## 1.0 INTRODUCTION

This user's manual is for the XR21B1411_SP337 evaluation board rev 1.2. The XR21B1411 will be configured for the RS-232 mode when it is shipped from the factory. However, this manual describes how the evaluation board can be re-configured to operate in different modes.

2.0 EVALUATION BOARD OVERVIEW

A block diagram of the evaluation board is shown in **Figure 1** below..

FIGURE 1. EVALUATION BOARD BLOCK DIAGRAM
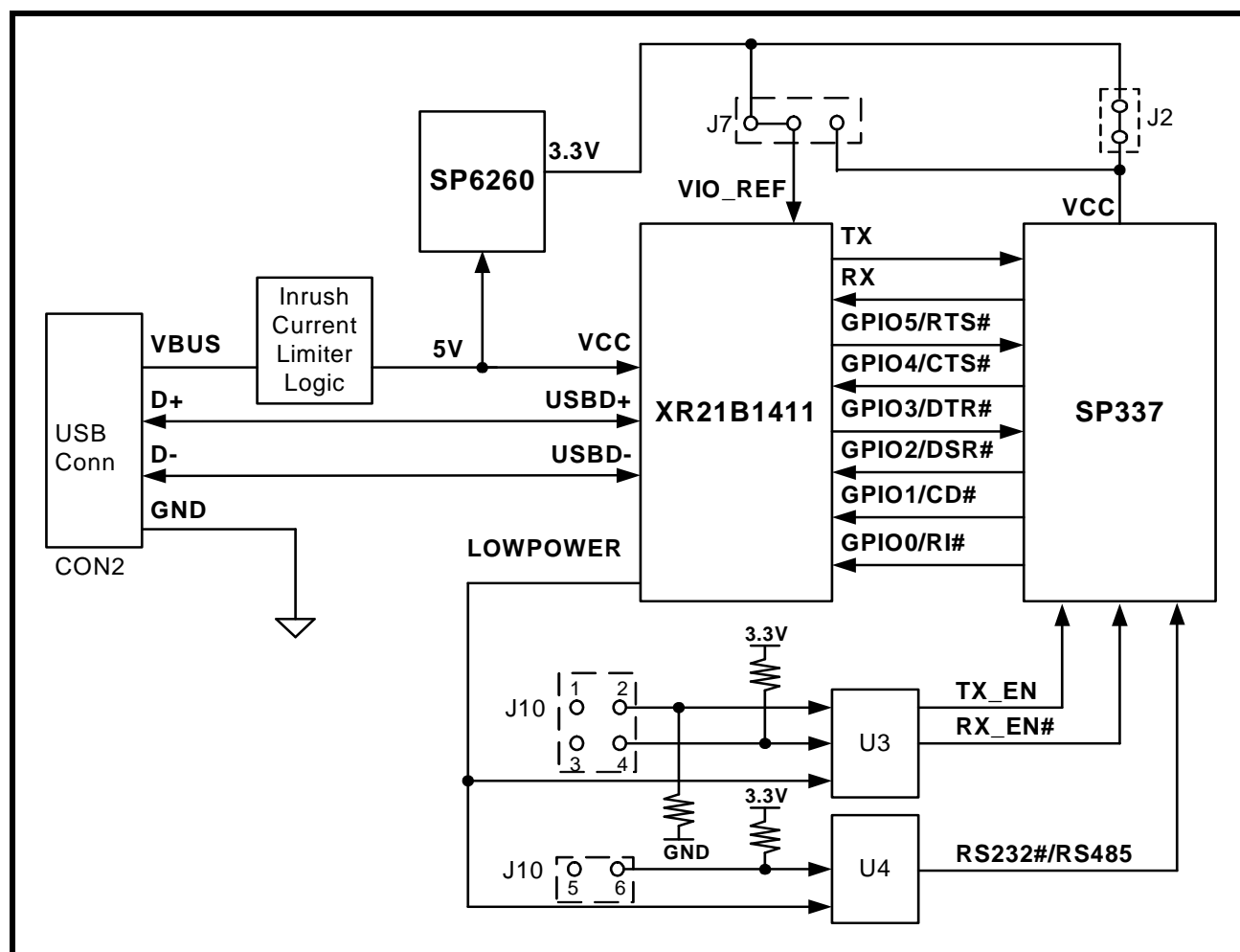
The primary devices on the XR21B1411 evaluation board are all Exar devices.

• The XR21B1411 is an enhanced 1-ch USB UART that can be powered directly from the 5V from VBUS.

• The SP6260 is an Exar LDO that regulates the 5V from VBUS to 3.3V that is used as the supply voltage of the SP336 and for the VIO_REF of the XR21B1411.

• The SP337 is Exar's programmable serial transceiver that can be programmed for RS-232 or RS-485/422 mode.

2.1   Evaluation Board Components

Table 1 shows where the Exar components are located and provides a brief description of some of the other components on the board.

TABLE 1: COMPONENTS OF THE XR21B1411 EVALUATION BOARD

UNIT	PART	FUNCTION
U1	SP337	Exar's 3.3V-5V Programmable RS-232/RS-485/RS-422 Serial Transceiver. Refer to the table in the schematic to select the mode via J10.
U2	XR21B1411IL16-F	Exar's Enhanced 1-channel USB UART.
U3 U4	SN74LVC2G66DCT	Analog switch. A logic '1' on the "C" control inputs enables the switch connectivity between "A" and "B" pins. U1 and U2 control the mode select for Exar's SP336 transceiver. When the XR21B1411 enters the sleep mode, the output of the SN74LVC2G66 is tri-stated. The mode select pins have internal pull-up resistors that enables the shutdown mode for the SP336.
U5	SP6260GEK-L	Exar's 150mA RF Ultra Low Dropout Regulator used for converting 5V from VBUS to 3.3V for the SP337 and VIO_REF of the XR21B1411.
CON1	DB9 male connector	Communicate with remote UART or device via RS-232.
SW1	Switch	Can be used to trigger remote wake-up event.

2.2   Description of Headers/Jumpers

This section describes the headers/jumpers on this evaluation board that are installed as well as the headers/ jumpers that are not installed. Some headers/jumpers may not be installed because they are used for internal testing purposes only.   The headers/jumpers that are installed are highlighted in Table 2 below.

TABLE 2: DESCRIPTION OF HEADERS/JUMPERS (INSTALLED)

JUMPERS	FUNCTIONS	COMMENTS
J2	Enables 3.3V supply voltage for SP337 from SP6260	By default, jumper is in. Caution: If using an external supply voltage for VIO_REF, J7 1&2 should not be installed.
J3	Testing RS-485/422	Header with all of the RS-485/422 I/Os
J5	Header to easily connect to an external board/device	All of the UART I/O signals as well as the VIO_REF and LOWPOWER pin are available on this header.
J6	Selects input to VBUS_SENSE	■ 1&2 selects voltage divider circuit from VBUS. This is only required for self-powered applications. ■ 2&3 terminates VBUS_SENSE to GND (default)
J7	Selects input to VIO_REF	■ 1&2 selects VIO_REF input from J2 (same supply voltage as SP337) ■ 2&3 selects VIO_REF input from SP6260 (default)
J8	Selects input to RI#	■ 1&2 selects RI# input from SP337 (trace is cut) ■ 2&3 selects push button switch (default, jumper installed on 2&3)

NOTE: Pin 1 of all jumpers is designate by a square pad.

The headers/jumpers that are not installed are highlighted in **Table 3** below.

TABLE 3: DESCRIPTION OF HEADERS/JUMPERS (NOT INSTALLED)

| JUMPERS	FUNCTIONS	COMMENTS
J4	Power supply for XR21B1411	Trace between 1&2.
J9	Enabling 5V from VBUS to the rest of the board	Trace between 1&2.

3.0 BOARD CONFIGURATION

The RS-232 mode or RS-485 mode can be selected via the RS232#/RS485 pin of the SP337. This next section shows the default configuration (RS-232 mode) and how it can be re-configured for RS-485 mode.

3.1   RS-232 Mode (default)

The RS-232 mode can be enabled by installing a jumper between pins 5&6 of J10 (RS232#/RS485 pin will be '0'). Jumpers should also be installed on J10 pins 3&4 (if not installed, the SP337 will be in shutdown mode).

RS-232 mode is the default setting for the evaluation board (**Figure 2**). In this mode, a null modem cable can be connected to the DB9 connector (CON1) to communicate with another serial port that has a DB9 connector. Alternatively, a custom RS-232 connection can also be made using the signals at J3.

FIGURE 2. RS-232 MODE
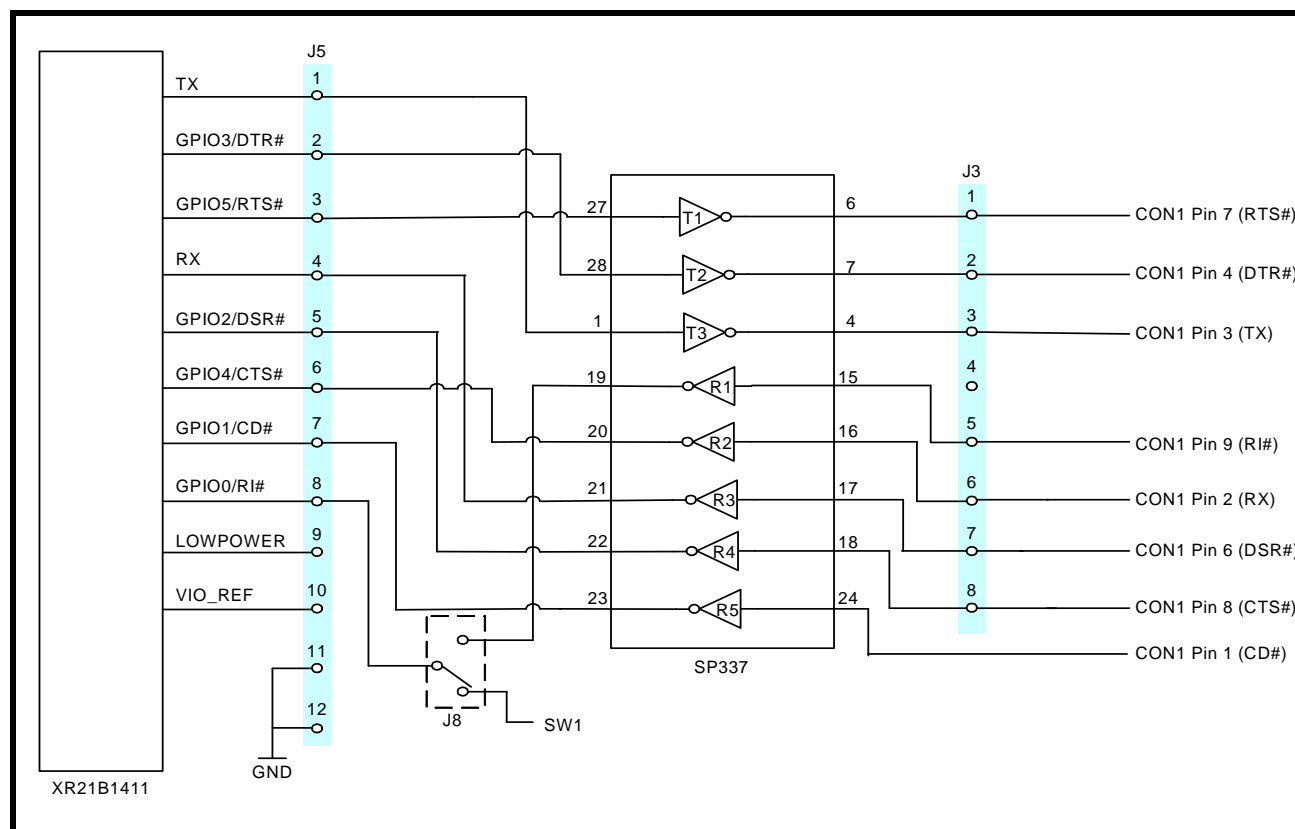
3.2 RS-485/422 Mode

3.2.1 Full-Duplex RS-485/422 Mode

The RS-485 mode can be enabled by removing the jumper between 5&6 of J10 (RS232#/RS485 pin will be '1'). Jumpers should be installed on J10 pins 1&2 and J10 pins 3&4.

In this mode, the differential pairs can communicate with an external RS-485 network via J3 pins 3, 4, 7 and 8 (see Figure 3 below).

Note: When configured for this mode, the DB9 connector (CON1) should not be used.

3.2.2 Half-Duplex RS-485 Mode

For half-duplex RS-485, the full-duplex configuration below will need to be modified as follows:

- Remove jumpers on J10 pins 1&2 and J10 pins 3&4

- Connect J3 pin 3 to J3 pin 8

- Connect J3 pin 4 to J3 pin 7

- Connect J10 pin 2 and J10 pin 4 with J5 pin 3

Of course, the (RS-485) Transceiver Enable feature needs to be enabled in the software driver/application.

Note: When configured for this mode, the DB9 connector (CON1) should not be used.

FIGURE 3. FULL-DUPLEX RS-485 MODE
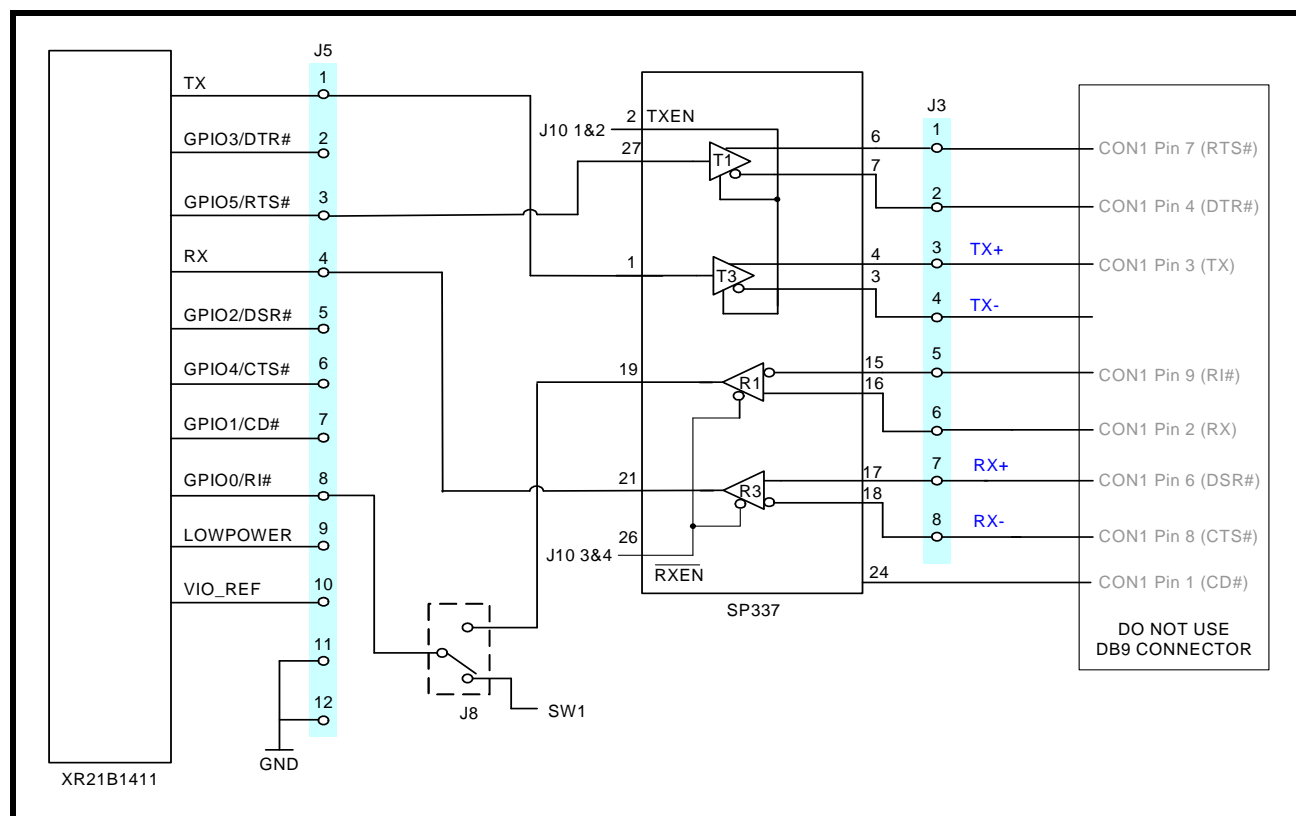
3.3   SP337 in Shutdown Mode

The shutdown mode for the SP337 is enabled when the TXEN pin is '0' and RXEN# pin is '1' controlled via J10. (The SP337 also enters this mode when the XR21B1411 enters the suspend mode and the LOWPOWER pin is asserted.)

In this mode, the I/Os of the SP337 are at high impednace. Therefore, the UART I/Os can connect directly with an external UART or serial transceiver. In addition, the LOWPOWER pin and VIO_REF pins are also available at J5.

4.0   DRIVERS AND SUPPORT

For any questions about this evaluation board, software drivers or technical support, send an e-mail to uarttechsupport@exar.com.

NOTICE