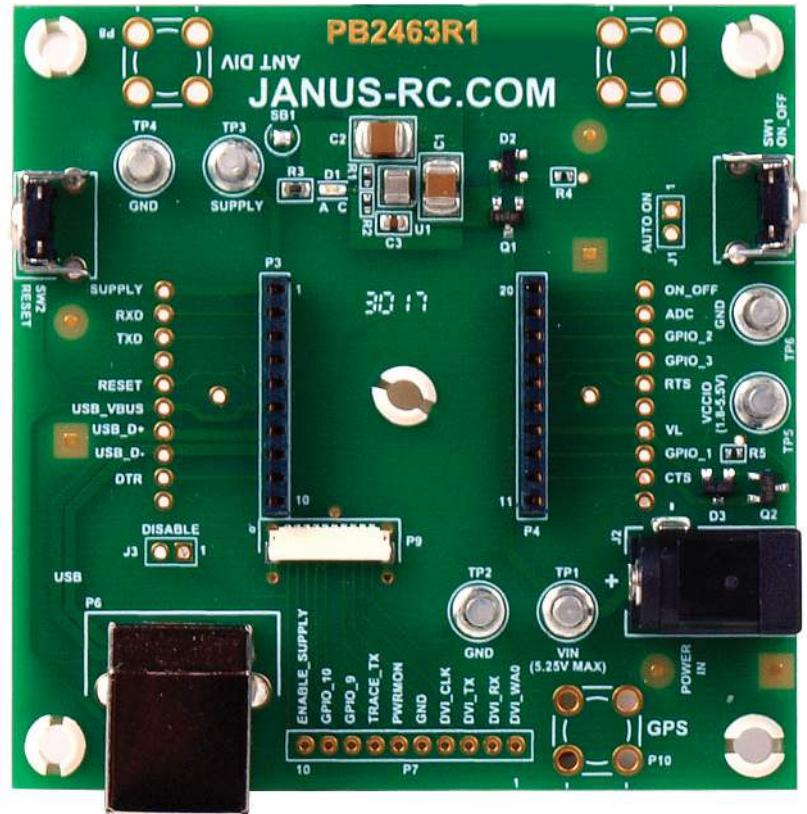


# Cellular XF Socket Modem Evaluation Board User Guide



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## 1. INTRODUCTION

### Scope

The aim of this document is the description of XF Evaluation Board features useful for evaluating the XF Socket Modems.

### Audience

This document is intended for Janus customers, who are about to implement their applications using XF Socket Modems.

### Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Janus Remote Communications at:

info@janus-rc.com

Alternatively use: [www.janus-rc.com/support.html](http://www.janus-rc.com/support.html) for technical details and recommendations on accessories.

### Text Conventions



Danger- This information MUST be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to follow the points mentioned, if the points are not followed the product may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when using this product.

### Related Documents

Embedded Cellular XF Socket Modems – [www.janus-rc.com/XF.html](http://www.janus-rc.com/XF.html)

### Document History

Rev 00 – 12/12/2017

## 2. Overview

In this document, all the basic functions of this product are explained and proper hardware solutions are suggested. The given information shall be considered as a starting point for properly evaluate and design products using XF Socket Modems. For further hardware details that may not be explained in this document, contact Janus technical support at info@janus-rc.com

### XF Socket PIN-OUT

SIGNAL	I/O	FUNCTION	PIN	NOTES
VCC	Input	Main Positive Supply Input	1	
RXD	Output	UART data out	2	VREF/VL level
TXD	Input	UART data in	3	VREF/VL level
GND	Input	Ground Pin	4	
RESET	Input	Hardware reset	5	OC drive only <sup>2</sup>
USB_VUSB	Input	USB power sense	6	5 V level
USB_D+	I/O	USB differential Data + signal	7	
USB_D-	I/O	USB differential Data - Signal	8	
DTR	Input	UART Data Terminal Ready	9	VREF/VL level
GND	Input	Ground Pin	10	
GND	Input	Ground Pin	11	
CTS	Output	UART Clear to Send	12	VREF/VL level
GPIO_1	Output	GPIO1	13	1.8 V level
VREF/VL	Input	Reference level for UART I/O	14	1.8 to 5.5 V
GND	Input	Ground Pin	15	
RTS	Input	UART Request to Send	16	VREF/VL level
GPIO_3	I/O	GPIO <sup>1</sup>	17	1.8 V level
GPIO_2	I/O	GPIO <sup>1</sup>	18	1.8 V level
ADC	Input	A/D input	19	1.2 V max
ON_OFF	Input	On/off control	20	OC drive only <sup>2</sup>

#### NOTES:

1. GPIO number on Telit based modems.
2. Open Collector/Open Drain drive only.

### Mechanical Dimension / Weight

The XF Evaluation Board overall dimensions are:

Length: 2.65"

Width: 2.65"

Height: 0.75"

Weight: 25g

### Temperature Range

Operating Temperature Range: : -40°C to +85°C

Storage and non- operating Temperature Range: -40°C to +85°C

### RoHS Compliance

As a part of Janus Remote Communication's policy of environmental protection, the XF Evaluation Board complies with RoHS.

### 3. Hardware Guide

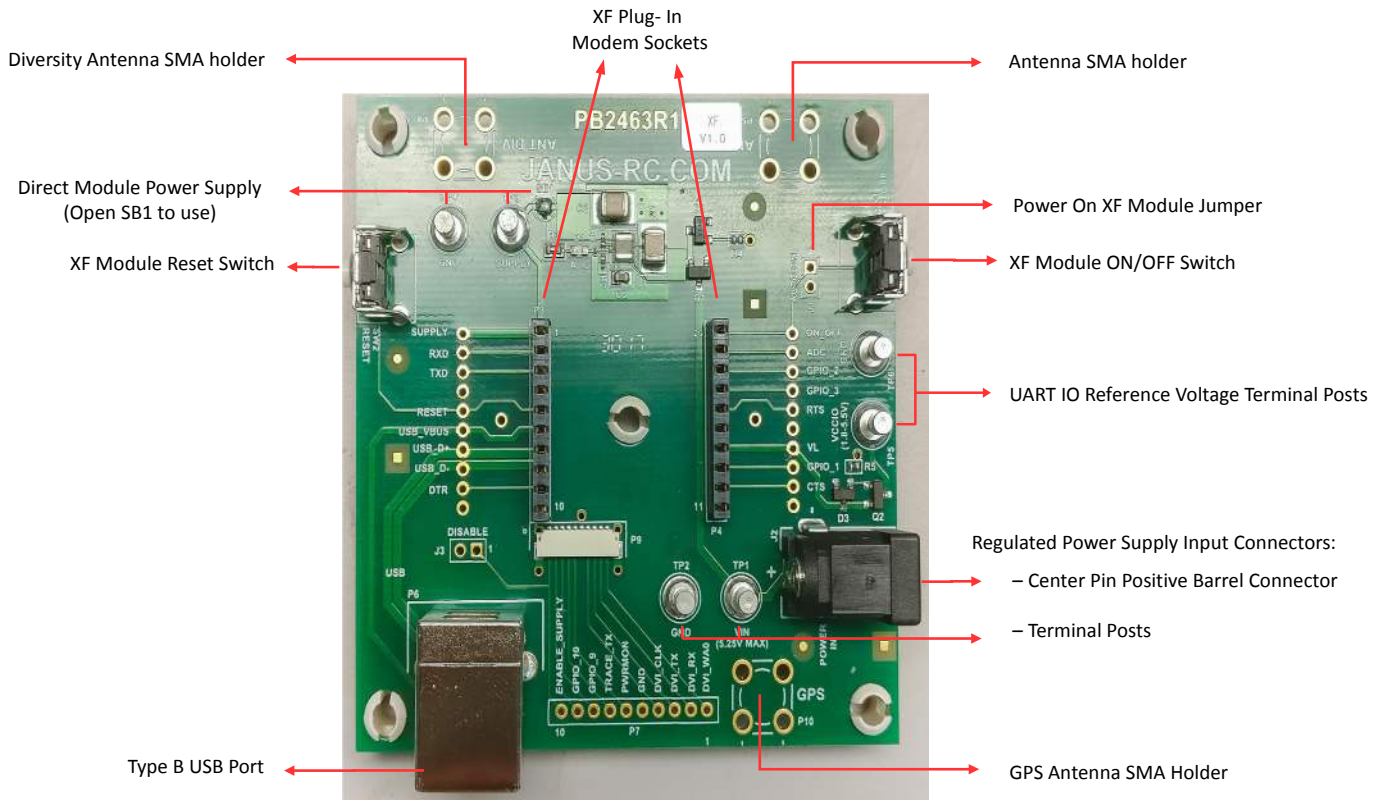


Figure 1: XF Evaluation Board Layout Details

User can connect any carrier and generation's XF Socket Modem model to this Evaluation Board. For more details on various XF Socket Modems, check this link: <http://www.janus-rc.com/carrier-gen-nb.html>

### 3. Hardware Guide continued

The XF Evaluation Board has an on-board regulator which can accept 5VDC to power the on-board circuitry and the XF modem. This product has two main power supply connection options and an optional direct modem power supply:

- Main supply -- center positive barrel connector (J2)
- Main supply – terminal posts (TP1, TP2)
- Direct modem power supply – terminal posts (TP3, TP4)

Regulated Power Supply Input Connectors:

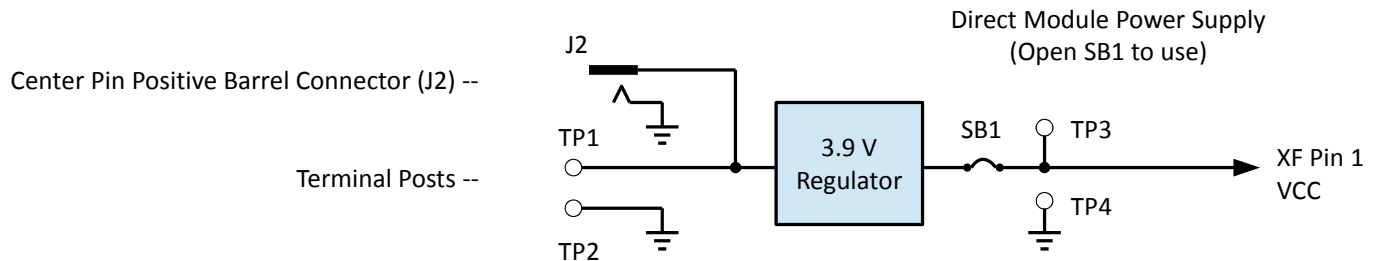
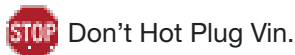


Figure 2: Power Supply Details

The two main power supply options are internally connected and simply offer alternative connection methods. The evaluation board is equipped with protection circuit to prevent reverse voltage as well as help with protection from transients.

The Voltage input range is 4.75V - 5.25V.

Direct modem Power Supply allows to powering the XF modem directly without any onboard voltage regulation. Remove the SB1 solder bridge to use this feature.



### UART Level Translation Interface

XF products require a reference voltage for interfacing the UART I/O lines. A reference voltage applied to pin 14 VCCIO SELECT (VREF) will set the interface voltage level for these signals. This allows for connecting these signals directly to a user's host system at its I/O voltage operating level. See the product User Guide for information on which pins are translated.

The user can choose the translation level between 1.8V – 5.5V by connecting a voltage to selecting P14 VCCIO SELECT. The VCCIO translation voltage is also applied to the RS232 translators.

*Note: User must supply a VCCIO voltage to allow the interface circuit to work for Telit based modems. This interface must be supported even if the UART port is not used as an AT command port. The handshaking lines (CTS, DTR) are used to provide operational signaling and functional control such as low power modes.*

### Absolute Maximum Ratings

Parameters	Min	Max
Supply Voltage		
J2 or TP1-TP2	-0.5V	5.25V
VCCIO		
TP5-TP5	-0.5V	5.25V

---

### 3. Hardware Guide continued

#### UART Port

The XF Evaluation Board exposes the XF modem UART signals as thru-hole pads. The XF modems typically support input signals TXD, RTS and DTR, and output signals RXD and CTS. These signals are translated to operate at the level set by the VCCIO voltage applied to TP5-TP6 terminals. See the UART Level Translation Interface section.

While the UART port can be directly connected to a host system, an alternative method would be to use a USB to TTL serial cable such as the an FTDI TTL-232R-5V-WE or TTL-232R-3V3-WE. These cables can be directly soldered to the XF Evaluation Board and can supply the VCCIO voltage to the VL pin as well.

#### USB Ports

The XF Evaluation Board allows access to virtual COM ports and modem ports via the USB on those products that support it. A Type B USB cable must be connected between the XF Evaluation Board and a PC USB host. To use this interface during the development you may need USB drivers. You can obtain USB driver information on our website ([www.janus-rc.com](http://www.janus-rc.com))

A XF Socket Modems may instantiate up to 6 COM ports when connected to a host. These ports serve various functions depending on the product, and some products allow re-configuring of the USB port functions. See the applicable XF product User Guide for more information.



For proper power sequencing, the XF Socket Modem must be turned on before connecting the USB cable. Voltage applied to the USB\_VBUS pin before the unit is on may keep the it from turning on correctly.

#### Jumper Connector

The J1 jumper on the XF Evaluation Board can be used to ground the ON\_OFF pin of Telit based cellular modems. This will cause the unit to power on automatically when power is applied.



Using the J1 jumper precludes the ability to shut down the modem using the ON\_OFF pushbutton, requiring that the modem be shut down using a software command. Turning off a cellular modem without first unregistering from the network is not a recommended operating procedure.

#### RESET Button

The XF Evaluation Board has one RESET switch.

SW2 RESET is used to recover the operation of the XF Socket Modem's terminal in case of unexpected error resulting from the inability of the application to communicate with the terminal.



## 4. Getting Started

This will take you through the initial steps required that will allow AT commands to be sent to a Telit based cellular XF Socket Modem. Some of the following components typically provided with XF Evaluation Kits will be required:

XF Evaluation Board	1
XF Socket Modem	1
Wall transformer, 5V	1
Type-B USB cable	1
Cellular Antenna(s)	1 or 2
GPS Antenna	Optional
U.FL to SMA Cable	1 to 3

- Insert the SIM card if the XF Socket Modem has a SIM holder.

### Turning ON the XF Evaluation Board

- Insert the SIM card if the XF Socket Modem has a SIM holder.
- A SIM card will be required for connecting to a cellular network with most cellular modems. Even without a SIM card, any operational features of the cellular modem will still be available.
- Before connecting power to the XF Evaluation Board, plug a XF Socket modem into the sockets on the board. Connect the XF Socket Modem into the Evaluation Kit Sockets.
- Make sure the alignment of the XF modem is correct, before placing it into the sockets.
- Connect a cellular antenna cable to the XF Socket Modem (label CELL) and connect a cellular antenna to the other end of the antenna cable (SMA Connector).
- Connect power to the evaluation board. To use barrel connection, connect the 5V wall transformer power plug to the power jack (J2) on the XF Evaluation Board. Otherwise use an external supply to connect the 5V to TP1 and GND to TP2 on the XF Evaluation Board.
- Connect power to the VCCIO terminal TP5 (1.8 to 5.5V).
- Press and Hold the ON/OFF Switch (SW1) push-button for 5 seconds to enable the XF Socket Modem1.
- After releasing the SW1, the XF Socket modem may take several seconds to initialize before it is able to accept AT commands. Yellow LED will be turned on during this stage if the default #GPIO settings are in effect.

#### NOTES:

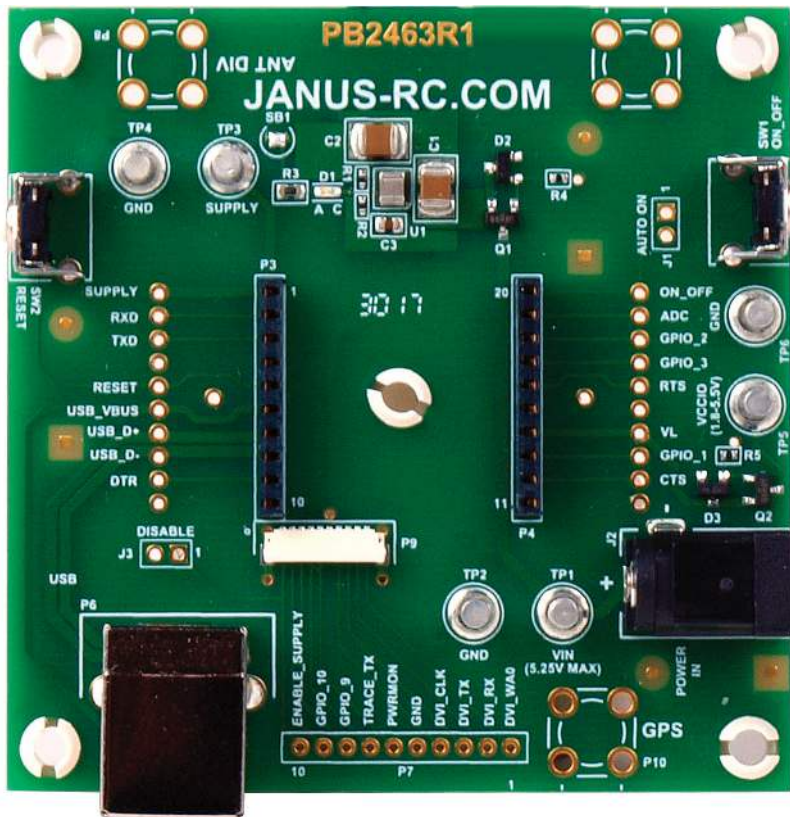
1. The ON/OFF Switch is used for Telit based modems; for other products (e.g. WiFi) refer to the specific XF product User Guide.
2. On Telit based cellular modems you can have the XF Socket Modem turn-on automatically when power is applied by shorting the AUTO ON jumper J1. With this method, the modem can't be turned off using ON/OFF switch. Refer to the AT command guide for how to turn off modem using the #SHDN command.

### USB Communications

- Follow the steps mention in the Turning On the XF Evaluation Board section to turn on the board.
- Connect the USB cable to the evaluation Kit and to you PC.
- If you are using Windows Operating System, you can go to Device Manger and check the MODEM and COM ports that are instantiated. Depending on the specific modem, at least one COM port will support AT commands. MODEM ports also support AT commands; look at the port properties to determine the proper /COM port number to use.
- You should now be able to send 'AT' commands to the modem. To confirm a proper connection, send the command "AT" followed by a line terminator (Enter key) on the terminal and you should see "OK" as the response.



# Cellular XF Socket Modem Evaluation Board User Guide



## LTE 910XF Eval Kits Ordering Information

LTE910XF MODELS	DESCRIPTION
LTE910XF Eval Kit v2.00 TDH3S	Global CAT-M1/NB2 Embedded Cellular Modem Eval Kits
LTE910XFX Eval Kit v1.00 TAH3S	Global CAT1 Embedded Cellular Modem Eval Kits

## Revision History

Revision	Revision Date	Note
00	03/01/18	Initial release of XF Evaluation Board User Guide
01	02/18/20	Updated Ordering Information
02	11/09/22	Updated Model #'s



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