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Pmod MTDS™ Reference Manual

Revised July 12, 2017

This manual applies to the Pmod MTDS rev. A

Overview

The Digilent Pmod MTDS (Revision A) is a gorgeous 2.8" touchscreen display with a powerful on-board microcontroller that performs graphics processing tasks. The display is a capacitive touchscreen with QVGA resolution (320×240) and 2 finger multi-touch support.



The Pmod MTDS.

Features include:

- 2.8" Display with QVGA resolution (320×240)
- 2 Finger Capacitive touch panel
- Powerful PIC32MZ Microcontroller
- Multi-Touch Display System (MTDS) Firmware
- Design a beautiful UI with only a few lines of code using libraries for Arduino IDE and Xilinx SDK
- Follows the Digilent Pmod Interface Specification 1.0, Type 2A (Expanded SPI)

The most compelling aspect of the Pmod MTDS is the programming experience provided by its [Multi-Touch Display System \(MTDS\) Firmware](#) and the associated libraries. These allow you to design sleek, stylish user interfaces very quickly and with very little code. The timing dependent tasks are handled by the firmware, so integrating the display into existing projects is also a snap. Some of the key functionality provided by the libraries include the ability to draw basic shapes and text, draw images stored on microSD with binary transparency, draw buttons and easily check if they have been pressed, and check the status and location of the user's two fingers. The libraries are supported in Arduino IDE and Xilinx SDK, and have been tested with Arduino, chipKIT and Arty host boards.

1 Specifications

Parameter	Min	Typical	Max	Units
Pmod Power Supply Voltage (VCC)	2.2*	3.3	5.5	V
Optional External Power Supply Voltage (VEXT)	2.7	5.0	6	V

Table 1. Pmod MTDS specifications.

**If VCC is selected as the Backlight Power source, then the minimum voltage is 2.7V.*

1.1 Pinout Table Diagram

Header J1

Pin	Signal	Description
1	CS	Chip Select
2	MOSI	Master Out Slave In
3	MISO	Master In Slave Out
4	SCLK	Serial Clock
5	GND	Power Supply Ground
6	VCC	Power Supply (3.3V/5V)
7	NC	Not Connected
8	RESET	Active-Low Reset
9	NC*	Not Connected
10	NC*	Not Connected
11	GND	Power Supply Ground
12	VCC	Power Supply (3.3V/5V)

Table 2. Header J1.

* Pins 9 and 10 of J1 are attached to the PIC32, but are not used by the firmware and should be treated as if they are not connected.

Header J2 (External Backlight Power)

Pin	Signal	Description
1	VEXT	External Power Supply Positive Connection
2	GND	Power Supply Ground

Table 3. Header J2 (External Backlight Power)

Jumpers

Name	State	Description
JP1	EXT	Use External power supply attached to J2 to power Backlight
JP1	VCC	Use VCC from Pmod connector to power Backlight

Table 4. Jumpers.

1.2 Physical Dimensions

The pins on the pin header are spaced 100 mil apart. The PCB is 3.45 inches long on the sides parallel to the pins on the pin header and 2.00 inches long on the sides perpendicular to the pin header.

2 Functional Description

The Pmod MTDS has an on-board PIC32MZ microcontroller that is running the MTDS firmware. To communicate with the device, you must use the MTDS and MyDisp libraries available and documented on the [MTDS resource center](#). Arduino and chipKIT host boards should use the Arduino IDE libraries, and Xilinx FPGA or Zynq based host

boards should use the Pmod MTDS IP core and the libraries included with it. For information on downloading and using the Pmod MTDS IP core see the [Using Pmod IPs Tutorial](#). After exporting to Xilinx SDK, follow the README.txt guide included in the examples folder.

JP1 is used to select how to power the display's backlight. A single jumper should be loaded across 2 of the three pins in order to select the power source. When the jumper is loaded across the bottom 2 pins the backlight is powered by VCC on the Pmod connector, and when it is loaded across the top two pins the backlight is powered by an external power supply attached to J2. This external power supply must meet the minimum and maximum voltage requirements outlined in the Specifications table above.

The microSD connector allows the MTDS firmware to draw and save images to an attached microSD card. In order to work properly, the microSD card must be formatted as FAT32. Image files should be saved as Windows Bitmap files (.bmp). For more information see the MTDS documentation available on the MTDS resource center.

2.1 Serial Communication

The Pmod MTDS communicates with the host board via the [SPI protocol](#); however, the implementation of this physical interface is handled by the MTDS libraries and it is not necessary to understand the details for its use.

2.2 Quick Usage

To get started with the Pmod MTDS quickly, go to the [MTDS resource center](#) and follow the instructions found there for your host platform.