Features

- CSR BlueCore 4 external chipset

- Bluetooth v3.0

- Class 1 radio, range can exceed 250m

- 10 Digital programmable I/O Pins

- 2 Analog programmable I/O Pins

- Low power connection modes < 8mA

- Easy to use AT Command interface via Uart

- Remote command and control

- Onboard Antenna

- 8Mbit Flash Memory

- UART, USB, I2C Interfaces

26.0mm x 15.0mm x 2.5mm

Bluetooth Data Profiles

- SPP – Serial Port Profile
  A universal bi-directional data link. Up to 380Kbits/s.

- HID – Human Interface Device
  Including keyboard, mouse, joystick, and media controls.

- HFP – Handsfree Profile
  Remote phone control (without audio link).

- IAP – Apple iOS wireless data peripheral link. Requires approval and an Apple authentication chip.

Applications

- Serial Cable Replacement

- Data Acquisition

- Remote Sensors

- RFID Tag Readers

- Remote control

Description

The KC-1114 Class 1 Bluetooth Hi Power Data Module is a highly tuned and completely integrated wireless data transceiver subsystem ready for installation in data devices. The KC-1114 offers reprogrammable, embedded firmware for serial cable replacement deploying the Bluetooth Serial Port Profile (SPP). Our kcSerial embedded firmware provides an easy to use AT style command interface over Uart. Our kcSerial firmware also provides remote control capability, where our AT commands can be issued remotely from any other Bluetooth device via SPP.

All firmware offered by KC Wirefree can be customized for OEM clients. In many cases a few changes can produce great value by differentiating and improving your product. Firmware can be updated via Uart or optionally, via Usb.

Please see our *kcSerial User Guide* and *kcKeyboard User Guide* for more information on specific features and operation.

SPP – Serial Port Profile

The KC Wirefree KC-1114 data modules come standard with kcSerial which implements (SPP) Serial Port Profile.

The SPP is a very popular widely used profile for transmitting data in place of a serial cable. SPP defines how to set up virtual serial ports and connect two Bluetooth enabled devices. A scenario would be using two devices, such as PCs or laptops, as virtual serial ports and then connecting the two devices via Bluetooth technology.

HID – Human Interface Profile

Our kcKeyboard firmware implements the HID profile defines the protocols, procedures and features to be used by Bluetooth HID including keyboards, mice, game controllers, and media controllers. HID commands are issued via Uart commands, and/or Pio button feature assignments.

HFP – Handsfree Profile

Our kcKeyboard firmware optionally implements the HFP profile and provides wireless control for phones, but without the capabilities of providing an audio link. This can be a convenient addition for a full featured wireless controller device.

IAP – Apple iOS Wireless Profile

Our kcSerial firmware implements the IAP profile that provides a peripheral data link to iOS devices. The IAP profile requires an Apple authentication chip, and finished products require an MFi license from Apple. The IAP profile controls the iOS authentication procedure, and implements the Apple lingo data link requirements.

Other Available Bluetooth Data Profiles

KC-1114 is capable of supporting additional Bluetooth profiles. Contact KC Wirefree for customization options.

Available Bluetooth Data Modules

	Class 1 +18dB High Power	Class 2 +4dB Standard Power
External Antenna	KC-1014 Class 1 Bluetooth Data Module	KC-2014 Class 2 Bluetooth Data Module
Onboard Antenna	KC-1114 Class 1 Bluetooth Data Module	KC-2114 Class 2 Bluetooth Data Module

Physical Dimensions

KC-1114 Top View

Pin	Name
1	AIO1
2	AIO0
3	PIO2
4	PIO3
5	PIO4
6	PIO5
7	PIO6
8	PIO7
9	PIO8
10	PIO9
11	GND
12	VDD
13	SPI_MISO
14	SPI_MOSI
15	SPI_CSB
16	SPI_CLK
17	PIO10
18	GND
19	RESET
20	PIO11
21	PIO1
22	UART_TXD
23	PIO0
24	UART_RXD
25	UART_CTS
26	UART_RTS
27	USB+
28	USB-
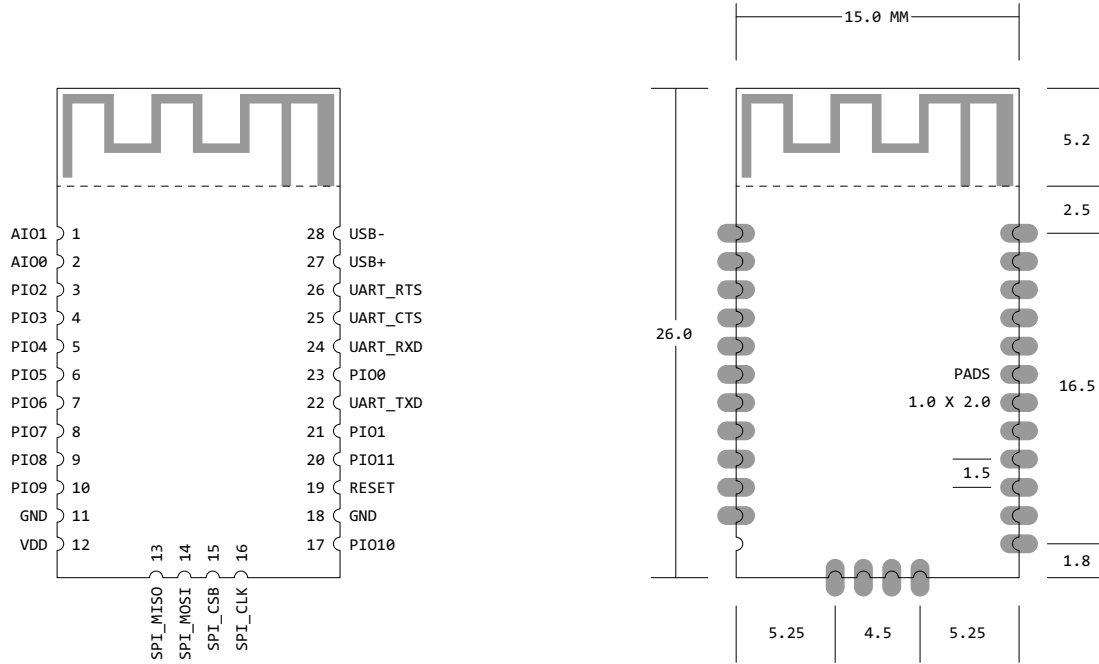
Pin Assignment

Pin	Function	Type	Description
1	AIO1	Input	Analog Input
2	AIO0	Input	Analog Input
3	PIO2	I/O	Programmable I/O
4	PIO3	I/O	Programmable I/O
5	PIO4	I/O	Programmable I/O
6	PIO5	I/O	Programmable I/O
7	PIO6	I/O	Programmable I/O [I^{2}C]
8	PIO7	I/O	Programmable I/O [I^{2}C]
9	PIO8	I/O	Programmable I/O [I^{2}C]
10	PIO9	I/O	Programmable I/O
11	GND	--	Ground
12	VDD	Input	3.3V Regulated Input (2.7V – 3.6V)
13	SPI_MISO	Output	SPI Master In
14	SPI_MOSI	Input	SPI Master Out
15	SPI_CSB	Input	SPI Chip Select
16	SPI_CLK	Input	SPI Clock
17	PIO10	I/O	Programmable I/O
18	GND	--	Ground
19	RESET	Input	Hardware Reset when Low >5ms
20	PIO11	I/O	Programmable I/O
21	PIO1	I/O	Class 1 TX Enable
22	UART_TXD	Output	UART Data Transmit
23	PIO0	I/O	Class 1 RX Enable
24	UART_RXD	Input	UART Data Receive
25	UART_CTS	Input	UART Clear To Send
26	UART_RTS	Output	UART Request To Send
27	USB+	I/O	USB Data Positive
28	USB-	I/O	USB Data Negative

[Option features in brackets]

Interface Pins

AIO Interface Pins [1-2]

AIO 0 and AIO 1 are enabled for analog input by default, providing 8 bit samples at rates up to 50 samples/sec. Analog pins are 1.8V logic for input mode. Voltage reading accuracy is guaranteed to 6 bits resolution.

PIO Interface Pins [3-10,20-21,23]

PIO pins are read and write enabled via kcSerial commands. Inputs can be configured for weak pull-up, weak pull-down, strong pull-up, strong pull-down. Voltage input tolerance and output level is equal to the VDD level.

I2C Interface [7-9]

The I2C interface pins are hardware assigned to PIO 6 = SDL, PIO 7 = SDA, and PIO 8 = RESET. The I2C interface must be custom programmed per application. It is used for EEPROM, LCD, and Apple Authentication chips (iOS wireless accessories).

VDD Pin [12]

Voltage supply pin accepts voltages between 2.7V and 3.6V. Regulation should have a fast response time < 20µs. It is essential that the power rail recover quickly. We recommend Texas Instruments TLV71333PDBVR. Note, the USB, UART, and PIO pins high outputs will be driven relative to this VDD input voltage level.

SPI Pins [13-16]

The SPI pins are only available for firmware loading and test tools. SPI test points are highly recommended for emergency diagnostics access.

UART Pins [22,24-26]

The UART is compatible with the 16450 industry standard. Four signals are provided with the UART interface. The UART pins operate at TTL voltage level and must be translated to higher RS-232 voltage levels for communicating with PC hosts. A 3.3V buffered signal IC is recommended. It is highly recommended that UART test points are available for external connection to allow firmware reinstallation or updates. If a microcontroller is attached, provide a tri-state mode to allow external access to the UART lines.

USB Interface [27-28]

The USB interface is available for custom applications.

Application Notes

- We highly recommend providing a header or test points for the SPI lines. This allows emergency access for diagnostic tools.

- We highly recommend providing UART test points to allow firmware reinstallation or updates. If a microcontroller is attached, provide a tri-state mode with microcontroller to allow external access to the UART lines.

- RS232 hardware flow control is disabled in kcSerial v3.0 firmware by default, and can be enabled with AT HwFlowControl E command (this configuration setting is saved in flash memory). It is highly recommended to enable hardware flow control, since data can be lost with poor wireless connections without flow control.

- UART interfaces are 3.3V TTL. A voltage level shifter or buffer IC is required when interfacing to higher voltage RS232 ports.

- Regulator should have a fast response time < 20µs. It is essential that the power rail recover quickly. We recommend Texas Instruments TLV71333PDBVR.

- Power supply to module should have less than 10mVrms noise between 0-10MHz, and spikes should be minimal.

- A voltage level monitor IC connected to RESET is recommended for fluctuating power sources (especially automotive). Flash memory can become corrupted with high or low spiking power sources. We recommend Diodes Inc. APX809-29SAG-7 (2.93V).

- Unused pins should be unconnected.

- The area around the antenna should be free of metal and grounds. Minimum clearance is 5mm, but additional clearance improves RF performance.

- Do not use ultra sonic cleaning, which may cause internal interconnect damage to IC's and crystals.

- Driving LEDs directly from PIO pins is not recommended. We recommend using MOSFET gates or a buffer driver.

Electrical Characteristics

(Conditions VDD= 3.3V and 25 °C)

Absolute Maximum Ratings	Min	Max	Unit
Storage temperature range	-40	150	°C
Supply voltage VDD	-0.4	3.7	Volts

Recommended Operating Conditions	Min	Max	Unit
Temperature Range	-40	85	°C
Supply Voltage VDD (3.3V Recommended)	2.8	3.6	Volts

Digital PIO & UART Pins	Min	Typ	Max	Unit
Input Voltage Low Logic	-0.4	-	0.8	Volts
Input Voltage High Logic	2.3	-	3.7	Volts
Output Voltage Low Logic	-	-	0.2	Volts
Output Voltage High Logic	3.1	-	-	Volts
Input Leakage Current	-1	-	+1	µA
Input Capacitance	1.0	-	5.0	pF
Weak Internal Pull-Up	-5.0	-1.0	-0.2	µA
Weak Internal Pull-Down	+0.2	+1.0	+5.0	µA
Strong Internal Pull-Up	-100	-40	-10	µA
Strong Internal Pull-Down	+10	+40	+100	µA

Analog I/O Pins	Min	Max	Unit
Resolution		8	Bits
Sample Rate		50	Per Sec
Voltage	0	1.8	V

RF Characteristics	Test Conditions	BT Spec	Typical	Unit
Maximum RF power	50 Ω load	-6 to +4	+19	dBm
Sensitivity level	0.1% BER	≤ -70	-96	dBm
Antenna load			50	Ω

Current Consumption	Avg	Unit
ACL Data 115Kbps Data Transfer(Master)		mA
ACL Data 115Kbps Data Transfer(Slave)		mA
Connection, No Data Traffic (Master)		mA
Connection, No Data Traffic (Slave)		mA
Peak current		mA
Sniff Mode (40ms sniff) (Master)		mA
Sniff Mode (40ms sniff) (Slave)		mA
Sniff Mode (1.3s sniff) (Master)		mA
Sniff Mode (1.3s sniff) (Slave)		mA
Deep Sleep (not discoverable, not connectable)		µA

Example Hardware Interface Connections

This schematic example is our BlueDemo Data Board.
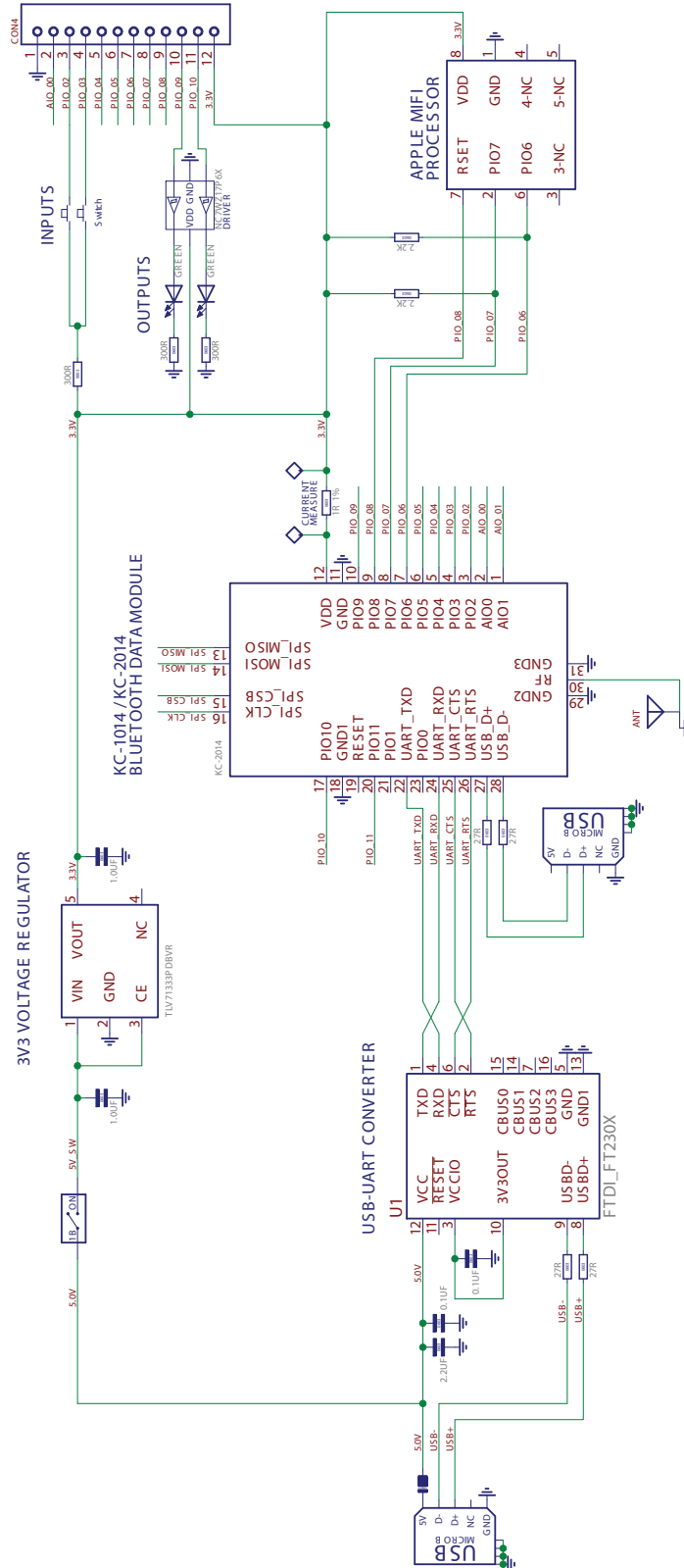
Firmware Interface

The KC-1114 offers our powerful kcSerial firmware interface using the UART, which provides an easy to use AT style text command interface. The firmware interface allows persistent storage of configuration parameters such as device name, default baud rate, security PIN, and automatic connection settings. Additionally kcSerial provides operational commands such as discovery, connections, security, read/write commands for I/O pins. These commands are also available in remote command mode, so a kcSerial device will respond to these commands issued locally via UART, or wirelessly via remote command mode.

kcSerial v4.0 AT Command List

```
AT Help
-> [CommandList]
-> AT AioRead            AT AutoConnect        AT BatteryMon
-> AT BtAddr             AT Build              AT CoD/Temp
-> AT ConfigRawBaud/Temp AT ConfigUart/Temp    AT ConnDiscForce/Temp
-> AT Connect            AT Connectable        AT ConnectIOS
-> AT ConnectScan        AT Data               AT DebugMode/Temp
-> AT DeepSleep/Temp     AT Dfu                AT Disconnect
-> AT Discoverable       AT DiscoverConfig     AT DiscoverSvc
-> AT Discovery          AT EscapeMode/Temp    AT FactoryReset
-> AT HwFlowControl      AT InputCmdMode       AT InputConnect
-> AT InputDiscoverable  AT InputSleepBlock    AT InquiryScan
-> AT IosBundleID        AT IosNameApp         AT IosNameDevice
-> AT IosNameManf        AT IosNameModel       AT IosService
-> AT IosSettings        AT IosVersion         AT LinkStatus
-> AT LinkTest           AT LinkTimeout/Temp   AT LowLatency/Temp
-> AT Messages/Temp      AT Name/Temp          AT NegotiateSync
-> AT OutputActivity     AT OutputConnect      AT OutputCpu
-> AT OutputDiscoverable AT OutputLowBatt      AT PacketSize/Temp
-> AT Pair               AT Pairable           AT PairingDelete
-> AT PairingOption/Temp AT Passkey            AT PinCode
-> AT PioConfig          AT PioRead            AT PioSettings
-> AT PioStatus          AT PioWrite           AT Radio
-> AT RemoteMode/Temp    AT Reset              AT RfcService
-> AT RfPower/Temp       AT RoleSwitch         AT Rssi
-> AT ScoConfig          AT Security/Temp      AT SecurityAuth/Temp
-> AT ShowSettings       AT ShowStatus         AT Sniff/Temp
-> AT SniffSettings      AT SniffSubrate       AT SppName
-> AT SppService/Temp    AT Timer              AT Version
->
->
-> EscapeSeq prefix: ~~~~~1
-> EscapeCmd prefix: ~~~~~2
-> RemoteSeq prefix: ~~~~~3
-> RemoteCmd prefix: ~~~~~4
->
-> Specific command help: AT <command> ?
-> See kcSerial UserGuide www.kcwirefree.com
-> [EndCommandList]
```

Please refer to our *kcSerial v4.0 User Guide* for additional information.

Qualifications

Bluetooth

The KC-1114 is registered with and licensed by Bluetooth SIG as a qualified design.

> Qualification Design ID: 20218
> Qualified Profiles: BB, DUN, GAP, HCI, L2CAP, LM, RFCOMM, SDP, SPP

KC Wirefree provides a Qualified Design that should be sufficient for product licensing without additional Bluetooth testing requirements. Usage of Bluetooth registered trademarks must be licensed directly from Bluetooth SIG. Please contact Bluetooth SIG regarding product licensing fees.

FCC

The KC-1114 has a granted modular approval by the Federal Communications Commission. The module meets the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.247 for Bluetooth spread spectrum transmitters.

With a written agreement, Original Equipment Manufacturers may use our FCC ID transmitter license. The following FCC ID must be visible on the exterior of final the product.

> FCC ID: S2242

CE

The KC-1114 complies with the following EMC Directives:

> ETSI EN 300.328 V1.6.1
> ETSI EN 300.328 V1.8.1 [Approval Pending]

Industry Canada

IC Warning Statement: The device's user manual does not contain the following or equivalent statement as per RSS-GEN section 7.1.5: Operation of this device is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

> IC ID: 8193A-BTMODULECL2

SAR

SAR compliant.

Datasheet Versions

Revisions	Changes
Aug 26, 2014	First release

Ordering Information

Product Series	KC-1114
Product Version	0
Country of Manufacture	USA
Order Part Number	**Description**
KC-1114.0	Class 1 Bluetooth Hi Power Data Module w/ kcSerial Firmware Latest Edition
KC-1114.0-FW	Class 1 Bluetooth Hi Power Data Module, w/ Custom Firmware

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