WaRP Hardware Quick Start Guide

WaRP Mainboard + Pedometer Daughterboard

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Document History

Revison	Date	
1.0	2014/12/29	Initial Release

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1.0 Introduction

This document is intended as an introduction to the WaRP Mainboard and Pedometer Daughterboard hardware and focuses primarily on its initial setup and basic usage.

2.0 Hardware Setup Guide

2.1 Kit Contents
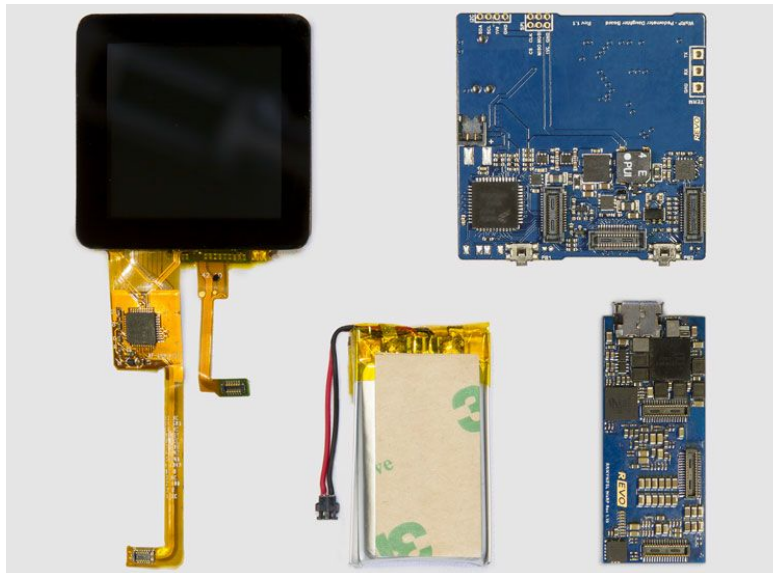
WaRP + Pedometer Daughterboard Kit Contents

The WaRP + Pedometer Daughterboard Kit arrives in several parts. The following instructions will show how to properly assemble WaRP. The kit contains the following:
- WaRP Mainboard
- WaRP Pedometer Daughterboard
- Touchscreen LCD Module
- Single Cell Lithium Polymer Battery

2.2 Connect WaRP mainboard to Pedometer Daughterboard

1. Make sure the boards are oriented per the image on the left

2. Align the Mainboard's connectors up with the daughterboards

3. Press gently on the Mainboard applying even pressure

4. A light click will indicate that the mainboard is attached

5. Inspect the assembly to ensure the boards are attached right

WaRP - Wearable Reference Platform

2.3 Attaching the Display Module

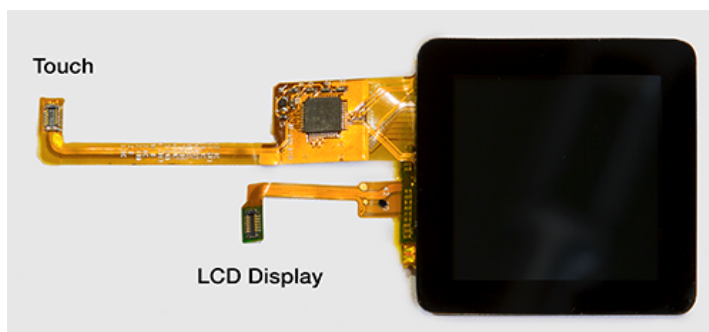
WaRP Touchscreen Display Module

The kit ships with a Touchscreen Display Module which is comprised of the touch screen glass and LCD module. The connectors are not keyed so it is crucial to get the alignment correct. Note that this display module requires a daughter board to connect the touch connector to the WaRP Mainboard.

2.3.1 Attaching the LCD Display to WaRP Mainboard
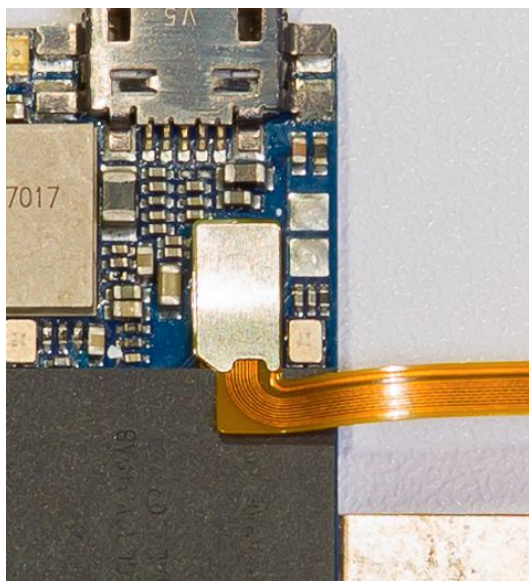
To attach the display, use the image below as a guide to orient the cable and attach the LCD Display connector to the top of the WaRP Mainboard.

1. Align the cable aligned over the connector

2. Apply gentle pressure

3. A gentle snap will indicate that the display is attached. The cable does overlap the processor a little so make sure excessive pressure isn't applied to the flex cable.

Note: Photo depicts beta units. Production units will have more margin between the display and processor to minimize pressure on the flex.

2.3.1 Attaching the Touch Panel to WaRP Daughterboard

To attach the touch panel, follow the image below as a guide.

Route cable over the WaRP Mainboard | Flip the assembly over | Attach the touch connector to the board
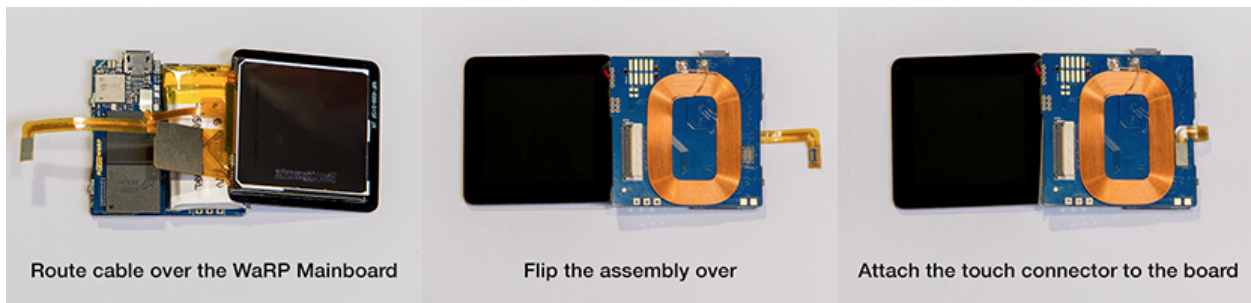
1. First, route the touch cable OVER the top of the WaRP Mainboard.

2. Carefully flip the assembly over (both display and board assembly)

3. Attach the touch connector to the connector on the bottom of the Daughterboard. Gently press until the connector clicks into place.

2.4 Attaching the Battery to Daughterboard
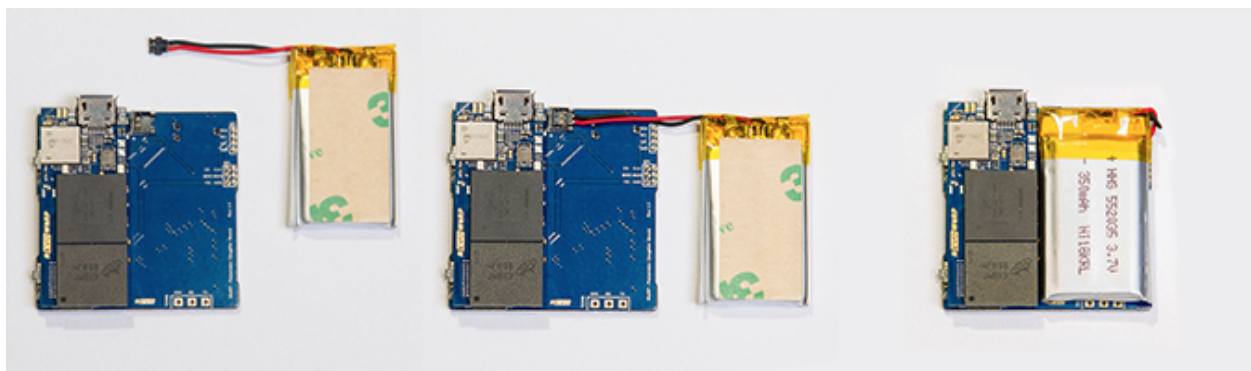
1. Note the orientation of the battery connector. Using the image above as a guide, orient the cable.

2. Press the cable onto the connector. The connector will snap into place.

3. Optionally: To permanently affix the battery, remove the adhesive backing and flip the battery over onto the daughterboard.

   Note: The battery ships with adhesive on the back of it allowing the battery to be attached securely to the board, however, for development purposes, avoid step 3.

3.0 WaRP Mainboard Overview

3.1 Block Diagram
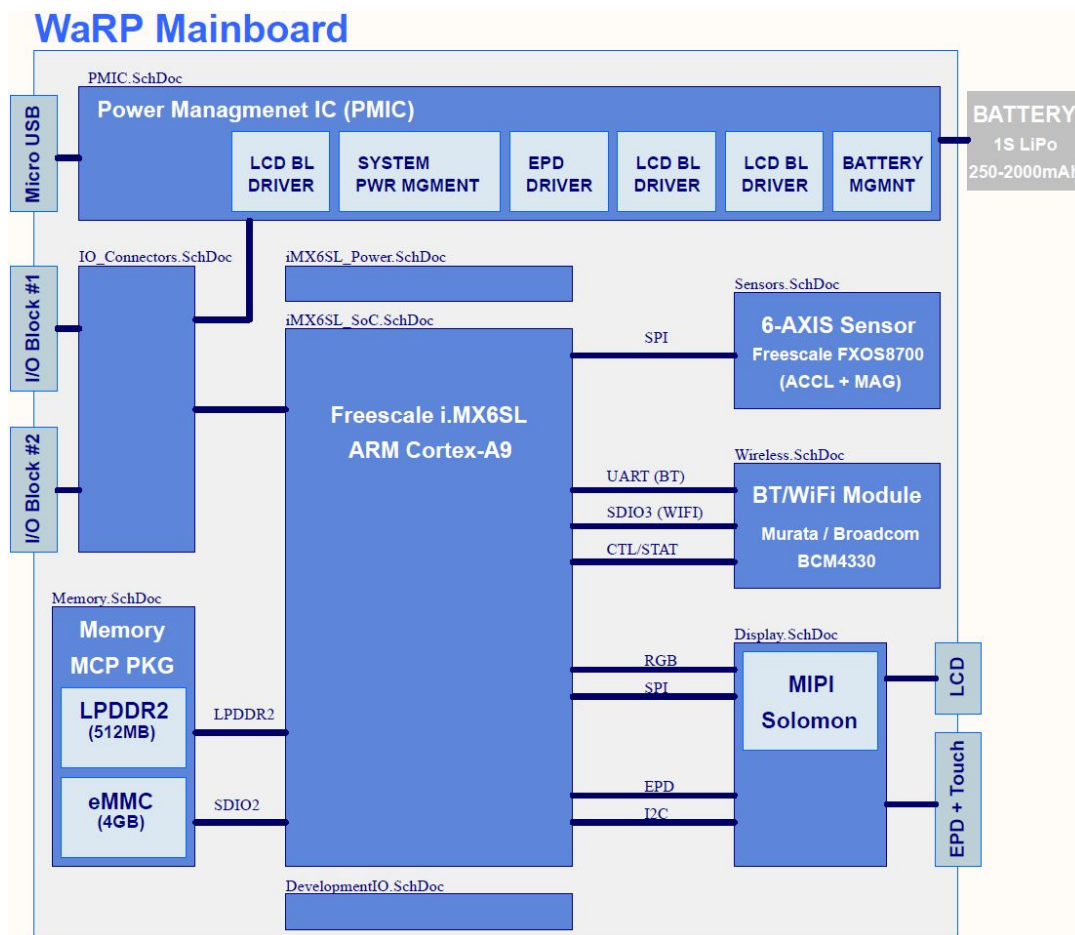
3.2 Electrical Guidelines

3.2.1 Absolute Maximum Electrical Characteristics

WaRP Secondary Charger Input Voltage   -0.3V to +16V
Input voltage from Mainboard   -0.3V to +6V

3.2.2 Electrical Characteristics

	Min	Typical	Max
Input Voltage from Mainboard (SYS_PWR)	2.7V	4V	5.5V
WaRP Mainboard Secondary Charger Input Voltage		5V	16V
WaRP Mainboard IO signal [1]		1.8V	
VBAT	2.7V		4.2V

[1] Signal voltages of the WaRP Mainboard default to 1.8V. 3V signaling requires kernel customization.

3.3 Pin Map & Pin Function Description

3.3.1 WaRP Mainboard I/O Connectors Overview
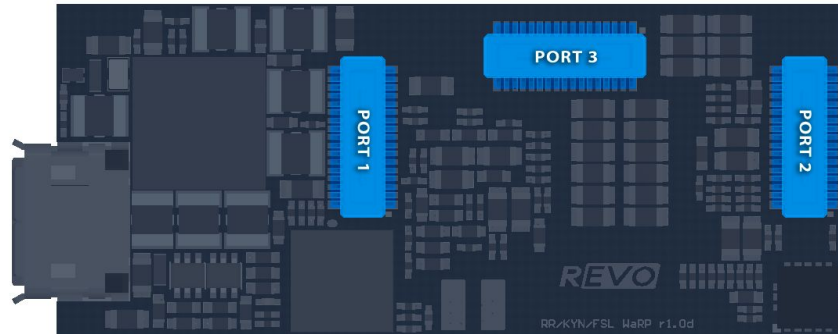
WaRP Mainboard (Bottom View)

3.3.2 Connector Port 1 (Location: Nearest USB)

SWD - Interface for Programming Daughter Board
PWR Control - Wake/Push Button/Event triggers
UART - Board to Board Communication
PMIC_CTL - I2C interface for interfacing to PMIC (multi master)
VBAT - Primary Battery Interface
VSYS_PWR - Power from PMIC to power Daughterboard
ALT_CHARGE - Secondary charger input from daughterboard (Wireless Charging)
32K_CLK - 32.768K Clock maintained by mainboard for use by MCU on DB

3.3.3 Connector Port 2 (Location: Furthest from USB)

JTAG - i.MX6 JTAG interface
USB - i.MX6 USB interface
MIPI_CTL - MIPI display controller SPI interface

3.3.4 Connector Port 3 (Location: Middle)

E-Paper Display
Touch Panel Interface

3.4 Connector Pinouts

3.4.1 Port 1

PIN	NAME	Function	Notes
1	GND	Power	
2	GND	Power	
3	GND	Power	
4	I2C1_SCL	iMX6SL I2C1_SCL	Access to iMX6SL I2C1 bus for additional I2C devices or external PMIC control
5	I2C1_SDA	iMX6SL I2C1_SDA	
6	SWD_CLK	WaRP GPIO	Future programming interface for KL16
7	UART3_TXD	iMX6SL UART3_TX, KL16 UART0_RX	UART communication interface with daughterboard
8	UART3_RXD	iMX6SL UART3_RX, KL16 UART0_TX	
9	SWD_DIO	WaRP GPIO	Future programming interface for KL16
10	SWD_RST#	WaRP GPIO	Future programming interface for KL16
11	ECSPI3_SCLK	iMX6SL SPI3 interface	User accessible iMX6SL SPI/GPIO
12	ECSPI3_MOSI	iMX6SL SPI3 interface	User accessible iMX6SL SPI/GPIO
13	ECSPI3_MISO	iMX6SL SPI3 interface	User accessible iMX6SL SPI/GPIO
14	ECSPI3_SS0	iMX6SL SPI3 interface	User accessible iMX6SL SPI/GPIO
15	GND	Power	
16	RESERVED[1]		
17	CTRL_EVENT	WaRP board-to-board IO	WaRP power management
18	PMIC_32K_CLK	32.768 KHz Clock Signal	
19	CTRL_WAKE	WaRP board-to-board IO	WaRP power management
20	CTRL_PB2	General Purpose Push Button	Active low push button
21	B2B_PMIC_PB	Power Control Push Button	Active low push button
22	DB_ALT_CHRG	Power	ALT charger input from Daughterboard to the Mainboard PMIC. Ex: wireless coil output filtered through 5V reg
23	DB_ALT_CHRG	Power	(See Above)
24	**VSYS_PWR**	Power	Daughterboard system power input
25	**VSYS_PWR**	Power	Daughterboard system power input
26	VBAT	Battery connection to WaRP	
27	VBAT	Battery connection to WaRP	
28	VBAT	Battery connection to WaRP	
29	VBAT	Battery connection to WaRP	
30	VBAT	Battery connection to WaRP	

[1] All RESERVED pins should be left unconnected.

3.4.2 Port 2

PIN	NAME	Function	Notes
1	UART1_RXD	iMX6SL UART1_RX	WaRP serial console
2	UART1_TXD	iMX6SL UART1_TX	WaRP serial console
3	JTAG_TRSTB	JTAG Interface	High voltage domain signal (2.9-3.2V)
4	JTAG_TDI	JTAG Interface	High voltage domain signal (2.9-3.2V)
5	JTAG_TMS	JTAG Interface	High voltage domain signal (2.9-3.2V)
6	JTAG_TCK	JTAG Interface	High voltage domain signal (2.9-3.2V)
7	JTAG_TDO	JTAG Interface	High voltage domain signal (2.9-3.2V)
8	JTAG_MOD	JTAG Interface	High voltage domain signal (2.9-3.2V)
9	USB_HOST_DP	iMX6SL USB_HOST_DP	
10	USB_HOST_DN	iMX6SL USB_HOST_DN	
11	GND	Power	
12	GND	Power	
13	GND	Power	
14	GND	Power	
15	GND	Power	
16	I2C3_SDA	iMX6SL I2C3 interface	User accessible iMX6SL I2C/GPIO interface
17	I2C3_SCL	iMX6SL I2C3 interface	User accessible iMX6SL I2C/GPIO interface
18	GPIO2_7[1]		User accessible iMX6SL GPIO
19	GPIO2_8[1]		User accessible iMX6SL GPIO
20	GPIO2_9[1]		User accessible iMX6SL GPIO
21	GPIO2_10[1]		User accessible iMX6SL GPIO
22	GND	Power	
23	GND	Power	
24	RESERVED[2]		Leave as no connect
25	RESERVED[2]		Leave as no connect
26	RESERVED[2]		Leave as no connect
27	RESERVED[2]		Leave as no connect
28	V2P9	WaRP Mainboard AP power domain	Mainboard 2.9V-3.2V supply output
29	BOOT_MODE0	iMX6SL BOOT_MODE selection	Use to force Serial Bootloader mode
30	RESERVED[2]		Leave as no connect

[1] These pins will map to alternate pins in the final board revision.

[2] All RESERVED pins should be left unconnected.

3.4.3 Port 3

| PIN	NAME	Function	Notes
1	GND	Power	
2	TOUCH_INT	LCD Touchpanel Interface	
3	RESERVED[1]		
4	TOUCH_SDA	LCD Touchpanel Interface	
5	TOUCH_SCL	LCD Touchpanel Interface	
6	EPDC_BDR0	EPD Signal	
7	EPDC_GDCLK	EPD Signal	
8	EPDC_GDSP	EPD Signal	
9	MODE	EPD Signal	
10	VEPD_EE	EPD Supply	-20V
11	VEPD_GG	EPD Supply	22V
12	VEPD_COM	EPD Supply	VCOM
13	RESERVED[1]		
14	EPDC_D7	EPD Signal	
15	EPDC_D6	EPD Signal	
16	EPDC_D5	EPD Signal	
17	EPDC_D4	EPD Signal	
18	EPDC_D3	EPD Signal	
19	EPDC_D2	EPD Signal	
20	EPDC_D1	EPD Signal	
21	EPDC_D0	EPD Signal	
22	EPDC_SDCE0	EPD Signal	
23	EPDC_SDSHR	EPD Signal	
24	EPDC_SDOE	EPD Signal	
25	EPDC_SDLE	EPD Signal	
26	EPDC_SDCLK	EPD Signal	
27	V2P9	WaRP Mainboard AP power domain	Mainboard 2.9V-3.2V supply output
28	GND	Power	
29	VEPD_POS	EPD Supply	15V
30	VEPD_NEG	EPD Supply	-15V

[1] All RESERVED pins should be left unconnected.

4.0 Mechanical Specifications

4.1 Physical Board Dimensions (Top View)
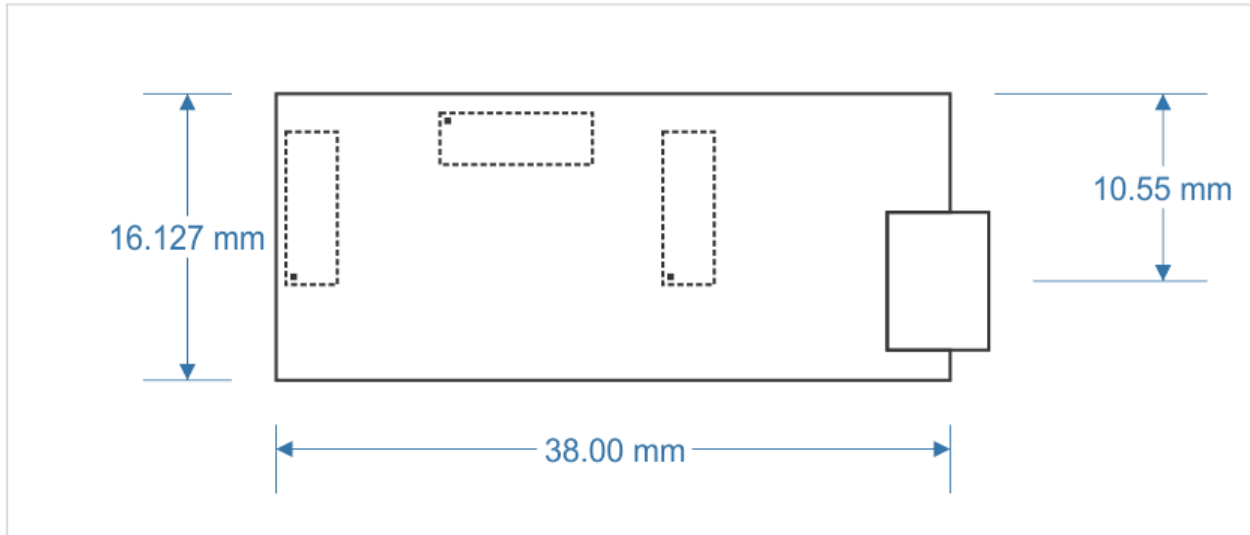
4.2 Connector Locations (Top View)

WaRP - Wearable Reference Platform
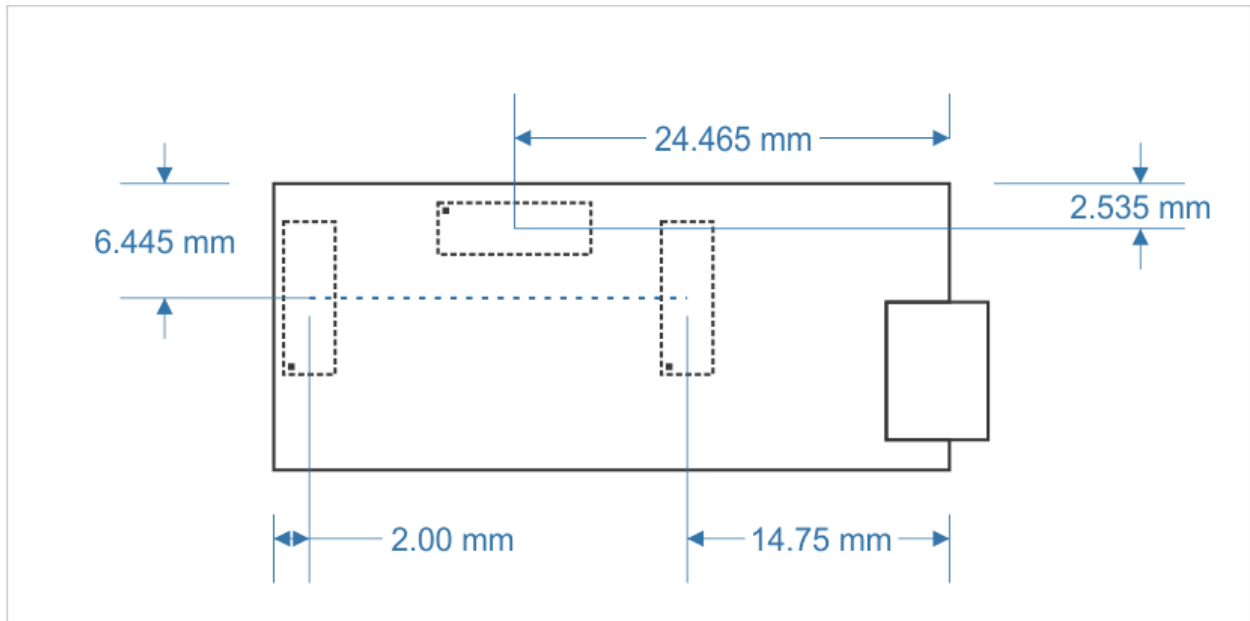
5.0 Additional Development & Support Resources

This document is authored by hardware developers Aaron Moore and Jacob Postman, Ph.D. and is maintained by Revolution Robotics. For additional detailed information regarding WaRP and its related hardware and accessories, please find the latest documentation at: http://revolution-robotics.com/warp/

5.1 Supporting Documents

Software Quick Start Guide - Get started developing software for the WaRP platform.
Daughterboard Design Guidelines

5.2 Community

revotics.com/warp
WaRP hardware developers website. For latest information on the hardware and hardware accessories.

warpx.io
Community hub for WaRP

https://community.freescale.com/community/imx
Freescale i.MX community site

5.3 Accessory

WaRP Development Interposer - Provides serial console access and breakout headers of iMX6SL pins accessible from the board-to-board connectors.