

MINI-MAX/AVR-AU USB Converter Board Technical Manual

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BiPOM Electronics

16301 Blue Ridge Road, Missouri City, Texas 77489
Telephone: 1-713-283-9970. Fax: 1-281-416-2806
E-mail: info@bipom.com
Web: www.bipom.com

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MINI-MAX/AVR-AU USB Converter Board Technical Manual. No part of this work may be reproduced in any manner without written permission of BiPOM Electronics.

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WARRANTY:

BiPOM Electronics warrants MINI-MAX/AVR-AU for a period of 1 year. If the board becomes defective during this period, BiPOM will at its option, replace or repair the board. This warranty is voided if the product is subjected to physical abuse or operated outside stated electrical limits. BiPOM Electronics will not be responsible for damage to any external devices connected to MINI-MAX/AVR-AU. BiPOM Electronics disclaims all warranties express or implied warranties of merchantability and fitness for a particular purpose. In no event shall BiPOM Electronics be liable for any indirect, special, incidental or consequential damages in connection with or arising from the use of this product. BiPOM Electronics' liability is limited to the purchase price of this product.

1. Overview

MINI-MAX/AVR-AU is a general purpose, low-cost and highly-expandable micro-controller system. It is based on the ATMEL AT90USB162-16MU 8-bit micro-controller with integrated USB controller. This micro-controller features:

- Program execution speed up to 16 MIPS at 16MHz
- 8 Kilobytes of Flash
- 512 Bytes of EEPROM
- 512 Bytes of internal SRAM
- 22 Programmable I/O Lines
- USART with SPI master
- SPI Master/Slave Serial Interface
- USB Bus Disconnection on Microcontroller Request
- One 8-bit Timer/Counter
- One 16-bit Timer/Counter
- One Programmable Watchdog Timer with Separate On-chip Oscillator
- On-chip Analog Comparator
- Internal Calibrated Oscillator

MINI-MAX/AVR-AU USB Converter Board complements these features and provides:

- One USB device port
- Connector for 2-wire UART (5V levels)
- 5V levels expansion slot to connect low-cost peripheral boards
- Connector for PROGRAMING (SPI)

The Flash micro-controller can be programmed through USB or SPI. This simplifies new program development and debugging. Downloading of a program to the micro-controller typically takes few seconds.

MINI-MAX/AVR-AU is powered from a 5 Volt DC external power source through the USB connector. Current consumption is less than 20mA at 5 Volt DC.

Software examples for MINI-MAX/AVR-AU USB are available from www.bipom.com

2. Specifications

MINI-MAX/AVR-AU USB board has the following configuration:

- AT90USB162-16MU micro-controller
- Device mini USB Port for Full Speed (12 Mbit per Second) data communications
- 8-pin connector for 2-wire UART (5V levels)
- 20-pin Expansion connector for peripheral boards
(http://www.bipom.com/periph_boards.php)
- 6-pin Connector for programming (SPI)
- Dimensions are 2.35 X 2.40 inches (5.97 X 6.10 centimeters).
- Mounting holes of 0.138 inches (3.5 millimeters) are on four corners.
- 0° - 70° C operating, -40° - +85° C storage temperature range.

3. Functional Blocks

Figure 1 shows the block diagram of the MINI-MAX/AVR-AU board

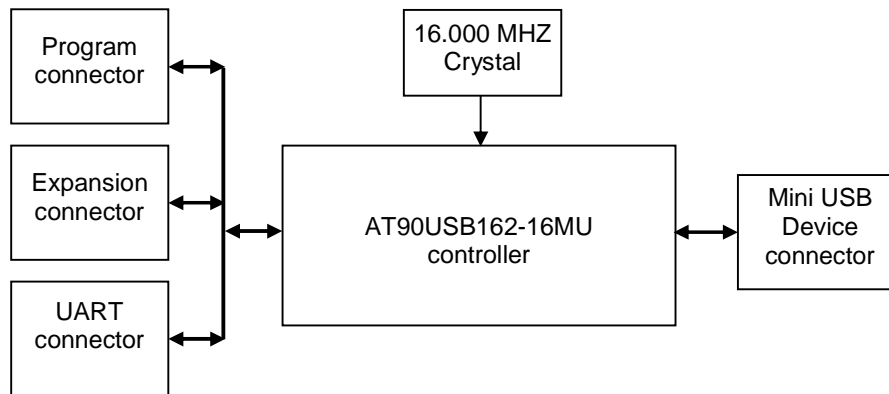


Figure 1

Expansion connector

Control signals and 5 Volt power supply output are available on 20-pin connector (X2) for interfacing to peripheral boards. A peripheral board can be connected to MINI-MAX/AVR-AU board either as a piggyback daughter-board using standoffs or can be placed away from the micro-controller board using a 20-wire ribbon cable (Part #: EXPCABLE-6).

Table 1 shows the pin assignments for the X2 connector:

Expansion Connector (X2)

Signal	Pin	Pin	Signal
RXD	20	19	TXD
PB6	18	17	MISO
SCK	16	15	CS
PB7	14	13	MOSI
PC2	12	11	PC7
PC4	10	9	PD0
PD4	8	7	PD1
PC6	6	5	PC5
Not connected	4	3	GND
VCC (+5V)	2	1	Not connected

Table 1

PROGRAM connector

PROGRAM connector is available on a 6-pin male connector X5.
Table 2 shows the pin assignments for the PROGRAM connector:

PROGRAM Connector (X5)

Pin	Name	Signal
1	5V	5V Power Output
2	RESET	Test Reset Input
3	SCK	
4	MISO	
5	MOSI	
6	GND	Power ground

Table 2

UART Connector

Tables 3 show the pin assignments for the UART0 connector:

UART0 Connector (X3)

Pin	Name	Signal
1,2,4,7	GND	Power ground
3	5V	Power supply
5	TXD	Data output
6	RXD	Data input
8	5V	Power supply

Table 3.

USB Device connector

Standard Type Mini 'B' Right Angle Receptacle connector is used for USB Device bus.
Tables 4 show the pin assignments for the USB connector:

USB Connector (X1)

Pin	Name	Signal
1	VBUS	+5V Power input
2	D-	Data (-)
3	D+	Data (+)
4	PD5	
5	GND	Ground
6...11	SGND	Shield

Table 4.

Jumper

Tables 5 show the jumper assignments:

Jumper X4

Name	Signal	Open	Closed
X4	HWB	Hardware Boot Disabled	Hardware Boot Enabled

Table 5

4. Application Notes

The **FLIP** software is used for a programming of MINI-MAX/AVR-AU through USB interface.

http://www.atmel.com/dyn/products/tools_card.asp?tool_id=3886

A peripheral board can either be stacked on top of MINI-MAX/AVR-AU using stand-offs or connected in a chain configuration using flat ribbon cable. Figure 2 shows how DAC-2 peripheral board can be connected to a Micro-Computer board in a stacked fashion. Figure 3 shows the chain connection.

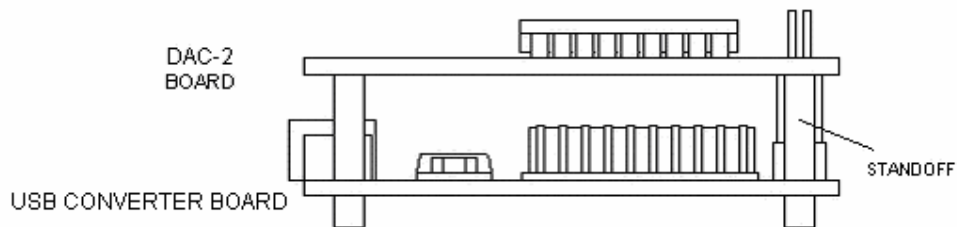


Figure 2

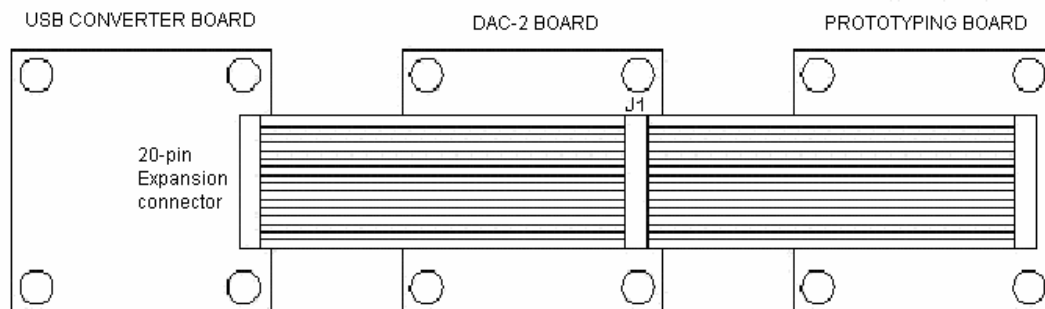


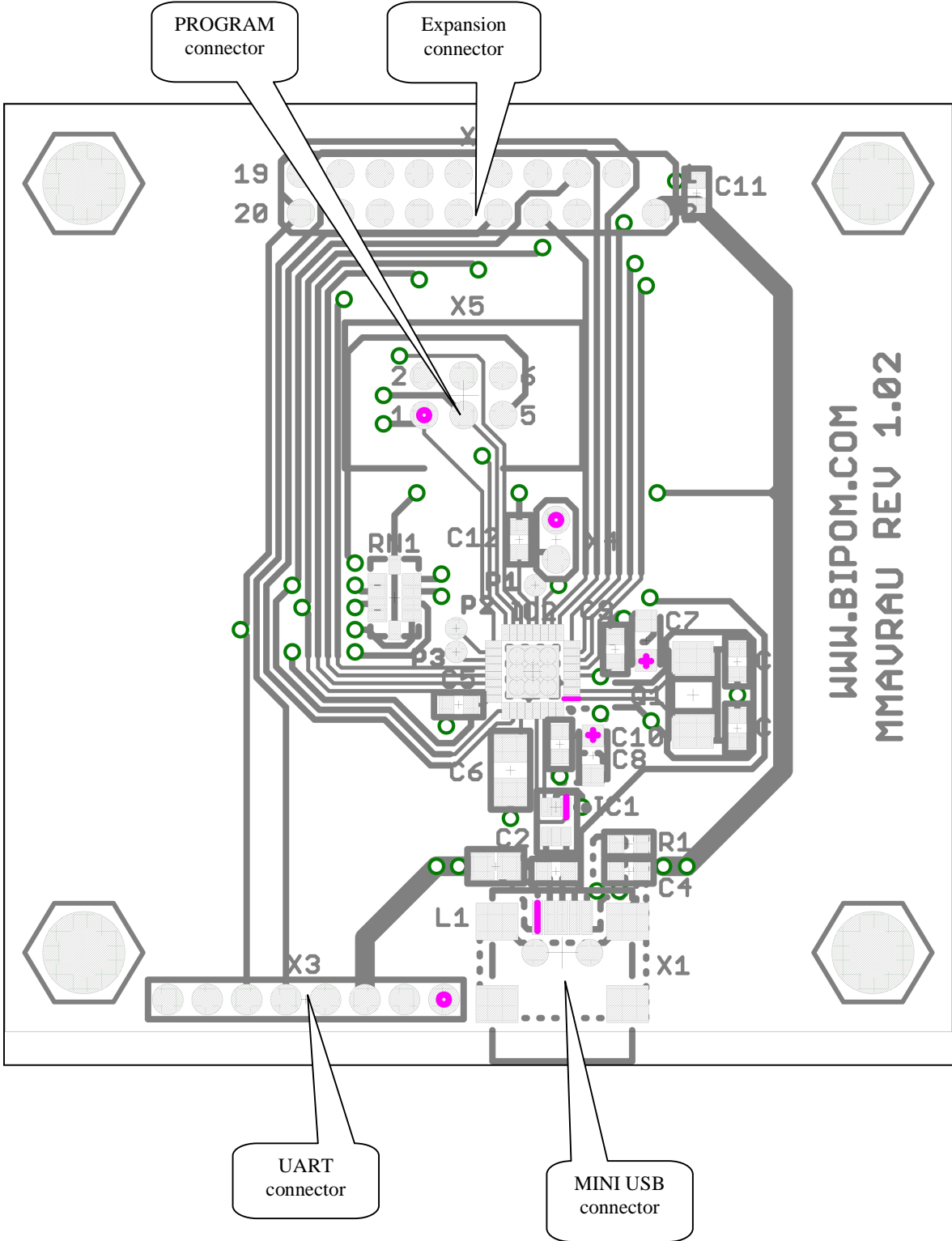
Figure 3

More details concernig BiPOM Peripheral boards are available from:

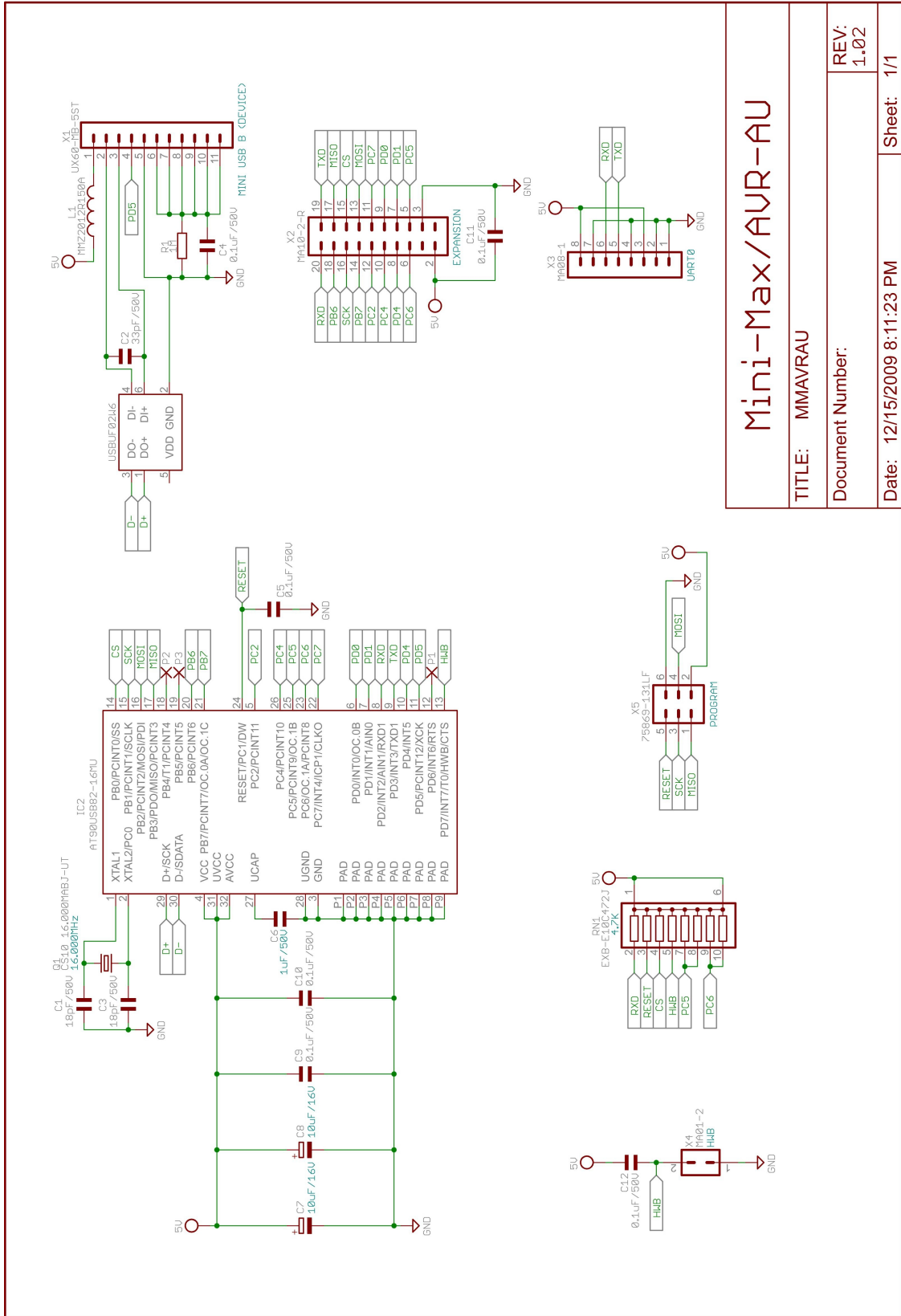
http://www.bipom.com/periph_boards.php

5. Board Layout

Top view of the MINI-MAX/AVR-AU board is shown below:



6. Schematic



Mini-Max/AVR-AU

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