Bluetooth® Serial Module

Application Note

Bluetooth Class 2 OEM Module

Model: Parani-BCD210

Ver 1.0

1. General

The Parani-BCD210 is a Bluetooth Class 2 OEM module for OEM manufacturers who want to implement Bluetooth Class 2 functionality with their products cost effectively and also in timely manner. Users can build their own antenna circuit around the BCD210 to lower the overall cost while benefit from the BCD210's field-proven standard SPP (Serial Port Profile) firmware provided with no additional cost.

The BCD210 supports Class 1 Bluetooth transmission level for longer communication distance typically ranges from 100 m up to 1 km. The BCD210 supports UART, USB, I2C, PCM, PIO interfaces for the communication with the OEM products.

The BCD210 is provided with Bluetooth v2.0 compatible firmware runs internally for SPP (Serial Port Profile) applications by default. The SPP firmware supports up to 4 simultaneous multiple connections and is designed to work out-of-box for real world SPP applications such as POS (Point-of-sales), industrial automation, remote metering and other various applications.

Optionally, the BCD210 can be supplied with only software stack up to HCI level so entire Bluetooth stack runs on the host side for the application such as USB dongles for computers, or OEM manufacturers can even develop and embed their own firmware into the BCD210.

The BCD210 is fully qualified with Bluetooth v.2.0+EDR specification so OEM manufacturers can save cost and time for overall OEM product certifications, which makes the BCD210 ideal solution for larger volume and cost sensitive applications.

To comply with FCC RF exposure compliance requirements, the antenna 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 operate in conjunction with any other antenna or transmitter."

As such, the radio component of this device is intended only for OEM integrators under the following two conditions: The antenna must be installed such that 20 cm is maintained between the antenna and users.

The transmitter module may not be co-located with any other transmitter or antenna.

As long as the two conditions above are met, further transmitter testing 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 (e.g., digital device emissions, PC peripheral requirements).

In the event that these conditions cannot be met (for example, co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot 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 Transmitter Module FCC ID: S7AIW03".

The radio component is an integral part of the Parani-BCD210DU and cannot be removed.

1.1 Features

- Fully qualified Bluetooth v2.0 + EDR
- Full-speed Bluetooth operation
- Full piconet and scatternet support
- Minimum external components
- Low-power 1.8V operation
- 1.8V core, 1.8 to 3.6V I/O
- Integrated 1.8V regulator
- 8 x 8mm, 96-ball TFBGA and 6 x 6mm, 96-ball, VFBGA package options
- USB v2.0 and dual UART ports
- Support for IEEE 802.11 coexistence
- Support for 8Mbit external Flash
- Green (RoHS and no antimony or halogenated flame retardants)

1.2 Applications

- PCs
- PDAs
- Computer accessories (compact Flash cards, PCMCIA cards, SD cards and USB dongles)
- Access points
- Digital cameras

Model despription

Model name	Interface	Connector	Antenna		
			Type1	Type2	Type3
Parani-BCD210**DU**	**D**IP, pin	**U**.FL	5dBi dipole	3dBi dipole	1dBi stub
Parani-BCD210**DS**	**D**IP, pin	RP**S**MA	5dBi dipole	3dBi dipole	1dBi stub
Parani-BCD210**DC**	**D**IP, pin	**C**HIP	0dBi Chip		
Parani-BCD210**SU**	**S**MD, pad	**U**.FL	5dBi dipole	3dBi dipole	1dBi stub
Parani-BCD210**SC**	**S**MD, pad	**C**HIP	0dBi Chip		

Use Antenna

Dipole antenna (M/N: R-AN2400-1901RS) Max Gain 5.37 dBi

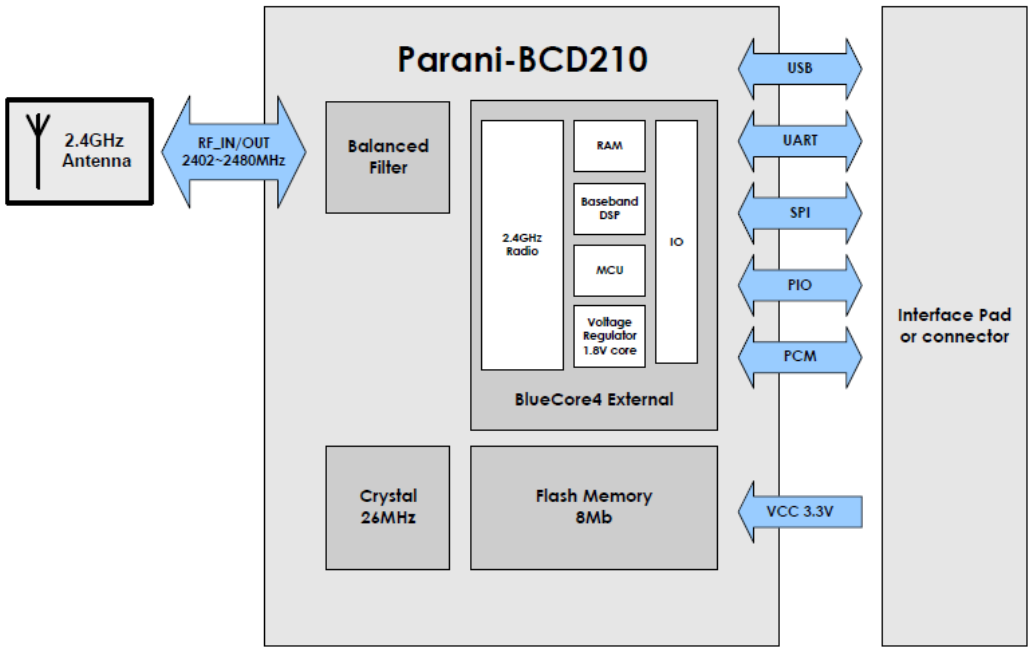
Dipole antenna (M/N: R-AN2400-5801RS) Max Gain 3.27 dBi

Dipole antenna (M/N: AN2400-3306RS) Max Gain 1.40 dBi

Chip antenna (SENA_F0615) Max Gain: 0.2dBi

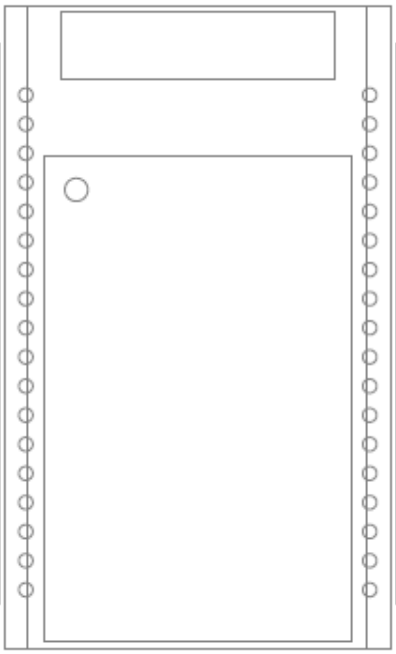
1.3 Device Diagram

SENA
Bluetooth Data Plafform
Model: Parani-BCD210



1.4 Pin Diagram

	NAME	DEFINE
1	GND	GND
2	GND	GND
3	NC	NC
4	AIO_0	
5	AIO_1	
6	UART_RTS	UART_RTS
7	UART_RXD	UART_RXD
8	UART_TXD	UART_TXD
9	UART_CTS	UART_CTS
10	USB_DN	USB_DN
11	USB_DP	USB_DP
12	PCM_IN	PCM_IN
13	PCM_SYNC	PCM_SYNC
14	PCM_CLK	PCM_CLK
15	PCM_OUT	PCM_OUT
16	+3V3	+3V3
17	GND	GND
18	RESETB	RESETB



DEFINE	NAME	
GND	GND	36
	PIO_0	35
	PIO_1	34
STATUS_LED1	PIO_11	33
STATUS_LED0	PIO_10	32
	PIO_9	31
	PIO_8	30
UART_DCD	PIO_2	29
UART_DTR	PIO_3	28
F/C_CTRL	PIO_7	27
BT_MODE	PIO_6	26
FACTORY RESET	PIO_5	25
UART_DSR	PIO_4	24
SPI_MOSI	SPI_MOSI	23
SPI_CSB	SPI_CSB	22
SPI_CLK	SPI_CLK	21
SPI_MISO	SPI_MISO	20
GND	GND	19

1.5 Pin Descriptions

Function	Pin Name	Pin Number	Description
USB Interface	USB_DP	8	USB data plus
	USB_DN	7	USB data minus
UART Interface	UART_TXD	11	UART data output
	UART_RXD	12	UART data input
	UART_RTS	10	UART request to send active low
	UART_CTS	9	UART clear to send active low
PCM Interface	PCM_OUT	25	Synchronous data output
	PCM_IN	24	Synchronous data input
	PCM_SYNC	23	Synchronous data sync
	PCM_CLK	22	Synchronous data clock
SPI Interface	SPI_MISO	30	SPI data output
	SPI_MOSI	32	SPI data input
	SPI_CSB	29	Chip select for SPI, active low
	SPI_CLK	31	SPI clock
PIO Interface	PIO_0	50	Programmable input/output line
	PIO_1	49	Programmable input/output line
	PIO_2	52	Programmable input/output line
	PIO_3	51	Programmable input/output line
	PIO_4	1	Programmable input/output line
	PIO_5	20	Programmable input/output line
	PIO_6	4	Programmable input/output line
	PIO_7	3	Programmable input/output line
	PIO_8	19	Programmable input/output line
	PIO_9	13	Programmable input/output line
	PIO_10	6	Programmable input/output line
	PIO_11	14	Programmable input/output line
	PIO_12	2	Programmable input/output line
	PIO_13	15	Programmable input/output line
	PIO_14	5	Programmable input/output line
	PIO_15	21	Programmable input/output line
	AIO_0	54	Analogue programmable input/output line

	AIO_1	55	Analogue programmable input/output line
Power	VCC	16	Power supply for system, I/O, 3.3V
	VCHG	35	Lithium ion/polymer battery charger input
	VBAT	34	Lithium ion/polymer battery positive terminal
	VREG_EN	33	Take high to enable internal regulators
	GND	17	Ground
	GND	18	Ground
	GND	28	Ground
	GND	36	Ground
	GND	46	Ground
	GND	48	Ground
	GND	56	Ground
LED Drivers	LED_0	26	LED driver
	LED_1	27	LED driver
Others	RF_I/O	47	Transmitter output/receiver input
	RESETB	53	Reset, active low, > 5ms to cause a reset

2. Electrical characteristics

2.1 Absolute maximum ratings

Ratings		Min	Max	Unit
Storage Temperature		-40	+85	°C
Operating Temperature		-40	+85	°C
Supply voltage	VCC	-0.4	3.6	V
	VREG_EN	-0.4	4.9	V
	VBAT	-0.4	4.4	V
	LED[1:0]	-0.4	4.4	V
	VCHG	-0.4	6.5	V
Other terminal voltages		GND – 0.4	VCC + 0.4	V

2.2 Recommended operating conditions

Ratings		Min	Typ	Max	Unit
Operating Temperature		-30	20	+70	°C
Supply voltage	VCC	3.1	3.3	3.5	V
	VREG_EN	2.8	4.2	4.4	V
	VBAT	2.8	4.2	4.4	V
	LED[1:0]	2.8	4.2	4.4	V
	VCHG	4.5	5.0	5.5	V

2.3 Power Consumption

3. RF Characteristics

3.1 Basic Data Rate

3.1.1 Transmitter Performance

RF Characteristics VCC = 3.3V, 20°C		Min	Typ	Max	Bluetooth Specification	Unit
Output power		2	4	6	20	dBm
Power Density		2	4	6	20	dBm
Power Control		2	4	6	2 ≤ step ≤ 8	dB
TX Output Spectrum-Frequency range		-	-	-	2400 ~2483.5	MHz
TX Output Spectrum-20dB Bandwidth		-	940	1000	≤ 1000	kHz
Adjacent Channel Power	$F = F_0 \pm 2MHz$	-	-36	-20	≤ -20	dBm
	$F = F_0 \pm 3MHz$	-	-45	-40	≤ -40	dBm
	$F = F_0 \pm > 3MHz$	-	-50	-40	≤ -40	dBm
Modulation Characteristics	$\Delta f1_{avg}$	140	165	175	$140 \le \Delta f1_{avg} \le 175$	kHz
	$\Delta f2_{avg}$	115	142	-	$\Delta f2_{avg} \ge 115$	kHz
	$\Delta f2_{avg}/\Delta f1_{avg}$	0.80	0.92	-	$(\Delta f1_{avg}/\Delta f2_{avg}) \ge 0.8$	
Initial Carrier Frequency Tolerance		-75	±20	75	≤ ±75	kHz
Carrier Frequency Drift	Drift rate	-20	-	20	≤ ±20	kHz/50μs
	1 slot Freq Drift	-25	-	25	≤ ±25	kHz
	5 slot Freq Drift	-40	-	40	≤ ±40	kHz

3.1.2 Transceiver

RF Characteristics VCC = 3.3V, 20°C		Min	Typ	Max	Specification	Unit
Out of band Spurious Emissions	0.030-1.000GHz	-	-	-36	≤ -36	dBm
	1.000-12.75GHz	-	-	-30	≤ -30	dBm
	1.800-5.100GHz	-	-	-47	≤ -47	dBm
	5.100-5.300GHz	-	-	-47	≤ -47	dBm

3.1.3 Receiver Performance

RF Characteristics VCC = 3.3V, 20°C		Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity - Single slot packets (0.1%)		-88	-85	-82	≤ -70	dBm
Sensitivity - Multi slot packets (0.1%)		-88	-85	-82	≤ -70	dBm
C/I performance at 0.1% BER	co-channel	-	-	11	≤ -11	dB
	$F = F_0 + 1MHz$	-	-	0	≤ 0	kHz
	$F = F_0 – 1MHz$	-	-	0	≤ 0	dB
	$F = F_0 + 2MHz$	-	-	-20	≤ -20	dB
	$F = F_0 – 2MHz$	-	-	-30	≤ -30	dB
	$F = F_0 – 3MHz$	-	-	-40	≤ -40	dB
	$F = F_0 + 5MHz$	-	-	-40	≤ -40	dB
	$F = F_{Image}$	-	-	-9	≤ -9	dB
Blocking performance	0.030-2.000GHz	-10	-	-	-10	dBm
	2.000-2.400GHz	-27	-	-	-27	dBm
	2.500-3.000GHz	-27	-	-	-27	dBm
	3.000-12.75GHz	-10	-	-	-10	dBm
Inter-modulation performance		-39	-	-	≥ -39	dBm
Maximum input level at 0.1% BER		-20	-	-	≥ -20	dBm

3.2 Enhanced Data Rate

3.2.1 Transmitter performance

RF Characteristics VCC = 3.3V, 20°C			Min	Typ	Max	Bluetooth Specification	Unit
Maximum RF Transmit Power			0	2	4	-6 to +4	dB
Relative Transmit Power			-4	-1	1	-4 to +1	dB
Carrier Frequency Stability	π/4 DQPSK	$\lvert \omega_0 \rvert$	-10	-	10	≤ ±10 for all blocks	kHz
		$\lvert \omega_i \rvert$	-75	-	75	≤ ±75 for all packets	kHz
		$\lvert \omega_0 + \omega_i \rvert$	-75	-	75	≤ ±75 for all blocks	kHz
	8DPSK	$\lvert \omega_0 \rvert$	-10	-	10	≤ ±10 for all blocks	kHz
		$\lvert \omega_i \rvert$	-75	-	75	≤ ±75 for all packets	kHz
		$\lvert \omega_0 + \omega_i \rvert$	-75	-	75	≤ ±75 for all blocks	kHz
Modulation Accuracy	π/4 DQPSK	RMS DEVM	-	-	20	≤ 20	%
		99% DEVM	-	-	30	≤ 30	%
		Peak DEVM	-	-	35	≤ 35	%
	8DPSK	RMS DEVM	-	-	13	≤ 13	%
		99% DEVM	-	-	20	≤ 20	%
		Peak DEVM	-	-	25	≤ 25	%
EDR Differential Phase Encoding			99	-	-	≥ 99	%
In-band Spurious Emissions (8DPSK)	$F \geq F_0 + 3MHz$		-	-	-40	≥ -40	dBm
	$F < F_0 + 3MHz$		-	-	-40	≥ -40	dBm
	$F = F_0 – 3MHz$		-	-	-40	≥ -40	dBm
	$F = F_0 – 2MHz$		-	-	-20	≥ -20	dBm
	$F = F_0 – 1MHz$		-	-	-26	≥ -26	dB
	$F = F_0 + 1MHz$		-	-	-26	≥ -26	dB
	$F = F_0 + 2MHz$		-	-	-20	≥ -20	dBm
	$F = F_0 + 3MHz$		-	-	-40	≥ -40	dBm

3.2.2 Receiver performance

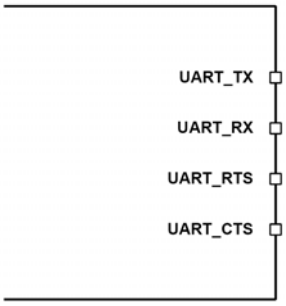
RF Characteristics VCC = 3.3V, 25°C			Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.01% BER		π/4 DQPSK	-87	-84	-81	≤ -70	dBm
		8DPSK	-87	-84	-81	≤ -70	dBm
BER floor performance			-	-	-60	≤ -60	dBm
C/I Performance (co-channel at 0.1% BER)		π/4 DQPSK	-	-	13	≤ +13	dB
		8DPSK	-	-	21	≤ +21	dB
C/I Performance (Adjacent Channel Selectivity)	$F = F_0 + 1MHz$	π/4 DQPSK	-	-	0	≤ 0	dB
		8DPSK	-	-	5	≤ +5	dB
	$F = F_0 – 1MHz$	π/4 DQPSK	-	-	0	≤ 0	dB
		8DPSK	-	-	5	≤ +5	dB
	$F = F_0 + 2MHz$	π/4 DQPSK	-	-	-30	≤ -30	dB
		8DPSK	-	-	-25	≤ -25	dB
	$F = F_0 – 2MHz$	π/4 DQPSK	-	-	-20	≤ -20	dB
		8DPSK	-	-	-13	≤ -13	dB
	$F \geq F_0 + 3MHz$	π/4 DQPSK	-	-	-40	≤ -40	dB
		8DPSK	-	-	-33	≤ -33	dB
	$F \leq F_0 – 5MHz$	π/4 DQPSK	-	-	-40	≤ -40	dB
		8DPSK	-	-	-33	≤ -33	dB
	$F = F_{Image}$	π/4 DQPSK	-	-	-7	≤ -7	dB
		8DPSK	-	-	0	≤ 0	dB
Maximum input level at 0.1% BER		π/4 DQPSK	-20	-	-	≥ -20	dBm
		8DPSK	-20	-	-	≥ -20	dBm

4. Device Terminal Descriptions

4.1 UART Interface

This is a standard UART interface for communicating with other serial devices.

BCD210 UART interface provides a simple mechanism for communicating with other serial device using the RS232 protocol.



When BCD210 is connected to another digital device, UART_RX and UART_TX transfer data between the two devices. The remaining two signals, UART_CTS, UART_RTS, can be used to implement RS232 hardware flow control where both are active low indicators. All UART connections are implemented using CMOS technology and have signaling levels of 0V and 3.3V

Parameter		Possible Values
Baud Rate	Minimum	1200 baud (2%Error)
	Maximum	4M baud (1%Error)
Flow Control		RTS/CTS or None
Parity		None, Odd or Even
Number of Stop Bits		1 or 2
Bits per Channel		8

[Possible UART Settings]

4.2 USB Interface

BCD210 USB devices contain a full speed (12Mbits/s) USB interface that is capable of driving of a USB cable directly. No external USB transceiver is required. The device operates as a USB peripheral, responding to requests from a master host controller such as a PC. Both the OHCI and the UHCI standards are supported. The set of USB endpoints implemented behave as specified in the USB section of the Bluetooth specification v2.0+EDR or alternatively can appear as a set of endpoints appropriate to USB audio devices such as speakers.

As USB is a Master/Slave oriented system (in common with other USB peripherals), BCD210 only supports USB slave operation.

The USB data lines emerge as pins USB_DP and USB_DN. These terminals are connected to the internal USB I/O buffers of the BCD210, therefore, have low output impedance. To match the connection to the characteristic of the USB cable, resistors must be placed in series with USB_DP/USB_DN and the cable.
BCD210 features an internal USB pull-up resistor. This pulls the USB_DP pin weakly high when BCD210 is ready to enumerate. It signals to the PC that it is a full speed (12Mbit/s) USB device.

The USB internal pull-up is implemented as a current source, and is compliant with section 7.1.5 of the USB specification v1.2. The internal pull-up pulls USB_DP high to at least 2.8V when loaded with a 15KΩ±5% pull-down resistor (in the hub/host) when VDD_PADS=3.1V. This presents a Thevenin resistance to the host of at least 900Ω. Alternatively, an external 1.5KΩ pull-up resistor can be placed between a PIO line and D+ on the USB cable. The firmware must be alerted to which mode is used by PS key PSKEY_USB_PIO_PULLUP appropriately. The default setting uses the internal pull-up resistor.

4.3 I^2C Interface

PIO[8:6] can be used to form a mater I^2C interface. The interface is formed using software to drive these lines. Therefore, it is suited only to relatively slow functions such as driving a dot matrix LCD (*Liquid Crystal Display*), keyboard scanner or EEPROM.

Notes:
PIO lines need to be pull-up through 2.2KΩ resistors.
PIO[7:6] dual functions, UART bypass and EEPROM support, therefore, devices using an EEPROM cannot support UART bypass mode.
For connection to EEPROMs, refer to CSR documentation on I^2C EEPROM for use with BlueCore. This provides information on the type of devices currently supported.

4.4 PCM CODEC Interface

PCM (*Pulse Code Modulation*) is a standard method used to digitize audio (particularly voice)

for transmission over digital communication channels. Through its PCM interface, BCD210 has hardware support for continual transmission and reception of PCM data, thus reducing processor overhead for wireless headset applications. BCD210 offers a bi-directional digital audio interface that route directly into the baseband layer of the on-chip firmware. It does not pass through the HCI protocol layer.

Hardware on BCD210 allows the data to be sent to and received from a SCO connection.
Up to three SCO connections can be supported by the PCM interface at any on time.
BCD210 can operate as PCM interface Master generating an output clock of 128, 256, or 512kHz. When configured as PCM interface slave, it can operate with an input clock up to 2048kHz. BCD210 is compatible with a variety of clock formats, including Long Frame Sync, Short Frame Sync and GCI timing environments.

It supports 13-bit or 16-bit liner, 8-bit u-law or A-law companied sample formats at 8k samples/s and can receive and transmit on any selection of three of the first four slots following PCM_SYNC. The PCM configuration options are enabled by setting the PS Key PSKEY_PCM_CONFIG32 (0x1b3).

BCD210 interfaces directly to PCM audio devices including the following:

- Qualcomm MSM 3000 series and MSM 5000 series CDMA baseband devices
- OKI MSM7705 four channel A-raw and u-law CODEC
- Motorola MC145481 8-bit A-law and u-law CODEC
- Motorola MC145483 13-bit linear CODEC
- STW 5093 and 5094 14-bit linear CODECs
- BCD210 is also compatible with the Motorola SSI™ interface

4.5 I/O Parallel Ports

PIO lines can be configured through software to have either weak or strong pull-downs. All PIO lines are configured as inputs with weak pull-downs at reset.

Any of the PIO lines can be configured as interrupt request lines or as wake-up lines from sleep modes. PIO_6 or PIO_2 can be configured as a request line for an external clock source. This is useful when the clock to BCD210 is provided from a system ASIC (*Application Specific*

Integrated Circuit). Using PSKEY_CLOCK_REQUEST_ENABLE (0x246), this terminal can be configured to be low when BCD210 is in Deep Sleep and high when a clock is required. The clock must be supplied within 4ms of the rising edge of PIO_6 or PIO_2 to avoid losing timing accuracy in certain Bluetooth operating modes.

BCD210 has three general purpose analogue interface pins, AIO_0, AIO_1 and AIO_2. These are used to access internal circuitry and control signals. One pin is allocated to decoupling for the on-chip band gap reference voltage, the other two may be configured to provide additional functionality.

4.6 Reset Interface

BCD210 may be reset from several sources: RESETB pin, power on reset, a UART break character or via a software configured watchdog timer.

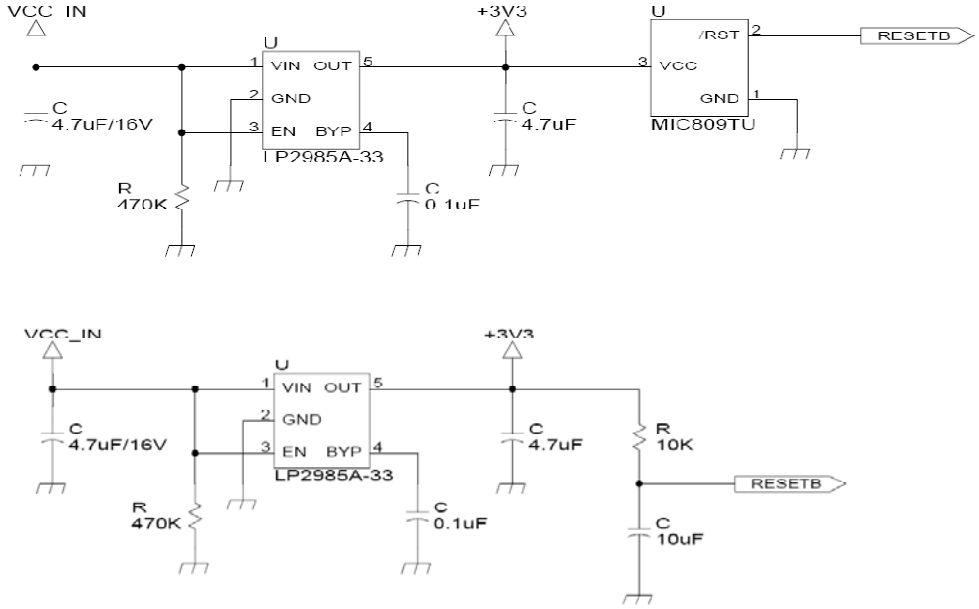
The RESETB pin is an active low reset and is internally filtered using the internal low frequency

clock oscillator. A reset will be performed between 1.5 and 4.0ms following RESETB being active. It is recommended that RESETB be applied for a period greater than 5ms.

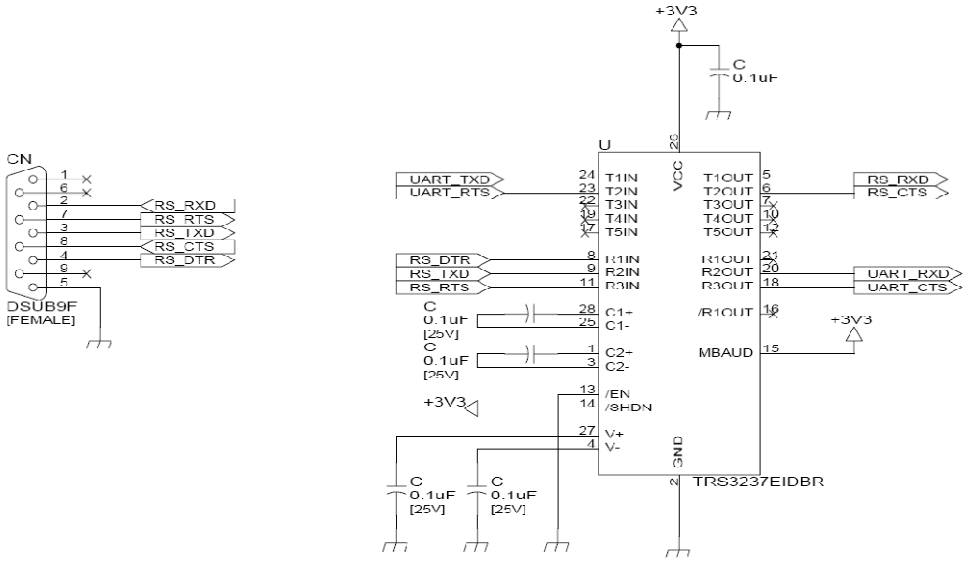
The power on reset occurs when the VDD_CORE supply falls below typically 1.5V and is released when VDD_CORE rises above typically 1.6V.

At reset the digital I/O pins are set to inputs for bi-directional pins and outputs are tri-state. The PIOs have weak pull-downs.

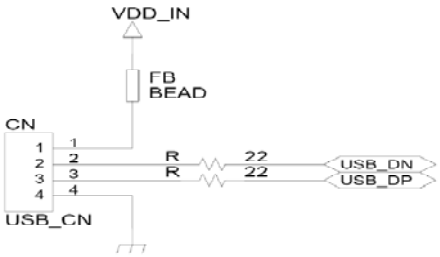
5. Application Schematic



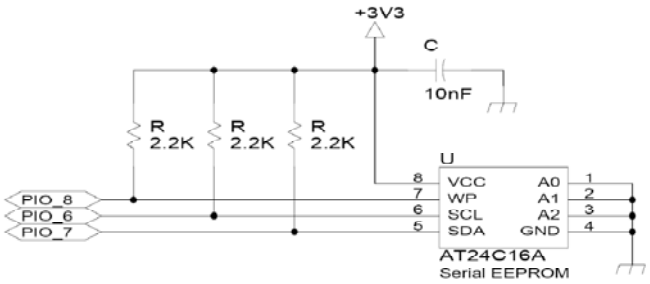
[Power Supply and Reset Interface]



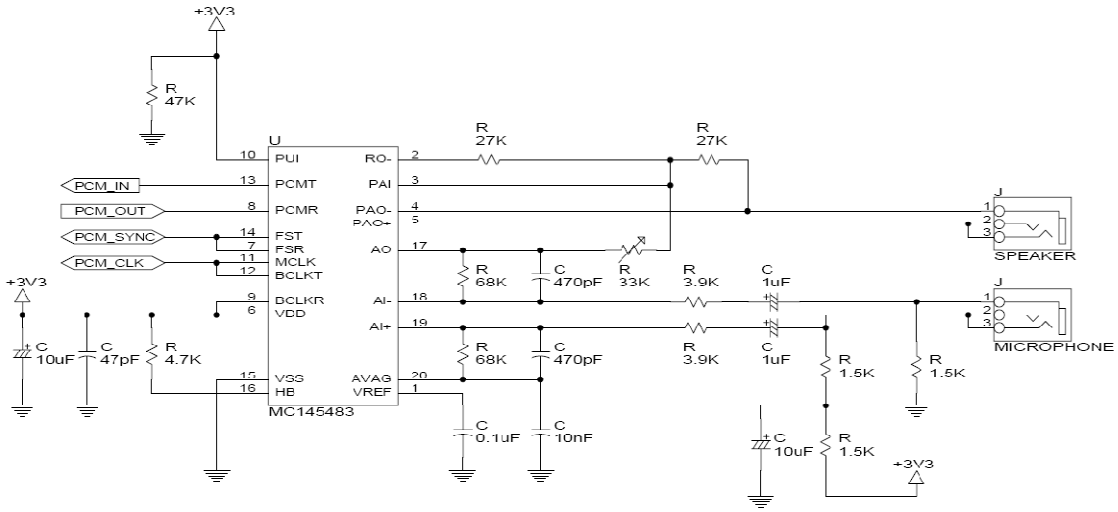
[Serial Interface for Host PC]



[USB Interface]



[I²C Interface]

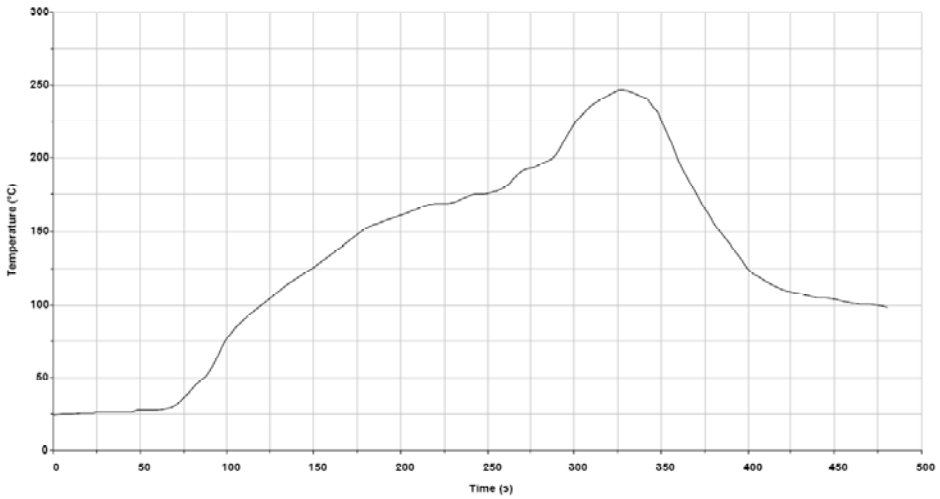


[PCM Interface]

7. Solder Profiles

The soldering profile depends on various parameters necessitating a set up for each application. The data here is given only for guidance on solder re-flow. There are four zones:

- **Preheat Zone** – This zone raises the temperature at a controlled rate, typically 1-2.5°C/s
- **Equilibrium Zone** – This zone brings the board to a uniform temperature and also activates the flux. The duration in this zone (typically 2-3 minutes) will need to be adjusted to optimize the out gassing of the flux.
- **Reflow Zone** – The peak temperature should be high enough to achieve good wetting but not so high as to cause component discoloration or damage. Excessive soldering time can lead to intermetal growth which can result in a brittle joint.
- **Cooling Zone** – The cooling rate should be fast, to keep the solder grains small which will give a longer lasting joint. Typical rates will be 2-5°C/s



[Typical Lead-Free Re-flow Solder Profile]

Key features of the profile:

- Initial Ramp = 1-2.5°C/sec to 175°C±25°C equilibrium
- Equilibrium time = 60 to 180 seconds
- Ramp to Maximum temperature (245°C) = 3°C/sec max.
- Time above liquids temperature (217°C): 45~90 seconds
- Device absolute maximum reflow temperature: 260°C

Devices will withstand the specified profile.

Lead-free devices will withstand up to three reflows to a maximum temperature of 260°C

8. Packaging Information

TBD

9. Contact Information

Technical Support

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11. Document History

Date	Revision	Reason of Change

12. Certificate Information

12.1 FCC

FCC Rule: Part 15 Subpart C Section 15.247
FCCID: S7AIW03

12.1.1 FCC Compliance Statement

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

Information to User

This equipment has been tested and found to comply with 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 generate, 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 on 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 a circuit different form that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

12.1.2 RF Exposure Statement

The equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter.

12.1.3 Do not

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

To comply with FCC RF exposure compliance requirements, the antenna 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 operate in conjunction with any other antenna or transmitter."

As such, the radio component of this device is intended only for OEM integrators under the following two conditions: The antenna must be installed such that 20 cm is maintained between the antenna and users.

The transmitter module may not be co-located with any other transmitter or antenna.

As long as the two conditions above are met, further transmitter testing 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 (e.g., digital device emissions, PC peripheral requirements).

In the event that these conditions cannot be met (for example, co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot 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 Transmitter Module FCC ID: S7AIW03".

The radio component is an integral part of the Parani-BCD210DU and cannot be removed.

12.2 CE

CE1177!

Declare under our own responsibility that the product
Bluetooth Module
Brand name: SENA
Model No.: Parani-BCD210DU / Parani-BCD210DC / Parani-BCD210DS
Parani-BCD210SU / Parani-BCD210SC

To which this declaration refers conforms with the relevant standards or other standardizing documents

EN 60950-1
ETSI EN 301 489-1
ETSI EN 301 489-17
ETSI EN 300 328

According to the regulations in Directive 1999/5/EC

12.3 IC

"This device complies with Industry Canada licence-exempt RSS standard(s). Operation 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."

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radio Cert. No.: IC: 8154A-IW03

12.4 KC

Type Registration
Certification No: KCC-CRM-SNA-IW03

12.5 JAPAN MIC

Technical Regulations for Specified Radio Equipment Article 2, Section 1 (19)
Certification No:

12.6 SIG

QDID: B016862

Model Name: Parani-BCD210

Core Version: 2.0+ EDR

Product Type: End Product

Declared Specifications: Baseband Conformance, Radio, Service Discovery Protocol, Logical Link Control and Adaption Protocol, Generic Access Profile, Link Manager, RFCOMM,
Serial Port Profile, Host Controller Interface, Summary ICS, Product Type