RTL8723BU EEPROM Content

Date: 2014/02/12
Version: 02

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Lists of Tables

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Modification History

Version	Data	Author	Change
V001	2013/05/29	JackieLau	1. Initial Release
V002	2014/02/12	Jerry Chou	1. Add 0xC3 bit[6] setting for single antenna path selection.

1. EEPROM (eFuse) Contents

The RTL8723BU is embedded an internal non-volatile memory called eFuse. The eFuse emulates the structure of a usual EEPROM such as 93C46. We will describe the content and its addressing of the eFuse as we did in 93C46 and will mix the terms of EEPROM and eFuse in the following text,. After the initial power on or auto-load command to the eFuse, the RTL8723BU performs a series of EEPROM read operations from the EEPROM addresses 00h to 7Fh. The definition of each EEPROM byte is shown as the below.

Note: It is suggested to obtain Realtek approval before any change on the default settings of the EEPROM.

1.1 WLAN Controller EEPROM Contents Spec

Table 1.1 WLAN Controller EEPROM (eFuse) Contents

Bytes	Contents	Description	Value
00h	29h	These 2 bytes contain the ID code word for the RTL8723BU. The RTL8723BU will load the contents of the EEPROM into the corresponding location if the ID word is correct.	8129h
01h	81h		
02h ~ 0Fh	Reserved	Reserved for Realtek. Do not change this field without Realtek's approval.	-
10h	Path A 2.4G CCK-1TX Power Index (Absolute Value)	Path A CCK Power Index for Ch 1,2, Range 0~63.	2Dh
11h		Path A CCK Power Index for Ch 3, 4, 5, Range 0~63.	2Dh
12h		Path A CCK Power Index for Ch 6, 7, 8, Range 0~63.	2Dh
13h		Path A CCK Power Index for Ch 9, 10, 11, Range 0~63.	2Dh
14h		Path A CCK Power Index for Ch 12, 13, Range 0~63.	2Dh
15h		Path A CCK Power Index for Ch 14, Range 0~63.	2Dh
16h	Path A 2.4G BW40-1S TX Power Index (Absolute Value)	Path A 2G BW40-1S Power Index for Ch 1, 2, Range 0~63.	2Dh
17h		Path A 2G BW40-1S Power Index for Ch 3, 4, 5, Range 0~63.	2Dh
18h		Path A 2G BW40-1S Power Index for Ch 6, 7, 8, Range 0~63.	2Dh
19h		Path A 2G BW40-1S Power Index for Ch 9, 10, 11, Range 0~63.	2Dh
1Ah		Path A 2G BW40-1S Power Index for Ch 12, 13, 14 Range 0~63.	2Dh

<table>
<tr><th>Bytes</th><th>Contents</th><th>Description</th><th>Value</th></tr>
<tr><td>1Bh</td><td>Path A 2.4G BW20-1S TX Power Index Difference OFDM-1 TX Power Index Difference</td><td>Power Index Difference between BW20-1S and BW40-1S.
Bit[7:4] : Path A 2G Offset, Range –8~7.
Power Index Difference between OFDM-1Tx and BW40-1S.
Bit[3:0] : Path A 2G Offset, Range –8~7.</td><td>02h</td></tr>
<tr><td>1Ch~39h</td><td>Reserved</td><td>Reserved for Realtek.</td><td>-</td></tr>
<tr><td>3Ah</td><td rowspan="6">Path B 2.4G CCK-1TX Power Index (Absolute Value)</td><td>Path B CCK Power Index for Ch 1,2, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>3Bh</td><td>Path B CCK Power Index for Ch 3, 4, 5, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>3Ch</td><td>Path B CCK Power Index for Ch 6, 7 ,8, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>3Dh</td><td>Path B CCK Power Index for Ch 9, 10, 11, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>3Eh</td><td>Path B CCK Power Index for Ch 12, 13, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>3Fh</td><td>Path B CCK Power Index for Ch 14, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>40h</td><td rowspan="4">Path B 2.4G BW40-1S Tx Power Index (Absolute Value)</td><td>Path B 2G BW40-1S Power Index for Ch 1, 2, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>41h</td><td>Path B 2G BW40-1S Power Index for Ch 3, 4, 5, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>42h</td><td>Path B 2G BW40-1S Power Index for Ch 6, 7 ,8, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>43h</td><td>Path B 2G BW40-1S Power Index for Ch 9, 10, 11, Range 0~63.</td><td>2Dh</td></tr>
<tr><td>44h</td><td></td><td>Path B 2G BW40-1S Power Index for Ch 12, 13, 14 Range 0~63.</td><td>2Dh</td></tr>
<tr><td>45h</td><td>Path B 2.4G BW20-1S Tx Power Index Difference
Path B 2.4G OFDM-1Tx Power Index Difference</td><td>Pwower Index Difference between BW20-1S and BW40-1S.
Bit[7:4]: Path B 2G Offset, Range –8~7.
Pwower Index Difference between OFDM-1Tx and BW40-1S.
Bit[3:0]: Path B 2G Offset, Range –8~7.</td><td>02h</td></tr>
<tr><td>46h~B7h</td><td>Reserved</td><td>Reserved for Realtek.</td><td>-</td></tr>
<tr><td>B8h</td><td>Channel Plan</td><td>Bit[7]: Software configure mode
0h: Enable software configure(refer to Channel Plane Domain Code)
1h: Disable software configure(can't change Channel Plan Setting)
Bit[6:0]: Channel Plan
<table>
<tr><th>Domain Code</th><th>eFuse Value</th><th>Channels</th><th>Descriptio</th></tr>
<tr><td>2G_WORLD</td><td>20h</td><td>1~13</td><td>Worldwird 13</td></tr>
<tr><td>2G_ETSI1</td><td>21h</td><td>1~13</td><td>Europe 2G</td></tr>
<tr><td>2G_FCC1</td><td>22h</td><td>1~11</td><td>US 2G</td></tr>
<tr><td>2G_MKK1</td><td>23h</td><td>1~13, 14</td><td>Japan 2G</td></tr>
<tr><td>2G_ETSI2</td><td>24h</td><td>10~13</td><td>France 2G</td></tr>
<tr><td>2G_Global</td><td>41h</td><td>1~13, 14</td><td>Global domain</td></tr>
</table></td><td>20h</td></tr>
<tr><td>B9h</td><td>Crystal Calibration</td><td>X’TAL calibration Value
Bit[5:0], Xi=Xo Range 0~3F h.
Bit[7:6]: reserved
FF h = 00 h</td><td>20h</td></tr>
</table>

Bytes	Contents	Description	Value
BAh	Thermal Meter	Thermal Meter Default Value System maker will calibrate a value and save it in EEPROM. Bit[7:0]: Thermal Meter Value	1Eh
BBh	Reserved	Reserved for Realtek.	00h
BCh	2G and 5G PA Type	2G PA Bit[7]: Path-D Internal/External PA 0h: Internal PA (or no 2.4G PA) 1 h: External PA Bit[6]: Path-C Internal/External PA 0h: Internal PA (or no 2.4G PA) 1h: External PA Bit[5]: Path-B Internal/External PA 0h: Internal PA (or no 2.4G PA) 1h: External PA Bit[4]: Path-A Internal/External PA 0h: Internal PA 1h: External PA 5G PA Bit[3]: Path-D Internal/External PA 0h: Internal PA (or no 5G PA) 1 h: External PA Bit[2]: Path-C Internal/External PA 0h: Internal PA (or no 5G PA) 1h: External PA Bit[1]: Path-B Internal/External PA 0h: Internal PA (or no 5G PA) 1h: External PA Bit[0]: Path-A Internal/External PA 0h: Internal PA (or no 5G PA) 1h: External PA	00h
BDh	2G LNA Type and Gain Selection	Bit[2:0]: 2G path-A external LNA Gain, used to modify DIG mechanism 0h~7h: External LNA, 8~22dB with 2dB/step Bit[3]: 2G Path-A Internal/External LNA 0h: Internal LNA 1h: External LNA Bit[6:4]: 2G path-B external LNA Gain, used to modify DIG mechanism 0h~7h: External LNA, 8~22dB with 2dB/step Bit[7]: 2G Path-B Internal/External LNA 0h: Internal LNA (or no 2.4G LNA) 1h: External LNA	00h
BEh~C0h	Reserved	Reserved for Realtek.	FFh

Bytes	Contents	Description	Value
C1h	Board Options	Bit[2:0]: Regulatory selection. 0h: driver-defined maximum power offset for longer communication range. (refer to Power by rate table) 1h: Power limit table-defined maximum power offset range. (refer to Power by rate table and Power limit table to take the smaler index value) 2h: not support power offset by rate. (Don't refer to Power by rate table) 3h (Only for 8188EE) : driver-defined maximum power offset for longer communication range(refer to table_0 in PHY_REG_PG.txt). Besides, both 0h & 1h also were refer to Power by rate table PHY_REG_PG.txt in currently. 4h~7h: reserved Bit[3]: Non-interrupt Antenna Diversity 0: disable 1: enable Bit[4]: reserved Bit[7:5]: Module Type 0h: WiFi solo module 1h: WiFi+BT combo module 2h: PCIe Card 3h~7h: reserved.	29h
C2h	Feature Options	Bit[1:0]: function configuration of pin_LED0 and pin_LED1 Bit[3:2]: Link Speed shown in OS 0h: Current Tx PHY Rate 1h: Current Rx PHY Rate 2h: Maximum RX PHY Rate 3h: reserved Bit[4]: power down mode selection 0: radio off 1: power down Bit[5]: Enable bluetooth coexistence 0: Disable 1: Enable Bit[6]: Enable WoWLAN 0: Disable 1: Enable Bit[7]: Enable WAPI support 0: Disable 1: Enable	20h

Bytes	Contents	Description	Value
C3h	Antenna Setting	Bit[0]: Total antenna number 0: 2-Antenna (default) 1: 1-Antenna Bit[5:3]: reserved Bit[6]: Single antenna path 0: Single antenna use S1 (default) 1: Single antenna use S0 Bit[7]: reserved	10h
C4h	Version	The EEPROM content version.	00h
C5h	Customer ID	Customer ID (0x00 and 0xFF are reserved for Realtek)	00h
C6h	2G Tx BB Swing Setting	Bit[1:0]: 2G PathA OFDM 0h: 0dB (default) 1h: -3dB 2h: -6dB 3h: -9dB Bit[3:2]: 2G PathB OFDM 0h: 0dB (or no 2G Path) 1h: -3dB 2h: -6dB 3h: -9dB Bit[5:4]: 2G PathC OFDM 0h: 0dB (or no 2G Path) 1h: -3dB 2h: -6dB 3h: -9dB Bit[7:6]: 2G PathD OFDM 0h: 0dB (or no 2G Path) 1h: -3dB 2h: -6dB 3h: -9dB	00h
C7h	Reserved	Reserved for Realtek.	FFh
C8h	Tx Power Calibratior Rate	Bit[0]: 2G 40M Tx Power Calibrator Rate. 0h : HT40, MCS7 64QAM (default) 1h : VHT40, MCS9 256QAM Bit[1]: 5G 40M Tx Power Calibrator Rate. 0h : HT40, MCS7 64QAM (default) 1h : VHT40, MCS9 256QAM Bit[7:2]: reserved	00h
C9h	Reserved	Reserved for Realtek.	FFh
CAh	Reserved	Reserved for Realtek.	FFh
CBh~CFh	Reserved	Reserved for Realtek.	FFh
D0h~FFh	Reserved	Reserved for Realtek.	-
100h~101h	VID	USB Vender ID	0BDAh
102h~103h	PID	USB Product ID	B720h

Bytes	Contents	Description	Value
104h	USB optional function_0 (SIE)	Bit[0]: USB Serial number Bit[1]: USB remote wakeup function Bit[2]: Device power Bit[3]: Earliest time when downstream port assert Chirp K. Bit[4]: Chirp K duration Bit[5]: Enable autoload UPHY Bit[6]: FS/HS Time Out check when set Bit[7]: Enable autoload Manufacture String & Product String	E7h
105h	USB optional function_1 (SIE)	Bit[0]: Link Power Management(LPM) support (0 : Disable, 1 : Enable) Bit[3:1] : Suspend Timing (default 011b:suspend timing = 3.05ms) Bit[4] : RSVD Bit[5] : SuperSpeed USB Device Capability Descriptor support selection (0:Disable, 1:Enable) Bit[6] : Response to ACK or NYET if HIRD value should be less than 300us. (0:NYET, 1:ACK) Bit[7] : Always response to NYET packet	47h
106h	TXQ, RXQ, INTQ EP setting (SIE)	Bit[1:0] : 00 : 3EP - RxQ + TXQ0 + TXQ1, 01 : 4EP - RxQ + INTQ + TXQ1 + TXQ2, 10 : 5EP - RxQ + INTQ + TXQ1 + TXQ2 + TXQ3. 11 : 6EP - RxQ + INTQ + TXQ1 + TXQ2 + TXQ3 + TXQ4. Bit[2] : RSVD Bit[3] : BESL enable Bit[7:4] : RSVD	03h
107h~10Ch	MAC address	WiFi MAC address	00E04CB72301h
10Dh~143h	Manufacture String & Product String	Manufacture String & Product String	
144h~146h	Reserved	Reserved for Realtek.	-
147h		WiFi INT EP interval & BT information	0Fh

1.2 Bluetooth Controller EEPROM Contents Spec

Table 1.2 Bluetooth Controller EEPROM (eFuse) Contents

Bytes	Contents	Description	Value
00h ~ 3Bh	Reserved	Reserved for Realtek. Do not change this field without Realtek's approval.	-
3Ch ~ 41h	bt_bd_addr[6]	BT BD address (unique in each device).	xxh, xxh, xxh, 4Ch, E0h, 00h
42h ~ 81h	bt_local_name[64]	BT local name.	'R', 'T', 'K, '_', 'B', 'T', '_', '4', '.', '0', '\0', FFh (x 53)
82h ~ 3F3h	Reserved	Reserved for Realtek. Do not change this field without Realtek's approval.	-