

Product Specification

CLASS II

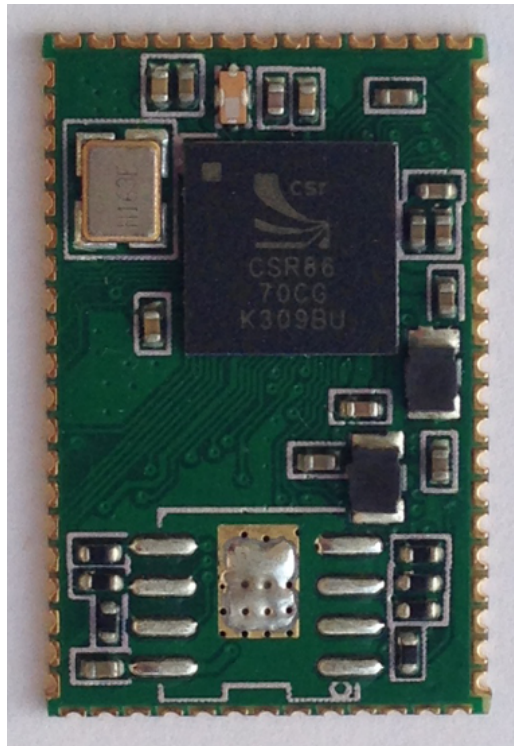
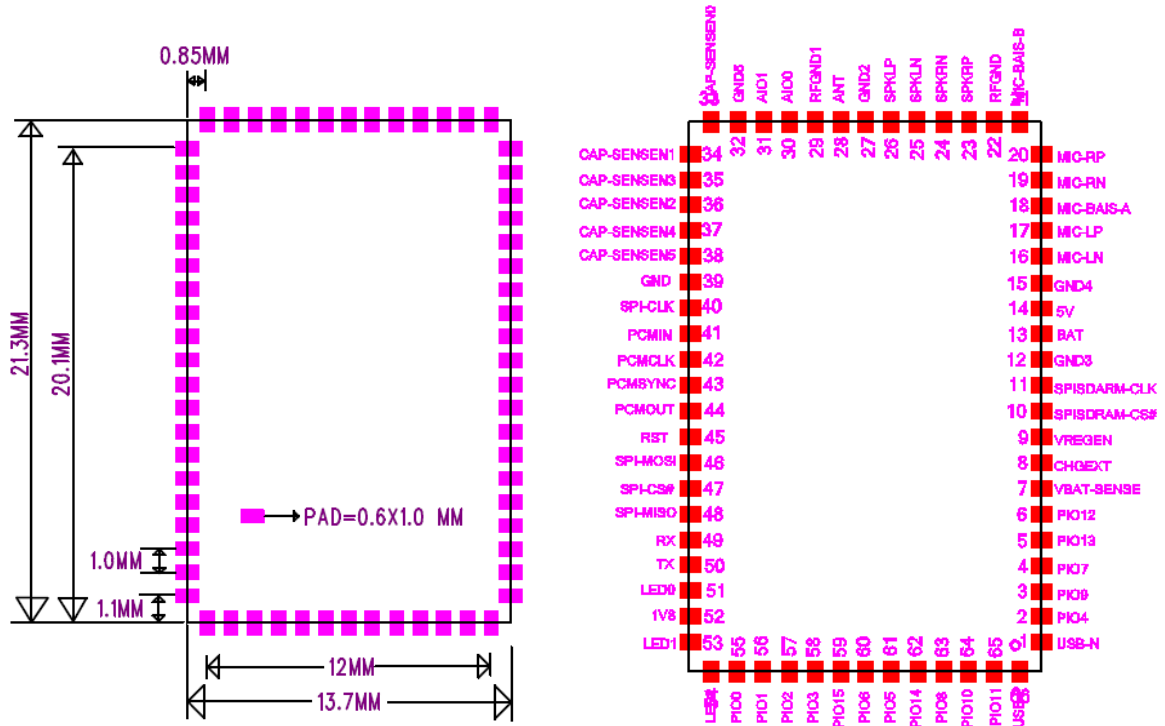
SJR-BTM870 MODULE

DRAWN BY :			MODEL : SJR-BTM870
CHECKED BY :			DESCRIPTION : CSR8670(16M Flash)Module
APPD. BY:			REV : 1.2

Contents

1. Product Photo
 2. Feature
 3. Summary of Benefit
 4. Device Terminal Function
 5. Block Diagram
 6. Electrical Specification:
 7. Schematic Diagram
 8. Testing Block Diagram
- Fig 1 Programming and Freq. Alignment Test Procedure
- Fig 2 RF Parameter Test procedure
- Fig 3 Assemble/Alignment/Testing Flow Chart

1. Product Photo



13.7X21.3X2.0(MM)

2. Feature

- **Bluetooth® v3.0 specification fully qualified software**
- **Bluetooth v4.0 specification compliant hardware**
- **Radio includes integrated balun and RF performance of 10dBm transmit power and -90dBm receive sensitivity**
- **80MHz RISC MCU and 80MIPS Kalimba DSP**
- **16Mb internal flash memory (64-bit wide, 45ns);
optional support for 64Mb of external SPI flash**
- **Stereo codec with 2 channels of ADC and up to 6 microphone inputs
(includes bias generators and digital microphone support)**
- **Support for CSR's latest CVC technology for narrow-band and wideband
voice connections including wind noise reduction**
- **Audio interfaces: I²S, PCM and SPDIF**
- **Serial interfaces: UART, USB 2.0 full-speed, master and slave
bit-serialiser (I²C and SPI)**
- **Integrated dual switch-mode regulators, linear regulators and battery
charger**
- **3 hardware LED controllers (for RGB) and ability to drive LCD segment
display directly**
- **Support for up to 6 capacitive touch sensor inputs**
- **Green (RoHS compliant and no antimony or halogenated flame
retardants)**

3. Summary of Benefit

■ **The Module consumer audio platform for wired and wireless applications integrates an ultra-low-power DSP and application processor with embedded flash memory, a high-performance stereo codec, a power management subsystem, LED and LCD drivers and capacitive touch sensor inputs in a SOC IC. The dual-core architecture with flash memory enables manufacturers to easily differentiate their products with new features without extending development cycles.**

■ **The enhanced Kalimba DSP coprocessor with 80MIPS supports enhanced audio and DSP applications.**

■ **Smallest footprint, 13.7mmX21.3mm**

■ **Class 1, Class 2 and Class 3 support without the need for an external power amplifier or TX/RX switch**

■ **Low-power Solution for DSP Intensive Audio Applications**

Applications:

Home Entertainment Ecosystem:

- **TVs**
- **Smart remote controllers**
- **Wired or wireless soundbars**
- **Wired or wireless speakers and headphones**

Tablets / PCs / Mobile Connectivity:

- **Wearable audio (on-the-go)**
- Wearable audio with sensors (health and well wellbeing applications)**
- **Wired or wireless stereo headphones for music/gaming/multimedia content**
 - **Wired or wireless speakers**

- **Wired or wireless speakerphones**
- **Mono headsets for voice**

- **Software**
 - Support CSR bluetooth stack
 - Design for Client

4. Device Terminal Function

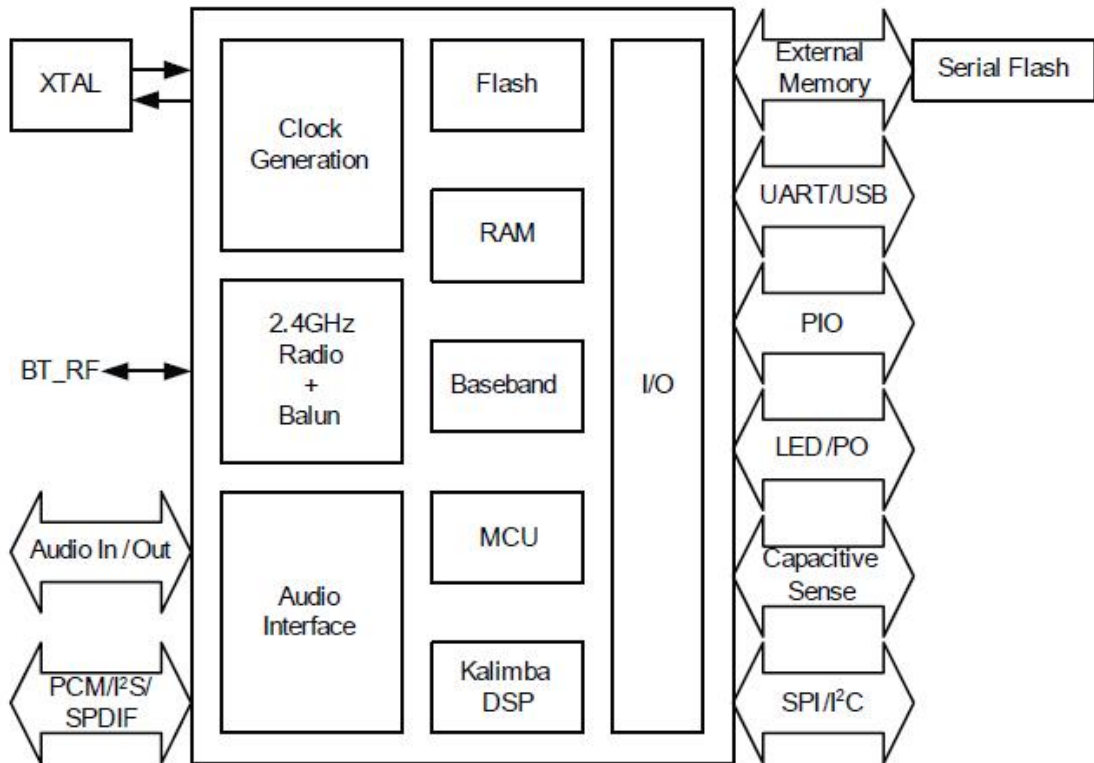
PIN Name	PIN #	Pad type	Description	Note
GND	12,15,22, 27,29,32, 39	VSS	Ground pot	
1.8V	52	VDD3.3V	output 3.3V (+) supply	MAX3.6V
BATT	13	Battery terminal	Lithium ion/polymer battery positive terminal.	
5V	14	Charger input	Lithium ion/polymer battery charger input	
VREGEN	9	Analogue	Regulator enable input	
AIO0	30	Bi-Directional	Programmable input/output line	
AIO1	31	Bi-Directional	Programmable input/output line	
PIO0	55	Bi-Directional	Programmable input/output line	
PIO1	56	Bi-Directional	Programmable input/output line	
PIO2	57	Bi-Directional	Programmable input/output line	
PIO3	58	Bi-Directional	Programmable input/output line	
PIO4	2	Bi-Directional	Programmable input/output line	
PIO5	61	Bi-Directional	Programmable input/output line	
PIO6	60	Bi-Directional	Programmable input/output line	
PIO7	4	Bi-Directional	Programmable input/output line	

PIO8	63	Bi-Directional	Programmable input/output line	
PIO9	3	Bi-Directional	Programmable input/output line	
PIO10	64	Bi-Directional	Programmable input/output line	
PIO11	65	Bi-Directional	Programmable input/output line	
PIO12	6	Bi-Directional	Programmable input/output line	
PIO13	5	Bi-Directional	Programmable input/output line	
PIO14	62	Bi-Directional	Programmable input/output line	
PIO15	59	Bi-Directional	Programmable input/output line	
RST	45	CMOS Input with weak internal pull-down	RESET	
RX	49	CMOS input with weak internal pull-down	UART Data input	
TX	50	CMOS output, Tri-stable with weak internal pull-up	UART Data output	
SPI-MOSI	46	CMOS input with weak internal pull-down	Serial peripheral interface data input	
SPI-CS#	47	CMOS input with weak internal pull-up	Chip select for serial peripheral interface, active low	
SPI-CLK	40	CMOS input with weak internal pull-down	Serial peripheral interface clock	
SPI-MISO	48	CMOS input with weak internal pull-down	Serial peripheral interface data Output	
USB-N	1	Bi-Directional	USB D-	
USB-P	66	Bi-Directional	USB D+	
MIC-RP	20	Analogue input	Microphone input R positive	Microphone Right Positive
MIC-RN	19	Analogue input	Microphone input R negative	Microphone

				Right Negative
MIC_LP	17	Analogue input	Microphone input L positive	Microphone Left Positive
MIC_LN	16	Analogue input	Microphone input L negative	Microphone Left Negative
MIC-BAIS-A	18	Analogue	Microphone bias L	
MIC-BAIS-B	21	Analogue	Microphone bias R	
SPKLP	26	Analogue output	Speaker output L positive	Left Positive
SPKLN	25	Analogue output	Speaker output L negative	Left Negative
SPKRP	23	Analogue output	Speaker output R positive	Right Positive
SPKRN	24	Analogue output	Speaker output R negative	Right Negative
PCM_IN	41		Synchronous PCM data input	
PCM_SYNC	43		Synchronous PCM data sync	
PCM_CLK	42		Synchronous PCM data clock	
PCM_OUT	44		Synchronous PCM data output	
ANT	28	Analogue	RF In/Out	
LED0	51	Open drain output	LED driver	
LED1	53	Open drain output	LED driver	
LED2	54	Open drain output	LED driver	
VBAT-SENSE	7		Battery charger sense input	
CHGEXT	8		External battery charger control	
SPISDRAM-CS#	10	Bidirectional with strong	SPI RAM chip select. Alternative function PIO[24]	
SPISDARM	11	Bidirectional with	SPI RAM clock. Alternative	

-CLK		strong pull-down	function PIO[22]	
CAP-SENS EN0	33	Analogue input	Capacitive touch sensor input	
CAP-SENS EN1	34	Analogue input	Capacitive touch sensor input	
CAP-SENS EN2	36	Analogue input	Capacitive touch sensor input	
CAP-SENS EN3	35	Analogue input	Capacitive touch sensor input	
CAP-SENS EN4	37	Analogue input	Capacitive touch sensor input	
CAP-SENS EN5	38	Analogue input	Capacitive touch sensor input	

5. Block Diagram



6. Electrical Specification:

Absolute Maximum Ratings

Rating		Min	Max	Unit
Storage temperature		-40	105	°C
Supply Voltage				
5V (USB VBUS)	VCHG	-0.4	5.75	V
3.3V	SMPS_3V3	-0.4	3.60	V
	VDD_USB	-0.4	3.60	V
Battery	LED[2:0]	-0.4	4.40	V
	SMP_VBAT	-0.4	4.40	V
	VBAT_SENSE	-0.4	5.75	V
	VREGENABLE	-0.4	4.40	V

Recommended Operating Conditions

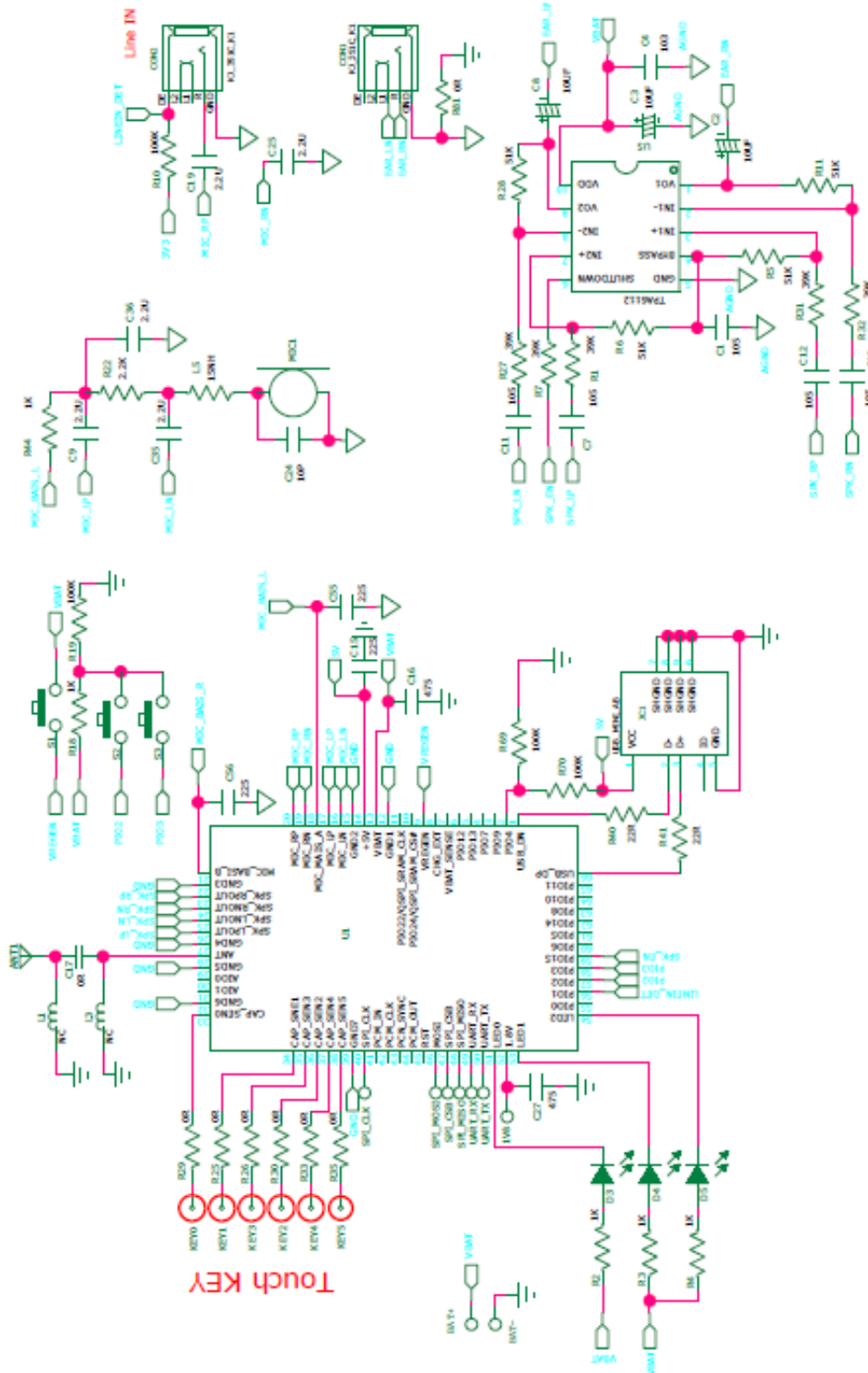
Rating		Min	Typ	Max	Unit
Operating temperature range		-40	20	85	°C
Supply Voltage					
5V (USB VBUS)	VCHG ^(a)	4.75 / 3.10	5.00	5.75	V
3.3V	SMPS_3V3	3.10	3.30	3.60	V
	VDD_USB	3.10	3.30	3.60	V
Battery	LED[2:0]	1.10	3.70	4.25	V
	SMP_VBAT	2.50	3.70	4.25	V
	VBAT_SENSE	0	3.70	4.25	V
	VREGENABLE	0	3.70	4.25	V

Comparison between Classic Bluetooth and LE

Feature	BR/EDR	LE	Notes
RF Channels	79	40	2 MHz spacing in LE
Modulation	GFSK / DQPSK/8DPSK	GFSK	Simple and effective
Modulation Index	0.25 to 0.35	0.45 to 0.55	Wider signal – more robust
Max Tx Power	+20 dBm (class 1) +4 dBm (class 2)	+10 dBm	No “class” structure +10 dBm regulatory limit
Rx Sensitivity (typical)	-85 dBm	-85 dBm	Pathloss = 90 dB for BR Pathloss = 95 dB for LE
Range (typical)	30 meters	50 meters	Modulation Index, increased power for class 2

Feature	BR/EDR	LE	Notes
Packet Format	28 (BR / EDR)	2 (LE)	LE - Advertising / Data
Ack Packet Len	126 μ s	80 μ s	63% shorter
8 octet Packet	214 μ s	144 μ s	67% shorter
Max Packet Size	2875 μ s = 1021 octets	376 μ s = 37 octets	LE very short
Max Data Rate	2178.1 kb/s	305 kb/s	EDR much faster
Time to transfer 1Mbyte	DH1 = 18.2 s, DH5 = 8.8 s, 3-DH5 = 2.9 s	26 s (LE)	LE less efficient for large packets
CRC Strength	16	24	LE stronger
Encryption	Safer+	AES-CCM-128	LE stronger

7. Schematic Diagram(This is for your reference only)



8. Testing Block Diagram

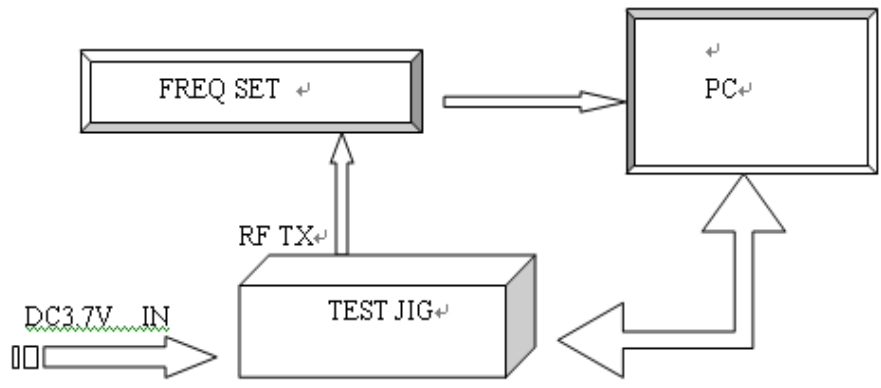


Fig 1 Programming and Freq. Alignment Test Procedure

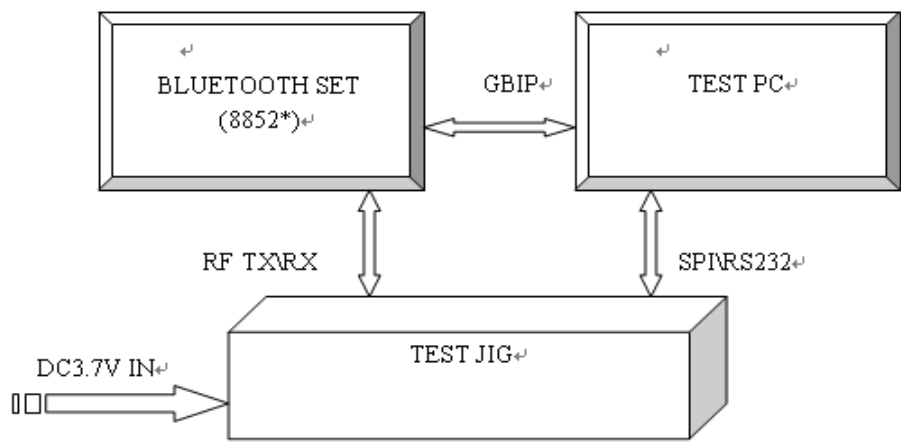


Fig 2 RF Parameter Test procedure

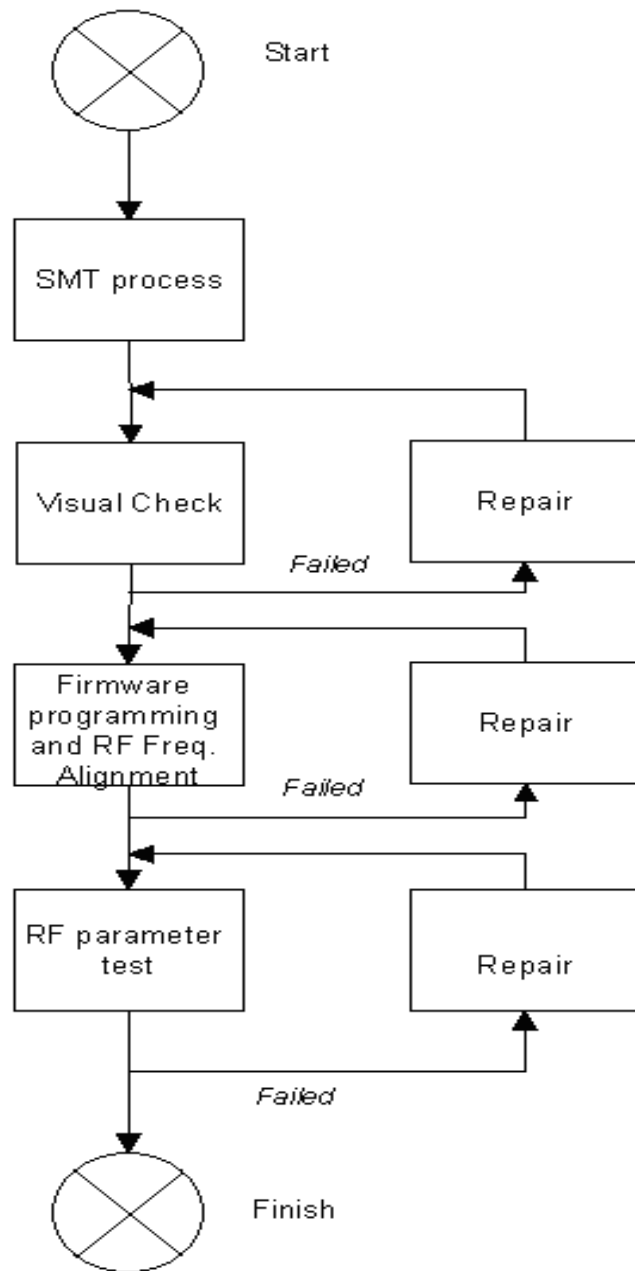


Fig 3 Assemble/Alignment/Testing Flow Chart