XR21B1421IL2x-0A-EVB

Evaluation Board User's Manual

Introduction

This user's manual is for the XR21B1421IL2x-0A-EVB evaluation board. The XR21B1421IL2x-F shares a common evaluation board with the XR21B1420IL28-F. The main difference between the XR21B1421 and the XR21B1420 is that the XR21B1421 is an HID USB UART. The XR21B1420 is a USB CDC-ACM/Custom Vendor Request device. The table below lists the ordering part number for the device installed for the different evaluation board ordering part numbers. There is a separate user's manual for the XR21B1420IL28-F.

Table 1: Evaluation Board Ordering Part Numbers

Device Ordering Part Number	Evaluation Board Ordering Part Number	Device Package	Device Location
XR21B1421IL24-F	XR21B1421IL24-0A-EVB	24-pin QFN	U3
XR21B1421IL28-F	XR21B1421IL28-0A-EVB	28-pin QFN	U5
XR21B1420IL28-F	XR21B1420IL28-0A-EVB	28-pin QFN	U4

Evaluation Board Overview

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

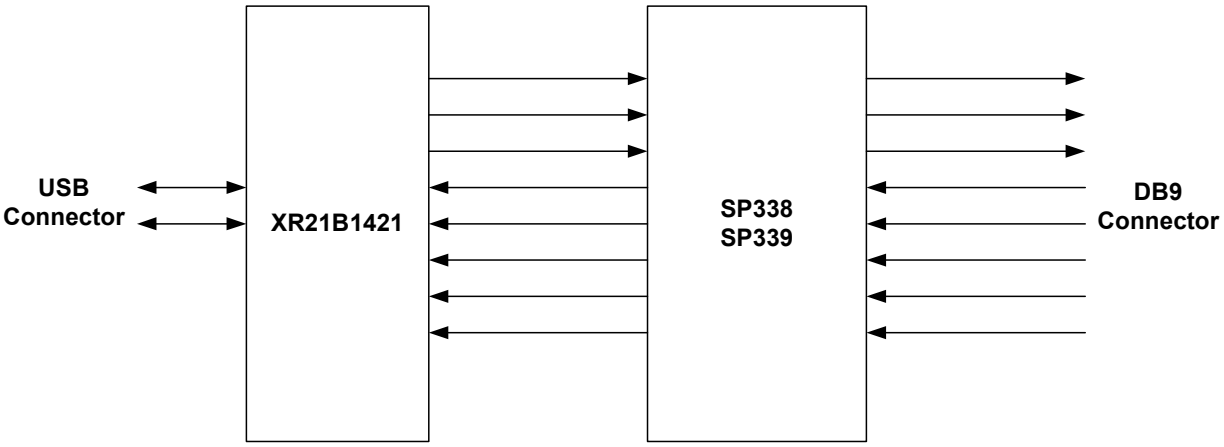

Figure 1: Evaluation Board Block Diagram

In addition to the XR21B1421IL2x-F, there is an Exar SP339 Multiprotocol transceiver on this evaluation board. The SP339 can be configured for Loopback, RS-232, Half-Duplex RS-485 or Full-Duplex RS-485/422 Modes. The default setting when shipped from the factory is RS-232 mode.

Figure 2 and Figure 3 on the next page show the top view and bottom view of the evaluation board with all of the components, connectors and headers labeled.

© 2020 MaxLinear, Inc.

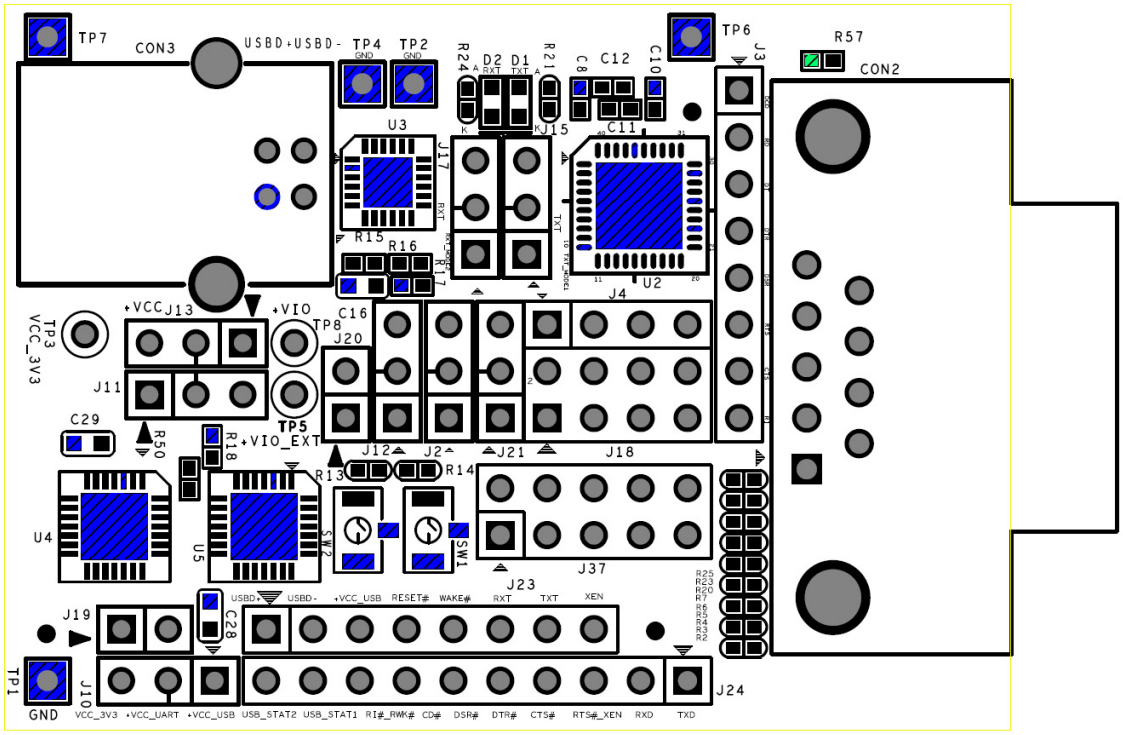

Figure 2: Top View of Evaluation Board

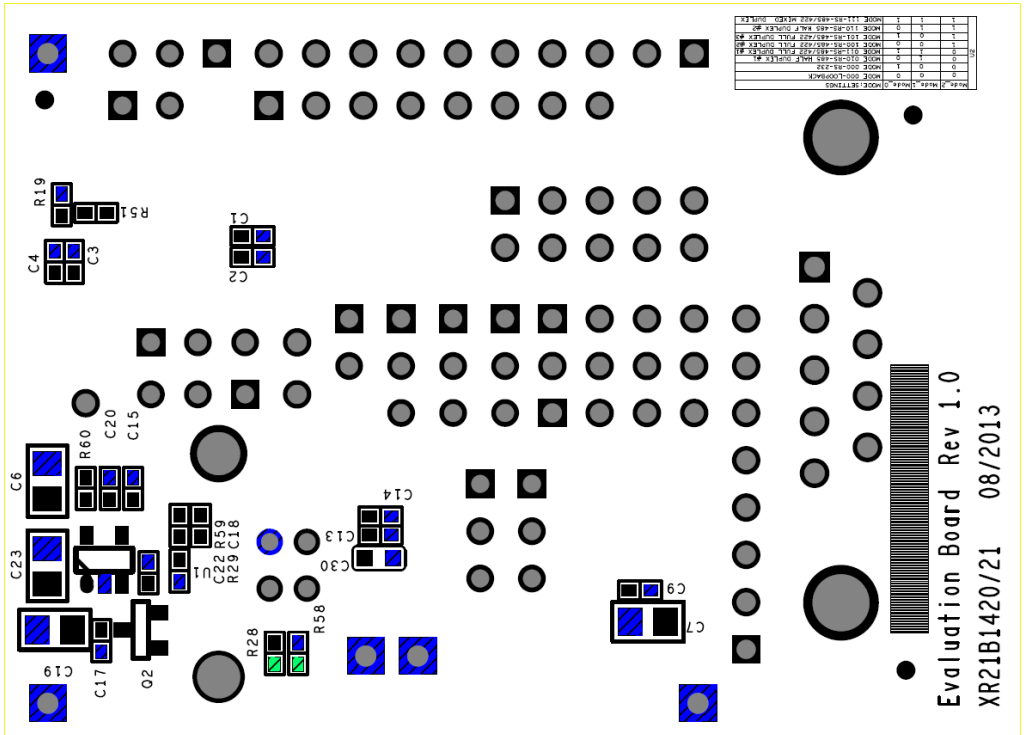

Figure 3: Bottom View of Evaluation Board

© 2020 MaxLinear, Inc.

Exar's Windows HID GUI Application

An HID GUI application is included on the CD shipped with the evaluation board. A .dll file on the CD must be in the same directory as the .exe file in order for the HID GUI application to work properly. If you did not receive the HID GUI, please contact uarttechsupport@exar.com. Figure 4 below shows the HID GUI with the Transmit / Receive data tab selected. Each portion of the GUI is described below in Table 2.

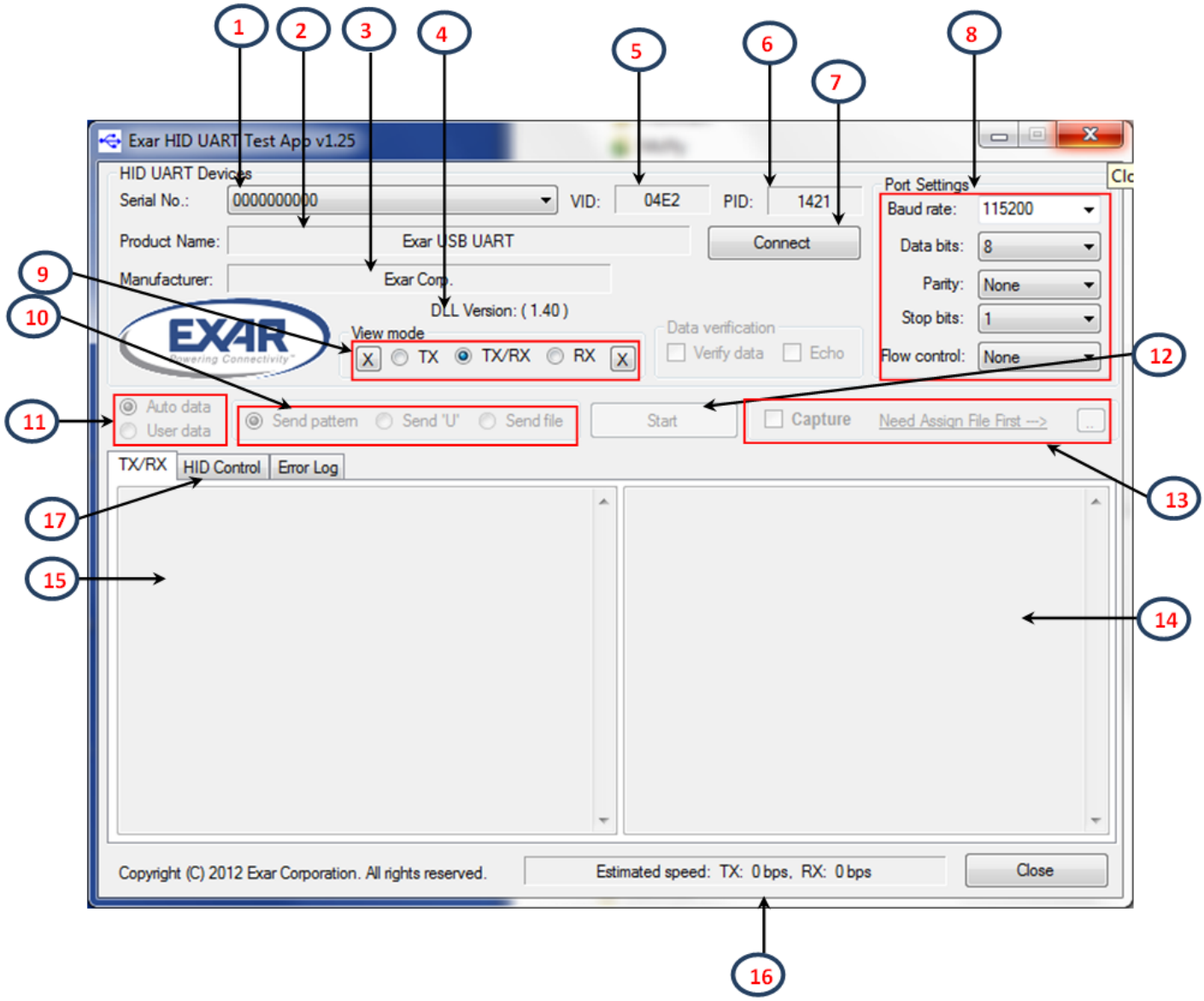

Figure 4: HID GUI

Table 2: HID GUI Description

GUI Item	Name	Description
1	Serial Number	This box lists the HID-UARTs connected to the system. Use the pull-down menu to select the appropriate device.
2	Product Name	This field is the Product String of the UART. Exar's default is "Exar USB UART".
3	Manufacturer	This field is the Manufacturer String. Exar's default is "Exar Corp.".
4	DLL Version	This field displays the version of the DLL file used by the application.
5	Vendor ID	This field displays the Vendor ID (VID) of the device. Exar's default is 0x04E2.
6	Product ID	This field displays the Product ID (PID) of the device. Exar's default is 0x1421.
7	Connect	After selecting the appropriate UART in the Serial No. Box. Click 'Connect' to open the port. Upon successful connection, the button changes to 'Disconnect'. Clicking on 'Disconnect' will close the port.
8	Port Settings	This section provides an interface to modify UART settings. The UART properties that can be modified are as follows:
	a. Baud Rate	selects among the standard baud rates ranging from 300kbps to 1.8Mbps
	b. Data Bits	selects the number of data bits - 5, 6, 7 or 8 per character
	c. Parity	selects among the parity types - odd, even, mark or space
	d. Stop Bits	selects the number of stop bits - 1 or 2. (If 5 bit data is selected, selection of 2 would be 1.5 stop bits)
	e. Flow Control	selects flow control setting - Hardware, Software, or no Flow Control
9	View Mode	Selects Data transfer views
	a. Tx	Only transmit data will be displayed.
	b. Tx/Rx	Both transmit and receive data will be displayed (default).
	c. Rx	Only receive data will be displayed.
	d. X	Clicking "X" button next to Tx clears TX window. Clicking "X" button next to Rx clears RX window.
10	Send Type	Selects different types of data transfers
	a. Send Pattern	Sends a fixed pattern continuously after we hit Start button. E.g.: L01 - 0123456789abcdefghijklmnopqrstuvwxyz. L02 - 0123456789abcdefghijklmnopqrstuvwxyz. L03 - 0123456789abcdefghijklmnopqrstuvwxyz.
	b. Send 'U'	Sends "U" (0x55) continuously
	c. Send file	Select this option to send a text file
11	Send Mode	Select between Auto data transmit mode or User Data transmit mode
	a. Auto	On clicking "Start", the data selected in Send Type will be sent continuously.
	b. User Data	User can enter the data to be transmitted in Tx Window
12	Start	Click this button to start data transmission. Once data transmission initiates successfully this button becomes "Stop" button. Select this button to stop data transmission
13	Capture	Click this option to save the receive data in to a text file. Assign the file before this button becomes active. By selecting "Need Assign File First"

© 2020 MaxLinear, Inc.

Table 2: HID GUI Description

GUI Item	Name	Description
14	Receive Window	Displays data received by the HID UART.
15	Transmit Window	Displays data transmitted by the HID UART.
16	Status	Displays estimated real time throughput of the data transmitted and received
17	HID Control tab	Use this tab to send and receive HID reports

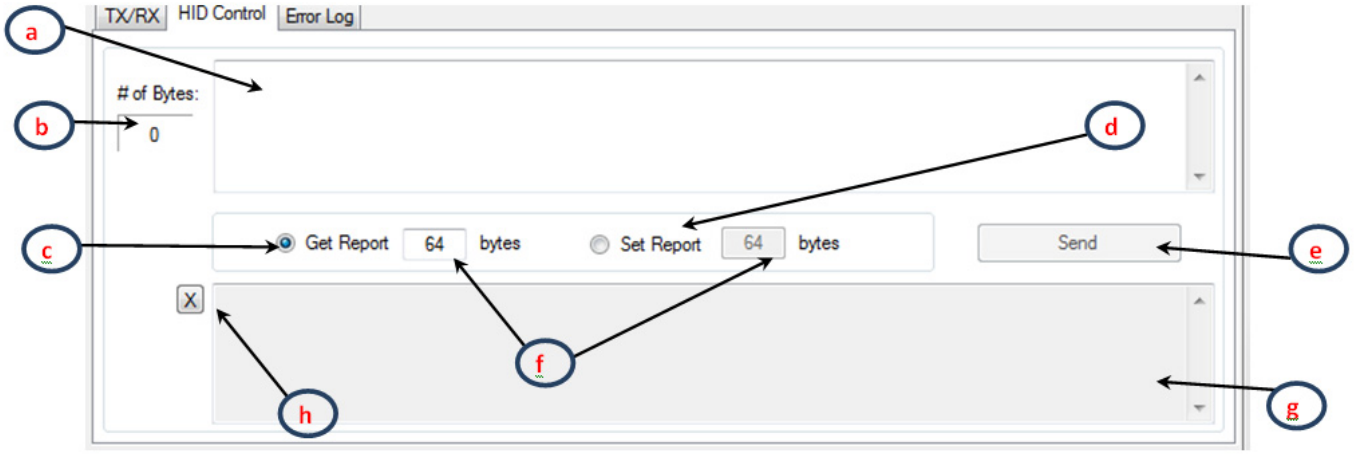

Figure 5: GUI - HID Control

Table 3: Description

GUI Item	Name	Description
a	Report window	Enter Report ID for read operation (Get Report). Enter Report ID followed by data for write operation (Set Report). All values should be in hexadecimal format. Refer to the XR21B1421 datasheet for more information. E.g.: 50 00 01 C2 00 00 00 00 00 Where '50' is the UART CONFIG Report ID and the remaining 8 bytes are the data fields of the Report.
b	# Of Bytes	This box displays the Report length entered in box a
c	Get Report	Selects read operation
d	Set Report	Selects write operation
e	Send	Click 'Send' to read/write the report
f	bytes	Enter the length of the report to read/write. For read operation, the length must be greater than or equal to Transfer Size specified in the datasheet. In the example shown above, the report length is 9. Operation will fail if the report length entered is less than the report length specified in the datasheet. Valid values are 1 - 64 (decimal).
g	Status Window	For Get Report operation (Read): This window will show the report read from the device. For Set Report operation (Write): This window will show the result of operation, either 'PASS' or 'FAIL'
h	"X"	Click this button to clear the status window.

© 2020 MaxLinear, Inc.

Examples

Get Report: Get UART CONFIG report

Report ID: 0x50

Transfer size: 9

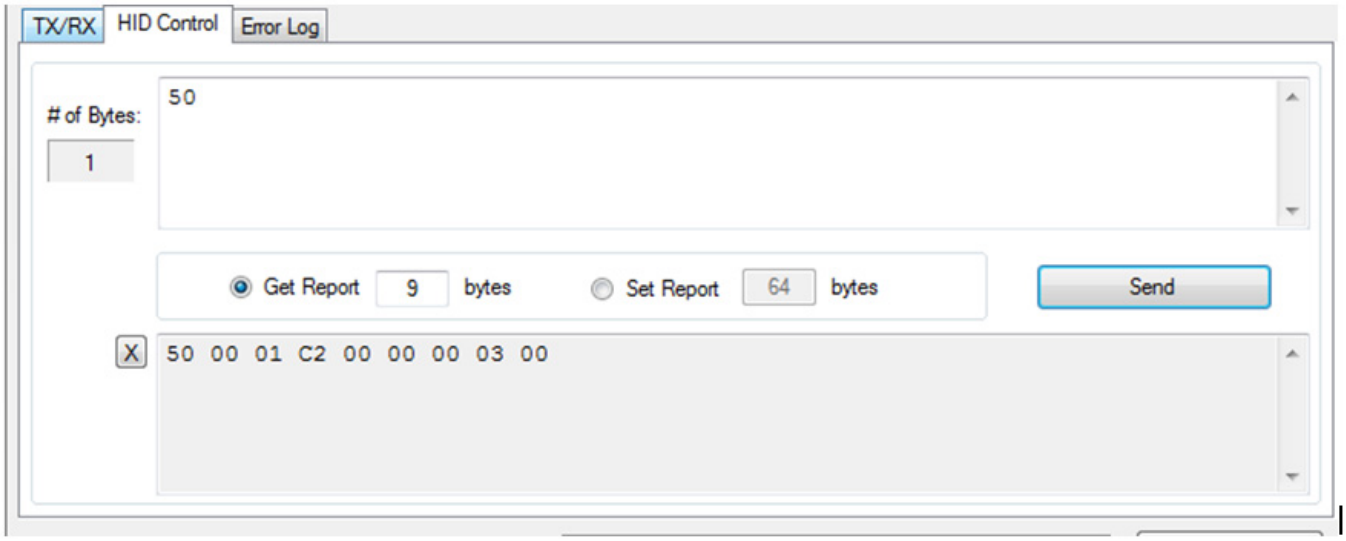

Figure 6: Get Report Example

Set Report: Set GPIO CONFIG report

Report ID: 0x49

Transfer size: 13

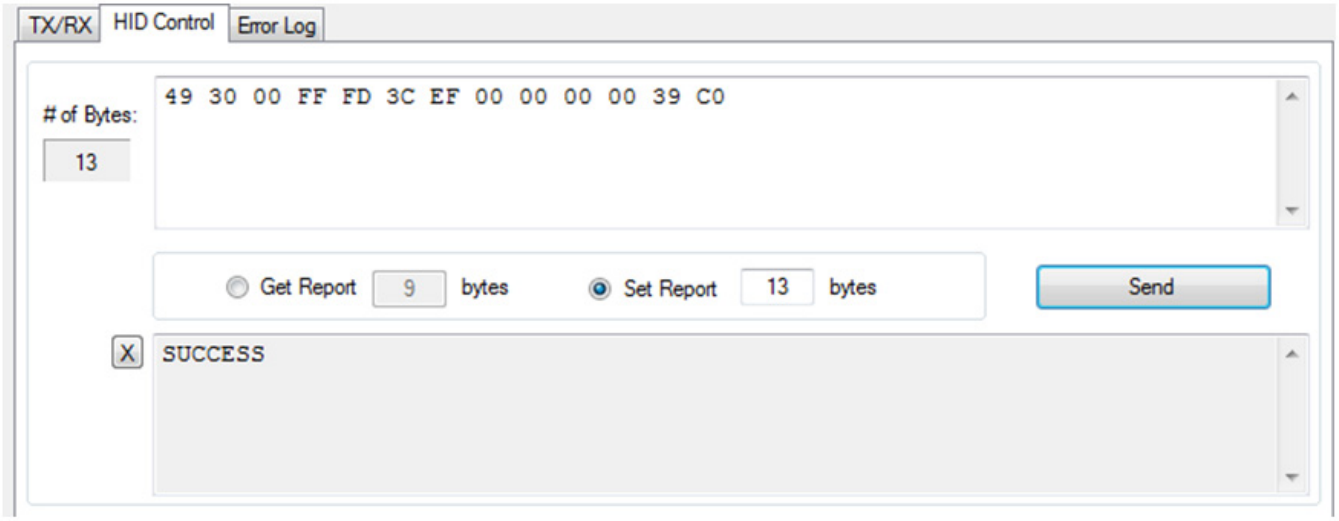

Figure 7: Set Report Example

© 2020 MaxLinear, Inc.

Hardware Configurations

This sections describes the default settings when shipped from the factory and what jumper setting changes are required when changing modes.

XR21B1421 Power Configurations

When shipped from the factory, the XR21B1421 is configured for bus-powered mode and uses the 5V from the USB VBUS pin. The default jumper settings are:

Table 4: Default Jumper Settings

Jumper Setting	Description
J10 - 1 & 2	Connects 5V from VBUS to VCC_REG (pin 7). A regulated 3.3V output will be available on VCC (pin 6).
J11 - 1 & 2	Connects the regulated 3.3V to VIO. The voltage of the UART/GPIO pins will be 3.3V.
J13 - 1 & 2	Connects all pull-up resistors for the I/Os to 3.3V.
J19	Not installed.

If not using the 5V from VBUS, an external 3.3V can be supplied to the VCC_REG pin. For testing purposes, there is an Exar SP6260 regulator on board that can be used. The required jumper settings for 3.3V operation are as follows:

Table 5: Jumper Settings for 3.3V Operation

Jumper Setting	Description
J10 - 2 & 3	Connects 3.3V from SP6260 to VCC_REG (pin 7). 3.3V will also need to be supplied to VCC via J19.
J11 - 1 & 2	Connects 3.3V to VIO. The voltage of the UART/GPIO pins will be 3.3V.
J13 - 1 & 2	Connects all pull-up resistors for the I/Os to 3.3V.
J19 - 1 & 2	Connects the regulated 3.3V from the SP6260 to the VCC pin of the XR21B1421.

GPIO Configurations

GPIO4/TXT

When shipped from the factory, the GPIO4/TXT pin is connected to the LED. The default configuration of this pin is the TXT function.

Table 6: Default Jumper Setting for GPIO4/TXT

Jumper Setting	Description
J15 - 2 & 3	GPIO4/TXT connected to LED D1. LED D1 toggles when data is transmitting.

Changing the header to J15 1&2 and adding a jumper on J18 3&4 will allow the GPIO4/TXT pin to control the MODE1 pin of the SP338/SP339 transceiver.

© 2020 MaxLinear, Inc.

GPIO5/RXT

When shipped from the factory, the GPIO5/RXT pin is connected to the LED and behaves as the RXT function.

Table 7: Default Jumper Setting for GPIO5/RXT

Jumper Setting	Description
J17 - 2 & 3	GPIO5/RXT connected to LED D2. LED D2 toggles when data is received.

Changing the header to J17 1&2 and adding a jumper on J18 5&6 will allow the GPIO5/RXT pin to control the MODE2 pin of the SP338 transceiver (this is a 'NC' on the SP339).

GPIO7/RI#/RWK#

When shipped from the factory, the GPIO7/RI#/RWK# pin is connected to the push-button switch (SW1).

Table 8: Default Jumper Setting for GPIO7/RI#/RWK#

Jumper Setting	Description
J12 - 2 & 3	GPIO7/RI#/RWK is connected to the SP338/SP339. Changing the jumper setting to 1 & 2 will connect the GPIO7/RI#/RWK# to SW1. Can be used for remote wake-up if enabled in the OTP.

The Windows HID driver does not support remote wake-up. The Mac OS HID driver does support remote wake-up.

Changing the header to J12 2&3 will connect the GPIO7/RI#/RWK# pin to the SP338/SP339 transceiver.

GPIO9/DSR#

By default, the GPIO9/DSR# pin is a GPIO output for the XR21B1421. Therefore, when shipped from the factory, J20 is not installed to avoid any bus conflicts with the output of the SP338/SP339. The GPIO9/DSR# pin can be configured as a GPIO input using the HID reports. See datasheet for complete details.

SP338/SP339 Mode Selection

When shipped from the factory, the SP338/SP339 are configured in the RS-232 mode. This is achieved with a combination of J18 and J4.

J18 pins 2, 4 and 6 go to MODE0, MODE1 and MODE2, respectively. The SP338/SP339 have weak internal pull-down resistors. Table 9 shows the SP338/SP339 MODE pin configurations for the RS-232 mode.

Table 9: SP339 RS-232 Mode Configurations

Mode	Configuration
MODE0	1
MODE1	0
MODE2	0

For the RS-232 mode, there is a jumper from J18 pin 2 to J4 pin 1. Refer to the table in the schematic or the SP339 data-sheet for more details of the different configurations.

The SP338/339 transceiver is enabled with a jumper from J18 pin 8 to J4 pin 4.

© 2020 MaxLinear, Inc.

Half-duplex, Full-Duplex and Mixed Duplex RS-485/422 modes

In the RS-485 half-duplex, full-duplex and mixed duplex modes, the DIR1 pin of the SP338/SP339 enables or disables the RS-485/422 line drivers. The DIR1 pin can be controlled by the XR21B1421 using the GPIO3/RS485 or GPIO1/RTS#/RS485 output pins (selected via J21). Refer to the datasheet for details for selecting and enabling the Automatic RS-485 Half-Duplex Control for the GPIO3/RS845 or GPIO1/RTS#/RS845 pins.

SP338/SP339 Power Settings

When shipped from the factory, the SP338/SP339 is powered from the regulated 3.3V output from the internal regulator.

Table 10: Default Jumper Setting for SP339 Power

Jumper Setting	Description
J2 - 1 & 2	SP339 is powered by the regulated 3.3V from the XR21B1421 (+VCC_OUT). Changing the jumper setting to 2&3 will power the SP339 using the 5V from VBUS (+VCC_USB).

© 2020 MaxLinear, Inc.

Software and Technical Support

Visit www.maxliner.com/XR21B1421 or www.maxlinear.com/XR21B1420 to download documentation and design tools including software, software drivers, evaluation board schematics, and evaluation board design files. Visit www.maxlinear.com/support/contact-us to search for regional contacts, knowledge-base articles, and submit new support requests.

© 2020 MaxLinear, Inc.

Revision History

Revision	Date	Description
1A	September 2014	Initial release.
1B	January 2020	Add MaxLinear logo and edit "Software and Technical Support" section.

Corporate Headquarters:
5966 La Place Court
Suite 100
Carlsbad, CA 92008
Tel.:+1 (760) 692-0711
Fax: +1 (760) 444-8598
www.maxlinear.com

The content of this document is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by MaxLinear, Inc. MaxLinear, Inc. assumes no responsibility or liability for any errors or inaccuracies that may appear in the informational content contained in this guide. Complying with all applicable copyright laws is the responsibility of the user. Without limiting the rights under copyright, no part of this document may be reproduced into, stored in, or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), or for any purpose, without the express written permission of MaxLinear, Inc.

Maxlinear, Inc. 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 MaxLinear, Inc. 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 MaxLinear, Inc. is adequately protected under the circumstances.

MaxLinear, Inc. may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from MaxLinear, Inc., the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

MaxLinear, the MaxLinear logo, and any MaxLinear trademarks, MxL, Full-Spectrum Capture, FSC, G.now, AirPHY and the MaxLinear logo are all on the products sold, are all trademarks of MaxLinear, Inc. or one of MaxLinear's subsidiaries in the U.S.A. and other countries. All rights reserved. Other company trademarks and product names appearing herein are the property of their respective owners.

© 2020 MaxLinear, Inc. All rights reserved

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

MaxLinear:

XR21B1422IL40-0A-EVB XR21B1421IL28-0A-EVB