or other reasons. BEST MODULES hereby declares that it does not authorise the use of these products in life-saving, life-sustaining or safety critical components. Any use of BEST MODULES' products in life-saving/sustaining or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold BEST MODULES harmless from any damages, claims, suits, or expenses resulting from such use. The information provided in this document, including but not limited to the content, data, examples, materials, graphs, and trademarks, is the intellectual property of BEST MODULES (and its licensors, where applicable) and is protected by copyright law and other intellectual property laws. No license, express or implied, to any intellectual property right, is granted by BEST MODULES herein. BEST MODULES reserves the right to revise the information described in the document at any time without prior notice. For the latest information, please contact us.