Modtronix Engineering

Modular Electronic Solutions

SBC83I Revision 2

Single Board Computer with PIC18F87J11 Controller

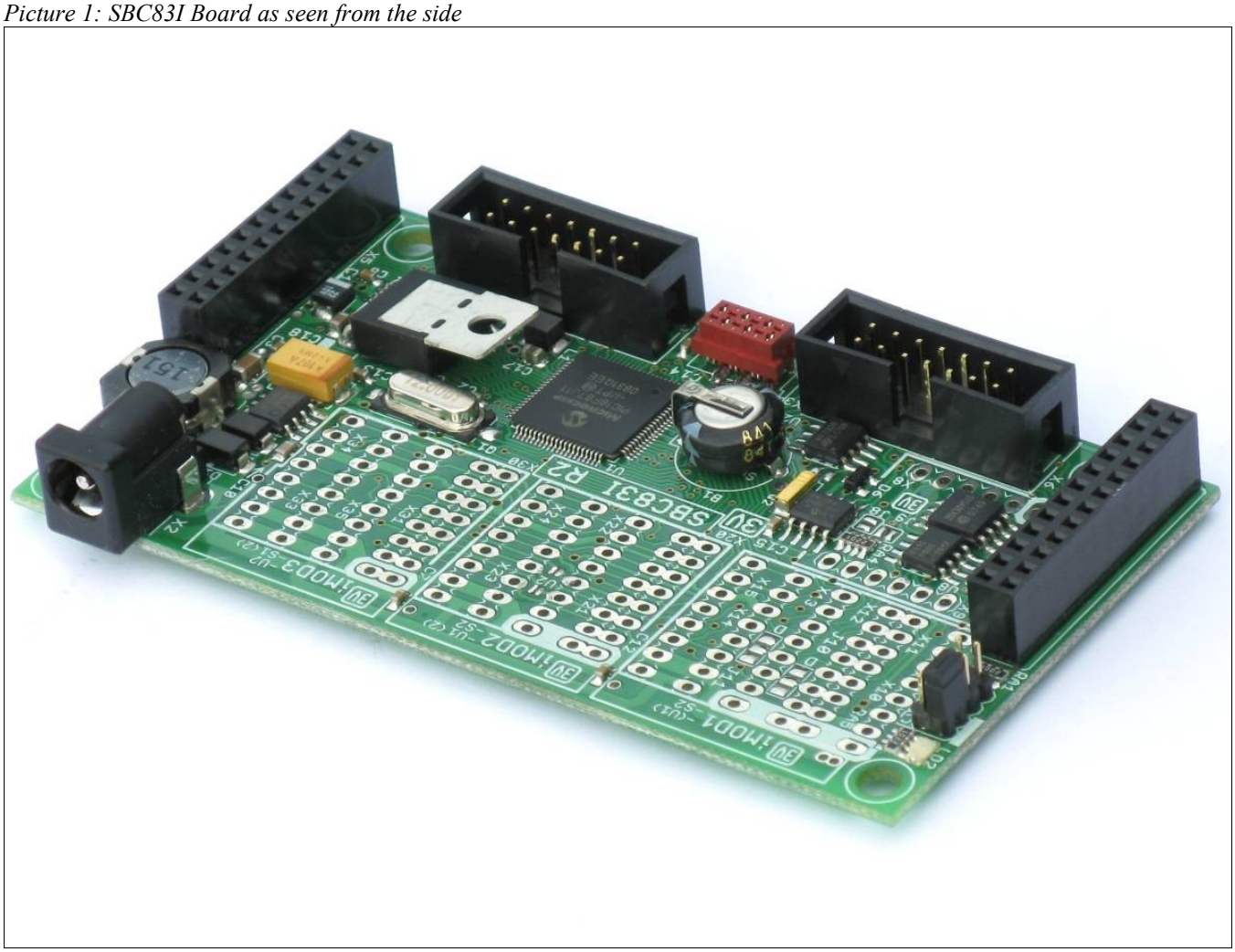
----- Part of Modtronix *Presto* product range -----

1 Introduction

The following documentation is for the SBC83I Revision 2. The SBC83I is a Single Board Computer (SBC) assembled with the PIC18F87J11 Microcontroller. The datasheet and errata for this Microcontroller can be downloaded from Microchip's web site www.microchip.com. This board is assembled with very high quality, brand name components! Our goal is for this board to work error free for many years. For this reason, we do not use cheap components, or stress components to the limit of their capability! The quality of assembly, and reliability of components used sets this board apart from similar competitor products!

The SBC83I is part of the Modtronix *Presto* product range.

Picture 1: SBC83I Board as seen from the side



2 Features

- Assembled with the Microchip PIC18F87J11 Microcontroller
- 48MHz Microcontroller Clock (12MHz crystal), with 12MIP Microcontroller execution speed
- 128KBytes internal FLASH memory for program and constant data
- 3936 Bytes of internal SRAM
- **Very High quality** assembly, with brand name, quality components. No cheap, “no name brand” components are used!
- Quality 500mA DC/DC Converter from National Semiconductors, with shielded Inductor and surge protected capacitors. Input Capacitors are high quality, long life, surge protected types as recommended by National Semiconductors.
- External RTC with 0.33F Super Capacitor, keeps time for over 1 week without power.
- External 32MBit SPI Winbond FLASH chip
- External 32Kbyte SPI SRAM chip
- External 8Kbyte I2C EEPROM
- 2.5V 0.5% Accurate voltage reference for ADC converter
- Filtered analog supply to CPU for accurate analog measurements
- Three Presto iMod Port for adding interfaces like RS-485, RS-232, 1-Wire, Ethernet.....
- Daughter board connector with 48 pins for adding prototype board or LCD display
- Two 14 pin IDC connectors with power and 8 I/O ports each
- Micro Match connector with I2C bus. Please note that this is a 3.3V I2C bus, and should NOT be used with our 5V serial LCD displays! Some users have however reported using a 3.3V I2C bus on our 5V serial displays successfully.
- Red System LED on PIC port RB6.
- Pin header with jumper that can be mounted in 3 positions: Park, "C" or "F". Software can for example use "C" position to restore default configuration, and "F" position to update firmware via bootloader.
- 2.1mm power connector for standard DC transformer.
- Very low supply current of 14mA at 12V.
- Has an ICSP (In Circuit Serial Programming) connector (ICPC1 type) - CPU can be programmed and debugged in circuit. For details see www.modtronix.com/picboards/prog.
- Free full functional MPLAB C18 C compiler available from www.microchip.com
- Is part of our *Presto* product range, can be used together with other Presto products. For details, see www.modtronix.com/products/presto
- Wide operating voltage range from 4.5V to 30V. Can be increased to 40V on request, just have to remove input surge protection diode.
- Wide operating temperature of -25 to 70°C. Can be increased to -40 to +85 if the Super Capacitor (RTC Battery) is not required.

3 Power

The SBC83I has a 2.1mm connector for supplying power to the board. The power connector should have standard polarity, with the inside pin positive, and the outside negative. It is protected against reverse polarity via diode D2, meaning that if the polarity of the 2.1mm connector is wrong, no damage will be done to the board.

The input circuit also has a protection diode protecting the input from voltage spikes. Voltage spikes might arise if a long power cable is used to supply the board with power. When inserting and removing the 2.1mm connector, this cable could act as a inductor, and along with the input capacitors could cause a high voltage at the input. The protection diode will protect the input circuitry from any such high voltages spikes. The input diode however limits the input voltage to about 30V. The DC/DC regulator is rated for a maximum input voltage of 40V. To increase the voltage range from 30V to 40V, the protection diode D2 can be removed.

The power supply consists of a LM2674 DC/DC switching regulator. A shielded inductor is used to provide low EMI emissions and noise radiation. Very high quality input and output capacitors are used. The capacitors are rated for very long life, and are surge protected. Seeing that the DC/DC converter is often a weak point of some circuits, better than required components were used to ensure reliable operation and long life.

4 Memory

The SBC83I has a PIC18F87J11 Microcontroller assembled, which has 128KBytes internal FLASH and 3936 Bytes of internal SRAM. Additionally it has a 32MBit (4MByte) external FLASH, a 32KByte external SRAM and a 64KBit external EEPROM. The FLASH and SRAM have a SPI serial bus, and are connected to SPI port 2 of the Microcontroller. The EEPROM has an I^2C serial bus, and is connected to I^2C port 1 of the Microcontroller. Both the SPI and I^2C ports can be shared with additional SPI and I^2C devices. Additional SPI devices have to be added to SPI port 2, and additional I^2C devices to I^2C port 1.

4.1 External Flash

The **external Flash** uses a Winbond W25X32 32MBit chip, which is selected by setting port H0 of the CPU low. It has a maximum clock frequency of 75MHz. It is organized into 16,384 programmable pages of 256 bytes each. An important feature of the Flash is that a single (previously erased) byte of the Flash can be programmed at a time. Groups of 16 pages for a 4KByte sector. The smallest amount of flash that can be erased is a sector. The chip is specified for up to 100,000 erage/write cycles, with a data retention of 20 years.

The datasheet for the W25X32 can be downloaded from Modtronix's web site at:
www.modtronix.com/products/components/flash/w25x16_32_64.pdf

4.2 External SRAM

The **external SRAM** uses a AMI Semiconductor N256S0830HDA 32KByte chip, which is selected by setting port H1 of the CPU low. It has a maximum clock frequency of 20MHz. It is organized as 32K x 8bit, and can be erased, read and programmed one byte at a time.

The datasheet for the N256S0830HDA can be downloaded from Modtronix's web site at:
www.modtronix.com/products/components/sram/n256s0830hda.pdf

4.3 External EEPROM

The **external EEPROM** uses a Microchip 24LC64 8KByte chip. It has a maximum clock frequency of 400KHz. It is organized as 8K x 8bit, and can be erased, read and programmed one byte at a time.

The datasheet for the 24LC64 can be downloaded from Modtronix's web site at:
www.modtronix.com/products/components/eeprom/24lc64.pdf

5 RTC

The SBC83I has a M41T82R Real Time Clock (RTC) connected to I²C port 1 of the Microcontroller. It has a maximum clock frequency of 400KHz. The board is assembled with a 20ppm accurate 32.768Khz crystal. It has a 0.33F Super Capacitor which will keep the time for about 7 to 10 days after removing power. A Super Capacitor is superior to a battery in that it can be recharged millions of times, compared to thousands (in most cases only a couple of 100) of times for a battery.

The datasheet for the M41T82R can be downloaded from Modtronix's web site at:
www.modtronix.com/products/components/rtc/m41t82.pdf

6 Serial SPI and I2C bus

The CPU used on the SBC83I has two SSP ports that can be configured as either a SPI or I²C port.

SSP port 1 should be configured as an I²C port, seeing that the external EEPROM and RTC are connected to it. The RTC has a maximum clock speed of 400KHz, which limits the maximum clock speed of the I²C bus to 400KHz. Any additional I²C devices should be added to I²C port 1 of the CPU, that is pins C3 and C4.

SSP port 2 should be configured as a SPI port, seeing that the external Flash and SRAM are connected to it. The Flash is enabled by setting CPU port H0 to 0V, and the SRAM by setting port H1 to 0V. Any additional SPI devices should be added to SPI port 2 of the CPU, that is pins D4, D5 and D6.

7 Connectors

7.1 Daughter Board Connector

The SBC83I has two 24 pin (2.54mm grid) female header connectors for adding a daughter board. For the location and pin numbering of this connector, see section 11 Dimensions of this document.

7.2 IDC Connectors

The SBC83I has two 14 pin (2.54mm grid) IDC connectors. For the location and pin numbering of this connector, see section 11 Dimensions of this document. These connectors both have 8 I/O ports, two pins for Ground, two pins for Vcc and two pins for Vaux. Note that the I/O pins of both these connectors are shared with the daughter board connectors X4 and X5. If the daughter board connector and both IDC connectors are to be used, try not to use the signals on the daughter board that are shared with the ICD connectors.

Table 2 and Table 3 below show the pin-outs of these two connectors.

Table 2: ICD Connector X6

Connector Pin	Description
1	**Vcc** - Positive supply voltage, is 3.3V for the SBC83I.
2	**E7** – I/O pin E7 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
3	**E6** – I/O pin E6 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
4	**E5** – I/O pin E5 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
5	**E4** – I/O pin E4 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
6	**E3** – I/O pin E3 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
7	**E2** – I/O pin E2 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
8	**E1** – I/O pin E1 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
9	**E0** – I/O pin E0 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
10	**Gnd** - 0V
11	**Gnd** - 0V
12	**Vaux** – Auxiliary supply voltage. This is the supply voltage applied to the SBC83I via the 2.1mm power connector.
13	**Vaux** – Auxiliary supply voltage. This is the supply voltage applied to the SBC83I via the 2.1mm power connector.
14	**Vcc** - Positive supply voltage, is 3.3V for the SBC83I.

Table 3: ICD Connector X7

Connector Pin	Description
1	**Vcc** - Positive supply voltage, is 3.3V for the SBC83I.
2	**F7** – I/O pin F7 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin
3	**F6** – I/O pin F6 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin, or Analog input
4	**F5** – I/O pin F5 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin, or Analog input
5	**F4** – I/O pin F4 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin, or Analog input
6	**F3** – I/O pin F3 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin, or Analog input
7	**F2** – I/O pin F2 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin, or Analog input
8	**F1** – I/O pin F1 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin, or Analog input
9	**H7** – I/O pin H7 of the PIC18F87J11 Microcontroller, general purpose digital I/O pin, or Analog input
10	**Gnd** - 0V
11	**Gnd** - 0V
12	**Vaux** – Auxiliary supply voltage. This is the supply voltage applied to the SBC83I via the 2.1mm power connector.
13	**Vaux** – Auxiliary supply voltage. This is the supply voltage applied to the SBC83I via the 2.1mm power connector.
14	**Vcc** - Positive supply voltage, is 3.3V for the SBC83I.

7.3 In Circuit Serial Programming Connector

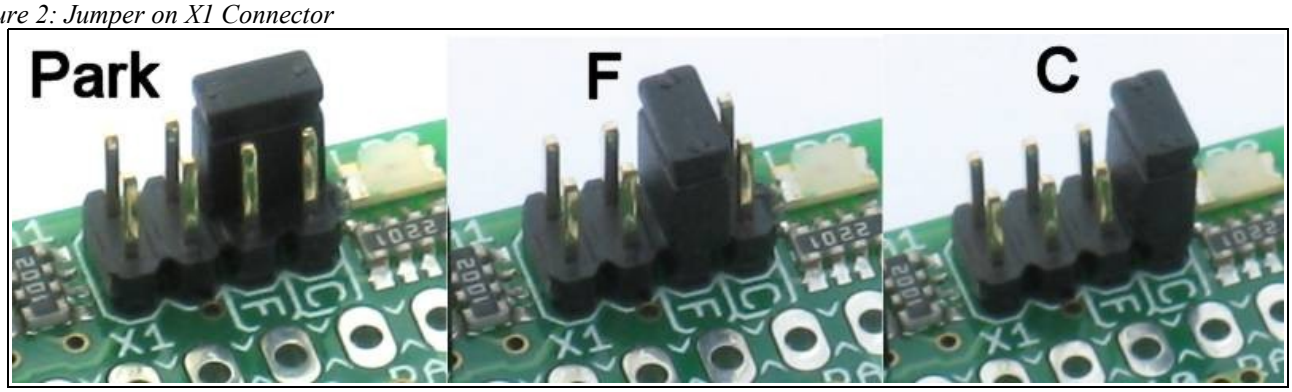
Connector X1 is the programming connector. It is a 2x4 pin, 2mm pin header. For programming, it has 5 signals, Gnd, Vcc, MCLR, B6 and B7. These 5 signals are all that is required to program the PIC Microcontroller in circuit. A special programming adapter is available from Modtronix that allows this board to be programmed with the Microchip PICKit 2 and 3, and ICD 2 and 3 programmers/debuggers. For details on programming, see www.modtronix.com/picboards/prog

See section 11 Dimensions of this document for the signal location on this connector.

7.4 Restore Configuration and update Firmware jumpers

Connector X1 also has a secondary function of recognizing a jumper in one of two positions. A third position, park is also available for when the jumper is not in use. The two positions are marked C and F on the board, and could be used to restore configuration, and update firmware. An example use would be where the software checks on start up if the jumper is in position F or C. If it is on C, it could restore the default configuration of the board. If it is on F, it could allow the firmware to be updated via a serial port. The C and F jumper uses port RB6 and RB7 of the Microcontroller. When in park position, both ports will read as 0. When the jumper is in position C, port RB6 will read as 1. When in position F, port RB7 will read as 1. The position of the jumpers are shown in Picture 2.

Picture 2: Jumper on X1 Connector

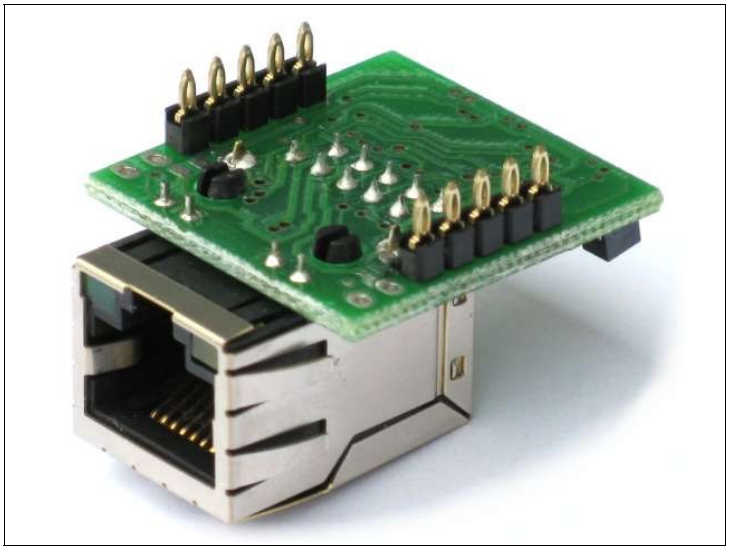


8 Presto iMod Ports

The SBC83I is part of the Modtronix *Presto* product range. One of the main features of the *Presto* product range are the *iMod Modules*. They are interface modules with press-fit connectors, and are fitted to *iMod Ports* by pressing them in – no soldering is required. The SBC83I has three *iMod Ports*.

8.1 Overview of iMod Modules and Ports

Picture 3: Press-Fit connectors on an iMod Module



For details on iMod modules and ports, see www.modtronix.com/info/imod. Presto iMod Modules are small interface boards that normally provide a single interface, like RS-232, RS-485, Ethernet.... They are mounted in iMod Ports, which are generally found on Single Board Computers (SBC). This provides a very flexible way to add different interfaces to a SBC board.

All iMod Modules have two rows of press-fit connectors, a left and a right row. See Picture 3 for a example of the in28J60 iMod Module. The signals on these connectors are pre-defined, allowing modules to be interchangeable. On the iMod Port, pin 1 (top most pin) of the left row will have a white marking around it. Most iMod Ports will have multiple left and right rows, situated next to each other. This allows iMod Modules of different widths to be mounted.

A single iMod Module is defined to have a maximum row spacing of 0.7", referred to as one module width. Modules can however be wider than one module width, other common module widths are 0.9", 1.1" and 1.6". Target boards can provide iMod Ports for fitting iMod modules. An iMod port is very simple and cheap to implement, and just two rows of 1.00mm holes 0.7" apart, with a 0.1" (2.54mm) grid. Modules wider than 0.7" will normally take up two iMod Ports on the target board. Adjacent iMod Ports should be spaced 0.2" apart. To help inserting the iMod module correctly into the iMod Port, pin 1 of the left connector is marked (white band around pad) on the iMod Module and iMod Port, and should always be aligned!

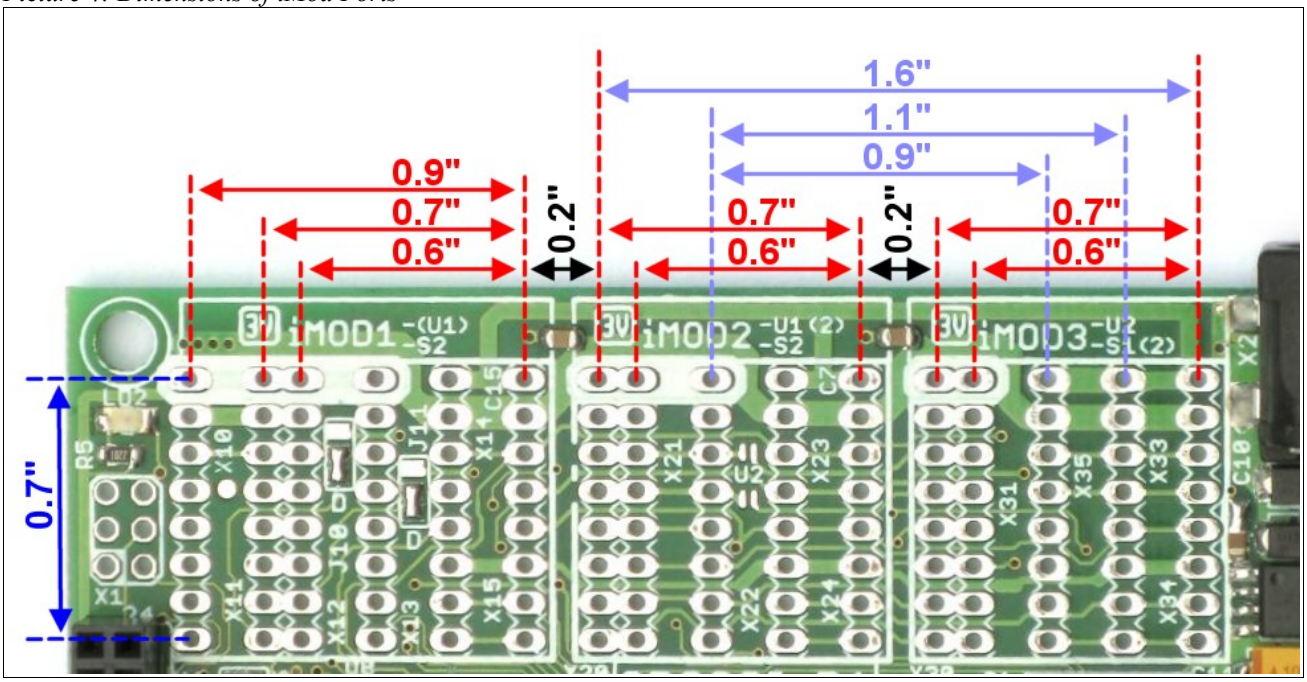
8.2 iMod Ports on the SBC83I

Picture 4 shows the iMod Ports on the SBC83I. The left iMod Port is 0.9" wide, which is wider than a standard iMod module. This

is so that a 0.9” iMod module can also be fitted to it, like the im28J60 Ethernet Module for example. The remaining two iMod Ports have a standard width of 0.7”.

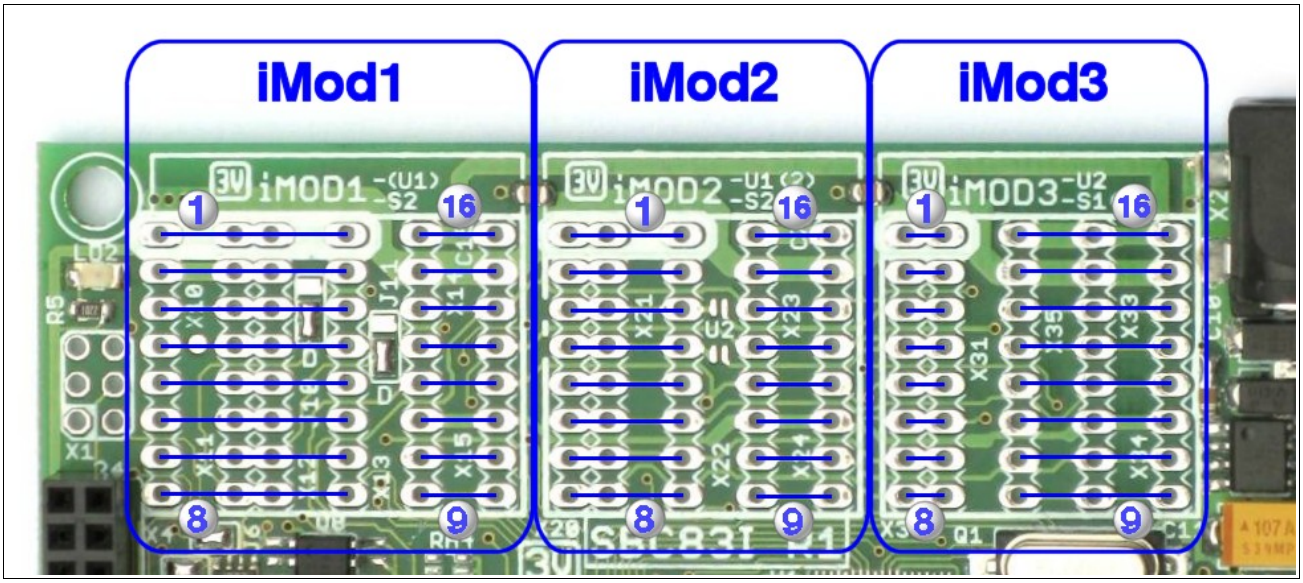
Adjacent iMod Ports are spaced 0.2” apart, and can be combined so that modules wider than one module width can be fitted. The blue dimensions show examples of combining iMod Port 2 and 3 to get a module with of 0.9”, 1.1” and 1.6”. When combining iMod Ports, it is **very important** that a left and right row are used! Pin 1 of the left row is always indicated with a white marking around it! Provision is also made for possible narrower iMod modules of 0.6” wide.

Picture 4: Dimensions of iMod Ports



Picture 5 shows the location of the 3 iMod Ports. The blue lines show pins that are connected. It can be seen that each iMod Port has multiple vertical left and right rows, each with 8 pins. Pin 1 of the left row is indicated by a white marking around it. The left row has pins 1 to 8, and the right row pins 9 to 16. All pins of each row are electrically connected, as shown by the blue lines in the picture. For example, iMod Port 1 has 4 left rows (vertical rows), of which all pin 1s are connected, all pin 2s are connected, and so forth.

Picture 5: iMod Ports on SBC83I board



8.3 Signals on iMod Ports

The pins of iMod Ports are assigned standard signals.

- Pin 1 is Ground
- Pins 3 and 4 is a serial port, like a USART, CAN Bus, USB....
  - When used for a USART, 3 = Received Data, and 4 = Transmit Data
  - When used for a CAN Bus, 3 = CAN Receive, and 4 = CAN Transmit (Initial pin assignment,might change)
  - When used for USB, 3 = D-, and 4 = D+ (Initial pin assignment,might change)
- Pins 2, 5, 6, 7, 9 and 10 are general purpose I/O ports
- Pins 12, 13 and 14 is a SPI or I2C serial port.
  - When used as a SPI port, 12=SDO, 13=SDI and 14=SCK
  - When used as a I2C port, 13=SDA and 14=SCL
- Pin 11 is Vsec (secondary voltage), which is 5.0V.
- Pin 15 is Vcc, which is 3.3V.
- Pin 16 is Vaux. This is the input voltage applied to the board via the 2.1mm power connector.

Table 4: Signals assigned to iMod Ports

iMod Port 1				iMod Port 2				iMod Port 3			
Left Row		Right Row		Left Row		Right Row		Left Row		Right Row	
1	**Ground = 0V**	16	**Vaux**	1	**Ground = 0V**	16	**Vaux**	1	**Ground = 0V**	16	**Vaux**
2	**D7**	15	**Vcc**	2	**H2**	15	**Vcc**	2	**G0**	15	**Vcc**
3	**D2 (C7)** *1	14	**D6** (SCK) *3	3	**C7** (RX 1UART1)	14	**D6** (SCK) *3	3	**G2** (RX UART2)	14	**C3/D6** (SCK) *4
4	**D3 (C6)** *1	13	**D5** (SDI) *3	4	**C6** (TX UART1)	13	**D5** (SDI) *3	4	**G1** (RX UART2)	13	**C4/D5** (SDA) *4
5	**D0**	12	**D4** (SDO) *3	5	**H4**	12	**D4** (SDO) *3	5	**H3**	12	**D4**
6	**D1**	11	**Vsec**	6	**H5** *5	11	**Vsec**	6	**H5** *5	11	**Vsec**
7	**D2**	10	**H0** *2	7	**H6** *5	10	**G3** *6	7	**H6** *5	10	**G3** *6
8	**D3**	9	**H1** *2	8	**H7** *5	9	**G4** *6	8	**H7** *5	9	**G4** *6

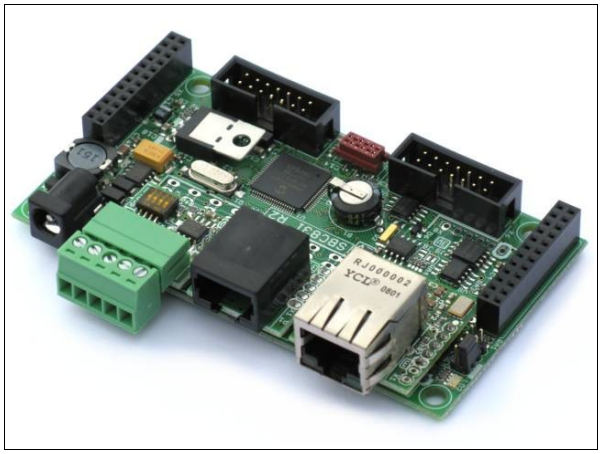
*1 - Set to D2 and D3 by default. Can be changed to C6 and C6 (USART1) via solder jumpers J10 and J11
*2 - H0 and H1 are used for the CS signals of the external SRAM and FLASH! Do not use these signals for anything!
*3 - Serial SPI port 2, is also used for external SRAM and FLASH. D4 = SDO, D5 = SDI and D6 = SCK.
*4 - These two pins are not connected by default! Can be configured for SPI port 2, or I2C port 1 via solder jumpers J2 and J3. When configured as I2C port, C3=SCL and C4=SDA. When configured as SPI port, D4 = SDO, D5 = SDI and D6 = SCK.
*5 - H5, H6 and H7 shared between iMod2 and iMod3
*6 - G3 and G4 shared between iMod2 and iMod3

8.4 Adding iMod Modules

Various iMod Modules can be purchased from Modtronix that can be mounted in the iMod ports. For available products, see: http://www.modtronix.com/products/presto

Picture 6 shows an example of a SBC board with 3 iMod Modules assembled, one RS-232, one RS-485 and one Ethernet Module.

Picture 6: Board with iMod Ports on SBC83I board



9 Presto sMod Port

The SBC83I has one sMod port, which can be used to add serial peripherals to the main board, like I2C or SPI Memory, RTC chips or other serial devices. It has 12 signals, consisting of Gnd, Vaux, 3.3V, 5.0V, SPI Port (3.3V), I2C Port (3.3V), and 3 I/O pins. The I/O pins can be used for chip select signals for SPI chips for example.

The sMod port consists of two rows of 1.00mm pads, with the rows spaced 0.6" apart. Each row has 6 pins, giving a total of 12 pins. Pin 1 of the left row is always indicated with a white marking around it! A sMod module normally has press-fit connectors, and is pressed into the port. It can however also have standard 2.54mm pin headers, and be soldered on.

For the location and pad allocation, see section 11 Dimensions of this document. For sMod modules available from Modtronix, see http://www.modtronix.com/products/presto.

Picture 7: Shows a sMod Module mounted on a target board

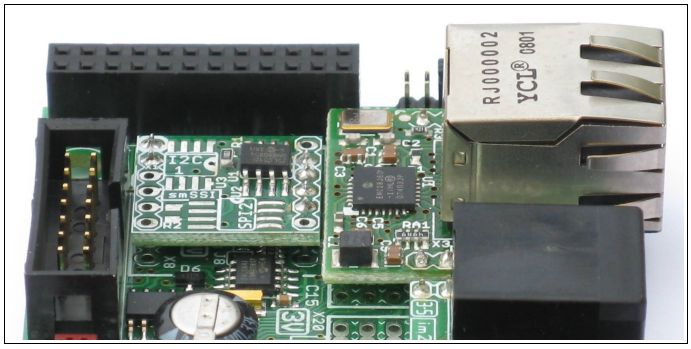


Table 5: Signals assigned to sMod Port 1

sMod Port1			
Left Row		**Right Row**	
1	Ground = 0V	12	Vaux
2	B5	11	Vcc = 3.3V
3	SCL = C3	10	SCK = D6
4	SDA = C4	9	SDI = D5
5	B4	8	SDO = D4
6	B3	7	Vsec = 5.0V

10 Specifications

10.1 Absolute Maximum Ratings

Item	*Symbol*	*Min*	*Typ*	*Max*	*Unit*
Operating Temperature without Super Capacitor	Top	-40		85	°C
Operating Temperature with Super Capacitor (Note 1)	Top	-25		70	°C

- Note 1: The only component on the board limiting the temperature to -25 to 70°C is the Super Capacitor used as the battery of the RTC. Without this components, the temperature range will be -40 to +85°C. The affect of using the Super Capacitor at this temperature range has not been tested, and it might be that the capacitance is just slightly out of the specified range.

10.2 Electrical Characteristics

Item	*Symbol*	*Condition*	*Min*	*Typ*	*Max*	*Unit*
DC Supply Voltage	Vdd		4.5		30	V
Typical Operating Current (Note 1)	Icc			14		mA

- Note 1: With CPU running at 40MHz, and a 12V supply voltage.

11 Dimensions

The SBC83I Dimensions are shown in Figure 2.

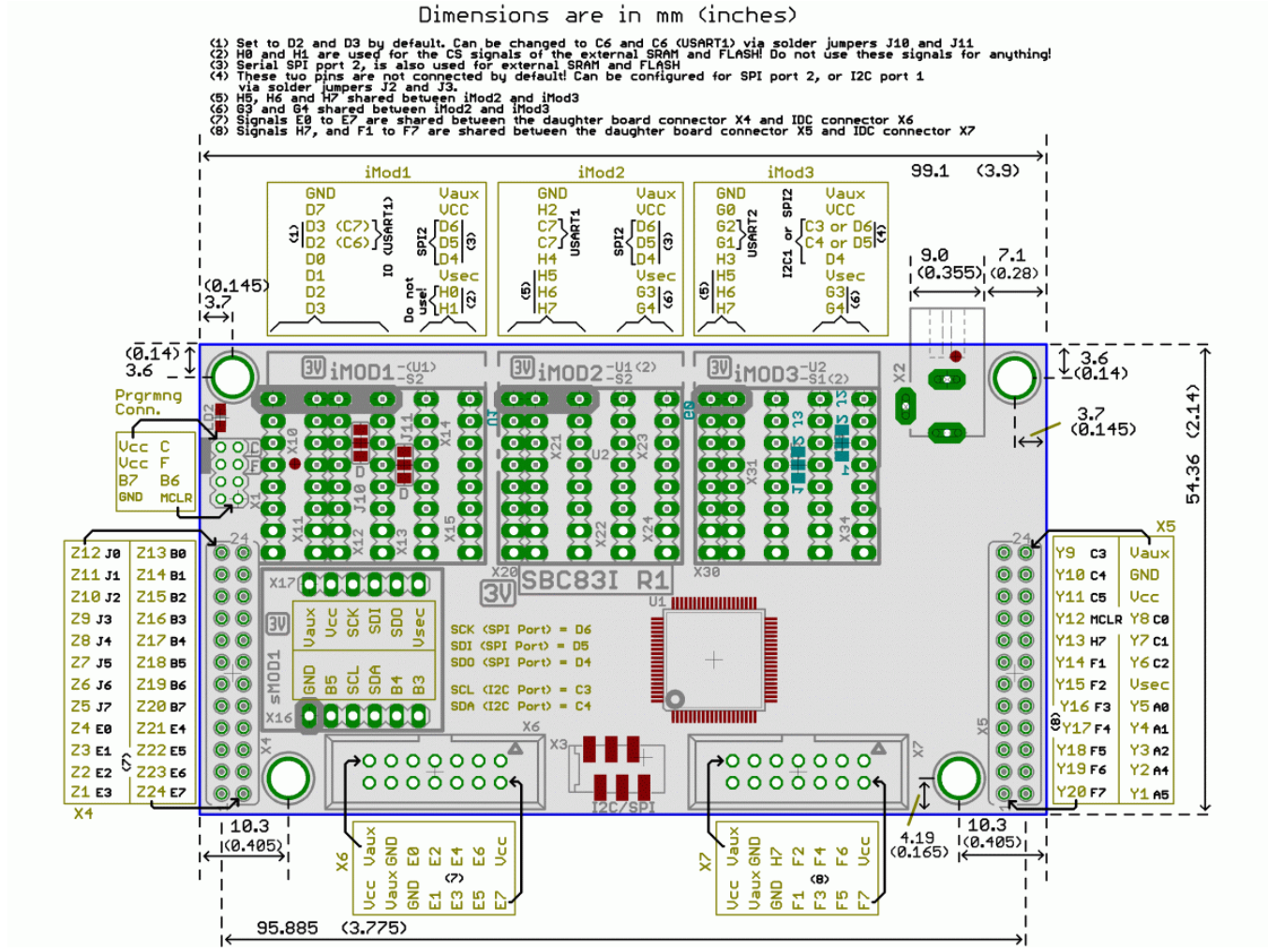
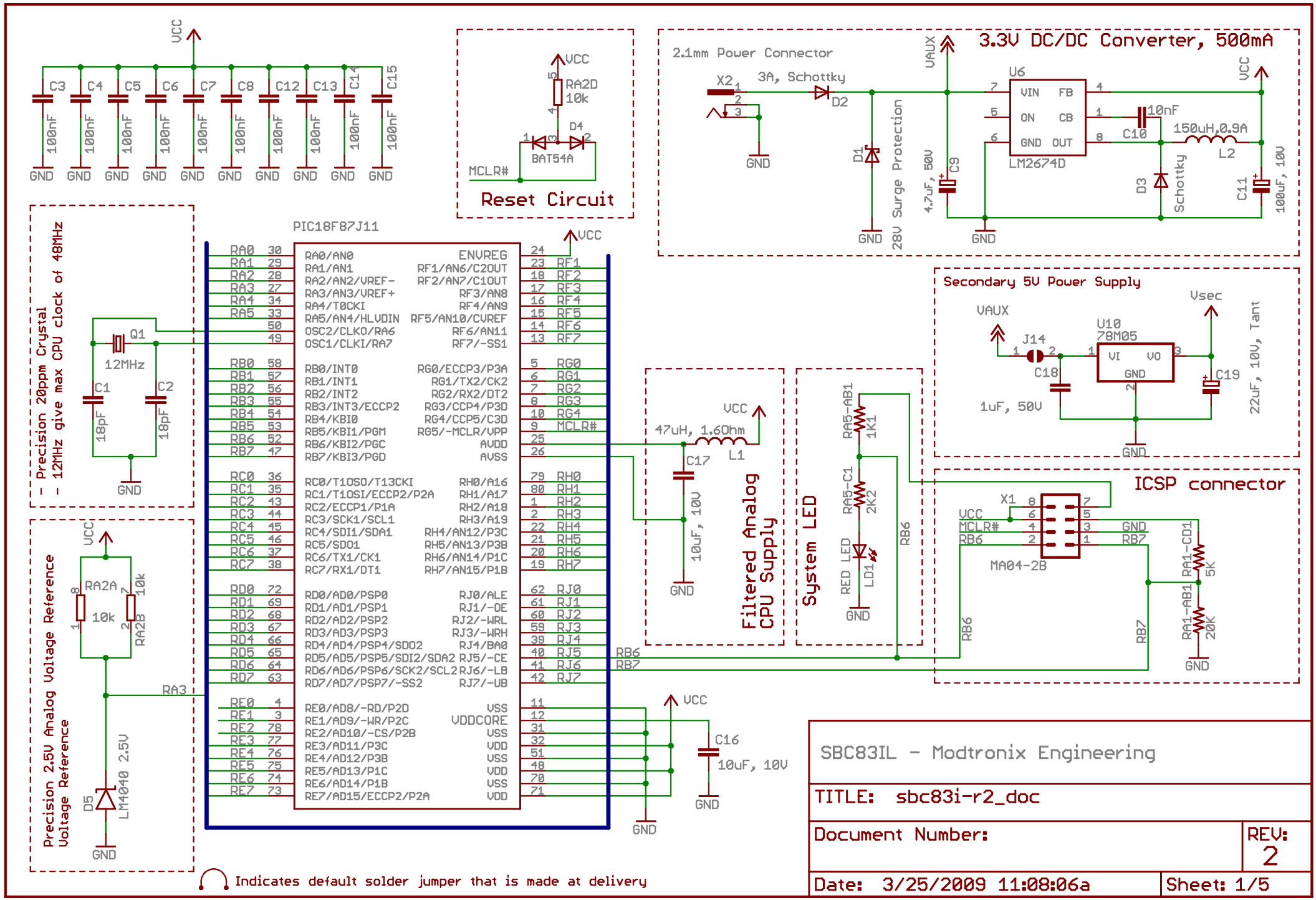


Figure 2: Board Dimensions and pin-outs

12 Schematics


VCC
C3 C4 C5 C6 C7 C8 C12 C13 C14 C15
100nF
GND
Reset Circuit
RA2D
10k
D4
BAT54A
MCLR#
2.1mm Power Connector
X2
3A, Schottky
D2
D1
28V Surge Protection
3.3V DC/DC Converter, 500mA
VAUX
U6
VIN FB
ON CB
GND OUT
LM2674D
C10
10nF
150uH,0.9A
L2
D3
Schottky
C11
100uF, 10V
C9
4.7uF, 50V
Secondary 5V Power Supply
Vsec
U10
78M05
VI VO
J14
C18
1uF, 50V
C19
22uF, 10V, Tant
PIC18F87J11
RA0 RA1 RA2 RA3 RA4 RA5
RB0 RB1 RB2 RB3 RB4 RB5 RB6 RB7
RC0 RC1 RC2 RC3 RC4 RC5 RC6 RC7
RD0 RD1 RD2 RD3 RD4 RD5 RD6 RD7
RE0 RE1 RE2 RE3 RE4 RE5 RE6 RE7
RF1 RF2 RF3 RF4 RF5 RF6 RF7
RG0 RG1 RG2 RG3 RG4
RH0 RH1 RH2 RH3 RH4 RH5 RH6 RH7
RJ0 RJ1 RJ2 RJ3 RJ4 RJ5 RJ6 RJ7
ENVREG
MCLR#
- Precision 20ppm Crystal
- 12MHz give max CPU clock of 48MHz
Q1
12MHz
C1
18pF
C2
18pF
47uH, 1.60hm
L1
C17
10uF, 10V
Filtered Analog CPU Supply
System LED
RA5-AB1
1K1
RA5-C1
2K2
RED LED
LD1
RB6
ICSP connector
X1
MA04-2B
RA1-CD1
5K
RA1-AB1
20K
Precision 2.5V Analog Voltage Reference
RA2A
RA2B
10k
LM4040 2.5V
D5
C16
10uF, 10V
Indicates default solder jumper that is made at delivery
SBC83IL - Modtronix Engineering
TITLE: sbc83i-r2_doc
Document Number:
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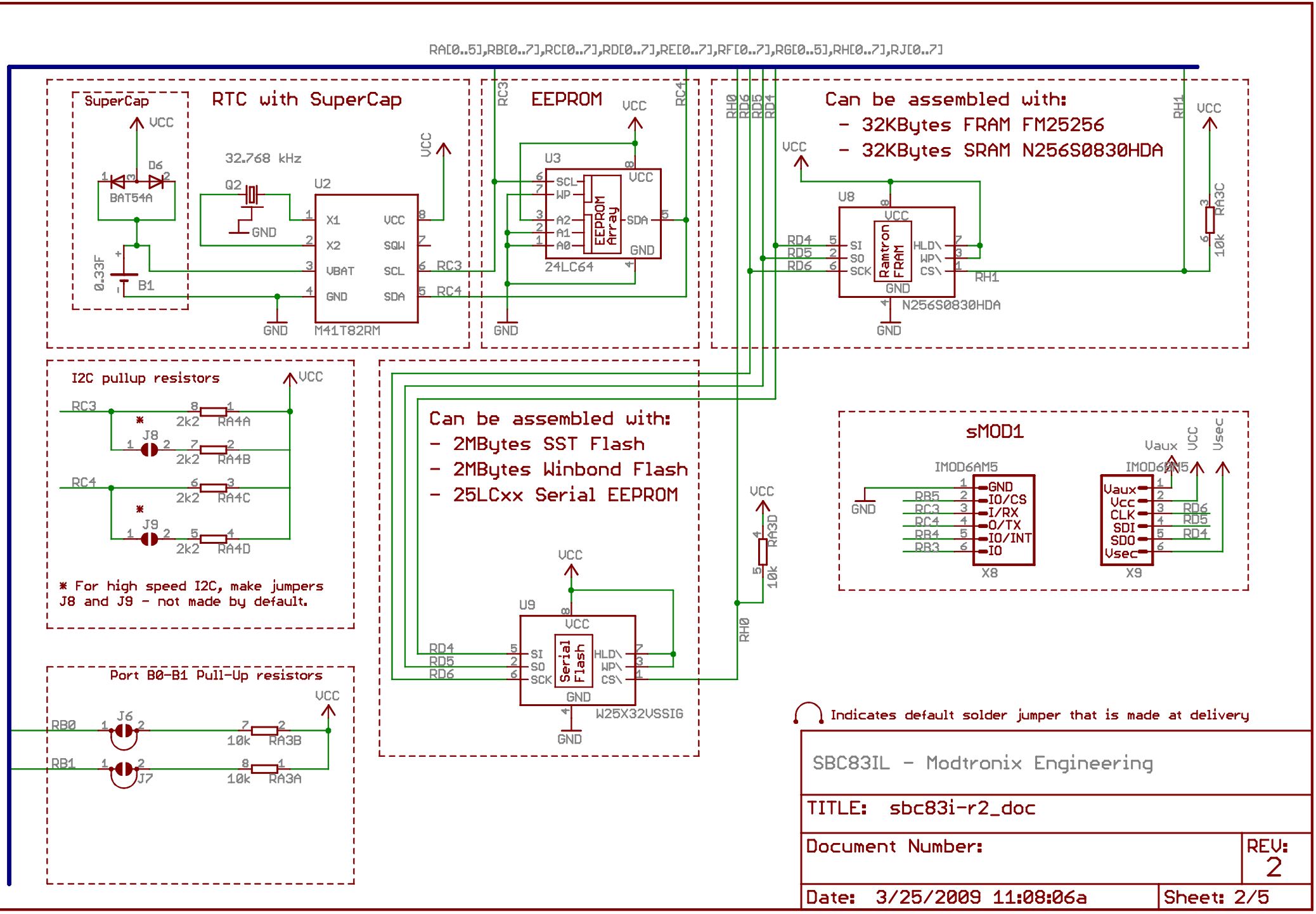
RA[0..5],RB[0..7],RC[0..7],RD[0..7],RE[0..7],RF[0..7],RG[0..5],RH[0..7],RJ[0..7]
SuperCap
RTC with SuperCap
VCC
D6
BAT54A
0.33F
B1
32.768 kHz
Q2
GND
U2
X1
X2
VBAT
GND
VCC
SQW
SCL
SDA
RC3
RC4
M41T82RM
EEPROM
U3
SCL
WP
A2
A1
A0
EEPROM Array
24LC64
Can be assembled with:
- 32KBytes FRAM FM25256
- 32KBytes SRAM N256S0830HDA
U8
SI
SO
SCK
HLD\
WP\
CS\
Ramtron FRAM
N256S0830HDA
RH0
RH1
RD4
RD5
RD6
RA3C
10k
I2C pullup resistors
RC3
RC4
J8
J9
2k2
RA4A
RA4B
RA4C
RA4D
* For high speed I2C, make jumpers
J8 and J9 - not made by default.
Can be assembled with:
- 2MBytes SST Flash
- 2MBytes Winbond Flash
- 25LCxx Serial EEPROM
U9
Serial Flash
W25X32VSSIG
RA3D
sMOD1
IMOD6AM5
GND
RB5
RC3
RC4
RB4
RB3
IO/CS
I/RX
O/TX
IO/INT
IO
X8
Vaux
Vcc
CLK
SDI
SDO
Vsec
X9
Port B0-B1 Pull-Up resistors
RB0
RB1
J6
J7
10k
RA3B
RA3A
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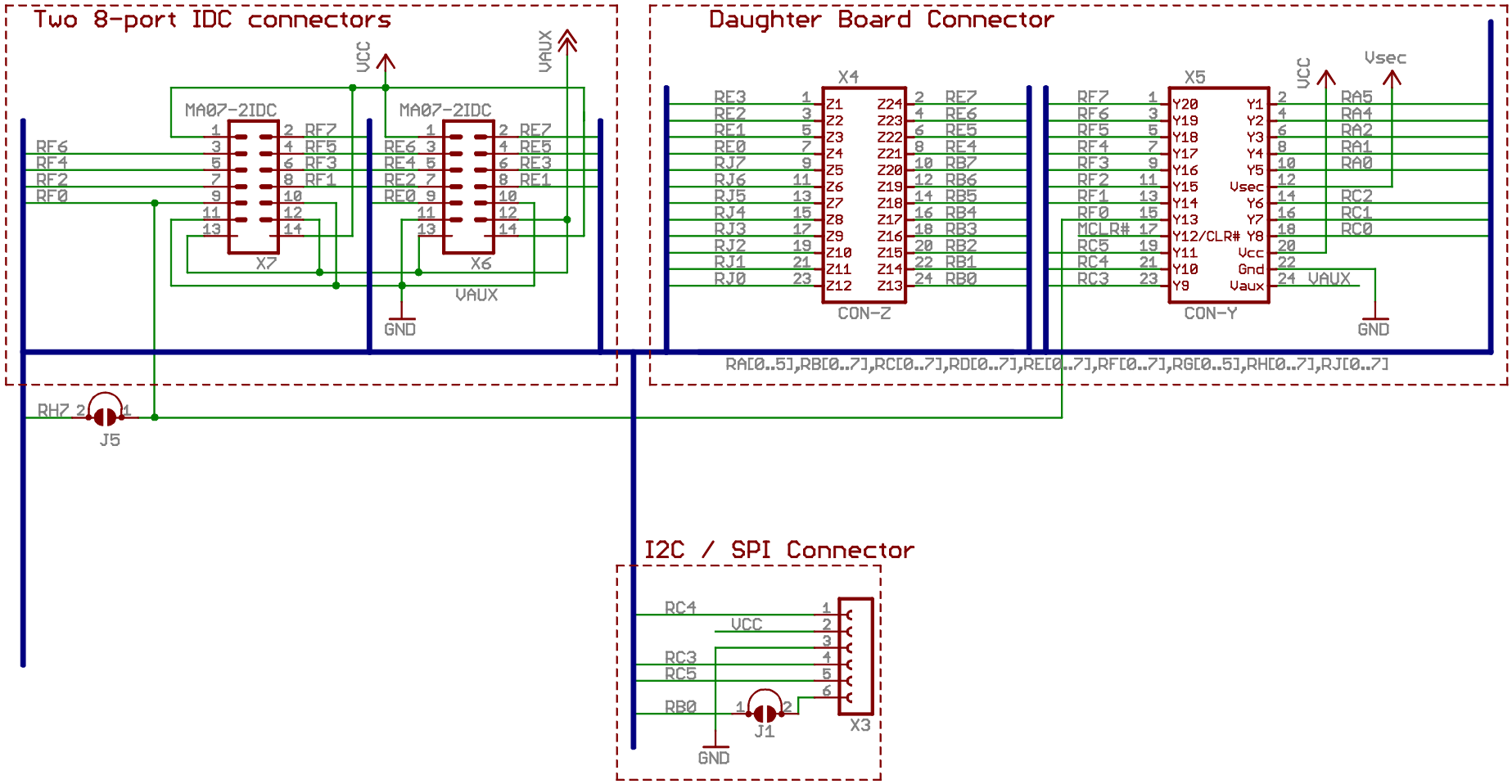

Indicates default solder jumper that is made at delivery

SBC83IL - Modtronix Engineering

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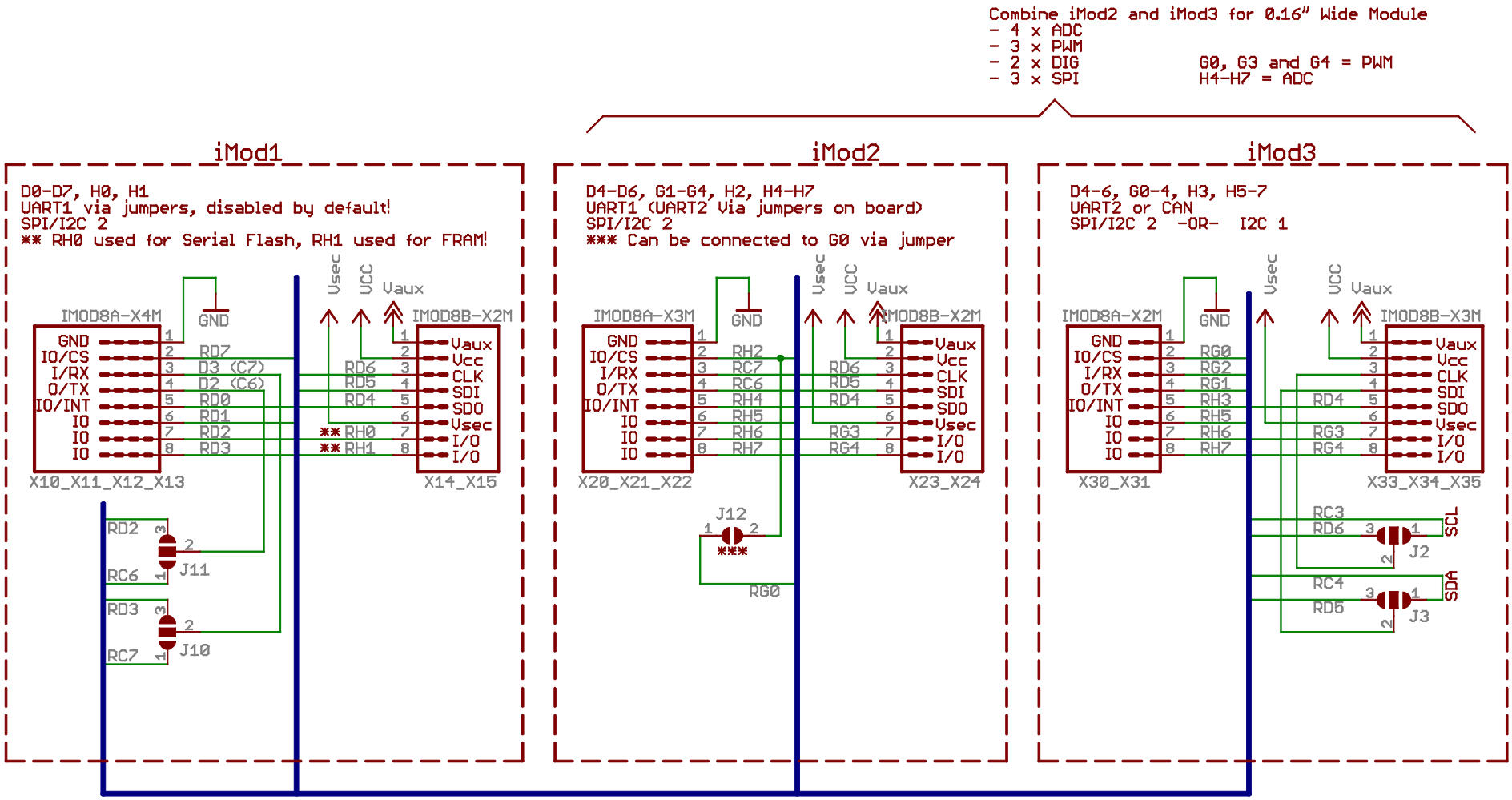
Combine iMod2 and iMod3 for 0.16" Wide Module
- 4 x ADC
- 3 x PWM
- 2 x DIG
- 3 x SPI
G0, G3 and G4 = PWM
H4-H7 = ADC
iMod1
D0-D7, H0, H1
UART1 via jumpers, disabled by default!
SPI/I2C 2
** RH0 used for Serial Flash, RH1 used for FRAM!
IMOD8A-X4M
GND
IO/CS
I/RX
O/TX
IO/INT
IO
IO
IO
RD7
D3 (C7)
D2 (C6)
RD0
RD1
RD2
RD3
X10_X11_X12_X13
Vsec
VCC
Vaux
IMOD8B-X2M
Vaux
Vcc
CLK
SDI
SDO
Vsec
I/O
I/O
RD6
RD5
RD4
** RH0
** RH1
X14_X15
RD2
RC6
J11
RD3
RC7
J10
iMod2
D4-D6, G1-G4, H2, H4-H7
UART1 (UART2 via jumpers on board)
SPI/I2C 2
*** Can be connected to G0 via jumper
IMOD8A-X3M
RH2
RC7
RC6
RH4
RH5
RH6
RH7
X20_X21_X22
IMOD8B-X2M
RG3
RG4
X23_X24
J12
***
RG0
iMod3
D4-6, G0-4, H3, H5-7
UART2 or CAN
SPI/I2C 2 -OR- I2C 1
IMOD8A-X2M
RG0
RG2
RG1
RH3
X30_X31
IMOD8B-X3M
X33_X34_X35
RC3
RD6
J2
SCL
RC4
RD5
J3
SDA
SBC83IL - Modtronix Engineering
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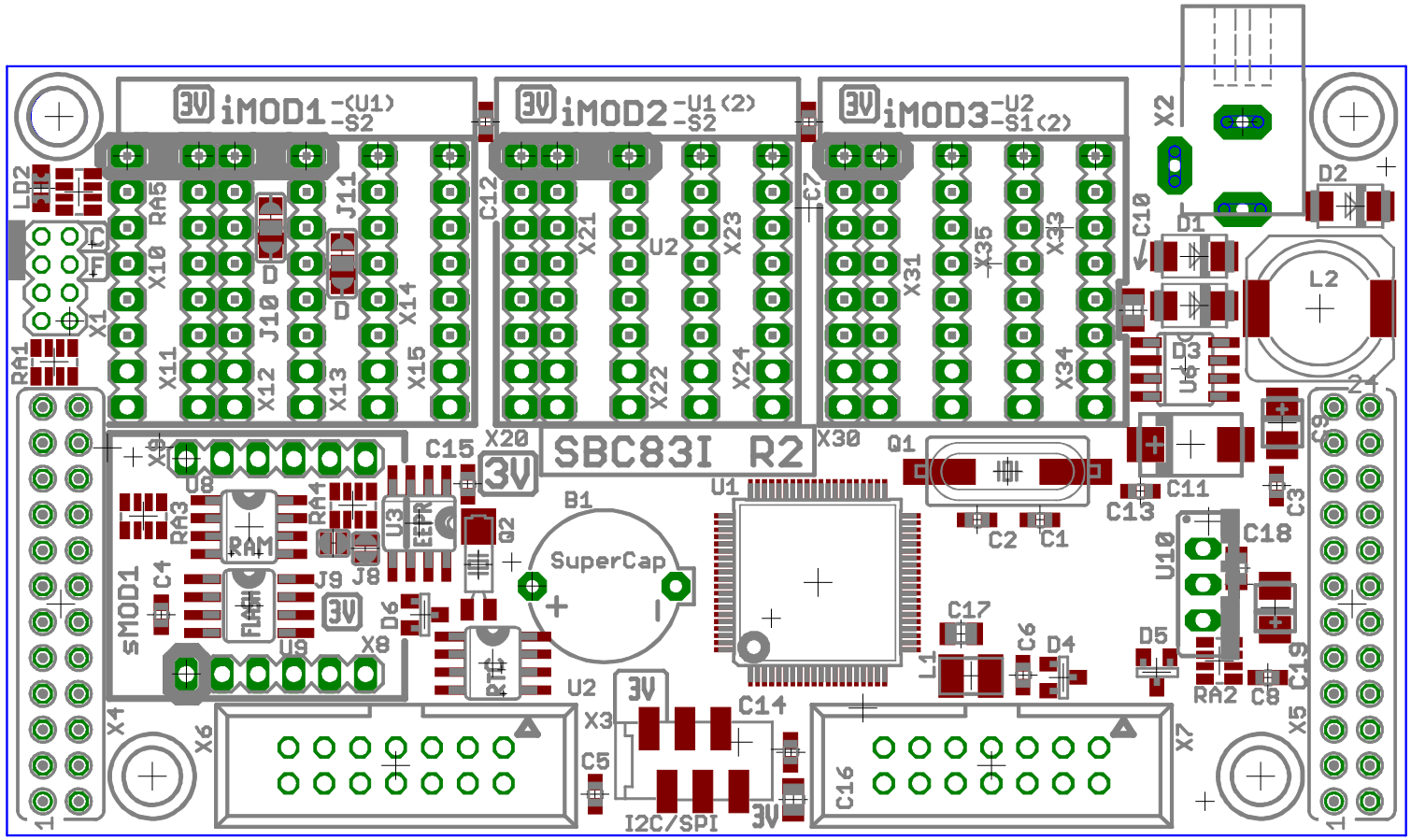
iMOD1 -(U1) -S2
iMOD2 -U1(2) -S2
iMOD3 -U2 -S1(2)
SBC83I R2
SuperCap
sMOD1
I2C/SPI
3V
RAM
FLASH
EEPR
PTC
LD2
RA5
RA1
RA3
RA4
RA2
J10
J11
J9
J8
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X20
X21
X22
X23
X24
X30
X31
X33
X34
X35
U1
U2
U3
U5
U6
U8
U9
U10
B1
Q1
Q2
L1
L2
D1
D2
D3
D4
D5
D6
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
21
1