Wireless Cables Inc.
2880 Zanker Rd, Suite 203
San Jose, CA 95134
Phone: (408) 850-1884
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Bluetooth Module

AIRcable SMD, AB5C1

USER GUIDE

V1.1

Federal Communication 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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this 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.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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This mobile device is intended for general use.

THE TRANSMITTING ANTENNA MUST BE LOCATED MORE THAN 20cm AWAY FROM THE BODY OF USER AND NEAR BY PERSON.

1) The transmitter module may not be co-located with any other transmitter or antenna. As long as condition 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 requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

The final end product must be labeled in a visible area with the following:
"Contains FCC ID: SQCAB5C1".

Manual Information That Must be Included

The users manual must include the following information in a prominent location:

IMPORTANT NOTE:

This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled nvironment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

Example Sticker:

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Description

Wireless Cables Inc. provides various Bluetooth products. They are suitable for customers to exploit them to implement Bluetooth functionality into PCs. The features of Bluetooth USB interface list as below:

Features

Model Name AB5C1
Standard Bluetooth v2.1
Frequency Band 2.4~2.4835GHz unlicensed ISM band
Spread Spectrum FHSS (Frequency Hopping Spread Spectrum)
RF Output Power Class 1 (18.91 dBm)
DC power 5V or Lithium battery
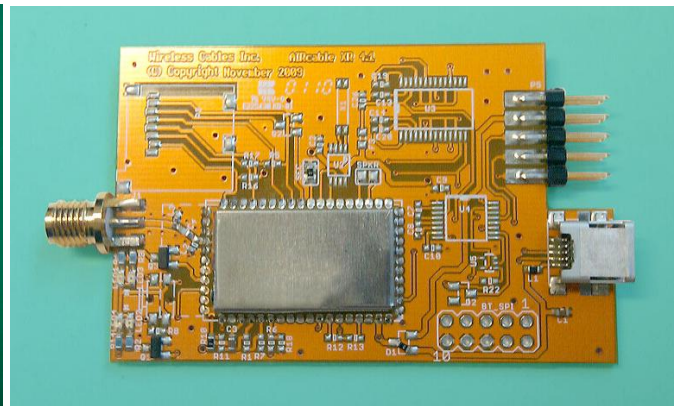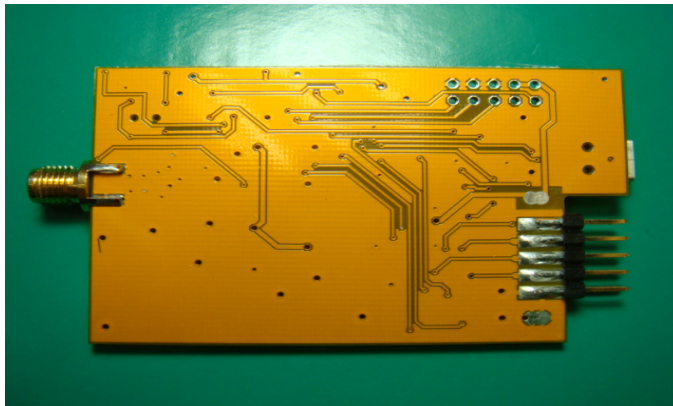I/O Interface
USB Compliant USB V2.1
Overair Baud rate 720kBit/s,
Audio intput and output, differential
16 PIO, 2 AIO, asynchronous and synchronous serial
Dimension 25 x 14.5 mm

Photos

AIRcable SMD AB5C1 V2 Datasheet

The AIRcable SMD

The Wireless Programmable Micro-Controller (W-PLC) with the Powerful AIRcable Operating System

The AIRcable SMD

Actual Size

24.5mm x 14.5mm x 2.5mm

Powerful wireless functions, high secutiry

Simultaneous master and slave connections

Allow and control incoming Bluetooth connections

Make outgoing connections to SPP, FTP and OBEX

Disable and enable Bluetooth profiles SPP, FTP and OBEX

Mesh network capable

Wireless Programmable Micro-Controller (W-PLC)

Runs applications in BASIC on the AIRcable OS

Easy, wireless software development and deployment

Data logging functions, up to 32kByte

Analog, digital, 2-wire and serial sensor interfaces

Single Processor Solution

Very low hardware cost

Ultra low power consumption (<50uA with OS running)

Ideal solution for wireless sensors, smart dust, motes

Benefits of the AIRcable SMD

Powerful wireless functions, high security

Single processor solution (one chip plus memory)

connects to various sensors

Very low hardware costs

Ideal solution for "smart dust" or "motes"

Compatible with all Bluetooth devices

Easy software development and deployment

Customizable (with or without file system, max
  BASIC code size, built-in functions etc.)

The **AIRcable SMD** is an intelligent, autonomous, wireless micro-controller with Bluetooth communication capability for applications running on its AIRcable Operating System. It conforms to Bluetooth V2.1+EDR and supports simultaneous master and slave connection modes, 2 serial port profiles, file transfer client and server, OBEX client and server and an audio channel.

The **AIRcable SMD** can be programmed and configured wirelessly via easy text file transfer.

The **AIRcable SMD** runs applications in BASIC that can be used in products for wireless cable replacement, mesh sensor and control network applications (motes), for reading sensors, logging data, controlling equipment and communicating wirelessly to other devices such as AIRcable devices, cell phones, PDAs, laptops and PCs based on the Bluetooth standard.

Please visit our web site for details about writing applications for the **AIRcable SMD**.
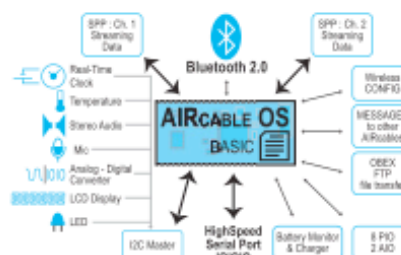
http://www.aircable.net/smd

Software Specification

BASIC Interpreter
Line numbers: 1-2047
Line length: 32 characters
Loop nesting: 6
Subroutines: 8 levels
Expressions: -32768 to 32767, 16-bit
Variables: 25, 'A' - 'Y', variable 'Z' used for debugging
String variable: $0 volatile 80 bytes long
String variables: $1-$2047, 32 byte length
Character size: 8 bit
Expression parser recursive, maximum of 5 levels
File system: BASIC and config file independent
PIN code limit: 15 characters
Programmable from other AIRmote devices
Programm load from standard file system

Event Handling
PIN code request
Incoming SPP connection
Outgoing SPP connection success
Sensor readings (connection quality, temperature, analog input)
Incoming vNote through OBEX
Inquiry results
SPP control indicator (DTR signal)
PIO change event
Timer messages

Interrupt Routines
2 levels: high priority interrupt: stops BASIC program execution
low priority: schedules execution

Bluetooth
Bluetooth 2.1 certified, with 802.11 tolerance
EDR supported where available

Profiles
master and slave mode simultanously
Two SPP profiles for streaming data at the same time
OBEX/FTP for file transfer of BASIC and config file
FTP server profile
OBEX vNote item transfer for messages
OBEX vCard business card exchange
OBEX server and OBEX client profile
up to 4 multiple connections at the same time
Security control, pairing and un-pairing functions

Certifications
Bluetooth certified (BQB)
FCC and IC module certification
CE certified
RoHS compliant

Sensor Interfaces
Parallel IO ports, 16 ports TTL level, 5V tolerant
Security overwrite port
2 analog input

UART configurable 1200 to 1382400 baud, parity and stop bits
I2C master interface, fast mode
SPI via general purpose PIO

Built-in Functions
powerful high level Bluetooth functions, slave connect, master, send biz card,
hardware control, pio input/output, uart, baud rate, sensor, date string operations, hex and ascii conversion, compare, length input and output, on 2 SPP, 1 UART, files and virtual string data logging
LCD 8 character display via I2C

File system
access to application BASIC program
read/write configuration file
wireless file transfer (OBEX), up/downloadable

Performance
max 2000 lines per second
standard: 100 lps
scheduler resolution 10ms
max 350kBit/s streaming data
recommended max average: none
fastest connect time < 2s
FTP file system: 16 kbps,

Radio
Device name configurable
Bluetooth class configurable
Max and default transmit power configurable
Scan modes configurable to as low as 30uA power consumption
Sniff mode configurable (soon)

Firmware
112000 words code size operating system
RTOS for baseband radio

Customizations
additional embedded functions
audio profiles (audio gateway, headset, handsfree)
networking profiles (TCP)
web server

Hardware Specification

Processor
BlueCore 5MM with DSP, 8BMit internal flash, 512kBit EEPROM

Size
14.5 mm x 24.5 mm

Pins
vertical 2 rows of 18 pins, 2 horizontal rows of 11 pins
spaced 1.27 mm
SMD pad mounted

Uart
1200 to 1382400 baud, 3.3V TTL level, 5V tolerant

Antenna connection
50 Ohm Impedance

Power Supply
5V regulated stand-alone
Lithium rechargeable battery, 4.2V, 100-500mAH
3V primary cells

Battery Charger
25mA-100mA configurable Lithium battery charger
requires current protected Lithium rechargeable batteries

Power consumption
30uA sleep, 11mA with connection, up to 250mA peek

Input and Output
16 digital input/output lines (3.3V TTL, 5V tolerant)
2 analog input lines (0-1.8V)
2 LED current sinks, 4.2V tolerant

Asynchronous serial
1200-1382400 bps, 8 bit, none-odd-even parity, 1 or 2 stop bits

Radio
raw output power: 20dBm
receiver sensitivity: -96dBm
range 200m

Sensor Interfaces
real time clock DS1372
temperature sensor TC54
16bit adc ADS1112
LCD controller PCF8562
general I2C and SPI master

Certifications
Bluetooth certified (BQB)
Bluetooth 2.1 Standard (802.11b tolerant)
FCC module certification
CE certification (pdf)