Rayson *Bluetooth* ® *Module*

CSR8600 serial Stereo Speaker A2DP Module - CSR8630

BTM-630

Features

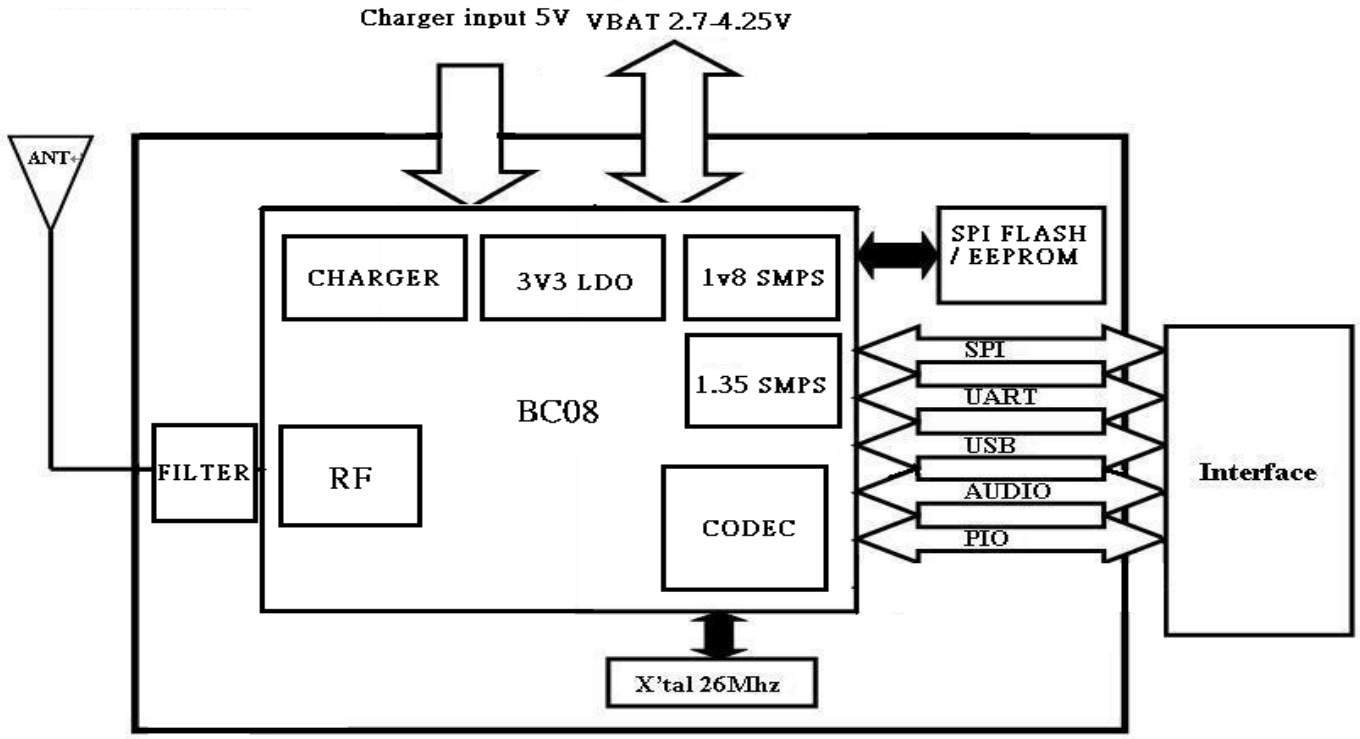
- Fully Qualified Bluetooth v4.0.
- Integrated Switched-Mode Regulator.
- Integrated Battery Charger.
- Embedded Kalimba DSP Co-Processor.
- High-performance Stereo codec with stereo line input.
- CSR's latest CVC technology for narrowband and wideband voice connections including wind noise reduction.
- Multipoint A2DP connection enables a headset(A2DP) connection to 2 A2DP source device for music playback.
- Audio interfaces: Line-in
- Serial interfaces: USB 2.0
- SBC,MP3, AAC, Faststream decoder support.
- Wired Audio support
- Voice prompts support
- RoHS compliant.
- Small outline. 16 x15 x1.8mm

Outline

Applications

- Bluetooth stereo speakers
- A2DP audio sink (including multipoint) for music Streaming

Block Diagram



General Electrical Specification

Absolute Maximum Ratings:		
Ratings	**Min.**	**Max.**
Storage Temperature	-40 ℃	+85 ℃
Supply Voltage (VCHG)	-0.4V	5.75V
Supply Voltage (VREG_ENABLE,VBAT_SENSE)	-0.4V	4.2V
Supply Voltage (LED[2:0])	-0.4V	4.4V
Supply Voltage (PIO_POWER)	-0.4V	3.6V
Recommended Operating Condition:		
Operating Condition		
Operating Temperature range	-20 ℃	+75 ℃
Supply Voltage (VBAT)	2.7V	4.25V
Supply Voltage (VCHG)	4.75V / 3.10 V	5.25V
Supply Voltage (VREG_ENABLE,VBAT_SENSE)	0V	4.2V
Supply Voltage (LED[2:0])	1.10V	4.25V
Supply Voltage (PIO_POWER)*	1.7V	3.6V

1.8V Switch-mode Regulator

1.8V Switch-mode Regulator	Min	Typ	Max	Unit
Input voltage (VBAT)	2.70	3.70	4.25	V
Output voltage (1V8_SMPS)	1.70	1.80	1.90	V
Normal Operation				
Transient settling time	-	30	-	µs
Load current	-	-	185	mA
Current available for external use, stereo audio with 16Ω load[(a)]	-	-	25	mA
Peak conversion efficiency	-	90	-	%
Switching frequency	3.63	4.00	4.00	MHz
Low-power Mode, Automatically Entered in Deep Sleep				
Transient settling time	-	200	-	µs
Load current	0.005	-	5	mA
Current available for external use	-	-	5	mA
Peak conversion efficiency	-	85	-	%
Switching frequency	100	-	200	kHz

(a) More current available for audio loads above 16Ω.

Regulator Enable

VREG_ENABLE, Switching Threshold	Min	Typ	Max	Unit
Rising threshold	1.0	-	-	V

When using the integrated regulators the voltage regulator enable pin, VREG_ENABLE, enables the MODULE and the following regulators:

- 1.8V switch-mode regulator
- 1.35V switch-mode regulator
- Low-voltage VDD_DIG linear regulator
- Low-voltage VDD_AUX linear regulator

The VREG_ENABLE pin is active high.

MODULE boots-up when the voltage regulator enable pin is pulled high, enabling the regulators. The firmware then latches the regulators on, it is then permitted to release the voltage regulator enable pin.

The status of the VREGENABLE pin is available to firmware through an internal connection. VREGENABLE also works as an input line.

Battery Charger

Battery Charger	Min	Typ	Max	Unit
Input voltage, VCHG[(a)]	4.75 / 3.10	5.00	5.25	V

(a) Reduced specification from 3.1 to 4.75. Full specification > 4.75V.

Trickle Charge Mode		Min	Typ	Max	Unit
Charge current $I_{trickle}$, as percentage of fast charge current		8	10	12	%
V_{fast} rising threshold		-	2.9	-	V
V_{fast} rising threshold trim step size		-	0.1	-	V
V_{fast} falling threshold		-	2.8	-	V
Fast Charge Mode		**Min**	**Typ**	**Max**	**Unit**
Charge current during constant Current mode, I_{fast}	Max, headroom > 0.55V	194	200	206	mA
	Min, headroom > 0.55V		10		mA
Reduced headroom charge current, As a percentage of I_{fast}	Mid, headroom=0.15V	50	-	100	%
I-CTRL charge current step size		-	10	-	mA
V_{float} threshold, calibrated		4.16	4.20	4.24	V
Standby Mode		**Min**	**Typ**	**Max**	**Unit**
Voltage hysteresis on VBAT, V_{hyst}		100	-	150	mV
Error Charge Mode		**Min**	**Typ**	**Max**	**Unit**
Headroom[(a)] error rising threshold		30	-	50	mV
Headroom[(a)] error threshold hysteresis		20	-	30	mV

(a) Headroom=VCHG-VBAT

External Charge Mode	Min	Typ	Max	Unit
Fast charge current, I_{fast}	200	-	500	mA
Control current into CHG_EXT	0	-	20	mA
Voltage on CHG_EXT	0		5.75	V
External pass device h_{fe}	-	50	-	-
Sense voltage, between VBAT_SENSE and VBAT at maximum current	195	200	205	mV

(a) In the external mode, the battery charger meets all the previous charger electrical characteristics and the additional or superseded electrical characteristics are listed in this table.

The battery charger hardware is controlled by the VM. The battery charger has 5 modes:

- Disabled
- Trickle charge
- Fast charge
- Standby: fully charged or float charge
- Error: charging input voltage, VCHG, is too low

The battery charger operating mode is determined by the battery voltage and current.
The internal charger circuit can provide up to 200mA of charge current, for currents higher than this the MODULE can control an external pass transistor

The external mode is for charging higher capacity batteries using an external pass device. The current is controlled by sinking a varying current into the CHG_EXT pin, and the current is determined by measuring the voltage drop across a resistor, Rsense, connected in series with the external pass device, see Figure 4.2.1. The voltage drop is determined by looking at the difference between the VBAT_SENSE and VBAT pins. The voltage drop across Rsense is typically 200mV. The value of the external series resistor determines the charger current. This current can be trimmed with a PS Key.
In Figure 4.2.1, R1 (220mΩ) and C1 (4.7μF) form a RC snubber that is required to maintain stability across all battery ESRs. The battery ESR must be <1.0Ω

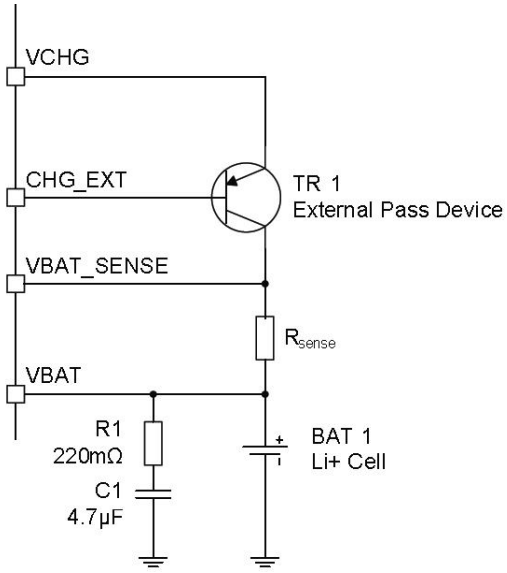


Figure 4.2.1: Battery Charger External Mode Typical Configuration

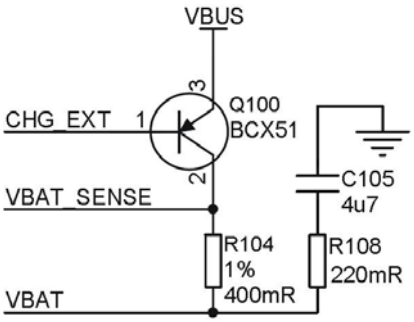


Figure 4.2.2: Optional Ancilliary Circuits

In Figure 4.2.2, Optional fast charge,400mΩ = 500m. Connect VBAT_SENSE to VBAT if not using this circuit.

Stereo Codec: Analogue to Digital Converter

Analogue to Digital Converter						
Parameter	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Resolution	-		-	-	16	Bits
Input Sample Rate, Fsample	-		8	-	48	kHz
Maximum ADC Input Signal Amplitude	0dB = 1600mVpk-pk		13		2260	mVpk-pk
SNR	fin = 1kHz B/W = 20Hz→Fsample/2 (20kHz max) A-Weighted THD+N < 1% 1.6Vpk-pk input	F_{sample}				
		8kHz	-	95	-	dB
		16kHz	-	93	-	dB
		32kHz	-	94	-	dB
		44.1kHz	-	92	-	dB
		48kHz	-	91	-	dB
THD+N	fin = 1kHz B/W = 20Hz→Fsample/2 (20kHz max) 1.6Vpk-pk input	F_{sample}				
		8kHz	-	0.0085	-	%
		48kHz	-	0.0129	-	%
Digital gain	Digital gain resolution = 1/32		-24	-	21.5	dB
Analogue gain	Pre-amplifier setting = 0dB, 9dB, 21dB or30dB Analogue setting = -3dB to 12dB in 3dB steps		-3	-	42	dB
Stereo separation (crosstalk)			-	-88	-	dB

Stereo Codec: Digital to Analogue Converter

Digital to Analogue Converter

Parameter	Conditions			Min	Typ	Max	Unit
Resolution	-			-	-	16	Bits
Output Sample Rate, Fsample	-			8	-	96	kHz
SNR	fin = 1kHz B/W = 20Hz→20kHz A-Weighted THD+N < 0.1% 0dBFS input	**Fsample**	**Load**				
		48kHz	100kΩ	-	95	-	dB
		48kHz	32Ω	-	95	-	dB
		48kHz	16Ω	-	94	-	dB
THD+N	fin = 1kHz B/W = 20Hz→20kHz 0dBFS input	**Fsample**	**Load**				
		8kHz	100kΩ	-	0.0029	-	%
		8kHz	32Ω	-	0.0024	-	%
		8kHz	16Ω	-	0.0039	-	%
		48kHz	100kΩ	-	0.0034	-	%
		48kHz	32Ω	-	0.0031	-	%
		48kHz	16Ω	-	0.0032	-	%
Digital Gain	Digital Gain Resolution = 1/32			-24	-	21.5	dB
Analogue Gain	Analogue Gain Resolution = 3dB			-21	-	0	dB
Output voltage	Full-scale swing (differential)			-	-	778	mV rms

Digital

Digital Terminals	Min	Typ	Max	Unit
Input Voltage				
V_{IL} input logic level low	-0.4	-	0.4	V
V_{IH} input logic level high	0.7xPIO_POWER	-	PIO_POWER+0.4	V
Tr/Tf	-	-	25	ns
Output Voltage				
V_{OL} output logic level low, I_{OL} = 4.0mA	-	-	0.4	V
V_{OH} output logic level high, I_{OH} = -0.4mA	0.75xPIO_POWER	-	-	V
Tr/Tf	-	-	5	ns
Input and Tristate Currents				
Strong pull-up	-150	-40	-10	uA
Strong pull-down	10	40	150	uA
Weak pull-up	-5	-1.0	-0.33	uA
Weak pull-down	0.33	1.0	5.0	uA
C_I input Capacitance	1.0		5.0	pF

LED Driver Pads

LED Driver Pads		Min	Typ	Max	Unit
Current, I_{PAD}	High impedance state	-	-	5	µA
	Current sink state	-	-	10	mA
LED pad voltage, V_{PAD}	I_{PAD} = 10mA	-	-	0.55	V
LED pad resistance	V_{PAD} < 0.5V	-	-	40	Ω
V_{OL} output logic level low[(a)]		-	0	-	V
V_{OH} output logic level high[(a)]		-	0.8	-	V
V_{IL} input logic level low		-	0	-	V
V_{IH} input logic level high		-	0.8	-	V

(a) LED output port is open-drain and requires a pull-up

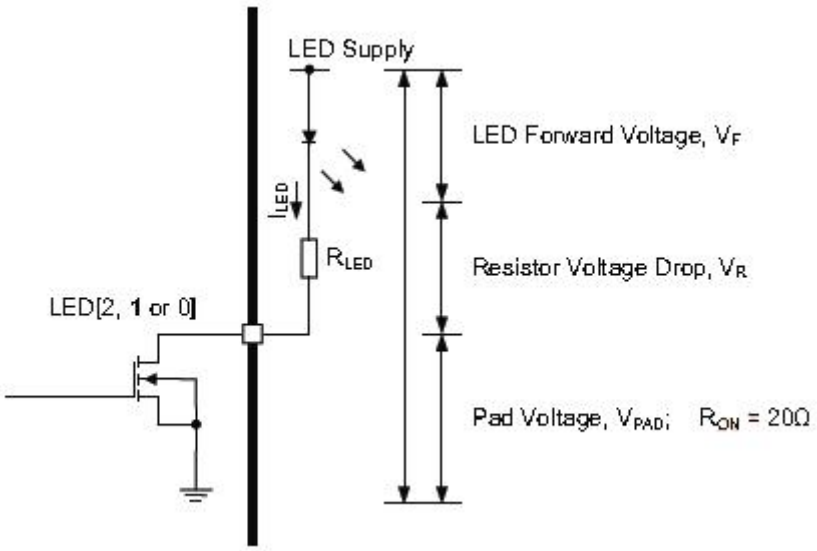


Figure 2.1: LED Equivalent Circuit

From Figure 2.1 it is possible to derive Equation 2.1 to calculate ILED. If a known value of current is required through the LED to give a specific luminous intensity, then the value of RLED is calculated.

$$I_{LED} = \frac{VDD - V_F}{R_{LED} + R_{ON}}$$

Equation 2.1: LED Current

For the LED pads to act as resistance, the external series resistor, RLED, needs to be such that the voltage drop across it, VR, keeps VPAD below 0.5V. Equation 2.2 also applies.

$$VDD = VF + VR + VPAD$$

Equation 2.2: LED PAD Voltage

Note:

The LED current adds to the overall current. Conservative LED selection extends battery life.

Auxiliary ADC

Auxiliary ADC	Min	Typ	Max	Unit
Resolution	-	-	10	Bits
Input voltage range(a)	0	-	1.35	V

Accuracy	INL	-1	-	1	LSB
(Guaranteed monotonic)	DNL	0	-	1	LSB
Offset		-1	-	1	LSB
Gain error		-0.8	-	0.8	%
Input bandwidth		-	100	-	kHz
Conversion time		1.38	1.69	2.75	µs
Sample rate(b)		-	-	700	Samples/s

(a) LSB size = VDD_AUX/1023

(b) The auxiliary ADC is accessed through a VM function. The sample rate given is achieved as part of this function.

Auxiliary DAC

Auxiliary DAC	Min	Typ	Max	Unit
Resolution	-	-	10	Bits
Supply voltage, VDD_DAC	1.30	1.35	1.40	V
Output voltage range	0	-	1.35	V
Full-scale output voltage	1.30	1.35	1.40	V
LSB size	0	1.32	2.64	mV
Offset	-1.32	0	1.32	mV
Integral non-linearity	-1	0	1	LSB
Settling time(a)	-	-	250	ns

(a) The settling time does not include any capacitive load

Power Consumption

DUT Role	Connection		Packet Type	Packet Size	Average Current	Unit
Slave	SCO		HV3	30	11.0	mA
Slave	eSCO		EV3	30	11.8	mA
Slave	eSCO		2EV3	60	9.2	mA
Slave	SCO	2-mic CVC	HV3	30	12.6	mA
Slave	eSCO	2-mic CVC	2EV3	60	10.8	mA
Slave	eSCO	2-mic CVC	2EV3	60	11.4	mA
Slave	Stereo high quality SBC: ■ SBC ■ 48KHz sampling ■ No sniff				13.3	mA

Slave	Stereo high quality: ■ MP3 ■ 48KHz sampling ■ No sniff				12.5	mA
Slave	ACL	Sniff = 500ms	-	-	213	mA
Slave	ACL	Sniff = 1280ms	-	-	142	mA
Master	SCO		HV3	30	10.8	mA
Master	eSCO		EV3	30	11.2	mA
Master	eSCO		2EV3	60	8.8	mA
Master	SCO	2-mic CVC	HV3	30	12.5	mA
Master	eSCO	2-mic CVC	2EV3	60	10.5	mA
Master	eSCO	2-mic CVC	2EV3	60	11.0	mA
Master	ACL	Sniff = 500ms	-	-	197	mA
Master	ACL	Sniff = 1280ms	-	-	142	mA

Note:

Current consumption values are taken with:

- VBAT pin = 3.7V
- RF TX power set to 0dBm
- No RF retransmissions in case of eSCO
- Microphones and speakers disconnected
- Audio gateway transmits silence when SCO/eSCO channel is open
- LEDs disconnected
- AFH classification master disabled

RF Specification: Basic Data Rate

Transmitter(Temperature=+20℃)

RF Characteristics, VDD = 1.35V	Min	Typ	Max	Bluetooth Specification	Unit
Maximum RF transmit power	0	2	4	-6 to +4	dBm
RF power control range	3	4.5	5.5	2<=PC<=8	dB
20dB bandwidth for modulated carrier	-	900	-	≤1000	kHz
Adjacent channel transmit power F = F0 ± 2MHz	-	-32	-	≤-20	dBm
Adjacent channel transmit power F = F0 ± 3MHz	-	-38	-	≤-40	dBm
Adjacent channel transmit power F = F0 ± > 3MHz	-	-65	-	≤-40	dBm
Δf1avg Maximum Modulation	-	165	-	140<f1avg<175	kHz
Δf2max Minimum Modulation	-	140	-	115	kHz
Δf1avg/Δf2avg	-	0.9	-	≥0.80	
Initial carrier frequency tolerance	-	±15	-	±75	kHz
Drift Rate		±7		±20	kHz/50μ

Drift (single slot packet)	-	±10	-	±25	kHz
Drift (five slot packet)	-	±10	-	±40	kHz
2nd Harmonic Content	-	-27	-	≤-30	dBm
3rd Harmonic Content	-	-26	-	≤-30	dBm

Receiver(Temperature=+20℃)

RF Characteristics, VDD = 1.35V	Frequency (GHz)	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER for all packet types	2.402	-	-81	-77	≤-70	dBm
	2.441	-	-87	-83		
	2.480	-	-87	-83		
Maximum received signal at 0.1% BER		-	>-10		≥-20	dBm
C/I co-channel		-	5	-	≤11	dB
Adjacent channel selectivity C/I F = F0 + 1MHz		-	-5	-	≤0	dB
Adjacent channel selectivity C/I F = F0 - 1MHz		-	-2	-	≤0	dB
Adjacent channel selectivity C/I F = F0 + 2MHz		-	-40	-	≤-30	dB
Adjacent channel selectivity C/I F = F0 - 2MHz		-	-32	-	≤-20	dB
Adjacent channel selectivity C/I F = F0 + 3MHz		-	-47	-	≤-40	dB
Adjacent channel selectivity C/I F = F0 - 5MHz		-	-45	-	≤-40	dB
Adjacent channel selectivity C/I F = FImage		-	-29	-	≤-9	dB
Maximum level of intermodulation interferers		-	-15	-	≥-39	dBm
Spurious output level		-	-155	-		dBm/Hz

BTM-630 Pin Functions

No.	Pin Name	Pin Type	Pin Description
1.	SPKR_RN	Analogue out	Speaker output negative, right
2.	SPKR_RP	Analogue out	Speaker output positive, right
3	SPKR_LN	Analogue out	Speaker output negative, left
4	SPKR_LP	Analogue out	Speaker output positive, left

5	RF_GND	RF_GND	RF GND
6.	RF_GND	RF_GND	RF GND
7	BT_RF	RF	Bluetooth 50Ω transmitter output / receiver input
8	RF_GND	RF_GND	RF GND
9.	RF_GND	RF_GND	RF GND
10	AIO[0]	Bidirectional	Analogue programmable input / output line.
11.	PIO[21]	Bidirectional with weak pull-down	Programmable input / output line 21.
12.	PIO[18]	Bidirectional with weak pull-down	Programmable input / output line 18.
13.	PIO[17]	Bidirectional with strong pull-down	Programmable input / output line 17. Alternative function: ■ UART_CTS: UART clear to send, active low
14.	PIO[16]	Bidirectional with strong pull-up	Programmable input / output line 16. Alternative function: ■ UART_RTS: UART request to send, active low
15.	GND	GND	Common Ground
16.	PIO[14]	Bidirectional with strong pull-up	Programmable input / output line 14. Alternative function: ■ UART_RX: UART data input
17.	PIO[15]	Bidirectional with strong pull-up	Programmable input / output line 15. Alternative function: ■ UART_TX: UART data output
18.	PIO[13]	Bidirectional with strong pull-down	Programmable input / output line 13. Alternative function: ■ QSPI_IO[1]: SPI flash data bit 1
19	PIO[11]	Bidirectional with strong pull-down	Programmable input / output line 11. Alternative function: ■ QSPI_IO[0]: SPI flash data bit 0 ■ I2C_SDA: I²C serial data line
20	PIO[10]	Bidirectional with strong pull-down	Programmable input / output line 10. Alternative function: ■ QSPI_FLASH_CLK: SPI flash clock ■ I2C_SCL: I²C serial clock line
21.	PIO[12]	Bidirectional with strong pull-up	Programmable input / output line 12. Alternative function: ■ QSPI_FLASH_CS#: SPI flash chip select

			■ I2C_WP: I²C bus memory write protect line
22.	PIO[7]	Bidirectional with strong pull-down	Programmable input / output line 7.
23.	PIO[6]	Bidirectional with strong pull-down	Programmable input / output line 6.
24.	RSTB	Input with strong pull-up	Reset if low. Pull low for minimum 5ms to cause a reset.
25	PIO_POWER	Power supply	Positive supply for PIO
26.	VREG_ENABLE	Analogue	Regulator enable input
27.	SPI_PCM#	Input with weak pulldown	SPI/PCM select input: ■ 0 = PCM/PIO interface ■ 1 = SPI
28.	VCHG	Charger input	Lithium ion/polymer battery charger input
29.	GND	GND	Common Ground
30.	GND	GND	Common Ground
31.	CHG_EXT		External battery charger control. External battery charger transistor base control when using external charger boost. Otherwise leave unconnected.
32.	VBAT_SENSE		Battery charger sense input. Connect directly to the battery positive pin.
33.	VBAT	Battery terminal +ve	Lithium ion/polymer battery positive terminal. Battery charger output and input to switch-mode regulator
34.	1V8_SMPS	Power supply	1.8V Output
35.	PIO[5]	Bidirectional with weak pull-down	Programmable input / output line 5. Alternative function: ■ SPI_CLK: SPI clock ■ PCM1_CLK: PCM1 synchronous data clock
36.	PIO[4]	Bidirectional with weak pull-down	Programmable input / output line 4. Alternative function: ■ SPI_CS#: chip select for SPI, active low ■ PCM1_SYNC: PCM1 synchronous data sync
37	PIO[3]	Bidirectional with weak pull-down	Programmable input / output line 3. Alternative function: ■ SPI_MISO: SPI data output

			■ PCM1_OUT: PCM1 synchronous data output
38.	PIO[2]	Bidirectional with weak pull-down	Programmable input / output line 2. Alternative function: ■ SPI_MOSI: SPI data input ■ PCM1_IN: PCM1 synchronous data input
39.	PIO[9]	Bidirectional with strong pull-down	Programmable input / output line 9. Alternative function: ■ UART_CTS: UART clear to send, active low
40.	PIO[8]	Bidirectional with strong pull-up	Programmable input / output line 8. Alternative function: ■ UART_RTS: UART request to send, active low
41.	PIO[1]	Bidirectional with strong pull-up	Programmable input / output line 1. Alternative function: ■ UART_TX: UART data output
42.	PIO[0]	Bidirectional with strong pull-up	Programmable input / output line 0. Alternative function: ■ UART_RX: UART data input
43.	GND	GND	Common Ground
44.	USB_DN	Bidirectional	USB data minus
45.	USB_DP	Bidirectional	USB data plus with selectable internal 1.5kΩ pull-up resistor
46.	LED[2]	Bidirectional	LED driver. Alternative function: programmable output PIO[31]
47.	LED[1]	Bidirectional	LED driver. Alternative function: programmable output PIO[30].
48.	LED[0]	Bidirectional	LED driver. Alternative function: programmable output PIO[29].
49.	NC		
50.	NC		
51.	LINE_BN	Analogue in	Line input negative, channel B
52.	LINE_BP	Analogue in	Line input positive, channel B
53.	LINE_AN	Analogue in	Line input negative, channel A
54.	LINE_AP	Analogue in	Line input positive, channel A
55.	AGND	AGND	AUDIO GND

USB Interface

MODULE has a full-speed (12Mbps) USB interface for communicating with other compatible digital devices.
The USB interface on MODULE acts as a USB peripheral, responding to requests from a master host controller.
MODULE contains internal USB termination resistors and requires no external resistor matching.
MODULE supports the Universal Serial Bus Specification, Revision v2.0 (USB v2.0 Specification), supports USB standard charger detection and fully supports the USB Battery Charging Specification , available from http://www.usb.org. For more information on how to integrate the USB interface on MODULE see the Bluetooth and USB Design Considerations Application Note.
As well as describing USB basics and architecture, the application note describes:

- Power distribution for high and low bus-powered configurations
- Power distribution for self-powered configuration, which includes USB VBUS monitoring
- USB enumeration
- Electrical design guidelines for the power supply and data lines, as well as PCB tracks and the effects of ferrite beads
- USB suspend modes and Bluetooth low-power modes:
  - Global suspend
  - Selective suspend, includes remote wake
  - Wake on Bluetooth, includes permitted devices and set-up prior to selective suspend
  - Suspend mode current draw
  - PIO status in suspend mode
  - Resume, detach and wake PIOs
- Battery charging from USB, which describes dead battery provision, charge currents, charging in suspend modes and USB VBUS voltage consideration
- USB termination when interface is not in use
- Internal modules, certification and non-specification compliant operation

Programming and Debug Interface

MODULE provides a debug SPI interface for programming, configuring (PS Keys) and debugging the MODULE. Access to this interface is required in production. Ensure the 4 SPI signals and the SPI/PCM# line are brought out to either test points or a header. To use the SPI interface, the SPI/PCM# line requires the option of being pulled high externally.

Analogue I/O Ports, AIO

MODULE has 1 general-purpose analogue interface pin, AIO[0]. Typically, this connects to a thermistor for battery pack temperature measurements during charge control.

Reset, RST#

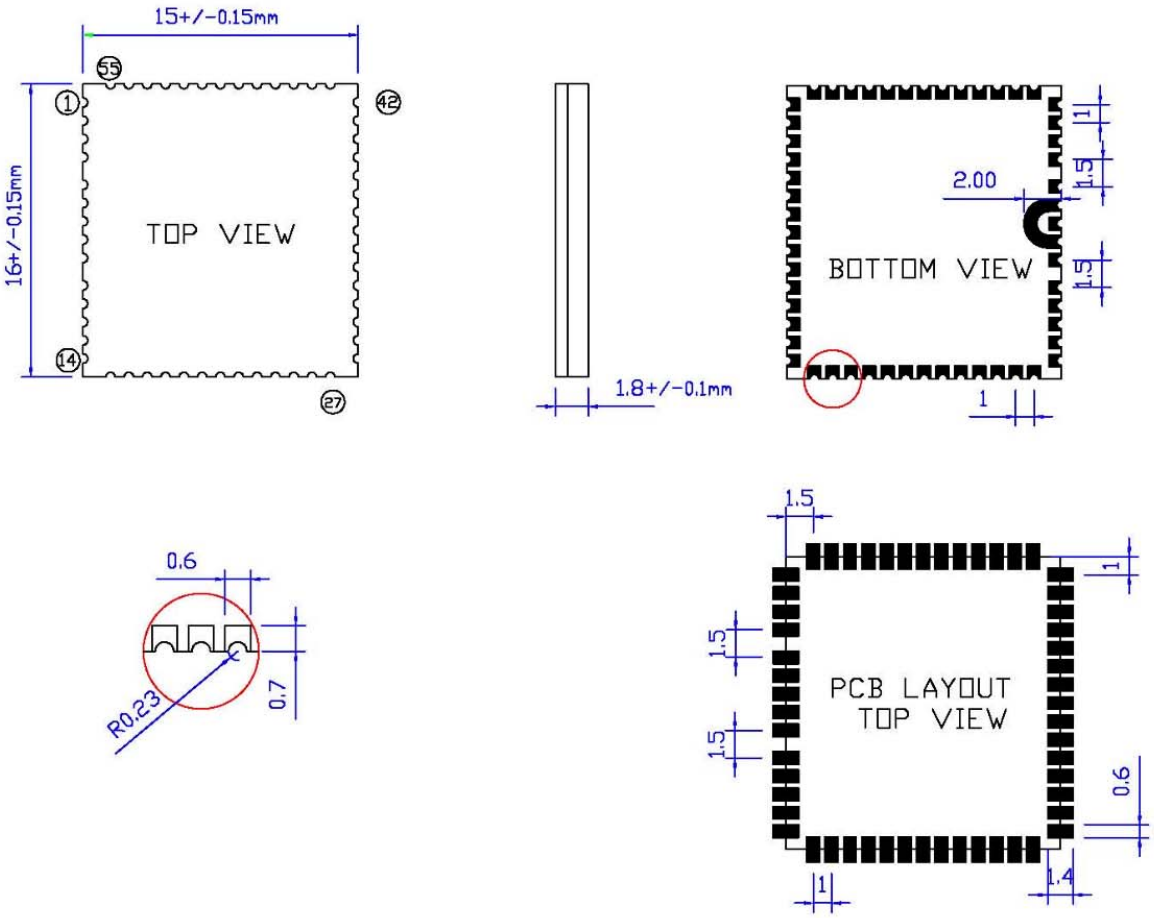
MODULE is reset from several sources:

- RST# pin
- Power-on reset
- USB charger attach reset
- Software configured watchdog timer

The RST# pin is an active low reset and is internally filtered using the internal low frequency clock oscillator. Rayson recommends applying RST# for a period >5ms.

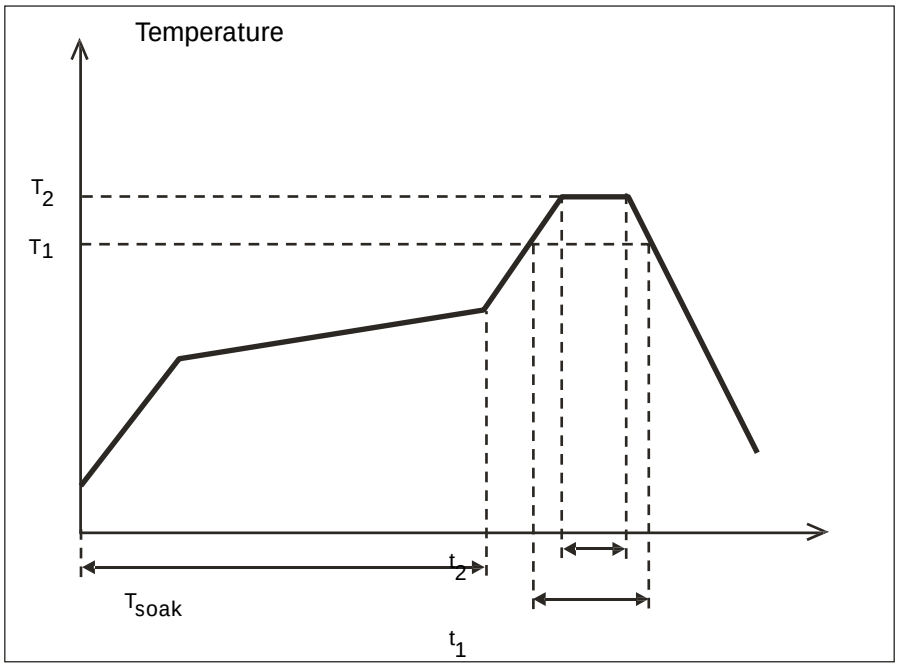
At reset the digital I/O pins are set to inputs for bidirectional pins and outputs are set to tristate.

Dimension

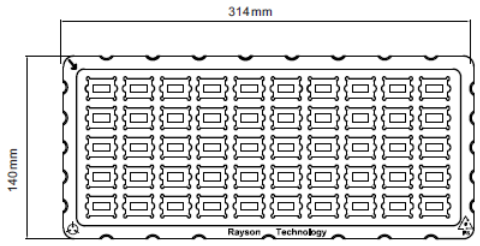


Reflow profile

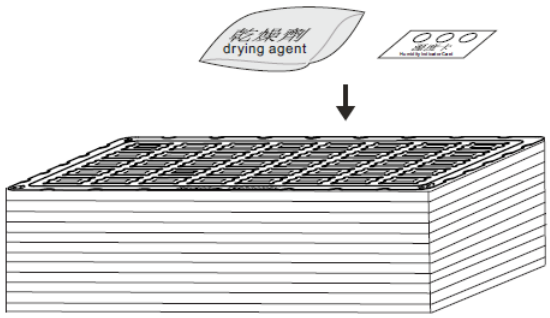
Reflow profile requirements		
Parameter Specification	**Reference**	**Specification**
Average temperature gradient in preheating		1~2.5°C/s to 175°C equilibrium.
Soak time	T_{soak}	120~180 seconds
Time above 217°C (T_1)	t_1	45~90 seconds
Peak temperature in reflow	T_2	250°C (–0/+5°C)
Time at peak temperature	t_2	6 seconds
Temperature gradient in cooling		6°C/second max.

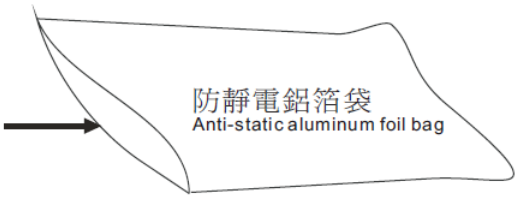


包裝示意圖
Packing diagram

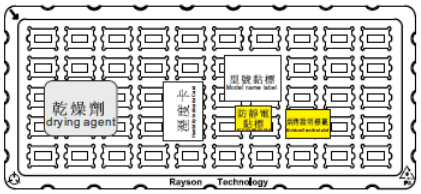


托盤一盤可裝50PCS
Each tray contains 50 pcs of module
314*140*7. 5mm (L*W*H)
托盤共計11層,最上層不放模組50*10=500PCS
Total 11 trays are stacked up with a empty tary on the top
50*10=500pcs



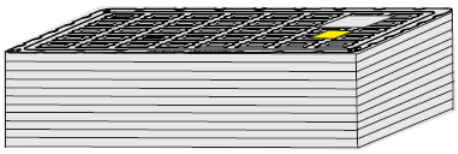


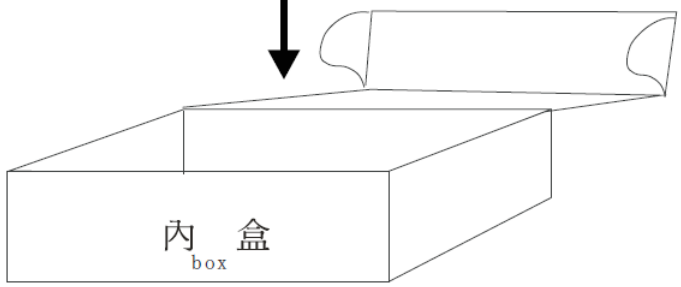
將裝入模組的拖盤放入防靜電鋁箔袋中進行真空
The stacked trays are loaded into a antistatic vacuum bag



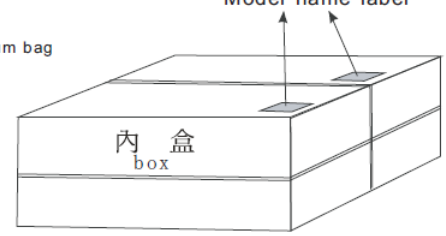
一個鋁箔袋放一個內盒50*10=500pcs
The vacuum bag will be placed in the box,50*10=500pcs
在盒外正面加貼型號黏標
Stick the model name lable at the front side of the box
四個內盒裝一個外箱,500*4=2000PCS
Each carton contains four boxes,500*4=2000PCS

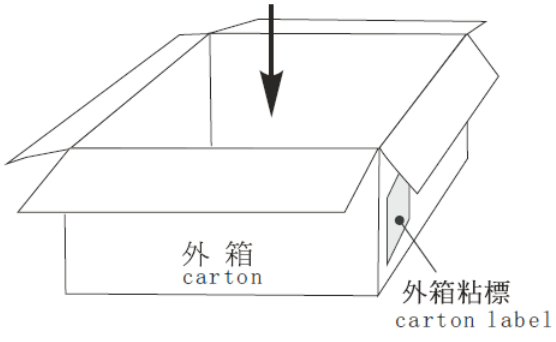
在鋁箔袋外,貼型號黏標及防靜电黏標,烘烤說明標籤
Stick the antistaic label and model name label and Moisture Sensitive Label on the vacuum bag





型號黏標
Model name label





外箱粘標貼於外箱側喽
Stick carton label at the side