PIXIE User Manual

1.General Description

PIXIE is a highly integrated single-chip 802.11n Wireless LAN (WLAN) USB 2.0 Multi-Function network interface controller with integrated Bluetooth 2.1/3.0/4.0 controller. It combines a WLAN MAC, a 1T1R capable WLAN baseband, and RF in s single chip. The RTL8723BU provides a complete solution for a high-performance integrated wireless and Bluetooth device. The integration provides better coordination between 802.11 and Bluetooth, and with sophisticated dynamic power control and packet traffic arbitration, RTL8723BU is able to provide the best coexistence performance Overview.

General

- IEEE 802.11b/g/n 1T1R WLAN and Bluetooth single chip

Host Interface

- Complies with USB2.0 for WLAN and BT controller
- USB Multi-Function for both BT (USB function 0) and WLAN (USB function 1)
- USB LPM/ USB SS supported

WLAN Controller

- CMOS MAC, Baseband PHY, and RF in a single chip for IEEE 802.11b/g/n compatible WLAN
- Integrated Balun and DPDT
- Complete 802.11n solution for 2.4GHz band
- 72.2Mbps receive PHY rate and 72.2Mbps transmit PHY rate using 20MHz bandwidth
- 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth
- Backward compatible with 802.11b/g devices while operating in 802.11n mode
- IEEE 802.11b/g/n compatible WLAN
- IEEE 802.11e QoS Enhancement (WMM)
- IEEE 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services
- WAPI supported
- Switch diversity for DSSS/CCK
- Packet based hardware antenna diversity
- Selectable receiver FIR filters
- Programmable scaling in transmitter and receiver to trade quantization noise against increased probability of clipping
- Fast receiver Automatic Gain Control (AGC)

Other Features

- Supports Wake-On-WLAN via Magic Packet and Wake-up frame
- Support S3/S4 AES/TKIP group key update
- Support Win8 Network List Offload
- Support TCP/UDP/IP checksum offload

Bluetooth Controller

- Compatible with Bluetooth v2.1 and v3.0 Systems
- Supports Bluetooth 4.0 Low Energy(BLE)
- Integrated MCU to execute Bluetooth protocol stack
- Supports all packet types in basic rate and enhanced data rate
- Supports 4 piconets in a scatternet
- Supports Secure Simple Pairing
- Supports Low Power Mode (Sniff/Sniff Sub-rating/Hold/Park)
- Enhanced BT/WIFI Coexistence Control to improve transmission quality in different

WLAN MAC Features

- Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU)
- Low latency immediate High-Throughput Block Acknowledgement (HT-BA)
- PHY-level spoofing to enhance legacy compatibility
- Multi MACID support with Fast Channel switch
- Channel management and co-existence
- Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth
- WiFi Direct supports wireless peer to peer applications

WLAN PHY Features

- IEEE 802.11n OFDM
- One Transmit and one Receive path (1T1R)
- 20MHz and 40MHz bandwidth transmission
- Support 2.4GHz band channels
- Short Guard Interval (400ns)
- DSSS with DBPSK and DQPSK, CCKmodulation with long and short preamble
- OFDM with BPSK, QPSK, 16QAM, 64QAM modulation.

Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6

- Maximum data rate 54Mbps in IEEE 802.11g; and 150Mbps in IEEE 802.11n

profiles

- Bluetooth 4.0 Dual Mode support: Simultaneous LE and BR/EDR
- Supports multiple Low Energy states
- Support 3D Glasses application
- Support Intel Latency Tolerance Reporting (LTR)

Bluetooth Transceiver

- Fast AGC control to improve receiving dynamic range
- Supports AFH to dynamically detect channel quality to improve transmission quality
- Integrated internal Class 1, Class 2, and Class 3 PA
- Bluetooth 3.0+HS compliant
- Supports Enhanced Power Control
- Supports Bluetooth Low Energy
- Integrated 32K oscillator for power management

Peripheral Interfaces

- General Purpose Input/Output (8 pins)
- 4-wire EEPROM control interface (93C46)
- Three configurable LED pins
- Flexible XTAL frequency selection(52, 48, 40, 38.4, 27, 26, 25, 24, 20, 19.2, 17.664, 16, 14.318, 13 and 12MHz)
- Support XTAL or external clock input

2.General Specification

Model	PIXIE
Product Name	WLAN 11b/g/n USB2.0 module
Major Chipset	Realtek RTL8723BU
Standard	WIFI: IEEE802.11n 、IEEE 802.11g、IEEE 802.11b BT :V2.1/BT V3.0/BT V4.0
Data Transfer Rate	1,2,5.5,6,11,12,18,22,24,30,36,48,54,60,90,120 and maximum of 150Mbps
Modulation Method	DSSS,DBPSK, DQPSK, CCK and OFDM (BPSK/QPSK/16-QAM/ 64-QAM)
Frequency Band	2.400GHz ~ 2.4835 GHz
Spread Spectrum	IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum) ,CCK(Com plem e ntary Code Keying) IEEE 802.11g/n:OFDM (Orthogonal Frequency Division Multiplexing)
Operation Range	Up to 180 meters in open space
OS Support	Windows 2000,XP32-64,Vista 32/64,Win7 32/64,Linux,Mac, Android, WIN CE
Security	WEP, TKIP, AES, WPA, WPA2
Bus Interface	WiFi：USB2.0 BT: USB2.0
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States；13: (Ch. 1-13) – Europe ； 14: (Ch. 1-14) – Japan BT 2.4GHz: Ch. 0 ~78
Power Consumption	3.3 V ±0.2V I/O supply voltage
Operating Temperature	-10 ~ +70° C ambient temperature
Storage Temperature	-10 ~ 70°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Dimension	13. 4 x 12. 2 x 1.6mm (LxWxH) +-0.2MM

FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT

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.

CAUTION:

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

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.

RF exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Information for the OEMs and Integrators：

This device is intended only for OEM integrators under the following conditions：

The module can be used to installation in other host.

the transmitter module may not be collocated with any other transmit or antenna. The module shall be only used with the integral antenna(s) that has been originally tested and certified with this module. As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirement with this module installed (for example, digital device emission, PC peripheral requirements, etc.)

The final end product must be labeled in a visible area with the following: ”Contains FCC ID: TFJPIEIX-W”. The equipment complies with FCC RF exposure limits set forth for an uncontrolled environment. The equipment must not be co-located or operating in conjunction with any other antenna or transmitter.