SAMSUNG

GSM TELEPHONE
SGH-E316

SERVICE Manual

GSM TELEPHONE

CONTENTS

ELECTRONICS

Code No.: GH68-05425A
BASIC.

1. SGH-E316 General Introduction

The SGH-E316 Dual Band phone functions as digital phone working in GSM (Global System for Mobile communications)850 and PCS(Personal Communication System)1900 modes.

<Specification>

- Dimension : 79x42x22 mm (with Standard Batt.
- Weight : 70g (with Standard Battery)
- LCD -.Internal LCD : 65K" TFT Color LCD (128 x 128), small LCD 65K TFT Color LCD
- R/F band : GSM850MHz+ PCS1900 MHz
- Vocoder : EFR + FR +AMR
- Antenna : Fixed type
- SIM : 3 Voltage operation

<GPRS Factor>

- MS Class : Class B
- GPRS Phase : GSM Phase II+
- Multi-slot : Class 8 (1 Up-link, 4 Down-link, supporting PBCCH)
- SMG : SMG #31
- Coding scheme : CS 1 , CS 2, CS 3, CS 4 support
  (CS 3, CS 4: network dependant)
- Power class : GSM850 - Class 4 (2W)
  PCS1900 - Class 1 (1W)

- WAP 2.0 Browser
- SIM AT(Application Toolkit)
- 40 Polyphonic Ringtone

< Basic Package >

- Handset + Standard Battery + TA
  + Ear Phone

< Option Item >

- Battery
  . Standard : Li-Ion, 800mA
- Travel Adapter
- Ear Microphone

2. SGH-E316 Specification

1. GSM General Specification

	GSM850	PCS1900
Freq. Band[MHz] Uplink/Downlink	824~849 869~894	1850~1910 1930~1990
ARFCN range	128~251	512~810
Tx/Rx spacing	45MHz	80MHz
Mod. Bit rate/ Bit Period	270.833kbps 3.692us	270.833kbps 3.692us
Time Slot Period/Frame Period	576.9us 4.615ms	576.9us 4.615ms
Modulation	0.3GMSK	0.3GMSK
MS Power	33dBm~13dBm	30dBm~0dBm
Power Class	5pcl~15pcl	0pcl ~ 15pcl
Sensitivity	-102dBm	-100dBm
TDMA Mux	8	8
Cell Radius	35km	-

2. GSM TX power class

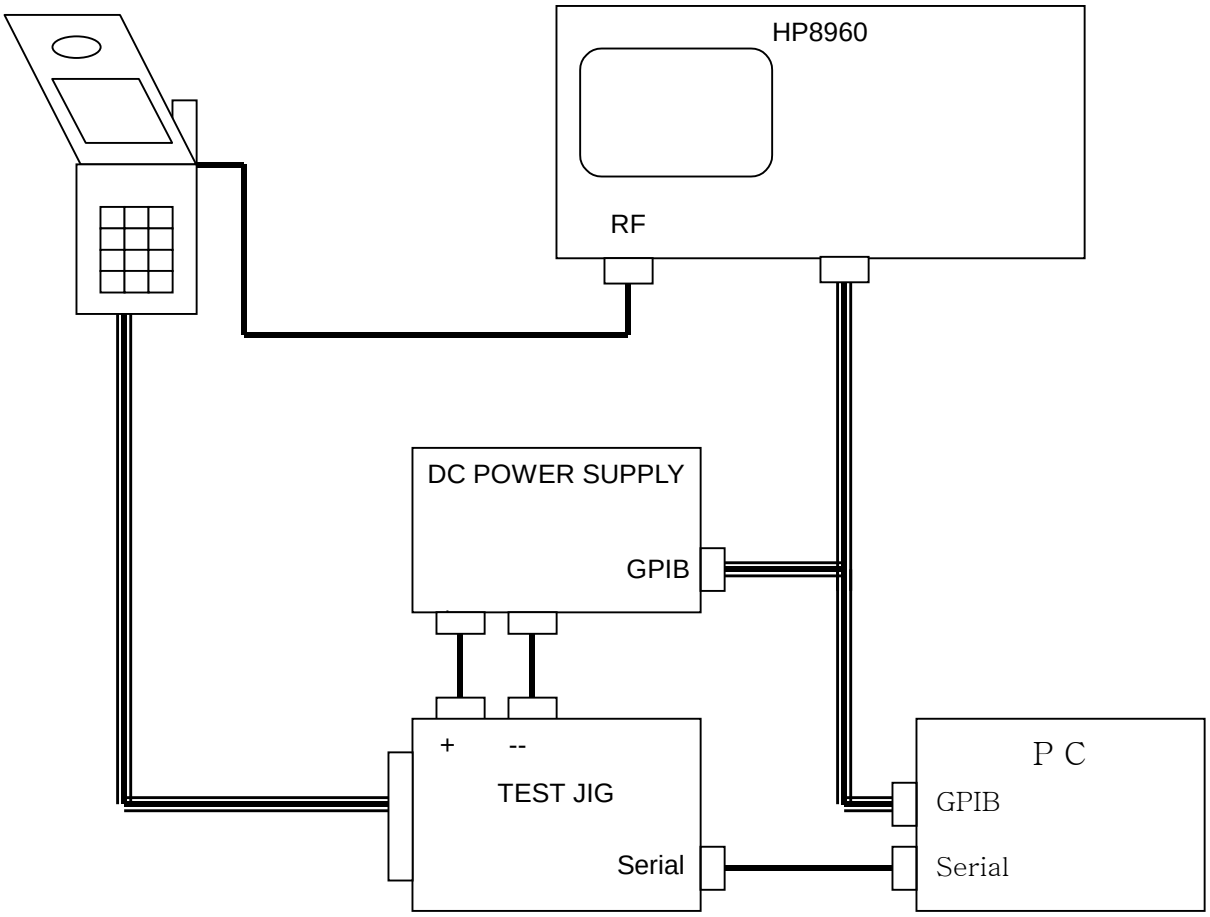
TX Power control level	GSM900
5	33±2dBm
6	31±2dBm
7	29±2dBm
8	27±2dBm
9	25±2dBm
10	23±2dBm
11	21±2dBm
12	19±2dBm
13	17±2dBm
14	15±2dBm
15	13±2dBm
16	11±2dBm
17	9±2dBm
18	7±2dBm
19	5±2dBm

TX Power control level	PCS1900
0	30±3dBm
1	28±3dBm
2	26±3dBm
3	24±3dBm
4	22±3dBm
5	20±3dBm
6	18±3dBm
7	16±3dBm
8	14±3dBm
9	12±4dBm
10	10±4dBm
11	8±4dBm
12	6±4dBm
13	4±4dBm
14	2±5dBm
15	0±5dBm

4. SGH-E316 Test Command & Test Procedure

1. Calibration Equipment

- HP 8960
- DC Power Supply
- Test Jig
- Configuration



2. Calibration Program

- Samsung internal software

3. Tx Power Tune up Procedure

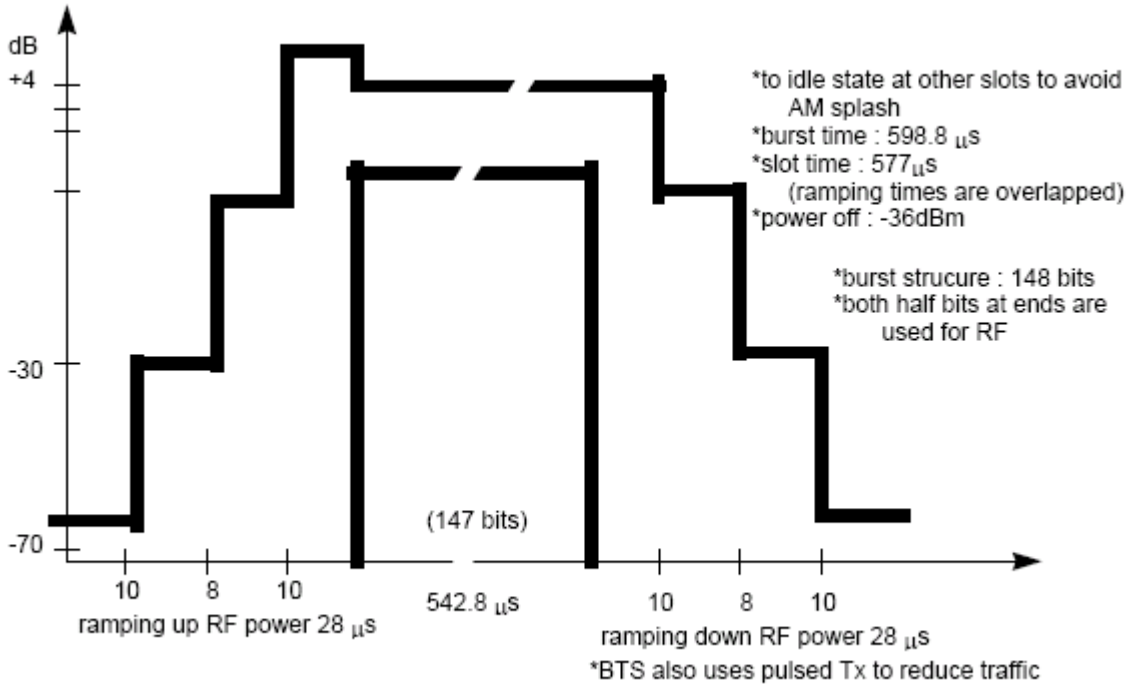
1) Procedure:
   a. Calibraion equipment HP8960 and the cell phone are connected through RF cable.
   b. Target power (required power level according to the specification which should be set by calibration program) is set to equipment as power level (ex: GSM 5 level is 32.5 dBm).
   c. Activate phone in Tx_Mode_Only.
   d. HP8960 equipment measures transmitted power through rf test cable from the phone and reports measured level to calibration program.
   e. The program compares measured power with the target power.
   f. The calibration program decides power code which is defined in advance in the program and writes the codes to the flash memory in the phone.

2) Target value is defined according to the value of GSM specification.
   See the TX power level definition table below.

3) Target values of the peak level of the phone are set normally in conducted mode
   - GSM 5 level : 32.5dBm
   - PCS 0 level : 29.5dBm (Tolerance : -2dB ~ +1dB)

4) Accuracy
   All the TX level from the phone after tuned-up satisfy the GSM specification

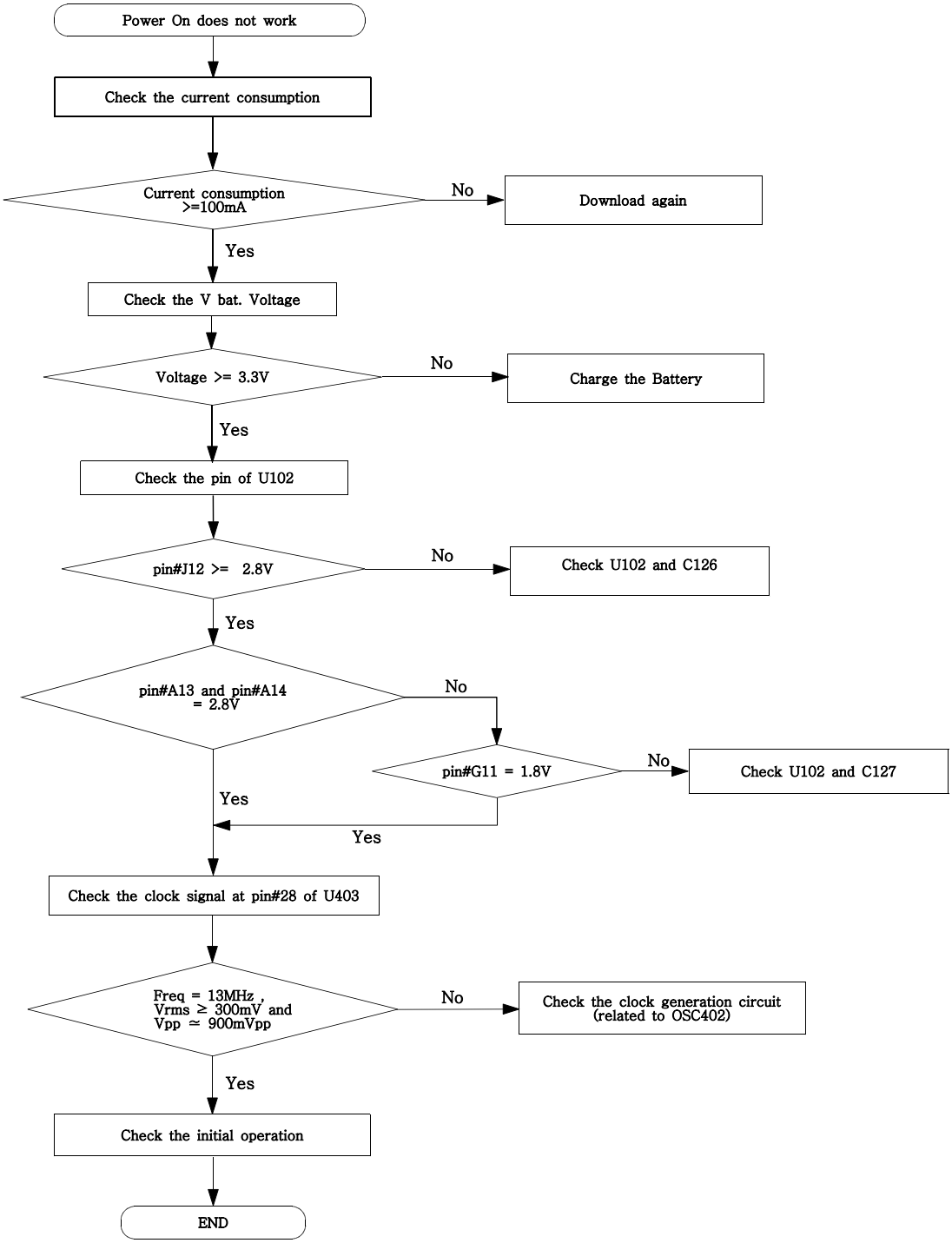
5) TX ramp mask specification applied to the calibration program:



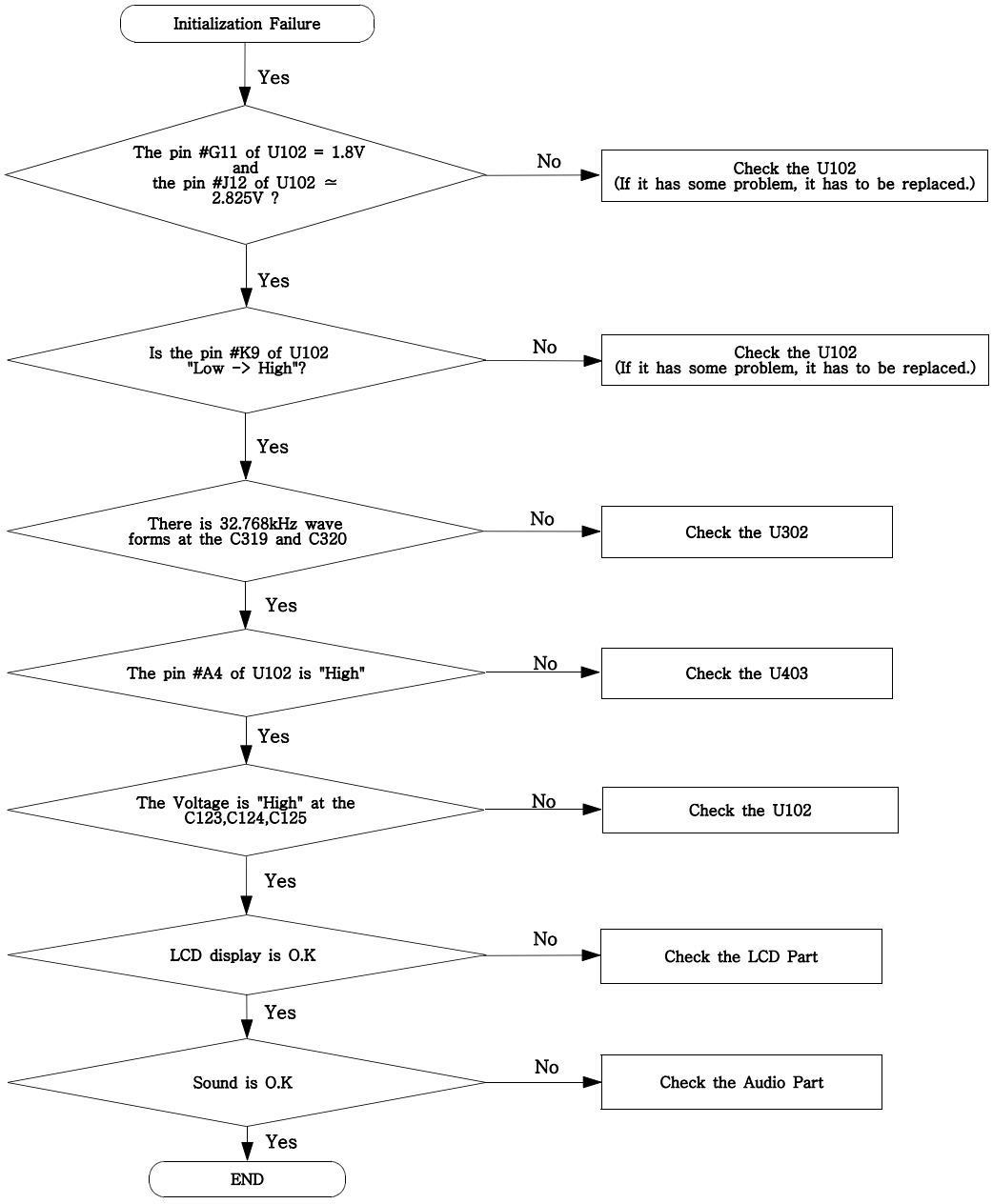
5. SGH-E316 Flow Chart of Troubleshooting

1.Baseband

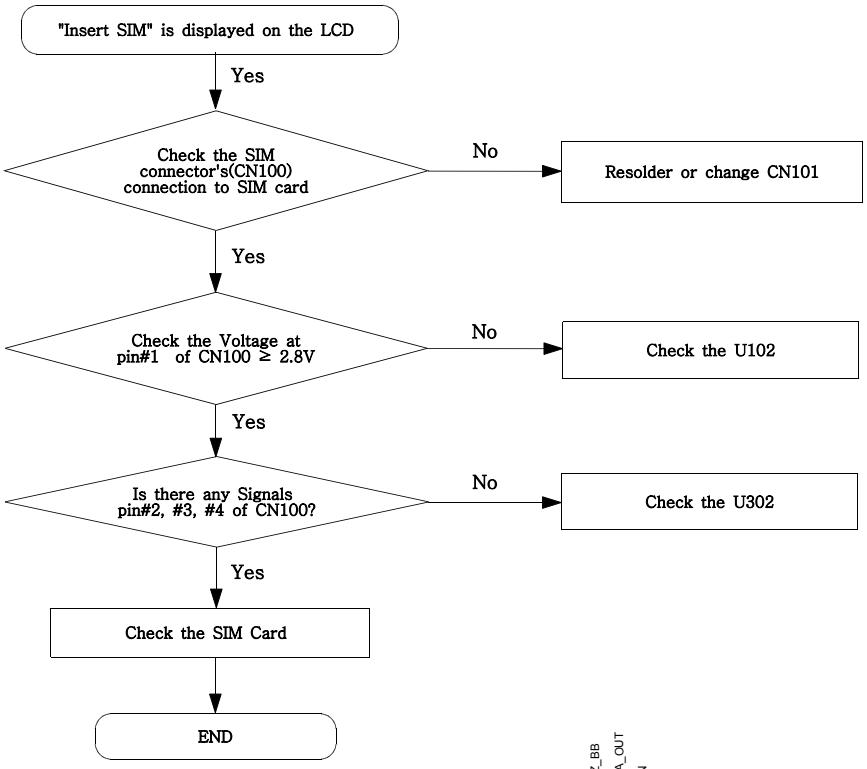
1. Power ON

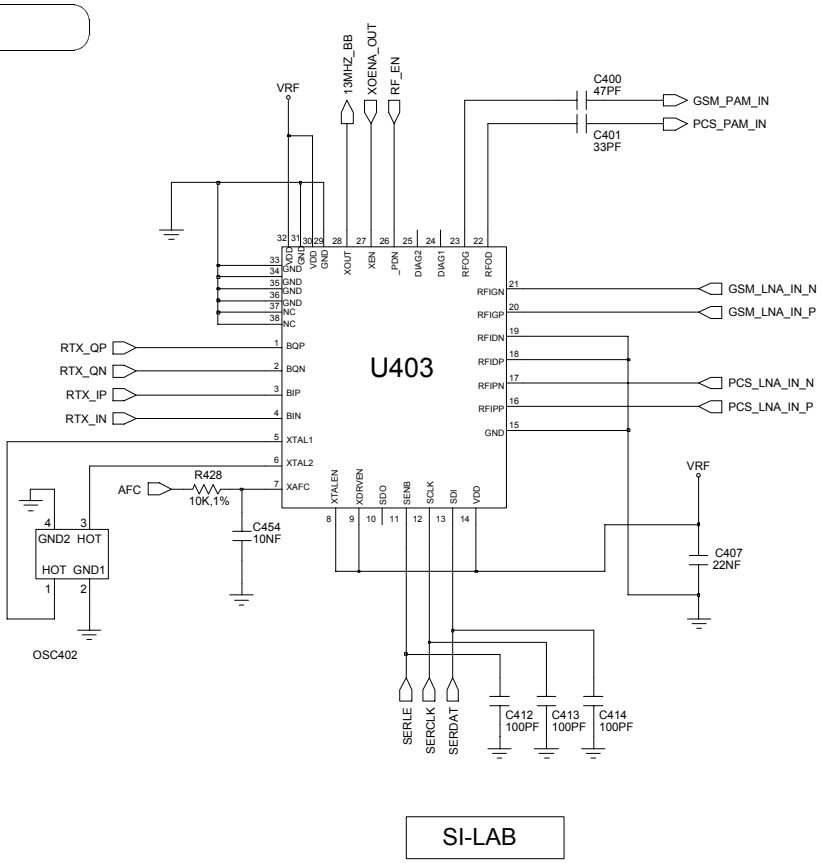


2. Initial

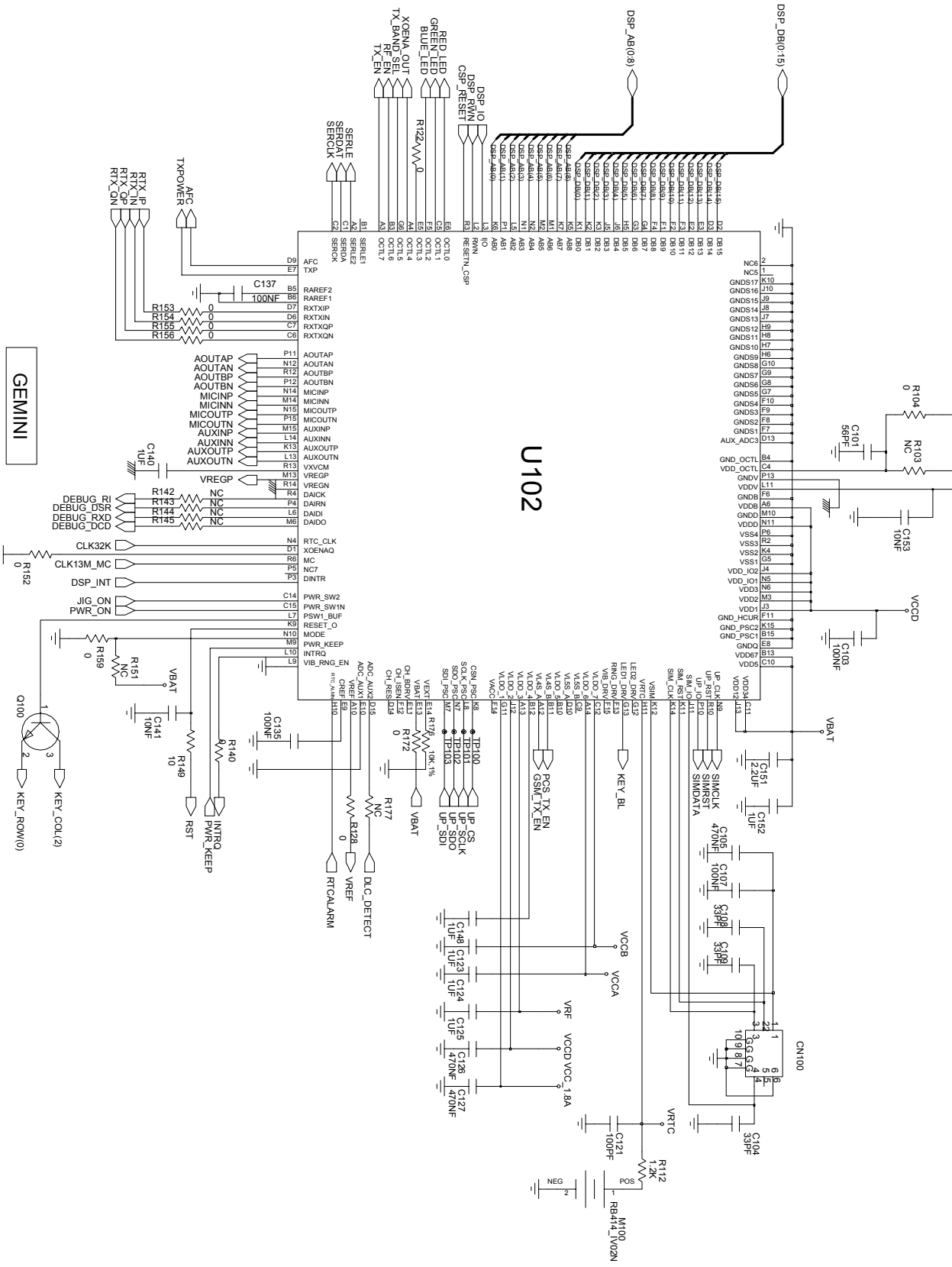


3. Sim Part



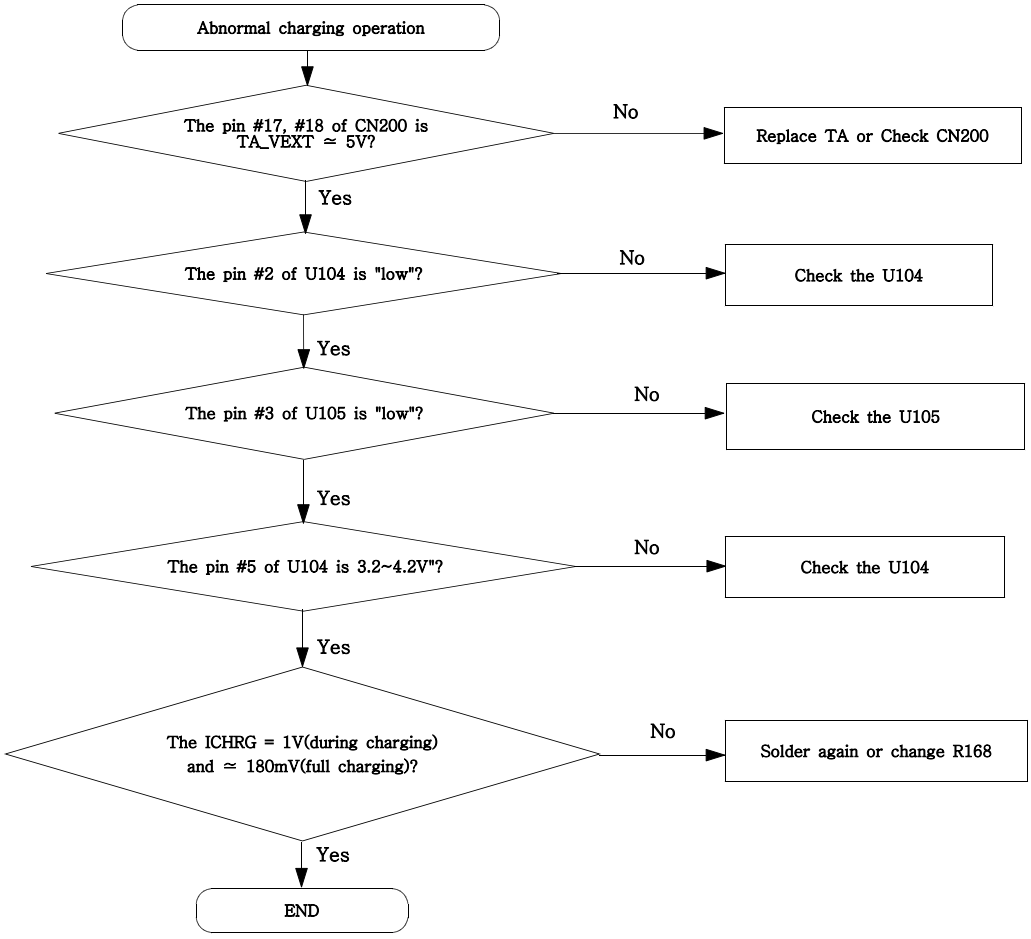


(Picture 1)



(Picture 2)

4. Charging Part



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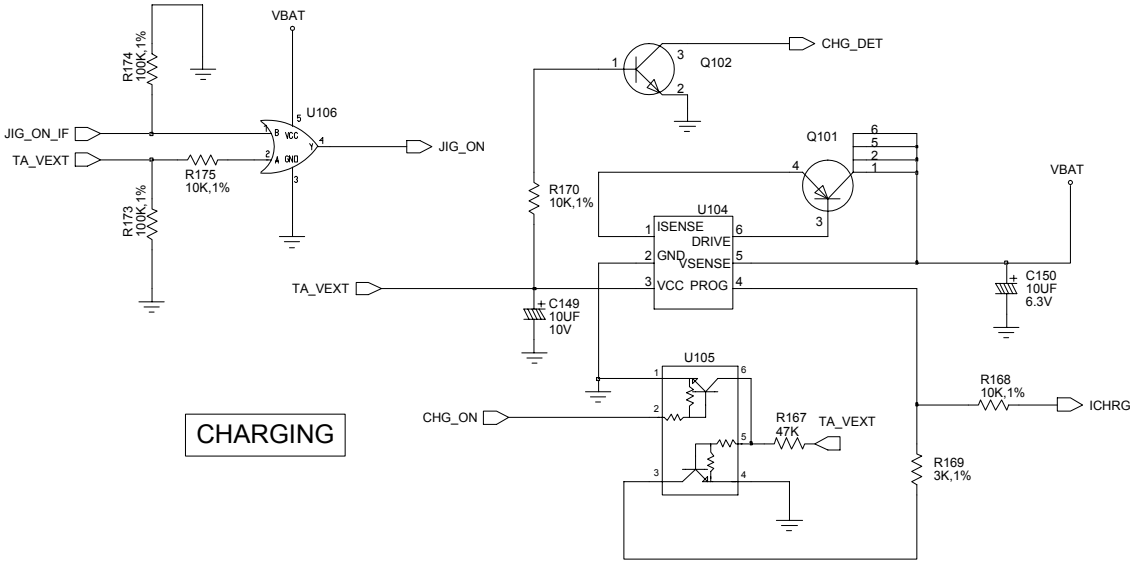
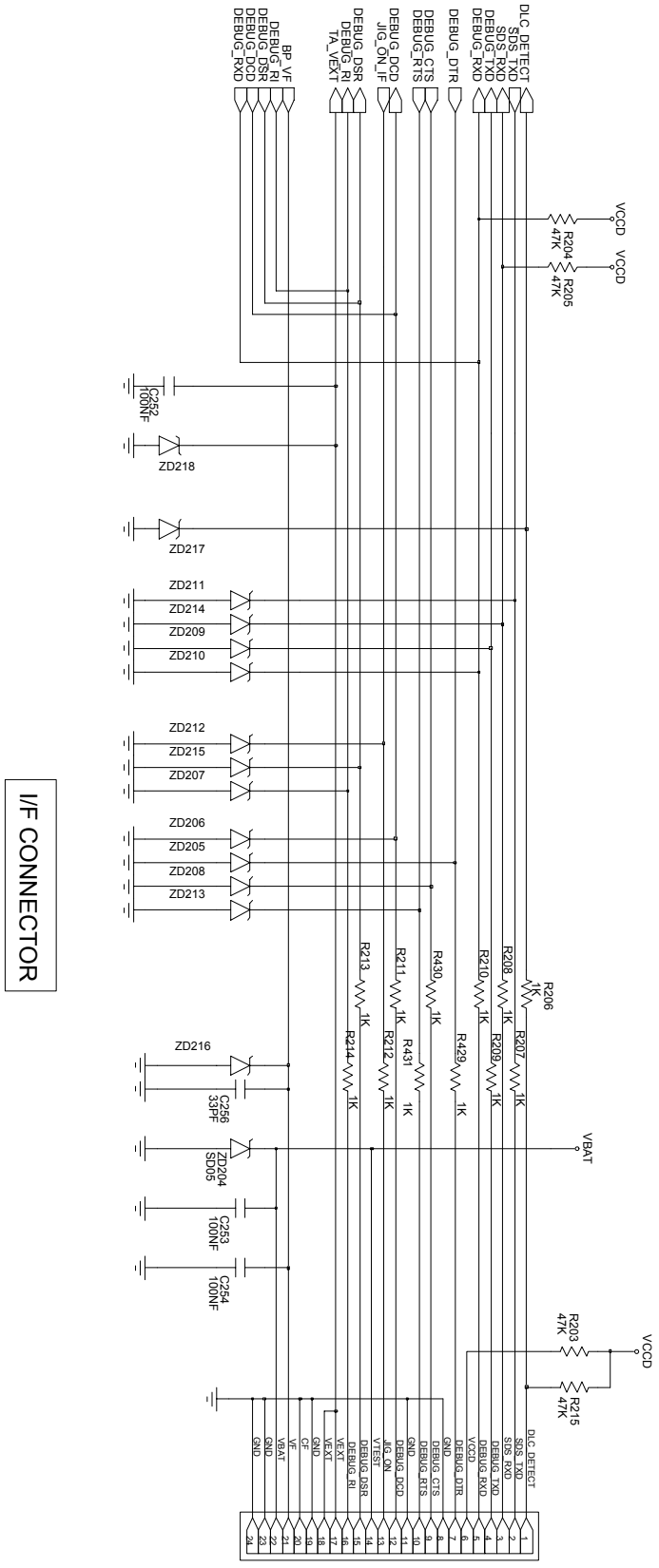
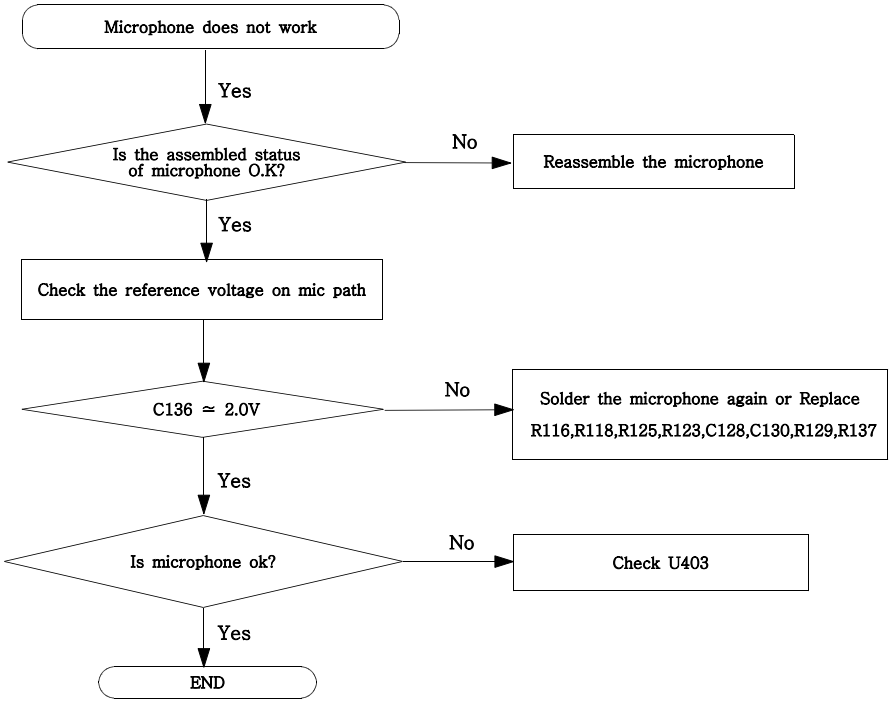


(Picture 1)

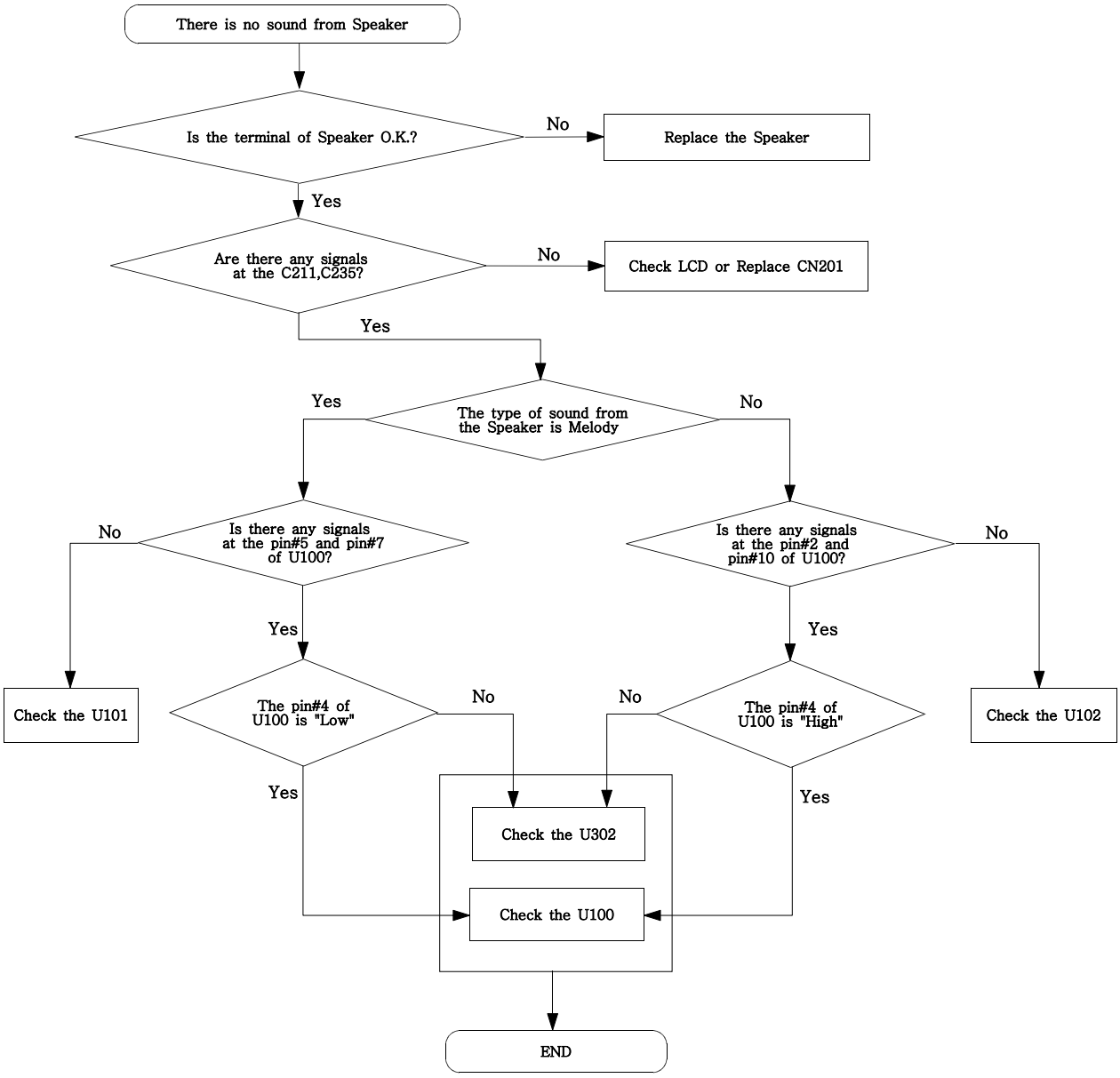


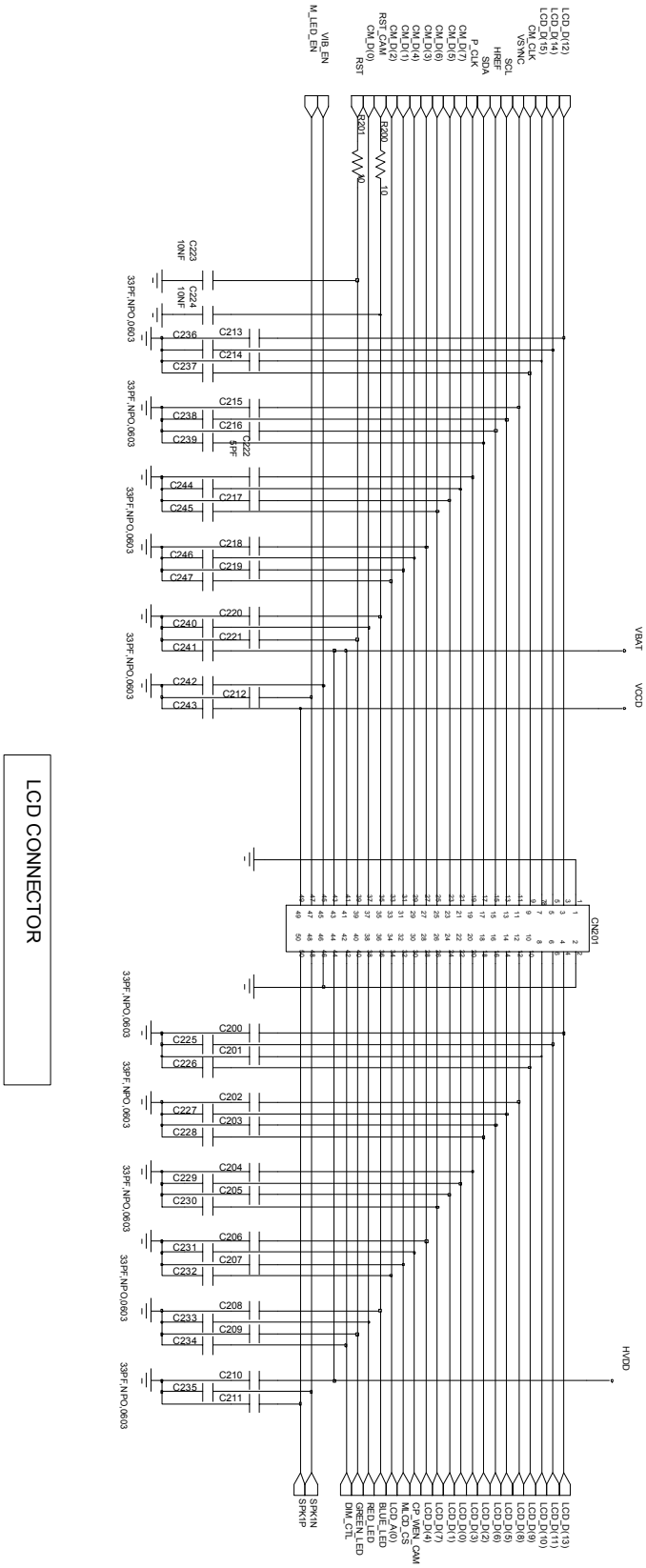
(Picture 2)

5. Microphone Part

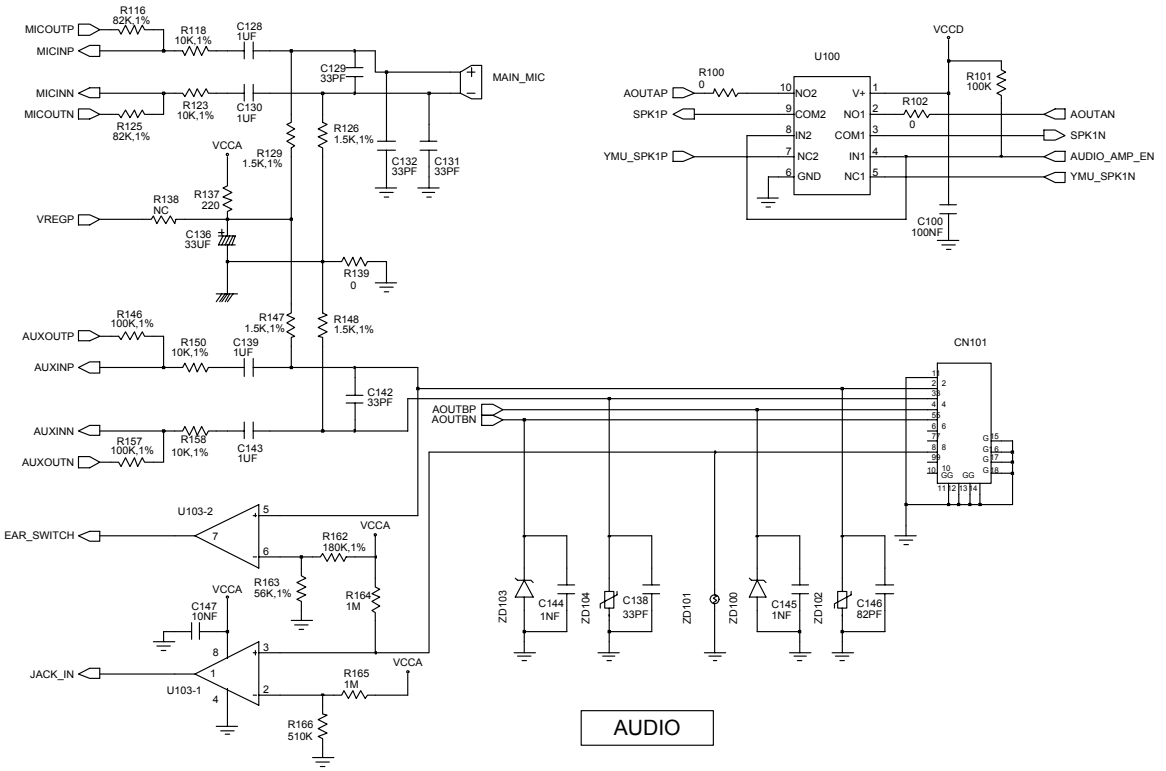


6. Speaker Part

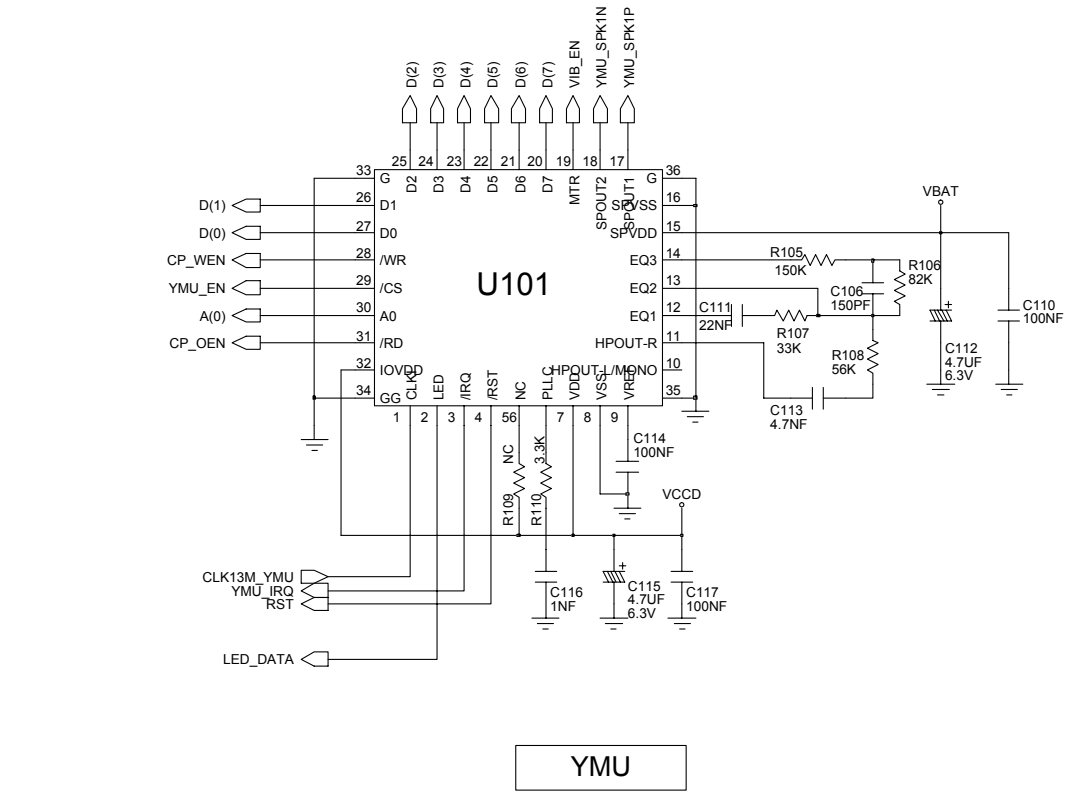




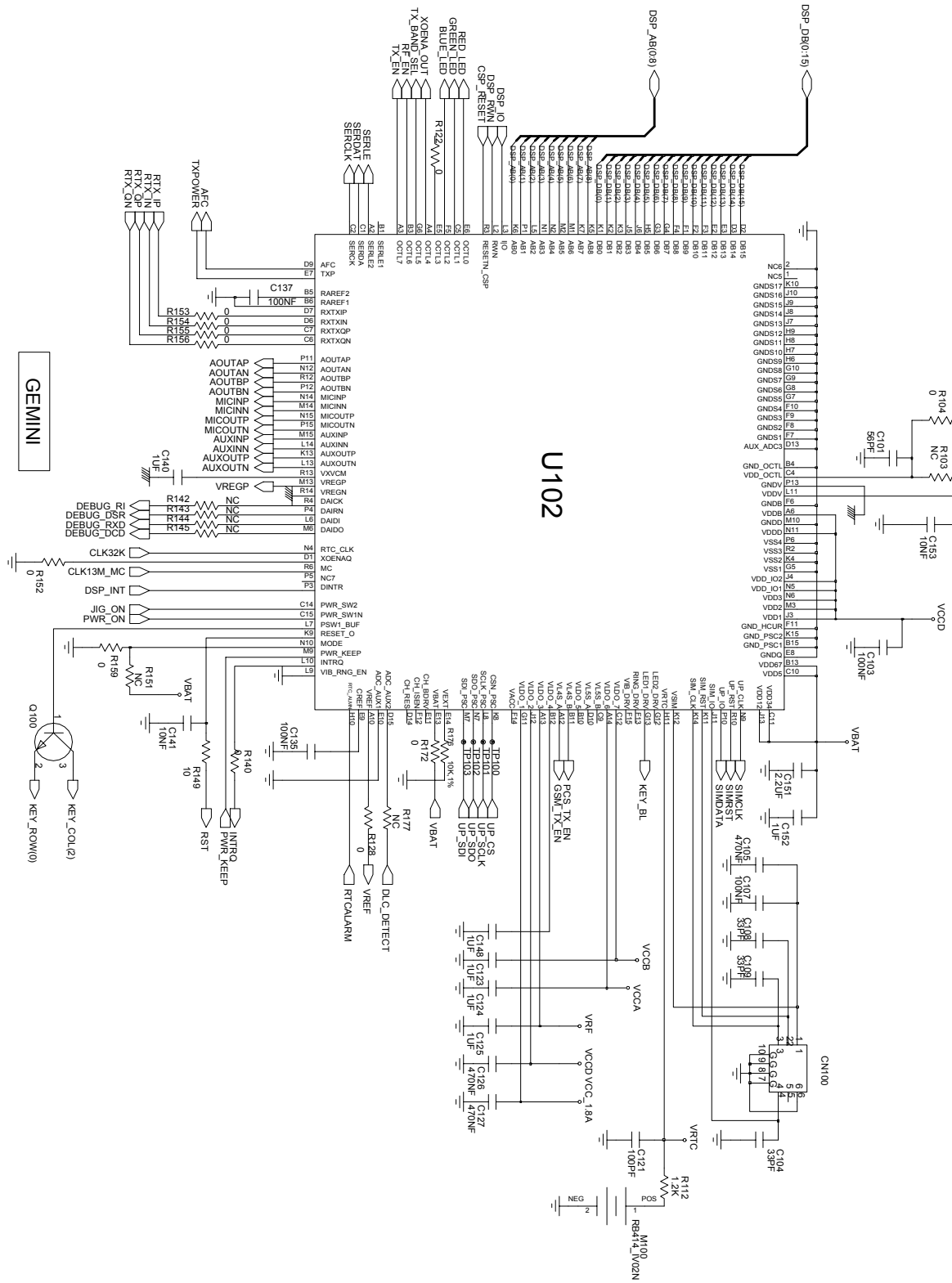
(Picture 1)



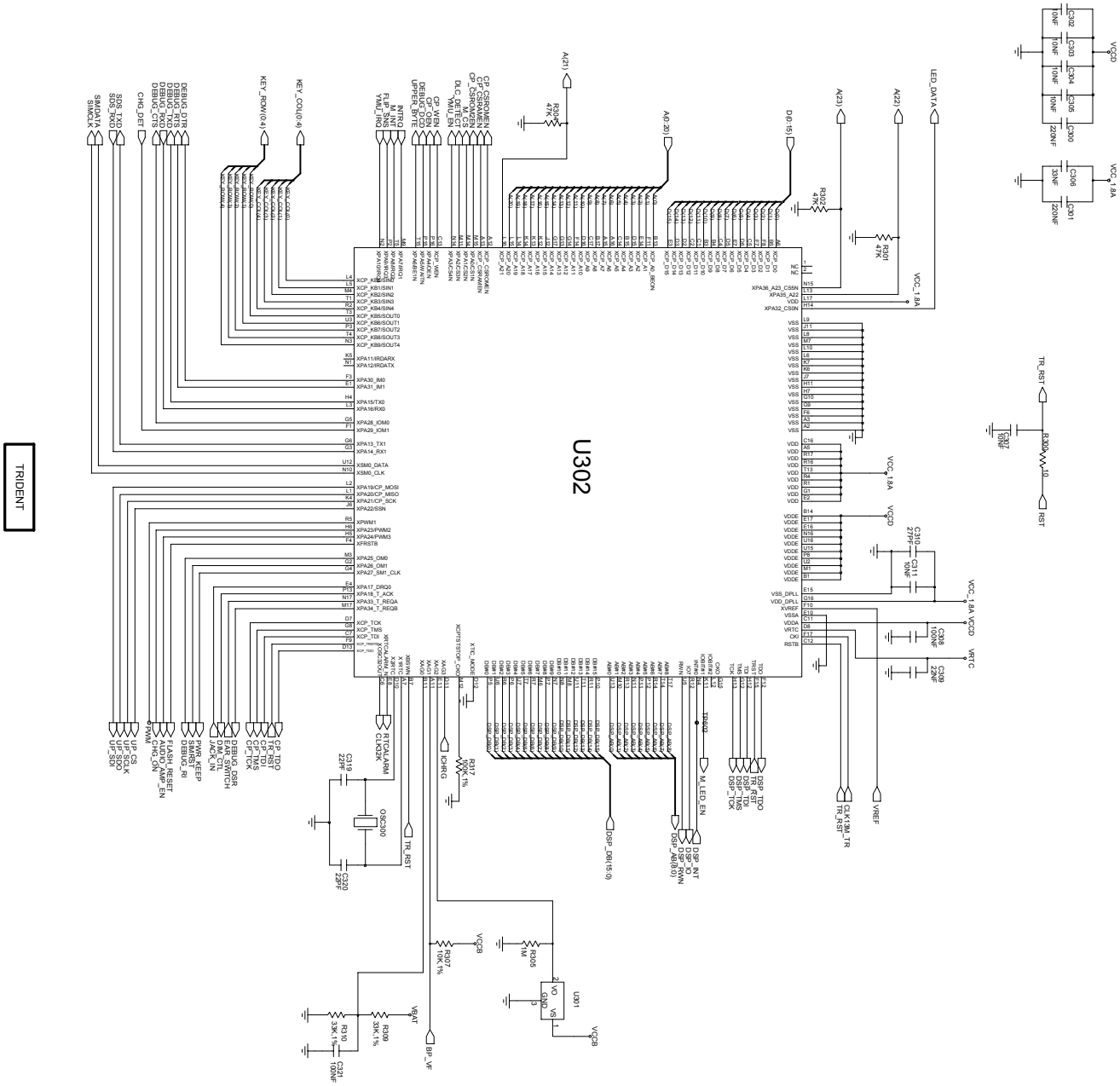
(Picture 2)



(Picture 3)



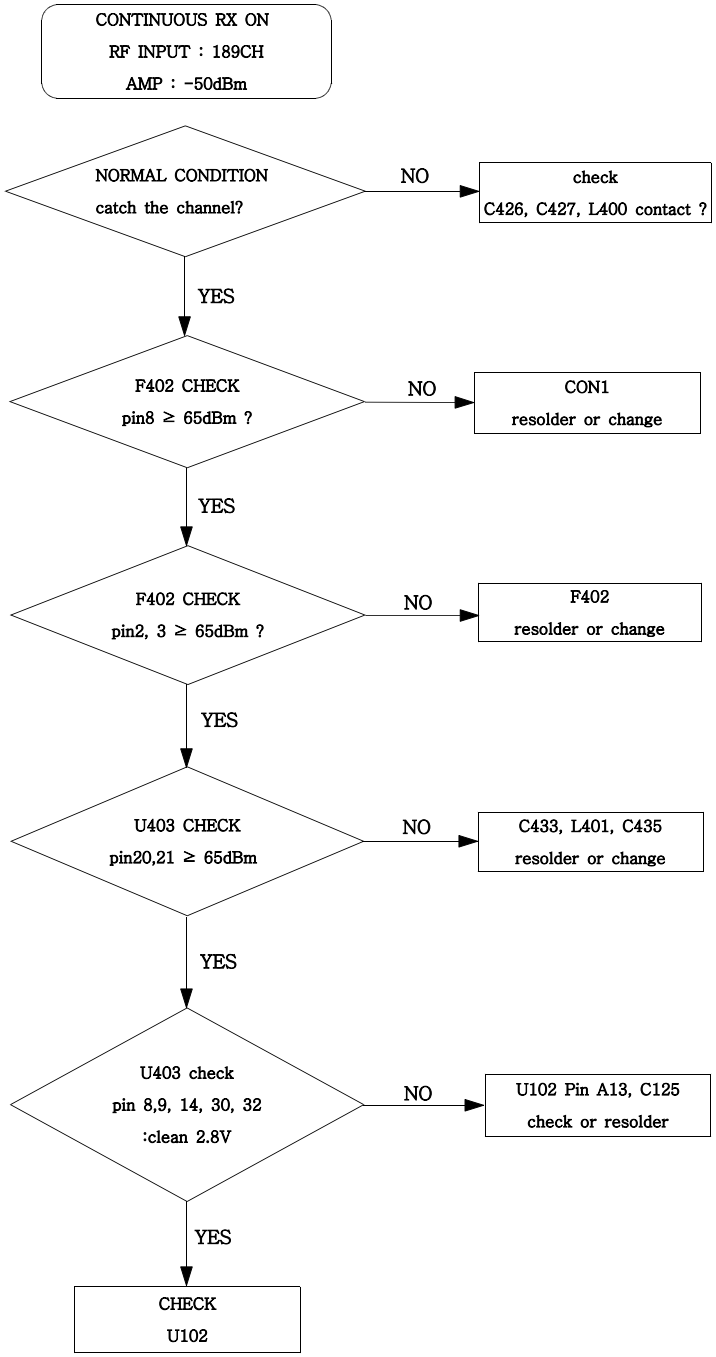
(Picture 4)



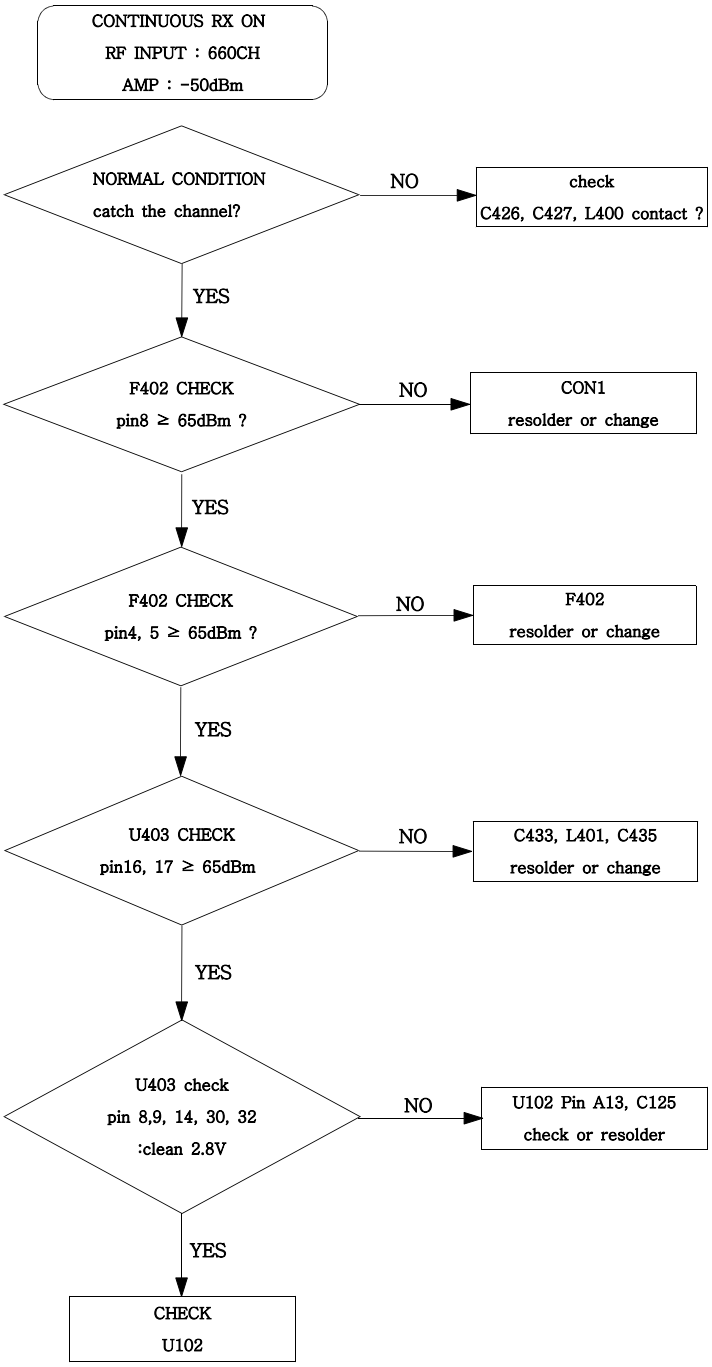
(Picture 5)

2.RF

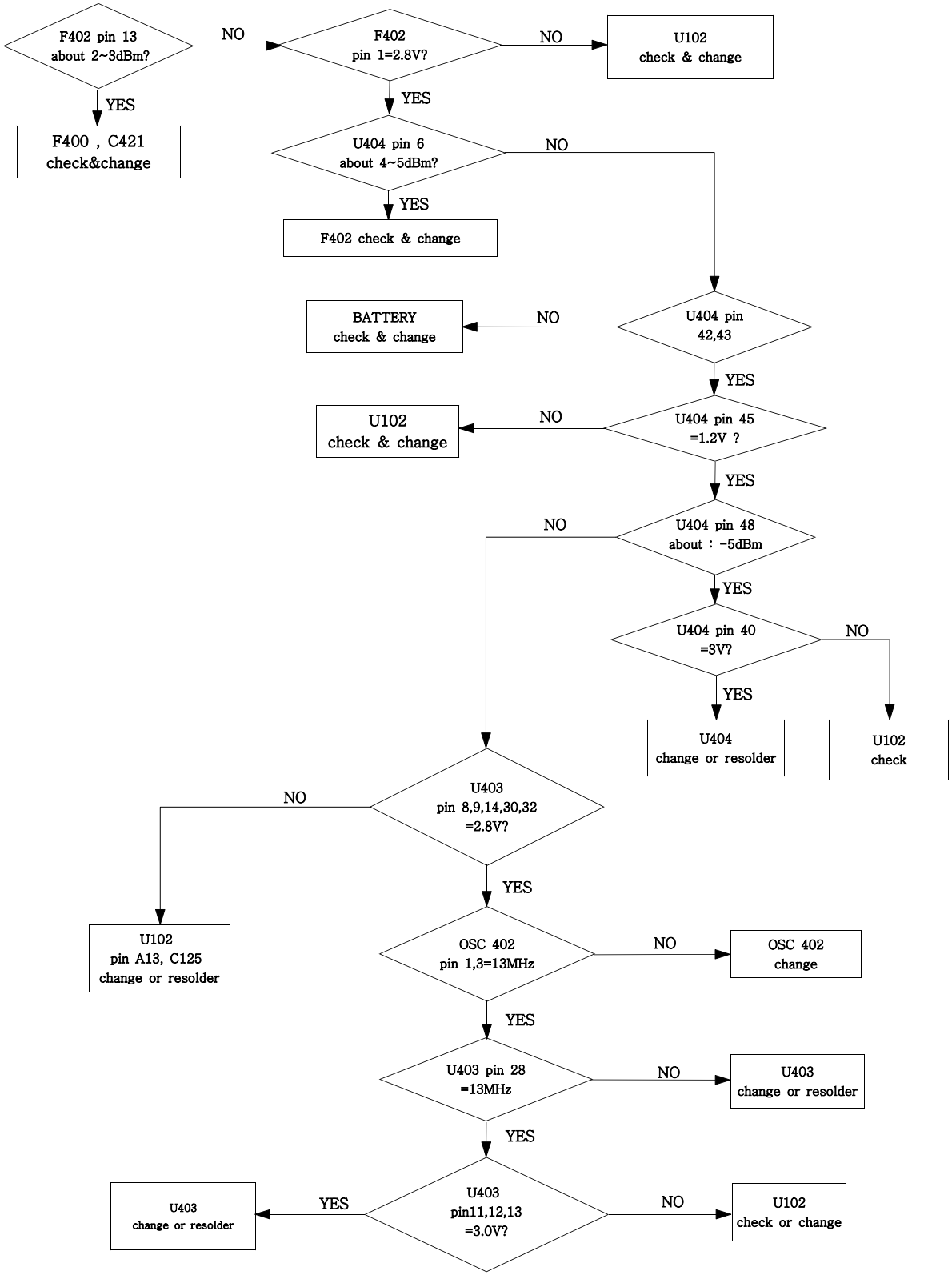
1. GSM RX



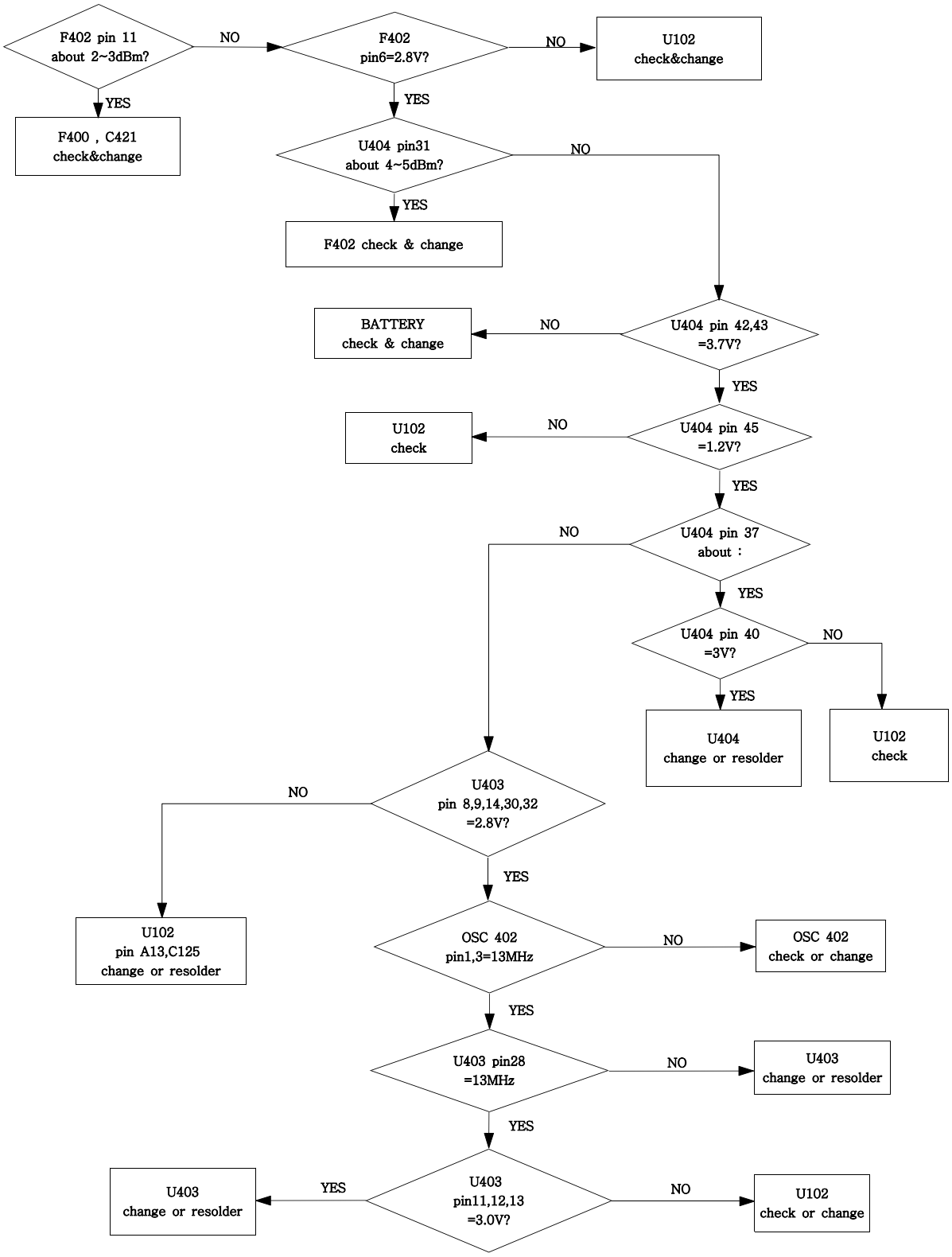
2. PCS RX

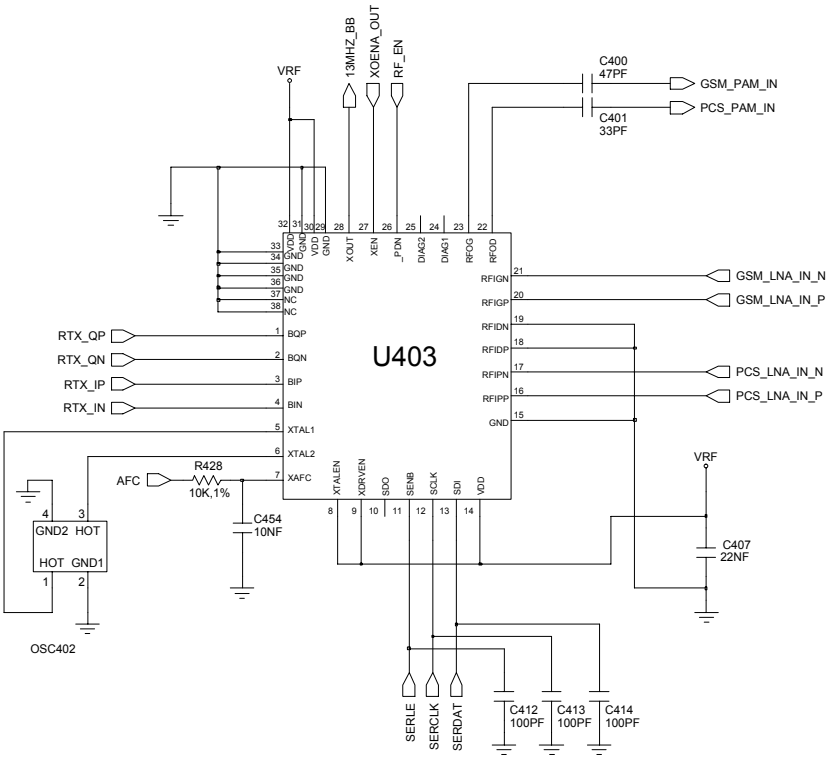


3. GSM TX



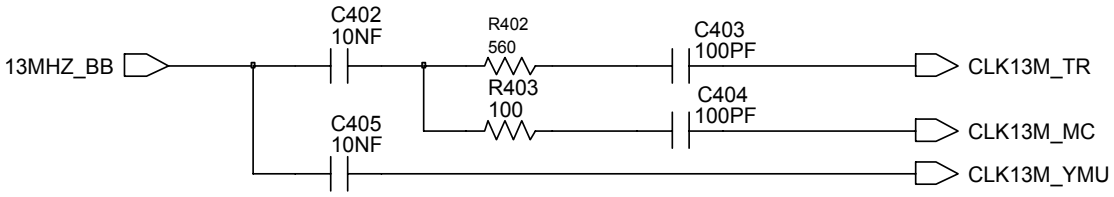
4. PCS TX





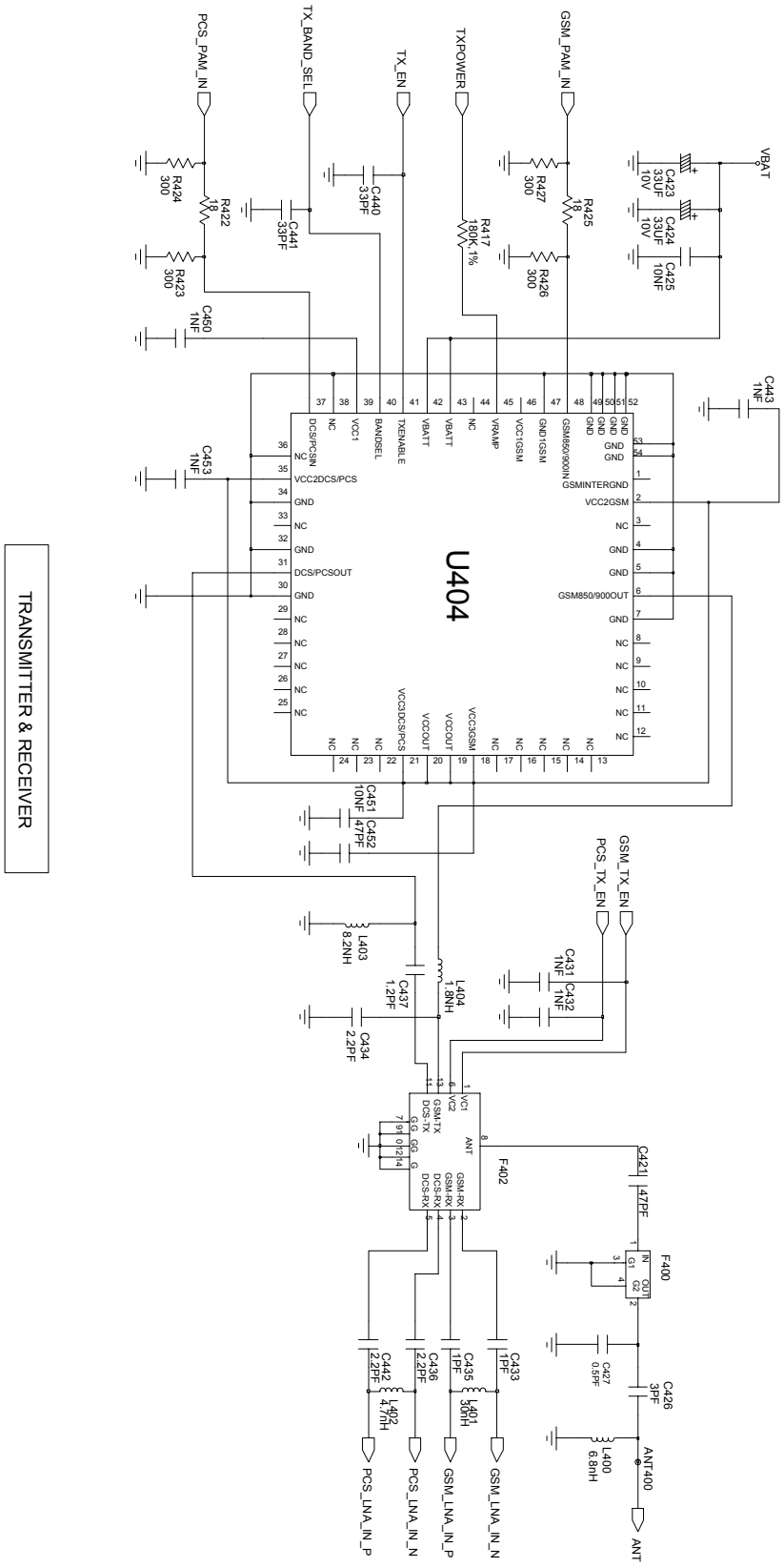
SI-LAB

(Picture 1)

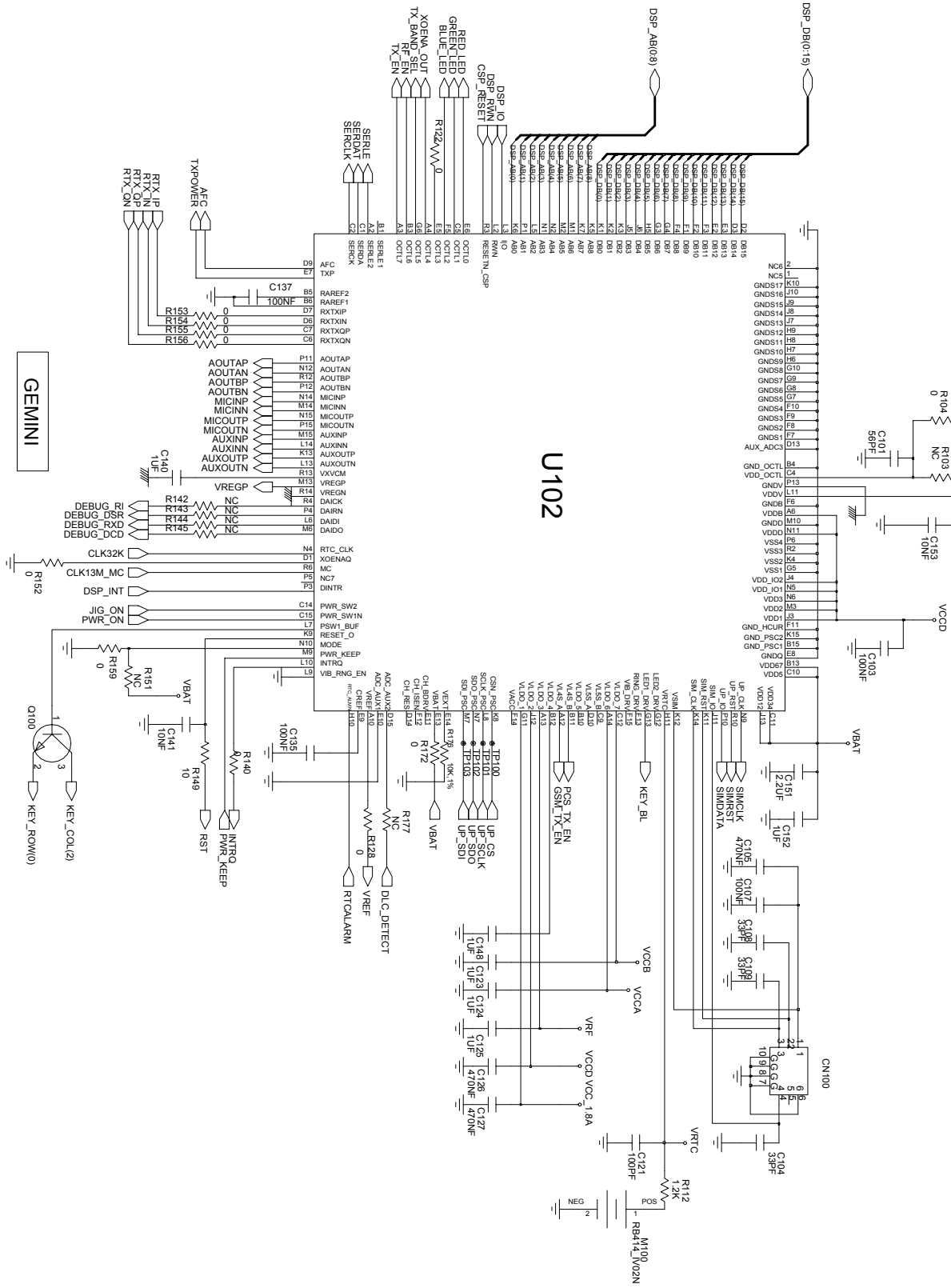


X-TAL(13MHz)

(Picture 2)



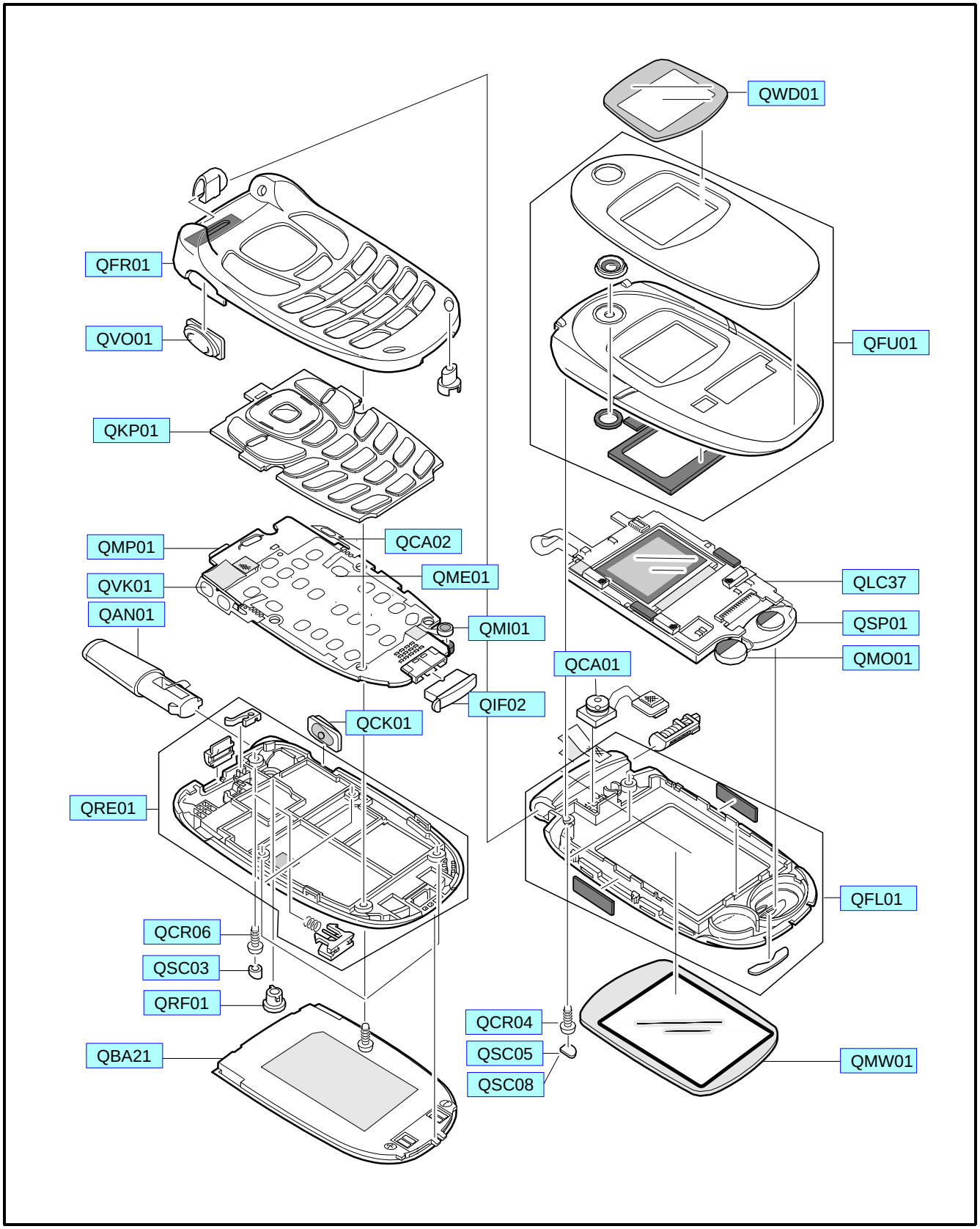
(Picture 3)



(Picture 4)

6. SGH-E316 Exploded View and its Parts list

1. Cellular phone Exploded View



2. Cellular phone Parts list

Location NO.		Description	SEC CODE	Remark
QWD01		MEC-DUAL WINDOWS	GH75-03873A	
QFU01		MEC-F/UPPER ASS'Y	GH75-04024A	
QLC37		LCD	GH07-00465A	
QSP01		SPEAKER	3001-001484	
QMO01		MOTOR	3101-001366	
QCA01		CAMERA	GH59-01102A	
CFL01		MEC-FOLDER LOWER ASSY	GH75-03870A	
QCR04		SCREW	6001-001479	
QSC05		MPR-SCREW SHEET-L	GH74-06866A	
QSC08		MPR-SCREW SHEET-R	GH74-06867A	
QMW01		MEC-LCD WINDOW ASS'Y	GH75-03874C	
QRE01		MEC-REAR ASS'Y	GH75-04025A	
QFR01		MEC-FRONT ASS'Y	GH75-04023A	
QVO01		MEC-VOL KEY	GH75-04736A	
QKP01		MEC-KEYPAD ASS'Y	GH75-04026A	
QMP01		MAIN PBA	GH92-01633A	
QVK01		UNIT-VOL KEY	GH59-01016A	
QCA02		UNIT-CAMERA KEY	GH59-01015A	
QAN01		ANTENNA	GH42-00394A	
QMI01		MIC	GH30-00062A	
QME01		METAL DOME	GH59-01324A	
QIF02		RMO-I/F COVER	GH73-01394A	
QRE01		MEC-REAR ASSY	GH75-04025A	
QCK01		MEC-CAMERA KEY ASS'Y	GH75-04735A	
QCR06		SCREW	6001-001155	
QSC03		PMO-SCREW COVER	GH72-10978A	
QRF01		PMO-RF COVER	GH72-10977A	
QBA21		BATTERY	GH43-01267A	

3. Test Jig (GH80-00865A)

3-1. RF Test Cable (GH39-00182A)

3-2. Test Cable (GH39-00127A)

3-3. Serial Cable

3-4. Power Supply Cable

3-5. DATA CABLE (GH39-00159A)

3-6. TA (GH44-00482A)

7. SGH-E316 MAIN Electrical Parts List

1.Main Parts List

SEC Code	Design LOC
2203-005061	C100
2203-001072	C101
2203-005482	C103
2203-000812	C104
2203-001652	C105
2203-000359	C106
2203-005061	C107
2203-000812	C108
2203-000812	C109
2203-005061	C110
2203-001405	C111
2404-001086	C112
2203-000885	C113
2203-005061	C114
2404-001086	C115
2203-000438	C116
2203-005061	C117
2203-000233	C121
2203-006053	C123
2203-006053	C124
2203-006053	C125
2203-001652	C126
2203-001652	C127
2203-006093	C128
2203-000812	C129
2203-006093	C130
2203-000812	C131
2203-000812	C132
2203-005482	C135
2404-001100	C136
2203-005482	C137
2203-000812	C138
2203-006093	C139
2203-006053	C140
2203-000254	C141
2203-000812	C142
2203-006093	C143
2203-000438	C144
2203-000438	C145
2203-001239	C146
2203-000254	C147
2203-006053	C148
2404-001268	C149
2404-001105	C150
2203-006324	C151
2203-006053	C152
2203-000254	C153
2203-000812	C200
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2203-000812	C256
2203-005496	C300
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2203-000254	C302
2203-000254	C303
2203-000254	C304
2203-000254	C305

SEC Code	Design LOC
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2203-005061	C308
2203-001405	C309
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2203-005509	C313
2203-005061	C314
2203-005509	C315
2203-005509	C316
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2203-000628	C320
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2203-000254	C322
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2203-000254	C405
2203-000254	C406
2203-001405	C407
2203-000233	C412
2203-000233	C413
2203-000233	C414
2203-005482	C415
2203-000254	C416
2203-000233	C417
2203-006053	C418
2203-000233	C419
2203-005482	C420
2203-000995	C421
2203-005482	C422
2404-001151	C423
2404-001151	C424

SEC Code	Design LOC
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2203-002668	C427
2203-005482	C430
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2203-000438	C432
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2203-005552	C442
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2203-000438	C453
2203-000254	C454
3709-001229	CN100
3722-002010	CN101
3710-001673	CN200
3711-005649	CN201
3711-004621	CN203
3705-001287	F400
2909-001236	F402
2703-001952	L400
2703-002602	L401
2703-002700	L402
2703-002544	L403
2703-001729	L404
0601-001790	LED200
0601-001790	LED201

SEC Code	Design LOC
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0601-001790	LED205
0601-001790	LED206
0601-001790	LED207
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0601-001790	LED209
0601-001790	LED210
0601-001790	LED211
0601-001790	LED212
0601-001790	LED213
0601-001790	LED214
0601-001790	LED215
0601-001790	LED216
0601-001790	LED217
0601-001790	LED218
4302-001130	M100
2801-003747	OSC300
2804-001577	OSC401
2801-004359	OSC402
0504-000168	Q100
0502-001201	Q101
0504-000168	Q102
2007-000171	R100
2007-000162	R101
2007-000171	R102
2007-000171	R104
2007-000164	R105
2007-000161	R106
2007-000775	R107
2007-000159	R108
2007-001325	R110
2007-001319	R112
2007-007590	R116
2007-007142	R118

SEC Code	Design LOC
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2007-007142	R123
2007-007590	R125
2007-007528	R126
2007-000171	R128
2007-007528	R129
2007-000139	R137
2007-000171	R139
2007-000171	R140
2007-007489	R146
2007-007528	R147
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2007-000172	R149
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2007-000169	R166
2007-000157	R167
2007-007142	R168
2007-008263	R169
2007-007142	R170
2007-000171	R172
2007-007107	R173
2007-007107	R174
2007-007142	R175
2007-007142	R176

SEC Code	Design LOC
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2007-000172	R201
2007-000157	R203
2007-000157	R204
2007-000157	R205
2007-000140	R206
2007-000140	R207
2007-000140	R208
2007-000140	R209
2007-000140	R210
2007-000140	R211
2007-000140	R212
2007-000140	R213
2007-000140	R214
2007-000566	R215
2007-000172	R300
2007-000157	R301
2007-000157	R302
2007-000171	R303
2007-000157	R304
2007-000170	R305
2007-000157	R306
2007-007142	R307
2007-000171	R308
2007-007308	R309
2007-007308	R310
2007-000172	R311
2007-007107	R317
2007-000148	R400
2007-000148	R401
2007-002797	R402
2007-000138	R403
2007-000171	R408
2007-000171	R409
2007-000172	R410
2007-000171	R413

SEC Code	Design LOC
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2007-007981	R417
2007-000171	R420
2007-000171	R421
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2007-007008	R423
2007-007008	R424
2007-001288	R425
2007-007008	R426
2007-007008	R427
2007-007142	R428
2007-000140	R429
2007-000140	R430
2007-000140	R431
1001-001183	U100
1204-002161	U101
1203-003304	U102
1201-001729	U103
1203-002127	U104
0506-001052	U105
0801-000796	U106
1009-001010	U200
1109-001281	U300
1209-001219	U301
GH09-00020A	U302
GH13-00020A	U401
1203-002236	U402
1205-002485	U403
1201-002075	U404
0406-001152	ZD100
1405-001121	ZD101
1405-001082	ZD102
0406-001152	ZD103
1405-001082	ZD104
0406-001152	ZD204
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SEC Code	Design LOC
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0406-001150	ZD208
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0406-001150	ZD210
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0406-001150	ZD212
0406-001150	ZD213
0406-001150	ZD214
0406-001150	ZD215
0406-001150	ZD216
0406-001150	ZD217
0403-001427	ZD218
0406-001150	ZD219
0406-001150	ZD220
0406-001150	ZD221
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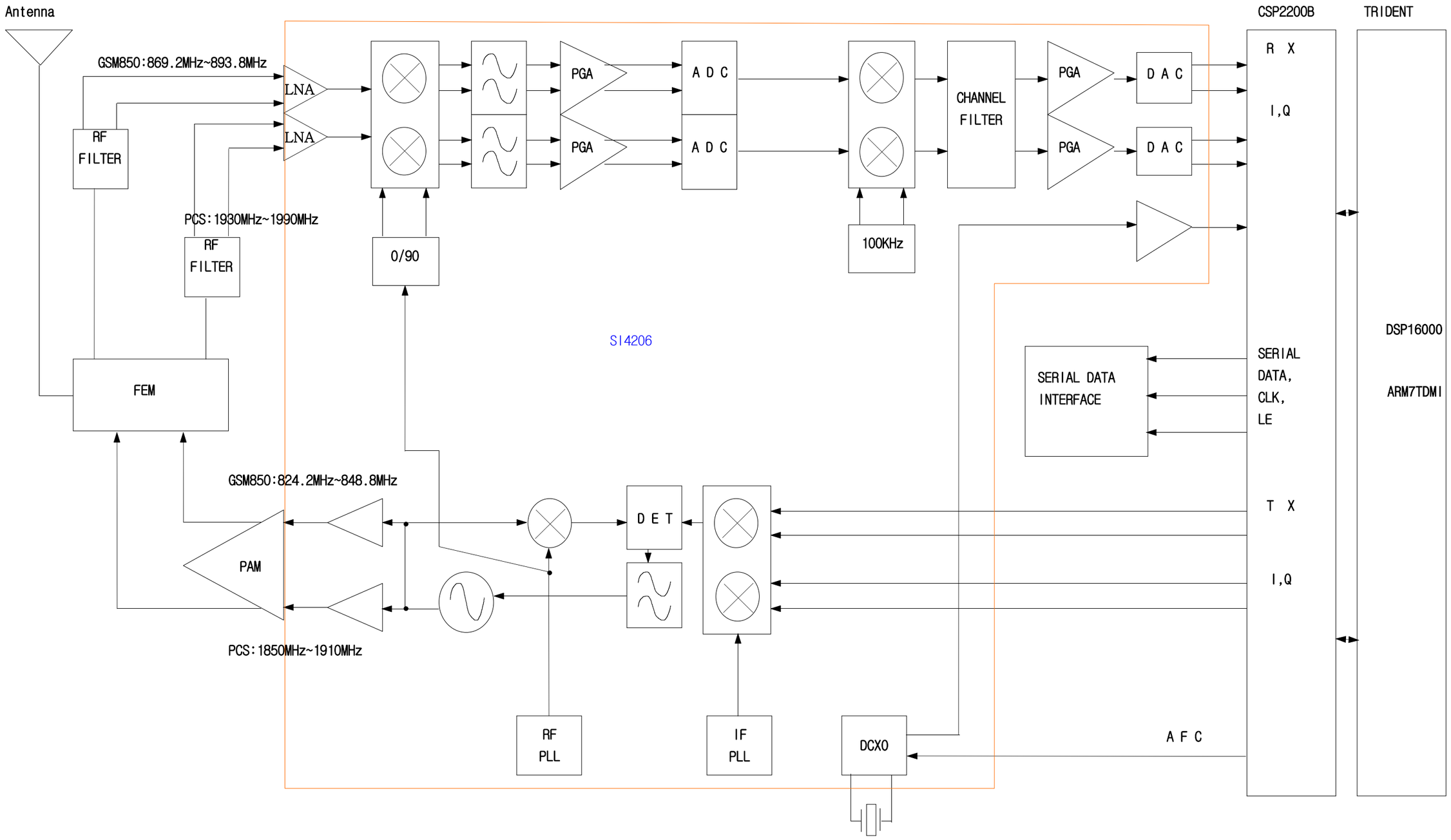
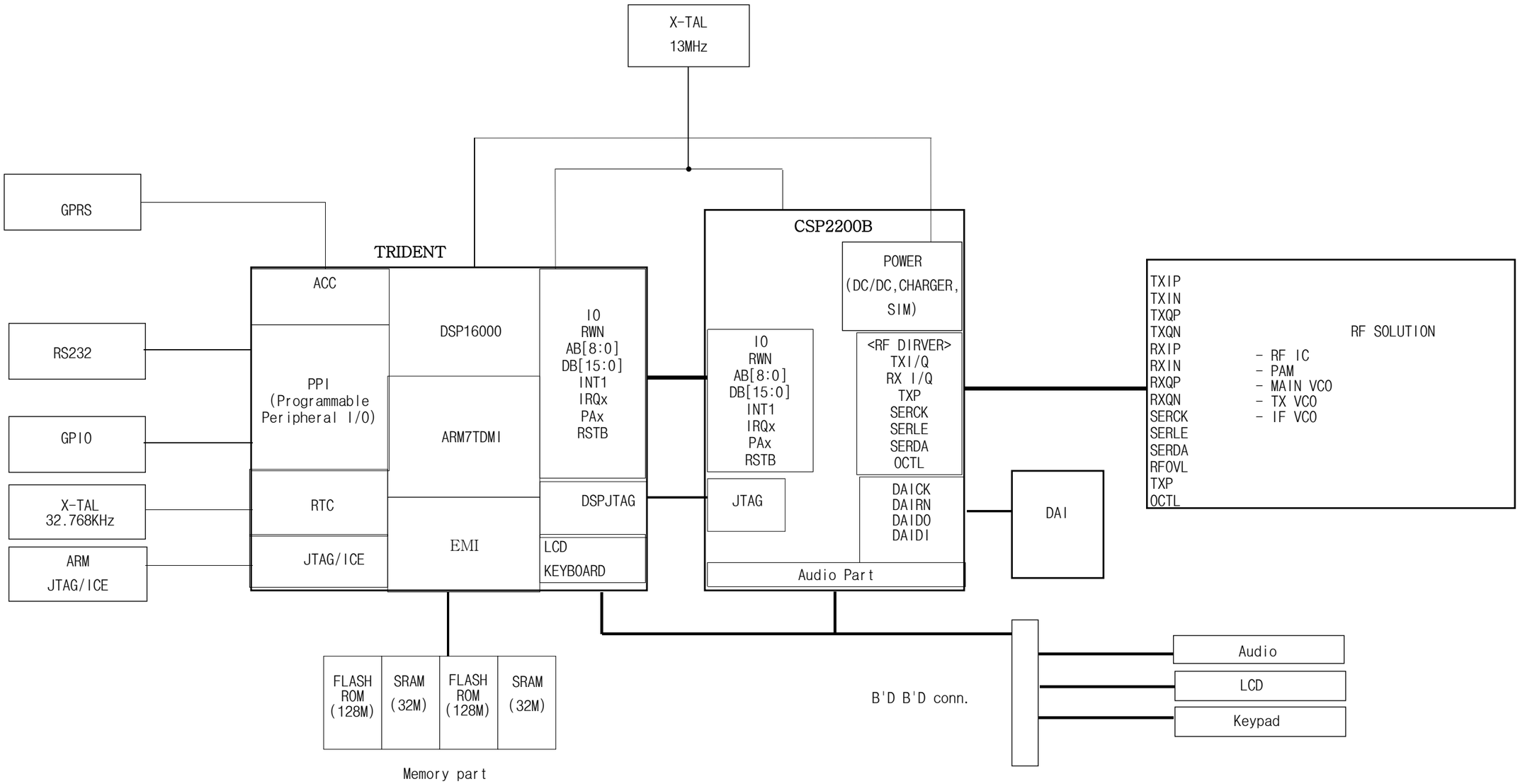
0406-001169	ZD223
GH92-01633A	

8. SGH-E316 Block Diagrams

1. RF Solution Block Diagram

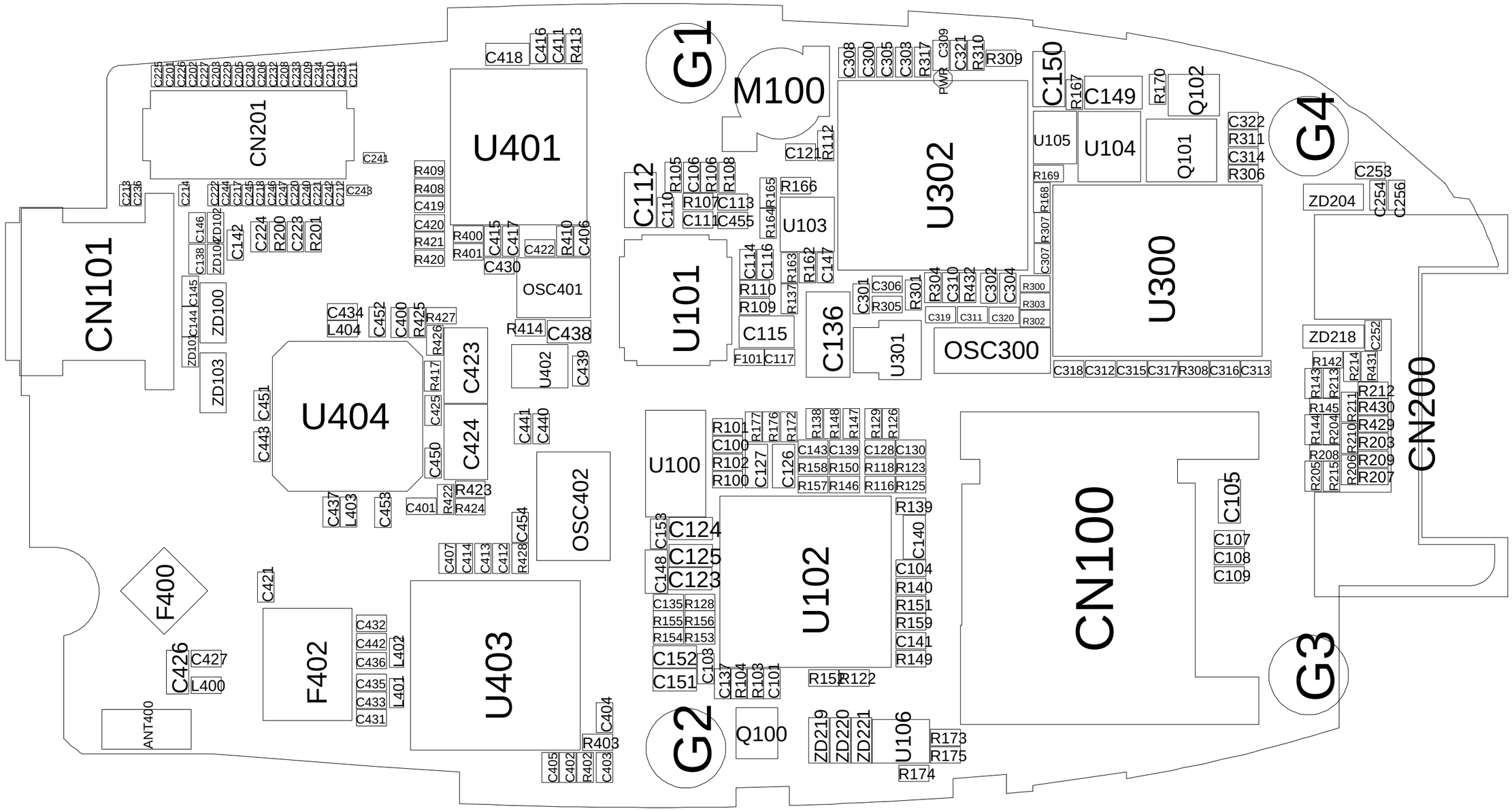


2. Base Band Solution Block Diagram



9. SGH-E316 PCB Diagrams

1.Main TOP Diagram



2. Main Bottom Diagram