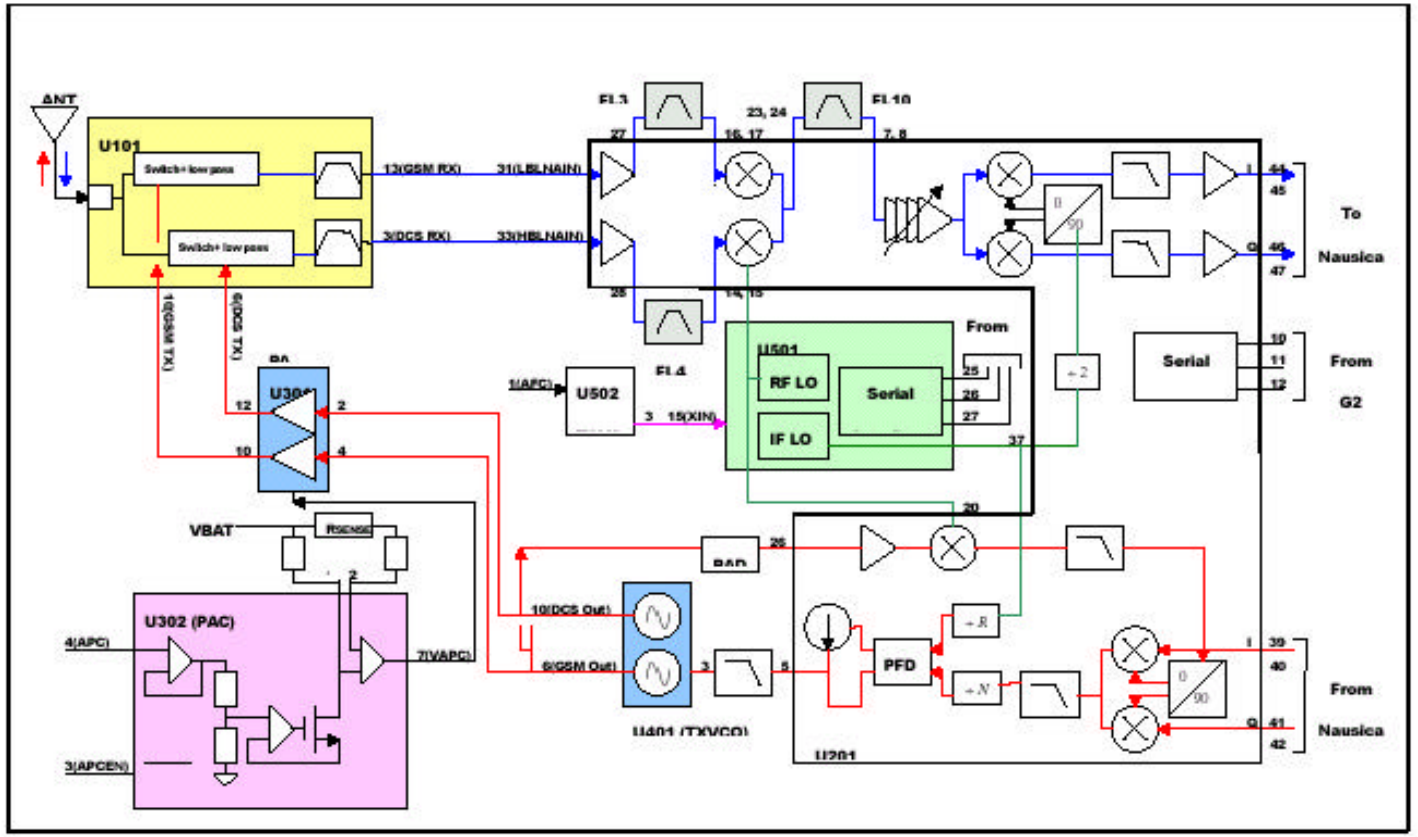
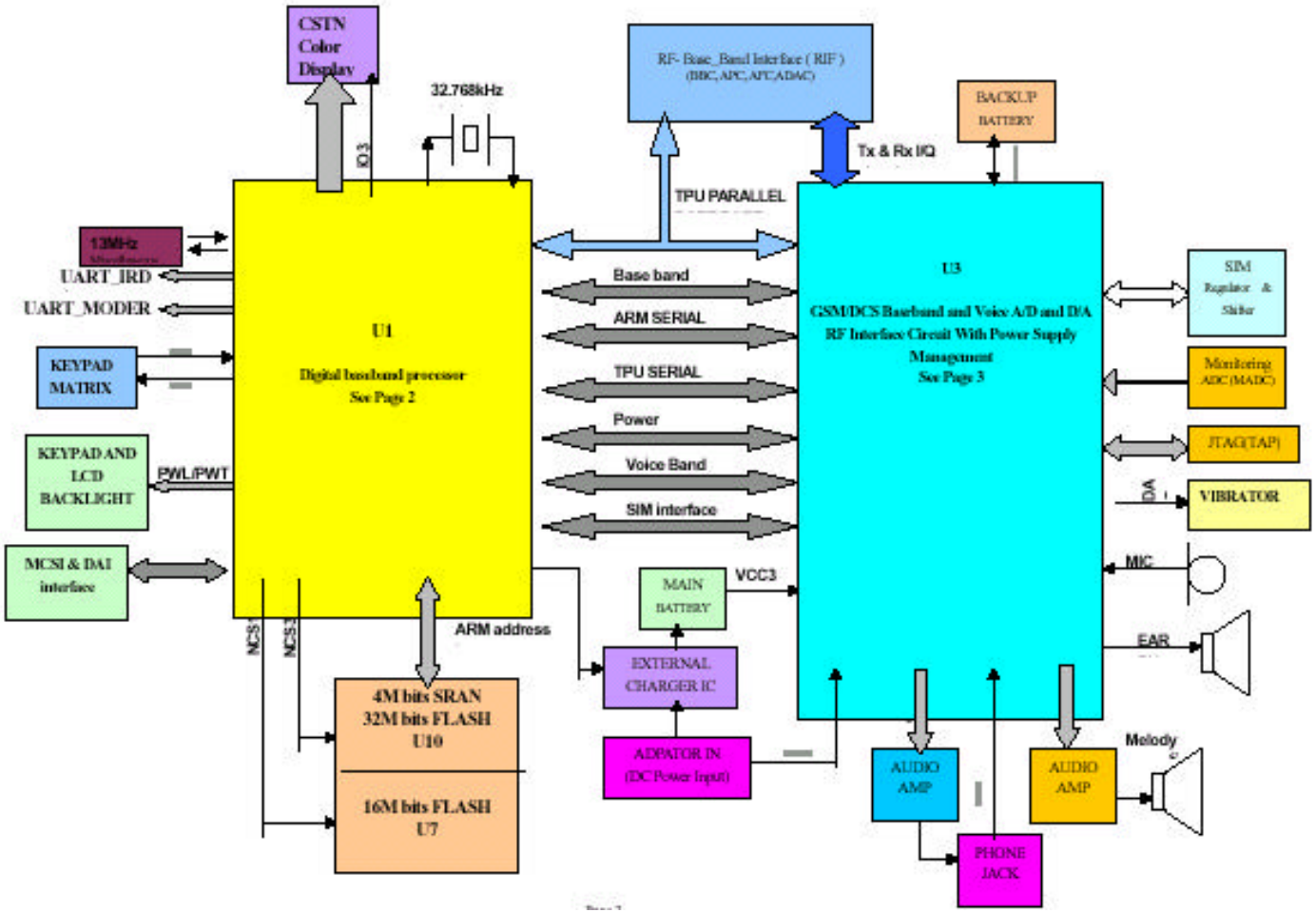
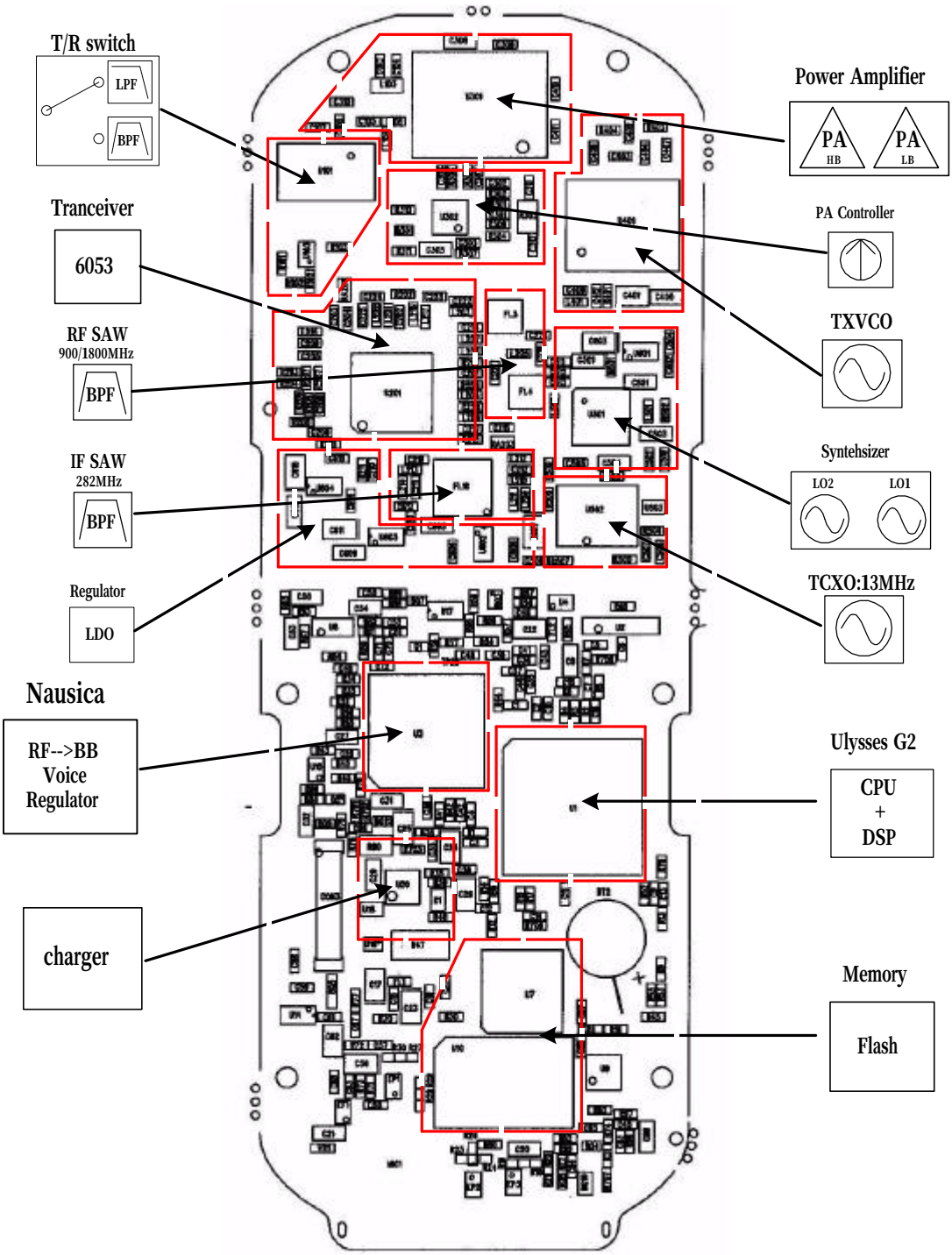
Garnet Trouble Shooting

DUAL BAND GARNET RF BLOCK DIAGRAM



DUAL BAND GARNET Baseband BLOCK DIAGRAM




T/R switch
LPF
BPF
Power Amplifier
PA
HB
PA
LB
Tranceiver
6053
PA Controller
RF SAW
900/1800MHz
BPF
TXVCO
IF SAW
282MHz
BPF
Syntehsizer
LO2
LO1
Regulator
LDO
TCXO:13MHz
Nausica
RF-->BB
Voice
Regulator
Ulysses G2
CPU
+
DSP
charger
Memory
Flash

RF Section :

● Transmitting

High power imply the difficulty of PA and PA controller.
Stringent spec. of spectrum imply the difficulty of LO, IF VCO.
Transcients problem due to PA saturation or suitable switch PA by PA controller.
Phase Error or Frequency Error due to power ramp unstable, or IF, LO, TXVCO unlock frequency.

I. Output Power

Specification:

The transmitter output power,under nomal and extreme test conditions at each frequency and for each power control level , shall be satisfied the table 1 and table 2 Specification.

Power class				Power control level	Transmitter output power	Tolerances	
2	3	4	5		dBm	normal	extreme
•				2	39	+/-2 dB	+/-2,5 dB
•	•			3	37	+/-3 dB*)	+/-4 dB*)
•	•			4	35	+/-3 dB	+/-4 dB
•	•	•		5	33	+/-3 dB*)	+/-4 dB*)
•	•	•		6	31	+/-3 dB	+/-4 dB
•	•	•	•	7	29	+/-3 dB*)	+/-4 dB*)
•	•	•	•	8	27	+/-3 dB	+/-4 dB
•	•	•	•	9	25	+/-3 dB	+/-4 dB
•	•	•	•	10	23	+/-3 dB	+/-4 dB
•	•	•	•	11	21	+/-3 dB	+/-4 dB
•	•	•	•	12	19	+/-3 dB	+/-4 dB
•	•	•	•	13	17	+/-3 dB	+/-4 dB
•	•	•	•	14	15	+/-3 dB	+/-4 dB
•	•	•	•	15	13	+/-3 dB	+/-4 dB
•	•	•	•	16	11	+/-5 dB	+/-6 dB
•	•	•	•	17	9	+/-5 dB	+/-6 dB
•	•	•	•	18	7	+/-5 dB	+/-6 dB
•	•	•	•	19	5	+/-5 dB	+/-6 dB

Table 1. GSM900 transmitter output power for different power classes and power control level.

Power class			Power control level	Transmitter output power	Tolerances	
1	2	3		dBm	normal	extreme
		*	29	36	+/-2,0 dB	+/-2,5 dB
		*	30	34	+/-3,0 dB	+/-4,0 dB
		*	31	32	+/-3,0 dB	+/-4,0 dB
*		*	0	30	+/-3,0 dB*)	+/-4 dB*)
*		*	1	28	+/-3 dB	+/-4 dB
*		*	2	26	+/-3 dB	+/-4 dB
*	*	*	3	24	+/-3 dB*)	+/-4 dB*)
*	*	*	4	22	+/-3 dB	+/-4 dB
*	*	*	5	20	+/-3 dB	+/-4 dB
*	*	*	6	18	+/-3 dB	+/-4 dB
*	*	*	7	16	+/-3 dB	+/-4 dB
*	*	*	8	14	+/-3 dB	+/-4 dB
*	*	*	9	12	+/-4 dB	+/-5 dB
*	*	*	10	10	+/-4 dB	+/-5 dB
*	*	*	11	8	+/-4 dB	+/-5 dB
*	*	*	12	6	+/-4 dB	+/-5 dB
*	*	*	13	4	+/-4 dB	+/-5 dB
*	*	*	14	2	+/-5 dB	+/-6 dB
*	*	*	15	0	+/-5 dB	+/-6 dB

Table 1. DCS1800 transmitter output power for different power classes and power control level.

More accuracy calibration comes out smaller error output power. We wish the maximum output power should be 32.8~33.2dBm for GSM and 30.3~30.7dBm for DCS in middle channel. This will reduce the chance of PA saturation and lead to spectrum over specification. Of course, the different channel have different value of output power, we must calibrate output power at an appropriate value.

Possibility of Low Output Power:

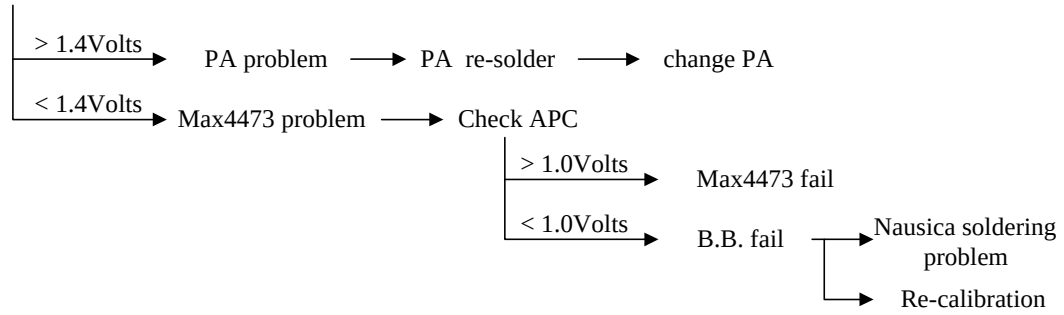
- If transmitting frequency is not correct, TXVCO or Synthesizer or Transceiver is failed. And the current is about 210mA~230mA for GSM power level 5 and 180mA~200mA for DCS power level 0.
- If transmitting frequency is correct, PA or PA controller or APC from base-band is failed. For this case, the current smaller than 100mA.

Trouble Shooting Flow:

1). Check TXVCO frequency.

2). Re-calibration.

3). Check VPAC



4). Check T/R switch

1. Check Vccgsm about 2.8V and Vccdcs =0V for GSM band.

2. Check Vccdcs about 2.8V and Vccgsm=0V for DCS band.

II. Phase Error

Definition:

$$RMS\ \ phase\,error = \sqrt{\frac{\sum_{i}^{N}\left(f_1^{'} - f_1\right)^2}{N}}$$

Specification:

RMS Phase Error < 5 Degree

Peak Phase Error < 20 Degree

Possibility of phase error fail

- IF, LO, TCXO(13Mhz), Transceiver (RF6053) and TXVCO.
- Power Ramp over spec.

Trouble Shooting Flow:

1). Check IF VCO, LO and synthesizer

- Check Vcc power supply of Si4133 pin 12, pin 17, pin 23.
- Check IF, LO frequency in Table 3 for different channel and measure the phase error of IF or LO by using the R&S Spectrum Analyzer FSIQ. The center frequency is set at IF or LO frequency, and the offset frequency is set at 67 kHz.

2) Check TCXO

- If IF and LO failed in phase error, then TXVCO must be failed. At this time, You should check TCXO output. It should re-soldering on TCXO or soldering it again.
- In other words, if either IF or LO is good, there is no problem in TCXO.

3) Check Power Ramp

- Check Power-Time Mask. If the ramp is unstable or over specification at several power level, phase error will fail.

4) Check TXVCO

- Measure the phase error of TXVCO output
  We can use HP spectrum analyzer HP859X series with GSM personality card.
- Inspect soldering condition of TXVCO.
- Check Vcc power supply to RF6053 pin 3 for charge pump, and pin9 for phase detector, frequency detector.

- Check the charge pump voltage of TXVCO

  We should check the voltage level, and compare with IQ signal. The flatness of waveform should synchronize with IQ data. Please refer to Figure 2.

Band	IF frequency	Channel
GSM	512Mhz	1~75
	528Mhz	76~100
	545Mhz	101~114
	512Mhz	115~124
DCS	550Mhz	512~669
	567Mhz	670~720
	576Mhz	721~770
	582Mhz	771~830
	570Mhz	831~885

Table 3. Intermediate frequency plan.

For different channel LO=RF+/-IF*N/R , for example channel 65, N=3, R=5, LO=903+512*3/5=1210.2Mhz for GSM middle channel and channel 697, N=2, R=5, LO=1747.2-567*2/5=1520.4Mhz for DCS middle channel.

The following table is the check frequency of IF and LO at low, middle, high channel.

Band	IF frequency	LO	Channel
GSM	512Mhz	1198.2Mhz	5
	512Mhz	1210.2Mhz	65
	512Mhz	1221.2Mhz	120
DCS	550Mhz	1490.2Mhz	512
	567Mhz	1520.4Mhz	697
	570Mhz	1555.8Mhz	880

III. Frequency Error

Specification:

Frequency Error < 0.1 ppm

(GSM < ± 90 Hz, DCS < ± 180 Hz)

Trouble Shooting Flow:

1) Frequency error is out spec in both **upper and lower limit**.

- It seems there is problem in TCXO. It should put more soldering on it or solder it again.
- Check AFC from BB at TCXO pin 3 and make sure it would change at different channel.

2) The **average** of frequency error is shift about **50 to 100 Hz**.
- It should check the soldering condition of IF SAW filter.

3) Frequency error is **over 1 kHz.**
- Check the soldering condition of TCXO.
- Check AFC from BB at TCXO pin 3 and make sure it would change at different channel.

IV. Output RF spectrum

Definition of phase noise and unit dBc：

Modulation Spectrum at ± 400 kHz < -60 dBc ,which is the relation between the frequency offset the center frequency ± 400 kHz and the power measured in specified bandwith and time must small than –60dBc. You may refer to the Figure 3.

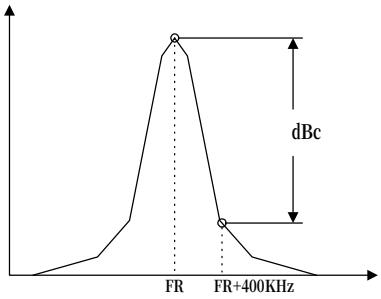


Figure 3. Phase noise at +400 KHz

Specification:

The specification of spectrum due to modulation for different frequency offset, please refer to Table 4 and Table 5.

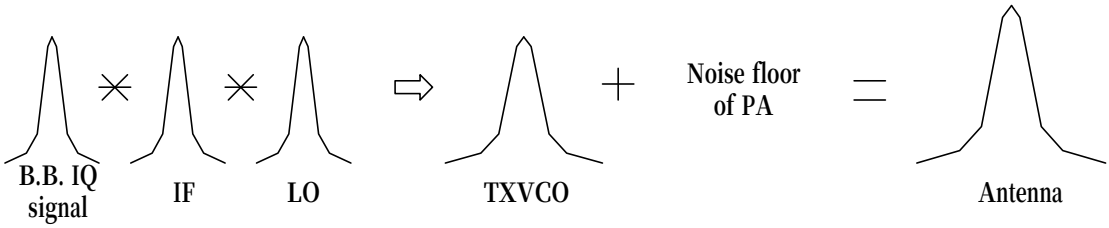
	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to <1800
39	+0,5	-30	-33	-60	-66
37	+0,5	-30	-33	-60	-64
35	+0,5	-30	-33	-60	-62
<= 33	+0,5	-30	-33	-60	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-51

Table 4. GSM900 Spectrum due to modulation out to less than 1800KHz offset

	power levels in dB relative to the measurement at FT				
Power level	Frequency offset (kHz)				
(dBm)	0-100	200	250	400	600 to <1800
<= 36	+0,5	-30	-33	-60	-60
The values above are subject to the minimum absolute levels (dBm) below.					
	-36	-36	-36	-36	-56

Table 5. DCS1800 Spectrum due to modulation out to less than 1800KHz offset

Illustration of Output Spectrum Theory:



Trouble Shooting Flow:

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2) Check TXVCO

- Measure the phase error of TXVCO output
  We can use HP spectrum analyzer HP859X series with GSM personality card.
- Inspect soldering condition of TXVCO.
- Check Vcc power supply to RF6053 pin 3 for charge pump, and pin9 for phase detector, frequency detector.
- Check the charge pump voltage of TXVCO
  We should check the voltage level, and compare with IQ signal. The flatness of waveform should synchronize with IQ data. Please refer to Figure 2.

* For intermediate frequency plan please refer to Table 3.

3) May be failed in PA or PA controller

4) Check saturation of PA

- Try to calibrate maximum power about 32.8~33.2dBm for GSM and 30.3~30.7dBm for DCS.
- Check Vapc voltage to PA and it should be less than 2.3V
- Check the frequency of TXVCO.

V. Power vs Time (Power Ramp)

Illustration of power ramp:

The Power/Time relationship of normal bursts shall be within the limits of the mask at each frequency under normal or extreme test conditions in Figure 4.

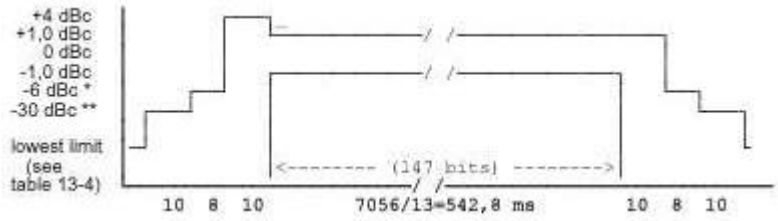


Figure 4. Power/Time template for normal burst.

*For GSM900 MS: -4 dBc for power control level 16
-2 dBc for power control level 17
-1 dBc for power control level 18 and 19

*For DCS1800 MS: -4 dBc for power control level 11
-2 dBc for power control level 12
-1 dBc for power control level 13, 14 and 15

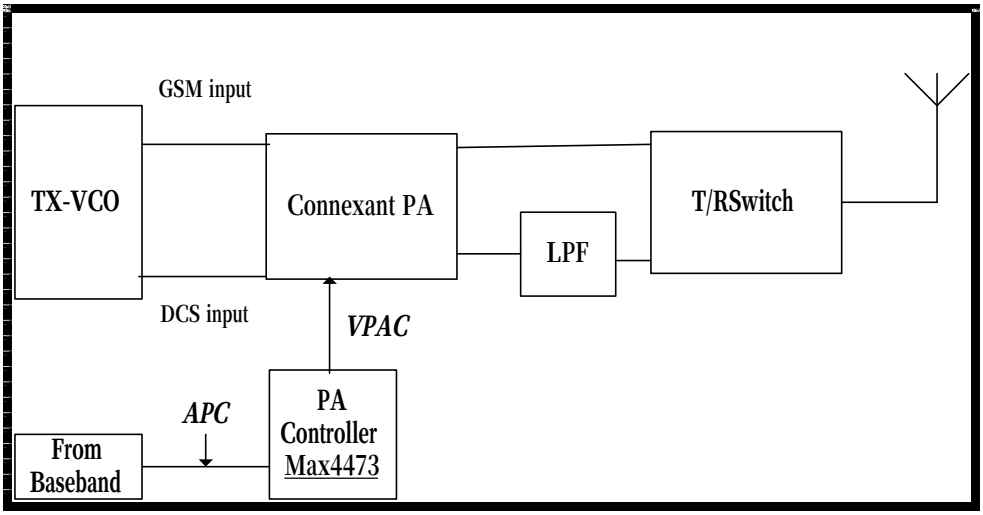
*For GSM900 MS: -30 dBc or –17 dBm, whichever is the higher
For GSM900 MS: -30 dBc or –20 dBm, whichever is the higher

*For lowest limit, please see Table 6.

	lowest limit
GSM900	-59 dBc or -54 dBm whichever is the highest, except for the timeslot preceding the active slot, for which the allowed level is equal to -59 dBc or -36 dBm, whichever is the highest
DCS1800	-48 dBc or -48 dBm whichever is the highest

Table 6. Lowest measurement limit for power/time template

We can control the different power or power shape by changing APC. Max4473 sense current to control PA output powers more stability.



Trouble Shooting Flow:

1) Re-Calibration

- Check the output power. If the output power is too low, it may cause ramping fail.
- More accurate power comes out accurate ramp.

2). Check the matching circuit between TXVCO and PA

- Matching affect the input power level of PA. It will change ramping profile.

3).Check PA controller (Max4473)

- Minimum R304 and R306 tolerance will minimum offset voltage of Vapc.

VI. TRANSIENT SPECTRUM

Specification:

GSM transient spectrum at ±400 kHz < -19 dBm
±600 kHz < -21 dBm
DCS transient spectrum at ±400 kHz < -22 dBm
±600 kHz < -24 dBm

For more detail specification, please refer to the following Table 6 and Table 7.

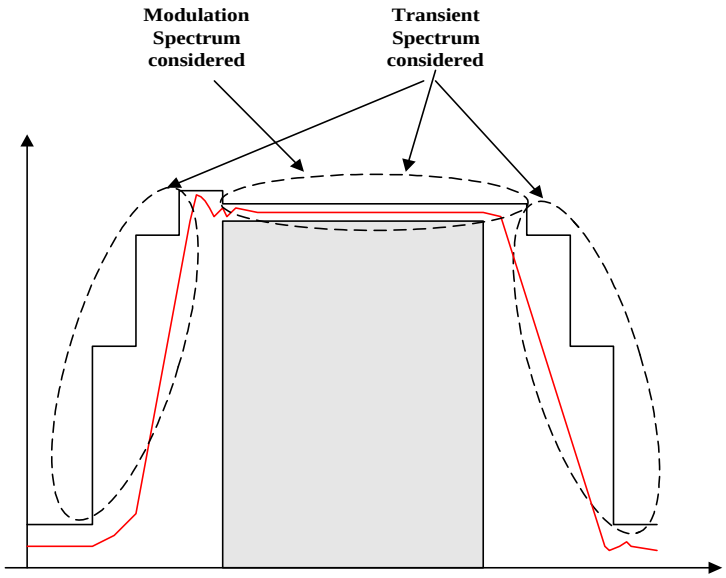
Power level	Maximum level for various offsets from carrier frequency			
	400 kHz	600 kHz	1200 kHz	1800 kHz
39 dBm	-13 dBm	-21 dBm	-21 dBm	-24 dBm
37 dBm	-15 dBm	-21 dBm	-21 dBm	-24 dBm
35 dBm	-17 dBm	-21 dBm	-21 dBm	-24 dBm
33 dBm	-19 dBm	-21 dBm	-21 dBm	-24 dBm
31 dBm	-21 dBm	-23 dBm	-23 dBm	-26 dBm
29 dBm	-23 dBm	-25 dBm	-25 dBm	-28 dBm
27 dBm	-23 dBm	-26 dBm	-27 dBm	-30 dBm
25 dBm	-23 dBm	-26 dBm	-29 dBm	-32 dBm
23 dBm	-23 dBm	-26 dBm	-31 dBm	-34 dBm
<= +21 dBm	-23 dBm	-26 dBm	-32 dBm	-36 dBm

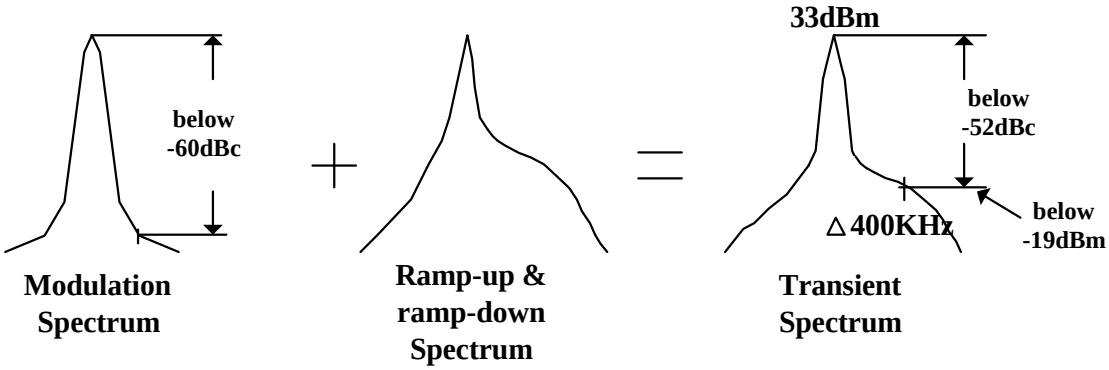
Table 6. GSM 900 Spectrum due to switching transients.

Power level	Maximum level for various offsets from carrier frequency			
	400 kHz	600 kHz	1200 kHz	1800 kHz
36 dBm	-16 dBm	-21 dBm	-21 dBm	-24 dBm
34 dBm	-18 dBm	-21 dBm	-21 dBm	-24 dBm
32 dBm	-20 dBm	-22 dBm	-22 dBm	-25 dBm
30 dBm	-22 dBm	-24 dBm	-24 dBm	-27 dBm
28 dBm	-23 dBm	-25 dBm	-26 dBm	-29 dBm
26 dBm	-23 dBm	-26 dBm	-28 dBm	-31 dBm
24 dBm	-23 dBm	-26 dBm	-30 dBm	-33 dBm
22 dBm	-23 dBm	-26 dBm	-31 dBm	-35 dBm
<= +20 dBm	-23 dBm	-26 dBm	-32 dBm	-36 dBm

Table 7. DCS 1800 Spectrum due to switching transients.

Illustration of Transient Spectrum:





Trouble Shooting Flow:

1) If modulation spectrum is failed in the same time, it should solve modulation spectrum at first.
   -Re-Calibration maximum power to 32.8~33.2 dBm for GSM and 30.3~30.7dBm for DCS.
2) If ramping profile is failed in the same time, it should solve the ramping profile at first.
3) Check **PA controller** or replace it.

● Receiving

Trouble Shooting Flow:

1). Check the IF and LO are working at correct frequency or not
   You have to check LO1 and LO2 to confirm synthesizer OK.

2). Check PM value

- $PM = \frac{value\ by\ ms\_trace\ echo}{64} \times 10$. PM value is about 490~520. If the PM value is too low, it should trace the power in receiving path, including

after antenna switch
before/after TR switch
before/after RF SAW filter

before/after IF SAW filter
Level of RX IQ

Example: (channel 699)
a. Set HP8960 in test mode, BCH+TCH, channel is 699, with power level –50 dBm,
or set HP8922 in test mode, TCH is not, channel is 699 with power level –50 dBm,
or set signal generator in frequency 1842.667 MHz with output power –50 dBm.

b. Use RF probe to check the power at antenna switch, before/after TR switch, in/out LNA and in/out RF SAW in frequency 1842.6 MHz.

c. Use RF probe to check the power at before/after IF SAW filter in frequency 282 MHz.

d. Use scope to check the waveform of RX IQ

● Connecting to Base Station

1. CAMP ON

Possibility of camp on fail:
- RX, SIM, AFC

Trouble Shooting Flow:
1) Check the receiving power indication on LCD of handset.
- If the indication is too low, it should be RX problem. Re-calibration could find some RX problem.

2) Check receiving PM value.
3) Bad contact in SIM card would cause camp on fail.
4) Check AFC
- Re-calibration could find some AFC problem.

2. BUILD A CALL

Possibility of camp on fail:

- TX phase error, AFC

Trouble Shooting Flow:

1) Check the TX phase error

- Check the charge pump waveform of TXVCO, since it is not convenient to check phase error in current handset software.

2) Check AFC

- Re-calibration could find some AFC problem.

● Calibration

1. CALIBRATION PROCEDURE

1. GSM AGC Measurement (g-magic)
2. GSM AFC Measurement (AFC default value/slope)
3. GSM APC Measurement
4. Write GSM data into flash memory
5. DCS AGC Measurement (g-magic)
6. DCS AFC Measurement (AFC default value/slope)
7. DCS APC Measurement
8. Write DCS data into flash memory

2. AGC CALIBRATION (G-MAGIC)

AGC – Automatic Gain Control

Definition of g-magic:

$$\frac{PM}{10} = Input\_level + AGC + \frac{g\_magic}{2}$$

Example:

$$\frac{600}{10} = -85_{(dBm)} + 45_{(dB)} + \frac{200}{2}$$

- ⇨ BS sends –85dBm signal, and base-band will tune the AGC value (45dB in example), until it received an appropriate PM value (600 in example), now we can obtain the g-magic = 200.
- ⇨ While a call is built, we can obtain the certain input_level(RSSI) by above equation with measured PM value, programmable AGC and fixed g-magic.
- ⇨ The specification of g_magic value should be within 190 to 220.

Trouble Shooting Flow:

1. IF or LO is not functional (PM < 400 with any agc value)
   - ⇨ Check IF, LO
   - ⇨ Check Synthesizer
2. It has extra loss in RX path (g-magic < 190)
   - ⇨ Trace RX path (T/R Switch, LNA, IF SAW, RX IQ)
3. Baseband Nausica has soldering problem
   - ⇨ Check RX IQ and PM value (Having RX IQ, but PM is fixed at certain value with any agc value)

3. AFC CALIBRATION

AFC – Automatic Frequency Control

It should correct the handset clock (TCXO) with GSM base station by tuning AFC value.

Trouble Shooting Flow:

1. Since AGC is passed, it should be good in IF, LO and RX path.
2. No AFC control voltage to TCXO
   - ⇨ Check AFC from BB and resistor to TCXO
3. Bad TCXO (Frequency can not be adjusted by AFC)
   - ⇨ Replace new one

4. APC CALIBRATION

APC – Automatic Power Control

The output power is not exactly the same with the same APC value in every handset because of the device tolerance. It needs to set proper APC value into every handset to have specified output power.

Table 1 list the FTA spec and our target setting.

Please note that the higher levels are not exactly same because of current consumption issue, and it follows spec with within ±2dBm in peak power.

GSM BAND			DCS BAND		
Power control level	**Transmitter output power**	**Our setting value**	**Power control level**	**Transmitter output power**	**Our setting value**
Level 5	**33**	**840**	**Level 0**	**30**	**600**
Level 6	**31**	**506**	**Level 1**	**28**	**396**
Level 7	**29**	**432**	**Level 2**	**26**	**292**
Level 8	**27**	**318**	**Level 3**	**24**	**222**
Level 9	**25**	**236**	**Level 4**	**22**	**163**
Level 10	**23**	**172**	**Level 5**	**20**	**379**
Level 11	**21**	**378**	**Level 6**	**18**	**298**
Level 12	**19**	**285**	**Level 7**	**16**	**238**
Level 13	**17**	**221**	**Level 8**	**14**	**190**
Level 14	**15**	**170**	**Level 9**	**12**	**156**
Level 15	**13**	**126**	**Level 10**	**10**	**127**
Level 16	**11**	**96**	**Level 11**	**8**	**104**
Level 17	**9**	**70**	**Level 12**	**6**	**86**
Level 18	**7**	**54**	**Level 13**	**4**	**70**
Level 19	**5**	**40**	**Level 14**	**2**	**59**
			Level 15	**0**	**49**

Trouble Shooting Flow:

Power is not enough in TX, and trace TX path.

Failure diagnostics and countermeasure

CALIBRATION :

FG1 (FD1)

Diagnostics

1. Output power is not right (33±2 dBm for GSM, 30±2 dBm for DCS)
2. No output power

Countermeasure

1. then
   a. Read APC value and add or reduce it according to power over-range or under-range
   b. Re-calibration
2. Check
   a. IF there is large current (> 200mA), touch the PA and find if it is hot. If so, replace the PA.
   b. IF no large current, check the APC pin(R308) which input to PA. There should be a pulse voltage with level >1.4V and <2.5V. IF the level >2.5V then got to c. IF the level <1V then check (R303) and go to d.
   c. Replace the PA. Go to e.
   d. IF there is no signal level then It should be BB fail(Nausica soldering problem). Else MAX4473 fail. Please replace U302. Go to e.
   e. Re-calibration.

FG2 (FD2)

Diagnostics

1. Phase error (RMS) >5 degree.
2. Phase error (Peack) > 20 degree
3. Frequency error > ±90 degree (GSM)
   ± 180 degree (DCS)

Countermeasure

1. Replace C401, if not work, replace U401.
2. Re-calibration. If not work, replace C401; if not work, replace U401.

Check:

1. Check Tx VCO, LO, and IF' s frequency. IF Tx are not correct. Please replace

U401 or U501.

2. Check RA203’ s solder.
3. Check TXI,TXIX,TXQ,TXQX signal.
4. Check Power-Time Mask. If the ramp is unstable at several power level , please replace U302.
5. Re-calibration.

FG3 (FD3) Spectrum due to Switching

Diagnostics

Countermeasure

1. Replace U302 and Re-calibration.
2. Replace C401.
3. Replace U401.
4. Change calibration loss from -0.5 -> -0.8 and -0.7->-1.0dbm. Please re-calibration again.

FG4 (FD4) Spectrum due to Modulation

Diagnostics

Countermeasure

1. If failure only occurs on one side, (e.g. 400 kHz OK., but –400 kHz fail), replace C207 by 220 pF. IF still not OK., restore C207 to 100 pF and replace C208 by 220 pF.
2. Replace R401 by 250Ω and C207,C208 replace by 220pF at the same time.

FG5 (FD5) Power-Time Mask

Countermeasure

1. Replace U302.

FG6 (FD6) CONNECT Fail

Countermeasure

1. Re-Calibration

FG7 (FD7) SACCH Fail

Countermeasure

1. Re-Calibration

FG8 (FD8) Sensitivity Fail

Countermeasure

1. Re-Calibration

Final Test :

CG1(CD1) 20<LEVEL 5<30

Countermeasure

1. Replace U302.
2. Re-calibration.

CG2(CD2) LEVEL1 5

Countermeasure

1.Replace PA U301.
2.Re-calibration.

CG3(CD3) TOLERANCE 0.45

Countermeasure

1.Re-calibration.

CG4,5,6(CD4,5,6) Gain Magic

Countermeasure

1.IF both GSM and DCS magic value fail or AGC fail go to b.
2.Re-calibration.

Check

a. Check Rx path' s solder and C402,L202,C225,C224 value
b. Check R201,R202,RA201,R210,R211 solder.
c. Check IR,IRX,QR,QRX four siganl

CG7(CD7) AFC Fail

Countermeasure

1.Re-calibration.

Check

a. Check 13Mhz(U502) solder
b. Measure R507 signal level which should >0V. If not so BB bad
c. Measure C510 pin3 13Mhz output signal level. If no 13Mhz , replace U502. Else go to d.
d. Measure C507 13Mhz input signal level >500mVp-p and <1V to BB.

BB Section :

1. **The mobile phone can' t boot after inserting the battery?**

   A: Check energy of the battery.

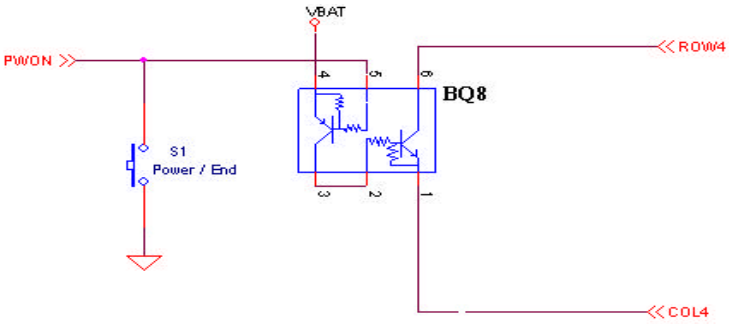
   Check Battery connector

   Check board to board connector

   Check the soldering and place of component BQ8 on MMI board

   Clear dirt near the board to board connecter, if it has dirt.

   When Power/End key is pressed, probe voltage level of ROW4 and PWON must be low.



2. **The mobile phone turn off automatically after turn on?**

   A: If Row4 and Col4 is short, the mobile phone turn off automatically after turn on

   If Pwon and Gnd is short, the mobile phone turn off automatically after turn on

   Clear dirt near the board to board connecter, if it has dirt.

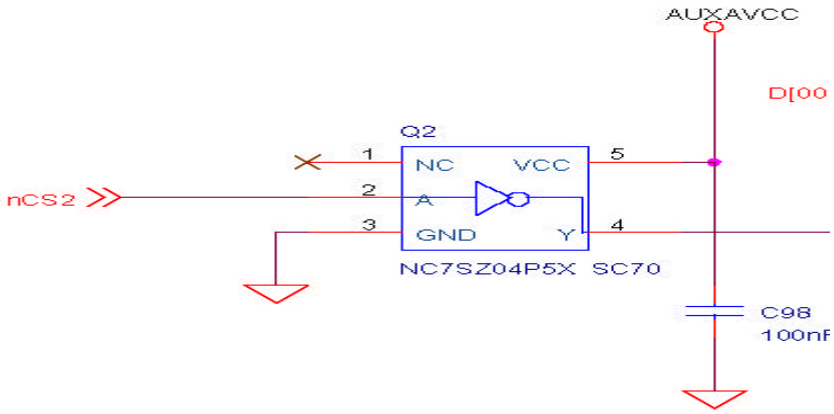
3. **The screen display insert SIM after turn on?**

   Check SIM card insert correct.

   Check SIM connecter.

4. **No display on LCD after turn on?**

   Check place of the LCD and MMI PCB connect



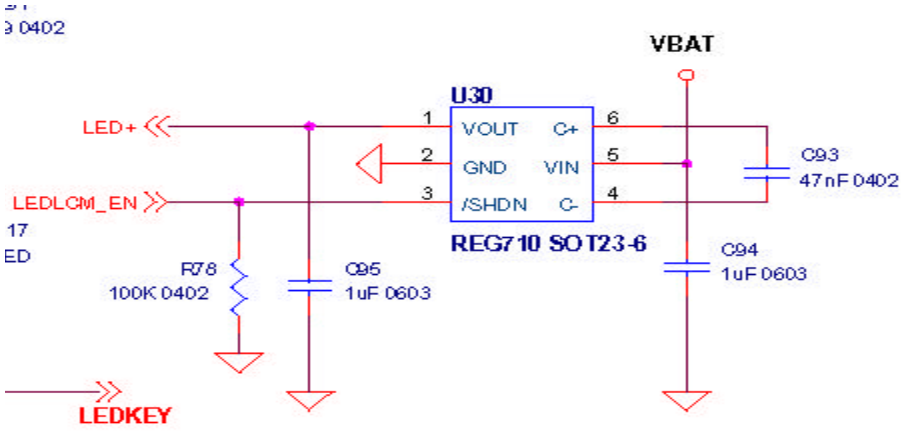
5. Has not LCM backlight :

Use voltage meter to probe:

LEDLCM_EN(U30.pin3) = 2.8V DC

U30.pin5 = VBAT(3.6 ~4.2 V)

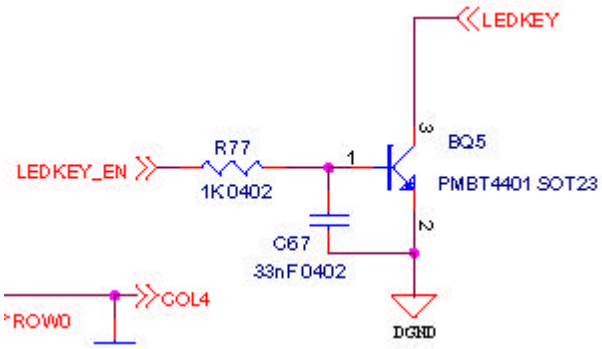
LED+(U30.1) = 5 V



6. Has not Keypad Backlight ?

Use voltage meter to probe:

LEDKEY_EN= 1.4 ~ 2.8V , BQ5.pin3 = 1V DC



7. Receiver has not key tone or sound.

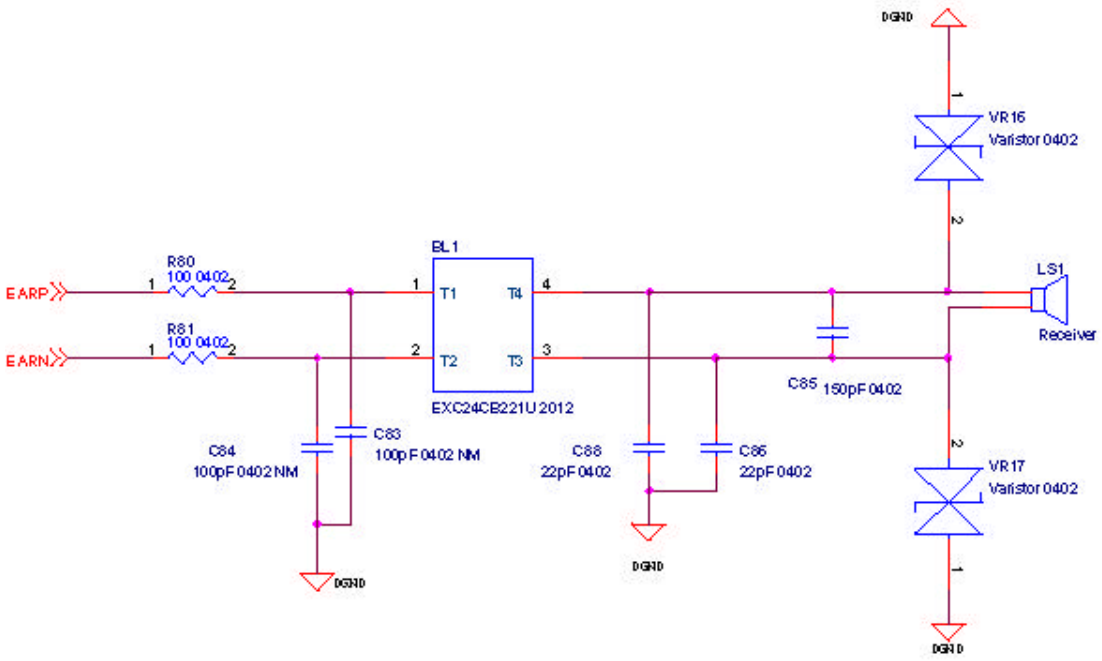
To check the contact of receiver connector.

Use impedance meter to probe receiver impedance (about 32 ohm)

Use voltage meter to probe:

VR16.pin2 = R80.pin1 = DC 1.3 V

VR17.pin2 = R81.pin1 = DC 1.3 V



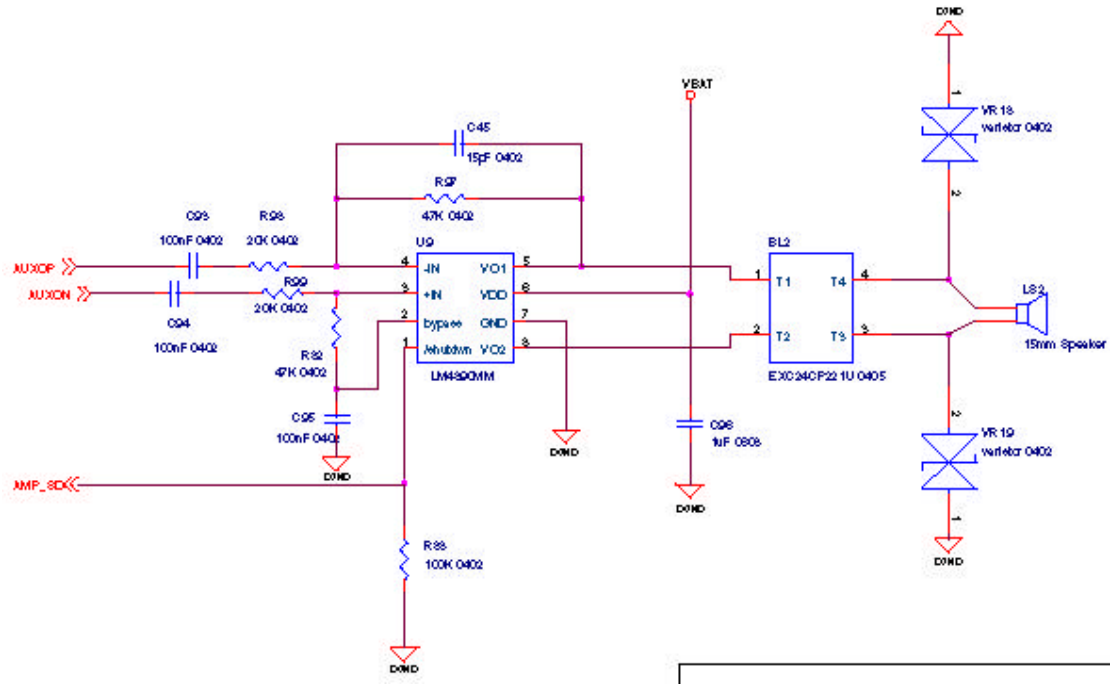
8. Ring tone is too small or has noise.

Make sure speaker connector has not out of shape.

Use impedance meter to probe speaker impedance (about 11 ohm)

Use oscilloscope to probe VR18,VR19 (maximumn 3 V pp)

AMP_SD : DC 2.8V

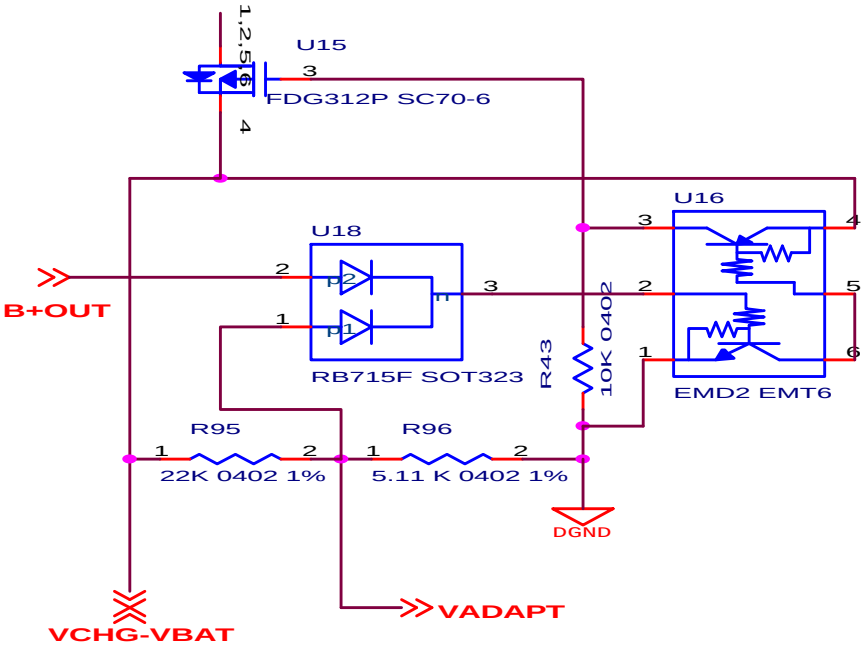


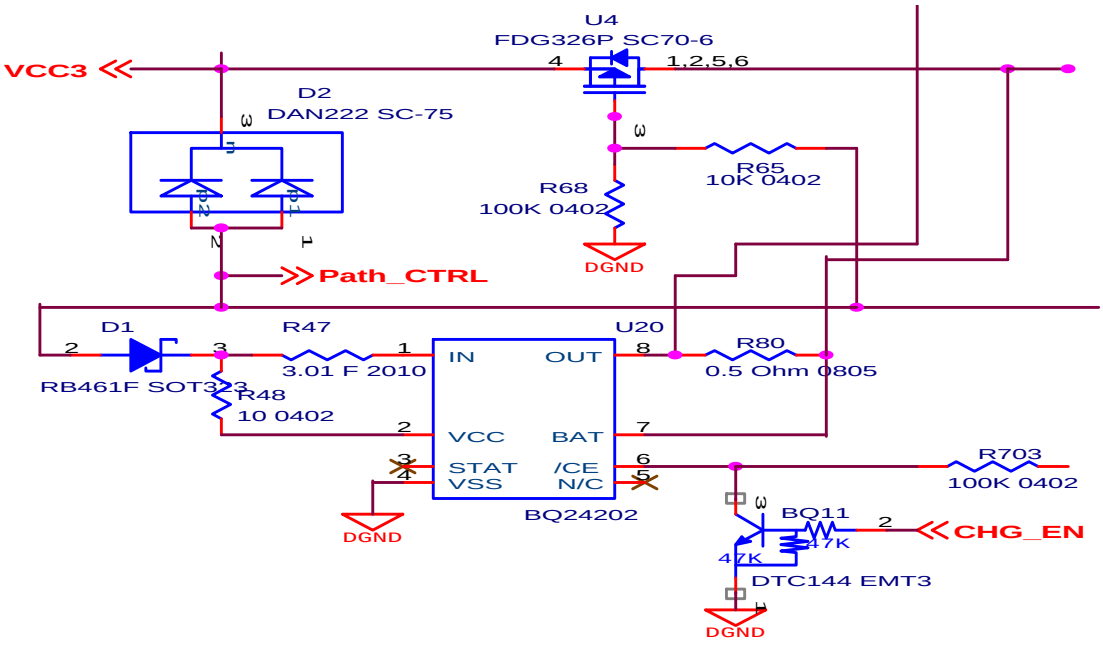
9. Can not charging:

Make sure the contact of charger connector is ok.

Use voltage meter to probe;

R95.1 = 6V , R96.1= 1 V , U15.3 = 0 V , U15.1 > 5.5 V , U20.6 = 0 V , U4.3=0.5V ,





10. Some of keypads is useless or wrong .

Make sure has not open or short on board to board connector.

Make sure the middle case has not coating on the side of connector.

11. Has not vibration or vibrator can not stop.

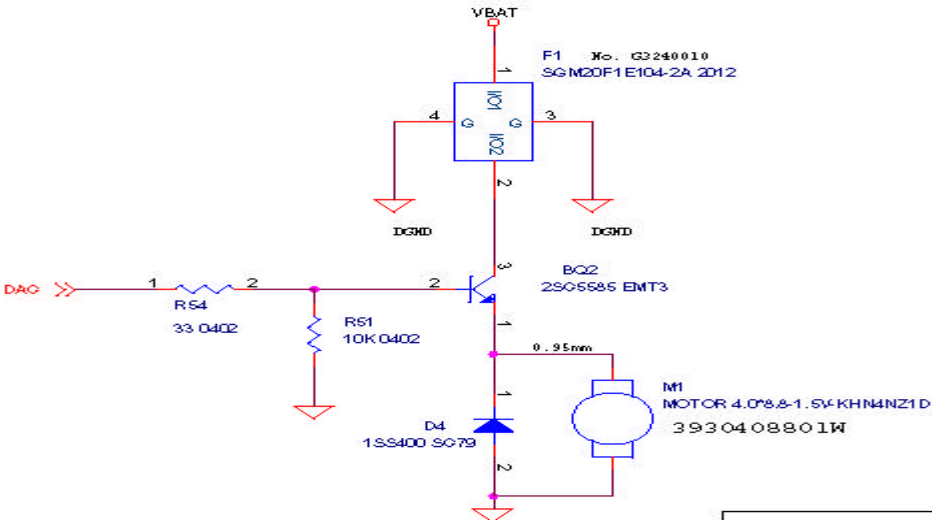
Use impedance meter to probe vibrator' s impedance (about 11 ohm) .

Use voltage meter to probe:

DAC = DC 1.8 V

BQ2.pin3 = Vbat (3.6 ~4.2V)

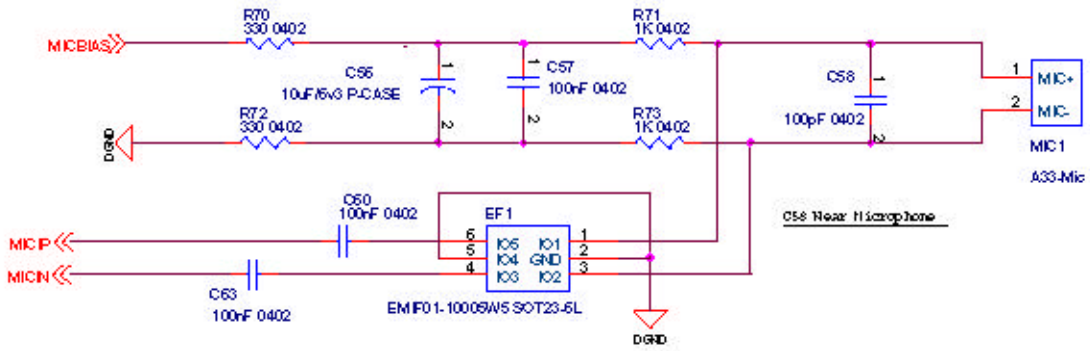
BQ2.pin1= DC 1.5 V



12. Microphone can not work:

Make sure microphone has assemble ok .

Use voltage meter to probe MIC1(pin 1, pin2)= DC 1.2V



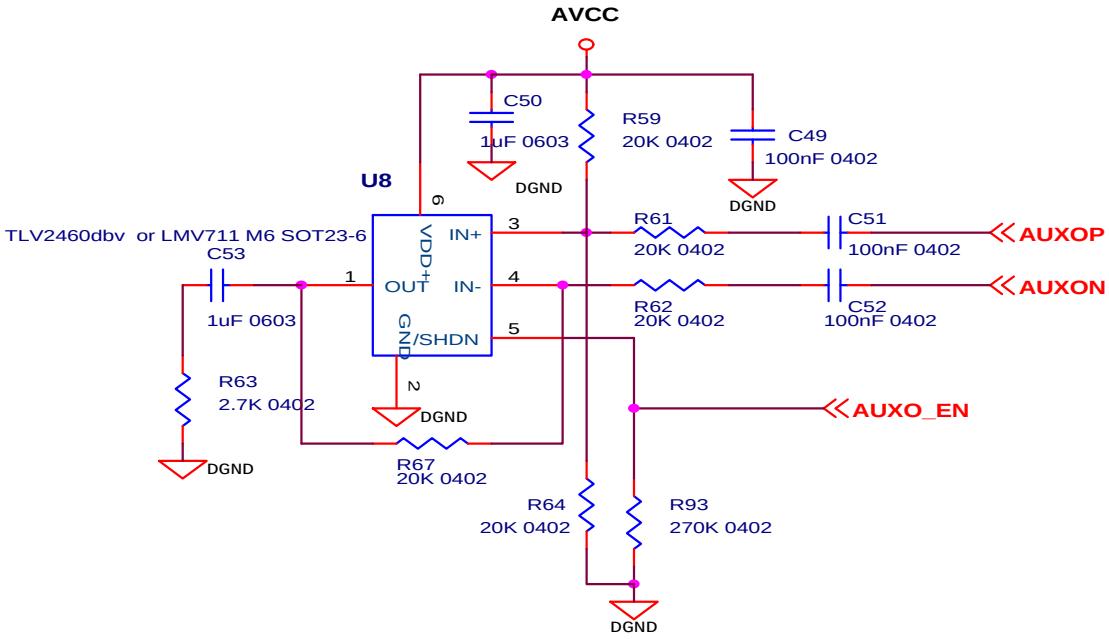
13. **No sound on earphone?**

Use voltage meter to measure the voltage:

Use probe to touch Earphone jack pin 2 (ADCID) : DC 0V (If it's ok , Earphone be detect)

AUXO_EN : DC 2.8V (If it is ok, U8 will active)

U8.1 : DC 1.4V (If it is ok, U8 is ok)



14. **Has big Leakage current :**

If leakage current > 100mA , battery on for a long time , we can touch the surface of component , If the component heat more than other , It may be fail .

If leakage current <100mA , replace component