



# **BT4EX8M Evaluation Kit**

## **Application Notes**

**Version 1.1**

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## Preface

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**SAFETY** – Improper use of the BT4EX8M OEM boards can lead to injury to persons or property and/or malfunction of the product. The BT4EX8M Evaluation Kit should only be repaired by authorized ArWest warranty service center. Users should review and heed the safety warnings in Appendix B on page 17.

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## Regulatory Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

“Changes or modifications not expressly approved by the manufacturer could void the user’s authority to operate the equipment”.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio

frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

## **WEEE Directive**

The following information is for EU-member states only:

The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact your supplier where you purchased the product or consult.



## **Technical Assistance**

If you have a problem and cannot find the information you need in the product documentation, contact your local dealer. Alternatively, request technical support using the ArWest World Wide Web site at: [www.arwestcom.com](http://www.arwestcom.com).

## **Return Material Authorization**

Initially, the customer contacts support to report a problem. Please refer to support: [support@arwestcom.com](mailto:support@arwestcom.com)

If support determines the problem cannot be resolved over e-mail/internet, it will authorize the return of the unit for repair or replacement, depending on the nature of the problem.

## **Preface**

Return Material Authorization



# INTRODUCTION

The Evaluation Kit is designed for use in laboratories and allows:

- ArWest BT4EX8M Bluetooth module testing;
- evaluating all the features of BT4EX8M Bluetooth module;
- developing applications using BT4EX8M Bluetooth module.

The kit consists of:

1. BT4EX8M Test Board:

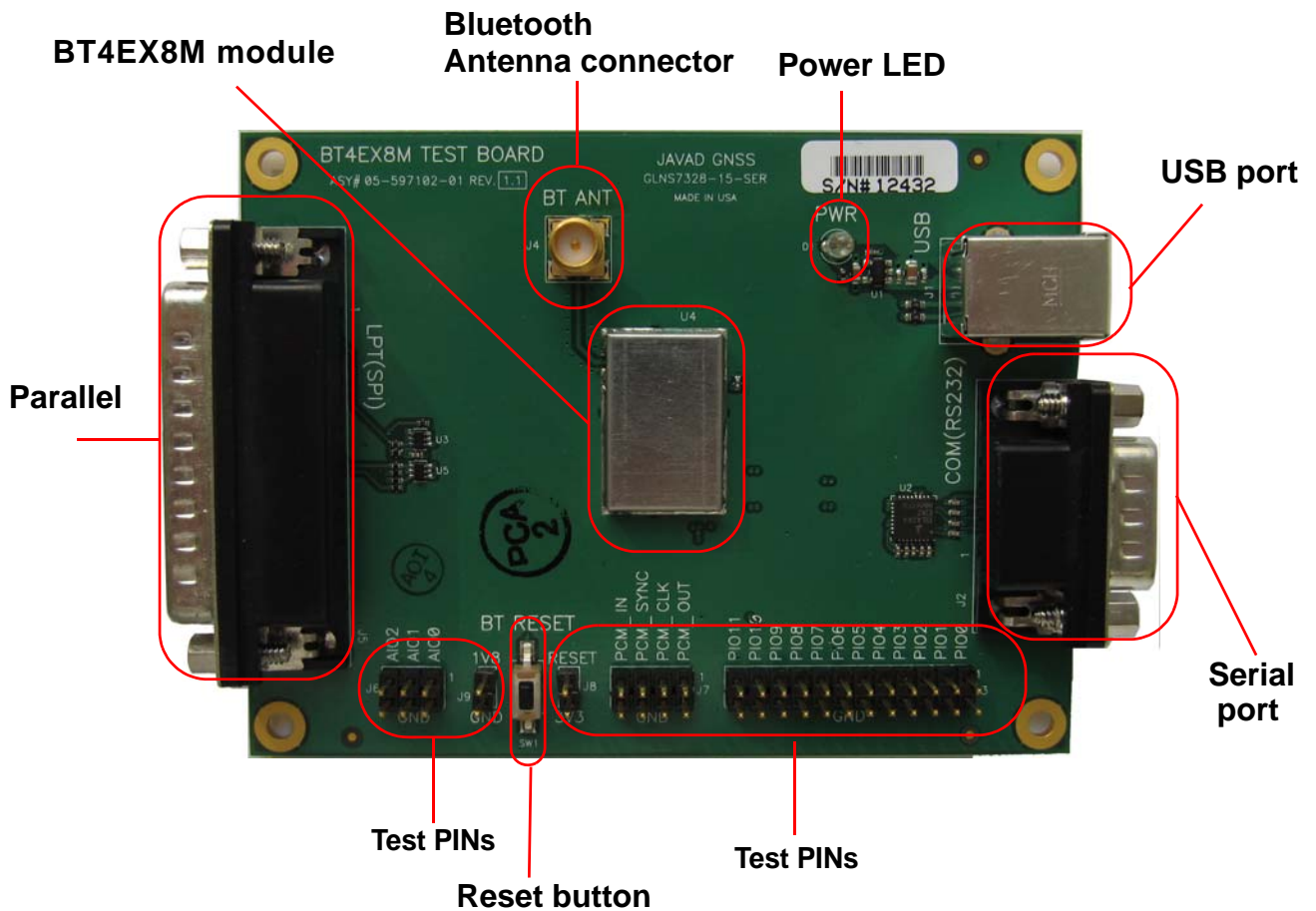


Figure 1. Test board

## Introduction

- Bluetooth Antenna:



**Figure 2. 4-Bluetooth Antenna**

- USB cable:



**Figure 3. USB cable**

- DB9 Female - DB9 Female Null-Modem Serial Cable.



**Figure 4. DB9 Serial Cable**

- USB AC Adapter:



**Figure 5. USB AC Adapter**

# CONNECTION

## 1. Powering the Evaluation Board

The BT4EX8M Evaluation board can be powered in two ways, using USB cable:

1. When the board is connected to PC via USB cable no additional powering required;
2. When the serial or parallel connection to PC is used, power the test board using USB cable connected to plug, as depicted on Figure 1:

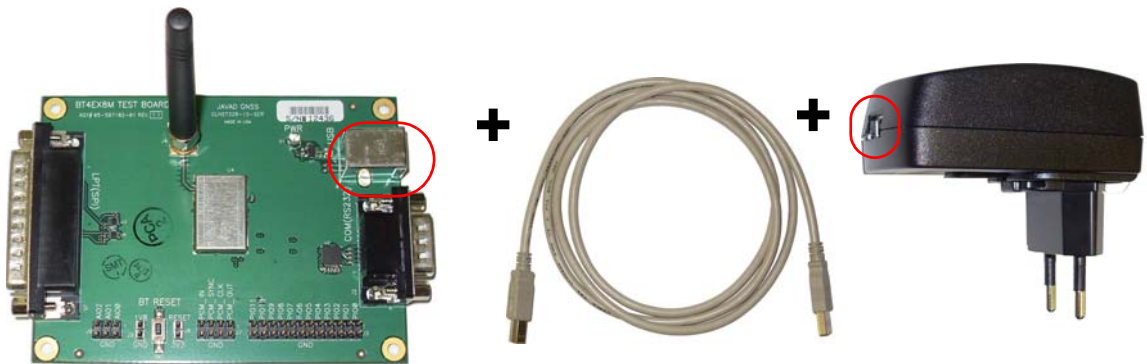


Figure 1. Powering

## 2. Bluetooth Antenna Connection

Connect the Bluetooth antenna to the Bluetooth antenna connector, as depicted on Figure 1.

## 3. USB Connection

A standard USB cable (included in Kit) may be used to connect PC USB port with USB port on adapter.

Table 1. USB Connector Specification

Pin	Signal Name	Dir	Description
1	5V_USB	I	+5 VDC Power Input
2	USB_D-	I/O	USB data minus
3	USB_D+	I/O	USB data plus
4	GND	-	Ground
5	GND	-	Ground

## Connection

Serial RS-232 Connection

# 4. Serial RS-232 Connection

A standard Null-Modem cable (included in Kit) with DB-9 Female connectors on both ends may be used to connect PC COM\_X port with Serial port on adapter.

Adapter's DB-9 male connector external view and pinout is shown on the Figure 2.

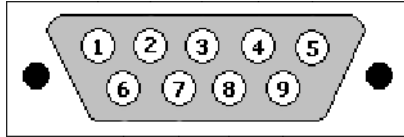


Figure 2. DB-9 Male connector

Table 2. DB-9 Male Connector Specification

Pin	Signal Name	Dir	Description
1	N/C <sup>1</sup>	-	
2	RX_IN	I	RS232 data input
3	TX_OUT	O	RS232 data output
4	N/C	O	
5	GND	-	Ground
6	N/C	-	
7	RTS_OUT	O	RS232 request to send active low
8	CTS_IN	I	RS232 clear to send active low
9	N/C	-	

1. N/C - Not connected

# 5. Parallel Connection

A standard parallel cable (not included in Kit) with DB-25 Female connectors on both ends may be used to connect PC LPT\_X port with LPT port on test board. Test board's DB-25 male connector external view and pinout is shown on the Figure 2.

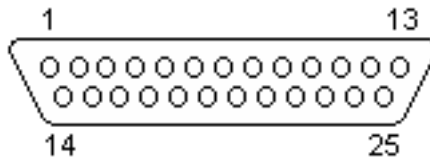


Figure 3. DB-25 Male connector

**Table 3. Connector Specification**

Pin	Signal Name	Dir	Description	Pin	Signal Name	Dir	Description
1	N/C <sup>1</sup>			14	N/C		
2	SPI_CS	I	Chip select for Synchronous Serial Interface. Active low.	15	N/C		
3	N/C			16	N/C		
4	N/C			17	N/C		
5	N/C			18	GND	-	Ground
6	N/C			19	GND	-	Ground
7	N/C			20	GND	-	Ground
8	SPI_MOSI	I	Serial Peripheral Interface data input	21	GND	-	Ground
9	SPI_CLK	I	Serial Peripheral Interface clock	22	GND	-	Ground
10	SPI_MISO	O	Serial Peripheral Interface data output	23	GND	-	Ground
11	N/C			24	GND	-	Ground
12	N/C			25	GND	-	Ground
13	N/C						

1. N/C - Not connected

Please, refer to particular external device parallel port specification to select and use right Serial cable for proper connection.

## 6. Test Pins Connection

### 6.1. PIO (J3)

Pin	Signal Name	Dir	Description	Pin	Signal Name	Dir	Description
1	PIO0	I/O	Control output for external LNA (if fitted)	13	PIO6	I/O	Programmable input/output line or optional WLAN_Active/Ch_Data input for co-existence signaling
2	GND	-	Ground	14	GND	-	Ground
3	PIO1	I/O	Control output for external PA (if fitted)	15	PIO7	I/O	Programmable input/output line
4	GND	-	Ground	16	GND	-	Ground
5	PIO2	I/O	Programmable input/output line	17	PIO8	I/O	Programmable input/output line
6	GND	-	Ground	18	GND	-	Ground
7	PIO3	I/O	Programmable input/output line	19	PIO9	I/O	Programmable input/output line
8	GND	-	Ground	20	GND	-	Ground
9	PIO4	I/O	Programmable input/output line or optional BT_Priority/Ch_Clk output for co-existence signaling	21	PIO10	I/O	Programmable input/output line

## Connection

Test Pins Connection

AIO (J6)

Pin	Signal Name	Dir	Description	Pin	Signal Name	Dir	Description
10	GND	-	Ground	22	GND	-	Ground
11	PIO5	I/O	Programmable input/output line or optional BT_Active output for co-existence signaling	23	PIO11	I/O	Programmable input/output line
12	GND	-	Ground	24	GND	-	Ground

## 6.2. AIO (J6)

Pin	Signal Name	Dir	Description	Pin	Signal Name	Dir	Description
1	AIO0	I/O	Programmable input/output line	4	GND	-	Ground
2	GND	-	Ground	5	AIO2	I/O	Programmable input/output line
3	AIO1	I/O	Programmable input/output line	6	GND	-	Ground

## 6.3. PCM (J7)

Pin	Signal Name	Dir	Description	Pin	Signal Name	Dir	Description
1	PCM_OUT	O	Synchronous data output	5	PCM_SYNC	I/O	Synchronous data sync
2	GND	-	Ground	6	GND	-	Ground
3	PCM_CLK	I/O	Synchronous data clock	7	PCM_IN	I	Synchronous data input
4	GND	-	Ground	8	GND	-	Ground

## 6.4. RESET (J8)

Pin	Signal Name	Dir	Description
1	3V3	O	+3.3 VDC Power Output
2	RESET	I	Reset

## 6.5. 1V8 (J9)

Pin	Signal Name	Dir	Description
1	1V8	O	+1.8 VDC Power Output (for test only)
2	GND	-	Ground

# BLUETOOTH COMMANDS

The built-in user-friendly Command Interface allows user performing a configuration of the unit and read the statistics and information status. To communicate with Bluetooth module, use serial port and any terminal program.

## 1. Switching to Command Mode

+++ This command must be sent to the module just after powered on, within few seconds. After power on, the module waits about 2 seconds for a command: if received, enters in commands mode, otherwise runs normally as master or slave device.

BT0 Quit command mode.

Answers from the module: BTOK or BTERR (error).

## 2. Commands

BTI	Manufacturer Identification
BTI1	Bluetooth Local Name
BTI2	Bluetooth Local Address
BTI3	Firmware Version
BTE0	Disable Echo Mode
BTE1	Enable Echo Mode
BT&NAME=xxxxxx	(max 14 characters) Set Bluetooth Local Name
BT&NAME?	Print Bluetooth Local Name
BT&PIN=xxxxxx	(max 8 characters) Set PIN code
BT&PIN?	Print PIN code
BT&MASTER=x	Set Master mode 0 - disable Master mode (enable Slave mode) 1 - enable Master mode
BT&MASTER?	Print value of Master mode
BT&ADDR=xxxxxx	(12 characters) Set Bluetooth address of far device (for example: BT&ADDR=0018d7000001)

## Bluetooth Commands

### Commands

BT&ADDR?	Print Bluetooth address of far device
BT&CRATE=x	Set Baud Rate of serial port for commands mode
	0 - 9600
	1 - 19200
	2 - 38400
	3 - 57600
	4 - 115200
	5 - 230400
	6 - 460800
	7 - 921600
	8 - 1382400
BT&CRATE?	Print value of Baud Rate for commands mode
BT&DRATE=x	Set Baud Rate of serial port for data mode
	0 - 9600
	1 - 19200
	2 - 38400
	3 - 57600
	4 - 115200
	5 - 230400
	6 - 460800
	7 - 921600
	8 - 1382400
BT&DRATE?	Print value of Baud Rate for data mode
BT&SBIT=x	Set serial port stop bit(s)
	1 - one stop bit
	2 - two stop bits
BT&SBIT?	Print value of serial port stop bit(s)
BT&PRTY=x	Set serial port parity bit
	0 - none
	1 - odd
	2 - even
BT&PRTY?	Print value of serial port parity bit.



# **SAFETY WARNINGS**

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Clean only with a damp cloth.
- Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, or has been dropped.
- Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, shall be placed on the apparatus.

## Safety Warnings

### General Warnings

# 1. General Warnings

This product should never be used:

- Without the user thoroughly understanding operator's manual.
- After disabling safety systems or altering the product.
- With unauthorized accessories.
- Contrary to applicable laws, rules, and regulations.

**DANGER: THE EVALUATION KIT SHOULD NEVER BE USED IN DANGEROUS ENVIRONMENTS.**

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ArWest Communications Corp., Inc. (“Company”) warrants, to the end-user only, that the Narrow Band Radio Modems (“Radios”) purchased (a) conforms to the Company’s published specifications for the model purchased, and (b) is free from defects in material or workmanship. The duration of this warranty is twelve (12) months<sup>1</sup> from date of purchase and any claim for breach of warranty must be brought to the Company’s attention within such twelve (12) month period and the Receiver must be returned for action on any such claim within twelve (12) months from the date of purchase. Within a reasonable period of time after a claim, the Company will correct any failure of the Radio to conform to specifications or any defect in materials or workmanship, or replace the Radio, or, at its option, provide a full refund of the purchase price. A repaired or replaced product is warranted for 90 days from the date of return shipment to the buyer, or for the balance of the original warranty period, whichever is longer. These remedies are the buyer’s exclusive remedies for breach of warranty.

To obtain warranty service, the buyer must return the Radio, postage-paid, with proof of the date of original purchase and the buyer's return address to the Company or an authorized service center. The Company will not be responsible for any loss or damage to the product incurred while it is in transit or is being shipped for repair. It is the buyer's responsibility to arrange for insurance, if the buyer so desires.

The Company does not warrant (a) any product, components or parts not manufactured by the Company, (b) defects caused by failure to provide a suitable installation environment for the Radio, (c) damage caused by disasters such as fire, flood, wind, and lightning, (e) damage caused by unauthorized attachments or modification, (f) damage during shipment, (g) any other abuse or misuse by the buyer, (h) that the Radio will be free from any claim for infringement of any patent, trademark, copyright or other proprietary right, including trade secrets.

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1. The warranty against defects in ArWest adapter, antenna, battery, charger, or cable is 90 days.

## Warranty Terms

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for \_\_\_\_\_

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The manual is well organized.	1	2	3	4	5
I can find the information I want.	1	2	3	4	5
The information in the manual is accurate.	1	2	3	4	5
I can easily understand the instructions.	1	2	3	4	5
The manual contains enough examples.	1	2	3	4	5
The examples are appropriate and helpful.	1	2	3	4	5
The layout and format are attractive and useful.	1	2	3	4	5
The illustrations are clear and helpful.	1	2	3	4	5
The manual is:	too long just right too short				

Please answer the following questions:

Which sections do you use the most? \_\_\_\_\_

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