



BK2401/BK2421

Demo Board

User's Guide

V2.0

CONFIDENTIAL

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Revision History

Version	Date	Author(s)	Description
1.0	2010/01/18	BEKEN	Initial
2.0	2010/04/19	BEKEN	Clear up for BK2401/BK2421 chips

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Content

1. PURPOSE.....	4
2. HARDWARE DESCRIPTIONS	4
3. PACKET TRANSMISSION	5
3.1. PARAMETER	5
3.2. CARRIER AND BER TEST	6
3.3. SINGLE TRANSMISSION	6
3.4. CONTINUOUS TRANSMISSION.....	6
3.5. PER TEST.....	7
4. REGISTER ACCESS(BANK0&BANK1).....	7
4.1 BUTTON FUNCTION	9
4.2 TEST ITEMS	10
5. REFERENCE	10

1. Purpose

BK2401/BK2421 demo board and software are used to verify BK2401/BK2421 chips, which include packet transmission and register access.

2. Hardware Descriptions

Before you start test, please make sure:

- (1) Connect BK2401/BK2421 demo board to PC through USB;
- (2) Connect BK2401/BK2421 RF module to the demo board through 8-PIN SPI connector

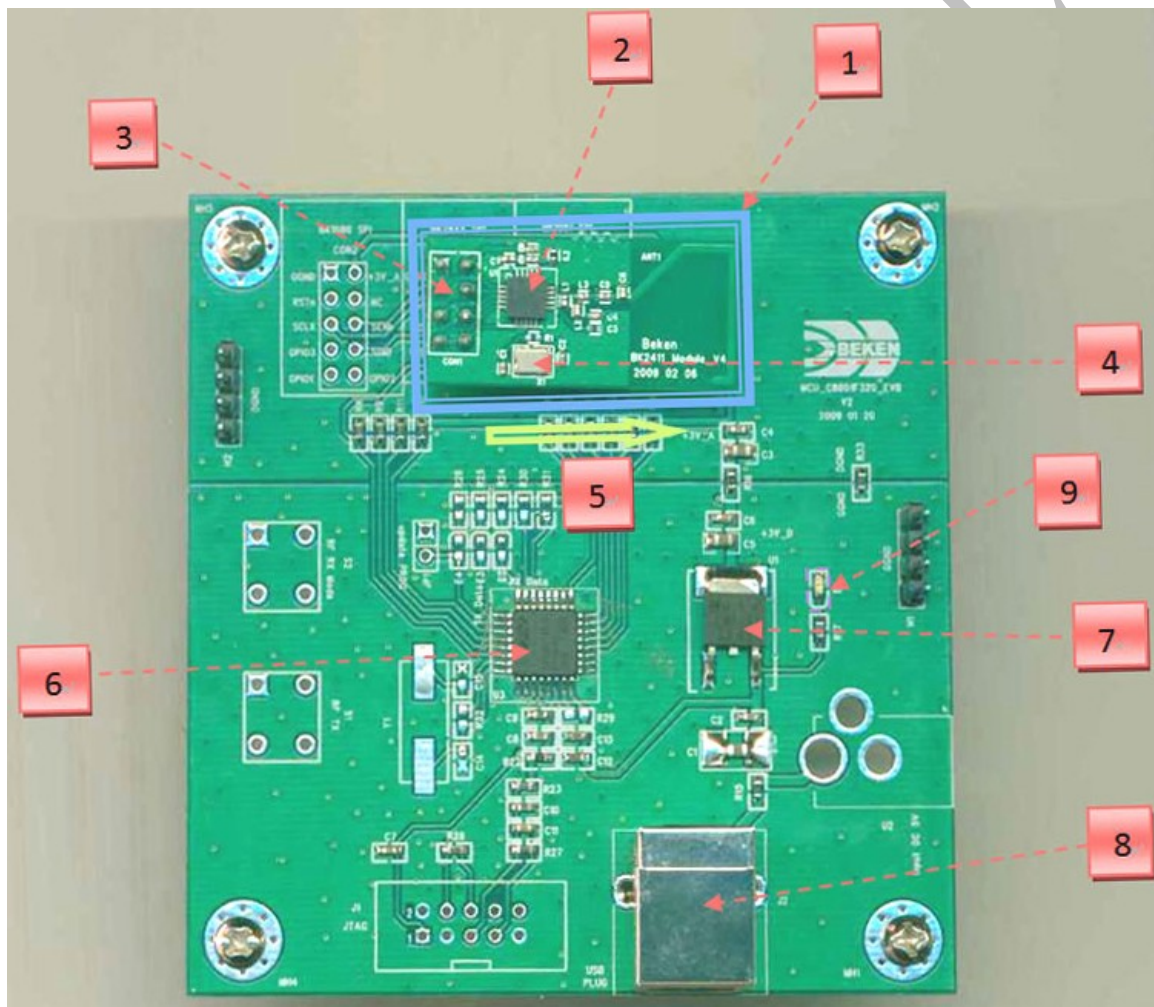


Figure 1 Demo Board

- | | |
|----------------------------|------------------------|
| [1]BK2401/BK2421 RF module | [6]MCU |
| [2]BK2401/BK2421 chip | [7]3.3V LDO(Optional) |
| [3]8-PIN SPI connector | [8]USB Connector |
| [4]16MHz crystal | [9]USB's LED indicator |
| [5]Connection direction | |

3. Packet Transmission

Figure 2 illustrates packet test with ACK/NoACK mode.

As the chip has been initialized by MCU when power on, you can begin transmission test after power on.

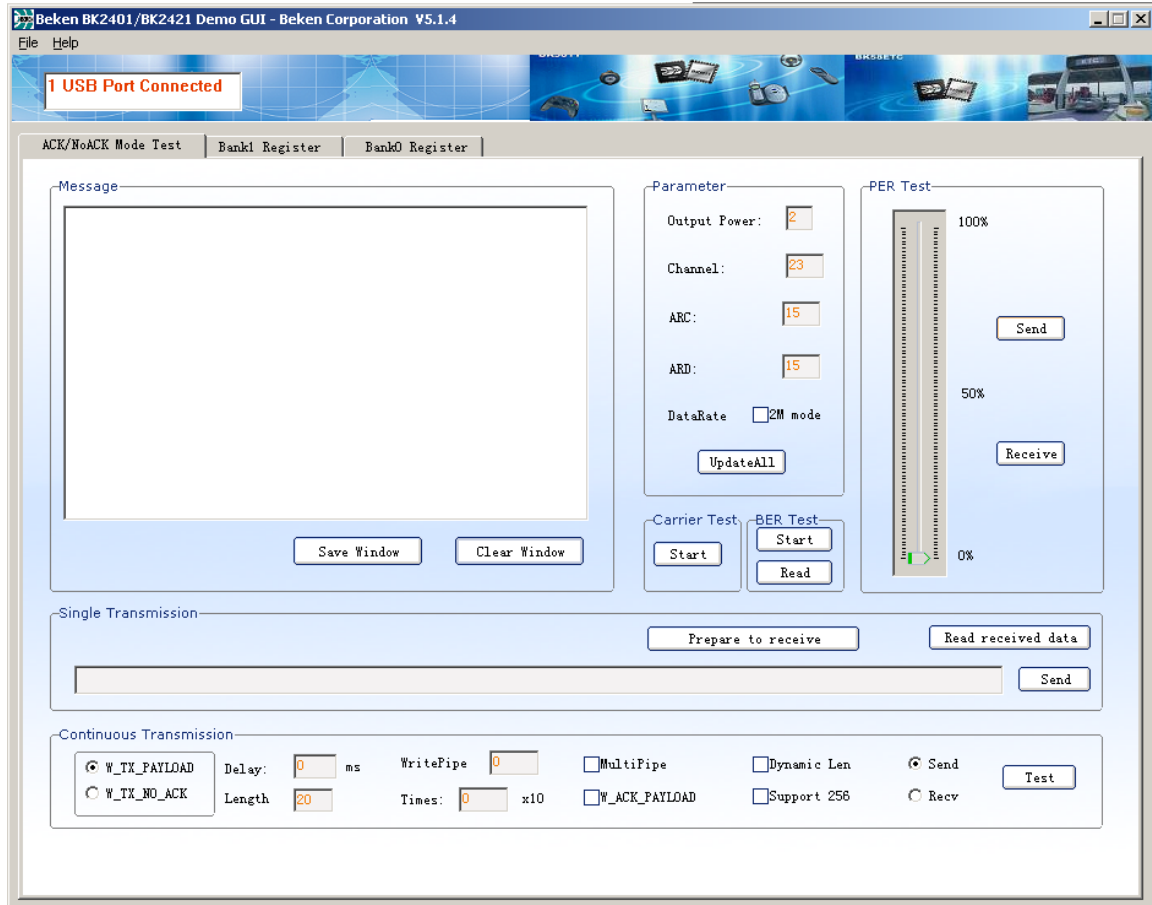


Figure 2 packet test

3.1. Parameter

In the group box “Parameter”, you can do an “Enter” keystroke in the edit box to update one parameter.

When you click the button “UpdateAll”, all the parameters will be updated.

3.1.1. Output Power

You can enter 0,1,2,3 (3 is the max output power) in the edit box on the right of “Output Power:”, and do an “Enter” keystroke to update output power. The default value of output power is 2(about 0dBm).

3.1.2. Channel

Channel number: 0-127 (decimal). The output frequency $f_{rf}=2400\text{MHz}+\text{channel number}$. The default value of channel is 23(2423MHz).



3.1.3. ARC

Auto Retry Counter: 0-15 (decimal)

3.1.4. ARD

Auto Retry Delay: 0-15 (decimal)

3.1.5. DataRate

Date rate: 1Mbps("2M Mode" unchecked), 2Mbps("2M Mode" checked)
2Mbps is only available for BK2421.

3.2. Carrier and BER test

3.2.1. Carrier Test

Carrier test will transmit a CW(Continuous Wave) at the current channel and power, so you can get the accurate transmission power and transmission center frequency.

3.2.2. BER Test

BER test is used to test BER when BK2401/BK2421 receives PN9 signal input.
Click "Start" to start test
Click "Read" to read BER
Input power when BER=0.1% corresponds to sensitivity value.

3.3. Single Transmission

3.3.1. Send

- (1) Enter the data in the input box on the left of the button "send".
- (2) Click the button "send" or do an "Enter" keystroke to send the packet.

Note: when click the button "send" to send packets, MCU would switch chip to the PTX mode automatically.

3.3.2. Receive

- (1) Click the button "Prepare to receive" to make the chip switch to the RX mode.
- (2) Click the "Read received data" button to read packet from RX FIFO.

3.4. Continuous Transmission

In the groupbox "Continuous Transmission",
W_TX_PAYLOAD/W_TX_NO_ACK: select no-acknowledge/ acknowledge transmission mode.

Delay: the delay milliseconds between two packets.

Length: the length of the packet.

WritePipe: the pipe number.

Times: the transmission packet number (*10). For example, you give the value 50, MCU would send 500 packets. If you give the value 0, MCU would send packets ceaselessly until you stop it.

W_ACK_PAYLOAD: enable acknowledge with payload.



Support 256: send or receive 256 bytes length payload. (Not available for BK2401/BK2421)

Dynamic Len: send variable length packets.

Send/Recv: send or receive mode.

3.4.1. Send

- (1) Set parameters: **Delay, Dynamical Len, Length, Times, W_ACK_PAYLOAD.**
- (2) Click the **“Send”** to select as send mode.
- (3) Click the button **“Test”** to start to send the packets. **“Test”** button would be changed to **“stop”** button.
- (4) Click **“stop”** button to stop transmission.

3.4.2. Receive

- (1).Set paramter: **Times.**
- (2).Click the **“Receive”** to select as receive mode.
- (3).Click the button **“Test”** to begin to receive data. **“Test”** button would be changed to **“stop”** button.
- (4).Click **“stop”** button to stop receiving packet. For NoACK mode, you could get the number of the received packets.

3.5. PER Test

At one test program, when click “send” button in the group box “PER Test”, MCU sends 100 packets per times.

At another test program, when click “receive” button in the group box ”PER Test”,MCU receives packets and calculate the received packet numbers.

4. Register Access (Bank0&Bank1)

Figure 3 shows the Bank0 register. Figure 4 shows the Bank1 register.

In Figure 3, the button “Bank0/Bank1” is used to select Bank0 or Bank1 register bank, ”Bank0/Bank1” in the group box ”Status(REG7)” indicates the current Bank0/Bank1 status, you can also read REG7 to check the current “Bank0/Bank1” status.

1 indicates Bank1 mode, you can access Bank1 register.

0 indicates Bank0 mode, you can access Bank0 register.

Before you access register, please check the current “Bank0/Bank1” status.

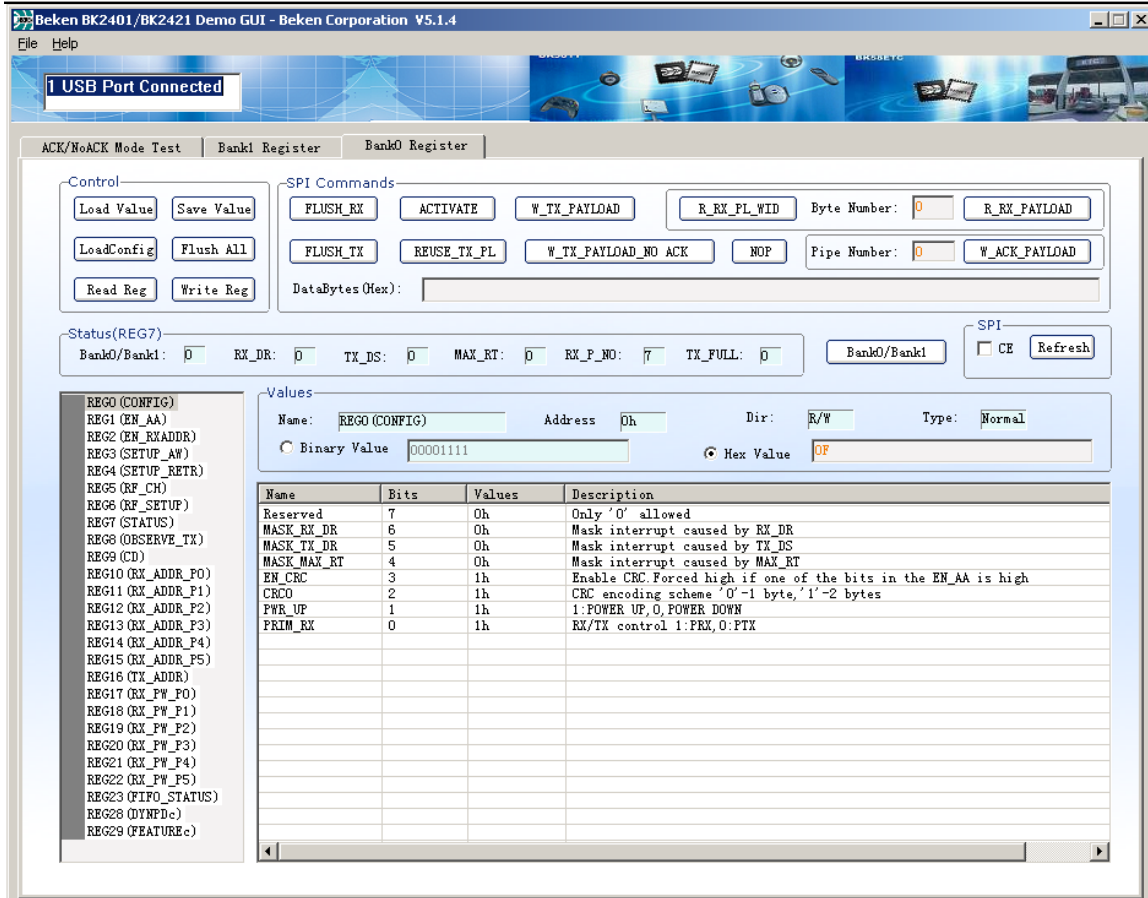


Figure 3 Bank0 Register

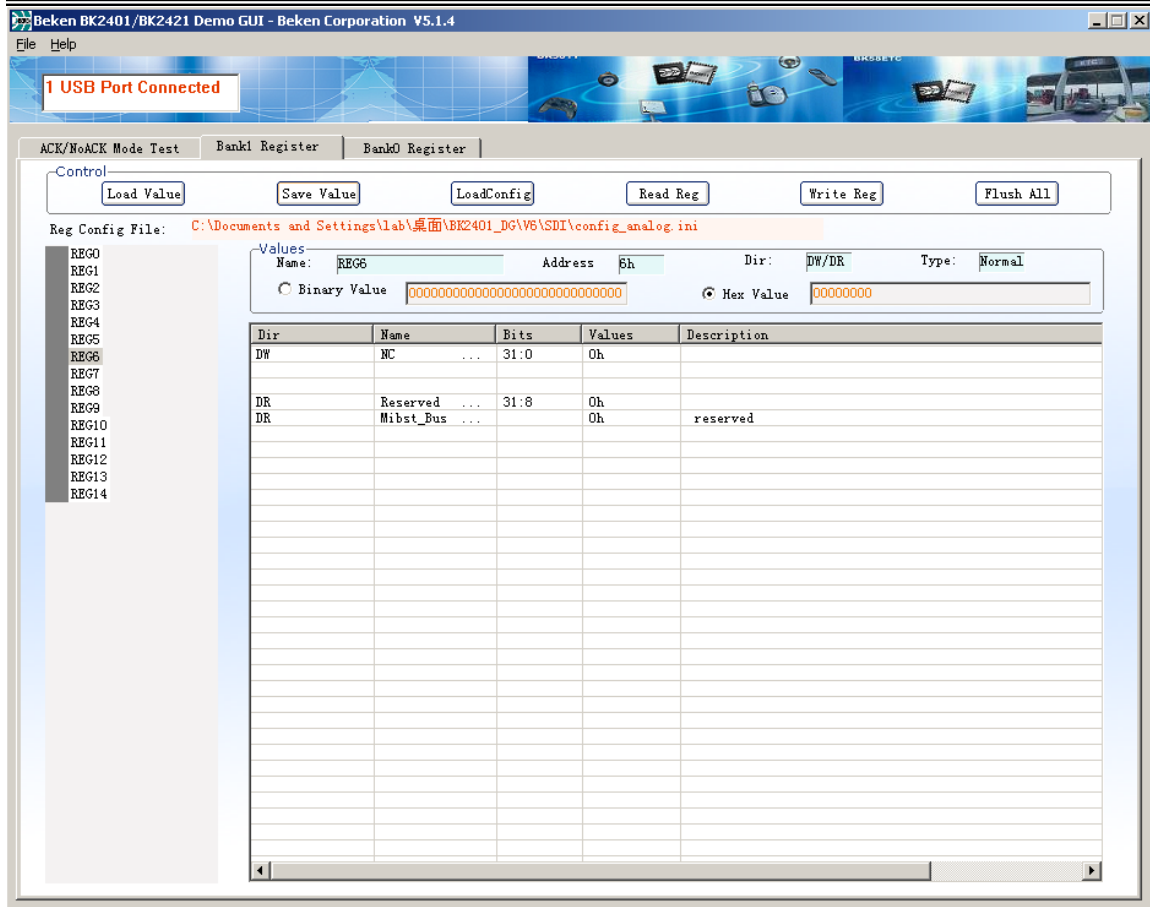


Figure 4 Bank1 Register

4.1 Button function

(1). Control

Load Value: Load a register value file to the program for “Flush All”.

Save Value: Save all registers.

Write Reg: Update a register.

Flush All: Update all the registers.

Read Reg: Read a register.

(2). Status (REG7):

CE Combox check: Click to select or unselect CE.

Refresh: Update CE value from Hardware CE port.

(3). SPI Commands

FLUSH_RX: Flush RX buffer

FLUSH_TX: Flush TX buffer.

ACTIVATE: Do ACTIVATE command

REUSE_TX_PL: REUSE the last packet.

W_TX_PAYLOAD: Send a packet with ACK.

W_TX_PAYLOAD_NO_ACK: Send a packet with NoACK.

NOP: Nop, only return status.

R_RX_PL_WID: Get the length of received data.

R_RX_PAYLOAD: Get received data.



W_ACK_PAYLOAD: Fill an ACK-with payload packet for transmission when received a packet.

4.2 Test Items

4.2.1. Read a register

- (1) Click the register number in the register tree control.
- (2) Push "Read Reg" button.
- (3) Check the register value after the radio button "Binary Value" or "Hex Value".

4.2.2. Write a register

- (1) Click the register number in the register tree control.
- (2) Enter the value of the written register in the input field after the radio button "Binary Value" or "Hex Value".
- (3) Push "Write Reg" button, or do an "Enter" keystroke.

4.2.3. Load register configuration file and register value file

- (1) Click button "LoadConfig" to open a register configuration file.
- (2) Click button "Load Value" to open a register value file.

4.2.4. Send data

- (1).Fill DataBytes (Hex) with data.
- (2).Click button W_TX_PAYLOAD to send an ACK packet, or click button W_TX_PAYLOAD_NO_ACK to send a NoAck packet.

4.2.5. Receive data

- (1).Click R_RX_PL_WID to get length of the received data.
- (2).Click R_RX_PAYLOAD to read received data.

5. Reference

[1].BK2401/BK2421 Datasheet v2.0