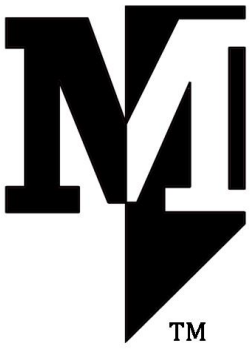
MyMENSCH™



W65Cx65PRO

Intentionally left blank.

DOCUMENT REVISION HISTORY

Version	Date	Author	Description
1.0	27-Oct-2021	Bill Mensch, David Gray	Initial Document Entry

Intentionally left blank.

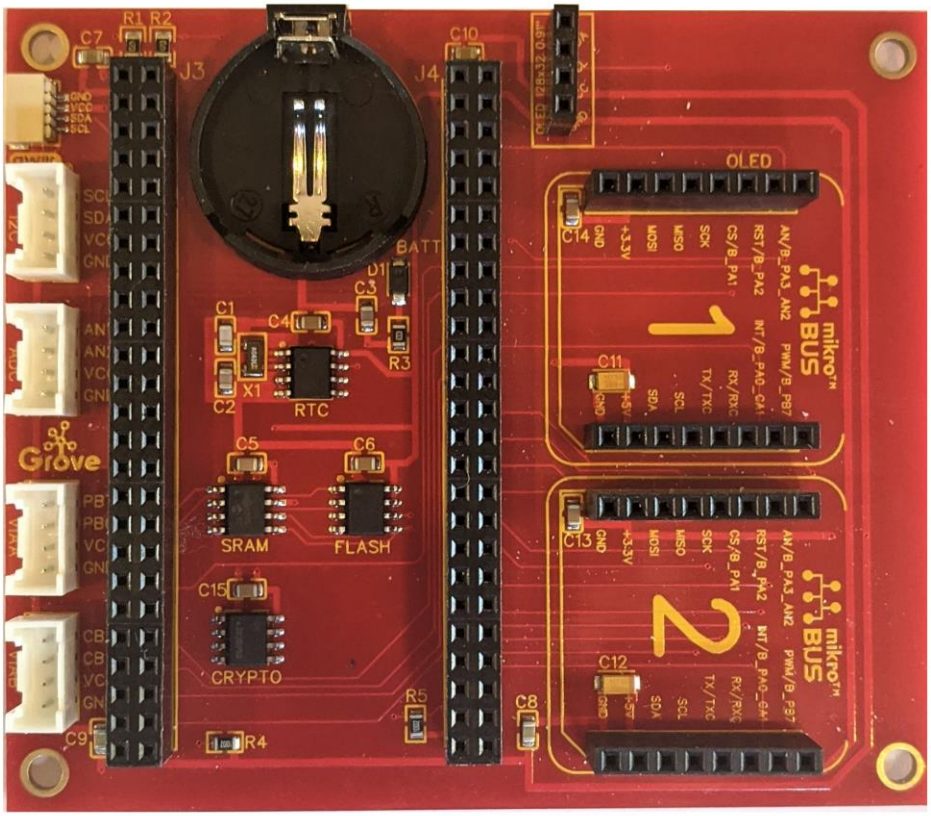
Table of Contents

1.0 Introduction

The W65Cx65PRO or PRO for short, is a companion board for the MyMENSCH™ (Rev-B/Rev-C fully supported) product line. It is a small printed circuit board (PCB), 3.50" x 3.00", designed for rapid prototyping using various modules from several popular companies.
Please visit http://wdc65xx.com/MyMENSCH/ for additional information on the base SBC boards that work with this product.

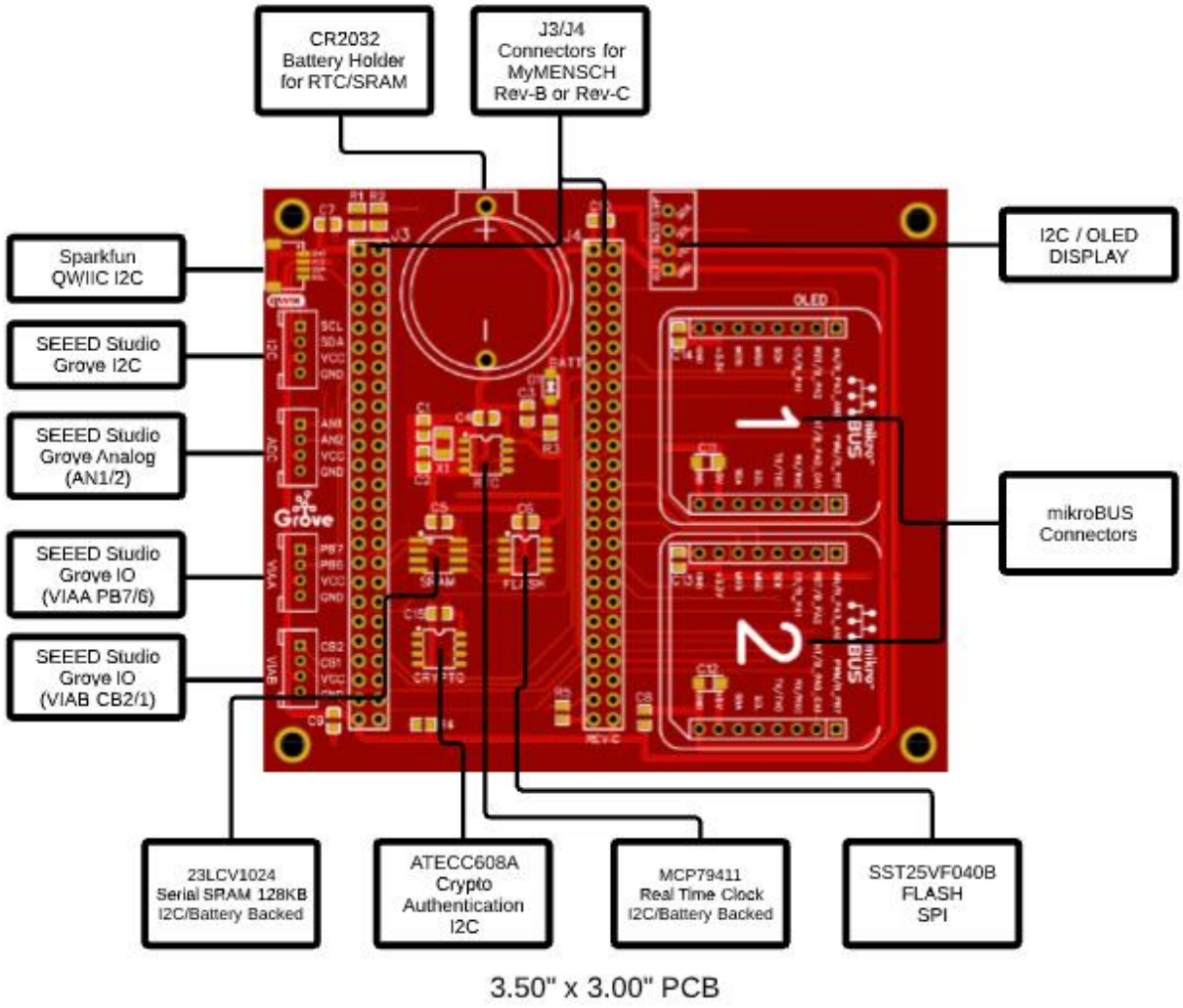
1.1 Feature List

- Designed for MyMENSCH Rev-B and Rev-C
- All IO pins are 3.3V.
- 1x Sparkfun QWIIC connector for I2C module expansion
- 4x Seeed Studio Grove connectors for I2C, Analog, and I/O expansion
- 2x MikroElektronika Click Board connectors for I2C, UART, SPI, ADC, PWM, and I/O expansion
- 1x I2C Connector for I2C OLED or other general I2C modules
- CR2032 3.3V Battery holder for Real-Time Clock and Serial SRAM. Note: battery not included with the board due to shipping restrictions.
- MCP79411 Real Time Clock
- ATECC608A CryptoAuthentication
- SST25VF040B – 512KB Serial FLASH (SPI)
- 23LCV1024 – 128KB Serial SRAM with battery backup (I2C)



1.2 Board Diagram

The board diagrams identifies the placement and types of the various connectors used on the board. Commonly accepted connector/bus platforms have been chosen for ease of expansion using prebuilt modules. The PRO has 1x Sparkfun QWIIC connector, 4x SEEED Studio Grove (1x I2C, 1x ADC, 2x I/O) Connectors and 2x MikroElectronica mikroBUS connectors for module expansion. The J3 and J4 connector are 2x50 connectors used to plug in either MyMENSCH Rev-B or Rev-C to the PRO.



1.3 Board Schematic

The latest board revision is Rev-C. Board schematics are available on-line at WDC65xx.com/support/documentation.

2.0 Connectors

Following are descriptions of W65Cx65PRO connectors.

2.1 I2C/OLED Connector

This connector is designed for a 1x4 0.100" connector. The spacing on the board was meant for a 0.91" OLED 128x32 display, however it can be used as a general purpose I2C connector.

I2C OLED Connector		
Pin	***Signal Name***	***MyMENSCH Pin***
1	GND	-
2	VCC	-
3	SCL	J3-3
4	SDA	J3-5

2.2 QWIIC Connector

The QWIIC connector is a standard JST 4 pin connector used by Sparkfun. It is primarily an I2C interface connector. Sparkfun has numerous modules that can be hooked to the PRO through this I2C connector. You can find more QWIIC information, cables, modules, etc. at Sparkfun's QWIIC page. The pinout is shown below, however with QWIIC cables, you can easily hook up a board correctly each time.

QWIIC I2C Connector		
Pin	***Signal Name***	***MyMENSCH Pin***
1	GND	-
2	VCC	-
3	SDA	J3-5
4	SCL	J3-3

2.3 SEEED Studio Grove Connectors

SEEED has their Grove system of standard connectors for easy 4-pin connection to a wide variety of modules. They have a comprehensive wiki page here. The PRO has 4 Grove connectors: 1x I2C, 1x Analog, and 2x Digital. The signal names are screen printed on board. Pins 3 and 4 for each connector are VCC and GND respectively. Below is a pinout for each Grove connector. Grove cables plug in only one way for easy board connection.

Grove I2C Connector		
Pin	***Signal Name***	***MyMENSCH Pin***
1	SCL	J3-3
2	SDA	J3-5
3	VCC	-
4	GND	-

Grove Analog Connector (ADC)		
Pin	***Signal Name***	***MyMENSCH Pin***
1	AN1	J4-14
2	AN2	J4-16
3	VCC	-
4	GND	-

Grove Digital Connector (VIAA)		
Pin	***Signal Name***	***MyMENSCH Pin***
1	PB7	J3-13
2	PB6	J3-15
3	VCC	-
4	GND	-
When programming, this uses VIA A, PB7/6		

Grove Digital Connector (VIAB)		
Pin	***Signal Name***	***MyMENSCH Pin***
1	CB2	J4-22
2	CB1	J4-21
3	VCC	-
4	GND	-
When programming, this uses VIA B, CB2/1		

2.4 mikroBUS Connectors 1 and 2

The signal names in Sections 2.1-2.4 are typical for most of the FPGA Microcontroller builds. MyMENSCH Note that AN2 on mikroBUS 2 is not connected to an Analog pins. This socket and pin should be for digital use only. Use only with modules that do not have analog going to AN2.

mikroBUS Connector 1							
Pin	***Signal Name***	***FPGA Ball***	***MyMENSCH Pin***	***Pin***	***Signal Name***	***FPGA Ball***	***MyMENSCH Pin***
1	AN1	-	J4_6 (AN0)	2	PWM1	-	J3-13 (VIA A PB7)
3	VIAA_PA2_RST1	K11	J3_39 (VIA A PA2)	4	INT1	K7/H13	J3-43/45 (VIA A PA0/CA1)
5	VIAA_PA1_CS1	J12	J3-41	6	RX1	K5	J4-42 (TXB)
7	SCK	D9	J4-32	8	TX1	N2	J4-44 (RXB)
9	MISO	A5	J4-28	10	SCL	L4	J3-3
11	MOSI	A6	J4-30	12	SDA	K6	J3-5
13	+3.3V	-	-	14	+5V	-	-
15	GND		-	16	GND	-	-

mikroBUS Connector 2							
Pin	***Signal Name***	***FPGA Ball***	***MyMENSCH Pin***	***Pin***	***Signal Name***	***FPGA Ball***	***MyMENSCH Pin***
1	AN2	C10	J4_37	2	PWM2	-	J4-26 (VIA B PB7)
3	VIAB_PA2_RST2	B10	J4_39 (VIA B PA2)	4	INT2	B12/B13	J4-43/45 (VIA B PA0/CA1)
5	VIAB_PA1_CS2	B11	J4-41	6	RX2	E8	J4-34 (TXC)
7	SCK	D9	J4-32	8	TX2	F8	J4-36 (RXC)
9	MISO	A5	J4-28	10	SCL	L4	J3-3
11	MOSI	A6	J4-30	12	SDA	K6	J3-5
13	+3.3V	-	-	14	+5V	-	-
15	GND	-	-	16	GND	-	-

2.5 Left IO Connector J3 Ball Assignments

The J3 left connector has 46 IO, 2x 3v3 power and 2x VSS pins. Signal Names for individual microcontrollers are shown in the microcontroller datasheet. NA are Non-Assigned logic IO pins that are assigned by the FPGA microcontroller chosen. Note that NA is used for the signals as these can change with different builds. The signal names in Section 2.4 are typical for most of the FPGA Microcontroller builds.

J3 – Left Expansion Connector					
Pin	***Signal Name***	***FPGA Ball (Rev-B,C)***	***Pin***	***Signal Name***	***FPGA Ball***
1	VSS	-	2	VDD	-
3	NA	L4	4	NA	L3
5	NA	K6	6	NA	K5
7	NA	M3	8	NA	N2
9	NA	M4	10	NA	N3
11	NA	M5	12	NA	N4
13	NA	L5	14	NA	N5
15	NA	N7	16	NA	N6
17	NA	N8	18	NA	M7
19	NA	M9	20	NA	M8
21	NA	M10	22	NA	N9
23	NA	M11	24	NA	N10
25	NA	N12	26	NA	N11
27	NA	M13	28	NA	M12
29	NA	L13	30	NA	L12
31	NA	K13	32	NA	K12
33	NA	K8	34	NA	J8
35	NA	J9	36	NA	L10
37	NA	K10	38	NA	L11
39	NA	K11	40	NA	J10
41	NA	(H9) or (J12)	42	NA	H10
43	NA	(J12) or (K7)	44	NA	J13
45	NA	H13	46	NA	G12
47	NA	G13	48	NA	F12
49	VDD	-	50	VSS	-

2.6 Right IO Connector J4 Ball Assignments

The J4 right connector has 46 IO, 2x 3v3 power and 2x VSS pins. Signal names for individual microcontrollers are shown in the microcontroller datasheet. NA are Non-Assigned logic pins. NA (ADC_Inx) are dual function pins that can be either logic IO or analog input pins. JTAG pins are available on Rev-A not on Rev-B and Rev-C. Note that NA is used for the signals as these can change with different builds. The signal names in Section 2.4 are typical for most of the FPGA Microcontroller builds.

J4 – Right Expansion Connector					
Pin	***Signal Name***	***FPGA Ball***	***Pin***	(Rev-A) ***Signal Name*** (Rev-B,C)	***(Rev-A) FPGA Ball (Rev-B,C)***
1	VDD	-	2	VSS	-
3	NA	H3	4	(JTAG_TCK) or (AGND)	(G2) or (E2)
5	NA	H1	6	(JTAG_TDI) or (ADC_IN0)	(F5) or (D2)
7	NA	H2	8	(JTAG_TDO) or (3v3REF)	(F6) or (D3)
9	NA (ADC_IN5)	F1	10	(JTAG_TMS) or (5vBAT)	(G1) or (-)
11	NA (ADC_IN6)	E1	12	(JTAG_EN) or (VIA_B_PB6)	(E5) or (F4)
13	NA (ADC_IN7)	C1	14	NA (ADC_IN1)	D1
15	NA (ADC_IN8)	B1	16	NA (ADC_IN2)	C2
17	NA	B2	18	NA (ADC_IN3)	E3
19	NA	A2	20	NA (ADC_IN4)	E4
21	NA	B3	22	NA	E6
23	NA	B4	24	NA	A3
25	NA	B5	26	NA	A4
27	NA	B6	28	NA	A5
29	NA	B7	30	NA	A6
31	NA	A7	32	NA	D9
33	NA	A8	34	NA	E8
35	NA	C9	36	NA	F8
37	NA	C10	38	NA	A9
39	NA	B10	40	NA	A10
41	NA	B11	42	NA	A11
43	NA	B12	44	NA	A12
45	NA	B13	46	NA	C11
47	NA	C13	48	NA	C12
49	VSS	-	50	VDD	-

3.0 On board circuits and features

Following are descriptions of W65Cx65PRO connectors.

- CR2032 3.3V Battery for Real Time Clock and Serial SRAM
- MCP79411 Real Time Clock
- ATECC608A CryptoAuthentication
- SST25VF040B – 512KB Serial FLASH (SPI)
- 23LCV1024 – 128KB Serial SRAM with battery backup (I2C)

3.1 Battery Holder

The battery holder is for a standard CR2032 coin cell battery, operating at 3.3V. You can use any brand battery you choose. Board does not come with a battery due to shipping restrictions at this time. Coin cell battery is used as the backup battery for the MCP79411 Real Time Clock and 23LCV1024 Serial SRAM chips.

3.2 MCP79411 I2C Real Time Clock

The MCP79411 general purpose I2C™Compatible real-time clock/calendar (RTCC) is highly integrated with nonvolatile memory and advanced features normally found in higher priced devices. These features include a battery switchover circuit for backup power, a timestamp to log power failures and digital trimming for accuracy. Using a low-cost 32.768 kHz crystal or other clock source, time is tracked in either a 12-hour or 24-hour format with an AM/PM indicator and timing to the second, minute, hour, day of the week, day, month and year. As an interrupt or wakeup signal, a multifunction open drain output can be programmed as an Alarm Out or as a Clock Out that supports 4 selectable frequencies. In addition, non-volatile memory is included along with a Unique ID in a locked section of EEPROM that is factory programmed with an EUI-48 MAC Address. Complete details and datasheet can be found directly from Microchip.

3.3 ATECC608A – I2C CryptoAuthentication

The ATECC608A is a secure element from the Microchip CryptoAuthentication™ portfolio with advanced Elliptic Curve Cryptography (ECC) capabilities. The device used on the PRO board uses an I2C interface. With ECDH and ECDSA being built right in, this device is ideal for the rapidly growing IoT market by easily supplying the full range of security such as confidentiality, data integrity, and authentication to systems with MCU or MPUs running encryption/decryption algorithms. Complete details and datasheet can be found directly from Microchip.

3.4 SST25VF040B – SPI FLASH

The 25 series Serial Flash family features a four-wire, SPI compatible interface that allows for a low pin-count package which occupies less board space and ultimately lowers total system costs. The SST25VF040B devices are enhanced with improved operating frequency for lower power consumption. SST25VF040B SPI serial flash memories are manufactured with SST proprietary, high-performance CMOS SuperFlash technology. The split-gate cell design and thick-oxide tunneling injector attain better reliability and manufacturability compared with alternate approaches. Complete details and datasheet can be found directly from Microchip.

3.5 23LCV1024 SPI SRAM

The Microchip Technology Inc. 23LCV1024 are 1 Mbit Serial SRAM devices. The memory is accessed via a simple Serial Peripheral Interface (SPI) compatible serial bus. The bus signals required are a clock input (SCK) plus separate data in (SI) and data out (SO) lines. Access to the device is controlled through a Chip Select (CS) input. Additionally, SDI (Serial Dual Interface) is supported if your application needs faster data rates. The SRAM can be battery backed via the Vbat pin essentially making the SRAM non-volatile. The device also supports unlimited read and write cycles to the array. Complete details and datasheet can be found directly from Microchip.

4.0 Notices and Ordering Information

4.1 FCC Compliance

The Western Design Center, Inc. (WDC) provides the enclosed product under the following conditions: This board is intended for use for Engineering Development or Evaluation Purposes ONLY and is not considered by WDC to be a finished consumer product. This board should be handled with caution using good electronics handling practices. This board is compliant per RoHS/Green directives. It does not fall within the scope of directives such as FCC, CE, and UL. It generates uses and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules.

4.2 Ordering Information

The W65Cx65PRO, W65Cx65MMC_Rev-B, and W65Cx65MMC_Rev-C are available from WDC Direct and our distribution partners. For information please visit: https://wdc65xx.com/where-to-buy