

# The AIRcable SMD

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

### Powerful wireless functions, high security

- 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

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**.

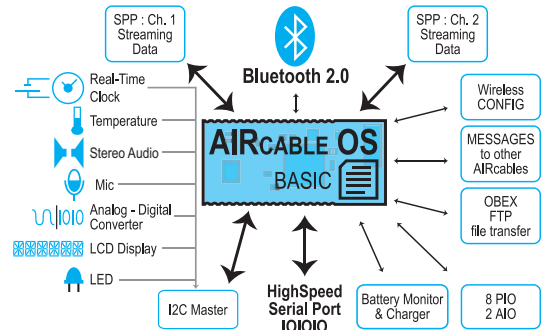
<http://www.aircable.net/smd>

### The AIRcable SMD

#### Actual Size



31mm x 14.5mm x 2.5mm



### 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.)



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 Bluetooth is a registered trademark of the Bluetooth SIG.  
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## Software Specification

<b>BASIC Interpreter</b>	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 AIRremote devices Programm load from standard file system
<b>Event Handling</b>	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
<b>Interrupt Routines</b>	2 levels: high priority interrupt: stops BASIC program execution low priority: schedules execution
<b>Bluetooth</b>	Bluetooth 2.1 certified, with 802.11 tolerance EDR supported where available
<b>Profiles</b>	master and slave mode simultaneously 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
<b>Certifications</b>	Bluetooth certified (BQB) FCC and IC module certification CE certified RoHS compliant

<b>Sensor Interfaces</b>	Parallel IO ports, 11 ports TTL level, 5V tolerant Security overwrite port 2 analog input 1 analog output UART configurable 1200 to 1382400 baud, parity and stop bits I2C master interface, fast mode SPI via general purpose PIO
<b>Built-in Functions</b>	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
<b>File system</b>	access to application BASIC program read/write configuration file wireless file transfer (OBEX), up/downloadable
<b>Performance</b>	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,
<b>Radio</b>	Device name configurable Bluetooth class configurable Max and default transmit power configurable Scan modes configurable to as low as 100uA power consumption Sniff mode configurable (soon)
<b>Firmware</b>	48000 words code size RTOS for baseband radio
<b>Customizations</b>	additional embedded functions audio profiles (audio gateway, headset, handsfree) networking profiles (TCP) web server

## Hardware Specification

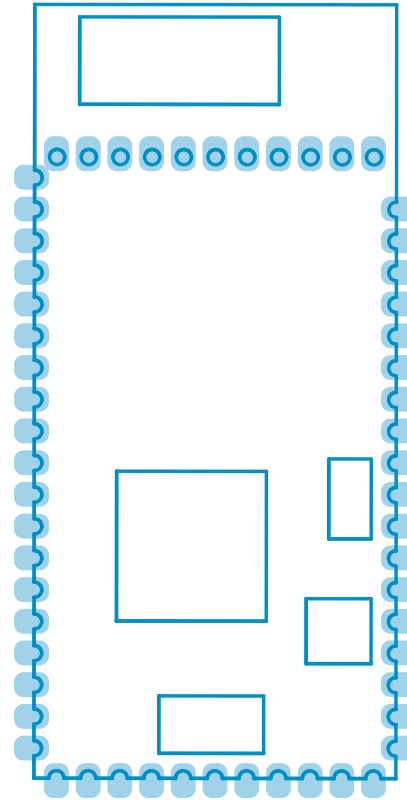
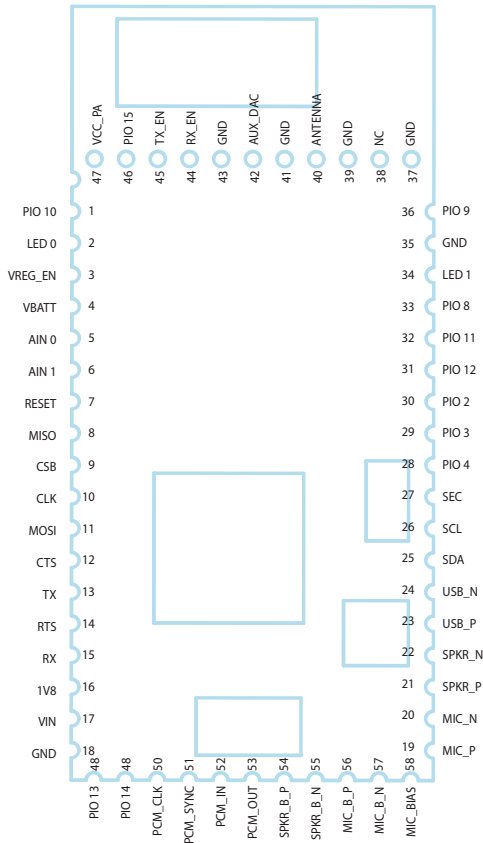
<b>Processor</b>	BlueCore 5MM with DSP, 8BMIT internal flash, 512kBit EEPROM
<b>Size</b>	14.5 mm x 31 mm with antenna
<b>Pins</b>	vertical 2 rows of 11 pins spaced 1.27 mm SMD pad mounted
<b>Uart</b>	1200 to 1382400 baud, 3.3V TTL level, 5V tolerant
<b>Internal ceramic antenna</b>	5.5dBm transmit power
<b>Power Supply</b>	5V regulated stand-alone Lithium rechargeable battery, 4.2V, 100-500mAh 3V primary cells
<b>Battery Charger</b>	25mA-100mA configurable Lithium charger requires current protected Lithium rechargeable batteries

<b>Power consumption</b>	50uA sleep, 11mA with connection, 25mA peek, max range peeks up to 70mA
<b>Input and Output</b>	12 digital input/output lines (3.3V TTL, 5V tolerant) 2 analog input lines (0-1.8V) 2 LED current sinks, 4.2V tolerant
<b>Asynchronous serial</b>	1200-1382400 bps, 8 bit, none-odd-even parity, 1 or 2 stop bits
<b>Radio</b>	raw output power: 5.5dBm receiver sensitivity: -90dBm range 20m
<b>Sensor Interfaces</b>	real time clock DS1372 temperature sensor TC54 16bit adc ADS1112 LCD controller PCF8562 other sensors available upon request
<b>Certifications</b>	Bluetooth certified (BQB) Bluetooth 2.0 Standard (802.11b tolerant) FCC module certification CE certification (pdf)



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## Terminal Description



**PCB Landing Pattern**

Pad Size is 1mm x 1.4mm

1	PIO(10)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program
2	LED(0)	O	Supply	Charger LED, current sink, 4.2V tolerant
3	VREG_EN	I	Supply	>2.2V enables the voltage regulator
4	VBATT	I/O	Supply	LiIon or LiPol battery, positive terminal
5	AIO(0)	I	Analog	Analog input 0-1.8V
6	AIO(1)	I	Analog	Analog input 0-1.8V
7	RESET	I	3.3V TTL	Active high reset
8	MISO	I	3.3V TTL	SPI firmware programming
9	CSB	I	3.3V TTL	SPI firmware programming
10	CLK	I	3.3V TTL	SPI firmware programming
11	MOSI	O	3.3V TTL	SPI firmware programming
12	CTS	I	3.3V TTL	Uart clear to send
13	TX	O	3.3V TTL	Uart async serial output
14	RTS	O	3.3V TTL	Uart request to send
15	RX	I	3.3V TTL	Uart async serial input
16	1V8	O	Supply	1.8V power supply output
17	VIN	I	Supply	Battery charger input, 4.5V – 5.75V
18	GND		Supply	Ground

## Terminal Description (cont.)

19	MIC_P	I	Analog	Microphone input plus
20	MIC_N	I	Analog	Microphone input minus
21	SPKR_P	O	Analog	Speaker output plus
22	SPKR_N	O	Analog	Speaker output minus
23	USB_DP	I/O	3.3V TTL	USB data plus
24	USB_DN	I/O	3.3V TTL	USB data minus
25	SDA	I/O	3.3V TTL	I2C master data
26	SCL	O	3.3V TTL	I2C master clock
27	SEC	I	3.3V TTL	Security overwrite
28	PIO(4)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program
29	PIO(3)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program
30	PIO(2)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program
31	PIO(11)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program
32	PIO(12)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program
33	PIO(8)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program
34	LED(1)	O	Supply	LED output, current sink, 4.2V tolerant
35	GND		Supply	Ground
36	PIO(9)	I/O	3.3V TTL	general purpose input or output pin defined by the BASIC program

## RF Port Description

For versions of the AIRcable SMD without antenna, only use the antenna port with a 50 Ohm trace to an external antenna. The other ports are designed for use with an external power amplifier. Contact Wireless Cables Inc. for these version.

37	GND		Supply	Ground
38	RF_IN	I	Analog	RF input, for class 1
39	GND		Supply	Ground
40	ANTENNA	I/O	Analog	RF antenna connector, 50 Ohm impedance
41	GND		Supply	Ground
42	AUX_DAC	O	Analog	Analog Output (not for class 1)
43	GND		Supply	Ground

44	RX_EN	O	3.3V TTL	radio receiver on
45	TX_EN	O	3.3V TTL	radio transmitter on
46	PIO 15	I/O	3.3V TTL	general purpose
47	VCC_PA		Supply	regulator input 2.0-5.0V
48	PIO 13	I/O	3.3V TTL	general purpose
49	PIO 14	I/O	3.3V TTL	general purpose
50	PCM_CLK	I/O		synchronous data clock
51	PCM_SYNC	I/O		synchronous data sync
52	PCM_IN	I		synchronous data input
53	PCM_OUT	O		synchronous data output
54	SPKR_B_P	O		speaker output positive, right
55	SPKR_B_N	O		speaker output negative, right
56	MIC_B_P	I		microphone input positive, right
57	MIC_B_N	I		microphone input negative, right
58	MIC_BIAS	O		microphone bias



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