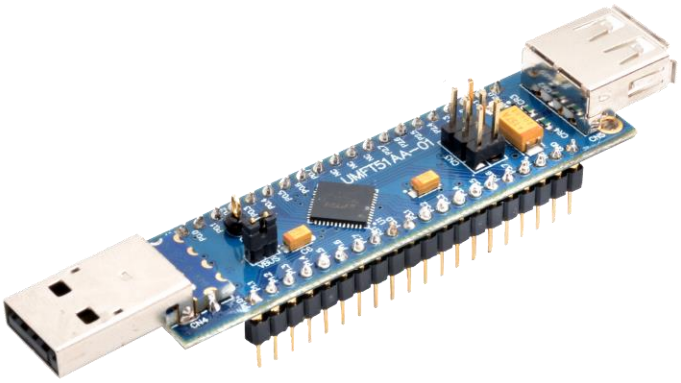
Future Technology Devices International

Datasheet

UMFT51AA 8051 Compatible Module



UMFT51AA is an FT51A DIP module that is compatible with an 8051 microcontroller.

1 Introduction

The UMFT51AA is a development module for FTDI's FT51AQ, one of the devices from FTDI's range of microcontrollers with USB interface bridging features integrated. FT51A is a MCU series which includes the following features: USB client and USB hub interfaces, 8051 core, 8-bit ADC, UART, SPI, I^2C, 245 FIFO and PWM.

The UMFT51AA is a module which is designed to plug into a standard 0.6" wide 40 pin DIP socket.

All components used, including the FT51AQ are Pb-free (RoHS compliant).

1.1 Features

The UMFT51AA is built with a FT51AQ; many of the features of the FT51AQ can be utilized with this module. For a full list of the FT51A's series features refer to the FT51A datasheet which can be found by clicking here.

In addition to the features listed in the FT51A datasheet, the UMFT51AA has the following features:

- PCB assembly module is designed to fit a standard 15.24mm (0.6") wide 40 pin DIP socket. Pins are on a 2.54mm (0.1") pitch. This module is a drop in replacement for an 8051 microcontroller.
- An on board USB type A socket and plug allow modules to be connected to a PC via a standard A extension cable or directly. This module is also capable of cascading several modules by utilizing the USB hub feature.
- Debugger interface header used for debugging and programming the FT51AQ. Designed for operation with the FTPD-1 programmer / debugger module. See the FTPD-1 datasheet for details about this module.
- Onboard jumper for configuring the FT51AA to be in self powered or USB powered modes.

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2 Driver Support

Driver support for the FT51A USB Device Firmware Updater (DFU) is available as part of the FT51A SDK and is available for the following OS:

- Windows 10 32,64-bit
- Windows 8.1 32,64-bit
- Windows 8 32,64-bit
- Windows 7 32,64-bit
- Linux 3.0 and greater

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3 Ordering Information

Module Code	Utilised IC Code	Description
UMFT51AA-01	FT51AQ	8051 compatibility module.

Other modules in the FT51A range:

Module Code	Utilised IC Code	Description
UMFT51-EVM	FT51AQ	FT51A demonstration platform.

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4 UMFT51AA Signals and Configurations

4.1 UMFT51AA Pin Out

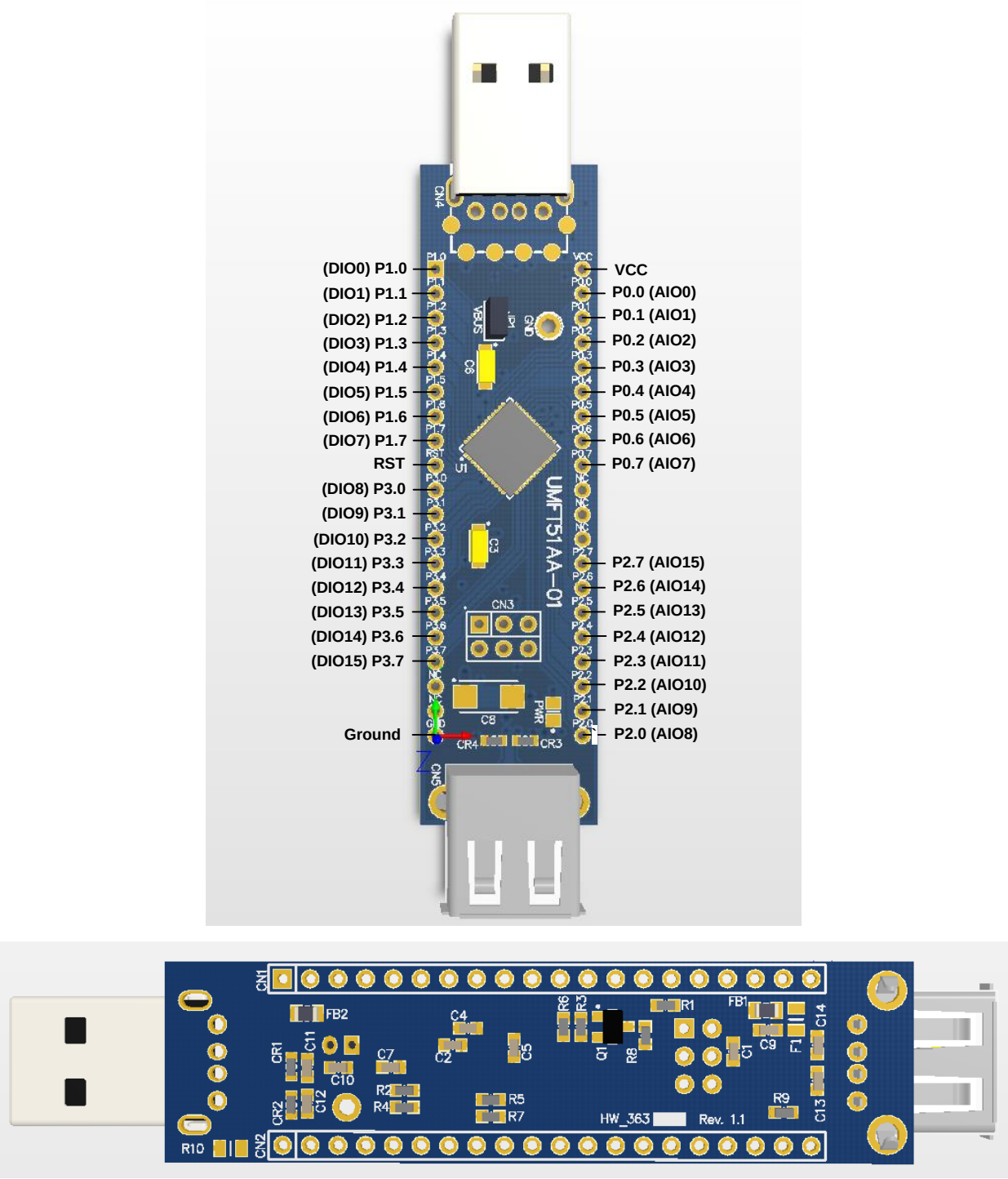


Figure 4.1 – Module Pin Out

Figure 4.1 illustrates the signals available on the DIL pins. The top image shows the pinout when the module is viewed from the top. The bottom image shows what signals are available when viewed from the bottom.

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4.2 Signal Descriptions

Pin No.	Name	Type	Description
CN1-1 to CN1-8	Port 1	I/O Signals	Port 1 pins, P1.0 to P1.7 (DIO0 to DIO7). All FT51A digital functions can be mixed to these pins; however ADC features are not available for these pins. These pins are 5 volt tolerant.
CN1-10 to CN1-17	Port 3	I/O Signals	Port 3 pins, P3.0 to P3.7 (DIO8 to DIO15). All FT51A digital functions can be mixed to these pins; however ADC features are not available for these pins. These pins are 5 volt tolerant.
CN2-21 to CN2-13	Port 2	I/O Signals	Port 2 pins, P2.0 to P2.7 (AIO8 to AIO15). ADC features are available for these pins however these pins are not suitable for high frequency data transfers such as SPI. These pins are **not 5 volt tolerant**.
CN2-2 to CN2-9	Port 0	I/O Signals	Port 0 pins, P2.0 to P0.7 (AIO8 to AIO15). ADC features are available for these pins however these pins are not suitable for high frequency data transfers such as SPI. These pins are **not 5 volt tolerant**.
CN1-9	RST	Reset Pin	Active high reset.
CN1-20	GND	Ground	Ground 0 volts.
CN2-1	VCC5V	Power	5 volt power input when JP1 is open, 5 volt power output when JP1 is closed and connected to upstream USB port.
CN1-18 to CN1-19	NC	Not Connected	Floating pin.
CN2-10 to CN2-12	NC	Not Connected	Floating pin.

Table 4.1 – Module Pin Out Description

Pin No.	Name	Type	Description
CN4-1	VBUS	Power	5 volt power input. To enable bus power mode close JP1
CN4-2	DM	Signal	USB Data - from upstream device
CN4-3	DP	Signal	USB Data + from upstream device
CN4-4	GND	Ground	0 volt ground.

Table 4.2 – Upstream USB Port Pin Out Description

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Pin No.	Name	Type	Description
CN5-1	VBUS	Power	5 volt power output.
CN5-2	DM	Signal	USB Data - to downstream device
CN5-3	DP	Signal	USB Data + to downstream device
CN5-4	GND	Ground	0 volt ground.

Table 4.3 – Downstream USB Port Pin Out Description

Pin No.	Name	Type	Description
CN3-1 and CN3-4	NC	Not Connected	Floating pin.
CN3-2	VCC5V	Power	5 volt power input. (Protected by zenor diode.)
CN3-3	RESET#	Signal	Active low reset input from the FTPD-1 debugger/programmer
CN3-5	DBG	Signal	Debugger data line, single line half-duplex UART.
CN3-6	GND	Ground	0 volt ground.

Table 4.4 – Debugger Port Pin Out Description

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4.3 I/O Pin Feature Options

The following features can be configured using the FT51A's multiplexer to bring signal to the available pins.

FT51A IO Signal Option	Available On Pin	Description
GPIO	DIO0-15 and AIO0-15	General purpose IO
ADC	AIO0-15	8-bit analog to digital converter
UART	DIO0-15	UART interface. Data rates up to 6 Mbaud.
SPI Master	DIO0-15	SPI master interface. Clock frequency up to 24MHz
SPI Slave	DIO0-15	SPI slave interface
245 FIFO	DIO0-15	8 bit parallel data interface with handshake. Data rates up to 7MB/s.
I^2C Master	DIO0-15	I^2C interface. Data rates up to 3.4Mb/s
I^2C Slave	DIO0-15	I^2C interface
PWM	DIO0-15 and AIO0-15	Pulse Width Modulation output.
BCD Detect	DIO0-15 and AIO0-15	Indicates a dedicated charger port has be detect on the upstream USB port.

Table 4.5 – I/O Signal Options

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5 Module Configurations

5.1 Jumper Configuration Options

Solder Link No.	Setting	Status	Description
JP1	Opened	Non-Default	Self-Powered mode. This setting removes the connection between VBUS and VCC5V. For self-powered operation 5V power is received from CN2-1.
JP1	Closed	Default	Bus-Powered mode. This setting creates a connection between VBUS and VCC5V. For bus-powered operations 5V power will be output on CN2-1 when the module is connected to an upstream USB port.

Table 5.1 – Jumper JP1 Modes

Warning: There should never be more than one power output supplying power to the same net at any one time. Closing JP1 will cause a direct short between two different power supplies, when a self-powered set-up is applied and the USB bus is connected resulting in the potential for damage to the module and other connected circuitry.

5.2 Programming Firmware to the Flash ROM

The FT51A can be programmed using the FTPD-1. CN3 is a dedicated port that can interface with the FTPD-1.

A list of available examples (at time of writing) is shown below and source code can be found in 'C:\Users\Username\Documents\FTDI\FT51A_SDK\version\examples' after installing the FT51A SDK:

- AN_344_FT51A_DFU_Sample
- AN_345 FT51A Keyboard Sample
- AN_346 FT51A Mouse Sample
- AN_347 FT51A Test and Measurement Sample
- AN_348 FT51A FT800 Sensors Sample
- AN_349 FT51A FT800 Spaced Invaders Sample
- AN_351 FT51A Compatibility Module
- AN_354 FT51A Standalone Demo Application

Users can develop their own custom applications using the SDK.

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6 Module Dimensions

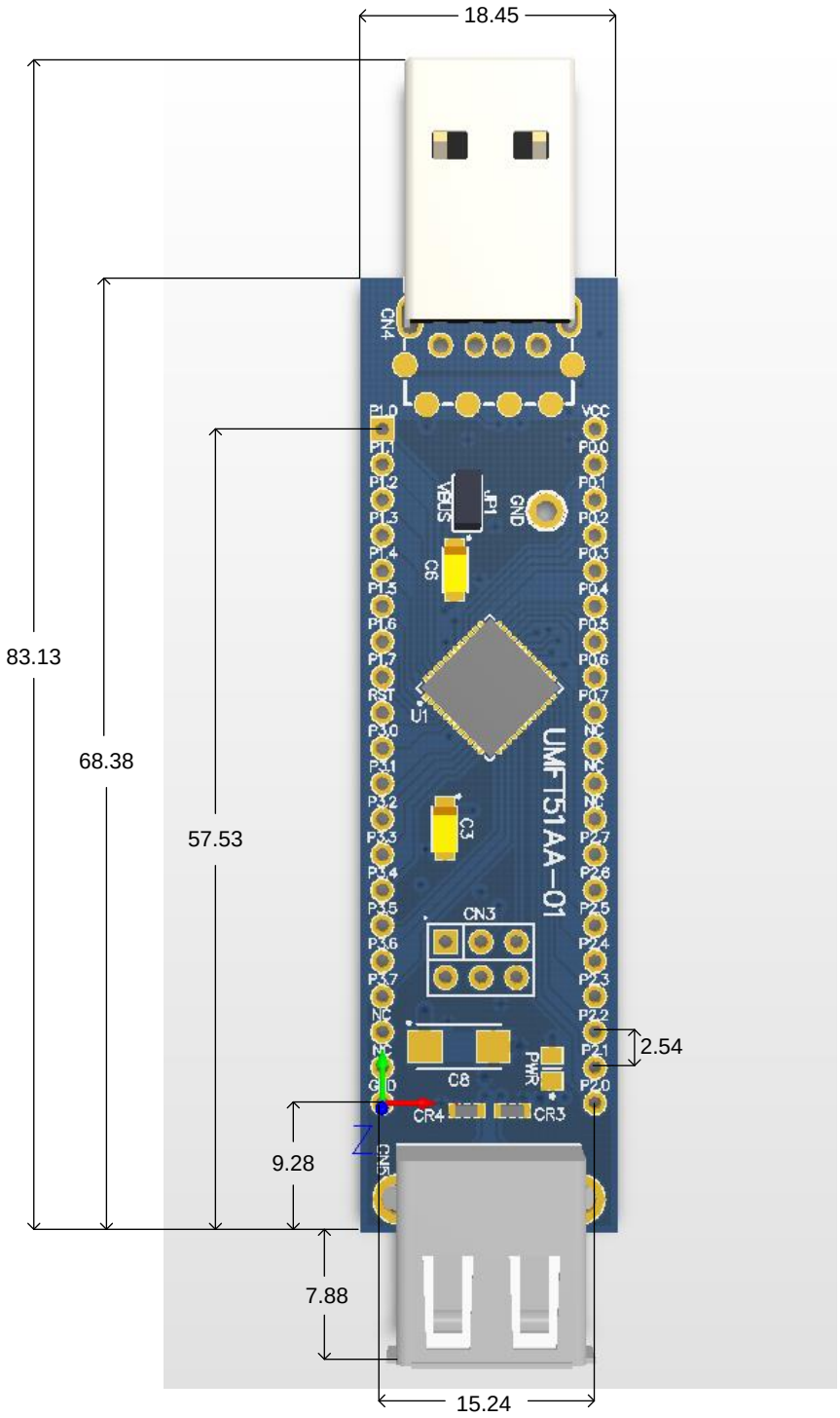


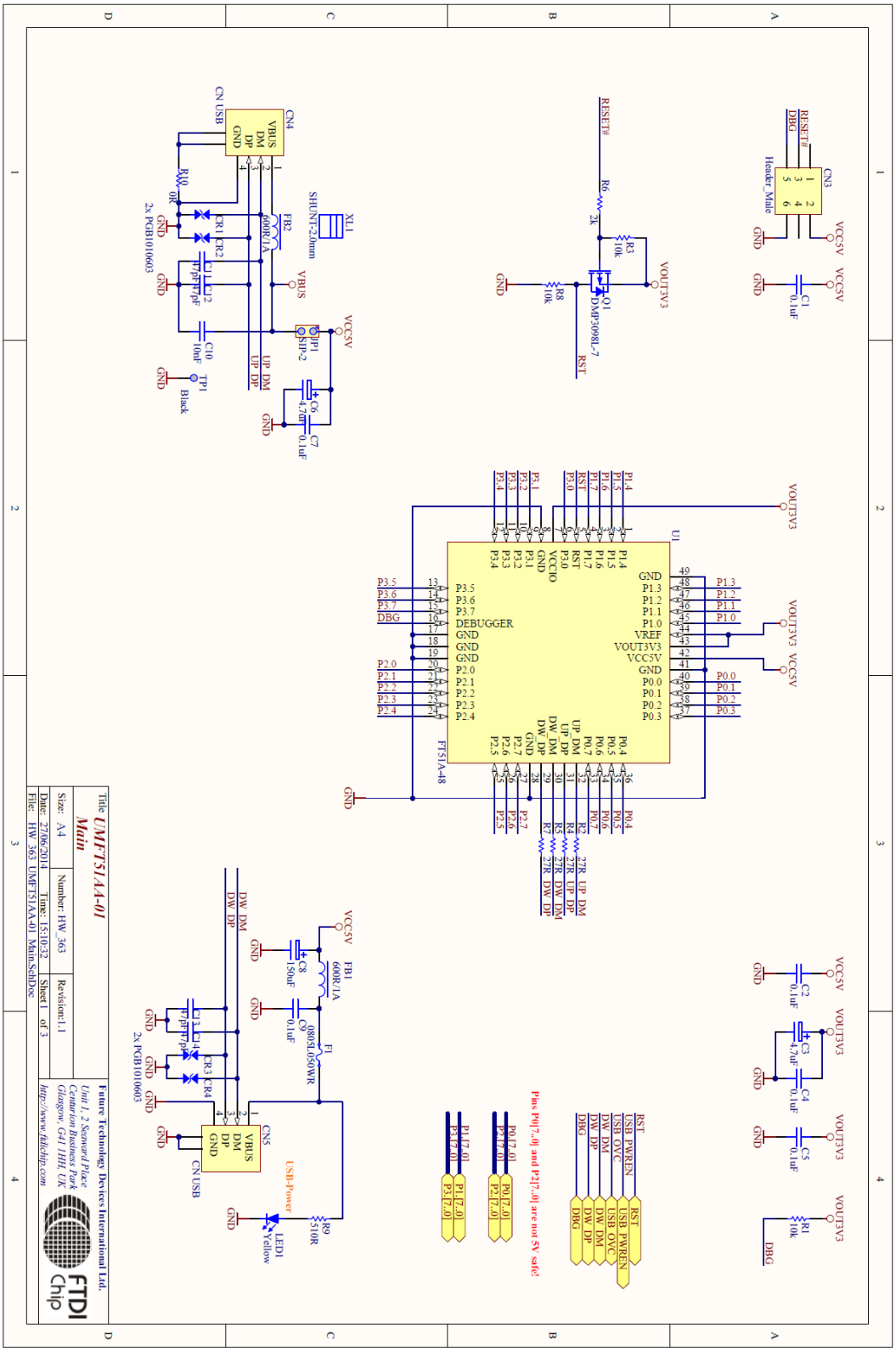
Figure 6.1 – UMFT51AA Module Dimensions

All dimensions are given in millimetres.

The UMFT51AA module exclusively uses lead free components, and is fully compliant with European Union directive 2002/95/EC.

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7 UMFT51AA Module Circuit Schematic



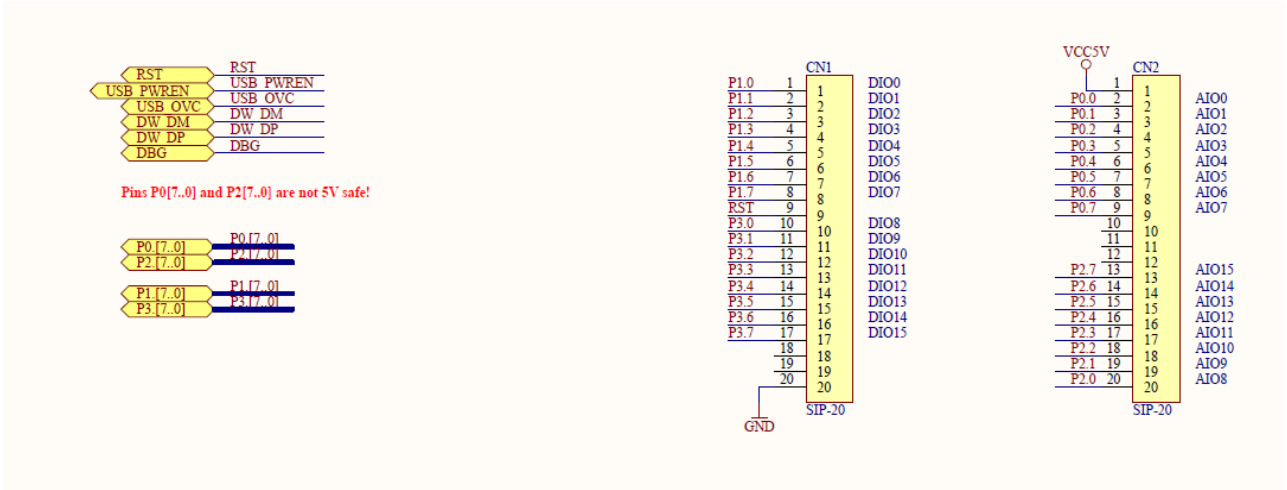


Figure 7.1 – Module Circuit Schematic

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8 Contact Information

Head Office – Glasgow, UK

Unit 1, 2 Seaward Place, Centurion Business Park
Glasgow G41 1HH
United Kingdom
Tel: +44 (0) 141 429 2777
Fax: +44 (0) 141 429 2758

E-mail (Sales) sales1@ftdichip.com
E-mail (Support) support1@ftdichip.com
E-mail (General Enquiries) admin1@ftdichip.com

Branch Office – Tigard, Oregon, USA

7130 SW Fir Loop
Tigard, OR 97223
USA
Tel: +1 (503) 547 0988
Fax: +1 (503) 547 0987

E-Mail (Sales) us.sales@ftdichip.com
E-Mail (Support) us.support@ftdichip.com
E-Mail (General Enquiries) us.admin@ftdichip.com

Branch Office – Taipei, Taiwan

2F, No. 516, Sec. 1, NeiHu Road
Taipei 114
Taiwan , R.O.C.
Tel: +886 (0) 2 8797 1330
Fax: +886 (0) 2 8751 9737

E-mail (Sales) tw.sales1@ftdichip.com
E-mail (Support) tw.support1@ftdichip.com
E-mail (General Enquiries) tw.admin1@ftdichip.com

Branch Office – Shanghai, China

Room 1103, No. 666 West Huaihai Road,
Shanghai, 200052
China
Tel: +86 (0)21 6235 1596
Fax: +86 (0)21 6235 1595

E-mail (Sales) cn.sales@ftdichip.com
E-mail (Support) cn.support@ftdichip.com
E-mail (General Enquiries) cn.admin@ftdichip.com

Web Site

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Appendix A – References

Document References

FT51A Datasheet

AN_289 FT51A programmers Guide

FTPD-1 Datasheet

AN_344 FT51A DFU Sample

AN_345 FT51A Keyboard Sample

AN_346 FT51A Mouse Sample

AN_347 FT51A Test and Measurement Sample

AN_348 FT51A FT800 Sensors Sample

AN_349 FT51A FT800 Spaced Invaders Sample

AN_352 FT51A Installation Guide

Acronyms and Abbreviations

Terms	Description
ADC	Analog to digital conversion
I^2C	Inter integrated Circuit
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MCU	Micro Controller Unit
SPI	Serial Peripheral Interface
USB	Universal Serial Bus

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Appendix C – Revision History

Document Title: UMFT51AA-01 Datasheet
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Document Feedback: Send Feedback

Revision	Changes	Date
Version 1.0	Initial Release	2015-11-18

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