

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>



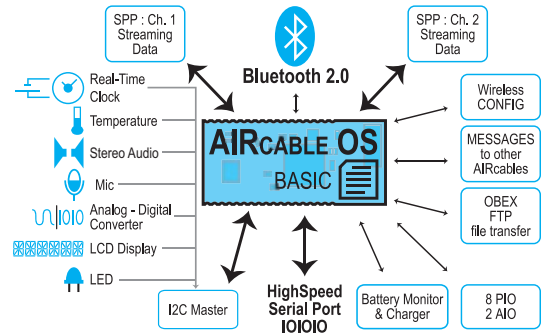
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The AIRcable SMD

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

| | |
|---------------------------|---|
| Sensor Interfaces | 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 |
| 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 100uA power consumption Sniff mode configurable (soon) |
| Firmware | 48000 words code size RTOS for baseband radio |
| Customizations | additional embedded functions audio profiles (audio gateway, headset, handsfree) networking profiles (TCP) web server |

Hardware Specification

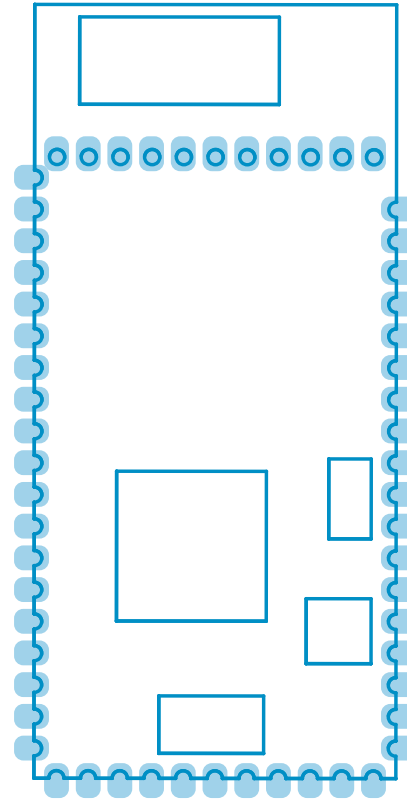
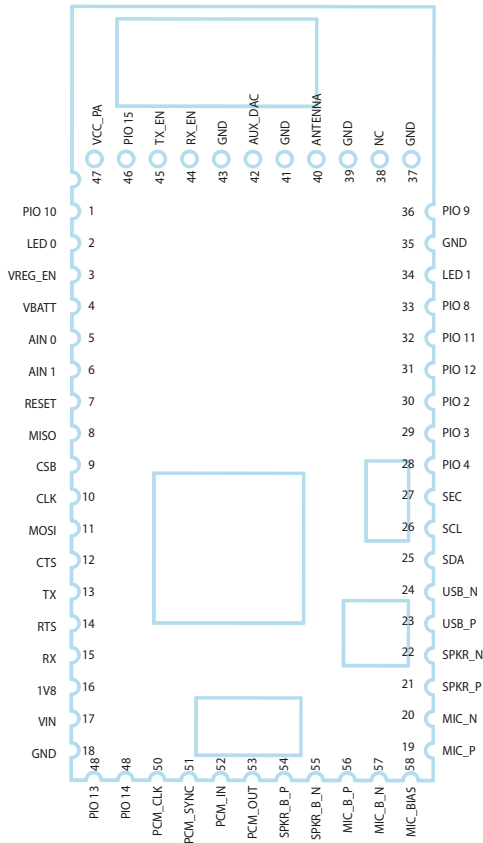
| | |
|---------------------------------|--|
| Processor | BlueCore 5MM with DSP, 8BMIT internal flash, 512kBit EEPROM |
| Size | 14.5 mm x 31 mm with antenna |
| Pins | vertical 2 rows of 11 pins spaced 1.27 mm SMD pad mounted |
| Uart | 1200 to 1382400 baud, 3.3V TTL level, 5V tolerant |
| Internal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

| | |
|----------------------------|--|
| Power consumption | 50uA sleep, 11mA with connection, 25mA peak, max range peeks up to 70mA |
| Input and Output | 12 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: 5.5dBm receiver sensitivity: -90dBm range 20m |
| Sensor Interfaces | real time clock DS1372 temperature sensor TC54 16bit adc ADS1112 LCD controller PCF8562 other sensors available upon request |
| Certifications | 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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