

# UART-1

## Peripheral Board

## Technical Manual

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UART-1 Peripheral 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 UART-1 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 UART1. BiPOM Electronics disclaims all the expressed warranties or the 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

UART-1 is the communications expanding peripheral board for the MINI-MAX series of micro-controller systems. UART-1 has two RS232 channels and two RS485 channels for communications with external devices and I<sup>2</sup>C bus for communications with a host microcontroller.

UART-1 board can be used in different configurations:

- UART-1-2xRS232
- UART-1-1xRS232-1xRS485
- UART-1-2xRS232-1xRS485(TX only)
- UART-1-2xRS485 ( Custom Product; please contact BiPOM for details )

UART-1 is powered from 5 Volts DC of external power source through the 20-pin expansion connector.

ARM7, 8051/52, BASCOM51 and SDCC (Small Device C Compiler) development systems provide examples for UART1.

Please download any of these development systems from:

<http://www.bipom.com/software.php>

# 2. Specifications

UART-1 board has the following configuration:

- 2 peripheral RS232 channels ( or 1 or 2 peripheral RS485 channels )
- 64 bytes of transmit and receive FIFO's ( SC16IS752 Dual UART IC )
- Slave mode 2-wire Serial Interface (I<sup>2</sup>C) for the host communications
- Two 2-pin terminal blocks for RS485
- Two 9-pin standard DB-9 Male RS232 connectors
- Two additional 10-pin 0.1" dual-row headers for RS232 connections
- 20-pin Expansion connector for a host micro-controller board (<http://www.bipom.com/boards.php>)
- Up to four UART-1 boards can be connected to the host micro-controller board
- Single operating voltage: 5 VDC, 10mA typical (20mA maximum) current consumption
- Onboard 3.3 VDC regulator powered from the external 5 VDC through the expansion connector
- Dimensions are 2.35 X 2.40 inches (5.97 X 6.10 centimeters).
- Mounting holes of 0.125 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 UART-1 peripheral board

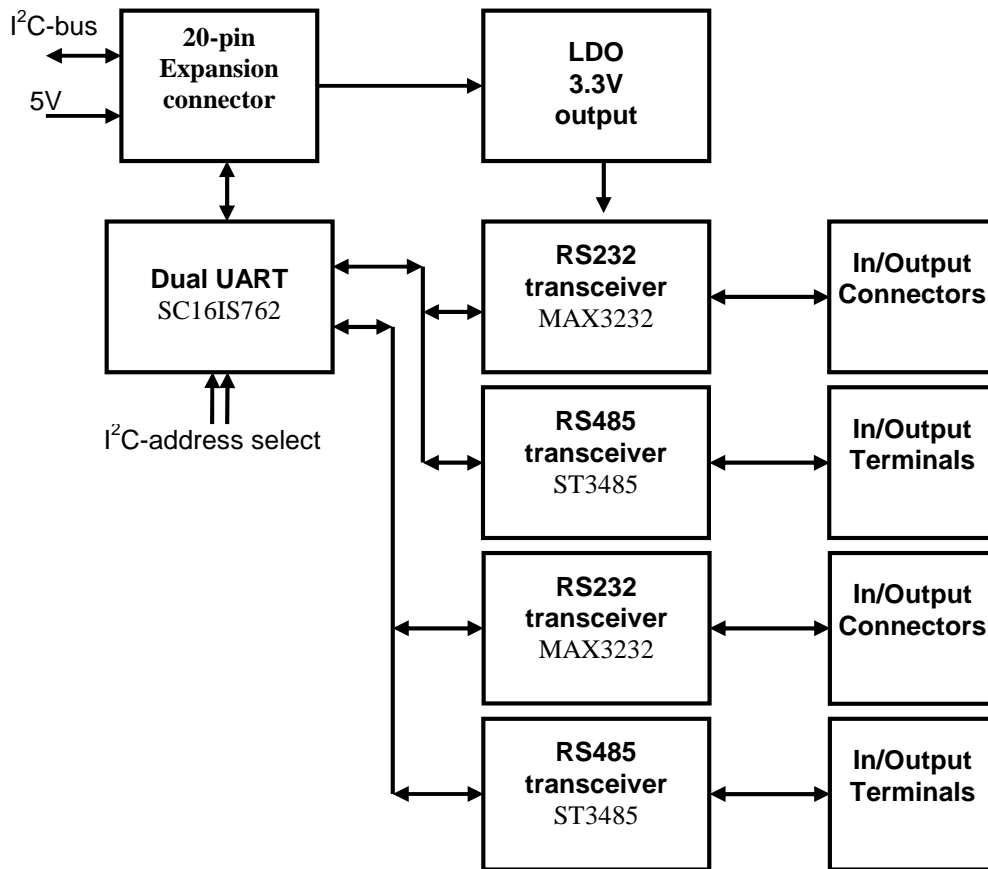


Figure 1

#### Expansion connector

Control pins and 5-Volt power supply pins are available on the 20-pin connector (X3) for interfacing to the micro-controller boards. Table 1 shows the pin assignments for the connector.

Table 1. **Connector X3**

Signal	Pin	Pin	Signal
Unused	20	19	Unused
<b>INT51</b> (Interrupt pin for 8051 family of MINI-MAX boards)	18	17	Unused
Unused	16	15	Unused
Unused	14	13	Unused
<b>INTAVR</b> (Interrupt pin for AVR family of MINI-MAX boards)	12	11	Unused
Unused	10	9	Unused
<b>INTARM</b> (Interrupt pin for ARM family of MINI-MAX boards)	8	7	Unused
<b>SCL (I2C CLOCK)</b>	6	5	<b>SDA (I2C DATA)</b>
Unused	4	3	<b>GND</b>
<b>VCC (+5V)</b>	2	1	Unused

## Input-Output Connectors

Table 2 shows the pin assignments for the RS232 connectors:

Table 2. **Connectors J1, J2**

Signal	Pin
Unused	1
RX	2
TX	3
Unused	4
GND	5
Unused	6
RTS	7
CTS	8
Unused	9

Table 3 shows the pin assignments for the additional RS232 connectors:

Table 3. **Connectors X4, X5**

Signal	Pin
Unused	1
Unused	2
RX	3
RTS	4
TX	5
CTS	6
Unused	7
Unused	8
GND	9
Unused	10

## Jumpers

Table 4 shows the jumpers assignments

Table 4. **Jumpers JP1 ... JP5**

Name	Signal	If removed	If installed
JP1	INTAVR	X3 pin 12 unconnected	IRQ output goes to X3 pin 12
JP2	INTARM	X3 pin 8 unconnected	IRQ output goes to X3 pin 8
JP3	INT51	X3 pin 18 unconnected	IRQ output goes to X3 pin 18
JP4	A0 (I <sup>2</sup> C address)	A0 = 1	A0 = 0
JP5	A1 (I <sup>2</sup> C address)	A1 = 1	A1 = 0
JP6	RS485 RX ch. B	RS485 RX ch. B is unused	RX-B is used for RS485
JP7	RS232 RX ch. B	RS232 RX ch. B is unused	RX-B is used for RS232
JP8	RS485 RX ch. A	RS485 RX ch. A is unused	RX-A is used for RS485
JP9	RS232 RX ch. A	RS232 RX ch. A is unused	RX-A is used for RS232
JP10	RS485 ch. B mode	Normal operation	121-Ohm terminating resistor is active
JP11	RS485 ch. A mode	Normal operation	121-Ohm terminating resistor is active

## **Power Supply**

External power supply should be able to supply 5 Volts DC at 20mA current

**WARNING:** Correct polarity should be observed when applying external DC supply to Expansion connector.

## **4. Application Notes**

UART-1 board can either be stacked on the top of MINI-MAX single board computer using stand-offs or connected in a chain configuration using flat ribbon cable (Part #: EXPCABLE-6). Figure 2 shows how UART-1 can be connected to the microcontroller board in a stacked fashion. Figure 3 shows the chain connection. Up to four UART-1 boards can be stacked on the top of the microcontroller board.

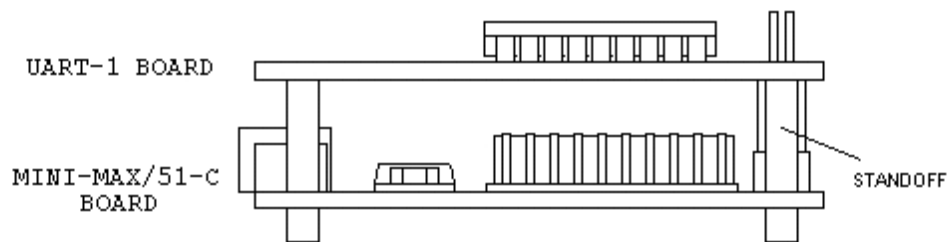


Figure 2

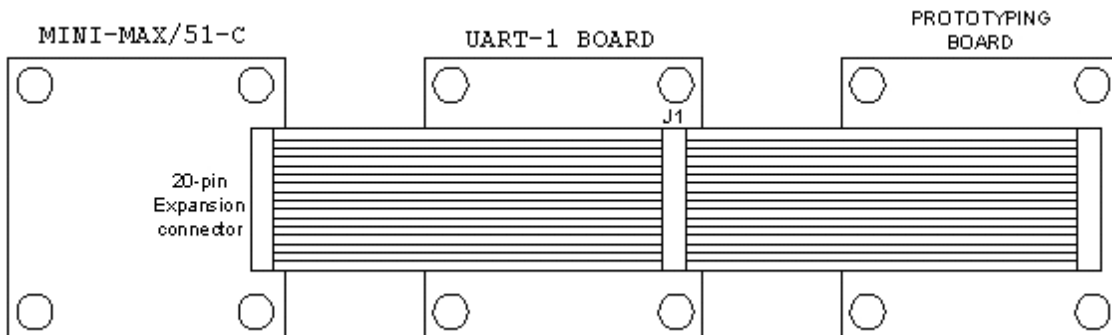


Figure 3

More details concerning BiPOM Peripheral boards are available from the link below:  
[http://www.bipom.com/periph\\_boards.php](http://www.bipom.com/periph_boards.php)

## 5. Board Layout

Layout of UART-1 board is shown below:

