Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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PROFIBUS / RS485 Expansion Kit
17 October 2012

FEATURES

- PROFIBUS Protocol (SoM Dependent)
    - Certified by PI International
    - Electrically Isolated Interface
    - Up to 6Mbaud operation
- RS485 Protocol
    - Electrically Isolated Interface
    - Up to 115,200 baud rate
- On-Board termination resistor
    - Jumper selectable
- Compatible with MityARM/MityDSP based Development Kits from Critical Link
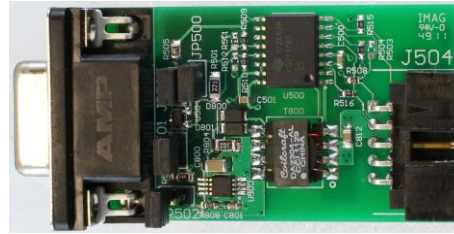
(2.2" x 1.2" – actual size)

DESCRIPTION

The **PROFIBUS/RS485 Expansion Kit** is compatible with Critical Link's line of **MityARM/MityDSP** based development kits; one is required to interface with this expansion kit. Specific MityARM/MityDSP based System on Modules support PROFIBUS. All **MityARM/MityDSP** based System on Modules support RS485, see Table 1 for details concerning SoM support for PROFIBUS.

Table 1: Critical Link SoM PROFIBUS Support

Module Type	PROFIBUS Support	RS485 Support
MityARM-1810	Yes	Yes
MityARM-1810F	Yes	Yes
MityDSP-L138	Yes	Yes
MityDSP-L138F	Yes	Yes
MityARM-1808	No	Yes
MityARM-1808F	No	Yes
MityARM-3359	No	Yes

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PROFIBUS Interface Description

Texas Instruments Inc. (TI) has integrated PROFIBUS functionality into its AM1810 Sitara ARM microprocessor (MPU). The expansion kit utilizes one of the AM1810 onboard UARTS through the Expansion Header on the PROFIBUS DEVELOPMENT KIT base board. This eliminates the need of an external ASIC or FPGA to support the PROFIBUS interface. Customers using a supported SoM in their industrial application can save cost and reduce design complexity as well as PCB space. Furthermore, the industrial application benefits from the low-power architecture of the Sitara ARM MPU and the MityARM-1810 or MityDSP-L138 platforms from TI and Critical Link. The ARM MPU PROFIBUS Slave solution has been certified by PROFIBUS International (PI).

The PROFIBUS real-time frame handler (Fieldbus Data Link or FDL) is encapsulated in the Programmable Real-Time Unit Subsystem (PRUSS), which is part of the Sitara ARM MPU on-chip peripherals. The PRUSS uses one Universal Asynchronous Receiver/Transmitter (UART) and a timer to generate PROFIBUS-compliant frames. The industrial application and the PROFIBUS DP-Protocol (Layer 7) are operated on the ARM. The solution is completed with an RS-485 transceiver suitable for harsh environments, such as TI's ISO1176 which is found on the PROFIBUS-RS485 Expansion Kit board.

The PROFIBUS subsystem uses the PRUs that implement real-time frame handling; PROFIBUS message transmission, frame validation and communication with the ARM processor. The PROFIBUS subsystem interfaces with one of the UARTs in the Sitara ARM MPU, which is designated for PROFIBUS communication at up to 6Mbaud data rate. The PRU uses interrupts to interact with the ARM where the PROFIBUS stack (Layer 7, DP Protocol) and the industrial application is run. All process data handling like cyclic, acyclic and service access point (SAP) between the PROFIBUS stack on ARM and the PRU is through the internal memory.

Linux Driver and API examples are available to support PROFIBUS functionality.

Additional details about PROFIBUS support can be found on TI's website (www.ti.com/tool/profibus).

RS485 Interface Description

When using any of the Critical Link MityARM/MityDSP based System on Modules (Som) the RS485 protocol is supported. When paired with our MityARM/MityDSP based development kits the RS485 Expansion Kit can be seamlessly added to your design.

A data rate of up to 115,200 baud is supported through this interface. Linux Driver and API examples are available to support RS-485 functionality.

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PROFIBUS / RS-485 Electrical Description

The PROFIBUS/RS-485 Expansion Kit provides standard serial interface at data rates up to 115,200 baud. The serial interface is routed to the UART2 serial port of MityARM / MityDSP through the Expansion Header on a MityARM/MityDSP based Development Kit.

The galvanic isolation is provided by a dedicated TI ISO1176 transceiver. The ISO1176 is powered by an isolated power supply with 1000V isolation from the primary supply.

Jumper JP500 can provide a dedicated 220 ohm bus termination resistor.

If the interface is to be configured to support PROFIBUS, JP501, JP502 and JP505 should be installed.

In the RS-485 configuration JP501 and JP505 should be installed and JP502 removed.

The electrical interface between the PROFIBUS/RS485 Expansion Kit and MityARM/MityDSP based Development Kit is provided via the 10-pin shrouded header described in Table 2.

The electrical in between the PROFIBUS/RS485 Expansion Kit and an external device is provided via the 9-pin DB0 connector described in Table 3.

Please reference your specific MityARM/MityDSP Based Development Kit documentation to determine which connector to use for the PROFIBUS/RS485 Expansion Kit.

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PROFIBUS / RS485 Expansion Kit
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PROFIBUS/RS485 Expansion Kit Pinouts

Table 2 shows the input 10-pin shrouded header pin out for the PROFIBUS/RS485 Expansion Kit input header. This connector, J504, is the interface to the MityARM/MityDSP based development kit.

Table 2: PROFIBUS/RS485 Expansion Kit 10-Pin Header Pin Out

Pin	Name	Type	Note
1	RS485 TX Enable	3.3V CMOS	Input to Expansion
2	RS485 RX	3.3V CMOS	Output from Expansion
3	+3.3V	Power	20mA max
4	Reserved	-	
5	Reserved	-	
6	RS485 TX	3.3V CMOS	Input to Expansion
7	GND	Power	
8	Reserved	-	
9	Reserved	-	
10	Reserved	-	

Table 3 shows the output 9-pin DB9 connector, J500, to interface with an outside PROBUS/RS485 device.

Table 3: PROFIBUS/RS485 Expansion Kit 9-Pin DB9 Pin Out

Pin	Name	Type	Note
1	Reserved	-	
2	Reserved	-	
3	A	RS485	Data signal
4	Reserved	-	
5	GND_ISO485	Power	
6	+5V_RS485	Power	Isolated output, jumper JP502
7	Reserved	-	
8	B	RS485	Data signal
9	Reserved	-	

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ABSOLUTE MAXIMUM RATINGS

If Military/Aerospace specified cards are required, please contact the Critical Link Sales Office or unit Distributors for availability and specifications.

Maximum Supply Voltage, Vcc   3.4 V

Storage Temperature Range   -65 to 80C

OPERATING CONDITIONS

Commercial
Temperature Range   0 to 70C

Humidity   0 to 95%
Non-condensing

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Vcc	Voltage supply, 3.3 volt input.			3.3	3.4	Volts
Icc	Quiescent Current draw, 3.3 volt input			TBD	TBD	Milliamps

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ORDERING INFORMATION

The following table lists the orderable module configurations. For shipping status, availability, and lead time of these or other configurations please contact your Critical Link representative.

The necessary 10-pin cable to connect to a MityARM/MityDSP based Development Kit is provided with each PROFIBUS/RS485 Expansion Kit.

Table 4: Orderable Model Numbers

Model	Protocol(s) Supported
80-000540	PROFIBUS/RS485

MECHANICAL INTERFACE
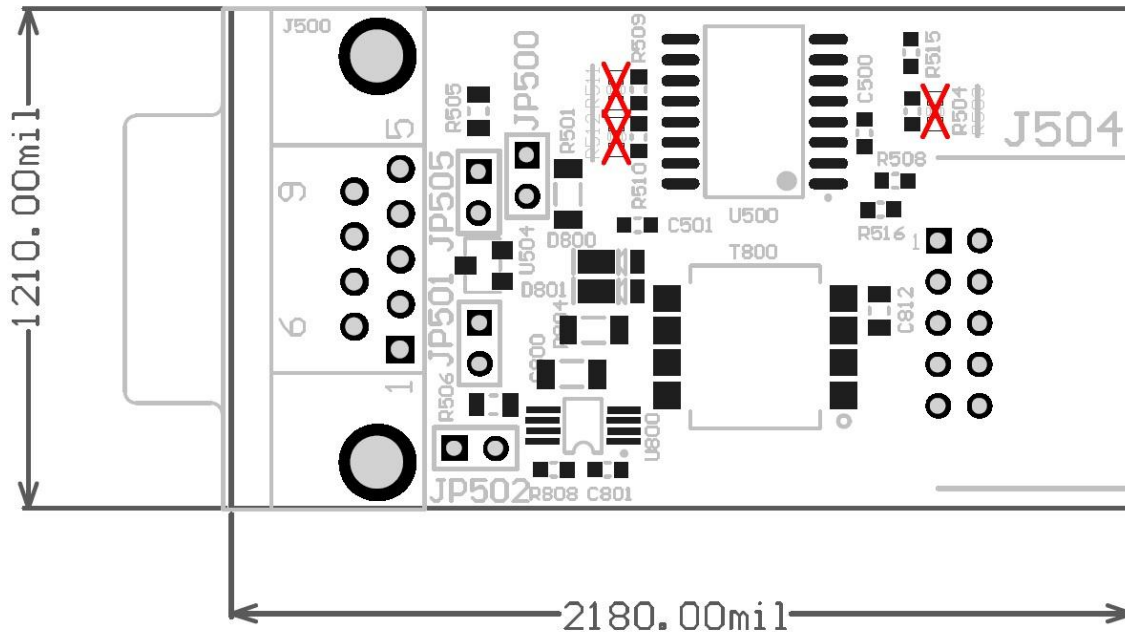A mechanical outline of the PROFIBUS/RS485 Board is illustrated below.

Figure 1: Dimensions 2.2'' x 1.2''

REVISION HISTORY

Date	Change Description
13-MAR-2012	Initial revision.
10-OCT-2012	Minor text corrections.
17-OCT-2012	Update part number