

# Future Technology Devices International

## Datasheet

### ME812A-WH50R Display Module



*General Purpose Multi Media Controller*

## 1 Introduction

The ME812A-WH50R is a development module for FTDI's FT812, Embedded Video Engine (EVE) graphics controller IC. This module behaves as an SPI slave, and requires a SPI Master for proper micro-controller interface and system integration.

The ME812A-WH50R module includes a 5.0 inch 800\*480 TFT LCD panel with resistive touch screen, and an audio amplifier to drive 8Ω speaker.

### 1.1 Features

The ME812A-WH50R module utilises the FT812, FTDI's 2<sup>nd</sup> generation EVE chip. Graphic, audio and touch functions of the FT812 can be accessed with the ME812A-WH50R. For a full list of the FT812's features, please see the [FT81x datasheet](#).

The ME812A-WH50R has the following features:

- Ready to use 5 inch WVGA LCD module.
- Supports portrait and landscape display mode.
- Bright backlight LED with dimming.
- Supports resistive touch with pressure sensing.
- Supports mono audio from FT812 or external source.
- On board audio amplifier for driving an external 1W speaker.
- +5.0V single power supply.
- Support direct connectivity to MM900EV series modules as a display add-on.
- Comes with bezel with four mounting holes for easy system assembly.

Neither the whole nor any part of the information contained in, or the product described in this manual, may be adapted or reproduced in any material or electronic form without the prior written consent of the copyright holder. This product and its documentation are supplied on an as-is basis and no warranty as to their suitability for any particular purpose is either made or implied. Future Technology Devices International Ltd will not accept any claim for damages howsoever arising as a result of use or failure of this product. Your statutory rights are not affected. This product or any variant of it is not intended for use in any medical appliance, device or system in which the failure of the product might reasonably be expected to result in personal injury. This document provides preliminary information that may be subject to change without notice. No freedom to use patents or other intellectual property rights is implied by the publication of this document. Future Technology Devices International Ltd, Unit 1, 2 Seaward Place, Centurion Business Park, Glasgow G41 1HH United Kingdom. Scotland Registered Company Number: SC136640

## 2 Ordering Information

Part No.	Description
ME812A-WH50R	FT812 module, with Quad SPI host connector, 5.0 inch 800*480 TFT LCD resistive touch panel preinstalled. Black bezel.
CleO-SPK1	An 8Ω 1W speaker enclosure with connecting wires to ME812A-WH50R.

**Table 2-1 – Ordering information**

Note: This module is recommended as an accessory to the MM900EV series for development purposes.

For more information on the MM900EV series, refer to:  
<http://www.ftdichip.com/Products/Modules/MCUModules.htm>.

## **Table of Contents**

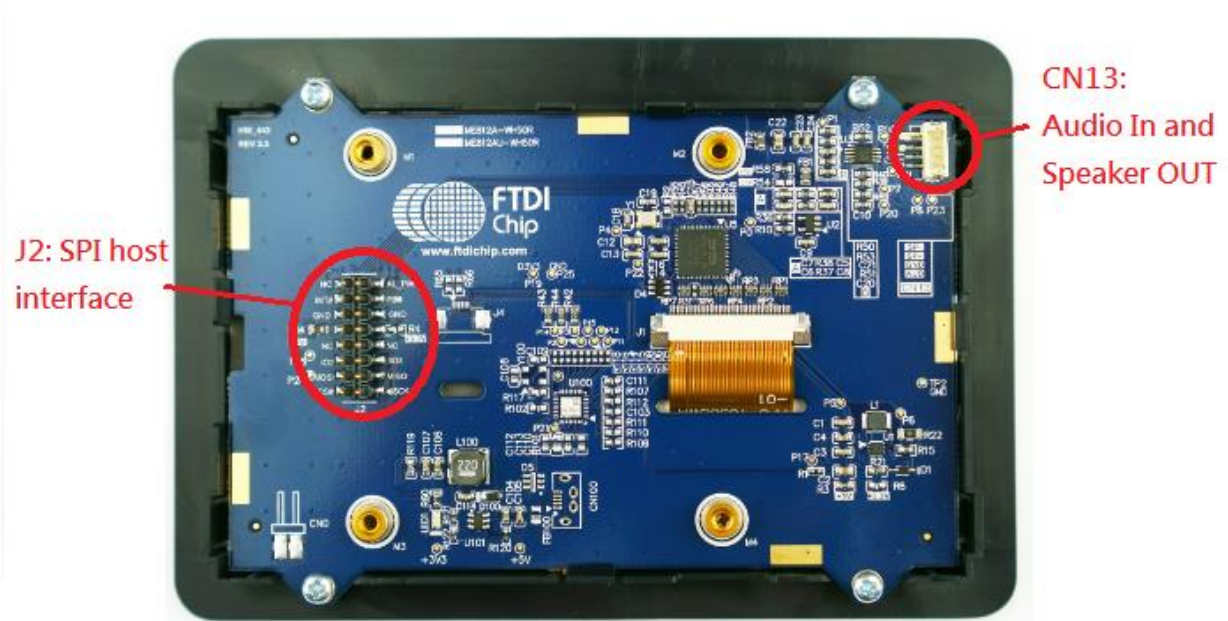
<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Features.....	1
<b>2</b>	<b>Ordering Information .....</b>	<b>2</b>
<b>3</b>	<b>Board Interface Description .....</b>	<b>4</b>
3.1	Board Profile.....	4
3.2	J2- SPI slave interface .....	5
3.3	CN13- Audio connector .....	5
<b>4</b>	<b>Specifications.....</b>	<b>0</b>
4.1	Electrical Specification .....	0
4.2	Display Specification .....	0
4.3	Optical Specification .....	1
<b>5</b>	<b>Board Schematics.....</b>	<b>3</b>
<b>6</b>	<b>Mechanical Dimensions .....</b>	<b>6</b>
6.1	Module Dimensions .....	6
6.2	Bezel Mechanical Drawing.....	8
<b>7</b>	<b>Application Example.....</b>	<b>9</b>
7.1	Getting Start With an MM900EV Module.....	9
7.2	Hardware Setup .....	9
7.3	Software Setup .....	10
<b>8</b>	<b>Contact Information.....</b>	<b>11</b>
	<b>Appendix A – References .....</b>	<b>12</b>
	Document References .....	12
	Acronyms and Abbreviations .....	12
	<b>Appendix B - List of Figures and Tables .....</b>	<b>13</b>
	List of Figures .....	13
	List of Tables .....	13
	<b>Appendix C – Revision History .....</b>	<b>14</b>

### 3 Board Interface Description

The ME812A-WH50R module is intended for direct use into existing applications that require a display.

This module is suitable for interfacing with an external microcontroller (e.g. MM900EV series) that has a SPI Master channel (single, dual or quad data bus).

#### 3.1 Board Profile



**Figure 3-1 – ME812A-WH50R board bottom view**

### 3.2 J2- SPI slave interface

J2 is an 8x2 pin header which provides power inputs and SPI slave interface signals. An MCU board with SPI master can easily add a display panel by connecting to the ME812A-WH50R through J2. If an MM900EV series module is used, it can be directly plugged into J2 and secured with 4 standoff mounting holes.

Pin No.	Name	Type	Description
1	MA_SCK	I	SPI clock input
2	MA_CS#	I	SPI chip select, active low
3	MA_MISO	I/O	SPI master input, slave output or Quad SPI IO1
4	MA_MOSI	I/O	SPI master output, slave input or Quad SPI IO0
5	MA_IO3	I/O	GPIO1 or Quad SPI IO3
6	MA_IO2	I/O	GPIO0 or Quad SPI IO2
7	-	-	NC
8	-	-	NC
9	-	-	NC
10	MA_5V	P	5V power supply input
11	GND	P	Ground
12	GND	P	Ground
13	MA_PD#	I	Powers down input, active low. Connect to 3.3V if not used.
14	MA_INT#	O	Interrupts output, active low. On board 4.7kΩ pull-up to 3.3V.
15	AL_PWM	O	PWM audio output from FT812
16	-	-	NC

**Table 3-1 – J2 pin description**

### 3.3 CN13- Audio connector

The ME812A-WH50R supports a mono speaker output through CN13. A PWM audio signal from the FT812 goes through a 3-stage RC filters and the audio amplifier, to drive the 8Ω speaker if connected. Maximum output power to the speaker is 1 Watt. A readymade speaker module (CleO-SPR1) is available from FTDI.

An alternative, mono line-in audio input is also provided on CN13. Users can drive in their own audio source to the on board power amplifier.

Pin No.	Name	Type	Description
1	SP-	O	8Ω speaker minus terminal
2	SP+	O	8Ω speaker plus terminal
3	AGND	P	Audio ground
4	AUD_IN	I	Audio Line IN

**Table 3-2 – CN13 pin description**

## 4 Specifications

### 4.1 Electrical Specification

Parameter	Description	Minimum	Typical	Maximum	Units	Notes
VCC	VCC supply voltage	4.75	5.0	5.25	V	J2 pin 9
Icc1	VCC operating current	-	350	-	mA	With LCD and Backlight LED on
Icc2	VCC operating current	-	750	-	mA	With 1W speaker
Voh	Output Voltage High	2.4	-	-	V	
Vol	Output Voltage Low	-	-	0.4	V	
Vih	Input High Voltage	2.0	-	-	V	
Vil	Input Low Voltage	-	-	0.8	V	
T	Operating temperature	-20	-	+70	°C	

**Table 4-1 - Operating Voltage and Current**

### 4.2 Display Specification

Item	Spec	Units	Notes
LCD Type	TFT active matrix	-	
Display Colours	16.7M	-	
Display active area	108.0(H) * 64.8(V)	mm	5.0 inch diagonal
Number of Pixels	800(RGB)*480	dots	
Pixel pitch	0.135(H) * 0.135(V)	mm	
Backlight	18 white LEDs	-	
Touch screen	4-wire resistive touch	-	

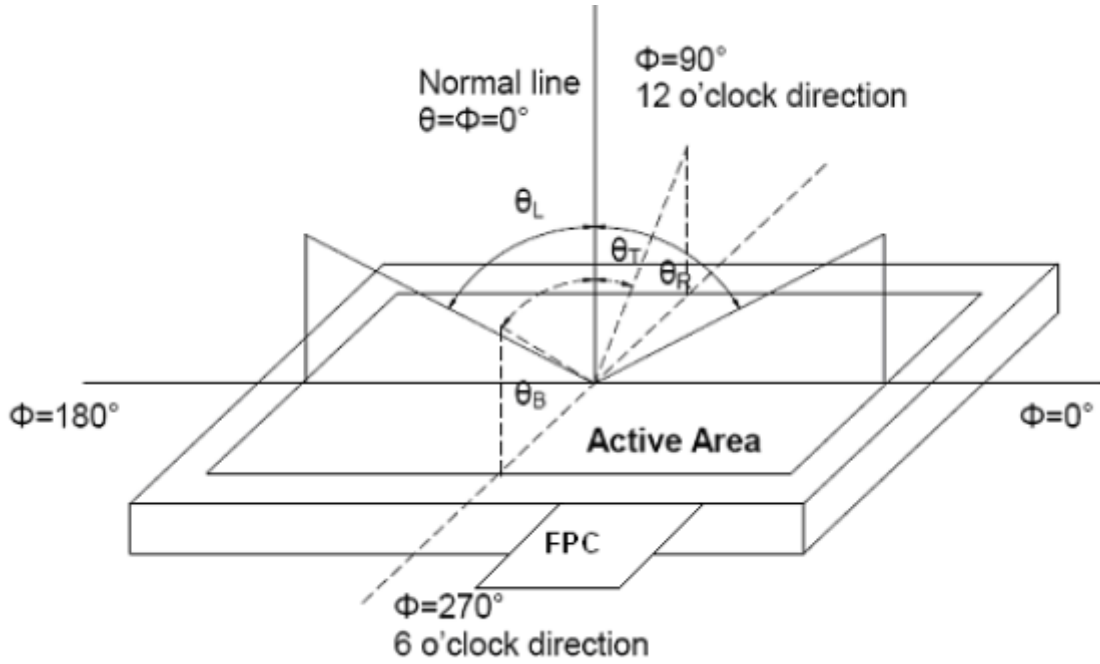
**Table 4-2 - LCD and Touch Information**

### 4.3 Optical Specification

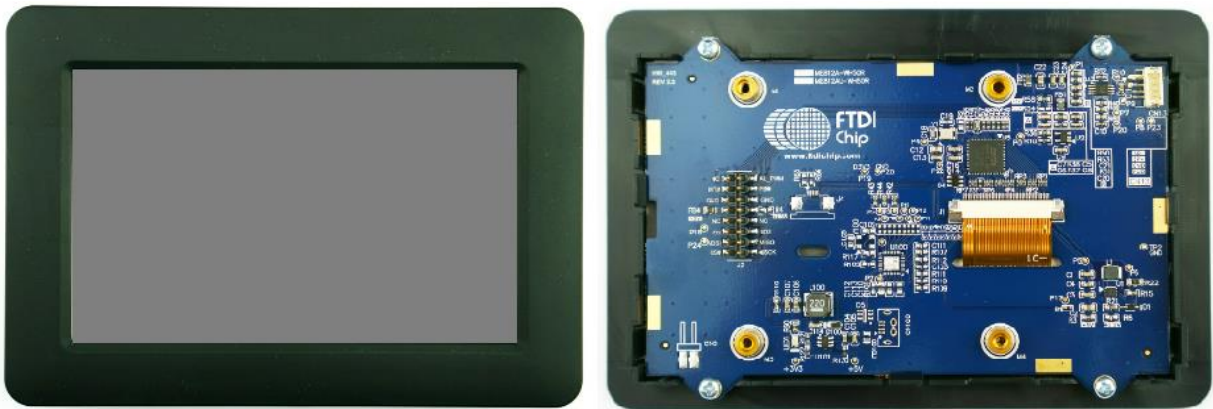
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	
Brightness (With TP)	Bp	$\theta=0^\circ$ $\Phi=0^\circ$		400	-	Cd/m <sup>2</sup>	
Uniformity	$\Delta$ Bp		75	-	-	%	
Viewing Angle	3:00	Cr $\geq$ 10	-	60	-	Deg	
	6:00		-	45	-		
	9:00		-	60	-		
	12:00		-	60	-		
Contrast Ratio	Cr		300	500		-	
Response Time	T <sub>r</sub>	$\theta=0^\circ$ $\Phi=0^\circ$	-	10	-	ms	
	T <sub>f</sub>		-	10	-	ms	
Color of CIE Coordinate	W	x		0.28		-	
		y		0.33		-	
	R	x		0.51		-	
		y		0.34		-	
	G	x	$\theta=0^\circ$ $\Phi=0^\circ$		0.31		-
		y			0.56		-
	B	x			0.15		-
		y			0.14		-
NTSC Ratio	S		50	60	-	%	

**Table 4-3 - 5.0" TFT Optical specification**

Note: The definition of viewing angle: refer to the figures below (if looking at the reverse side of the module the FTDI logo on the PCB is facing down).



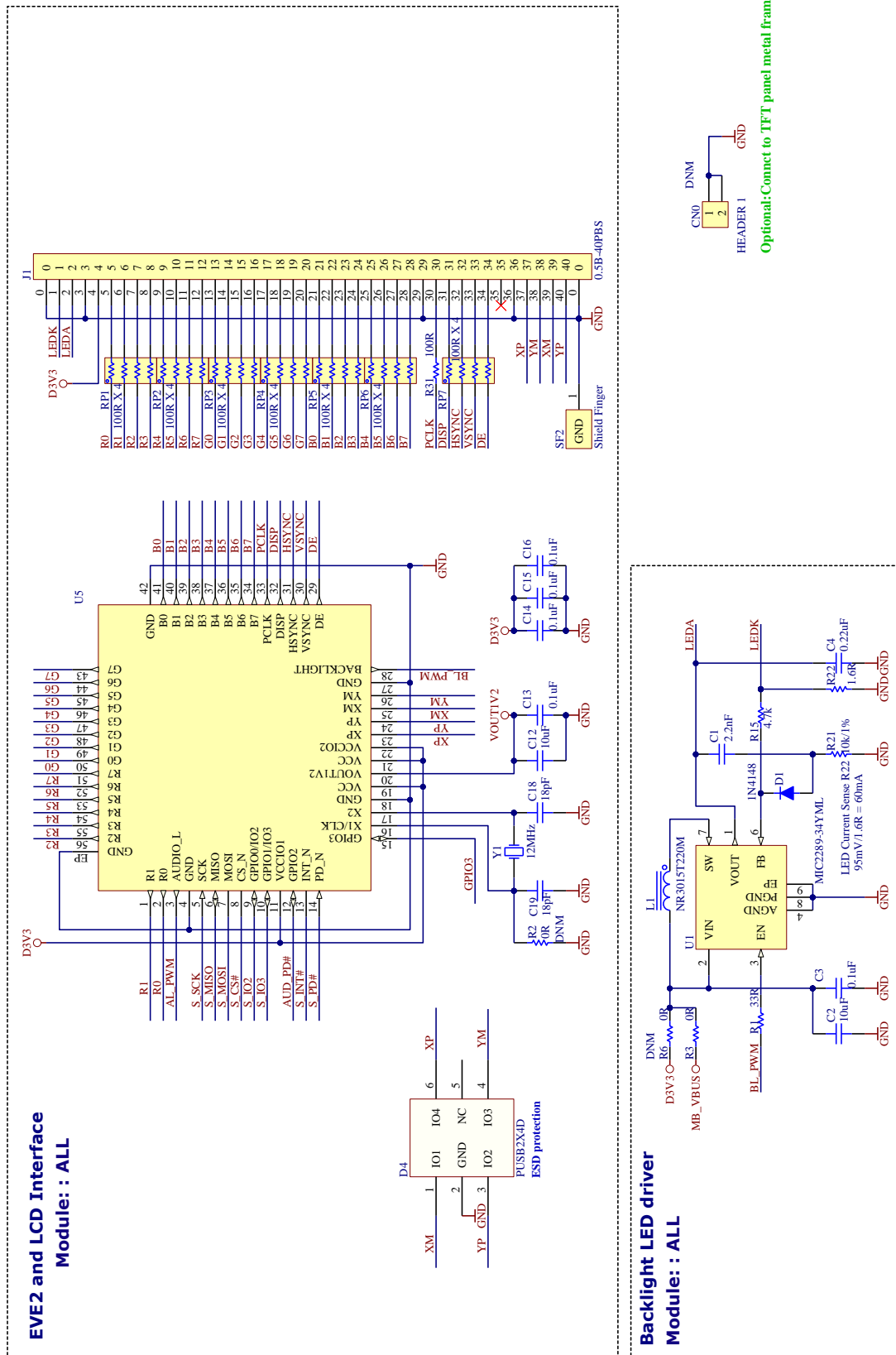
**Figure 4-1 – Viewing Angle definition**



**Figure 4-2 – Module orientation for viewing angle**



## 5 Board Schematics



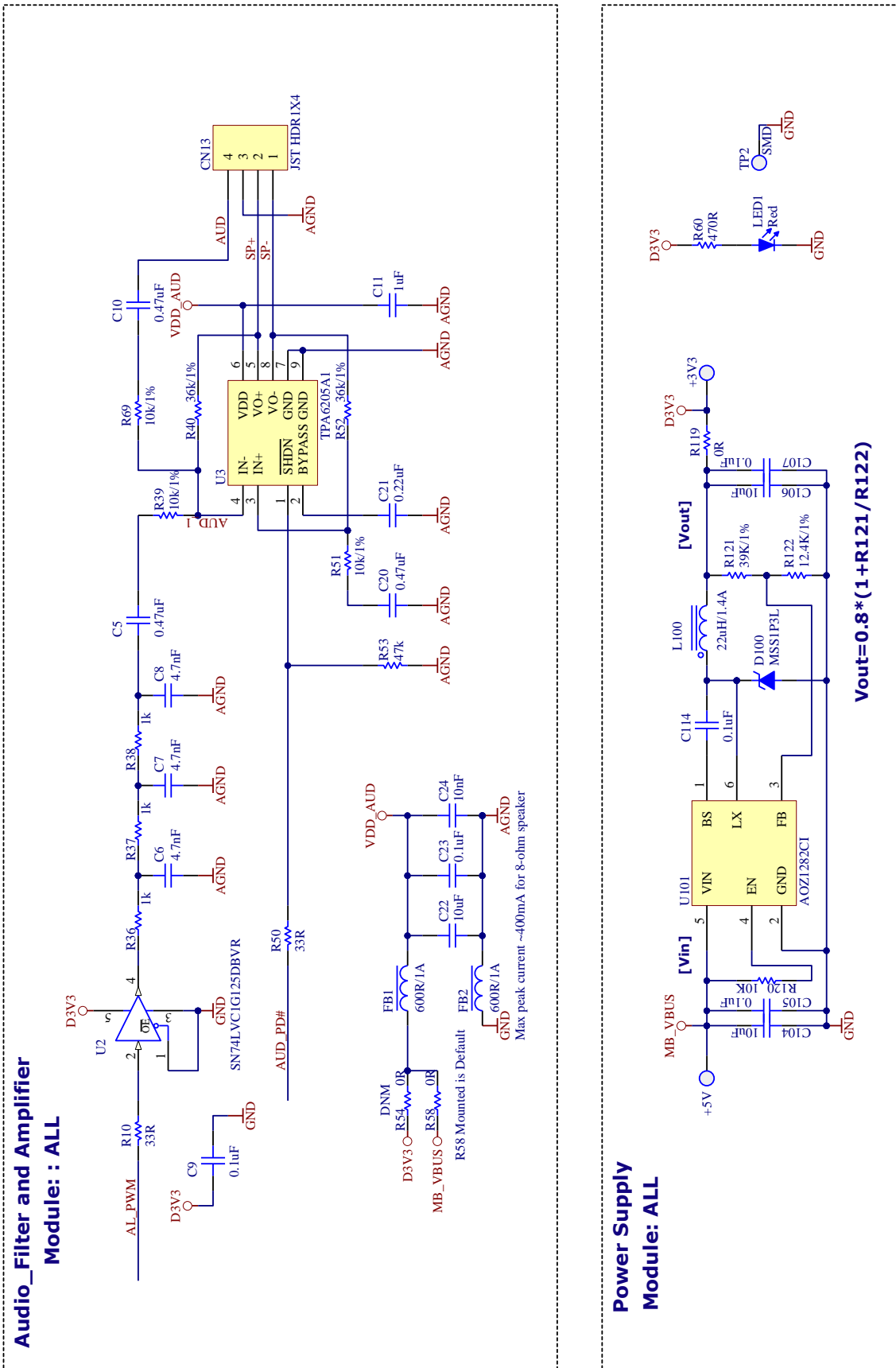
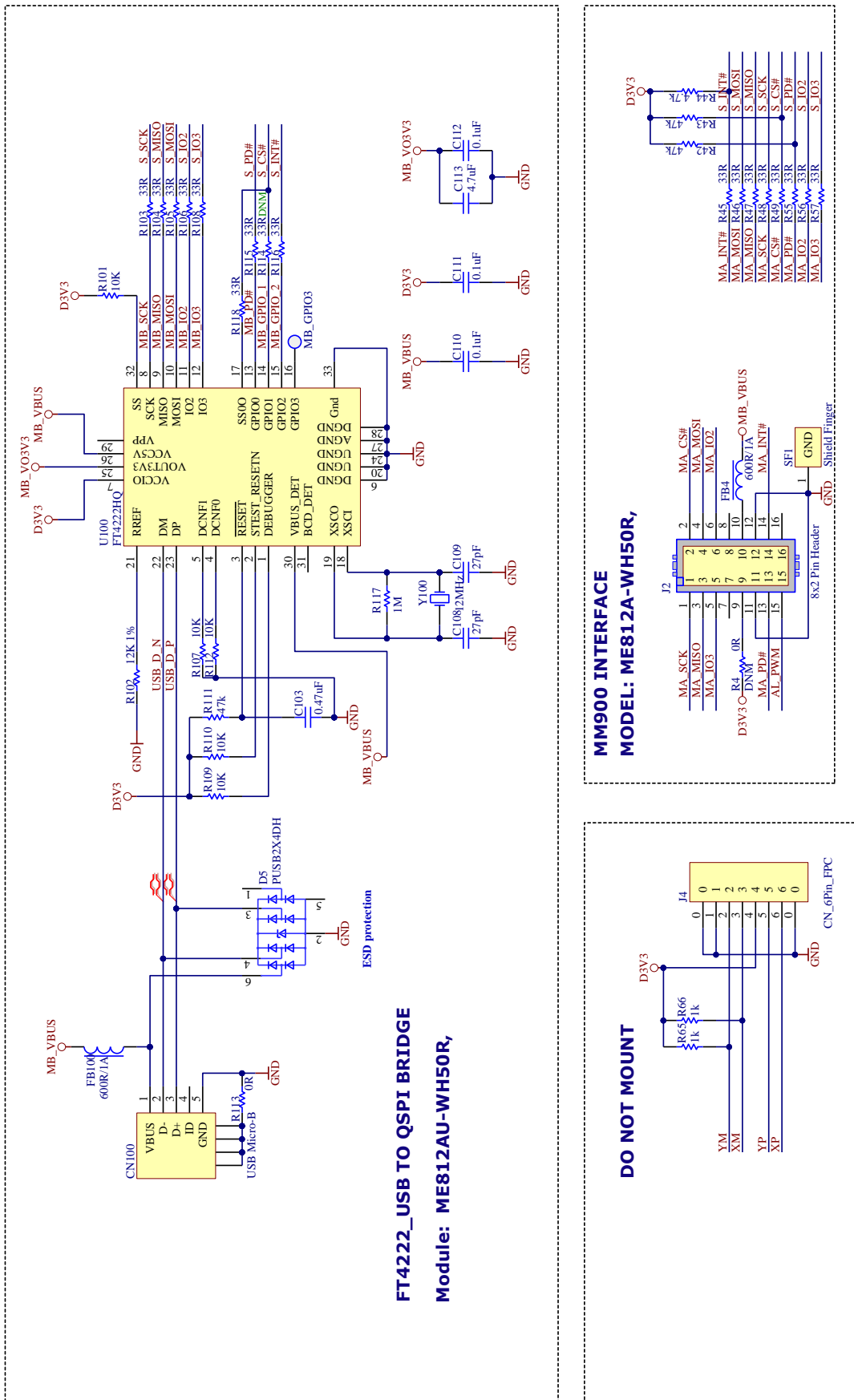


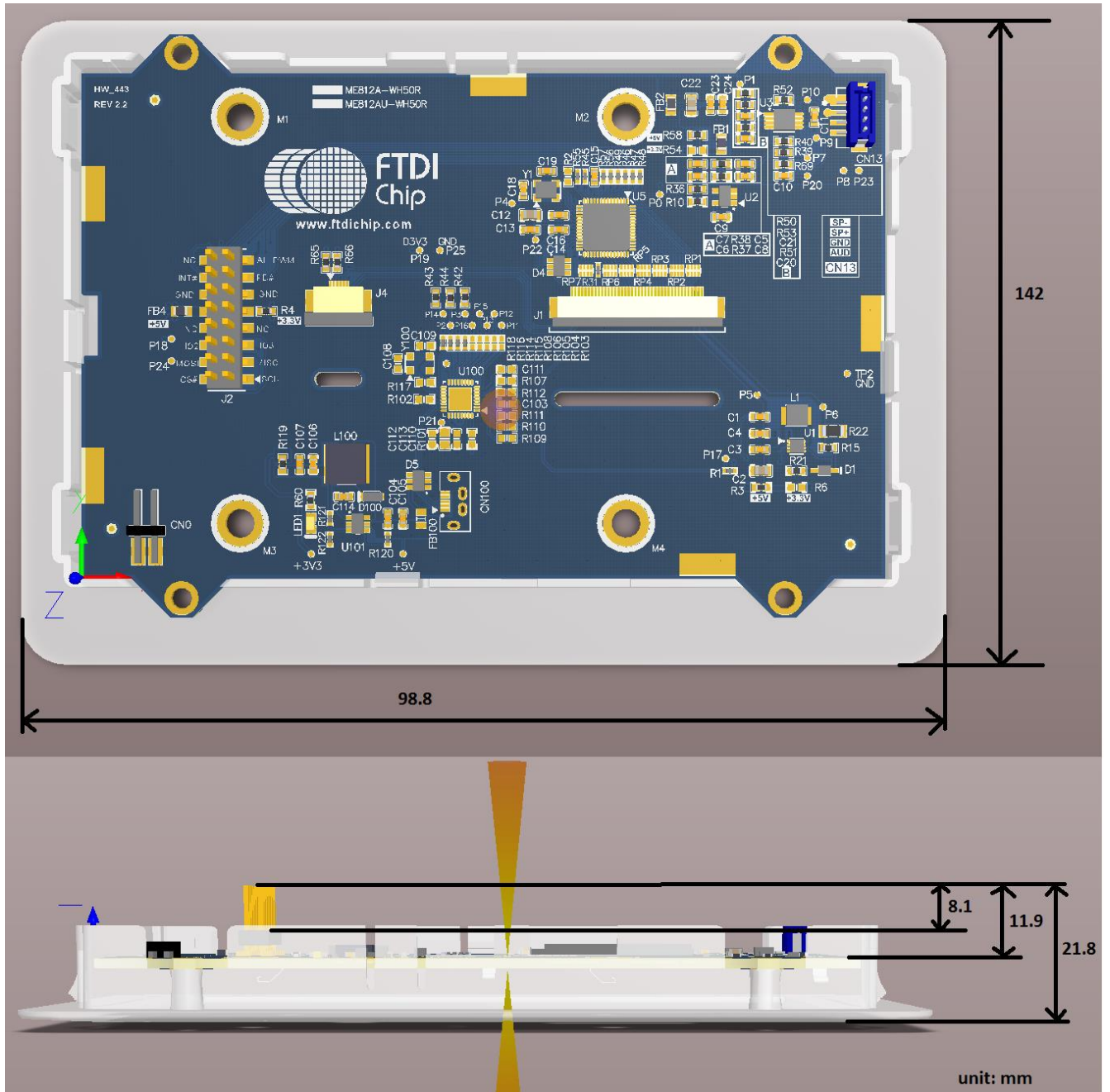
Figure 5-2 – Board Schematic (page 2)



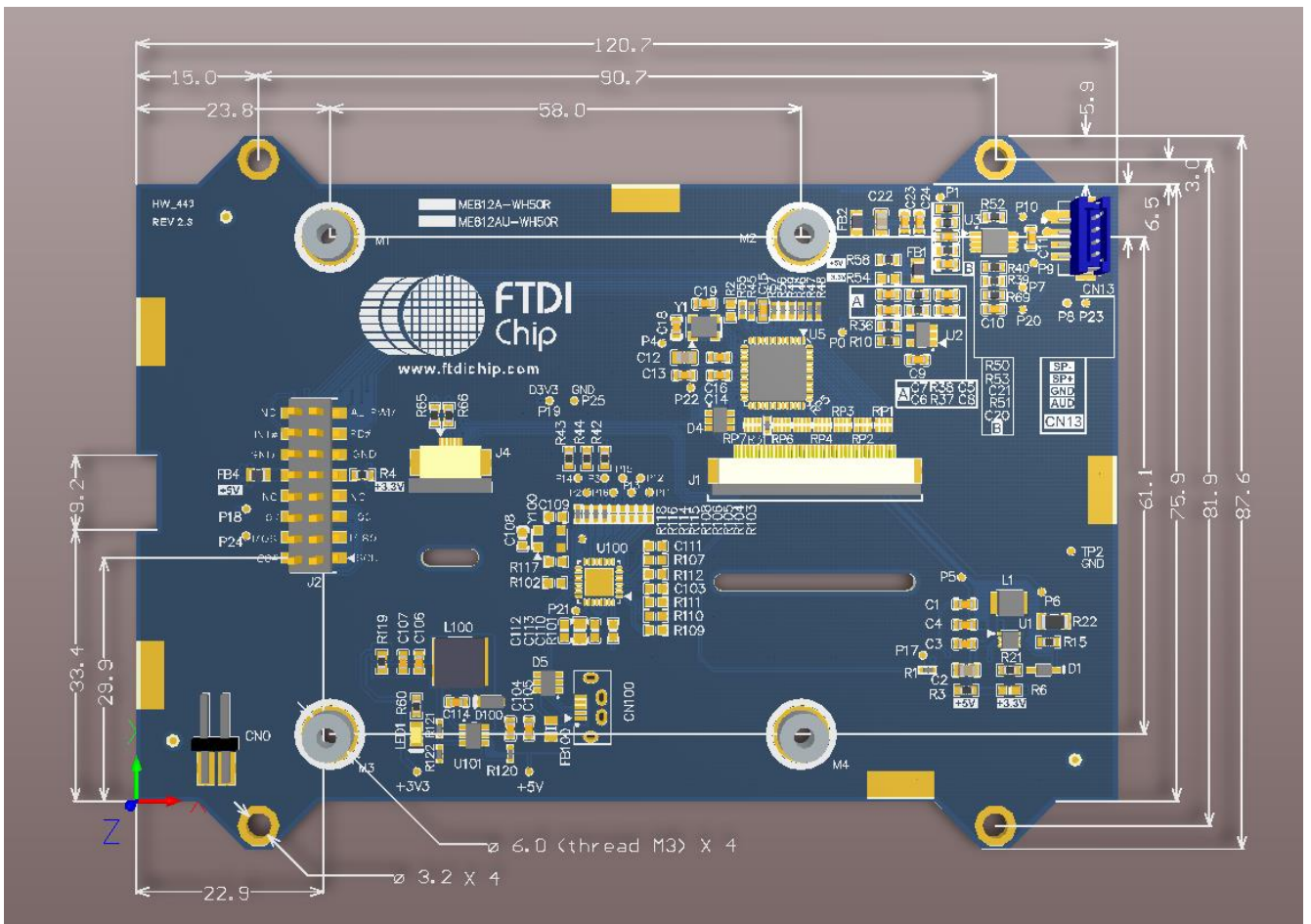
**Figure 5-3 – Board Schematic (page 3)**

## 6 Mechanical Dimensions

### 6.1 Module Dimensions



**Figure 6-1 – Module Dimensions**



**Figure 6-2 – PCB Dimensions**

## 6.2 Bezel Mechanical Drawing

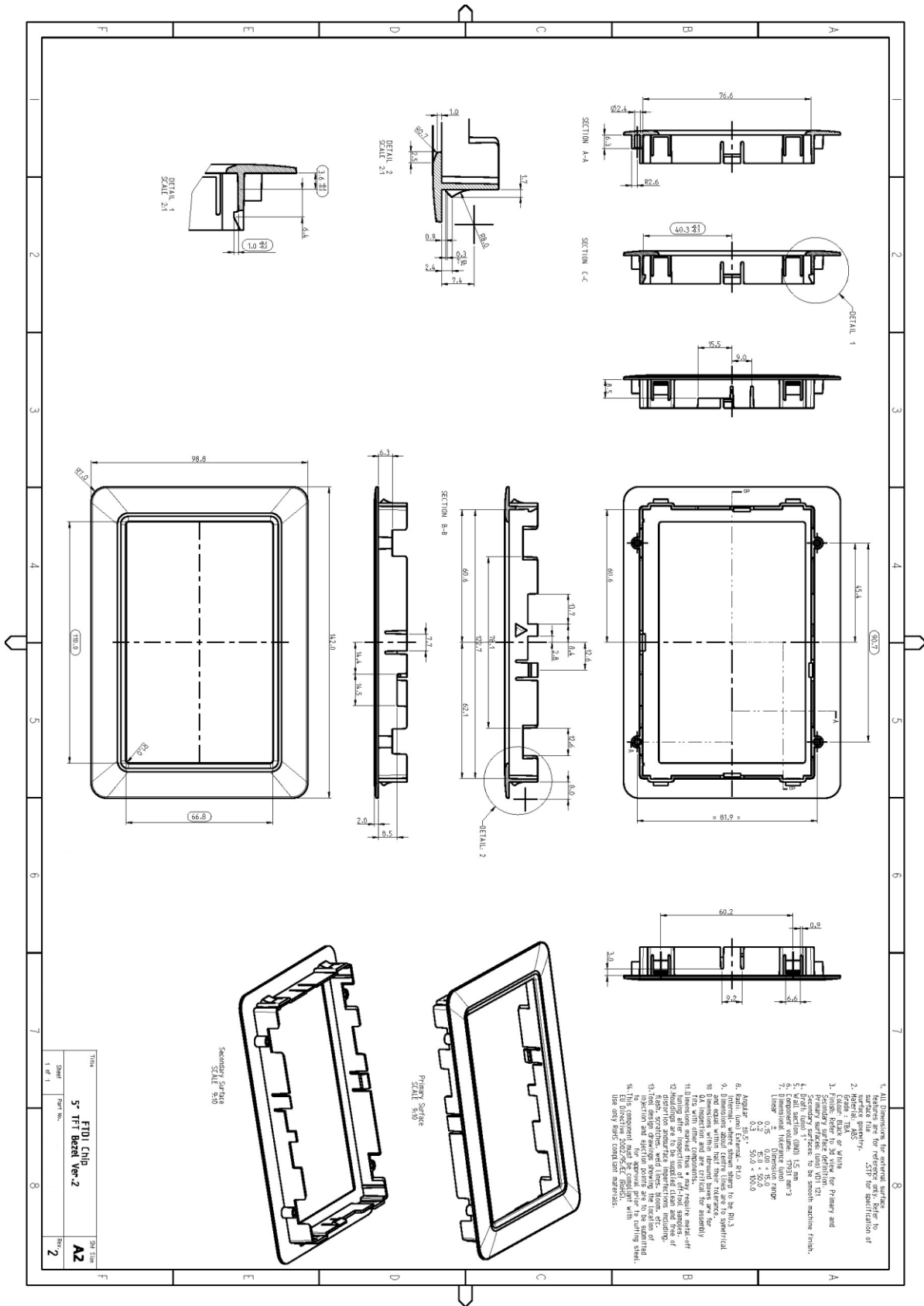


Figure 6-3 – Bezel dimensions



## 7 Application Example

### 7.1 Getting Start With an MM900EV Module

As a quick start with the ME812A-WH50R development board, connecting to an MM900EV module development platform is recommended. Demo applications are provided for users to experiment and experience the FT812 in the MM900EV+ME812A system. The following paragraphs provide a short description for development procedures.

The MM900EV series of FT900 MCU evaluation platforms allows users to develop various applications with rich peripheral interfaces. The following MM900EV modules are compatible:

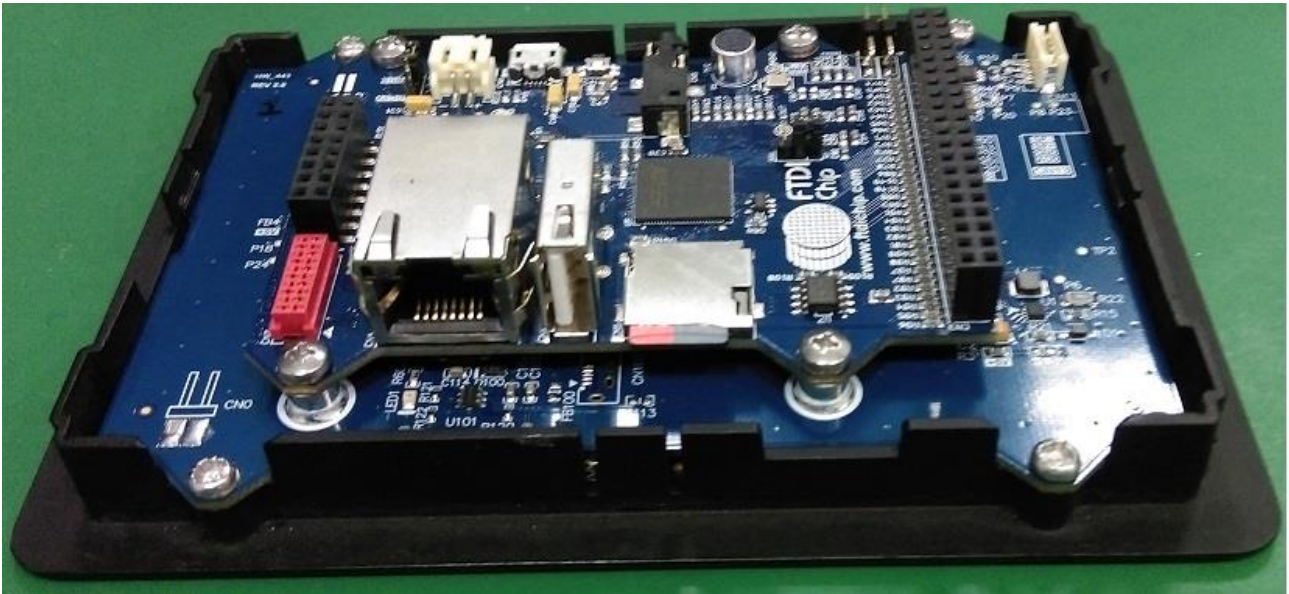
- **MM900EV1A:** with a 32-bit high performance FT900 MCU, 10/100Mbps Ethernet, USB2.0 Host, USB2.0 Device, SD3.0, Audio Codec, SPI Master Quad Interface, and 40-pin external GPIOs.
- **MM900EV-Lite:** Tiny board with a 32-bit high performance FT900 MCU, USB2.0 Device, SD3.0, SPI Master Quad Interface, and 40-pin external GPIOs.

Detailed information of MM900EV module can be found at:

<http://www.ftdichip.com/Products/Modules/MCUModules.htm>

### 7.2 Hardware Setup

Figure 7-1 shows the ME812A-WH50R module connected to an MM900EV1A module.



**Figure 7-1 – ME812A-WH50R connects to MM900EV1A Module**

The ME812A-WH50R **J2** pin header connects to the MM900EV module **J2** dual-enter socket (See **Error! Reference source not found.** for pin mapping).

- Connect a USB cable or Power Supply to the MM900EV module to power the system.

Pin number	ME812A J2 Signal	MM900EV J2 Signal
1	MA_SCK	SPIM_SCK
2	MA_CS#	SPIM_SS0
3	MA_MISO	SPIM_MISO
4	MA_MOSI	SPIM_MOSI
5	MA_IO3	SPIM_IO3
6	MA_IO2	SPIM_IO2
7	-	DCX
8	-	CS1#
9	-	VDD_3V3
10	MA_5V	VDD_5V
11	GND	GND
12	GND	GND
13	MA_PD#	PWD#
14	MA_INT#	INT#
15	AL_PWM	AUD_LIN
16	-	DISP

**Table 7-1 – ME812A-WH50R J2 and MM900EV J2 pin mapping**

### 7.3 Software Setup

- Download the FT90x toolchain and sample application for ME812A-WH50R from the FTDI website at <http://www.ftdichip.com/Products/ICs/FT90x.html>.
- Install the FT90x toolchain on a Windows PC.
- Download the sample application binary file to the MM900EV module.

The sample applications will demonstrate display, touch and audio functions of the ME812A-WH50R module. Refer to [http://www.ftdichip.com/Support/SoftwareExamples/FT800\\_Projects.htm](http://www.ftdichip.com/Support/SoftwareExamples/FT800_Projects.htm) for more details.



## 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](mailto:sales1@ftdichip.com)  
E-mail (Support) [support1@ftdichip.com](mailto:support1@ftdichip.com)  
E-mail (General Enquiries) [admin1@ftdichip.com](mailto:admin1@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](mailto:tw.sales1@ftdichip.com)  
E-mail (Support) [tw.support1@ftdichip.com](mailto:tw.support1@ftdichip.com)  
E-mail (General Enquiries) [tw.admin1@ftdichip.com](mailto:tw.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](mailto:us.sales@ftdichip.com)  
E-Mail (Support) [us.support@ftdichip.com](mailto:us.support@ftdichip.com)  
E-Mail (General Enquiries) [us.admin@ftdichip.com](mailto:us.admin@ftdichip.com)

### Branch Office – Shanghai, China

Room 1103, No. 666 West Huaihai Road,  
Changning District  
Shanghai, 200052  
China  
Tel: +86 21 62351596  
Fax: +86 21 62351595

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

### Web Site

<http://www.ftdichip.com>

### Distributor and Sales Representatives

Please visit the Sales Network page of the [FTDI Web site](#) for the contact details of our distributor(s) and sales representative(s) in your country.

System and equipment manufacturers and designers are responsible to ensure that their systems, and any Future Technology Devices International Ltd (FTDI) devices incorporated in their systems, meet all applicable safety, regulatory and system-level performance requirements. All application-related information in this document (including application descriptions, suggested FTDI devices and other materials) is provided for reference only. While FTDI has taken care to assure it is accurate, this information is subject to customer confirmation, and FTDI disclaims all liability for system designs and for any applications assistance provided by FTDI. Use of FTDI devices in life support and/or safety applications is entirely at the user's risk, and the user agrees to defend, indemnify and hold harmless FTDI from any and all damages, claims, suits or expense resulting from such use. This document is subject to change without notice. No freedom to use patents or other intellectual property rights is implied by the publication of this document. Neither the whole nor any part of the information contained in, or the product described in this document, may be adapted or reproduced in any material or electronic form without the prior written consent of the copyright holder. Future Technology Devices International Ltd, Unit 1, 2 Seaward Place, Centurion Business Park, Glasgow G41 1HH, United Kingdom. Scotland Registered Company Number: SC136640

## Appendix A – References

### Document References

For module related documentations, please refer to URL below:

FT81x datasheet: [DS\\_FT81x](#)

FT81x software programming guide: [FT81x Programmer Guide](#)

### Acronyms and Abbreviations

Terms	Description
EVE	Embedded Video Engine
IC	Integrated Circuit
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MCU	Micro-Controller Unit
PC	Personal Computer
PCB	Printed Circuit Board
PWM	Pulse Width Modulation
SPI	Serial Peripheral Interface
TFT	Thin Film Transistor
TP	Touch Panel

## Appendix B - List of Figures and Tables

### List of Figures

Figure 3-1 – ME812A-WH50R board bottom view .....	4
Figure 4-1 – Viewing Angle definition .....	2
Figure 4-2 – Module orientation for viewing angle .....	2
Figure 5-1 – Board Schematic (page 1) .....	3
Figure 5-2 – Board Schematic (page 2) .....	4
Figure 5-3 – Board Schematic (page 3) .....	5
Figure 6-1 – Module Dimensions .....	6
Figure 6-2 – PCB Dimensions .....	7
Figure 6-2 – Bezel dimensions.....	8
Figure 7-1 – ME812A-WH50R connects to MM900EV1A Module.....	9

### List of Tables

Table 2-1 – Ordering information .....	2
Table 3-1 – J2 pin description.....	5
Table 3-2 – CN13 pin description .....	5
Table 4-1 - Operating Voltage and Current.....	0
Table 4-2 - LCD and Touch Information .....	0
Table 4-3 - 5.0" TFT Optical specification .....	1
Table 7-1 – ME812A-WH50R J2 and MM900EV J2 pin mapping .....	10