

COMPARISON OF THE XR21V1410 AND THE XR21B1411

1.0 INTRODUCTION

This application note describes the similarity and differences between Exar's XR21V1410 and the XR21B1411.

2.0 SIMILAR FEATURES

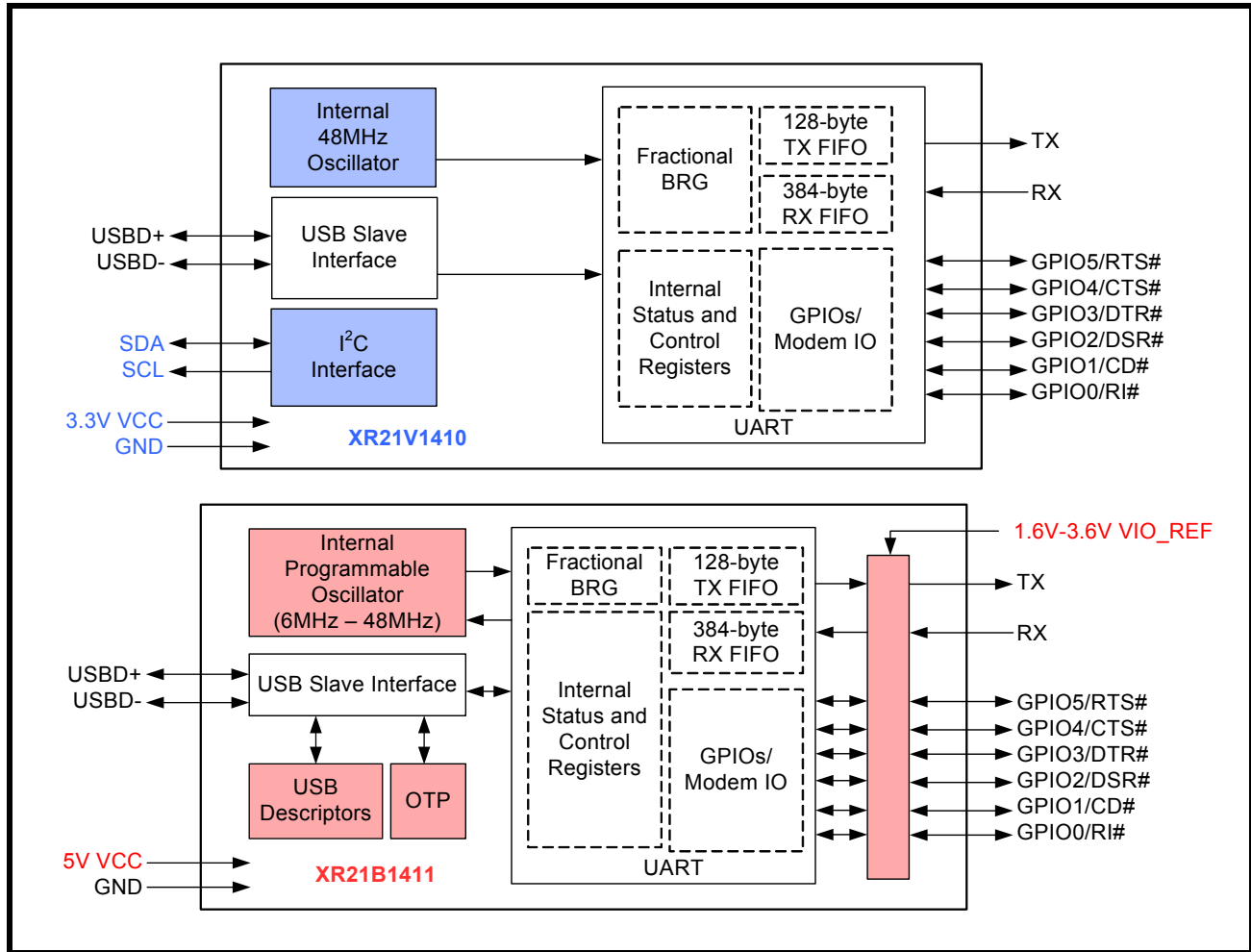
There are many similar features between the XR21V1410 and the XR21B1411. Some of these are:

- Single channel USB UART
- Supports 12 Mbps USB full-speed data rate
- 12 Mbps maximum UART data rate
- 128-byte Transmit FIFO and 384-byte Receive FIFO
- Automatic hardware (RTS/CTS) flow control
- Automatic software (Xon/Xoff) flow control
- Multidrop mode
- Auto transceiver enable
- Half-duplex mode
- Internal clock
- 16-pin QFN package

3.0 HARDWARE DIFFERENCES

Figure 1 shows the block diagrams for both XR21V1410 and XR21B1411.

FIGURE 1. BLOCK DIAGRAM XR21V1410 vs. XR21B1411



3.1 SUPPLY VOLTAGE

The XR21V1410 can operate from 2.97V up to 3.63V. If powered from V_{bus}, an external voltage regulator is required. The XR21B1411 can operate from 4.4V up to 5.25V and can be powered directly from V_{bus}.

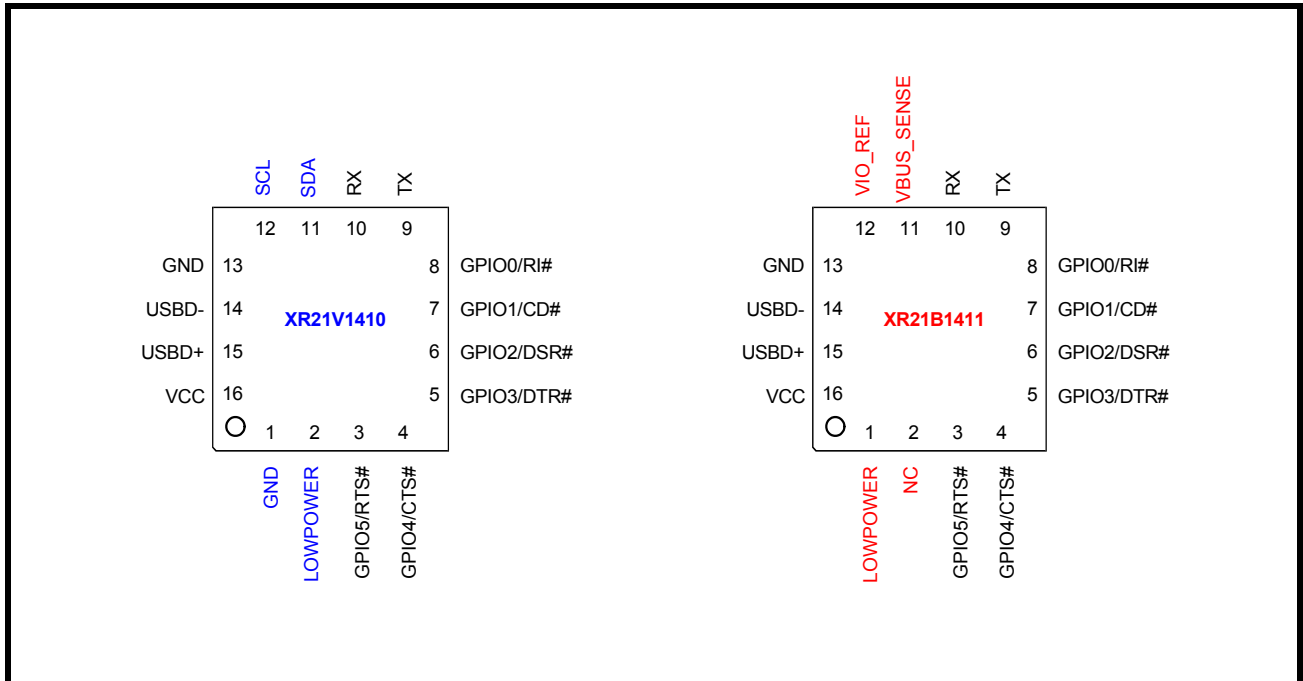
TABLE 1: SUPPLY VOLTAGE COMPARISON

PART NUMBER	SUPPLY VOLTAGE	POWER FROM VBUS
XR21V1410	2.97 V to 3.63 V	External regulator
XR21B1411	4.4 V to 5.25 V	Direct

3.2 PINOUT

Both the XR21V1410 and the XR21B1411 are available in the QFN-16 package. **Figure 2** shows the pinout drawing for both the devices.

FIGURE 2. PINOUT DRAWINGS FOR XR21V1410 AND XR21B1411



The XR21V1410 is not pin-to-pin compatible to the XR21B1411 (See **Table 2**).

TABLE 2: DIFFERENCE SUMMARY IN QFN-16 PACAKGE BETWEEN XR21V1410 AND XR21B1411

PIN #	QFN-16 PINS ASSIGNED DIFFERENTLY	
	XR21V1410	XR21B1411
1	GND	LOWPOWER
2	LOWPOWER	NC
11	SDA	VBUS_SENSE
12	SCL	VIO_REF

3.2.1 LOWPOWER

LOWPOWER pin is an output pin to indicate suspend mode for both the XR21V1410 and XR21B1411. However, the polarity of this pin is different between the two devices. The difference is shown in **Table 3**.

TABLE 3: LOWPOWER PIN COMPARISON

	LOWPOWER PIN (XR21V1410)	LOWPOWER PIN (XR21B1411)
Output Status Polarity	The polarity is selected by the pull-up or pull-down resistor.	The polarity is programmed in OTP.

3.2.2 VIO_REF

Only the XR21B1411 has the VIO_REF pin. It provides a reference voltage for the UART and GPIO signals. The voltage range for VIO_REF is 1.6V -- 3.6 V. If not connected to an external voltage reference, or if the external supply voltage falls below 1.6V, the UART and GPIO pins will be tri-stated.

3.2.3 VBUS_SENSE

Only the XR21B1411 has the VBUS_SENSE pin. It is used to disable the pull-up resistor on the USB D+ signal when VBUS is not present. In bus-powered mode, this pin should be left unconnected. In self-powered mode, the VBUS from the USB connector should be connected to this pin through a voltage divider circuit (VBUS = 5V), such that VBUS_SENSE = VIO_REF, using large resistance values to minimize power. It should also be decoupled by a 0.1 uF capacitor. This feature may be enabled via the OTP.

3.3 I²C INTERFACE

The XR21V1410 has an additional I²C interface to provide connectivity to an external I²C EEPROM. The EEPROM is for storing the Vendor ID, Product ID, USB attributes, max power, and remote wake support bus etc.. The XR21B1411 does not have I²C interface because it has OTP memory where these values can be programmed.

3.4 OTP

The XR21B1411 has an on-chip non-volatile one time programmable (OTP) memory, which is programmable via the USB interface. The OTP memory contains user programmable locations for custom Vendor and Product ID, attributes, textual strings, max power and remote wake support etc.. The XR21V1410 does not have OTP.

3.5 INTERNAL OSCILLATOR

Both the 1410 and 1411 have an internal oscillator. The 1410 has a fixed frequency oscillator while the 1411 has a selectable frequency oscillator.

TABLE 4: INTERNAL OSCILLATOR DIFFERENCE

	XR21V1410	XR21B1411
Frequency	48 MHz	6 MHz -- 48 MHz
Maximum baud rate	12 Mbps	1.5 Mbps -- 12 Mbps

3.6 SERIALIZATION

Each 1411 device is uniquely serialized, and this information is passed to the USB host during enumeration. The 1410 devices, (also per USB standard), do not have a serial number. Please refer to AN213.

4.0 SOFTWARE DIFFERENCES

4.1 UART MANAGER

Compared with the XR21B1411, the XR21V1410 has an additional UART manager. It is located in a separate register block from the UART registers.

4.2 USB CONTROL COMMANDS

As shown in the table below, the XR21V1410 does not have support for string descriptors. Also, the internal UART registers are 8-bit registers for the XR21V1410 and 12-bit registers for the XR21B1411.

TABLE 5: USB CONTROL COMMANDS

	XR21V1410	XR21B1411
GET_DESCRIPTOR for string descriptor	No	Yes
XR_GET_REG	Read 8-bit register	Read 12-bit register
XR_SET_REG	Write 8-bit register	Write 12-bit register

5.0 SUMMARY OF DIFFERENCES BETWEEN THE XR21V1410 AND THE XR21B1411

The differences between the XR21V1410 and the XR21B1411 are summarized in the **Table 6** below.

TABLE 6: DIFFERENCES BETWEEN THE XR21V1410 AND THE XR21B1411

COMPARISON		XR21V1410	XR21B1411
Supply Voltage		2.97V -- 3.63V	4.4V -- 5.25V
I ² C interface for EEPROM		Yes	No
OTP		No	Yes
LowPower Polarity Programmable		No	Yes
VBUS_SENSE		No	Yes
UART Manager		Yes	No
USB Control Commands	GET_DESCRIPTOR	No	Yes
	XR_SET_REG	8-bit	12-bit
	XR_GET_REG	8-bit	12-bit

In summary, the XR21V1410 and XR21B1411 are very similar devices. In choosing between the XR21V1410 and XR21B1411, I²C interface, OTP, power supply voltage need to be considered. For any questions, please send an email to uarttechsupport@exar.com.

NOTICE

EXAR Corporation reserves the right to make changes to the products contained in this publication in order to improve design, performance or reliability. EXAR Corporation assumes no responsibility for the use of any circuits described herein, conveys no license under any patent or other right, and makes no representation that the circuits are free of patent infringement. Charts and schedules contained here in are only for illustration purposes and may vary depending upon a user's specific application. While the information in this publication has been carefully checked; no responsibility, however, is assumed for inaccuracies.

EXAR Corporation does not recommend the use of any of its products in life support applications where the failure or malfunction of the product can reasonably be expected to cause failure of the life support system or to significantly affect its safety or effectiveness. Products are not authorized for use in such applications unless EXAR Corporation receives, in writing, assurances to its satisfaction that: (a) the risk of injury or damage has been minimized; (b) the user assumes all such risks; (c) potential liability of EXAR Corporation is adequately protected under the circumstances.

Copyright 2011 EXAR Corporation

Datasheet March 2011.

Send your UART technical inquiry with technical details to hotline: uarttechsupport@exar.com.

Reproduction, in part or whole, without the prior written consent of EXAR Corporation is prohibited.
