

XE1201A – QEK

(Quick Evaluation kit)

User's Guide

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Chapter 1

1. GENERAL INTRODUCTION

1.1 Introduction

This first chapter contains general information that will be useful to know before using the XE1201A Quick Evaluation Kit environment.

1.2 Highlights

The information you will gain from this chapter:

- About this Guide
- Warranty Registration
- Recommended Reading
- Troubleshooting
- The XEMICS Internet Web Site
- Customer Support

1.3 About this Guide

This document describes how to use the XE1201A Quick Evaluation Kit to develop and test RF application based on the XM1201A module. The manual layout is as follows:

Chapter 2: Overview and Installation - What XE1201A - QEK is and how it can help you, how to install the hardware.

Chapter 3: XE1201A QEK - Tutorial - A tutorial on using the XEMICS Quick Evaluation Kit with a XM1201A RF Module.

1.3.1 Conventions Used in this Guide

This manual uses the following documentation conventions:

Description	Represents	Examples
Underlined, Italic text with right arrow	A menu selection from the menu bar	File > Save
Bold characters	A window or dialog button to click	OK, Cancel, Next, Back
Characters in angle brackets <>	A key on the keyboard	<Tab>, <Enter>
Italic characters	Referenced documentations	XE1202 Datasheet

Table 1: Documentation Conventions

1.3.2 Documentation Updates

Since the Starter Kit and other XEMICS tools are constantly evolving to meet customer needs, tool descriptions may differ from those in this document. Please refer to our web site at www.xemics.com to obtain the latest documentation available.

1.4 Recommended Reading

This user's guide describes how to use the XE1201A Quick Evaluation Kit. Other useful documents can be found on our web site www.xemics.com/products/XE1200 :

Datasheets (XE12xx)

XEMICS Application notes (AN12xx)

1.5 The XEMICS' Internet Web Site

XEMICS provides on line support on the XEMICS World Wide Web site. The web site is used by XEMICS as a means to make files and information easily available to customers. It is at <http://www.xemics.com>

1.6 Customer Support

Customers should call their distributor, representative or field application engineer for support. Users of XEMICS products can receive assistance through several channels:

Distributors or Representative, Local Sales Office

Field Application Engineer (FAE)

Third party for source code

Chapter 2.

2 OVERVIEW AND INSTALLATION

2.1 Introduction

This chapter gives you an overview of the XE1201A QEK and then explains how to install the system hardware and software.

2.2 Highlights

The items discussed in this chapter include:

- What is the XE1201A QEK
- XE1201A QEK System Components
- How the XE1201A QEK - Helps You
- XE1201A QEK - Kit Components
- Installing XE1201A QEK Hardware

2.3 What is the XE1201A QEK

The XE1201A Quick Evaluation Kit is an environment for the XEMICS XE1201A transceiver. The XE1201A QEK allows the demonstration of a two way communication between two Radio boards, to perform practical "demonstration", "range" and "site survey" testing but also to evaluate the RF transceiver.

This document covers the basic setup and operation for the XE1201A QEK environment.

2.4 XE1201A QEK System Components

The XE1201A QEK system consists of the following items (Figure 1.1)

- Processor Board
- Battery
- XE1201A Module (XM1201A)

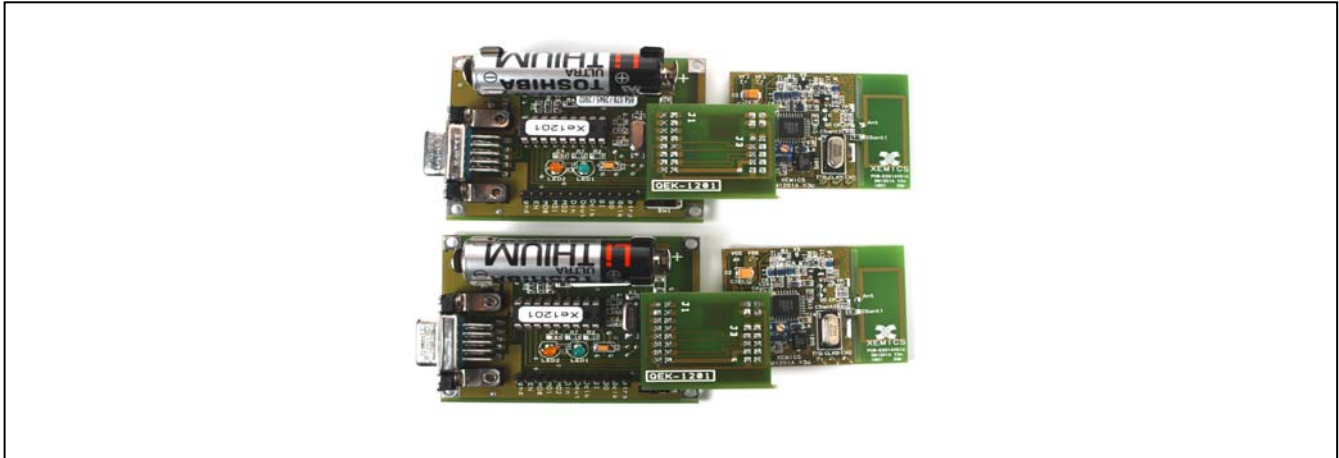


Figure 1.1: XE1201A QEK System Components

The XM1201A is connected to the processor board as shown in the figure 1.1. Note that the XE1201A QEK includes two separate, but identical, module assemblies. Two complete assemblies are required to perform remote two-way communication and can minimize the amount of RF lab equipment required for effective testing.

Full evaluation mode tests require attachment to a PC via an RS232 serial cable for connecting to the desired board.

2.5 How the XE1201A QEK Helps You

XE1201A QEK allows you to:

- Demonstrate a two way communication - Ping Pong Demo with a default configuration
- Configure internal registers of XE1201A transceiver for Evaluation purpose.
- Transmit and receive an external data stream

2.6 XE1201A QEK Kit Components

The components of the XE1201A Quick Evaluation Kit are shown in Figure 1.2.

- 1 – 2 x Processor Board
- 2 – 2 x Adapter Board
- 3 – 2 x batteries
- 4 – 2 x XM1201A - RF Module

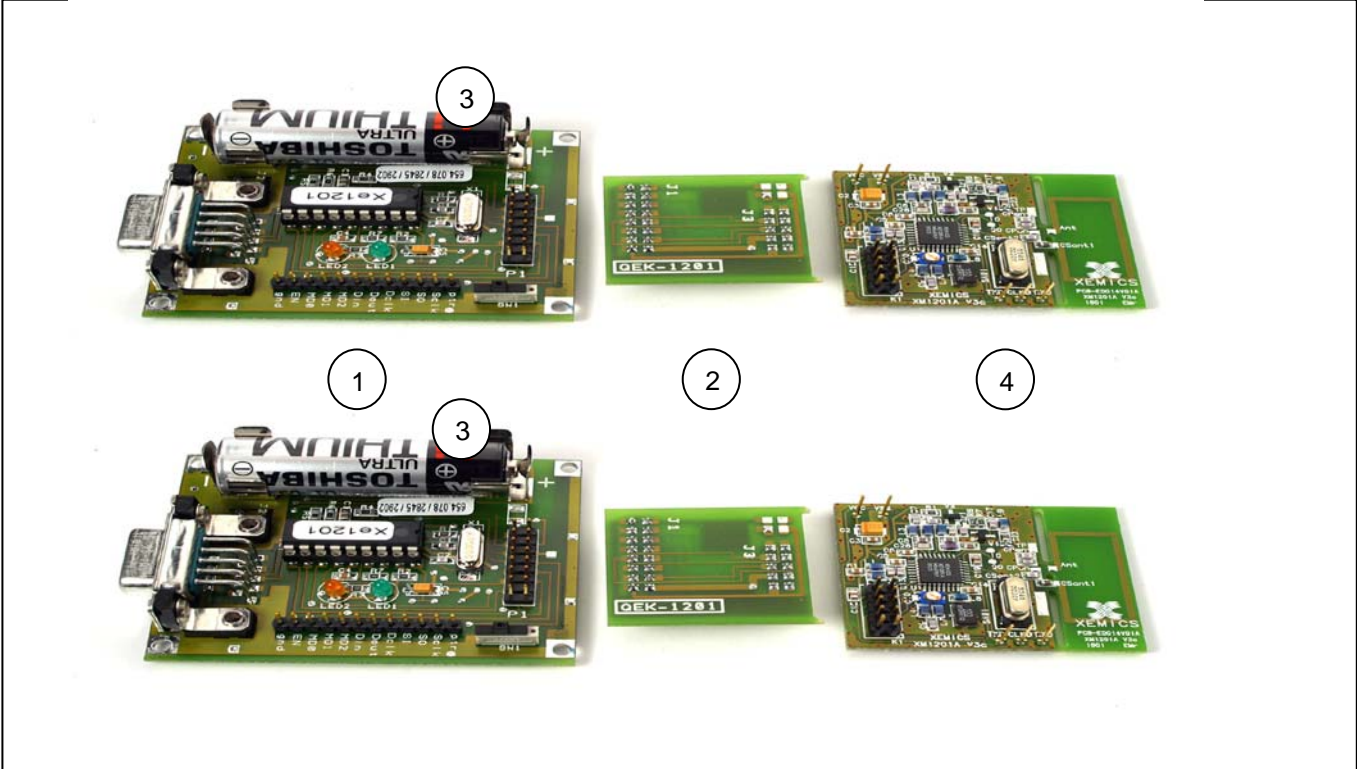


Figure 1.2: XE1201A QEK Components

2.7 Installing XE1201A QEK - Hardware

Follow the steps in this section to install the XE1201A Quick Evaluation Kit



Warning


The main board should not be placed in ON position

Step 1:

Install the AA size battery(s) while observing the polarity indicated on the PCB. The processor board uses an AA size 3.6-volt Lithium battery.

Step 2:

Connect the XM1201A RF module to the processor board via the adapter board as shown in Figure 1.2. Insure that the header pins and socket are aligned and inserted properly.



Note

That step 1 and 2 are the only steps required to perform a Ping Pong demo with the default settings.

Chapter 3

3 XE1201A QEK - TUTORIAL

3.1 Introduction

After installing the XE1201A QEK hardware, you are ready to start using the kit.

3.2 Highlights

- Reviewing Hardware
- System Description
- LED View Scenarios during Power-On mode
- Two Way Wireless Ping-Pong Test Set-Up
- LED View Scenario in Ping-Pong mode
- XE1201A QEK – Test Points

3.3 Reviewing Hardware

The hardware set-up for this tutorial is described below:

- Verify that the power supply is turned off at this time.
- Each XM1201A module is connected to the application board (processor board) via the adapter board.

3.4 System Description

The main objective of this Quick Evaluation Kit is to demonstrate a two way communication between two radio modules. In order to have a high flexibility, the Quick Evaluation Kit board has been developed in order to support to probe the main signals from/ to the XE1201A RF modules.

The Board description is following:

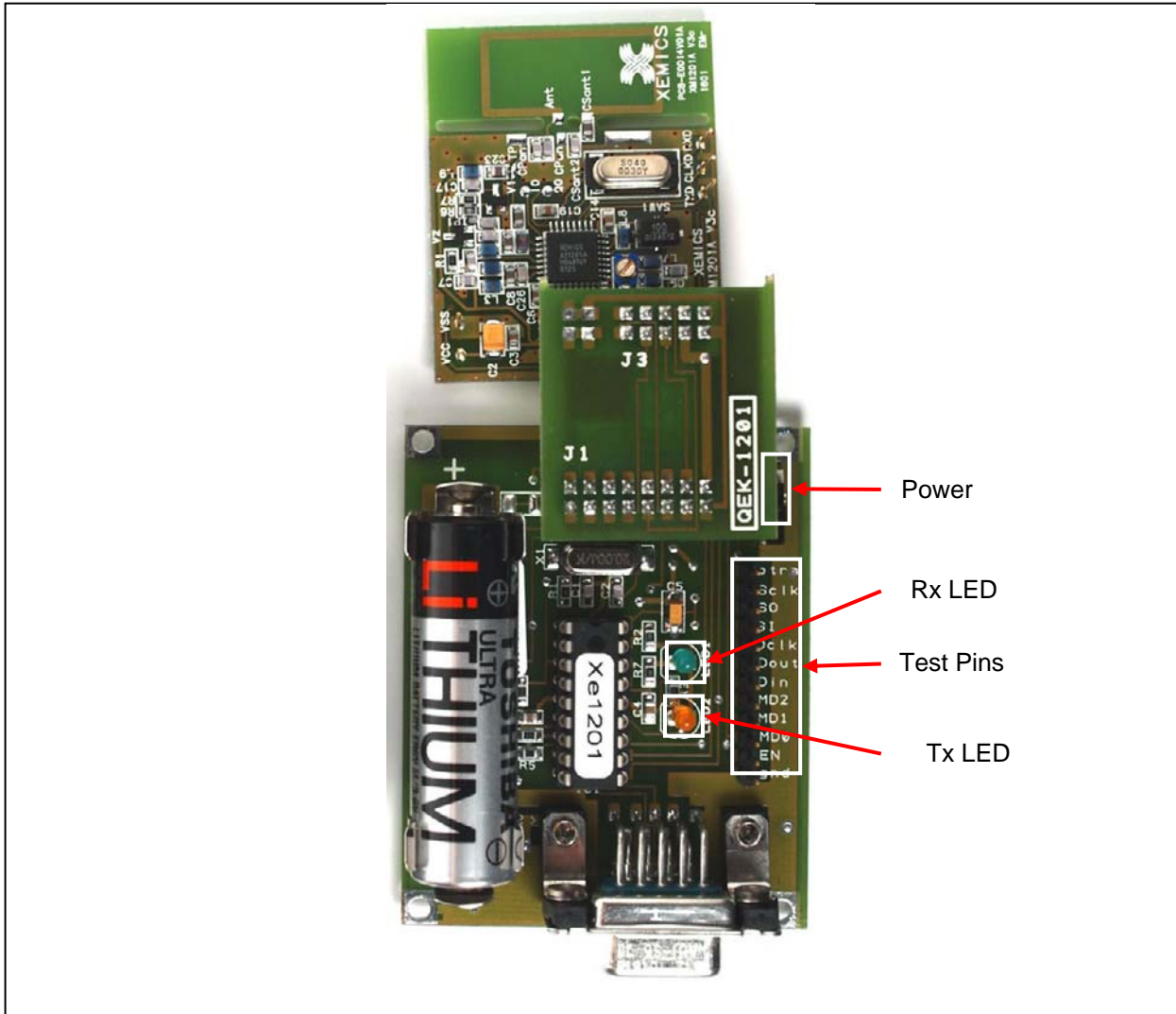


Figure 2.1: Board Overview

Brief narrative of LEDs and push buttons

- Power : Switch on or switch off the power supply
- Tx LED : LED which indicates that the RF transmission
- Rx LED : Led which indicates that a correct message has been received
- Test pins : Probing signals refer to chapter 3.8

3.5 LED View scenarios during Power-On mode

Scenario A:

Green LED blinks one or more times during the first 2.5 seconds after power supply is applied. The Orange LED does not light up.

Explanation:

The blink of the Green LED only indicates that the QEK board is operational (e.g. the Orange LED remains off)

Scenario B:

Neither the Green nor Orange LED lights up when power is applied. This indicates that the QEK board is not operational and is typically due to:

- A power fault (i.e. did not switch on, battery(s) low or not installed properly)
- QEK micro-controller IC improperly installed

Scenario C:

Either the Green or Orange LED or both LEDs light up and remain-on continually. This indicates that the QEK board is not operational and typically due to the micro-controller inserted improperly.

3.6 Two-Way Wireless PING-PONG Test Set-Up

The Ping Pong test provides the user a means to demonstrate practical two-way radio communications between two QEK boards with the XM1201A attached. The Ping-Pong can be a valuable test facility when conducting on-site range tests.

The Ping-Pong test program is embedded within the RISC microcontroller chip on the QEK board. The Ping Pong test is automatically started after the Power-On test completes.

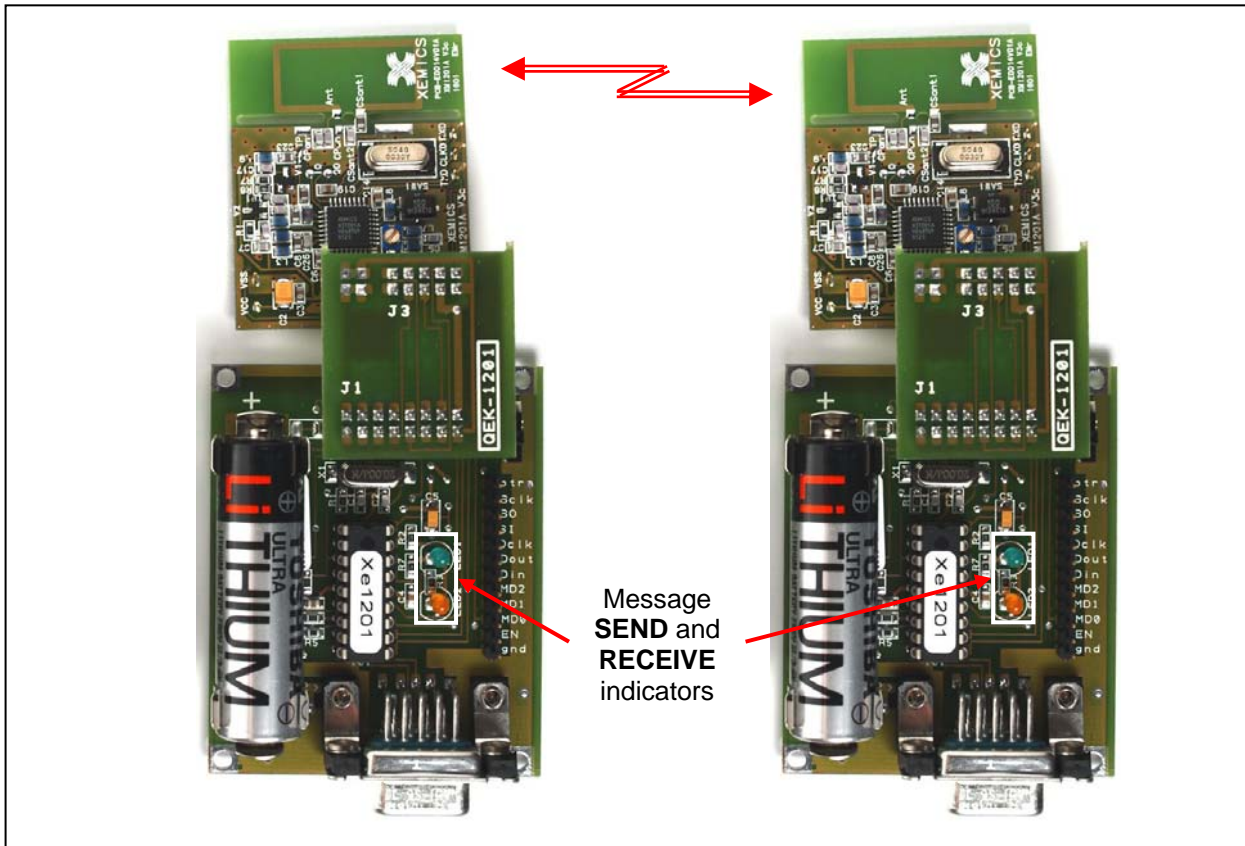


Figure 2.2: Ping-Pong Test Overview

While the Ping-Pong test is in progress, a blink of the:

- Orange LED indicates a radio message is sent.
- Green LED indicates a valid radio message is received

Ping-Pong radio frames are sent at 4800 bps NRZ with the XE1201A bit synchronizer feature enabled. Message frames consist of up to 39 characters (char):

4 Preamble char + 1 Start_of_frame char + 1 Control char + 1 to 32 Data char + 1 Checksum byte

Note:

The preamble consists of 4 x 055hex characters while the Start_of_frame character comprises a single 0F5hex data byte. A char is defined as 10 bits. Two bits are added to each character sent to assure that a data bit/signal transition occurs at least one every 8 bits, a requirement of the Bit_Sync.

3.7 LED View scenarios in Ping Pong mode

Scenario A:

Orange LED blinks (Ping) followed by immediate blink of the Green LED (Pong). The Orange/Green blink sequence (e.g. Ping-Pong) continues without pauses or interruption.

Explanation:

A reliable two-way radio link has been established between two modules. Each module, upon the receipt of a valid radio frame will immediately “echo-back”, keeping the Ping-Pong test sequence continually active. This indicates the desired state or 100% two-way communication reliability.

Scenario B:

Orange LED blinks followed by a delay of approximately 2.5 seconds. The Green LED does not light.

Explanation:

The QEK board being observed is sending frames or Pinging (e.g. Orange LED blinks) but no Pong response is received from the remote unit (e.g. Green LED remains off).

This scenario is typically due to one the following situations:

- Only one QEK board is turned on, no communication partner.
- The QEK’s remote communication partner is out of range or there is excessive noise/interference on the radio channel.
- Both XE1201A communicating devices are sending a frame at the same time. Turn either QEK board off and on again to resolve this condition.

Scenario C:

The Green LED blinks (receipt of a Ping) followed immediately by a blink of the Orange LED that indicating a Pong response to the ping received. The LEDs then remain off for approximately 2.5 seconds before sequence begins again.

Explanation:

This situation indicates that the QEK board being observed is receiving the Ping message from its paired remote module. However his Pong response is not being received correctly by the other QEK communication partner.

This scenario would generally indicates that the remote QEK board is not receiving a valid radio message and therefore “timing-out” and restarting after 2.5 seconds. This would be a typical indication when the maximum usable distance is approached.

This situation could also arise due to slight differences in the QEK module radio XE1201A device’s performance, particularly when the maximum usable distance is approached.

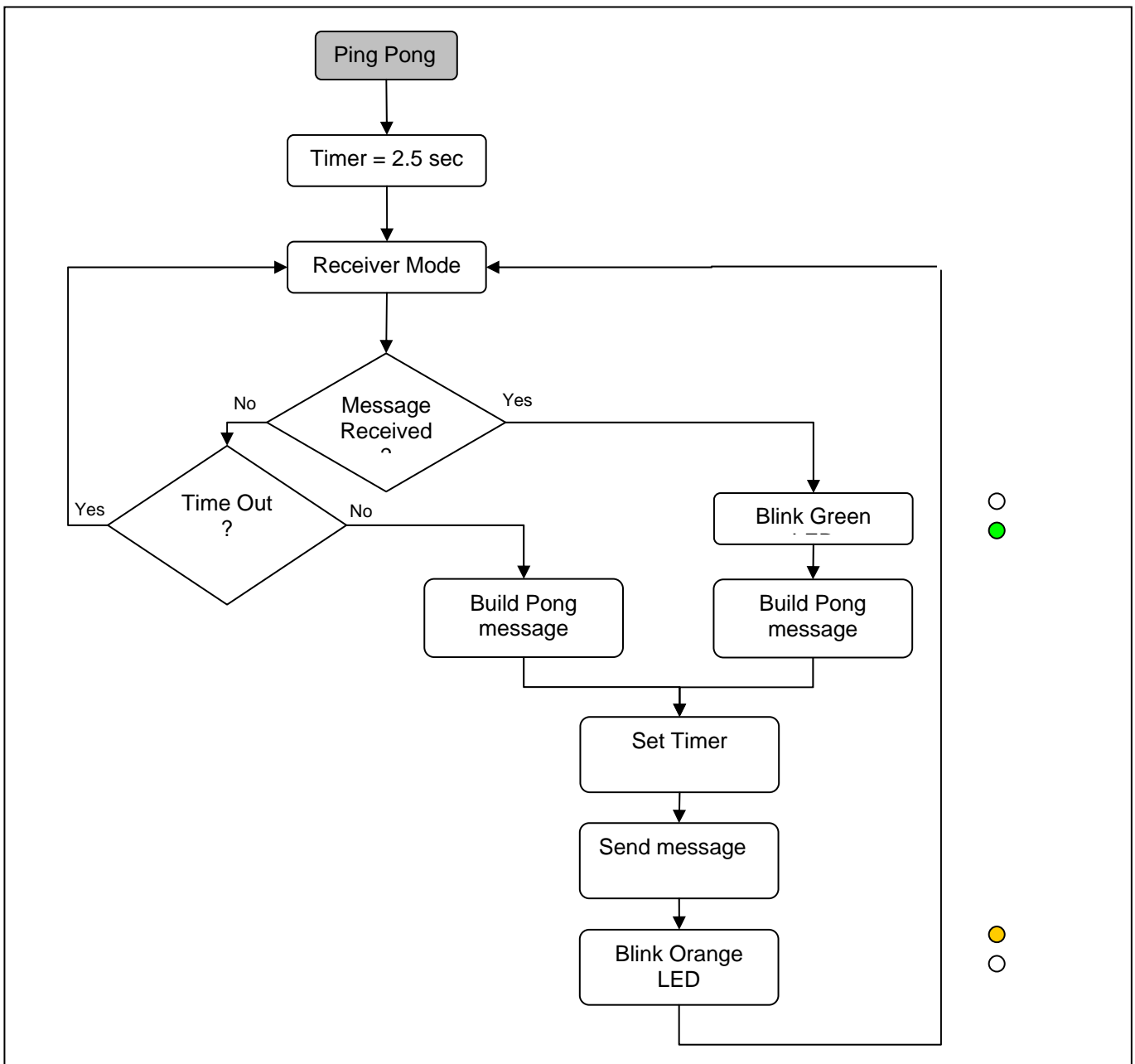


Figure 2.3: Ping-Pong Test Flow Chart

Brief narrative of figure 2.3

- On entry a 2.5 second timer is activated to provide WatchDog function to assure that the Ping-Pong test remains active
- The XM1201A continually monitors for receipt of a radio message being received
- If the radio message is received correctly the Green LED blinks, the timer is re-triggered for 2.5 second timeout and a Pong message is transmitted back to the communication partner (remote QEK). When sending a Pong message the Orange LED lights up and the board receives again.
- If a 2.5second timer expires, it is an indication that no valid message has been received. A Pong message is transmitted in order to re-establish Ping-Pong communications. When sending a Ping message, the Orange LED lights up, the 2.5 second timer is re-triggered and the process begins again.

3.8 XE1201A QEK Test points

Test pins are also provided to allow easier access to the specific XE1201A module signal points. The Figure 2.4 below identifies the test pin layout and signal names.

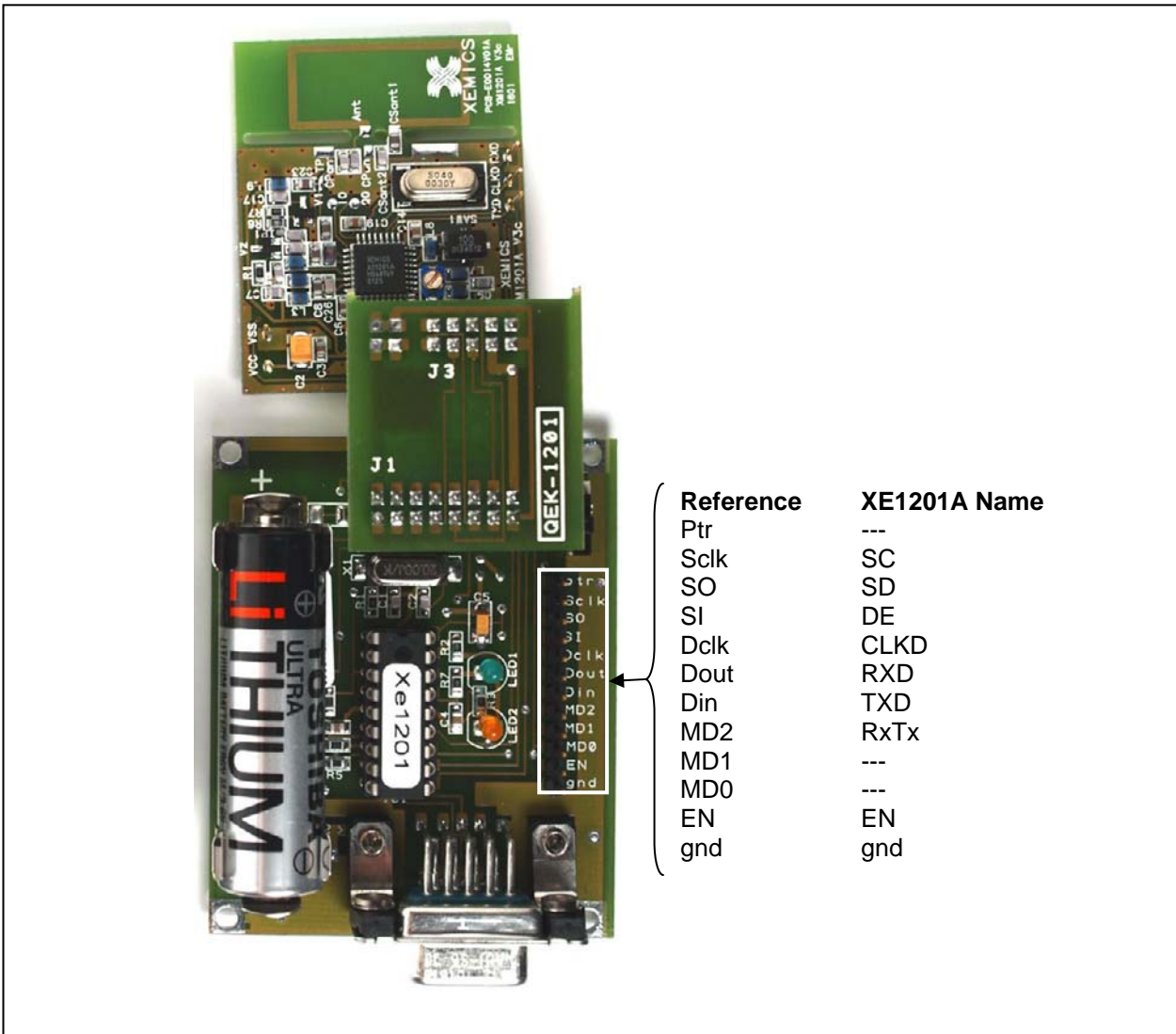


Figure 2.4: Test Pin Layout

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