

SAMSUNG

UMTS TELEPHONE
SGH-Z107

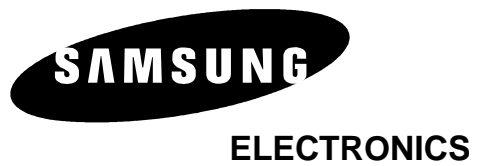
SERVICE *Manual*

UMTS TELEPHONE



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BASIC.

1. SGH-Z107 Specification

1. GSM General Specification

| | GSM900 Phase 1 | EGSM 900 Phase 2 | DCS1800 Phase 1 |
|-------------------------------------|------------------------|------------------------|------------------------|
| Freq. Band[MHz] Uplink/Downlink | 890~915 935~960 | 880~915 925~960 | 1710~1785 1805~1880 |
| ARFCN range | 1~124 | 0~124 & 975~1023 | 512~885 |
| Tx/Rx spacing | 45MHz | 45MHz | 95MHz |
| Mod. Bit rate/ Bit Period | 270.833kbps 3.692us | 270.833kbps 3.692us | 270.833kbps 3.692us |
| Time Slot Period/Frame Period | 576.9us 4.615ms | 576.9us 4.615ms | 576.9us 4.615ms |
| Modulation | 0.3GMSK | 0.3GMSK | 0.3GMSK |
| MS Power | 33dBm~13dBm | 33dBm~5dBm | 30dBm~0dBm |
| Power Class | 5pcl ~ 15pcl | 5pcl ~ 19pcl | 0pcl ~ 15pcl |
| Sensitivity | -102dBm | -102dBm | -100dBm |
| TDMA Mux | 8 | 8 | 8 |
| Cell Radius | 35Km | 35Km | 2Km |

2. GSM TX power class

| TX Power control level | GSM900 |
|------------------------|-----------|
| 5 | 33 ±2 dBm |
| 6 | 31 ±2 dBm |
| 7 | 29 ±2 dBm |
| 8 | 27 ±2 dBm |
| 9 | 25 ±2 dBm |
| 10 | 23 ±2 dBm |
| 11 | 21 ±2 dBm |
| 12 | 19 ±2 dBm |
| 13 | 17 ±2 dBm |
| 14 | 15 ±2 dBm |
| 15 | 13 ±2 dBm |
| 16 | 11 ±3 dBm |
| 17 | 9 ±3dBm |
| 18 | 7 ±3 dBm |
| 19 | 5 ±3 dBm |

| TX Power control level | DCS1800 |
|------------------------|-----------|
| 0 | 30 ±3 dBm |
| 1 | 28 ±3 dBm |
| 2 | 26 ±3 dBm |
| 3 | 24 ±3 dBm |
| 4 | 22 ±3 dBm |
| 5 | 20 ±3 dBm |
| 6 | 18 ±3 dBm |
| 7 | 16 ±3 dBm |
| 8 | 14 ±3 dBm |
| 9 | 12 ±4 dBm |
| 10 | 10 ±4 dBm |
| 11 | 8 ±4dBm |
| 12 | 6 ±4 dBm |
| 13 | 4 ±4 dBm |
| 14 | 2 ±5 dBm |
| 15 | 0 ±5 dBm |

2. SGH-Z107 Circuit Description

1. SGH-Z107 RF Circuit Description

1. Antenna Switch Module (U100)

The antenna switch module allows multiple operating bands and modes to share the same antenna. A common antenna connects to one of five paths: 1) UMTS-2100 Rx/Tx, 2) EGSM-900 Rx, 3) EGSM-900 Tx, 4) DCS-1800 Rx, and 5) DCS-1800 Tx. UMTS operation requires simultaneous reception and transmission.

2. Filter

To convert Electromagnetic Field Wave to Acoustic Wave and then pass the specific frequency band.

- GSM Rx FILTER (F101) For filtering the frequency band between 925 ~ 960 MHz.
- DCS Rx FILTER (F100) For filtering the frequency band 1805 and 1880 MHz.
- WCDMA Rx FILTER (F201) For filtering the frequency band 2110 and 2170 MHz.
- WCDMA Tx FILTER (F202) For filtering the frequency band 1920 and 1980 MHz.

3. TCVCXO (OSC202)

To generate the 19.2MHz reference clock to drive the logic and RF.

4. Duplexer (F203)

A duplexer splits a single operating band into receive and transmit paths.

5. Isolator (MIS201)

An isolator between the Power Amplifier and the duplexer is highly recommended to provide constant load and source impedances (respectively) to those devices.

6. UMTS PAM (U202)

This is a key component in the transmitter chain and must complement the RTR6200 IC precisely; jointly they dominate the UMTS transmitter performance characteristics. Parameters such as gain, output power level, ACLR, harmonics, Rx-band noise, and power supply current are critical.

7. GSM/DCS PAM (U102)

The PAM is a key component in any transmitter chain and must complement the rest of the transmitter precisely. For GSM and DCS operation, the closed-loop transmit power control functions add even more requirements relative to the UMTS PA. In addition to gain control and switching requirements, the usual RF parameters such as gain, output power level, several output spectrum requirements, and power supply current are critical.

8. GSM/DCS Dual Tx VCO (OSC101)

The dual Tx VCO outputs, one for EGSM and one for DCS, drive a resistive network that splits the active signal into two signals: 1) the input to the active PAM – this is the low loss path, and 2) the OPLL feedback signal.

9. Dual VCO (OSC201)

The dual-band UHF VCO is a key component within its phase-locked loop; VCO performance directly impacts PLL and transceiver performance. GSM/DCS Rx/Tx LO & UMTS Rx LO signal is generated from this dual VCO's output.

10. RFL6200 (U201)

The RFL6200 includes an LNA circuit optimized for UMTS-2100 operation. The LNA is separated from all other receive functions contained within the RFR6200 receiver IC to improve mixer LO to RF isolation – a critical parameter in the Zero-IF architecture.

11. RFR6200 (U205)

The RFR6200 provides the Zero-IF receiver signal path, from RF to analog baseband, for UMTS-2100 applications. The RFR6200 accepts its UMTS input signal from the handset RF front-end design. The UMTS input is configured differentially to optimize second-order inter-modulation and common mode rejection performance, and implements MSM-controlled gain adjustments to extend the receiver dynamic range.

12. RTR6200 (U101)

The RTR6200 supports multi-band, multi-mode phones with two receiver signal paths and three transmitter signal paths:

1) Receiver paths

- EGSM-900
- DCS-1800

2) Transmitter paths

- EGSM-900 (using OPLL technique)
- DCS-1800 (using OPLL technique)
- UMTS-2100

Numerous secondary functions are integrated on-chip as well:

3) Phase-locked loop circuits

- PLL#1 and an on-chip VCO supports UMTS Tx
- PLL#2 and an external VCO supports EGSM Rx and Tx, DCS Rx and Tx, and UMTS Rx

4) Transceiver LO generation and distribution circuits

- EGSM-900 Rx and Tx
- DCS-1800 Rx and Tx
- UMTS-2100 Tx

2. Baseband Circuit description of SGH-Z105

1. PM6050

1.1. Power Management

Ten low-dropout regulators designed specifically for GSM applications power the terminal and help ensure optimal system performance and long battery life. It provides seven LDO support for 2.6V, 2.8V while a self-resetting, electronically fused switch supplies power to external accessories. Ancillary support functions, such as RTC module and RTC charger, Clock Buffer, aid in reducing both board area and system complexity.

SBI BUS serial interface provides access to control and configuration registers. This interface gives full control of the MSM6200 and enables system designers to maximize both standby and talk times.

Supervisory functions, including a reset generator, an input voltage monitor, and a ADC Converter support reliable system design. These functions work together to ensure proper system behavior during start-up or in the event of a fault condition (low microprocessor voltage, insufficient battery energy, or excessive die temperature).

1.2. Keypad Backlight

The Keypad backlight driver output is at pin 17 (KEYBD_DRV) and is designed to drive parallel connected LEDs directly. Its output current level is SBI-programmable and meets the performance specified below.

Input parameters are not specified since they are internal.

1.3. TCXO Controller and Buffers

The PM6050 IC includes circuits for controlling the TCXO warm-up and buffering its signal for distribution throughout the handset. Performance specifications are presented below.

2. Connector

2-1. LCD Connector

LCD is consisted of main LCD (color 262K TFT LCD) and small LCD (OLED color 65K LCD). Chip select signals in the U302, LCD_CS1- can enable small LCD. W_LED_ON signal enables white LED of main LCD, EN_EN signal enables EL of small LCD.

"RESET-, TFT_RESET_N" signal initiates the Reset process of the LCD.

8-bit data lines (AD(0)~AD(7)) transfers data and commands to Small LCD through by pass capacitor. Data and commands use "RS" signal. If this signal is high, Inputs to LCD are commands. If it is low, Inputs to LCD are data. The signal which informs the input or output state to LCD, is required. But this system is not necessary this signal.

Power signals for LCD are "VDD_LP" and "2.8LV". "SPK+" and "SPK-" from U533 are used for audio speaker. And "Vibrator" from Q702 enables the motor.

2-2. Key

This is consisted of key interface pins among U302, KEYSENSE_N(0:4). These signals compose the matrix. Result of matrix informs the key status to key interface in the U302. Power on/off key is seperated from the matrix. So power on/off signal is connected with U302 to enable U601. twelve key LED use the "VBAT" supply voltage. "KEY_LED" signal enables LEDs with current control. "HALL_SW" informs the status of folder (open or closed) to the. This uses the hall effect IC, A3210ELH. A magnet under main LCD enables A3210ELH.

2-3. EMI ESD Filter

This system uses the EMI ESD filter, SMF05 to protect noise from IF CONNECTOR part.

2-4. IF connetor

It is 24-pin connector. They are designed to use VBATT, CF, M_TXD0, M_RXD0, RTS, CTS, JIG_ON, HFK_DETECT, M_RXD0, M_TXD0, HFK_MIC+, HFK_MIC-, HFK_SPK+, HFK_SPK- and GND. They connected to power supply IC, microprocessor and signal processor IC.

3. Audio

EAR1OP and EAR1ON from U302 are connected to the main speaker. AUXOP and AUXON are connected to the Hands free kit. MIC_P and MIC_N are connected to the main MIC. And EAR_MIC1P and EAR_MIC1N are connected to the Earphone.

YMU765 has a built-in amplifier, and thus, is an ideal device for outputting sounds that are used by mobile phones in addition to game sounds and ringing melodies that are replayed by a synthesizer.

The synthesizer section adopts "stereophonic hybrid synthesizer system" that are given advantages of both FM synthesizers and Wave Table synthesizers to allow simultaneous generation of up to 32 FM voices and 32 Wave Table voices. Furthermore, YMU765 has a built-in hardware sequencer that helps to realize complex play without heavily loading the host CPU. And this device also has a built-in circuit for controlling vibrators and LEDs synchronizing with play of music. The consumed electric current can be stopped to the minimum by power down mode when not operating.

The hardware sequence built in this device allows playing of the complex music without giving excessive load to the CPU of the portable telephones. Moreover, the registers of the FM synthesizer can be operated directly for real time sound generation, allowing, for example, utilization of various sound effects when using the game software installed in the portable telephone.

4. Memory

The signals in the MSM6200 enable two memories. They use only one volt supply voltage, VDD_LP from the PM6050. This system uses AMD's memory, AM50DL128BG. It is consisted of 128M bits flash NOR memory and 32M bits SRAM memory. It has 16 bit data line, AD[0~15] which is connected to MSM6200. It has 22 bit address lines, A[1~22]. ROM_CS and RAM_CS signals is chip select.

In the multi-media processor, it has three type memories. One is 256Mbit Nor Flash memory another is 256Mbit NAND Flash memory and the other is 128Mbit SDRAM memory. Multi-media processor doesn't have a NAND memory interface. But we make a software algorithm use for NAND memory.

5. Multi-media processor MA55133

MA55133 is an LSI, which is designed on 3GPP 3G-324M Standard for a video telephone system. Since protocol software is external, MA55133 can run with another protocol like H.323 by changing its software. Because of small power consumption - Typ.140mW and very small package - FPBGA, it is suitable to use 3G-324M LSI for portable apparatus.

Feature

- Based on 3GPP 3G-324M standard
- Video MPEG-4 (simple profile level1) or H263 (baseline)
- Audio AMR, G723.1, MP3 or AAC (program downloadable)
- Multiplexing H.223 (Level 0, 1, 2, processed by CPU with assistant hardware)
- Control H.245 (Processed all by CPU)
- Built-in 32bit RISC CPU(ARM7TDMI) for control, including H.245 and H.223
- Built-in 16bit DSP for audio CODEC
- Built-in SD card I/F
- Video input Rec601 YUV = 4:2:2, 8 bit I/F
- Video output Rec601 YUV = 4:2:2(8bit) / RGB 18bit

Built-in Picture-In-Picture Image Displaying Functions

Built-in On Screen Display(OSD) Functions

- Video CODEC 15fps for both encode and decode in QCIF size is possible.
- Program on SDRAM is executable without ROM (optional).
- Power supply VDDI=2.0V to 2.7V (internal), VDDO=2.7 to 3.6V (I/O)

6. Camera (HV7131GP)

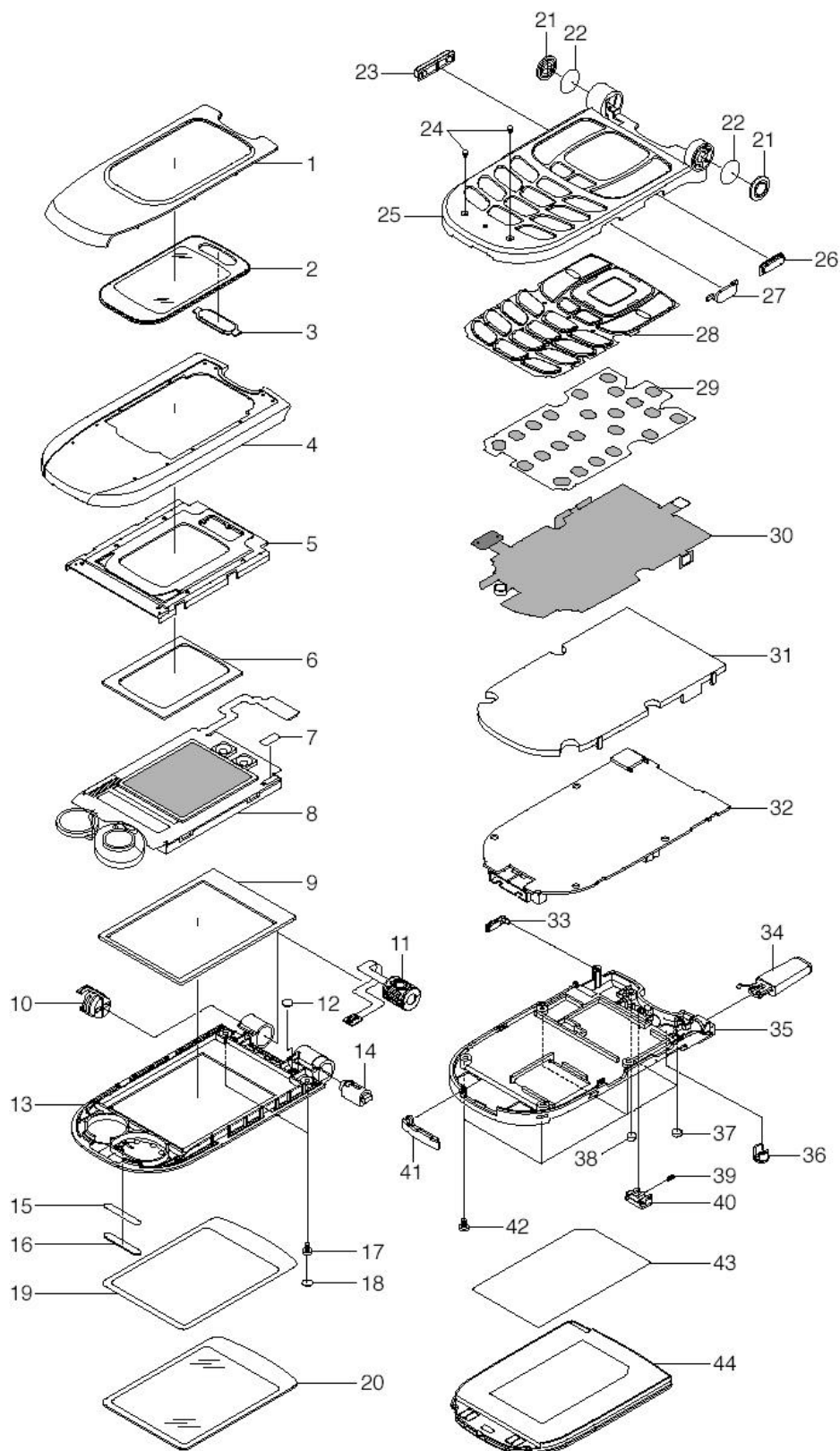
The HV7131GP is a highly integrated single chip CMOS color image sensor implemented by proprietary Hynix 0.35um COMS sensor process realizing high sensitivity and wide dynamic range. Total pixel array size is 652X492, and 652X488 pixels are active. Each active pixel composed of 4 transistors has a micro-lens to enhance sensitivity, and converts photon energy to analog pixel voltage. On-chip 10bit Analog to Digital Converter(ADC) digitizes analog pixel voltage, and on-chip Correlated Double Sampling(CDS) scheme reduces Fixed Pattern Noise(FPN) dramatically. The integration of sensor function and image processing functions make HV7131GP especially very suitable for mobile imaging systems such as IMT-2000.

7. Irda

This system uses IRDA module, HSDL_3208, Agilent's. This has signals, "IRA_DOWN"(enable signal), "RXD0"(Input data) and "TXD0"(output data). These signals are connected to U302(MSN6200). It uses two power signals. "VDD_LP" is used for circuit and "VBATT" is used for LED.

3. SGH-Z107U Exploded View and its Parts list

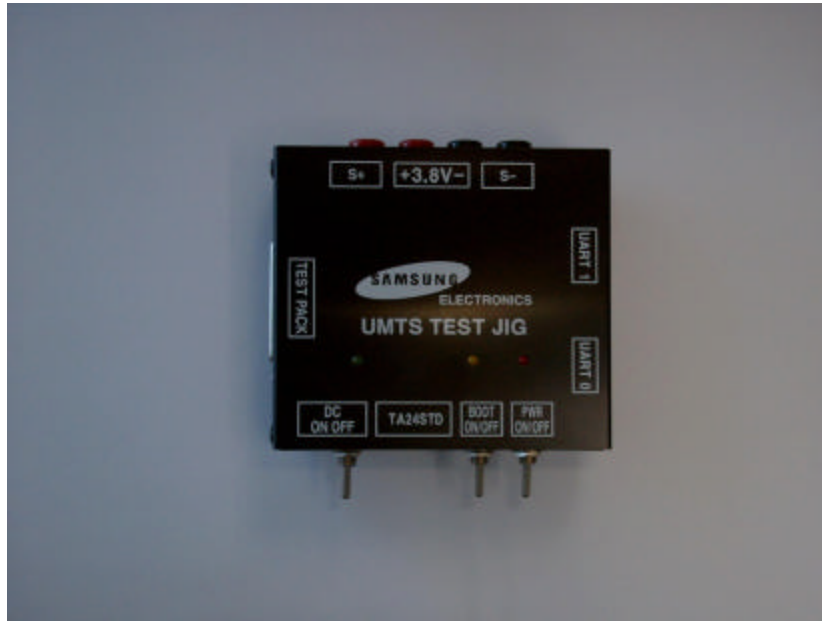
1. Cellular phone Exploded View



2. Cellular phone Parts list

| NO | SEC CODE | DESCRIPTION | COLOR | Q'TY | REMARKS |
|------|-------------|---------------------------|-----------|------|---------|
| 1 | GH72-15052 | PMO-FOLDER SIDE DECO | DEEP GRAY | 1 | |
| 2 | GH75-05133A | MEC-FOLDER DECO | SILVER | 1 | |
| 3 | GH72-15062A | PMO-FLASH LENS | - | 1 | |
| 4 | GH72-15051A | PMO-FOLDER UPPER | SILVER | 1 | |
| 5 | GH71-03694A | NDC-FOLDER BRACKET | - | 1 | |
| 6 | GH74-09373A | MPR-SPONGE DUAL LCD | - | 1 | |
| 7 | | TAPE-LCD | - | 1 | |
| 8 | | LCD | - | 1 | |
| 9 | GH74-09372A | MPR-SPONGE MAIN LCD | - | 1 | |
| 10 | GH75-03947A | MEC-CAMERA HINGE DUMMY | - | 1 | |
| 11 | | CAMERA | - | 1 | |
| 12 | | MAGNET | - | 1 | |
| 13 | GH72-15050A | PMO-FOLDER LOWER | SILVER | 1 | |
| 14 | GH75-04156A | MEC-HINGE | - | 1 | |
| 15 | GH74-06516A | MPR-TAPE SPK DECO | - | 1 | |
| 16 | GH71-02421A | NPR-SPEAKER DECO | - | 1 | |
| 17 | 6001-001155 | MACHINE SCREW | - | 2 | |
| 18 | GH74-06525A | MPR-FOLDER SCREW CAP | SILVER | 1 | |
| 19 | GH74-09369A | MPR-TAPE MAIN WINDOW DECO | - | 1 | |
| 20 | GH75-05132A | MEC-MAIN WINDOW DECO | SILVER | 1 | |
| 21 | GH71-02421A | NPR-SPEAKER DECO | SILVER | 1 | |
| 22 | GH74-06516A | MPR-TAPE SPK DECO | - | 1 | |
| 23 | GH75-03950A | MEC-VOLUME KEY | SILVER | 1 | |
| 24-1 | GH75-05129A | RMO-FOLDER DAMPER R | SILVER | 1 | |
| 24-2 | GH74-06516A | RMO-FOLDER DAMPER L | SILVER | 1 | |
| 25 | GH72-15048A | PMO-FRONT COVER | SILVER | 1 | |
| 26 | GH75-15061A | MEC-CALL REJECT KEY | SILVER | 1 | |
| 27 | GH72-15055A | PMO-WINDOW IRDA | VIOLET | 1 | |
| 28 | GH75-05134A | MEC-KEY PAD | - | 1 | |
| 29 | | DOME-SHEET | - | 1 | |
| 30 | | KEYPAD FPCB | - | 1 | |
| 31 | GH72-15060A | PMO-SHIELD CAN | - | 1 | |
| 32 | | PBA | - | 1 | |
| 33 | GH72-10996A | PMO-EARPHONE COVER | SILVER | 1 | |
| 34 | | ANTENNA | SILVER | 1 | |
| 35 | GH72-15053A | PMO-REAR COVER | SILVER | 1 | |
| 36 | GH72-15059A | PMO-RF COVER | SILVER | 1 | |
| 37 | GH72-15057A | PMO-SCREW CAP L | SILVER | 1 | |
| 38 | GH72-15058A | PMO-SCREW CAP R | SILVER | 1 | |
| 39 | GH70-10633A | BATT LOCKER SPRING | - | 1 | |
| 40 | GH72-15054A | PMO-BATT LOCKER | SILVER | 1 | |
| 41 | GH72-15056A | PMO-IF COVER | SILVER | 1 | |
| 42 | 6001-001155 | MACHINE SCREW | - | 6 | |
| 43 | | MAIN-LABEL | - | 1 | |
| 44 | | BATTERY | SILVER | 1 | |

3. Test Jig (GH80-03305A)



3-1. RF Test Cable
(GH39-00105A)



3-2. Test Cable
(GH39-00210A)



3-3. Serial Cable



3-4. Power Supply Cable



3-5. DATA CABLE
(GH39-00208A)



3-6. TC
(GH44-00482A)



4. SGH-Z107 MAIN Electrical Parts List

| | |
|-------------|-------|
| 0403-001427 | ZD806 |
| 0403-001427 | ZD807 |
| 0404-001110 | D500 |
| 0406-001084 | D502 |
| 0406-001084 | U513 |
| 0406-001084 | ZD808 |
| 0406-001084 | ZD809 |
| 0406-001084 | ZD810 |
| 0406-001178 | ZD801 |
| 0406-001178 | ZD805 |
| 0406-001201 | ZD811 |
| 0407-001002 | D601 |
| 0407-001002 | D602 |
| 0407-001002 | D603 |
| 0407-001038 | U704 |
| 0501-000218 | Q801 |
| 0504-000168 | Q601 |
| 0504-000168 | Q705 |
| 0504-001113 | Q202 |
| 0504-001151 | U203 |
| 0505-001131 | Q201 |
| 0505-001423 | U304 |
| 0505-001423 | U604 |
| 0505-001423 | U708 |
| 0505-001423 | U710 |

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|-------------|--------|
| 0505-001454 | Q704 |
| 0604-001261 | IRD200 |
| 1001-001248 | U949 |
| 1001-001253 | U501 |
| 1001-001253 | U547 |
| 1105-001489 | U403 |
| 1109-001234 | U401 |
| 1109-001243 | U303 |
| 1201-001954 | U102 |
| 1201-001984 | U201 |
| 1201-001990 | U202 |
| 1202-001036 | U503 |
| 1203-001285 | U711 |
| 1203-002965 | U707 |
| 1203-003007 | U786 |
| 1203-003137 | U603 |
| 1203-003137 | U607 |
| 1203-003137 | U608 |
| 1203-003326 | U204 |
| 1204-002018 | U402 |
| 1204-002138 | U510 |
| 1205-002293 | U509 |
| 1205-002295 | U302 |
| 1205-002297 | U205 |
| 1205-002300 | U101 |

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|-------------|-------|
| 1205-002514 | U705 |
| 1404-001224 | TH301 |
| 1405-001018 | V801 |
| 1405-001082 | V802 |
| 1405-001119 | CA400 |
| 1405-001119 | CA403 |
| 1405-001119 | CA404 |
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| 2007-000138 | R111 |
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| 2007-000138 | R131 |
| 2007-000138 | R203 |
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| 2007-000138 | R405 |
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| 2007-000138 | R808 |
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| 2007-000139 | R116 |
| 2007-000139 | R122 |
| 2007-000139 | R123 |
| 2007-000140 | R103 |

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| 2007-000140 | R229 |
| 2007-000140 | R334 |
| 2007-000141 | R102 |
| 2007-000143 | R411 |
| 2007-000143 | R827 |
| 2007-000144 | R137 |
| 2007-000147 | R133 |
| 2007-000148 | R124 |
| 2007-000148 | R132 |
| 2007-000148 | R205 |
| 2007-000148 | R210 |
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| 2007-000148 | R856 |
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| 2007-000148 | U798 |
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| 2007-000149 | R335 |
| 2007-000152 | R828 |
| 2007-000152 | U807 |
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| 2007-000159 | R611 |

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| 2007-000162 | R704 |
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| 2007-000163 | R517 |
| 2007-000164 | U806 |
| 2007-000166 | R1106 |
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| 2007-001298 | R233 |
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| 2007-001298 | U943 |
| 2007-001301 | R121 |
| 2007-001305 | R232 |
| 2007-001306 | C147 |
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| 2007-001313 | R309 |
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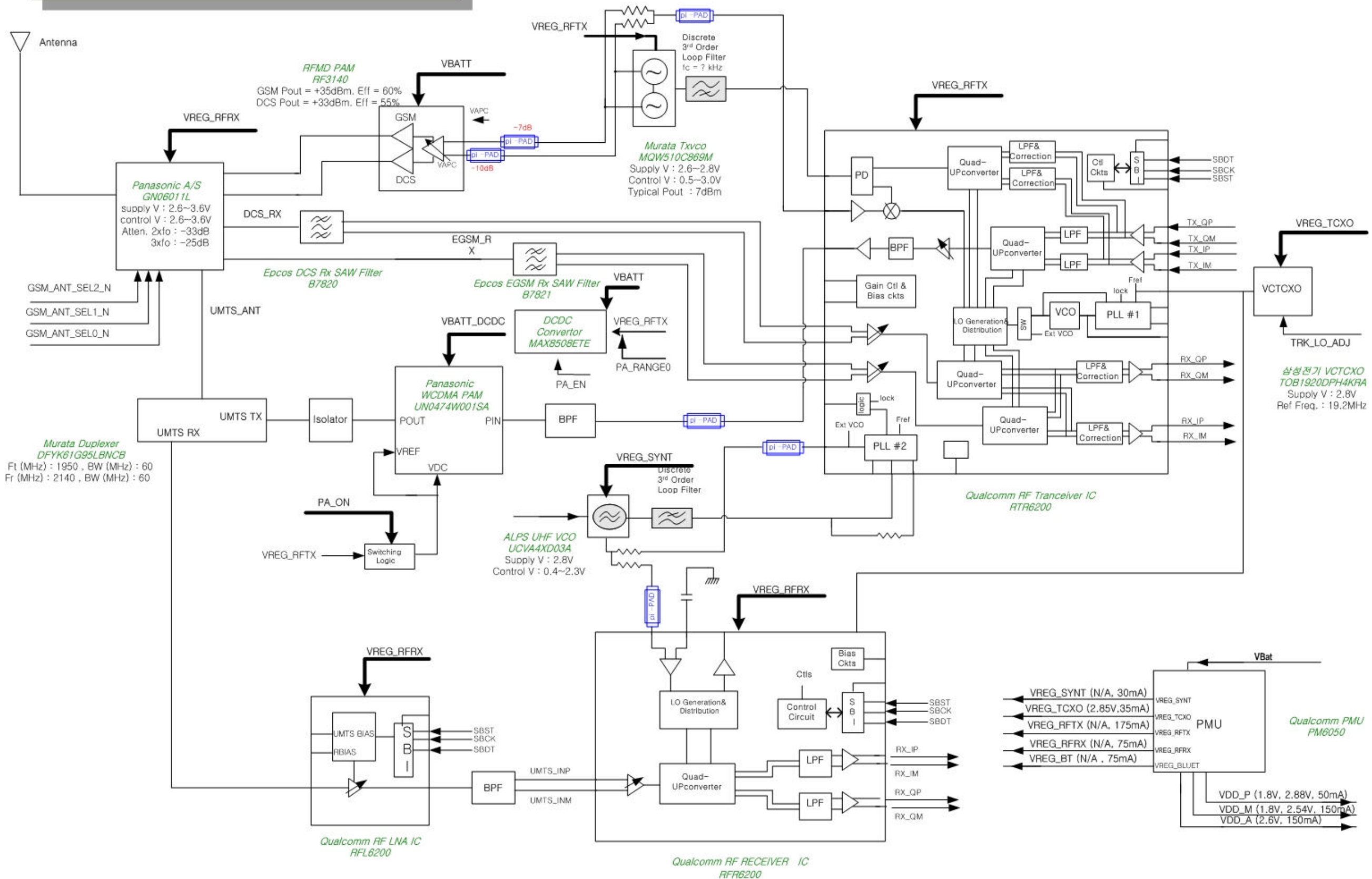
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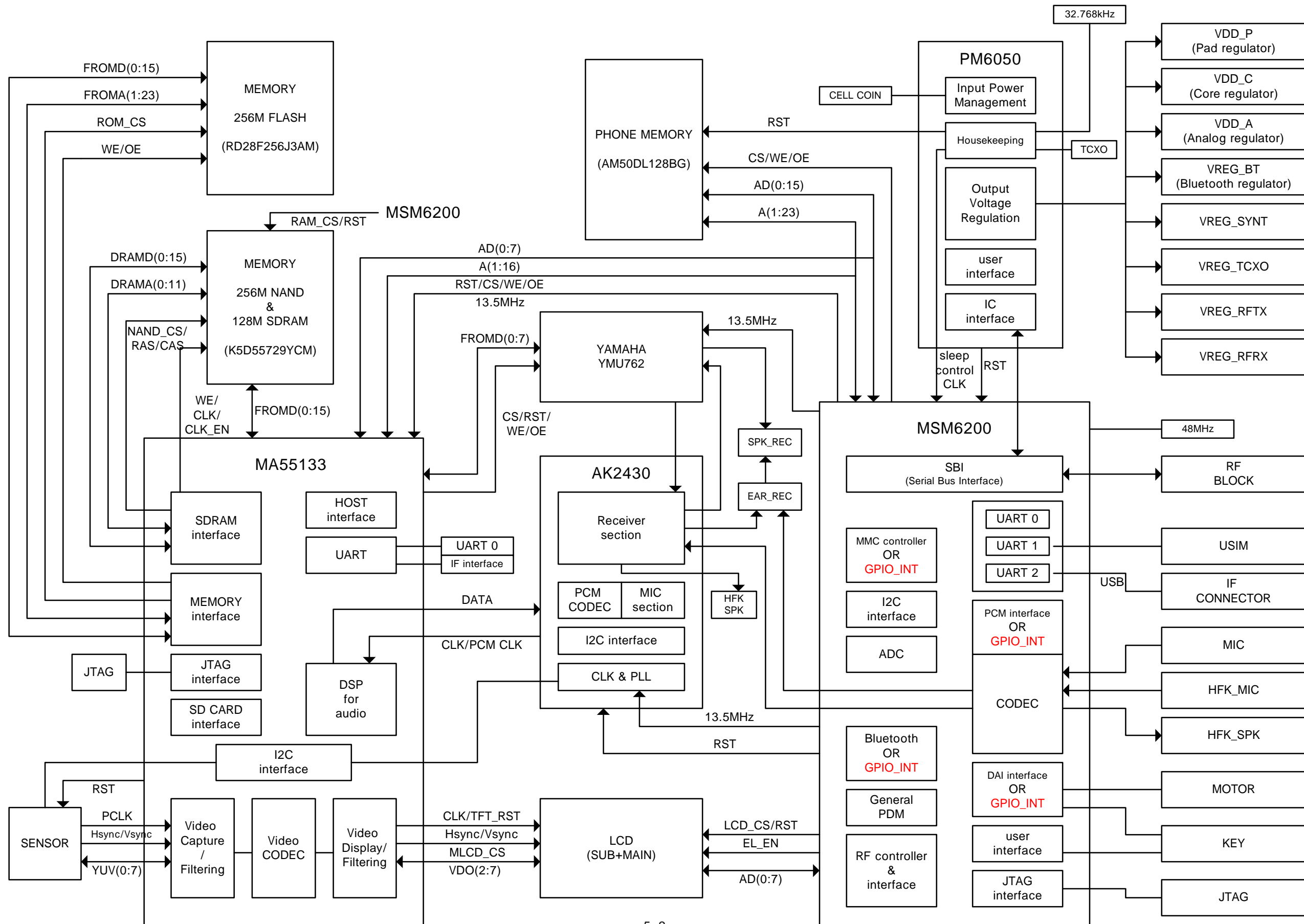
5. SGH-Z107 Block Diagrams

1. RF Solution Block Diagram

SGH-Z107 RF Block Diagram

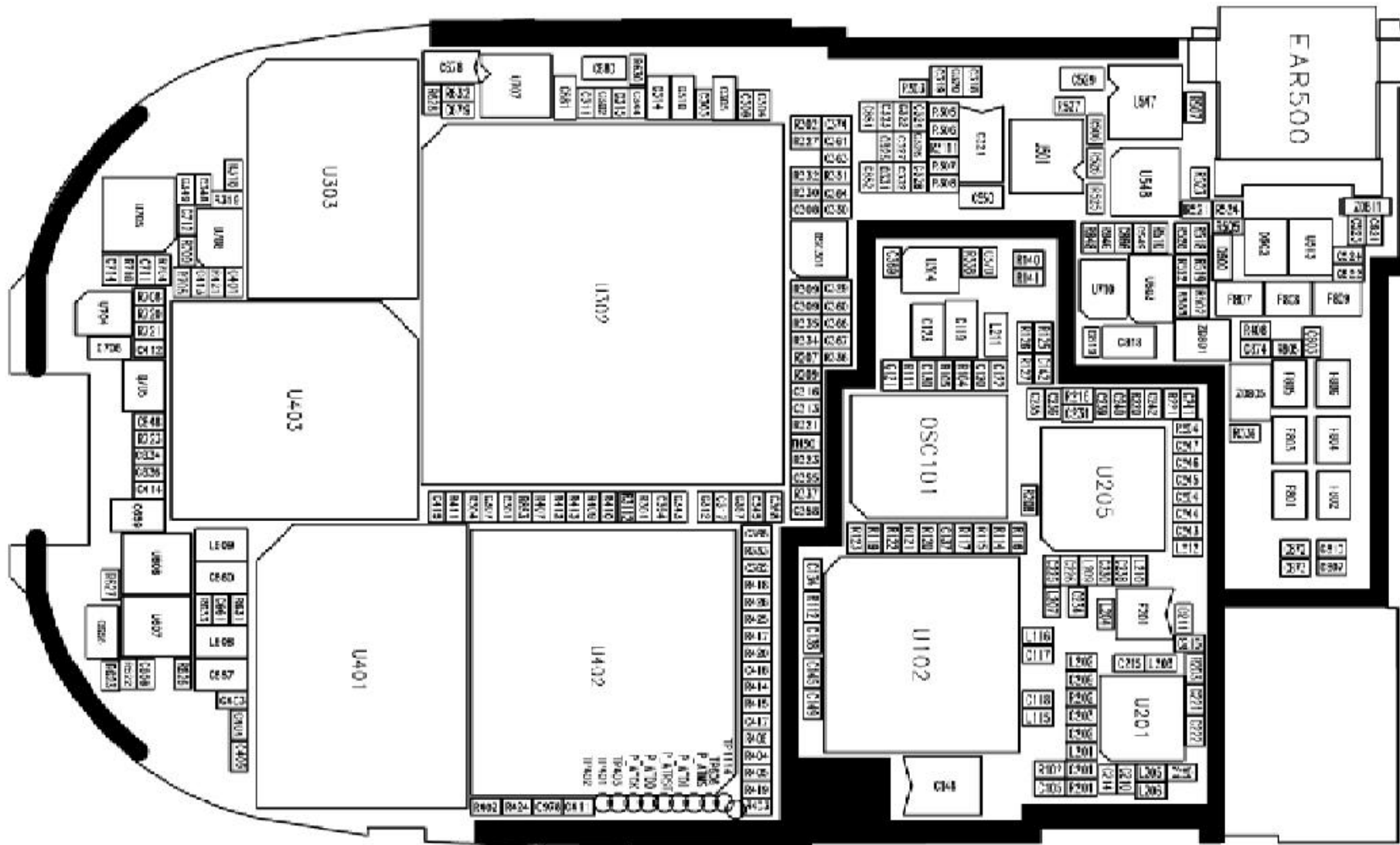


2. Base Band Solution Block Diagram



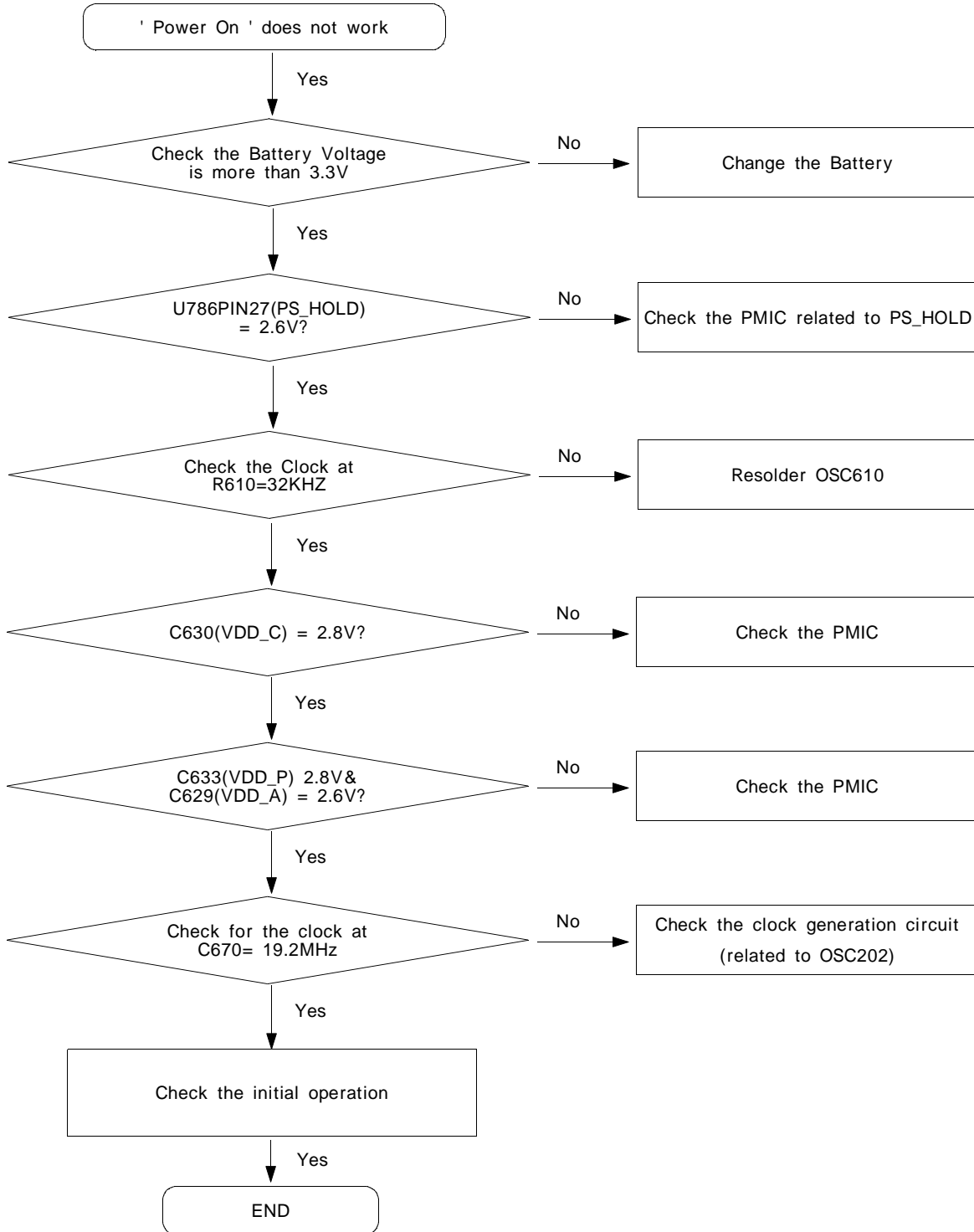
6. SGH-Z107 PCB Diagrams

1. Main PCB Top Diagram

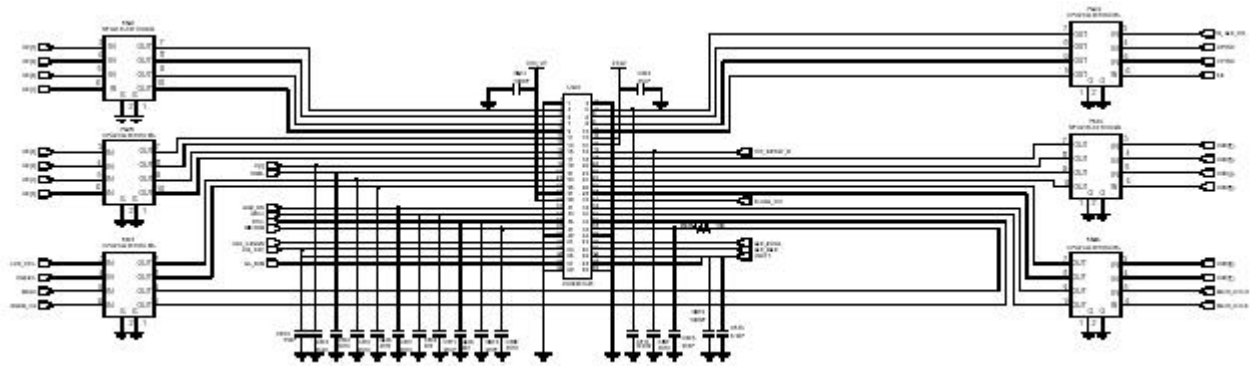
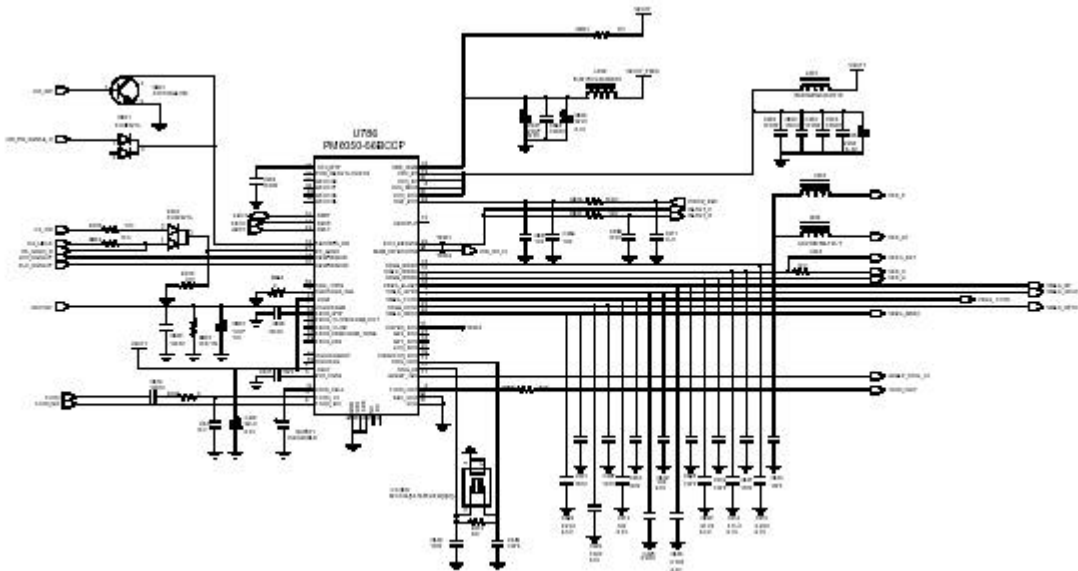


7. SGH-Z107 Flow Chart of Troubleshooting

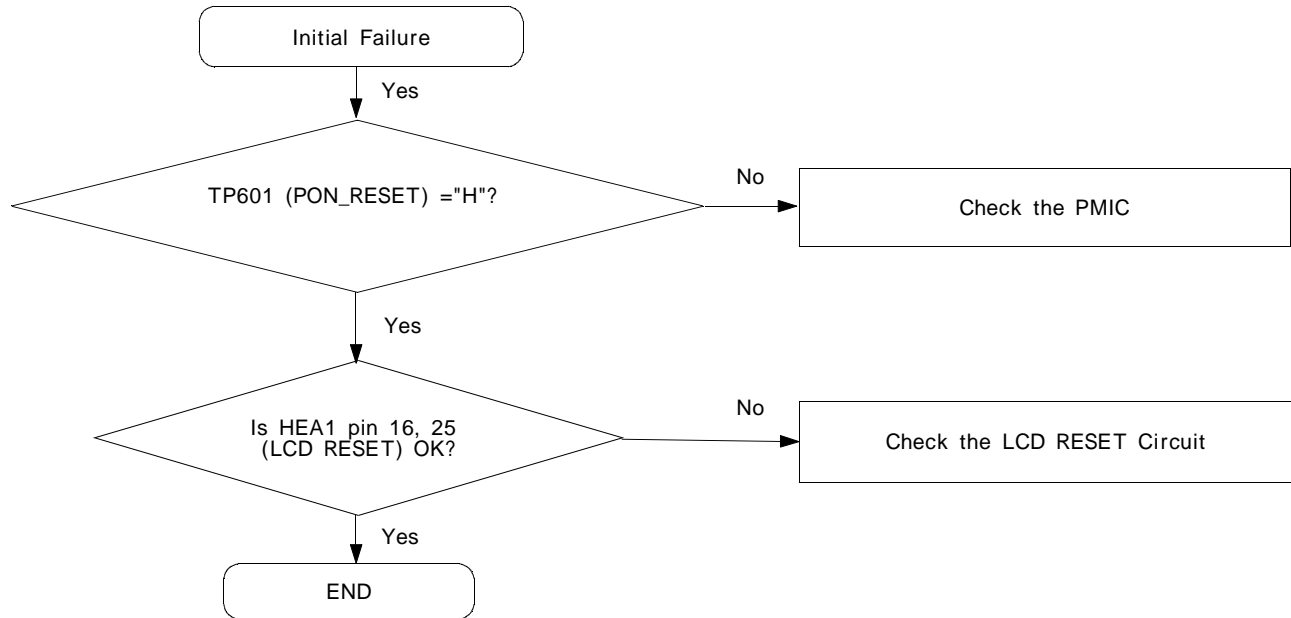
1. Power On



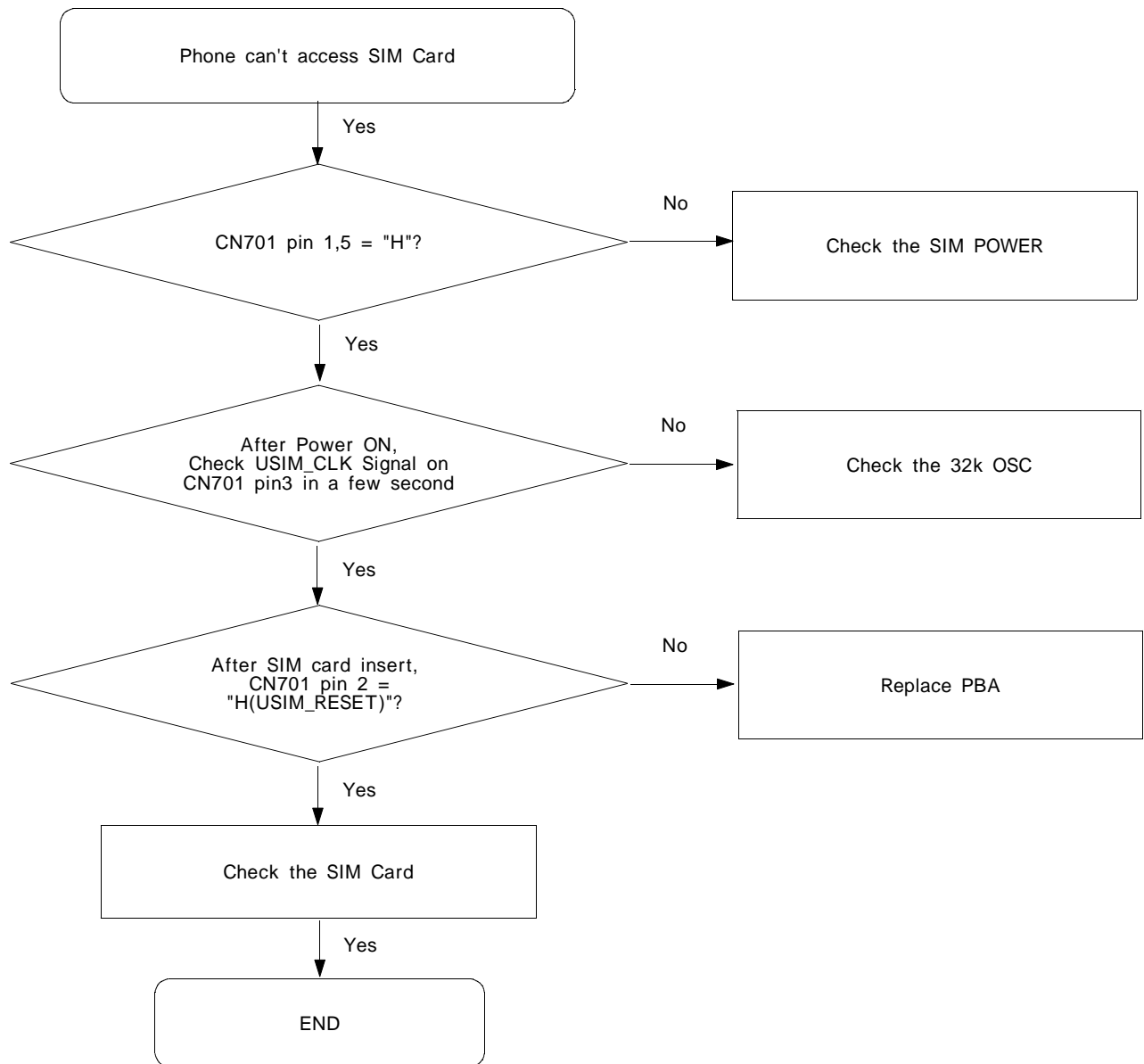
Power On



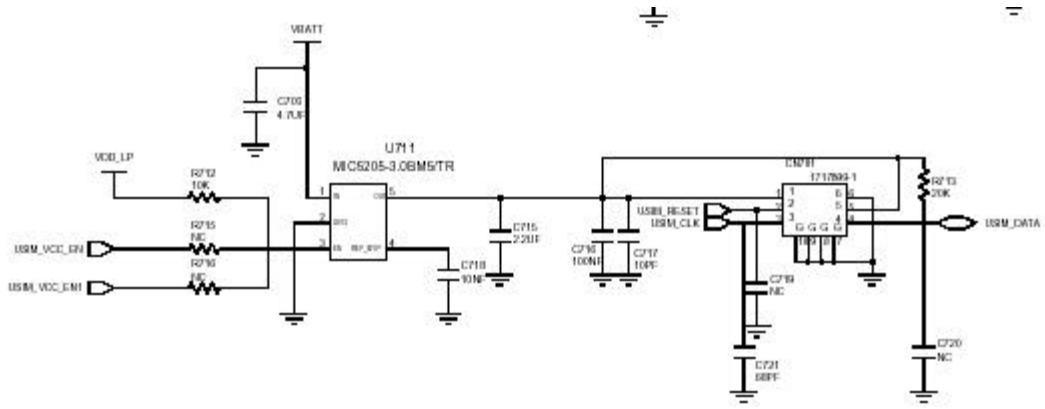
2. Initial



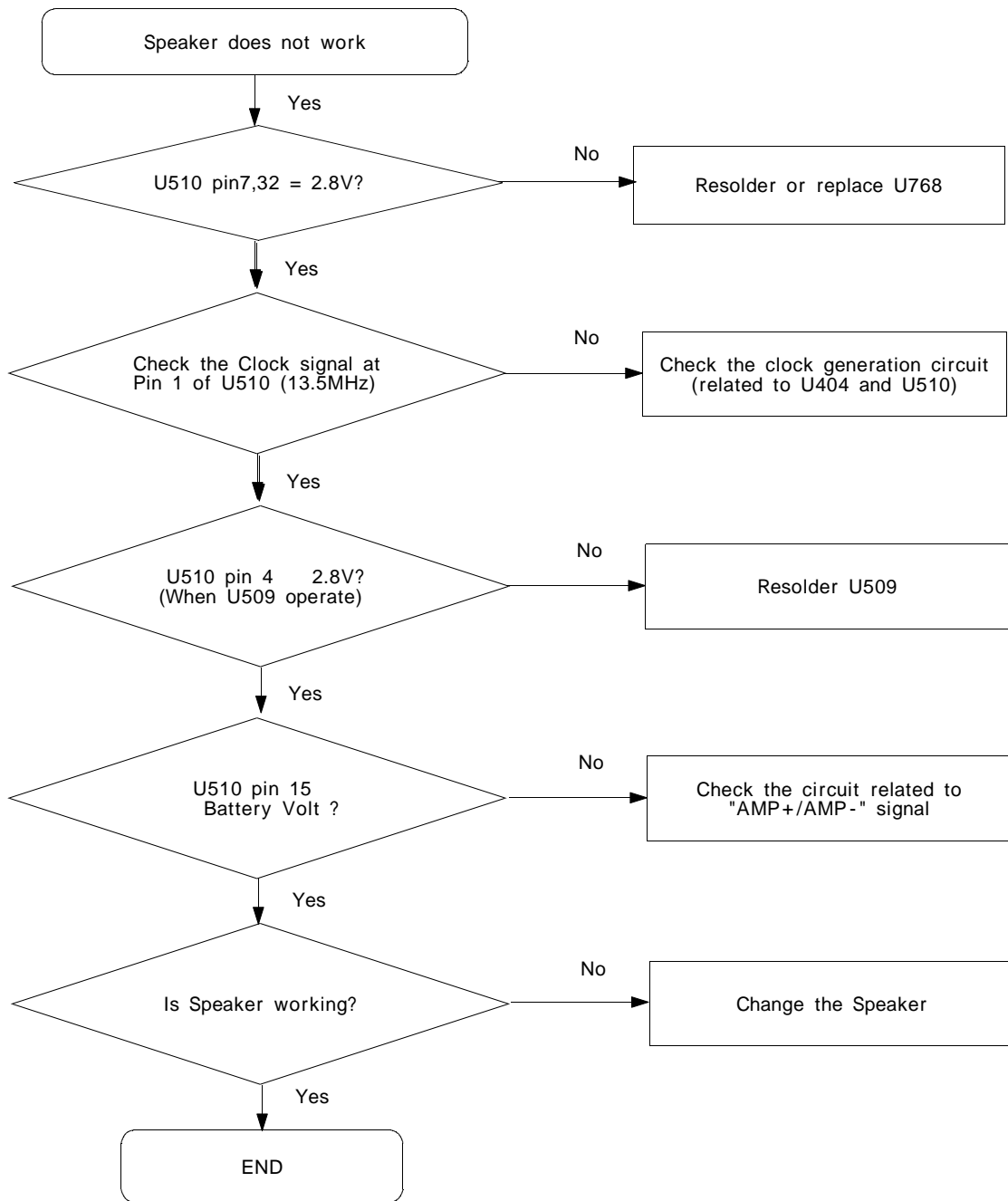
3. Sim Part



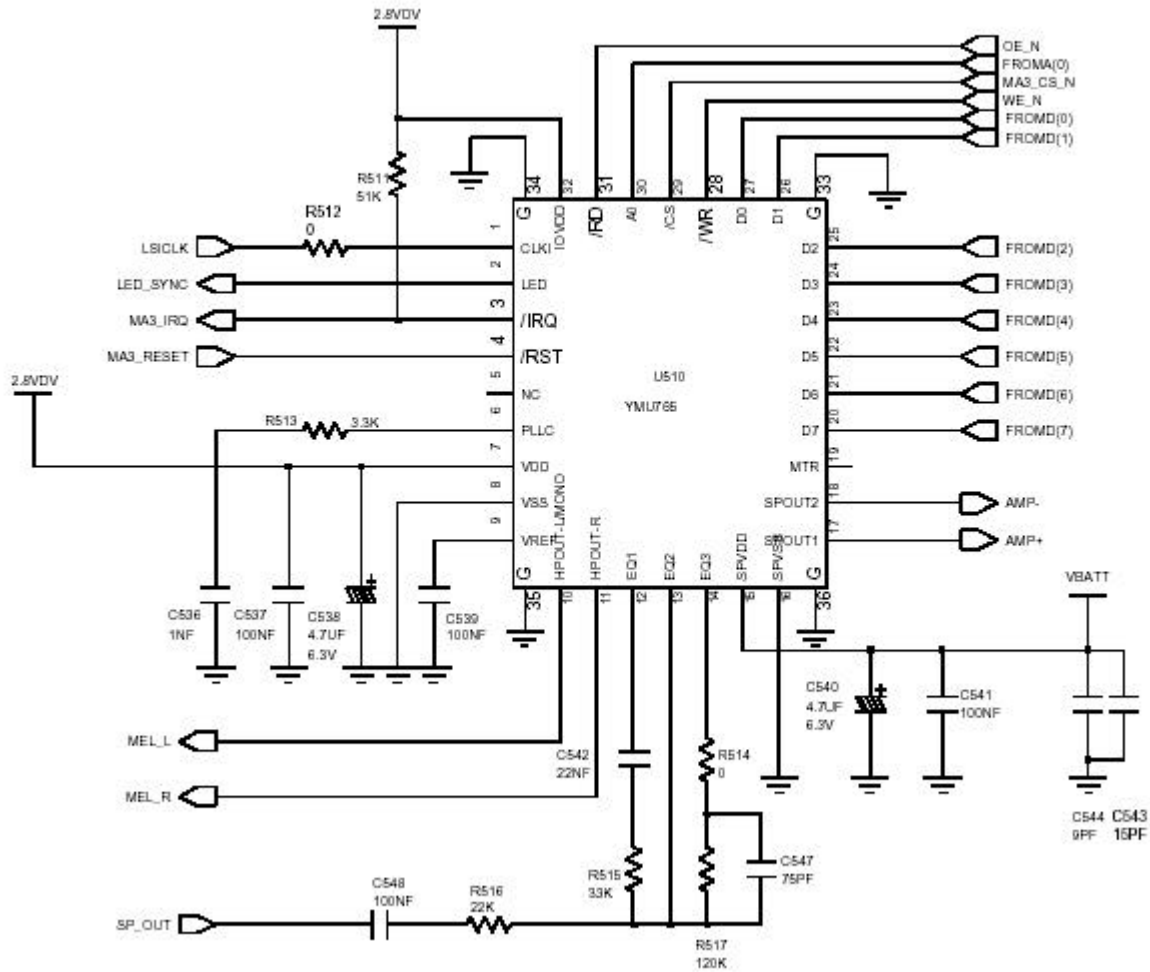
SIM



4. Microphone Part

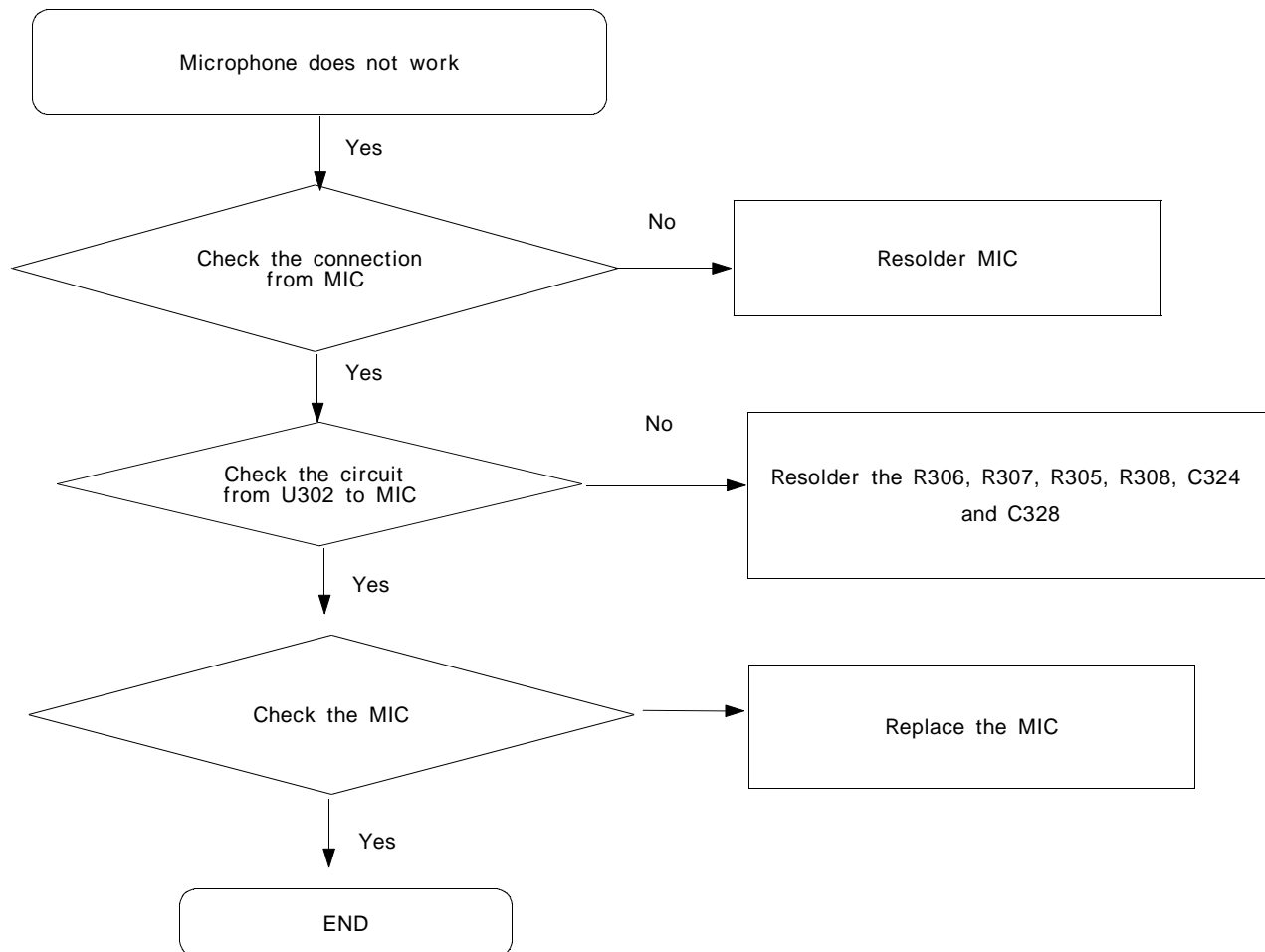


Microphone

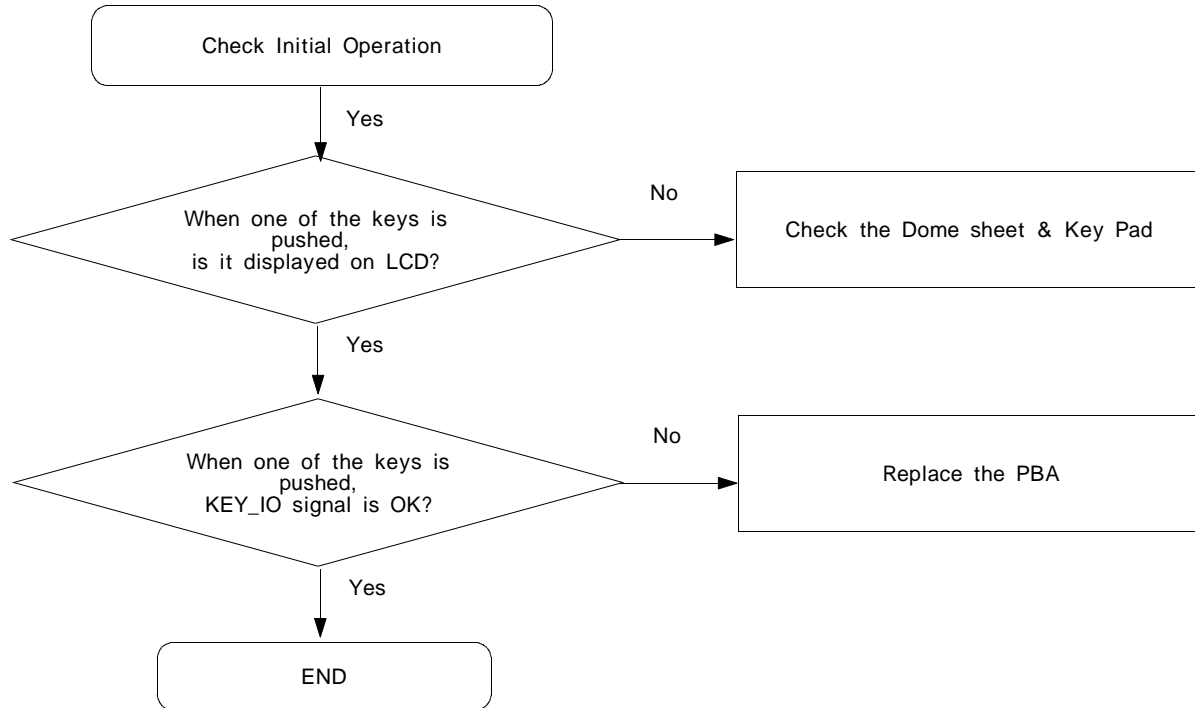


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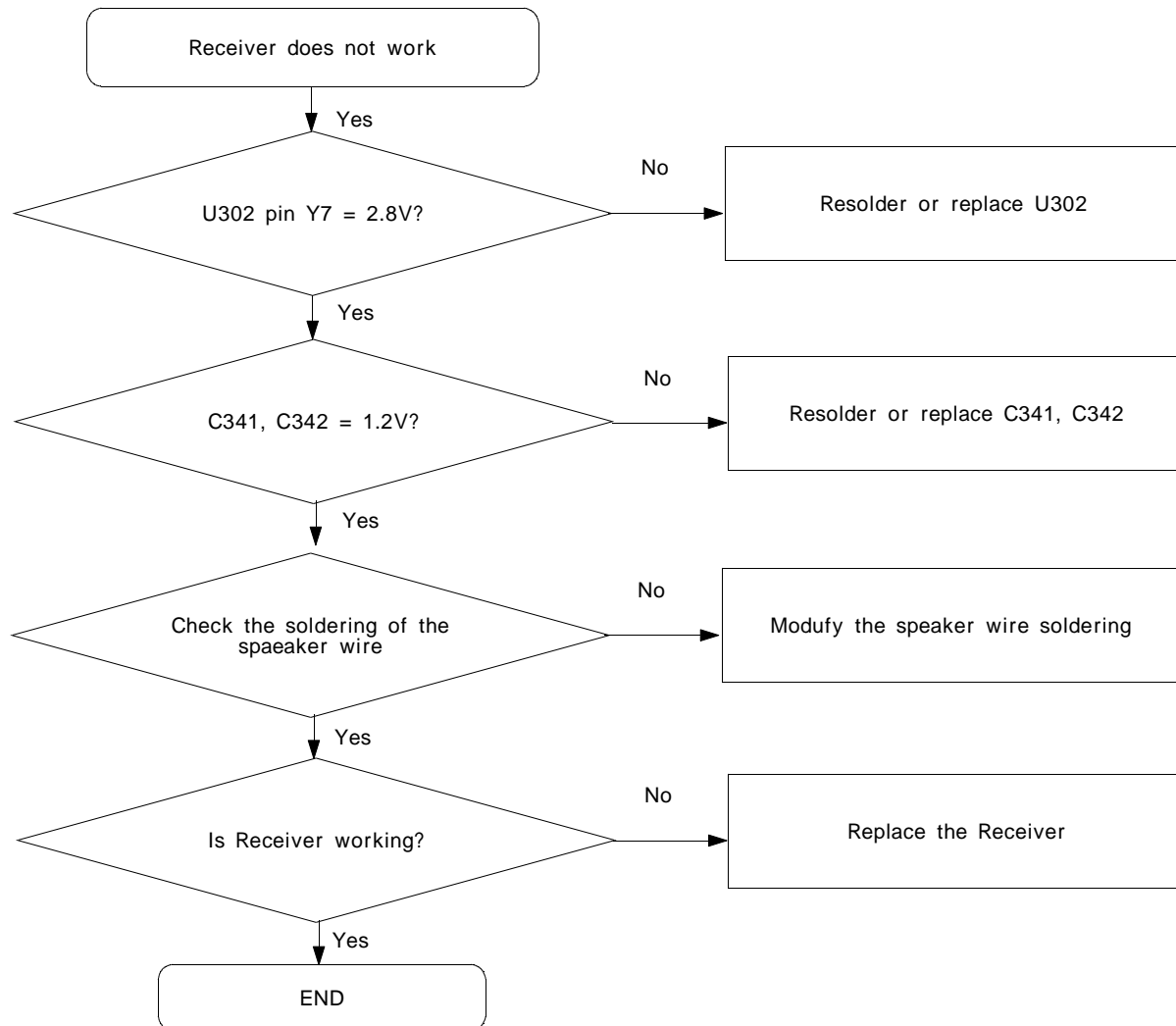
5. Speaker Part (Melody)



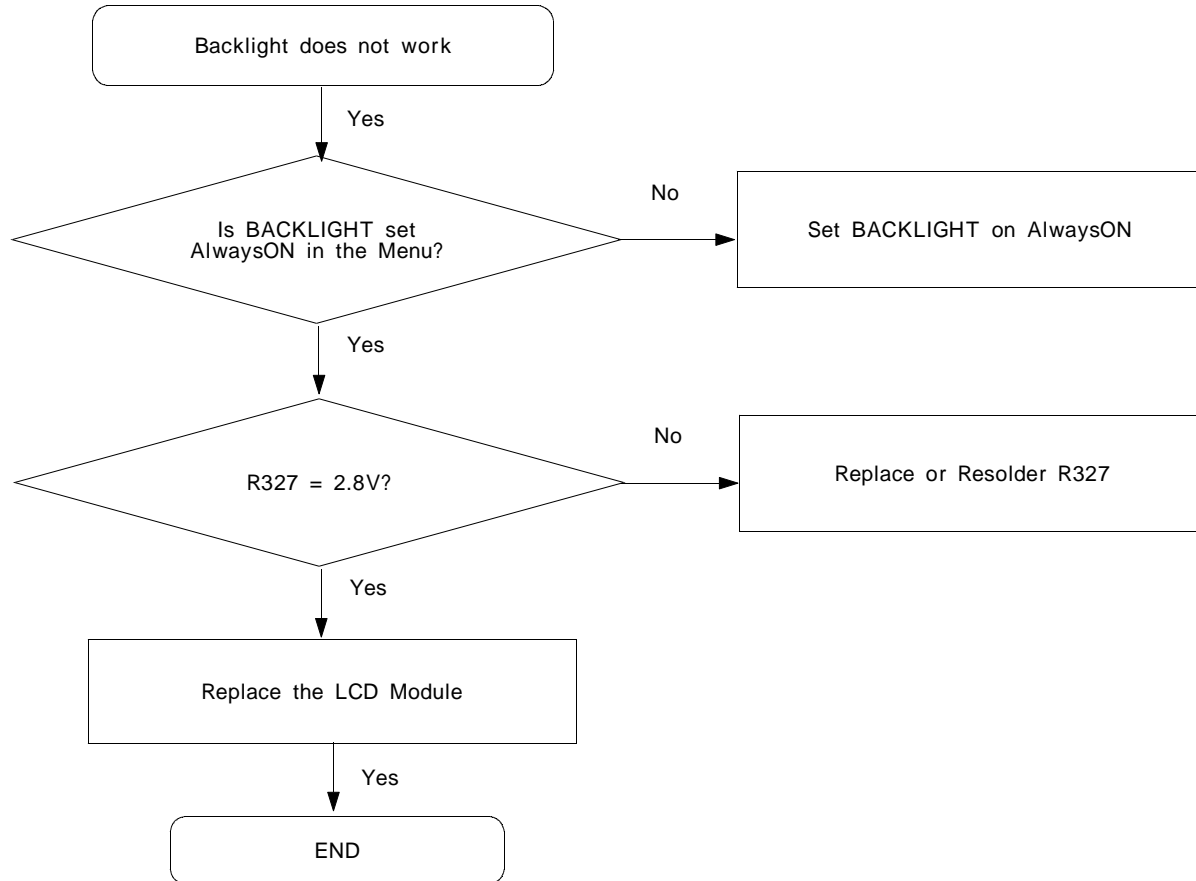
6. Key Data Input



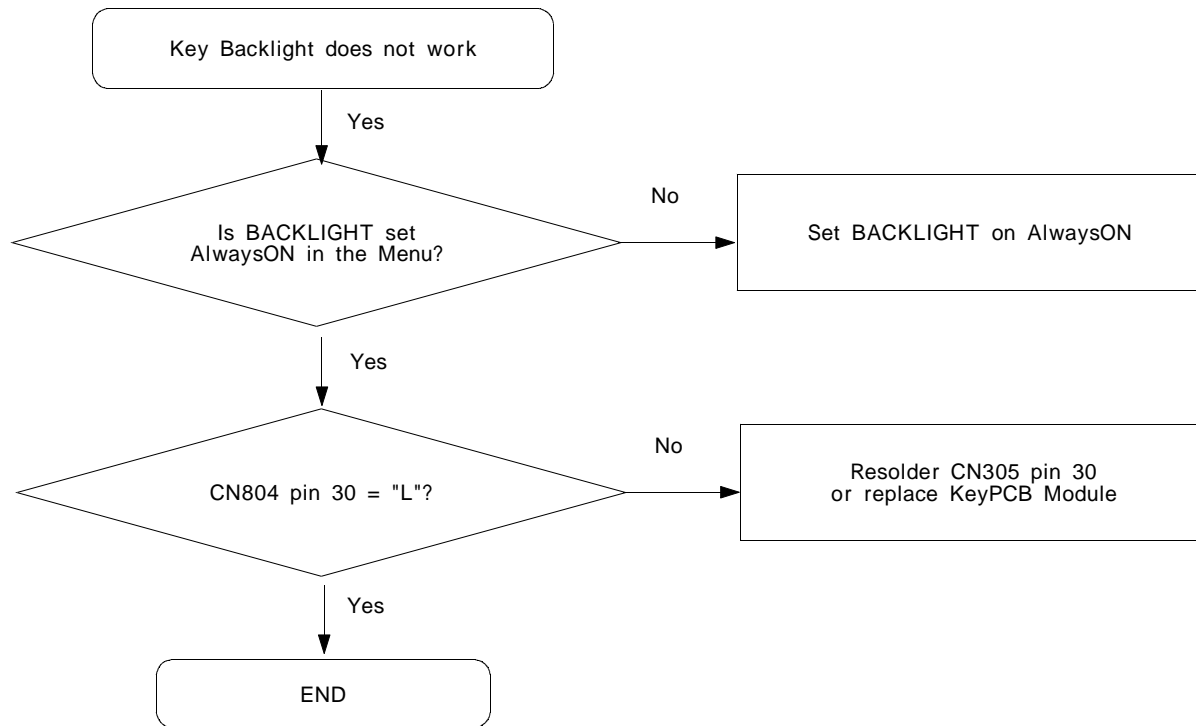
7. Receiver Part



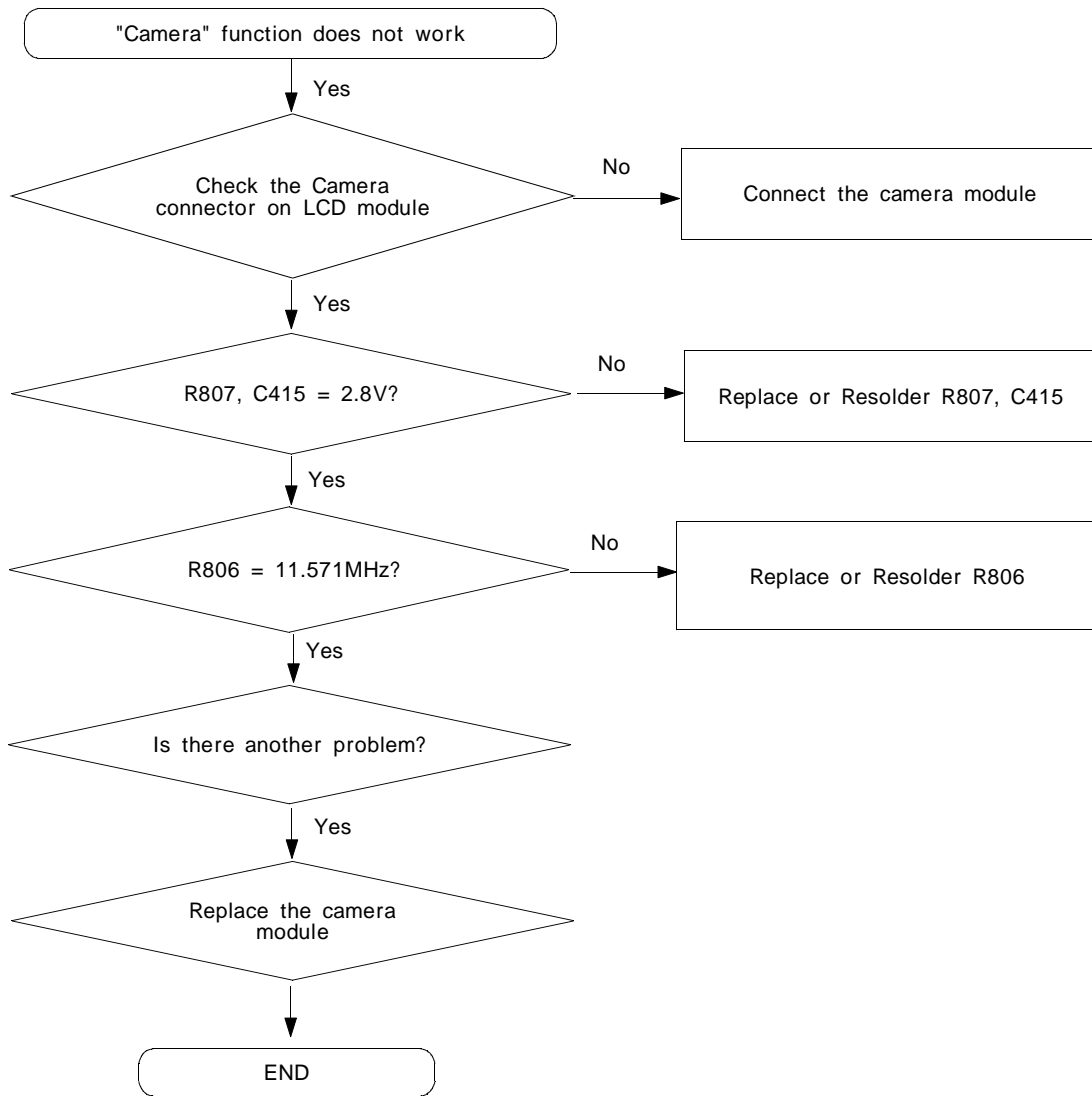
8. Back Light (for Color Main LCD)



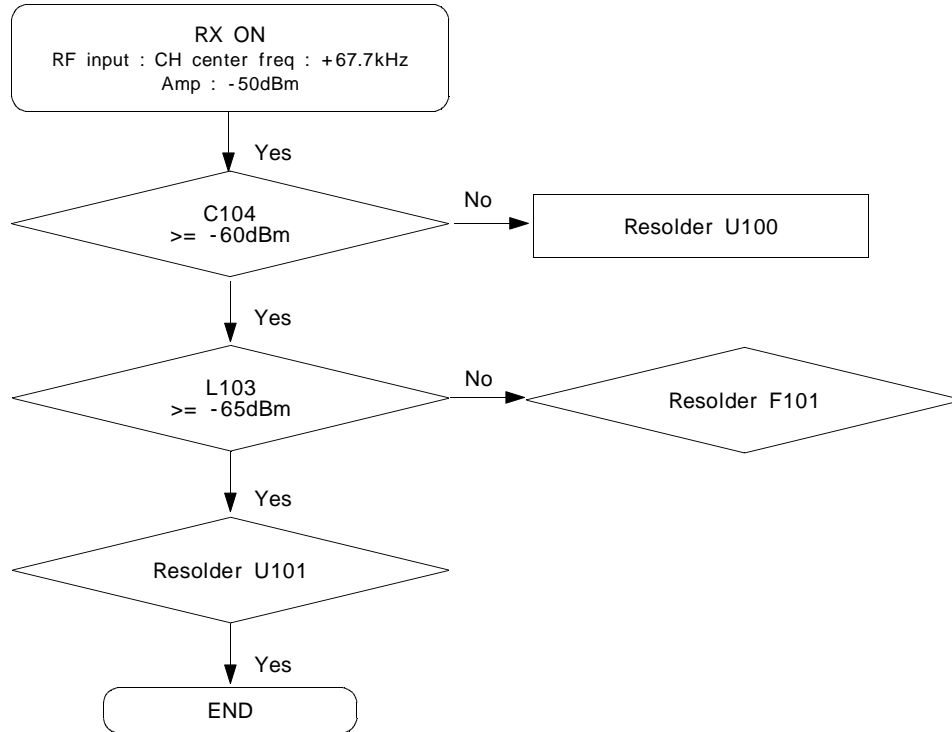
9. Key Back Light



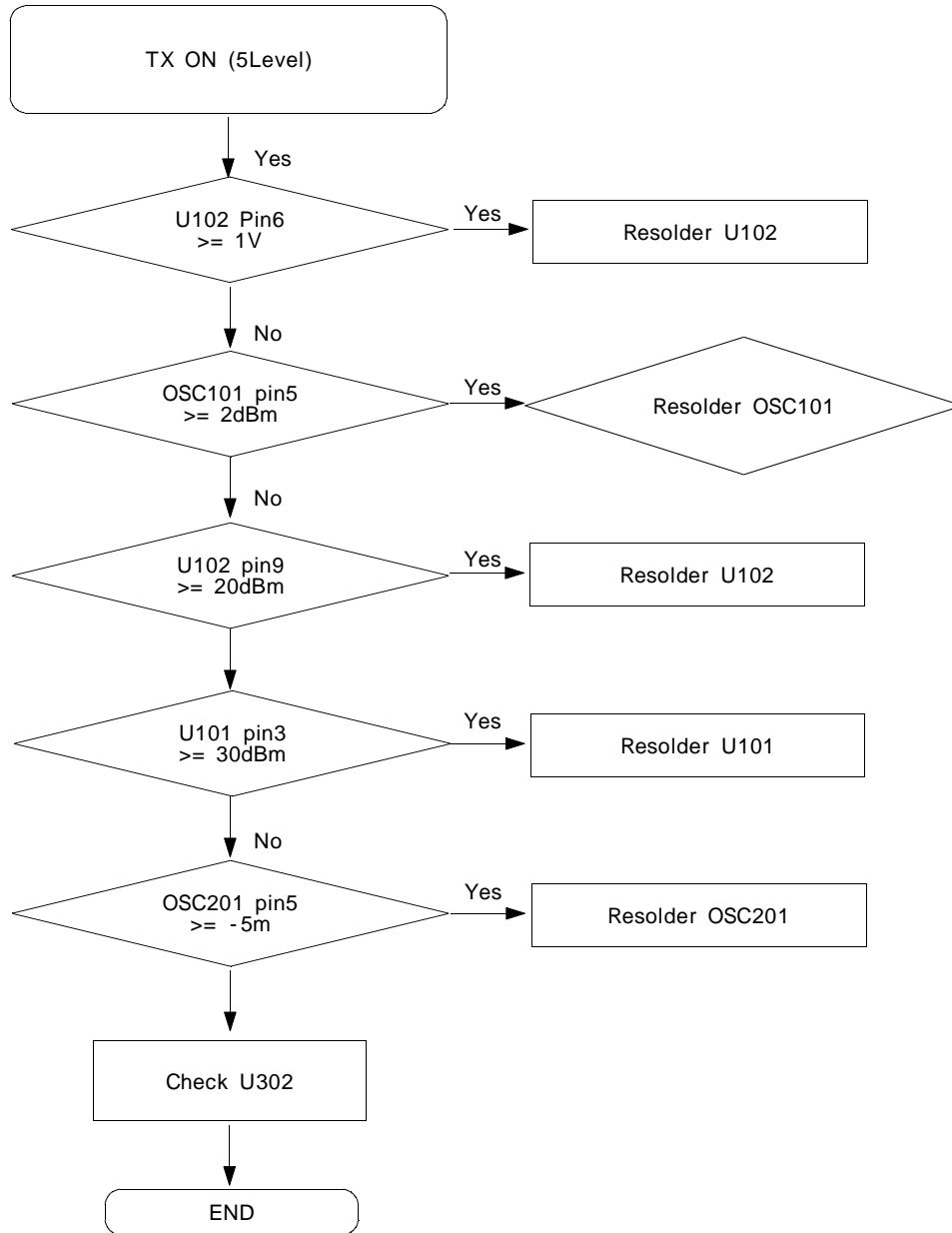
10. Camera part



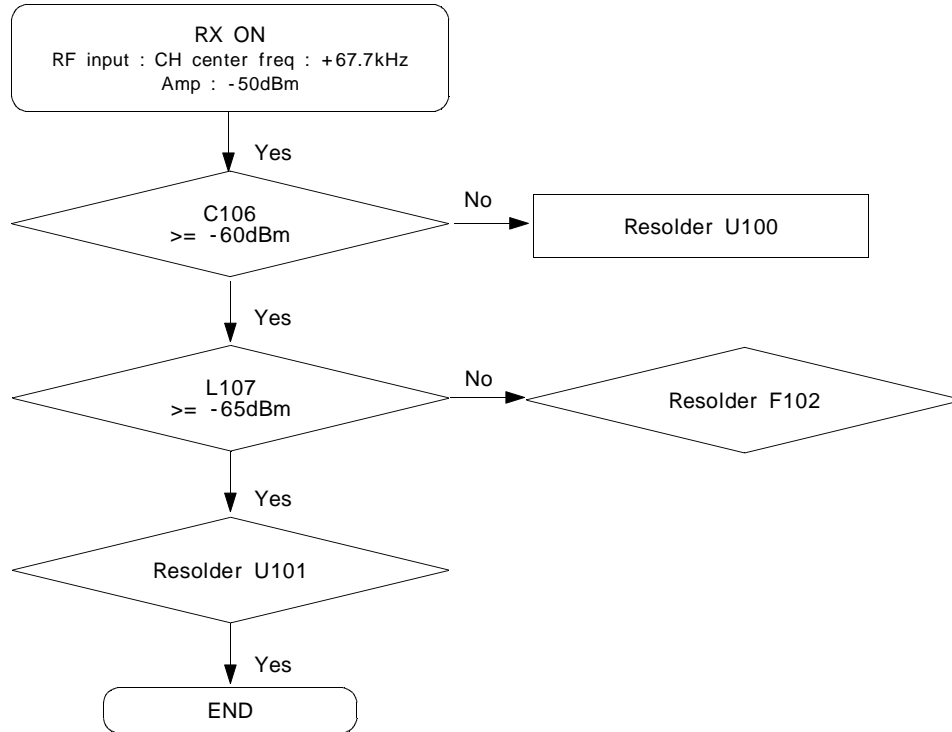
11. GSM Receiver



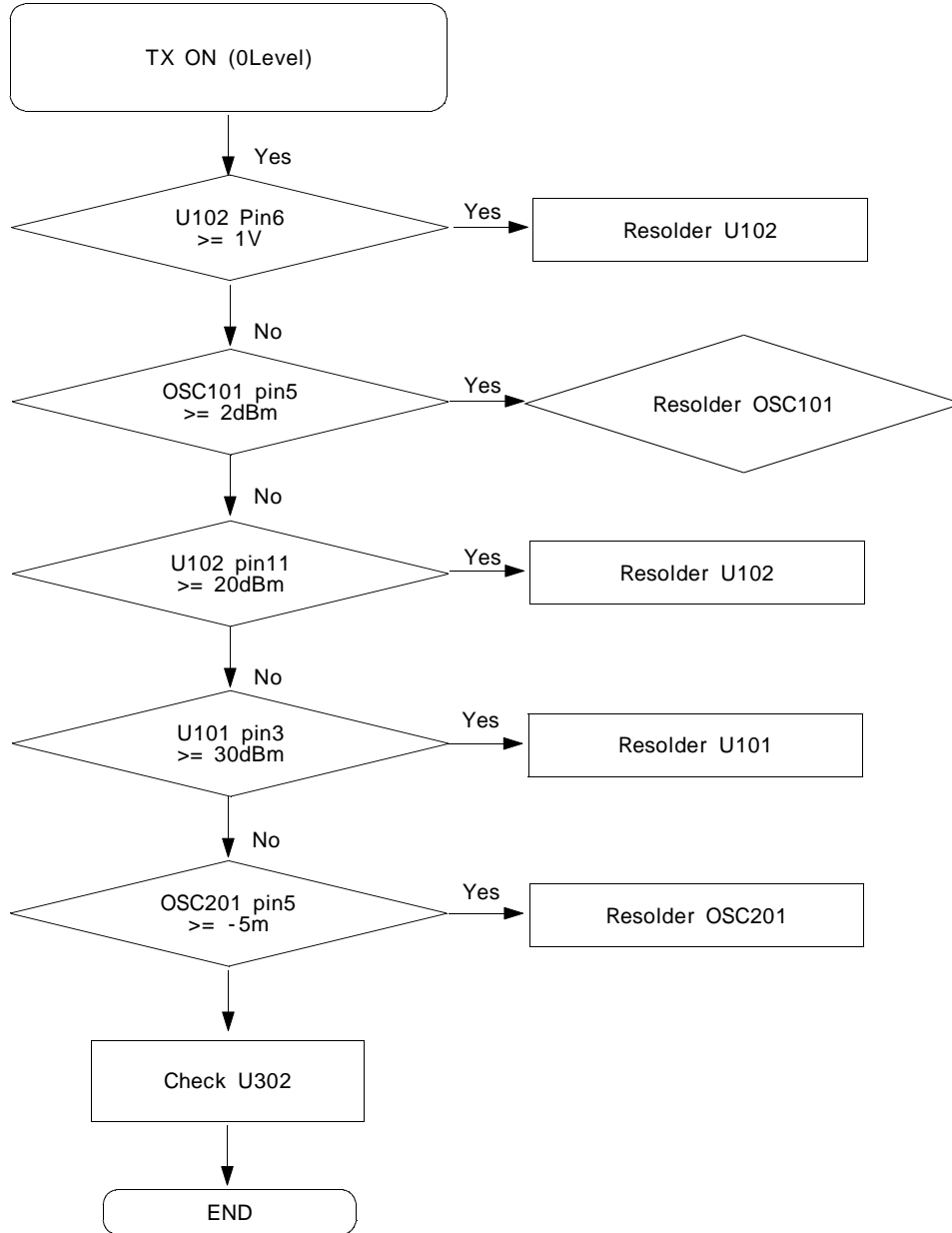
12. GSM Transmitter



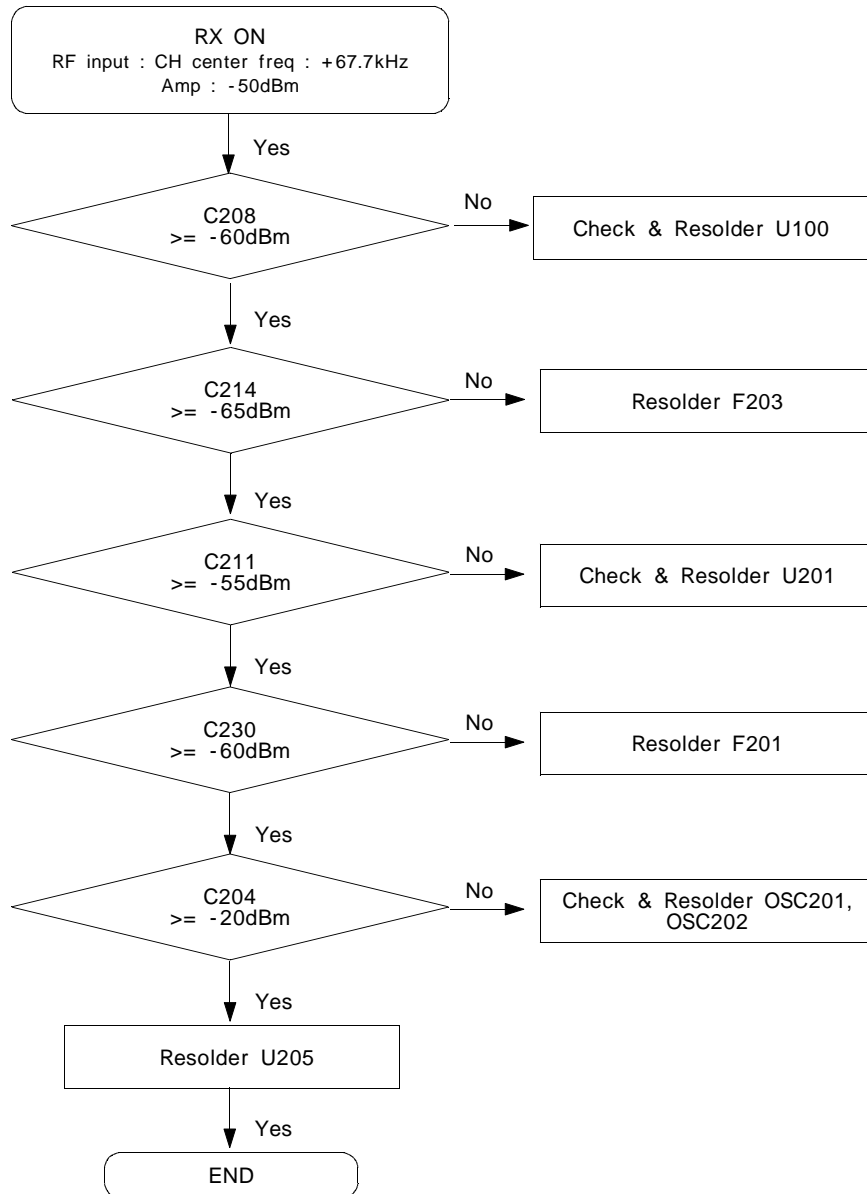
13. DCS Receiver



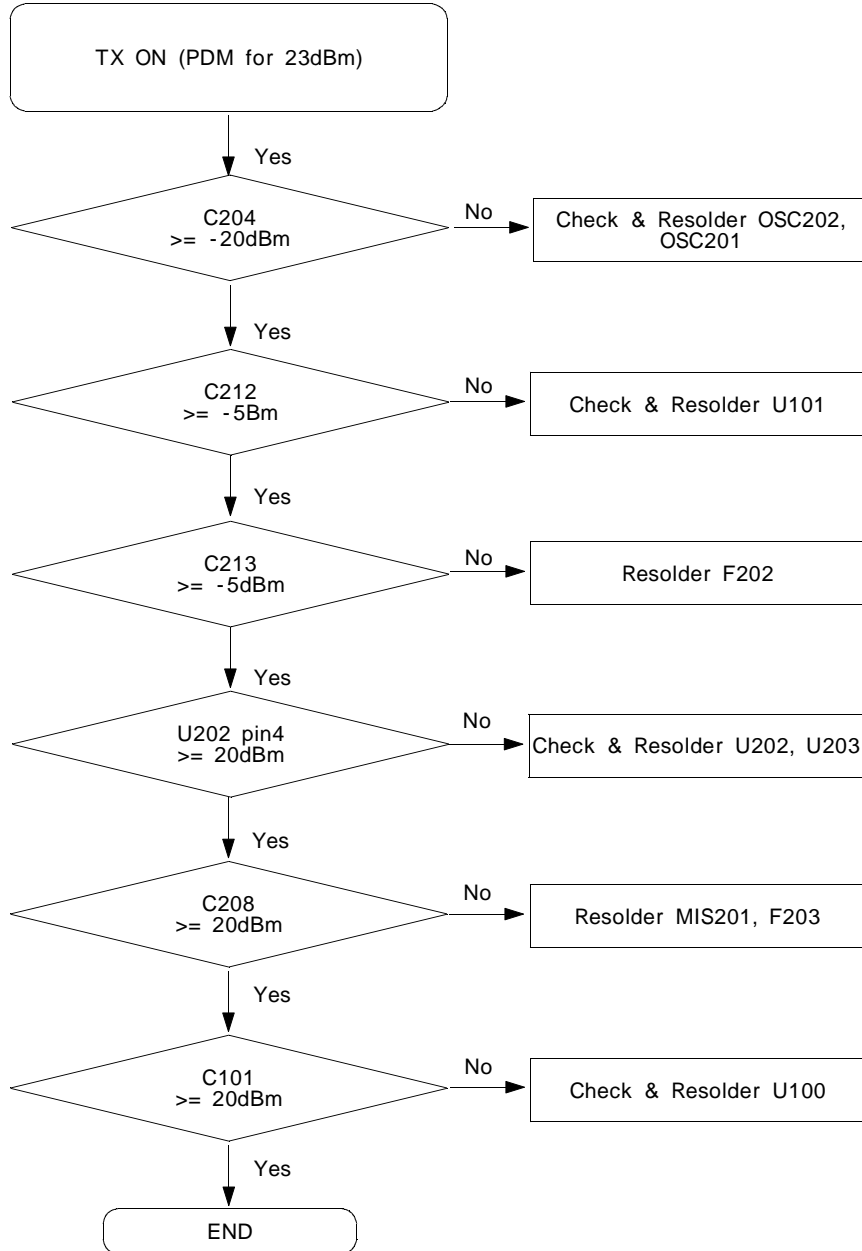
14. DCS Transmitter



15. WCDMA Receiver



16. WCDMA Transmitter



Transmitter

