

**SAMSUNG**

# GSM TELEPHONE SGH-X620

# ***SERVICE*** *Manual*

## GSM TELEPHONE



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BASIC.

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# 1. Specification

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## 1-1. GSM General Specification

|                                    | <b>GSM900<br/>Phase 1</b> | <b>DCS1800<br/>Phase 1</b> | <b>PC1900<br/>Phase 1</b> |
|------------------------------------|---------------------------|----------------------------|---------------------------|
| Freq. Band[MHz]<br>Uplink/Downlink | 890~915<br>935~960        | 1710~1785<br>1805~1880     | 1850~1910<br>1930~1990    |
| ARFCN range                        | 1~124                     | 512~885                    | 512~810                   |
| Tx/Rx spacing                      | 45MHz                     | 95MHz                      | 80MHz                     |
| Mod. Bit rate/<br>Bit Period       | 270.833kbps<br>3.692us    | 270.833kbps<br>3.692us     | 270.833kbps<br>3.692us    |
| Time Slot<br>Period/Frame Period   | 576.9us<br>4.615ms        | 576.9us<br>4.615ms         | 576.9us<br>4.615ms        |
| Modulation                         | 0.3GMSK                   | 0.3GMSK                    | 0.3GMSK                   |
| MS Power                           | 33dBm~5dBm                | 30dBm~0dBm                 | 30dBm~0dBm                |
| Power Class                        | 5pcl ~ 19pcl              | 0pcl ~ 15pcl               | 0pcl ~ 15pcl              |
| Sensitivity                        | -102dBm                   | -100dBm                    | -100dBm                   |
| TDMA Mux                           | 8                         | 8                          | 8                         |
| Cell Radius                        | 35Km                      | 2Km                        | 2Km                       |

## 1-2. GSM TX power class

| <b>TX Power<br/>control level</b> | <b>GSM900</b> | <b>TX Power<br/>control level</b> | <b>DCS1800</b> | <b>TX Power<br/>control level</b> | <b>PCS1900</b> |
|-----------------------------------|---------------|-----------------------------------|----------------|-----------------------------------|----------------|
| 5                                 | 33±2 dBm      | 0                                 | 30±3 dBm       | 0                                 | 30±3 dBm       |
| 6                                 | 31±2 dBm      | 1                                 | 28±3 dBm       | 1                                 | 28±3 dBm       |
| 7                                 | 29±2 dBm      | 2                                 | 26±3 dBm       | 2                                 | 26±3 dBm       |
| 8                                 | 27±2 dBm      | 3                                 | 24±3 dBm       | 3                                 | 24±3 dBm       |
| 9                                 | 25±2 dBm      | 4                                 | 22±3 dBm       | 4                                 | 22±3 dBm       |
| 10                                | 23±2 dBm      | 5                                 | 20±3 dBm       | 5                                 | 20±3 dBm       |
| 11                                | 21±2 dBm      | 6                                 | 18±3 dBm       | 6                                 | 18±3 dBm       |
| 12                                | 19±2 dBm      | 7                                 | 16±3 dBm       | 7                                 | 16±3 dBm       |
| 13                                | 17±2 dBm      | 8                                 | 14±3 dBm       | 8                                 | 14±3 dBm       |
| 14                                | 15±2 dBm      | 9                                 | 12±4 dBm       | 9                                 | 12±4 dBm       |
| 15                                | 13±2 dBm      | 10                                | 10±4 dBm       | 10                                | 10±4 dBm       |
| 16                                | 11±3 dBm      | 11                                | 8±4dBm         | 11                                | 8±4dBm         |
| 17                                | 9±3dBm        | 12                                | 6±4 dBm        | 12                                | 6±4 dBm        |
| 18                                | 7±3 dBm       | 13                                | 4±4 dBm        | 13                                | 4±4 dBm        |
| 19                                | 5±3 dBm       | 14                                | 2±5 dBm        | 14                                | 2±5 dBm        |
|                                   |               | 15                                | 0±5 dBm        | 15                                | 0±5 dBm        |

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## 2. Circuit Description

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### 2-1. SGH-X620 RF Circuit Description

#### 2-1-1. RX PART

- ASM(U100) → Switching Tx, Rx path for GSM900, DCS1800, PCS1900 by logic controlling.
- ASM Control Logic (U100) → Truth Table

|                        | VC1 | VC2 | VC3 |
|------------------------|-----|-----|-----|
| Tx Mode (GSM900)       | H   | L   | L   |
| Tx Mode (DCS1800/1900) | L   | H   | L   |
| Rx Mode (GSM900)       | L   | L   | L   |
| Rx Mode (DCS1800)      | L   | L   | L   |
| Rx Mode (PCS1900)      | L   | L   | H   |

- VC-TCXO (OSC101)

This module generates the 26MHz reference clock to drive the logic and RF. After division by two a reference clock of 13MHz is supplied to the other parts of the system through the pin CLKOUT. After additional process, the reference clock applies to the U100 Rx IQ demodulator and Tx IQ modulator. And then, the oscillator is controlled by serial data to select channel and use fast lock mode for GPRS high class operation.

- Transceiver (U101)

The receiver front-end which amplifies the GSM, DCS aerial signal, converts the chosen channel down to a low IF signal of 100 kHz. The first stages are symmetrical low noise amplifiers (LNAs). The LNAs are followed by an IQ down mixer. It consists of two mixers in parallel but driven by quadrature out of phase LO signals. The In phase (I) and Quadrature phase (Q) IF signals are low pass filtered to provide protection from high frequency offset interferes. The low IF I and Q signals are then fed into the channel filter. The front-end low IF I and Q outputs enter the integrated bandpass channel filter with provision for five 8 dB gain steps in front of the filter.

#### 2-1-2. TX PART

I and Q baseband signals are applied to the IQ modulator that shifts the modulation spectrum up to the transmit IF. It is designed for low harmonic distortion, low carrier leakage and high image rejection to keep the phase error as small as possible.

The modulator is loaded at its IF output by an integrated low pass filter that suppress unwanted spurs prior to get into the phase detector. The clock drive is generated by division of the RFLO signal provided for the transmit offset mixer. Baseband IQ signal fed into offset PLL, this function is included inside of U101 chip. OSC100 chip generates modulator signal which power level is about 6.5dBm and fed into Power Amplifier(U102). The PA output power and power ramping are well controlled by Auto Power Control circuit. We use offset PLL below table.

|                     |                                            |     |        |
|---------------------|--------------------------------------------|-----|--------|
| Modulation Spectrum | 200kHz offset<br>30 kHz bandwidth          | GSM | -35dBc |
|                     |                                            | DCS | -35dBc |
|                     | 400kHz offset<br>30 kHz bandwidth          | GSM | -66dBc |
|                     |                                            | DCS | -65dBc |
|                     | 600kHz ~ 1.8MHz offset<br>30 kHz bandwidth | GSM | -75dBc |
|                     |                                            | DCS | -68dBc |

## 2-2. Baseband Circuit description of SGH-X620

### 2-2-1. PCF50601

#### - Power Management

Ten low-dropout regulators designed specifically for GSM applications power the terminal and help ensure optimal system performance and long battery life. A programmable boost converter provides support for 1.8V, 3.0VSIMs, while a self-resetting, electronically fused switch supplies power to external accessories. Ancillary support functions, such as RTC module and High Voltage Charge pump, Clock generator, aid in reducing both board area and system complexity.

I2C BUS serial interface provides access to control and configuration registers. This interface gives a microprocessor full control of the PCF50601 and enables system designers to maximize both standby and talk times.

Supervisory functions, including a reset generator, an input voltage monitor, and a temperature sensor, 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).

#### -Backlight Brightness Modulator

The Backlight Brightness Modulator (BBM) contains a programmable Pulse-width modulator (PWM) and FET to modulate the intensity of a series of LED's or to control a DC/DC converter that drives LCD backlight.

This phone (SGH-X620) use PWM control to contrast the backlight brightness.

#### - Clock Generator

The Clock Generator (CG) generates all clocks for internal and external usage. The 32768 Hz crystal oscillator provides an accurate low clock frequency for the PCF50601 and other circuitry.

### 2-2-2. LCD Connector

LCD is consisted of main LCD(color 65K UFB LCD) and sub LCD (B/W LCD).

Chip select signals LCD\_MAIN\_CS and LCD\_SUB\_CS, can enable Each LCD. BACKLIGHT signal enables white LED of main LCD. "LCD\_RESET" signal initiates the reset process of the LCD.

16-bit data lines(HD(0)~HD(15)) transfers data and commands to LCD. Data and commands use "HA(1)" signal. If this signal is low, inputs to LCD are commands. If it is high, inputs to LCD are data.

The signal which informs the state of LCD is whether input or output, is required. But in this system, there is no input state from LCD. So only "HA(1)" signal is used to indicate write data or command to LCD. Power signals for LCD are "VBAT and "VDD3".

"SPK\_P" and "SPK\_N" are used for audio speaker containing voice or melody. And "VDD\_VIB" from PCF50601 enables the motor.

### 2-2-3. Key

This is consisted of key interface pins among OM6359, KBIO(0:7). These signals compose the matrix. Result of matrix informs the key status to key interface in the OM6359. Power on/off key is separated from the matrix. So power on/off signal is connected with PCF50601 to enable PCF50601. Twelve key LEDs are use the "VDD\_KEY" as supply voltage. "FLIP" informs the status of folder (open or closed) to the OM6359. This uses the hall effect IC, A321ELH-SAMSUNG. A magnet under main LCD enables A321ELH-SAMSUNG.

### 2-2-4. EMI ESD Filter

This system uses the EMI ESD filter, EMIF09 to protect noise from IF CONNECTOR part.

### 2-2-5. IF connetor

It is 18-pin connector. They are designed to use VBAT, V\_EXT\_CHARGE, TXD0, RXD0, RTS0, CTS0, JIG\_REC, CHARGER\_OK, RXD1, TXD1, AUX\_MIC, AUX\_SPK and GND. They connected to power supply IC, microprocessor and signal processor IC.

### 2-2-6. Battery Charge Management

A complete constant-current/constant-voltage linear charger is used for single cell lithium-ion batteries. If TA connected to phone, "+DCVOLT" enable charger IC and supply current to battery. When fault condition caused, "CHG\_ON" signal level change low to high and charger IC stop charging process.

### 2-2-7. Audio

EARP\_P and EARP\_N from OM6359 are connected to the main speaker. MIC\_P and MIC\_N are connected to the main MIC. YMU762 is a synthesizer LSI for mobile phones. It is a LSI as an input/output device for sound sources, which is the mobile phones, such as AAC, in addition to ringing-melodies.

As a synthesis, YMU762 is equipped 32 voices with different tones. Since the device is capable of simultaneously generating up to synchronous with the play of the FM synthesizer, various sampled voices can be used as sound effects. Since the play data of YMU762 are interpreted at anytime through FIFO, the length of the data(playing period) is not limited, so the device can flexibly support application such as incoming call melody music distribution service.

The hardware sequencer built in this device allows playing of the complex music without giving excessive load to the CPU of the portable telephones.

For the purpose of enabling YMU762 to demonstrate its full capabilities, Yamaha purpose to use "SMAF:Synthetic music Mobile Application Format" as a data distribution format that is compatible with multimedia. Since the SMAF takes a structure that sets importance on the synchronization between sound and images, various contents can be written into it including incoming call melody with words that can be used for training karaoke, and commercial channel that combines

texts, images and sounds, and others. The hardware sequencer of YMU788 directly interprets and plays blocks relevant to synthesis (playing music and reproducing ADPCM with FM synthesizer) that are included in data distributed in SMAF.

## 2-2-8. Memory

Signals in the OM6359 enable two memories. They use two volt supply voltage, VDD3 in the PCF50601 & VDD\_1.9V with a LDO. This system uses Intel's memory, RD38F3050LOZTQ0. It is consisted of 128M bits flash NOR memory and 64M bits SRAM. It has 16 bit data line, HD[0~15] which is connected to OM6359. It has 26 bit address lines, HA[1~26]. NCSFLASH & NCSRAM signals are chip select. Writing process, HWR\_N is low and it enables writing process to flash memory and SRAM. During reading process, HRD\_N is low and it enables reading process to flash memory and SRAM. Reading or writing procedure is processed after HWR\_N or HRD\_N is enabled.

## 2-2-9. OM6359

OM6359 is consisted of ARM core and DSP core. It has 8x1Kword on-chip program/data RAM, 55 Kwords on-chip program ROM in the DSP. It has 4K\*32bits ROM and 2K\*32bits RAM in the ARM core. DSP is consisted of KBS, JTAG, EMI and UART. ARM core is consisted of EMI, PIC(Programmable Interrupt Controller), reset/power/clock unit, DMA controller, TIC(Test Interface Controller), peripheral bridge, PPI, SSI(Synchronous Serial Interface), ACC(Asynchronous communications controllers), timer, ADC, RTC(Real-Time Clock) and keyboard interface. KBIO(0:7), address lines of DSP core and HD[0~15]. HA[1~26], address lines of ARM core and HD[0~15], data lines of ARM core are connected to memory and YMU762.

NCSRAM, NCSFLASH in the ARM core are connected to each memory. HWR\_N and HRD\_N control the process of memory. External IRQ(Interrupt ReQuest) signals from each units, such as, PMU need the compatible process.

KBIO[0~7] receive the status from key and RXD0/TXD0 are used for the communication using data link cable(DEBUG\_DTR/RTS/TXD/RXD/CTS/DSR).

It has JTAG control pins(TDI/TDO/TCK) for ARM core and DSP core. It receives 13MHz clock in CKI pin from external TCXO. ADC(Analog to Digital Converter) part receives the status of temperature, battery type and battery voltage.

## 2-2-10. TOH2600DGI4KRA(26MHz)

This system uses the 26MHz TCXO, TOH2600DGI4KRA, SEM. AFC control signal from OM6359 controls frequency from 26MHz x-tal. The clock output frequency of UAA3536 is 13MHz. This clock is connected to OM6359, YMU762.

## 2-2-11. FM Radio(TEA5761)

The TEA5761 is a single chip electronically tuned FM radio for low voltage application with fully integrated IF selectivity and demodulation.

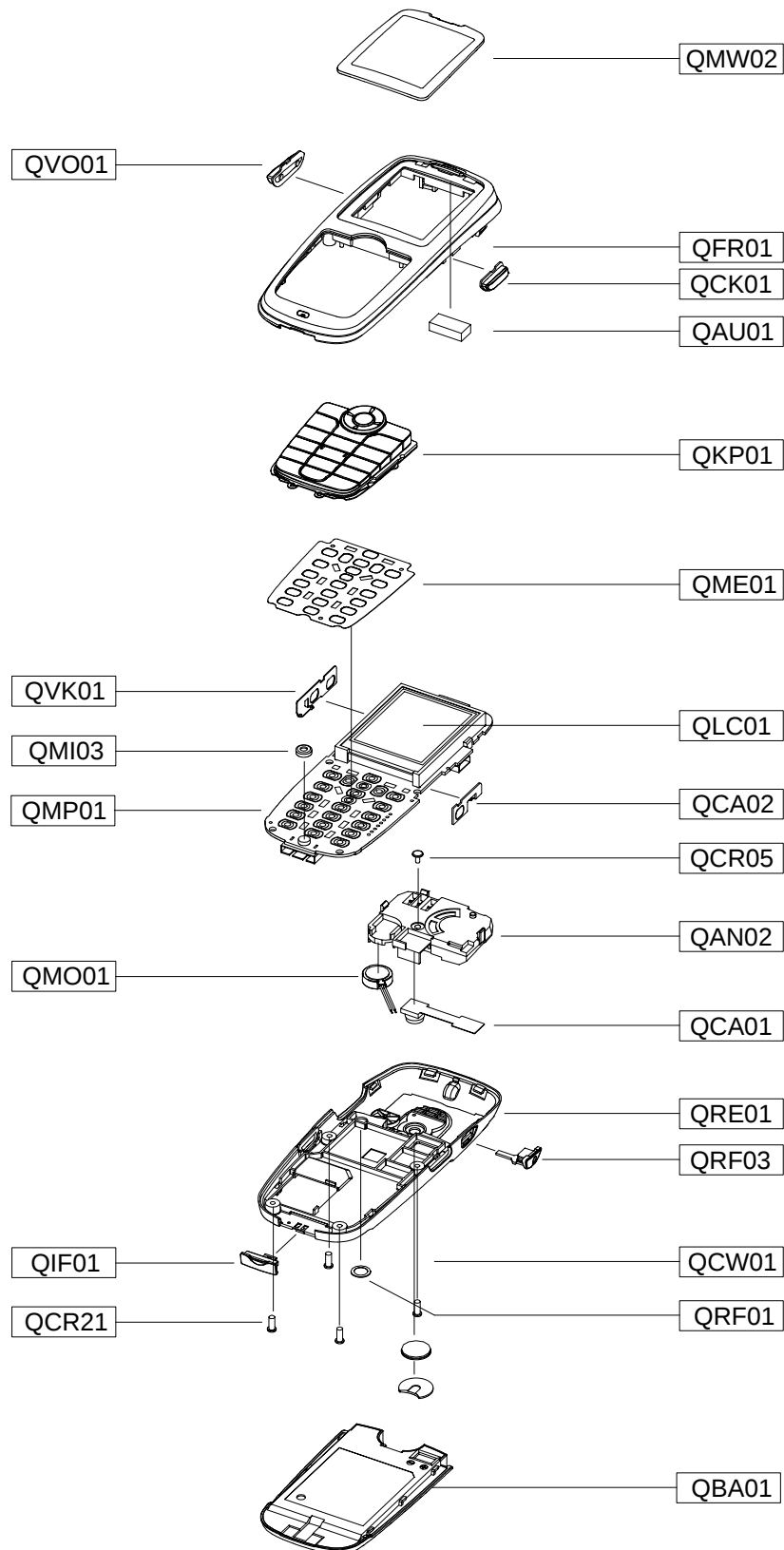
The radio is completely adjustment free and does only require a minimum of small and low cost external components. The radio can tune the European-, US- and Japan FM bands.

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### 3. Exploded View and Parts List

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#### 3-1. Exploded View



## 3-2. Parts List

| Location No |       | Description                          | Sec Code    |
|-------------|-------|--------------------------------------|-------------|
| QAN02       |       | ANTENNA-SGHX620;J90-OY505-F01P01,SGH | GH42-00573A |
| QAU01       |       | AUDIO-RECEIVER;32ohm,96dB±2dB,12.5X  | 3009-001100 |
| QBA01       |       | BATTERY-800MAH,DK/SILVE,EU,M;BST4138 | GH43-02007A |
| QCA01       |       | UNIT-CAMERA;SGH-X620,MOMFH150G1A,-,E | GH59-02115A |
| QCA02       |       | UNIT-CAMERA KEY;SGH-X620,SSC4018P087 | GH59-02111A |
| QCK01       |       | MEC-CAMERA KEY;SGH-X620,EU,-,-,-,S   | GH75-07456A |
| QCR05       |       | SCREW-MACHINE;PH,+,M1.4,L3,ZPC(BLK), | 6001-001478 |
| QCR21       |       | SCREW-MACHINE;BH(1.0),+,M1.7,L3.5,BL | 6001-001507 |
| QFR01       |       | MEC-FRONT CASE;SGH-X620,EU,-,-,-,S   | GH75-06379A |
| QIF01       |       | PMO-IF COVER;SGH-X620,PC+ELASTOMER,D | GH72-22325A |
| QKP01       |       | MEC-KEYPAD;SGH-X620,EU,-,-,-,BLK,-   | GH75-06380A |
| QLC01       |       | LCD-SGHX620 LCD;LTS166QQ-F01-0,SGH-X | GH07-00705A |
| QME01       |       | UNIT-METAL DOME;SGH-X620,SSM5017P800 | GH59-02112A |
| QMI03       |       | RMO-RUBBER MIC;SGH-X620,CR-RUBBER,P5 | GH73-04169A |
| QMO01       |       | MOTOR DC-SGHX620;JHV-10A1-C9S,SGH-X6 | GH31-00179A |
| QMP01       |       | PBA MAIN-SGHX620;SGH-X620,ERA,EU,PBA | GH92-02048A |
| QMW02       |       | PCT-MAIN WINDOW;SGH-X620,ACRYL,TRP,4 | GH72-19752A |
| QRF01       |       | MPR-RF COVER;SGH-X620,PC SHEET,P6.6X | GH74-13087A |
| QVK01       |       | UNIT-VOLUME KEY;SGH-X620,SSV4018P088 | GH59-02113A |
| QVO01       |       | MEC-VOLUME KEY;SGH-X620,EU,-,-,-,S   | GH75-07455A |
| QRE01       |       | MEC-REAR CASE;SGH-X620,EU,-,-,-,SI   | GH75-06383A |
|             | QRF03 | PMO-EAR JACK COVER;SGH-X620,PC+ELAST | GH72-21956A |
| QCW01       |       | MEC-CAMER WINDOW;SGH-X620,EU,-,-,-,- | GH75-07587A |

| <b>Description</b>                   | <b>Sec Code</b> |
|--------------------------------------|-----------------|
| BAG PE;LDPE,T0.05,W80,L180,TRP,-,-   | 6902-000634     |
| ADAPTOR-SGHD500 BLK;TAD137EBE,SGH-D5 | GH44-00954A     |
| UNIT-EARPHONE;SGH-C230,EM-SS550E-STB | GH59-02166A     |
| LABEL(P)-WATER SOAK;COMM,NORGE,100G, | GH68-02026A     |
| MANUAL-WEEE CARD;COMM,SEC,ENGLISH,UN | GH68-07013A     |
| LABEL(R)-SGHX620(EU);SGH-E335,TMB,PO | GH68-07405A     |
| MANUAL-USER;SGH-X620,XET,ITALIAN,ITA | GH68-07612A     |
| CUSHION-CASE(1-2_NEW);SGH-X620,PULP, | GH69-02994A     |
| BOX(P)-SGHX620(EU);SGH-X620,SC300+S1 | GH69-03067A     |
| ICT-MIRROR;SGH-X620,STS,P10.52,1.1,- | GH70-00404A     |
| PMO-BATTER LOCKER;SGH-X620,PC,D/SIL, | GH72-21963A     |
| MPR-BOHO VINYL C/WIN B;SGH-X620,SP30 | GH74-15524A     |
| MPR-TAPE INSULATION PCB;SGH-X620,3M8 | GH74-16995A     |
| MPR-BOHO VINYL M/WIN;SGH-X620,SP100, | GH74-16997A     |
| MPR-TAPE INTENNA CAMERA;SGH-X620,TES | GH74-16999A     |
| MPR-TAPE INSULATE CAMERA;SGH-X620,3M | GH74-17225A     |
| MPR-TAPE INSULATE VOLUME;SGH-X620,3M | GH74-17226A     |
| MPR-BOHO VINYL M/WIN A;SGH-X620,ST-5 | GH74-17308A     |
| MPR-BOHO VINYL CAM WIN A;SGH-X620,ST | GH74-17309A     |

### 3-3. Test Jig (GH80-01909A)



3-3-1. RF Test Cable  
(GH39-00283A)



3-3-2. Test Cable  
(GH39-00217A)



3-3-3. Serial Cable



3-3-4. Power Supply Cable



3-3-5. DATA CABLE  
(GH39-00219A)



3-3-6. TA  
(GH44-00184G)



## 4. Electrical Parts List

| Design LOC | Description       | SEC CODE    |
|------------|-------------------|-------------|
| BAT300     | BATTERY-LI (2ND)  | 4302-001180 |
| BAT500     | CONNECTOR-BATTERY | 3711-005829 |
| C101       | C-CER,CHIP        | 2203-000278 |
| C102       | C-CER,CHIP        | 2203-000278 |
| C103       | C-CER,CHIP        | 2203-000278 |
| C105       | C-CER,CHIP        | 2203-000812 |
| C107       | C-CER,CHIP        | 2203-000854 |
| C108       | C-CER,CHIP        | 2203-000854 |
| C109       | C-CER,CHIP        | 2203-005057 |
| C110       | C-CER,CHIP        | 2203-005482 |
| C111       | C-CER,CHIP        | 2203-000628 |
| C112       | C-CER,CHIP        | 2203-000628 |
| C113       | C-CER,CHIP        | 2203-005057 |
| C114       | C-CER,CHIP        | 2203-005482 |
| C115       | C-CER,CHIP        | 2203-002668 |
| C118       | C-CER,CHIP        | 2203-000233 |
| C119       | C-CER,CHIP        | 2203-000233 |
| C120       | C-CER,CHIP        | 2203-005482 |
| C121       | C-CER,CHIP        | 2203-005057 |
| C122       | C-CER,CHIP        | 2203-005138 |
| C124       | C-FILM,SMD-PPS    | 2301-001213 |
| C125       | C-CER,CHIP        | 2203-000359 |
| C126       | C-FILM,SMD-PPS    | 2301-001197 |
| C127       | C-CER,CHIP        | 2203-005482 |
| C128       | C-CER,CHIP        | 2203-005057 |
| C129       | C-CER,CHIP        | 2203-006053 |
| C130       | C-CER,CHIP        | 2203-000438 |
| C131       | C-CER,CHIP        | 2203-006190 |
| C132       | C-CER,CHIP        | 2203-000438 |
| C133       | C-CER,CHIP        | 2203-006190 |
| C134       | C-CER,CHIP        | 2203-000438 |
| C135       | C-TA,CHIP         | 2404-001239 |
| C136       | C-CER,CHIP        | 2203-000233 |
| C138       | C-CER,CHIP        | 2203-005503 |
| C139       | C-CER,CHIP        | 2203-000311 |
| C140       | C-CER,CHIP        | 2203-000233 |
| C141       | C-CER,CHIP        | 2203-000438 |
| C142       | C-CER,CHIP        | 2203-000254 |
| C143       | C-CER,CHIP        | 2203-000438 |
| C144       | C-CER,CHIP        | 2203-001153 |
| C145       | C-CER,CHIP        | 2203-000550 |
| C146       | C-CER,CHIP        | 2203-005480 |
| C147       | C-CER,CHIP        | 2203-005482 |
| C148       | C-CER,CHIP        | 2203-005057 |
| C149       | C-CER,CHIP        | 2203-000278 |
| C150       | C-CER,CHIP        | 2203-005482 |
| C151       | C-CER,CHIP        | 2203-000679 |
| C152       | C-CER,CHIP        | 2203-000278 |
| C153       | C-CER,CHIP        | 2203-000233 |
| C154       | C-CER,CHIP        | 2203-000254 |

| Design LOC | Description | SEC CODE    |
|------------|-------------|-------------|
| C155       | C-CER,CHIP  | 2203-000311 |
| C156       | C-CER,CHIP  | 2203-000311 |
| C157       | C-CER,CHIP  | 2203-000311 |
| C158       | C-CER,CHIP  | 2203-000311 |
| C159       | C-CER,CHIP  | 2203-002668 |
| C200       | C-CER,CHIP  | 2203-005061 |
| C201       | C-CER,CHIP  | 2203-005061 |
| C202       | C-CER,CHIP  | 2203-005061 |
| C203       | C-CER,CHIP  | 2203-005061 |
| C204       | C-CER,CHIP  | 2203-000254 |
| C205       | C-CER,CHIP  | 2203-005061 |
| C206       | C-CER,CHIP  | 2203-005061 |
| C207       | C-CER,CHIP  | 2203-000254 |
| C208       | C-CER,CHIP  | 2203-000254 |
| C209       | C-CER,CHIP  | 2203-000643 |
| C210       | C-CER,CHIP  | 2203-000233 |
| C211       | C-CER,CHIP  | 2203-005482 |
| C212       | C-CER,CHIP  | 2203-005482 |
| C213       | C-CER,CHIP  | 2203-000854 |
| C214       | C-CER,CHIP  | 2203-006141 |
| C215       | C-CER,CHIP  | 2203-005482 |
| C217       | C-CER,CHIP  | 2203-006053 |
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| C221       | C-CER,CHIP  | 2203-005061 |
| C222       | C-CER,CHIP  | 2203-005061 |
| C223       | C-CER,CHIP  | 2203-005061 |
| C224       | C-CER,CHIP  | 2203-005061 |
| C225       | C-CER,CHIP  | 2203-000254 |
| C226       | C-CER,CHIP  | 2203-005061 |
| C227       | C-CER,CHIP  | 2203-005061 |
| C228       | C-CER,CHIP  | 2203-005482 |
| C300       | C-CER,CHIP  | 2203-006208 |
| C301       | C-CER,CHIP  | 2203-005482 |
| C302       | C-CER,CHIP  | 2203-006208 |
| C303       | C-CER,CHIP  | 2203-005482 |
| C304       | C-CER,CHIP  | 2203-005482 |
| C307       | C-CER,CHIP  | 2203-006257 |
| C308       | C-CER,CHIP  | 2203-005571 |
| C309       | C-CER,CHIP  | 2203-006208 |
| C310       | C-CER,CHIP  | 2203-005395 |
| C311       | C-TA,CHIP   | 2404-001225 |
| C312       | C-CER,CHIP  | 2203-000386 |
| C313       | C-CER,CHIP  | 2203-000425 |
| C314       | C-CER,CHIP  | 2203-006257 |
| C315       | C-CER,CHIP  | 2203-005482 |
| C316       | C-CER,CHIP  | 2203-006053 |
| C317       | C-CER,CHIP  | 2203-000425 |
| C318       | C-CER,CHIP  | 2203-006208 |

| Design LOC | Description | SEC CODE    |
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| C320       | C-CER,CHIP  | 2203-006208 |
| C321       | C-CER,CHIP  | 2203-006208 |
| C322       | C-CER,CHIP  | 2203-005065 |
| C323       | C-TA,CHIP   | 2404-001225 |
| C324       | C-CER,CHIP  | 2203-006208 |
| C325       | C-CER,CHIP  | 2203-005482 |
| C326       | C-CER,CHIP  | 2203-005482 |
| C327       | C-CER,CHIP  | 2203-005482 |
| C328       | C-CER,CHIP  | 2203-006208 |
| C329       | C-TA,CHIP   | 2404-001101 |
| C330       | C-TA,CHIP   | 2404-001086 |
| C331       | C-CER,CHIP  | 2203-006053 |
| C332       | C-CER,CHIP  | 2203-006208 |
| C333       | C-CER,CHIP  | 2203-006399 |
| C334       | C-CER,CHIP  | 2203-006208 |
| C335       | C-CER,CHIP  | 2203-000679 |
| C336       | C-CER,CHIP  | 2203-006053 |
| C337       | C-CER,CHIP  | 2203-006208 |
| C338       | C-CER,CHIP  | 2203-006208 |
| C339       | C-CER,CHIP  | 2203-006053 |
| C340       | C-CER,CHIP  | 2203-005482 |
| C341       | C-TA,CHIP   | 2404-001374 |
| C342       | C-TA,CHIP   | 2404-001381 |
| C344       | C-CER,CHIP  | 2203-006090 |
| C345       | C-CER,CHIP  | 2203-006201 |
| C346       | C-CER,CHIP  | 2203-006053 |
| C347       | C-CER,CHIP  | 2203-006201 |
| C348       | C-CER,CHIP  | 2203-006201 |
| C349       | C-TA,CHIP   | 2404-001225 |
| C350       | C-CER,CHIP  | 2203-006201 |
| C351       | C-CER,CHIP  | 2203-005482 |
| C352       | C-CER,CHIP  | 2203-006208 |
| C353       | C-CER,CHIP  | 2203-006208 |
| C354       | C-CER,CHIP  | 2203-006208 |
| C400       | C-TA,CHIP   | 2404-001352 |
| C401       | C-CER,CHIP  | 2203-005482 |
| C407       | C-CER,CHIP  | 2203-000885 |
| C408       | C-CER,CHIP  | 2203-000885 |
| C409       | C-TA,CHIP   | 2404-001348 |
| C417       | C-CER,CHIP  | 2203-005061 |
| C418       | C-CER,CHIP  | 2203-000995 |
| C419       | C-CER,CHIP  | 2203-000679 |
| C421       | C-CER,CHIP  | 2203-000854 |
| C422       | C-CER,CHIP  | 2203-000995 |
| C423       | C-CER,CHIP  | 2203-000679 |
| C424       | C-CER,CHIP  | 2203-000679 |
| C426       | C-CER,CHIP  | 2203-000679 |
| C427       | C-CER,CHIP  | 2203-005061 |
| C428       | C-CER,CHIP  | 2203-000386 |

| Design LOC | Description | SEC CODE    |
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| C429       | C-CER,CHIP  | 2203-000812 |
| C430       | C-CER,CHIP  | 2203-000425 |
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| C433       | C-CER,CHIP  | 2203-000679 |
| C435       | C-CER,CHIP  | 2203-000425 |
| C436       | C-CER,CHIP  | 2203-005482 |
| C444       | C-CER,CHIP  | 2203-006053 |
| C445       | C-CER,CHIP  | 2203-006208 |
| C449       | C-CER,CHIP  | 2203-000679 |
| C450       | C-TA,CHIP   | 2404-001352 |
| C451       | C-CER,CHIP  | 2203-005061 |
| C452       | C-CER,CHIP  | 2203-000854 |
| C453       | C-CER,CHIP  | 2203-005061 |
| C454       | C-CER,CHIP  | 2203-000679 |
| C455       | C-CER,CHIP  | 2203-005065 |
| C456       | C-CER,CHIP  | 2203-005061 |
| C457       | C-CER,CHIP  | 2203-000885 |
| C458       | C-CER,CHIP  | 2203-000885 |
| C500       | C-CER,CHIP  | 2203-003054 |
| C501       | C-CER,CHIP  | 2203-005061 |
| C502       | C-CER,CHIP  | 2203-006141 |
| C503       | C-TA,CHIP   | 2404-001225 |
| C504       | C-CER,CHIP  | 2203-006141 |
| C505       | C-CER,CHIP  | 2203-000233 |
| C506       | C-CER,CHIP  | 2203-005482 |
| C507       | C-CER,CHIP  | 2203-000679 |
| C508       | C-CER,CHIP  | 2203-000725 |
| C509       | C-CER,CHIP  | 2203-005482 |
| C510       | C-CER,CHIP  | 2203-006141 |
| C511       | C-CER,CHIP  | 2203-005482 |
| C512       | C-CER,CHIP  | 2203-005482 |
| C513       | C-CER,CHIP  | 2203-000438 |
| C514       | C-CER,CHIP  | 2203-000812 |
| C515       | C-CER,CHIP  | 2203-000812 |
| C516       | C-CER,CHIP  | 2203-002759 |
| C517       | C-CER,CHIP  | 2203-005482 |
| C518       | C-TA,CHIP   | 2404-001225 |
| C519       | C-CER,CHIP  | 2203-002687 |
| C520       | C-CER,CHIP  | 2203-000254 |
| C521       | C-CER,CHIP  | 2203-005482 |
| C522       | C-CER,CHIP  | 2203-000359 |
| C523       | C-CER,CHIP  | 2203-005480 |
| C524       | C-CER,CHIP  | 2203-001239 |
| C526       | C-CER,CHIP  | 2203-005480 |
| C527       | C-CER,CHIP  | 2203-005480 |
| C528       | C-CER,CHIP  | 2203-006399 |
| C529       | C-CER,CHIP  | 2203-005482 |
| C530       | C-CER,CHIP  | 2203-005480 |
| C531       | C-CER,CHIP  | 2203-005482 |
| C532       | C-CER,CHIP  | 2203-000254 |

| Design LOC | Description          | SEC CODE    |
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| C534       | C-TA,CHIP            | 2404-001239 |
| C535       | C-CER,CHIP           | 2203-005482 |
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| C538       | C-CER,CHIP           | 2203-006260 |
| C539       | C-CER,CHIP           | 2203-006257 |
| C540       | C-TA,CHIP            | 2404-001088 |
| C541       | C-CER,CHIP           | 2203-001153 |
| C545       | C-CER,CHIP           | 2203-001033 |
| C546       | C-CER,CHIP           | 2203-001033 |
| C548       | C-CER,CHIP           | 2203-000359 |
| CN100      | CONNECTOR-COAXIAL    | 3705-001358 |
| CN300      | CONNECTOR-CAR EDGE   | 3709-001355 |
| CN400      | JACK-EAR PHONE       | 3722-002010 |
| CN500      | CONNECTOR- INTERFACE | 3710-001611 |
| CN501      | CONNECTOR-HEADER     | 3711-005643 |
| CN502      | CONNECTOR-SOCKET     | 3710-001105 |
| F500       | FILTER-SAW           | 1405-001158 |
| F501       | FILTER-SAW           | 1405-001158 |
| F502       | FILTER-SAW           | 1405-001158 |
| F503       | FILTER-SAW           | 1405-001158 |
| F504       | FILTER-EMI/ESD       | 2901-001322 |
| F505       | FILTER-EMI/ESD       | 2901-001322 |
| F506       | FILTER-EMI/ESD       | 2901-001322 |
| F507       | FILTER-EMI/ESD       | 2901-001322 |
| F508       | FILTER-EMI/ESD       | 2901-001322 |
| L104       | INDUCTOR-SMD         | 2703-002204 |
| L107       | INDUCTOR-SMD         | 2703-002170 |
| L109       | INDUCTOR-SMD         | 2703-002201 |
| L112       | INDUCTOR-SMD         | 2703-002201 |
| L113       | INDUCTOR-SMD         | 2703-002201 |
| L115       | INDUCTOR-SMD         | 2703-002170 |
| L118       | INDUCTOR-SMD         | 2703-002314 |
| L119       | INDUCTOR-SMD         | 2703-002368 |
| L120       | INDUCTOR-SMD         | 2703-002176 |
| L121       | INDUCTOR-SMD         | 2703-002176 |
| L301       | CORE-RERRITE         | 3301-001105 |
| L302       | INDUCTOR-SMD         | 2703-002714 |
| L401       | INDUCTOR-SMD         | 2703-001231 |
| L402       | INDUCTOR-SMD         | 2703-002314 |
| L403       | INDUCTOR-SMD         | 2703-002314 |
| L404       | INDUCTOR-SMD         | 2703-001259 |
| L405       | INDUCTOR-SMD         | 2703-001259 |
| L501       | CORE-RERRITE         | 3301-001105 |
| L503       | INDUCTOR-SMD         | 2703-001673 |
| L504       | INDUCTOR-SMD         | 2703-002206 |
| L505       | INDUCTOR-SMD         | 3301-001756 |
| L506       | INDUCTOR-SMD         | 3301-001756 |
| L507       | INDUCTOR-SMD         | 3301-001756 |
| LED400     | LED                  | 0601-001819 |

| Design LOC | Description       | SEC CODE    |
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| LED401     | LED               | 0601-001819 |
| LED402     | LED               | 0601-001819 |
| LED403     | LED               | 0601-001819 |
| LED404     | LED               | 0601-001819 |
| LED405     | LED               | 0601-001819 |
| LED406     | LED               | 0601-001819 |
| LED407     | LED               | 0601-001819 |
| LED408     | LED               | 0601-001819 |
| LED409     | LED               | 0601-001819 |
| MIC400     | MIC-CONDENSOR     | 3003-001107 |
| OSC100     | OSCILLATOR-VCO    | 2806-001341 |
| OSC101     | OSCILLATOR-VCTCXO | 2809-001281 |
| Q100       | TR-DIGITAL        | 0504-001151 |
| Q101       | TR-DIGITAL        | 0504-001151 |
| Q102       | TR-DIGITAL        | 0504-001151 |
| Q400       | IC-RELAY DRIVER   | 1003-001440 |
| R100       | R-CHIP            | 2007-000171 |
| R101       | R-CHIP            | 2007-000162 |
| R102       | R-CHIP            | 2007-000162 |
| R103       | R-CHIP            | 2007-000162 |
| R104       | R-CHIP            | 2007-007148 |
| R105       | R-CHIP            | 2007-000141 |
| R106       | R-CHIP            | 2007-000140 |
| R107       | R-CHIP            | 2007-001288 |
| R108       | R-CHIP            | 2007-001308 |
| R109       | R-CHIP            | 2007-001308 |
| R110       | R-CHIP            | 2007-000566 |
| R111       | R-CHIP            | 2007-001329 |
| R112       | R-CHIP            | 2007-000144 |
| R113       | R-CHIP            | 2007-001288 |
| R114       | R-CHIP            | 2007-007311 |
| R115       | R-CHIP            | 2007-000148 |
| R116       | R-CHIP            | 2007-001308 |
| R117       | R-CHIP            | 2007-001308 |
| R118       | R-CHIP            | 2007-000566 |
| R119       | R-CHIP            | 2007-007699 |
| R120       | R-CHIP            | 2007-007699 |
| R121       | R-CHIP            | 2007-000171 |
| R123       | R-CHIP            | 2007-008672 |
| R124       | R-CHIP            | 2007-000142 |
| R125       | R-CHIP            | 2007-000148 |
| R126       | R-CHIP            | 2007-001308 |
| R127       | R-CHIP            | 2007-007306 |
| R128       | R-CHIP            | 2007-000140 |
| R129       | R-CHIP            | 2007-007314 |
| R130       | R-CHIP            | 2007-007314 |
| R131       | R-CHIP            | 2007-007314 |
| R132       | R-CHIP            | 2007-007314 |
| R133       | R-CHIP            | 2007-000140 |
| R134       | R-CHIP            | 2007-000171 |

| Design LOC | Description | SEC CODE    |
|------------|-------------|-------------|
| R135       | R-CHIP      | 2007-000171 |
| R200       | R-CHIP      | 2007-000174 |
| R201       | R-CHIP      | 2007-007014 |
| R202       | R-CHIP      | 2007-001313 |
| R203       | R-CHIP      | 2007-007014 |
| R204       | R-CHIP      | 2007-000171 |
| R205       | R-CHIP      | 2007-000162 |
| R207       | R-CHIP      | 2007-007107 |
| R208       | R-CHIP      | 2007-007142 |
| R209       | R-CHIP      | 2007-007107 |
| R210       | R-CHIP      | 2007-007142 |
| R211       | R-CHIP      | 2007-000162 |
| R213       | R-CHIP      | 2007-000162 |
| R214       | R-CHIP      | 2007-007001 |
| R215       | R-CHIP      | 2007-000162 |
| R216       | R-CHIP      | 2007-000162 |
| R217       | R-CHIP      | 2007-000148 |
| R218       | R-CHIP      | 2007-000162 |
| R219       | R-CHIP      | 2007-000143 |
| R220       | R-CHIP      | 2007-000141 |
| R221       | R-CHIP      | 2007-000141 |
| R222       | R-CHIP      | 2007-000162 |
| R223       | R-CHIP      | 2007-000162 |
| R224       | R-CHIP      | 2007-000162 |
| R300       | R-CHIP      | 2007-000839 |
| R301       | R-CHIP      | 2007-000162 |
| R302       | R-CHIP      | 2007-007100 |
| R305       | R-CHIP      | 2007-000148 |
| R310       | R-CHIP      | 2007-000140 |
| R311       | R-CHIP      | 2007-003001 |
| R312       | R-CHIP      | 2007-000151 |
| R313       | R-CHIP      | 2007-000157 |
| R314       | R-CHIP      | 2007-007311 |
| R315       | R-CHIP      | 2007-000162 |
| R316       | R-CHIP      | 2007-007489 |
| R317       | R-CHIP      | 2007-007573 |
| R318       | R-CHIP      | 2007-007334 |
| R402       | R-CHIP      | 2007-007014 |
| R403       | R-CHIP      | 2007-007014 |
| R408       | R-CHIP      | 2007-003030 |
| R409       | R-CHIP      | 2007-003030 |
| R410       | R-CHIP      | 2007-002970 |
| R411       | R-CHIP      | 2007-002970 |
| R412       | R-CHIP      | 2007-002970 |
| R413       | R-CHIP      | 2007-002970 |
| R414       | R-CHIP      | 2007-002970 |
| R415       | R-CHIP      | 2007-002970 |
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| R417       | R-CHIP      | 2007-000140 |
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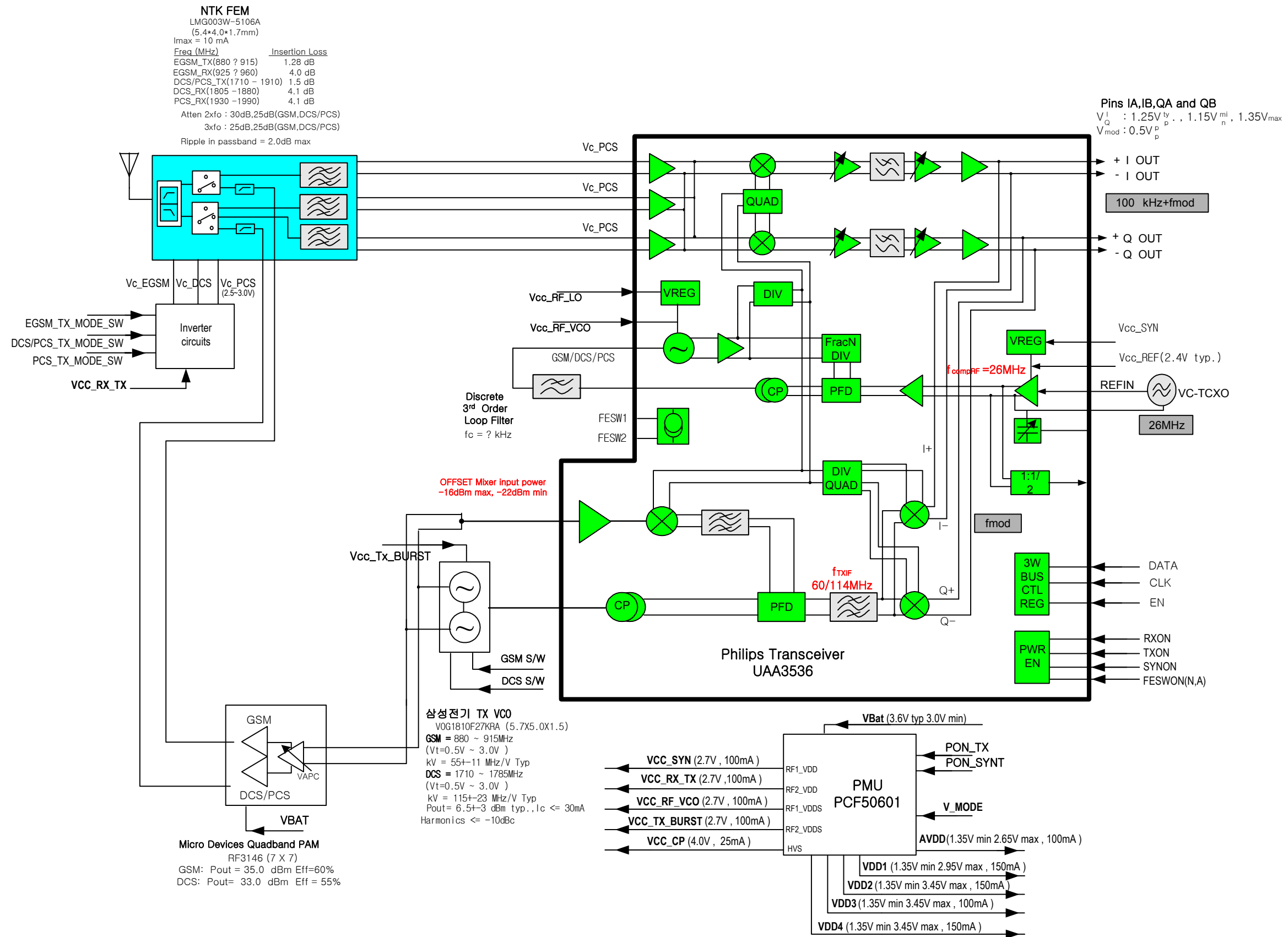
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| R419       | R-CHIP         | 2007-000140 |
| R420       | R-CHIP         | 2007-002796 |
| R423       | R-CHIP         | 2007-007573 |
| R424       | R-CHIP         | 2007-007529 |
| R426       | R-CHIP         | 2007-001339 |
| R427       | R-CHIP         | 2007-007107 |
| R428       | R-CHIP         | 2007-007107 |
| R430       | R-CHIP         | 2007-001317 |
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| R436       | R-CHIP         | 2007-000148 |
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| R439       | R-CHIP         | 2007-002796 |
| R440       | R-CHIP         | 2007-007014 |
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| R503       | R-CHIP         | 2007-000143 |
| R504       | R-CHIP         | 2007-000143 |
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| R510       | R-CHIP         | 2007-007014 |
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| R515       | R-CHIP         | 2007-001325 |
| R517       | R-CHIP         | 2007-007132 |
| R518       | R-CHIP         | 2007-007308 |
| R519       | R-CHIP         | 2007-007308 |
| R520       | R-CHIP         | 2007-000775 |
| R521       | R-CHIP         | 2007-001325 |
| R522       | R-CHIP         | 2007-003001 |
| R523       | R-CHIP         | 2007-000171 |
| R524       | R-CHIP         | 2007-007107 |
| R534       | R-CHIP         | 2007-000171 |
| R536       | R-CHIP         | 2007-000171 |
| R545       | R-CHIP         | 2007-000171 |
| R546       | R-CHIP         | 2007-008531 |
| R547       | R-CHIP         | 2007-008531 |
| R548       | R-CHIP         | 2007-008531 |
| R549       | R-CHIP         | 2007-008531 |
| R550       | R-CHIP         | 2007-008531 |
| R551       | R-CHIP         | 2007-008531 |
| R552       | R-CHIP         | 2007-000171 |
| TH200      | THERMISTOR-NTC | 1404-001221 |
| U100       | FILTER-ASM     | 2911-000008 |
| U101       | IC-TRANSCIEVER | 1205-002327 |
| U102       | IC-POWER AMP   | 1201-002075 |

| Design LOC | Description       | SEC CODE    |
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| U200       | IC ASIC-SCHN480   | GH13-00029A |
| U201       | IC-CMOS LOGIC     | 0801-002237 |
| U202       | IC-COMM           | 1205-002558 |
| U203       | IC-MEMORY         | 1108-000019 |
| U300       | PHOTO-IRDA        | 0604-001261 |
| U302       | IC-DC/DC          | 1203-003328 |
| U303       | IC-BATTERY        | 1203-003663 |
| U304       | IC-POSI.FIXED REG | 1203-003432 |
| U305       | IC-CONTROLLER     | 1205-002350 |
| U306       | IC-POSI.FIXED REG | 1203-003489 |
| U307       | IC-POSI.FIXED REG | 1203-003523 |
| U400       | IC-AUDIO AMP      | 1201-002240 |
| U402       | TR-DIGITAL        | 0504-001100 |
| U403       | IC-VOLTAGE COMP   | 1202-001068 |
| U406       | IC-POSI.FIXED REG | 1203-003563 |
| U500       | FILTER-EMI/ESD    | 2901-001246 |
| U501       | IC-FM RADIO       | 1201-002238 |
| U502       | IC MELODY         | 1204-002161 |
| U503       | IC-DEMODULATOR    | 1204-002398 |
| U504       | C-CER,CHIP        | 2203-000628 |
| U505       | C-CER,CHIP        | 2203-005061 |
| U507       | C-CER,CHIP        | 2203-000812 |
| U510       | IC-CMOS LOGIC     | 1001-001306 |
| U511       | R-CHIP            | 2007-000162 |
| U512       | IC-CMOS LOGIC     | 0801-002237 |
| V401       | VARISTOR          | 1405-001121 |
| V402       | VARISTOR          | 1405-001121 |
| V403       | VARISTOR          | 1405-001121 |
| V404       | VARISTOR          | 1405-001121 |
| V405       | VARISTOR          | 1405-001121 |
| V406       | VARISTOR          | 1405-001082 |
| V407       | VARISTOR          | 1405-001082 |
| V408       | VARISTOR          | 1405-001082 |
| V409       | VARISTOR          | 1405-001082 |
| V410       | VARISTOR          | 1405-001082 |
| V411       | VARISTOR          | 1405-001082 |
| V412       | VARISTOR          | 1405-001082 |
| X300       | CRYSTAL-SMD       | 2801-004373 |
| ZD300      | DIODE-ZENER       | 0403-001446 |
| ZD301      | DIODE-ZENER       | 0403-001427 |
| ZD400      | DIODE-TVS         | 0406-001201 |
| ZD402      | DIODE-TVS         | 0406-001121 |
| ZD403      | DIODE-TVS         | 0406-001190 |
| ZD404      | DIODE-TVS         | 0406-001190 |
| ZD405      | DIODE-TVS         | 0406-001201 |
| ZD500      | DIODE-ZENER       | 0403-001387 |

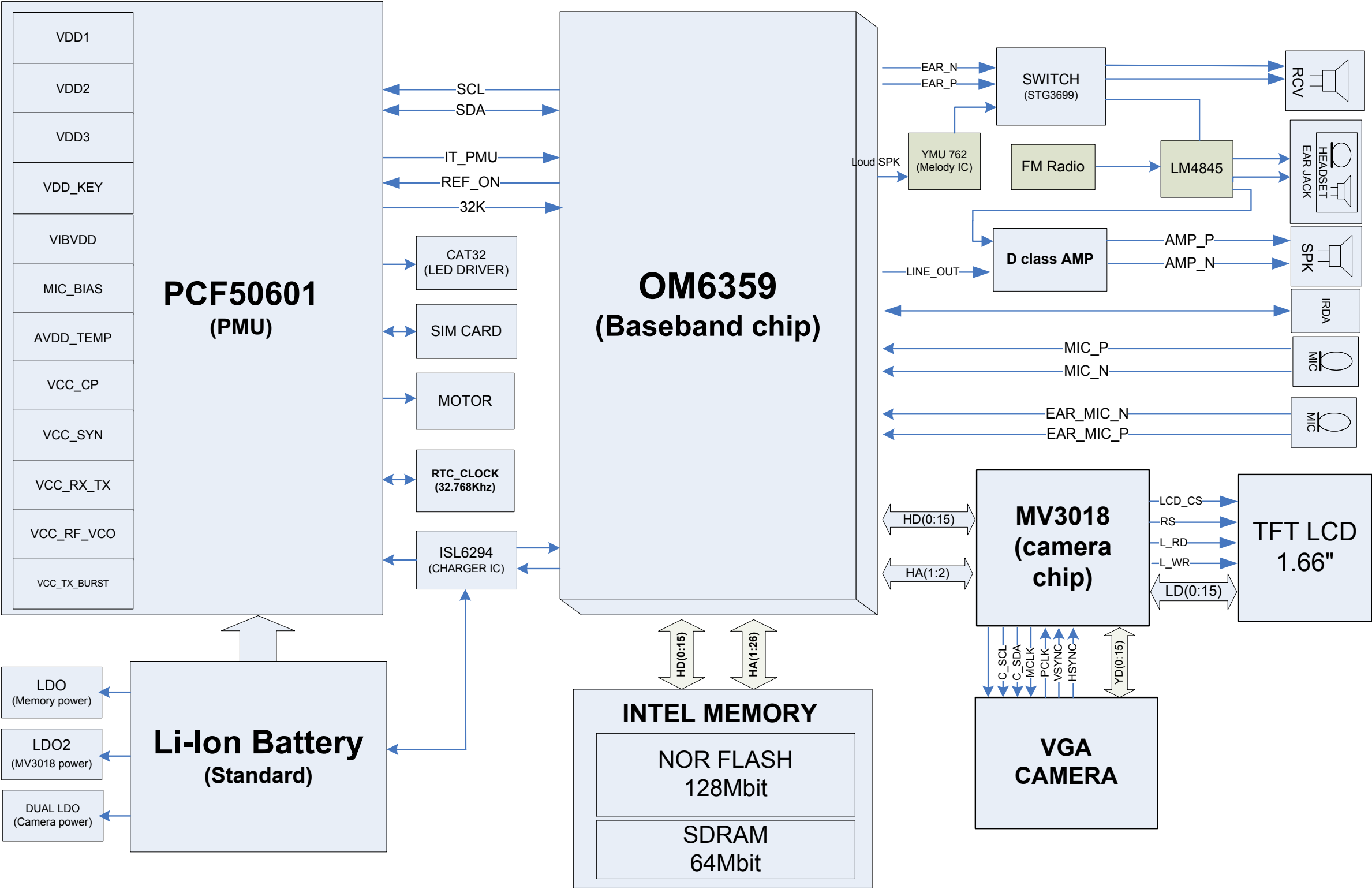


## 5. Block Diagrams

## 5-1. RF Solution Block Diagram

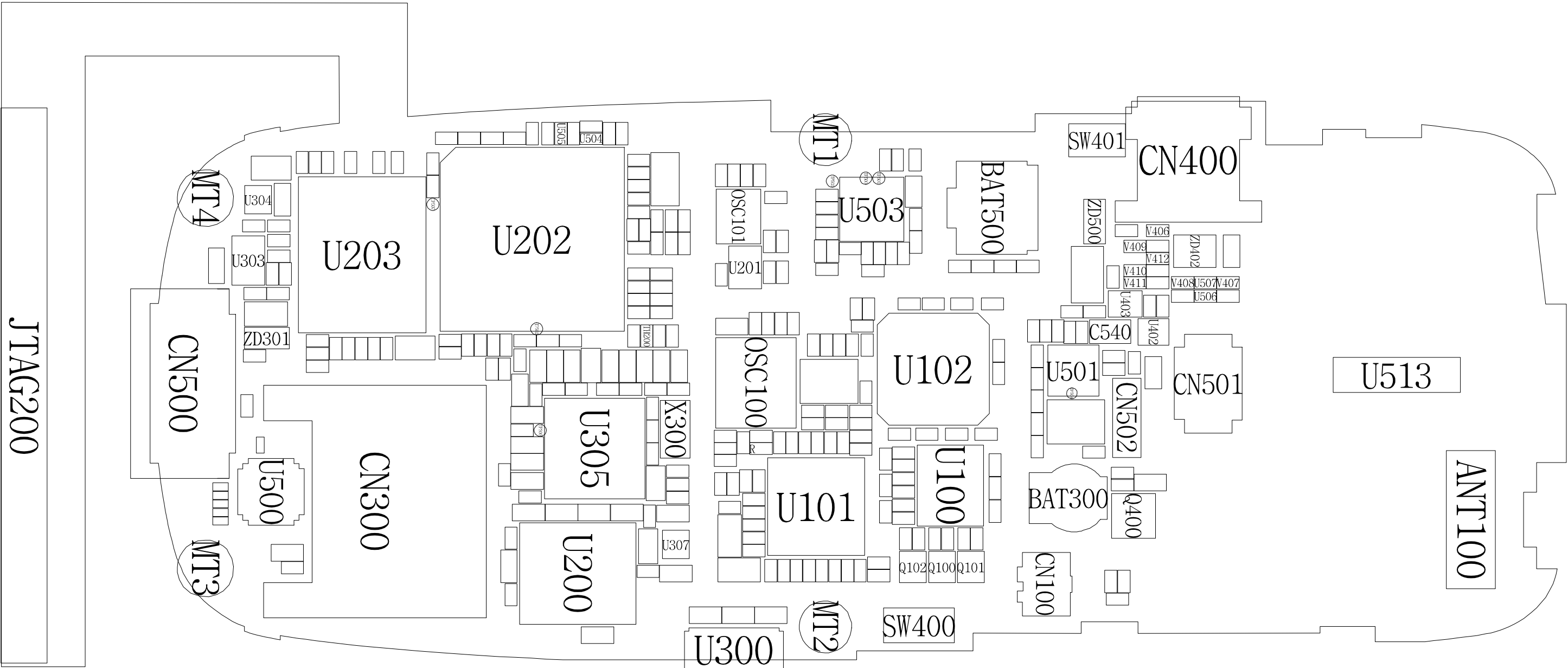


5-2. Base Band Solution Block Diagram

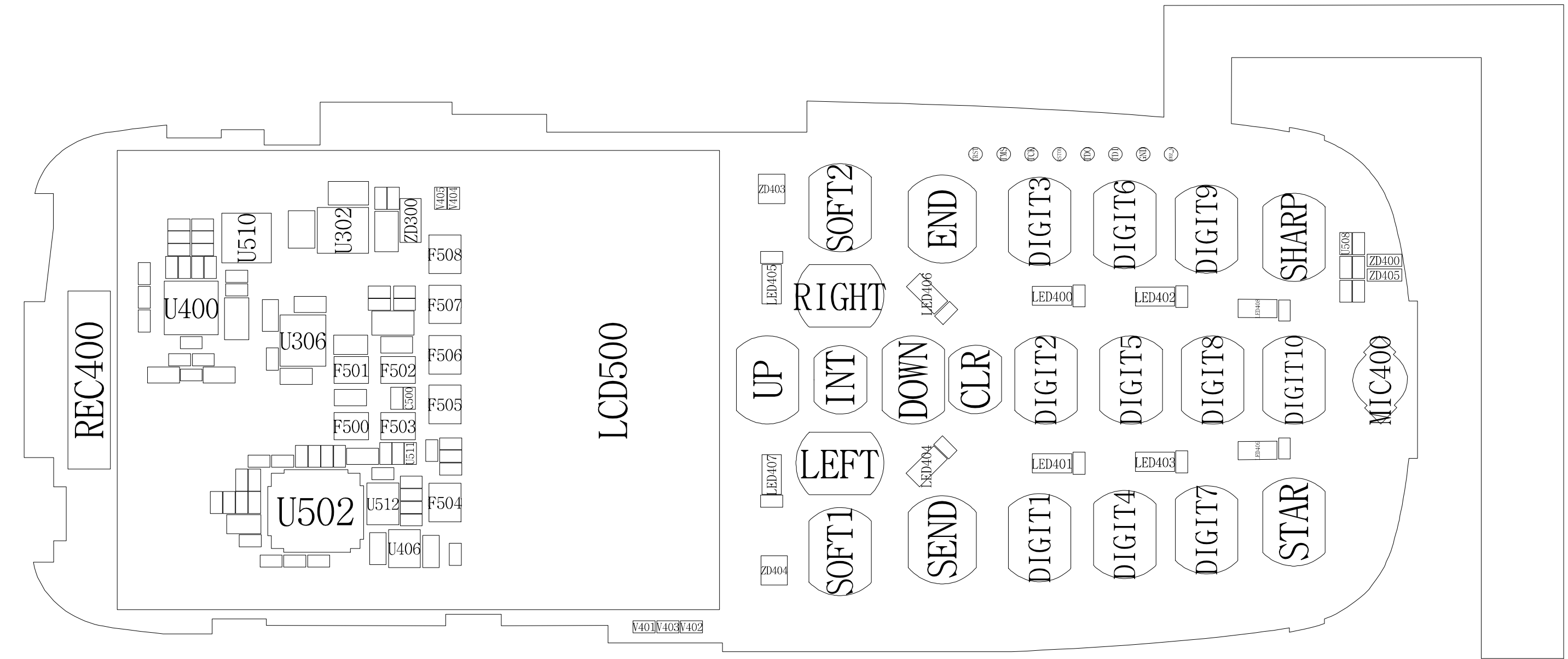


6. PCB Diagrams

6-1. PCB Top Diagram



6-2. PCB Bottom Diagram

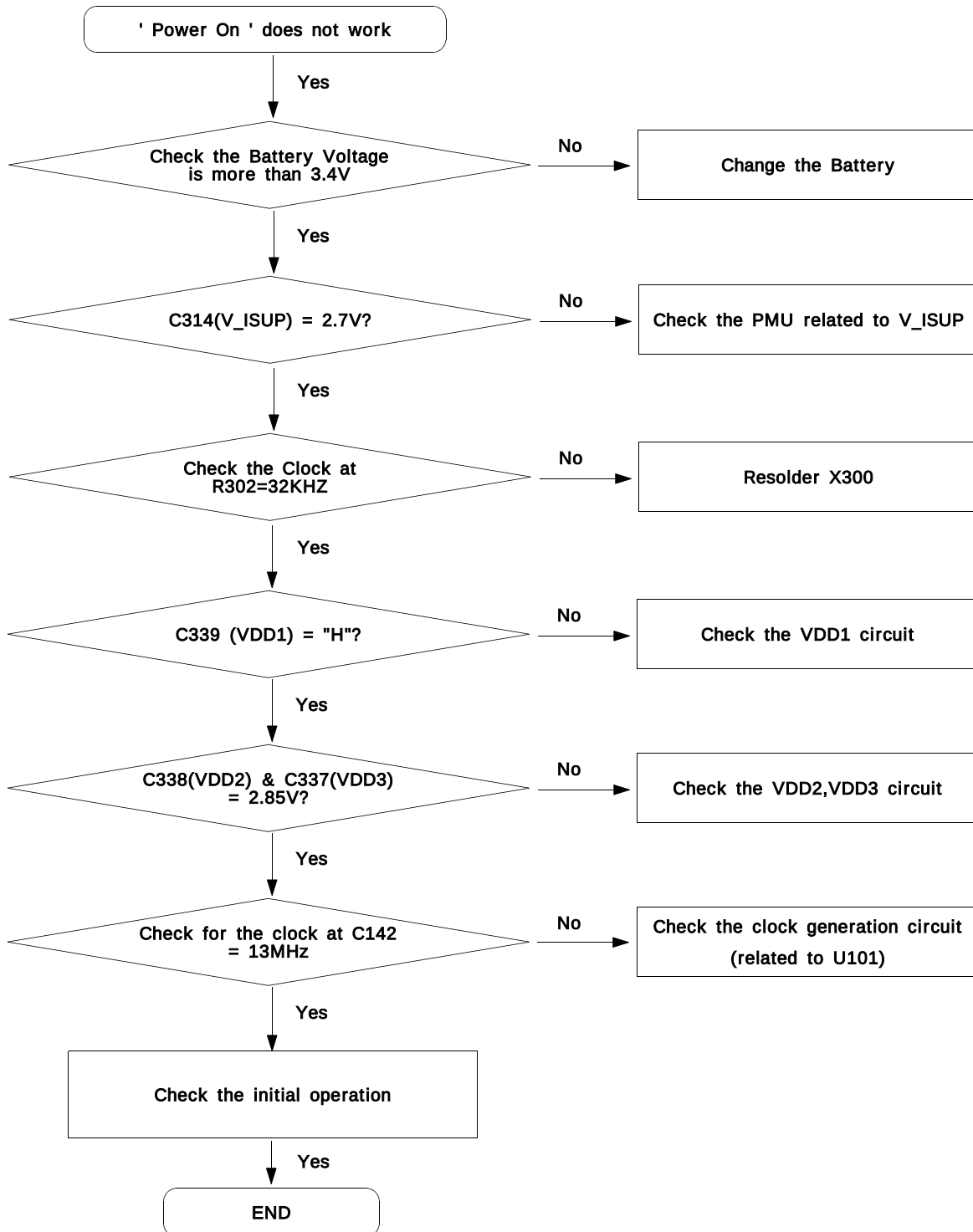


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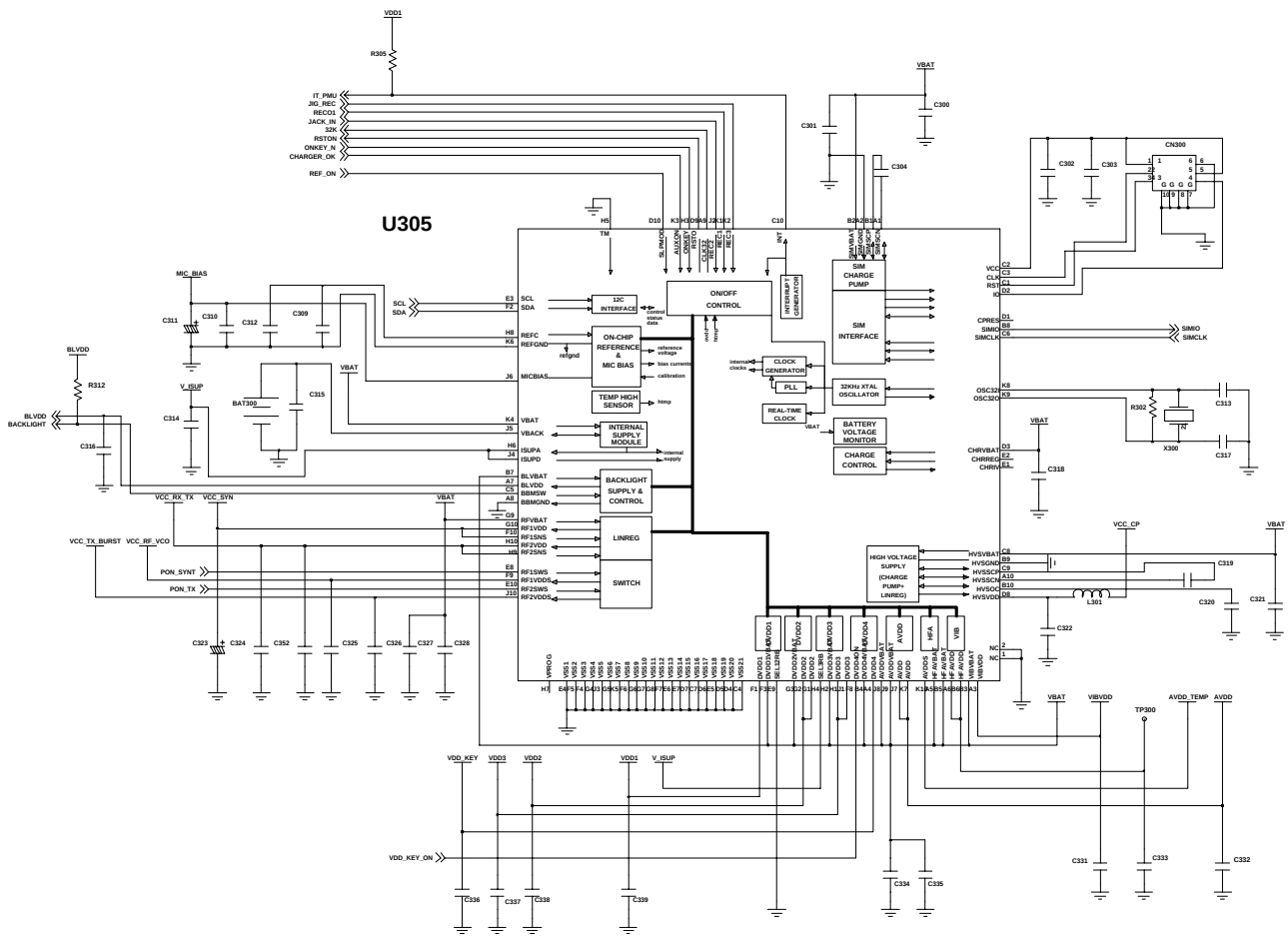
## 7. Flow Chart of Troubleshooting

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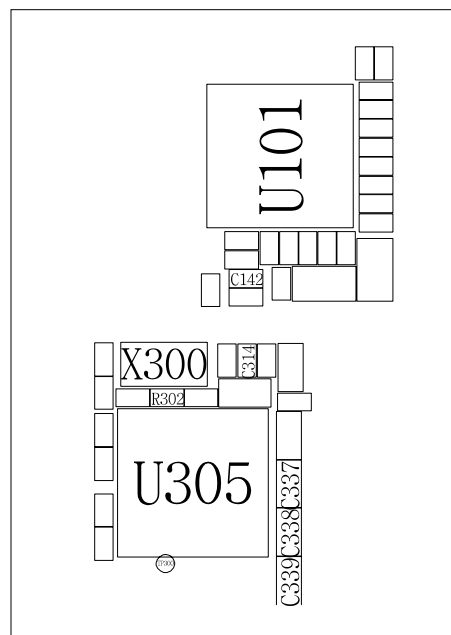
### 7-1. Power On



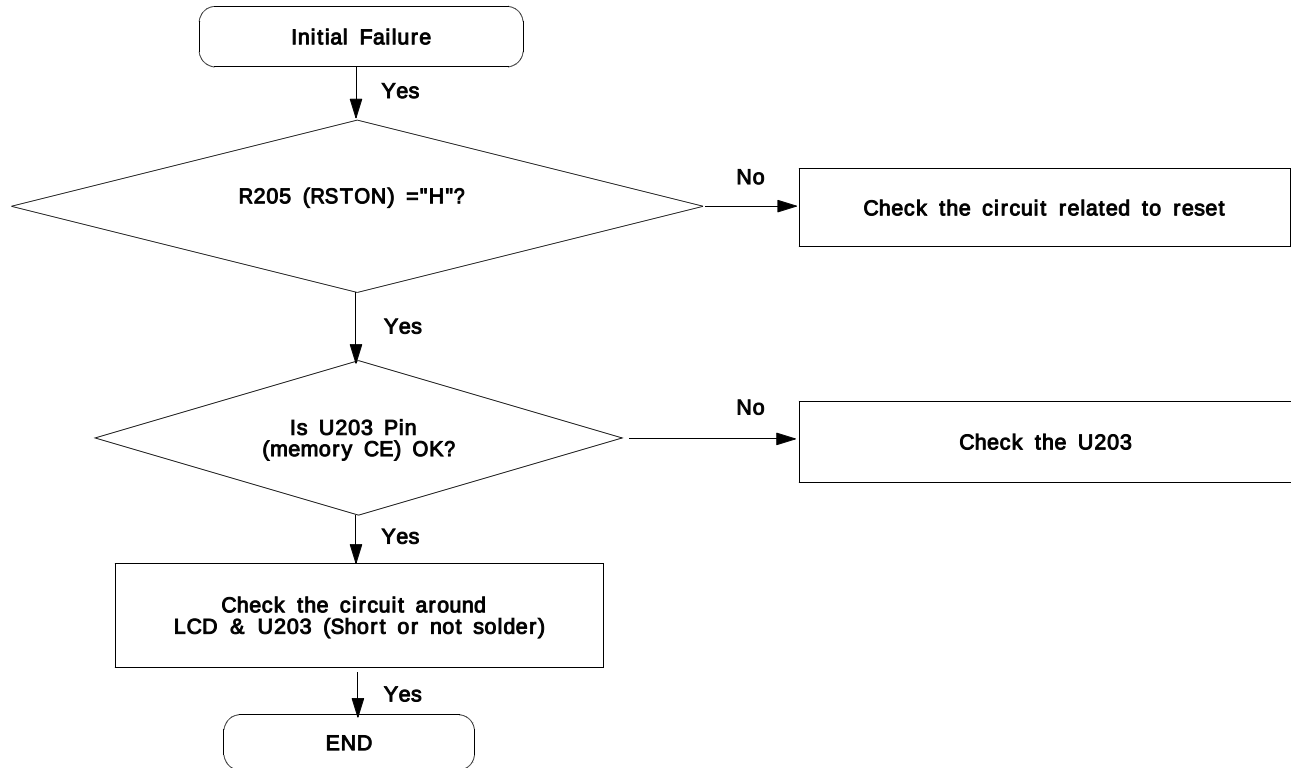
Power On



POWER MANAGEMENT UNIT(PMU IC)

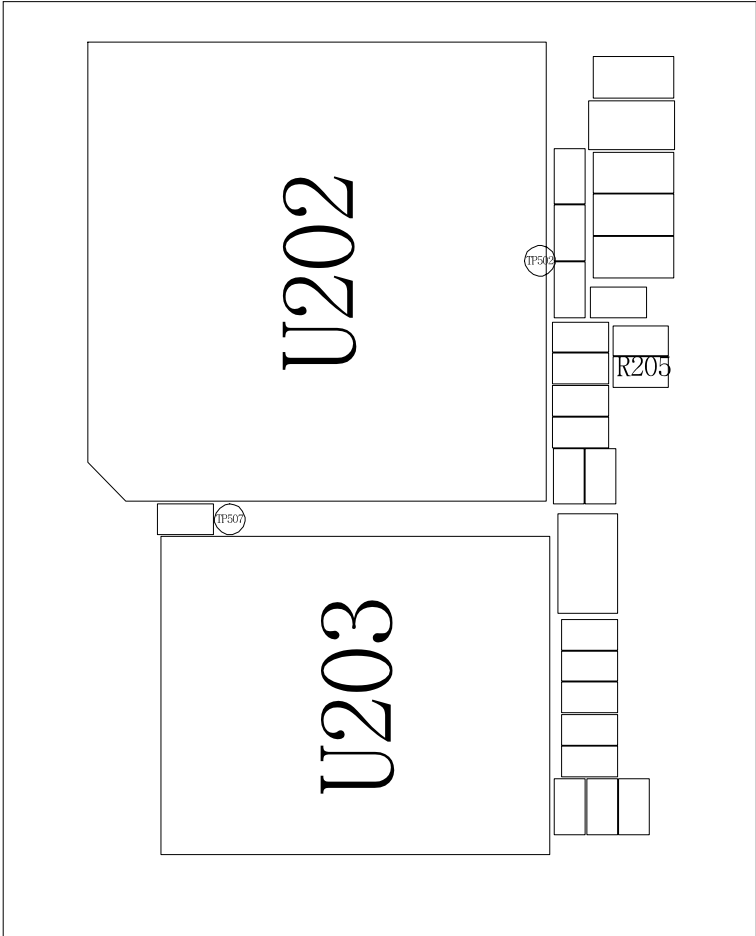


## 7-2. Initial

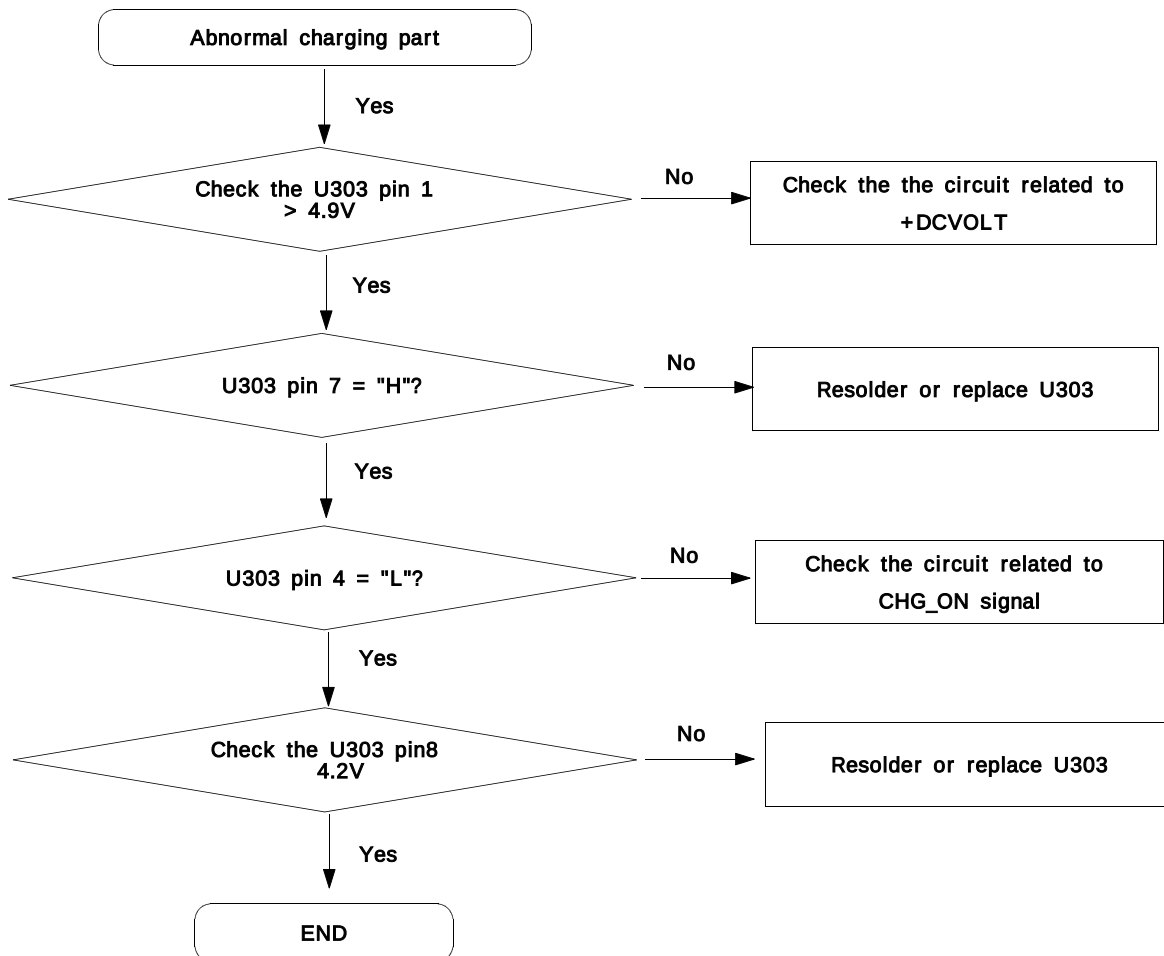


Initial

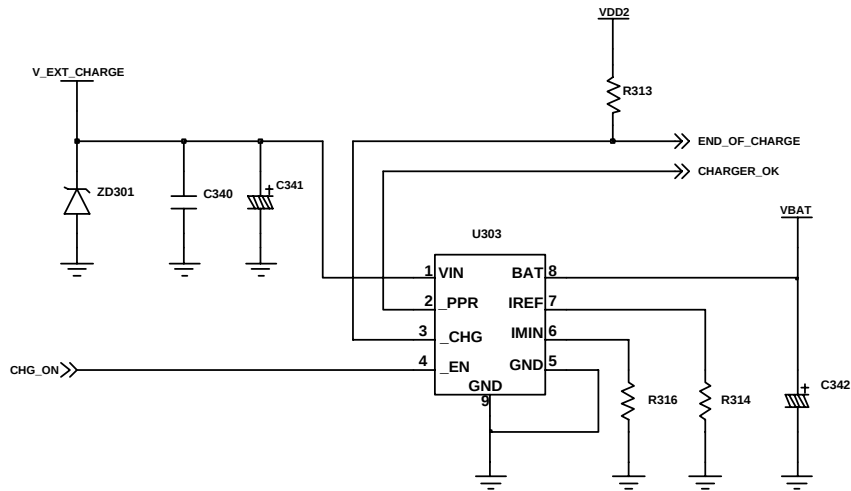




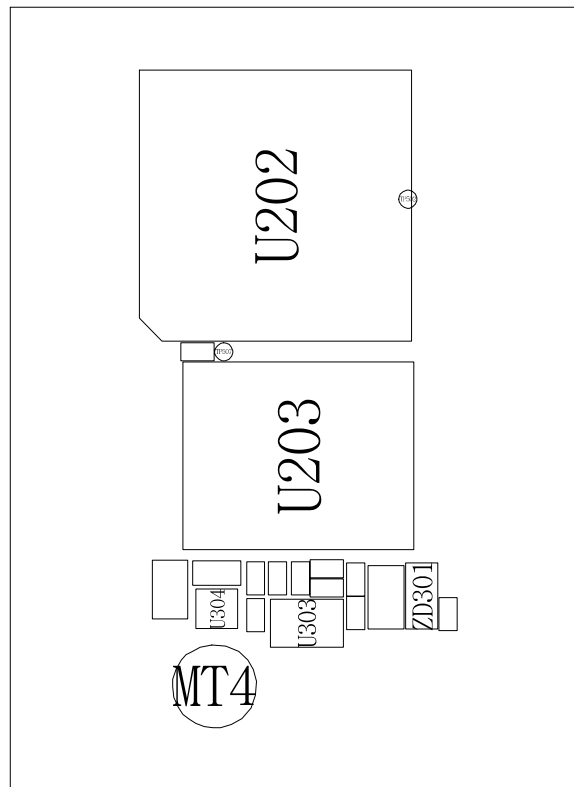
### 7-3. Charging Part



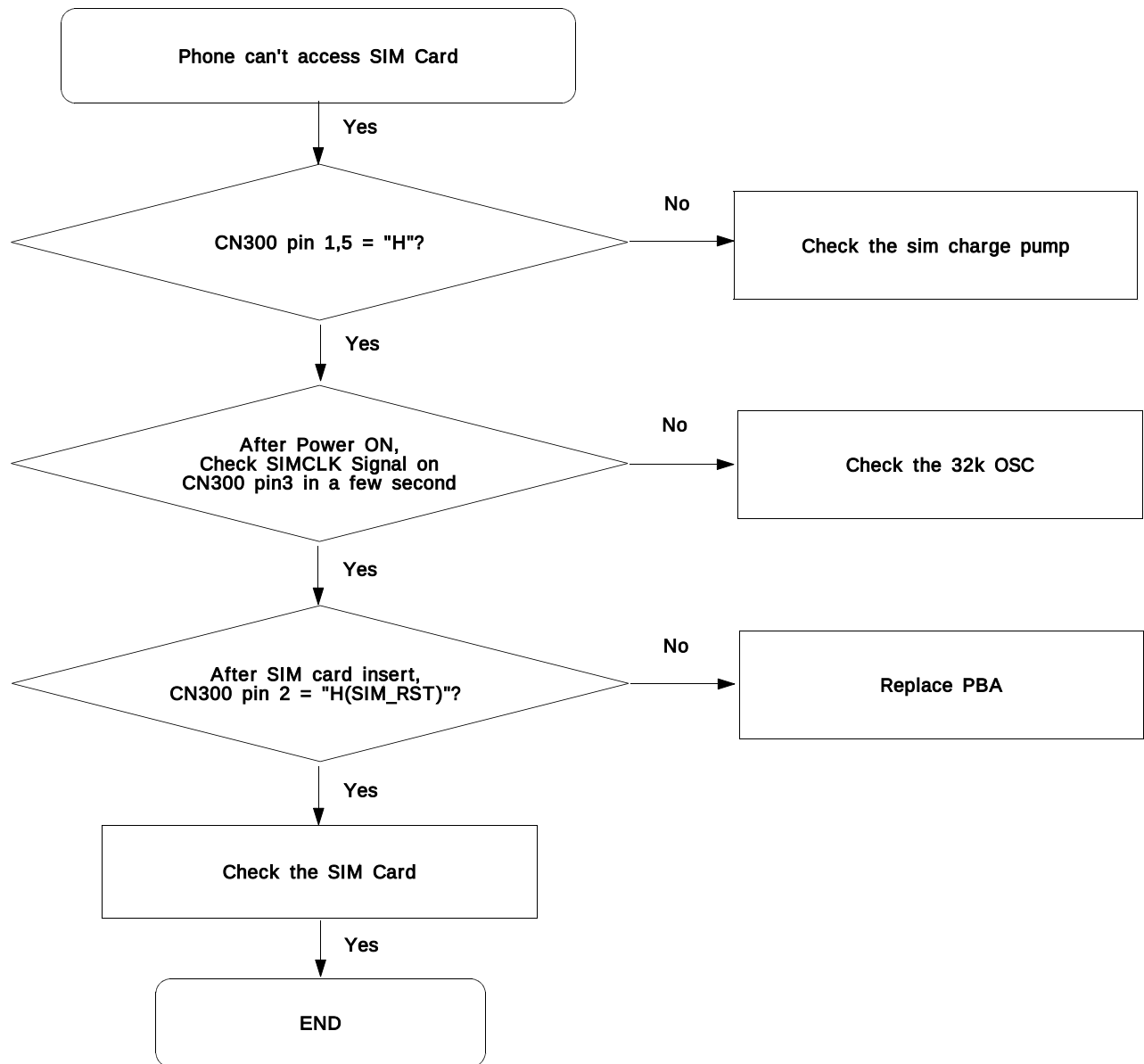
## Charging

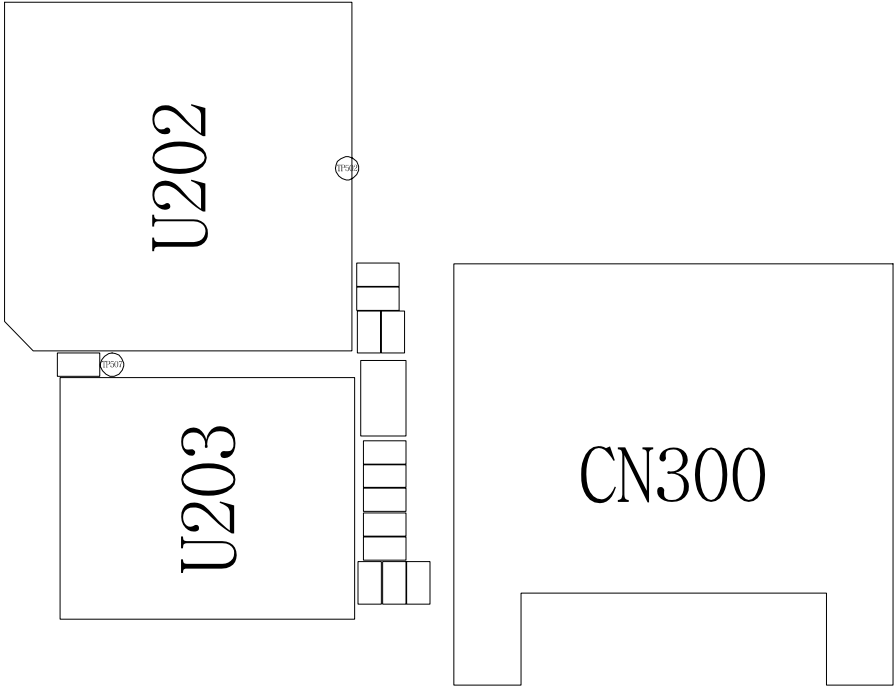


## CHARGER IC

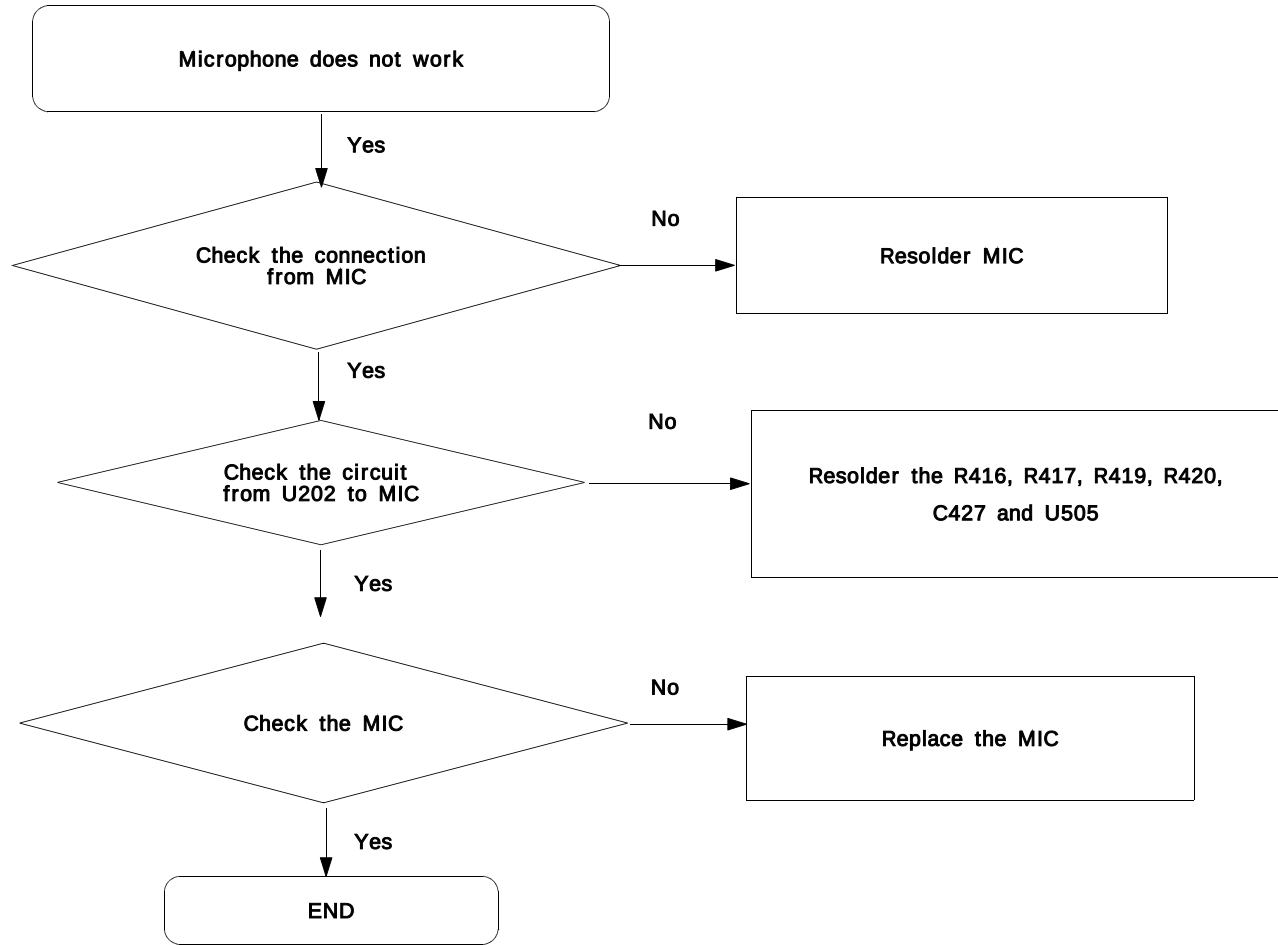


## 7-4. Sim Part

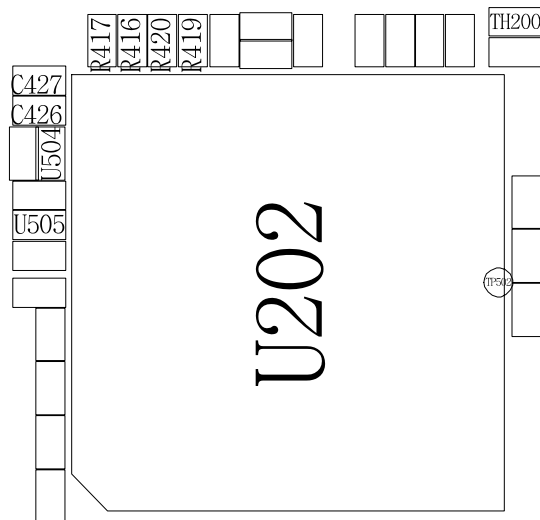
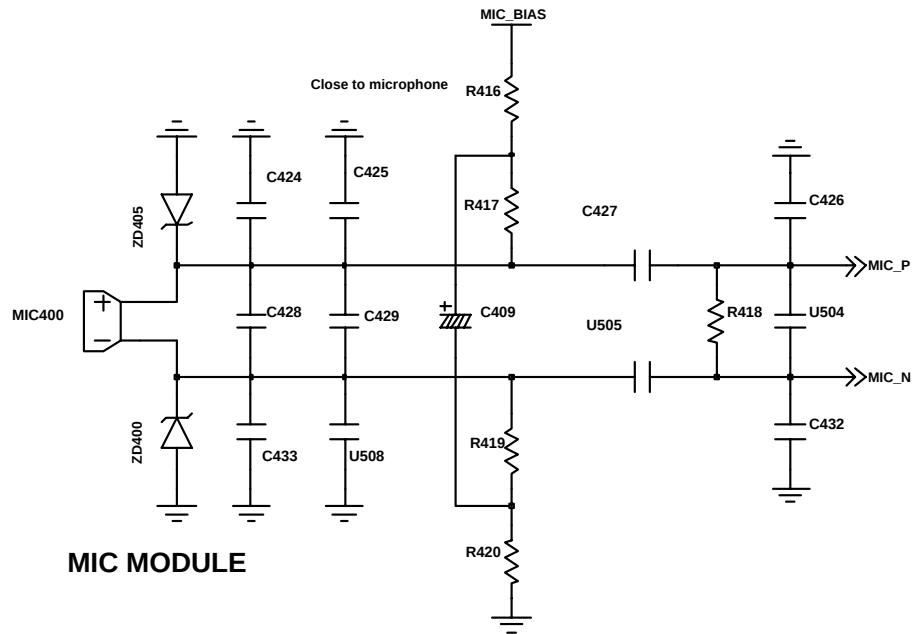




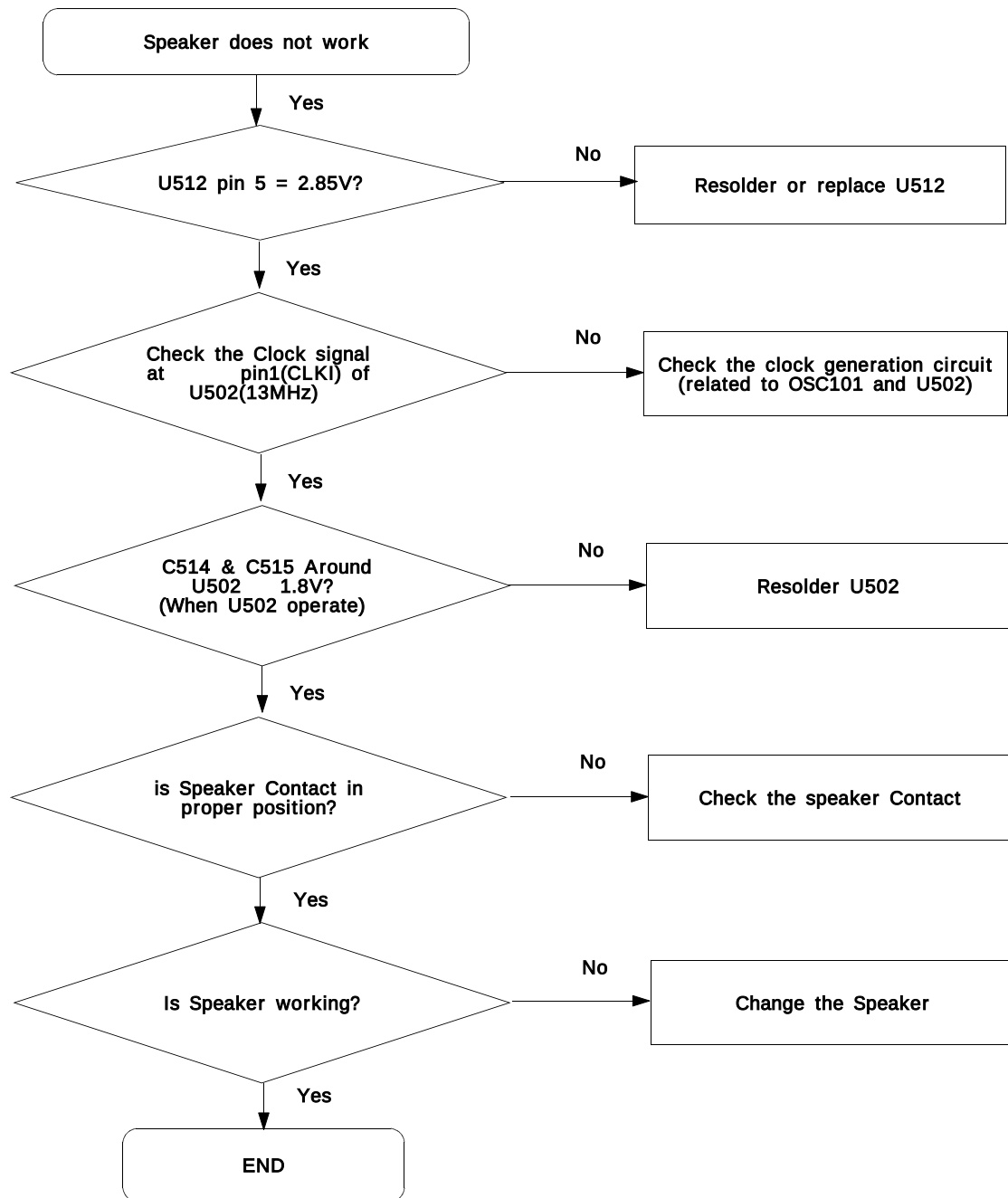
## 7-5. Microphone Part



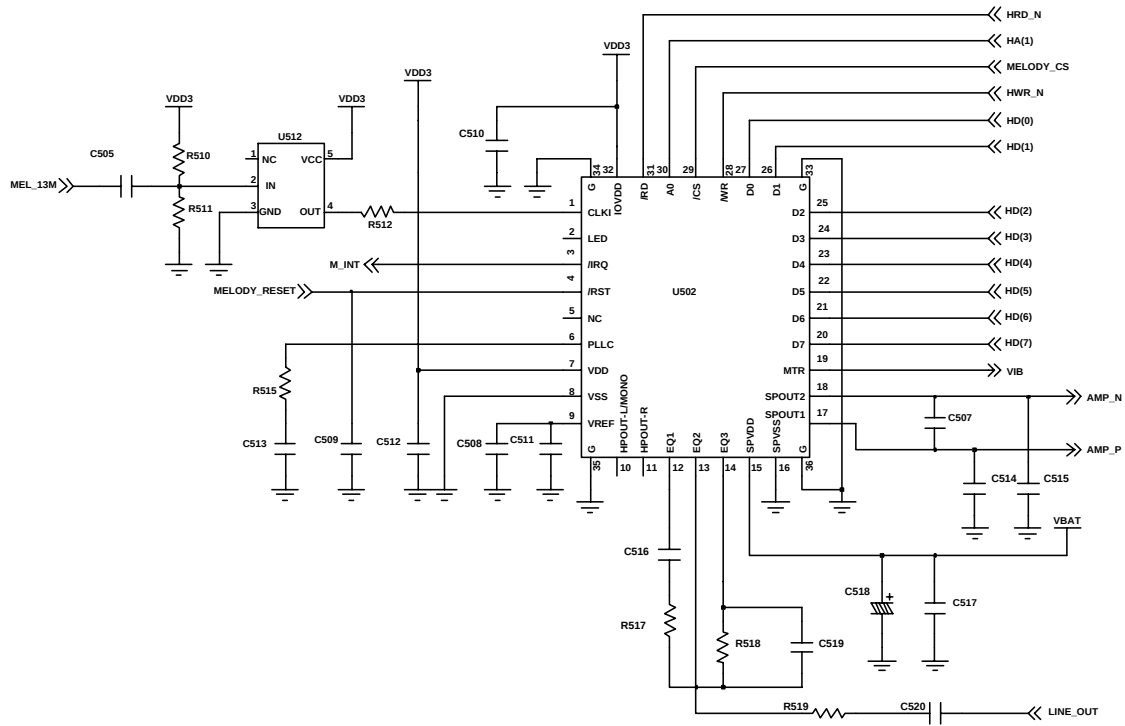
## Microphone



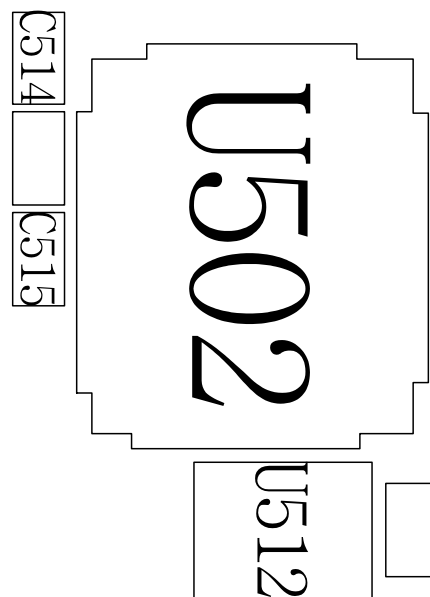
## 7-6. Speaker Part(Melody)



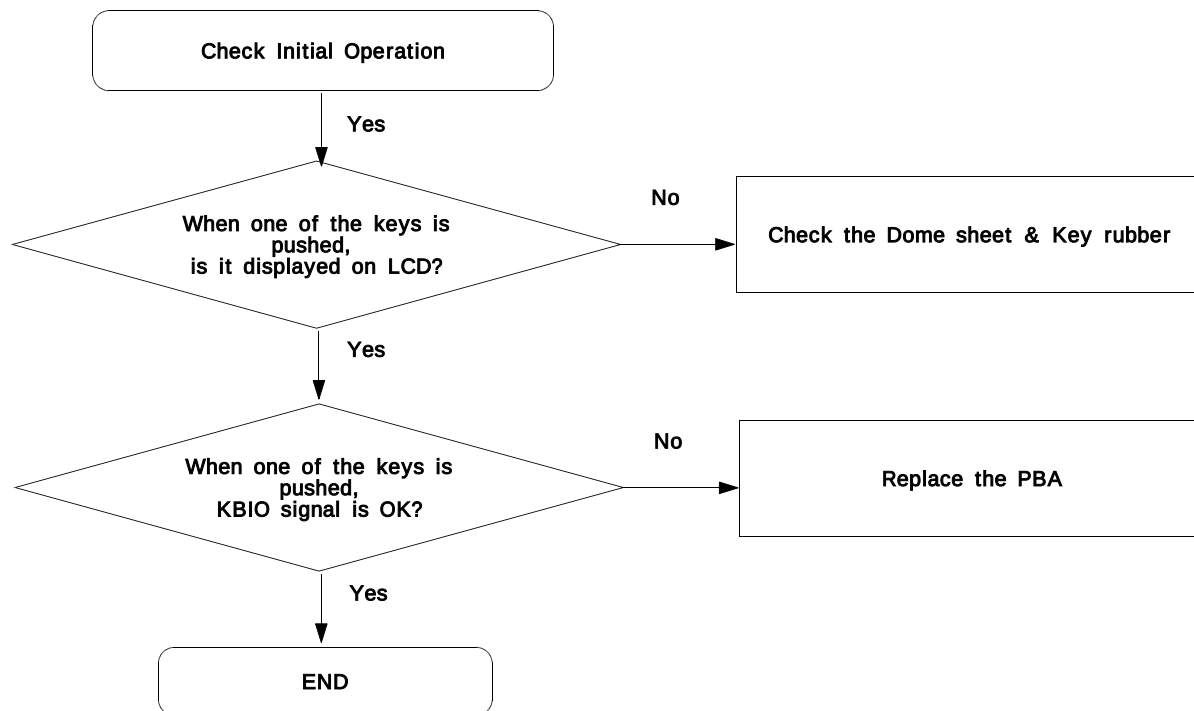
## Speaker



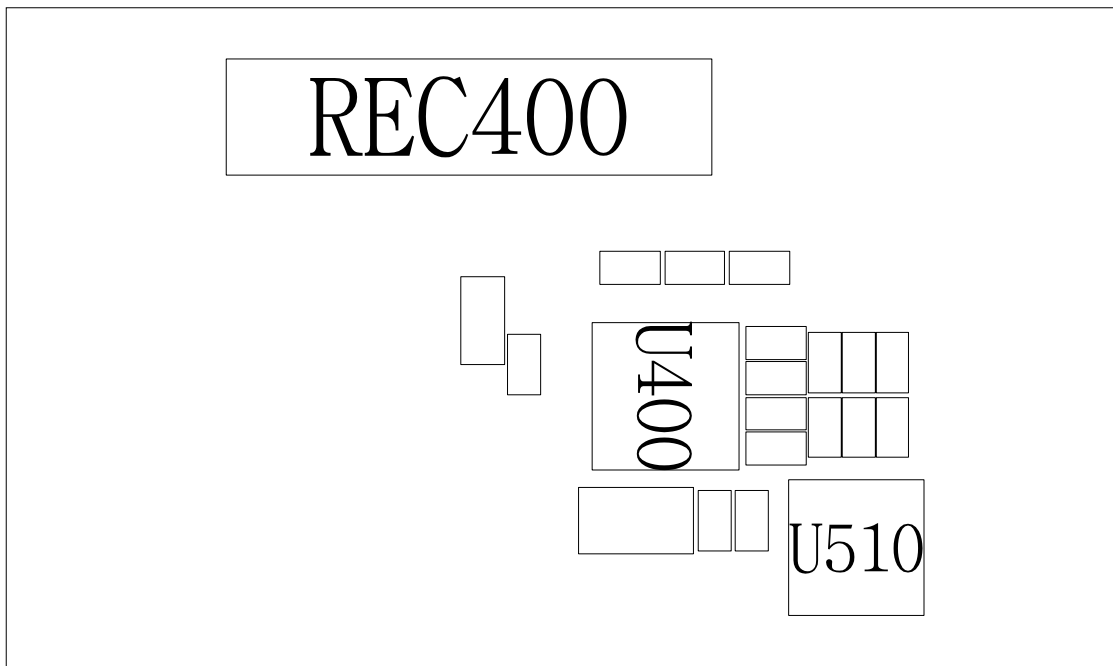
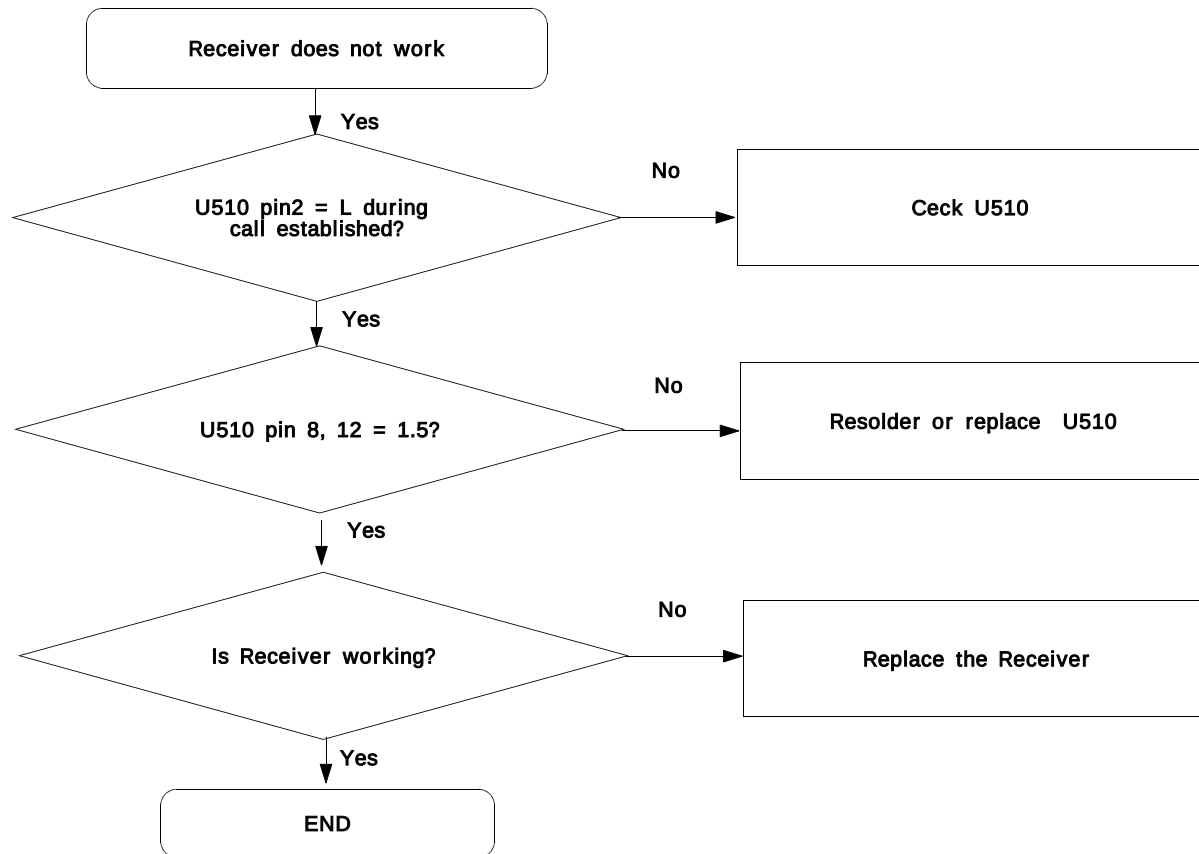
MELODY IC



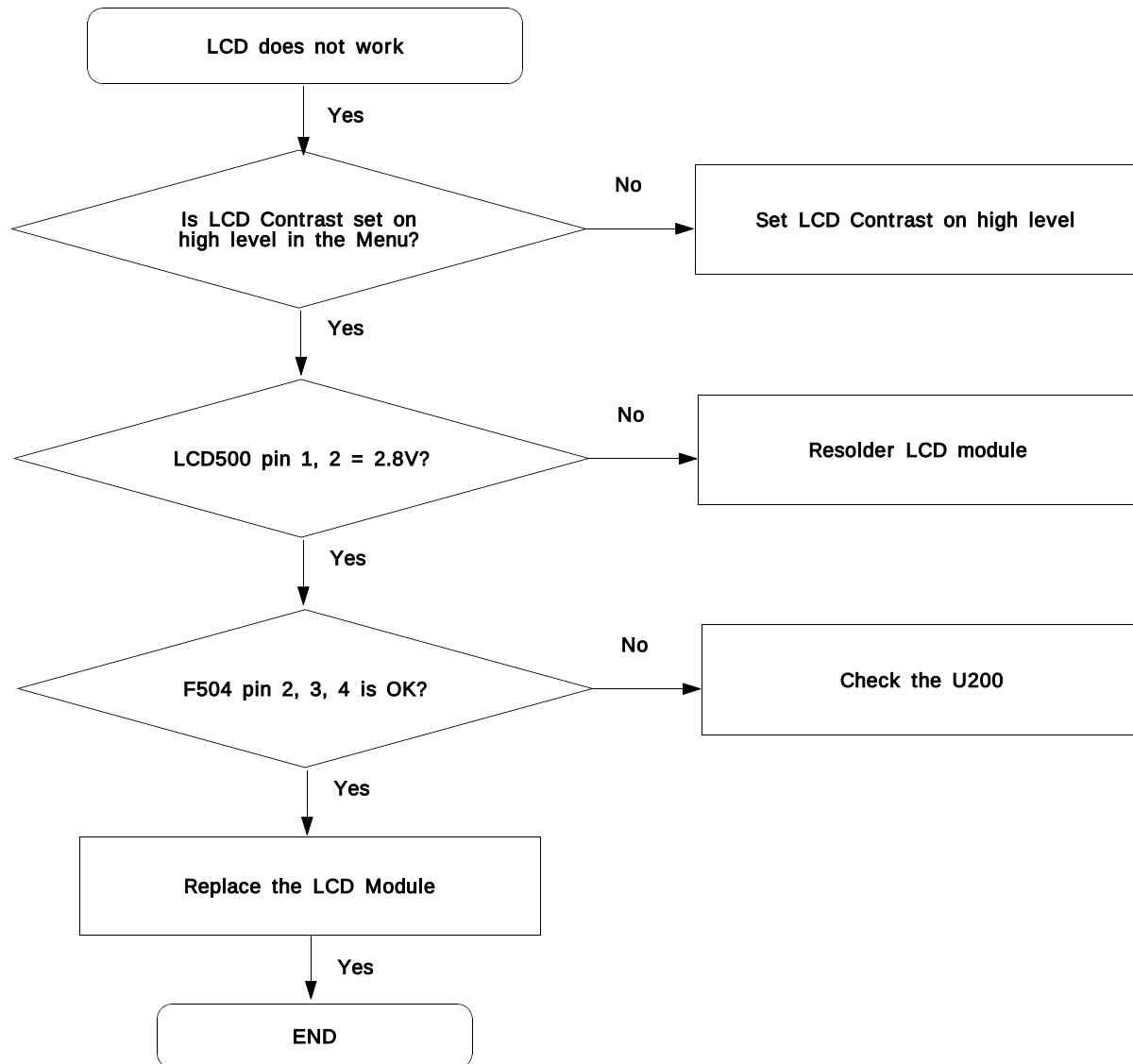
## 7-7. Key Data Input

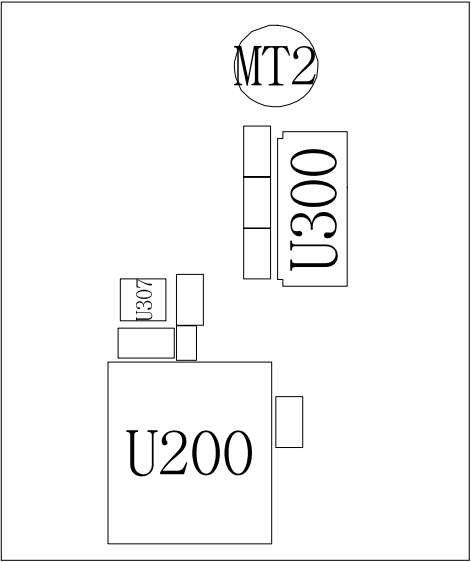


## 7-8. Receiver Part

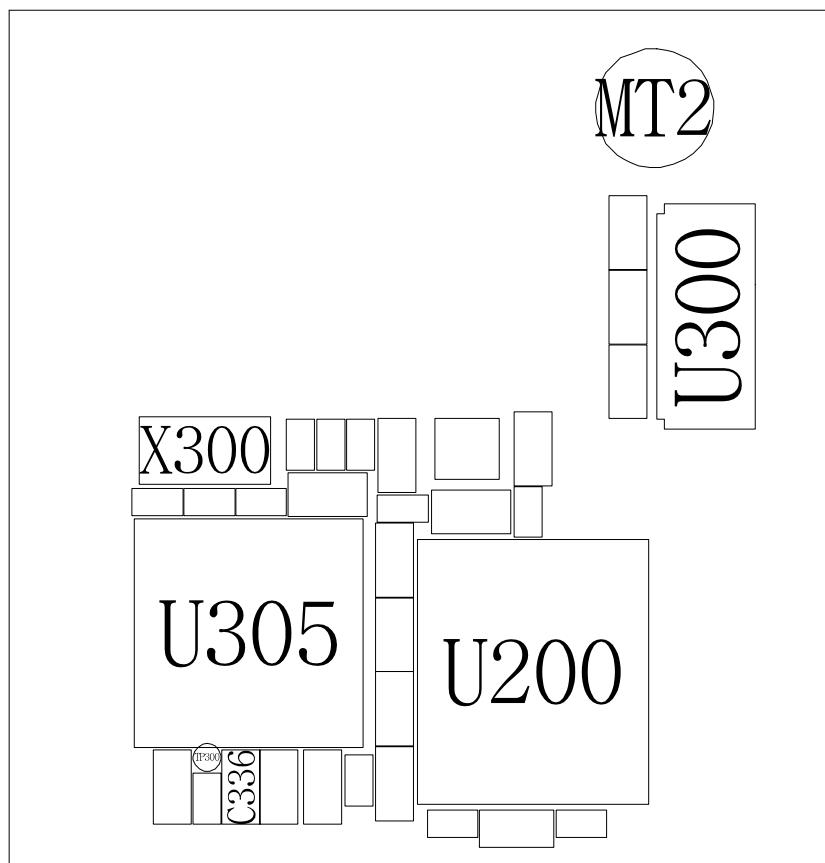
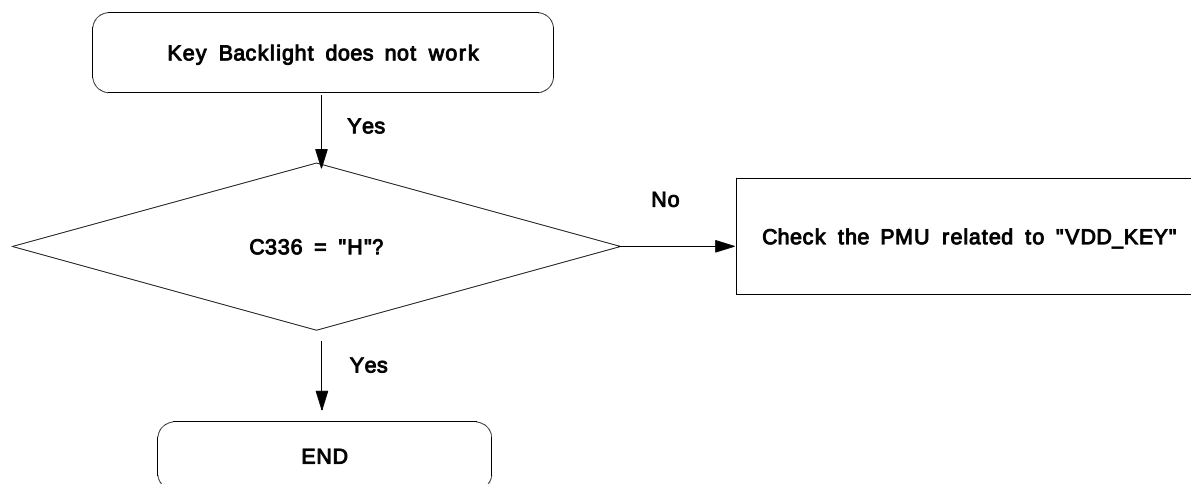


## 7-9. LCD Part (for Color Main )

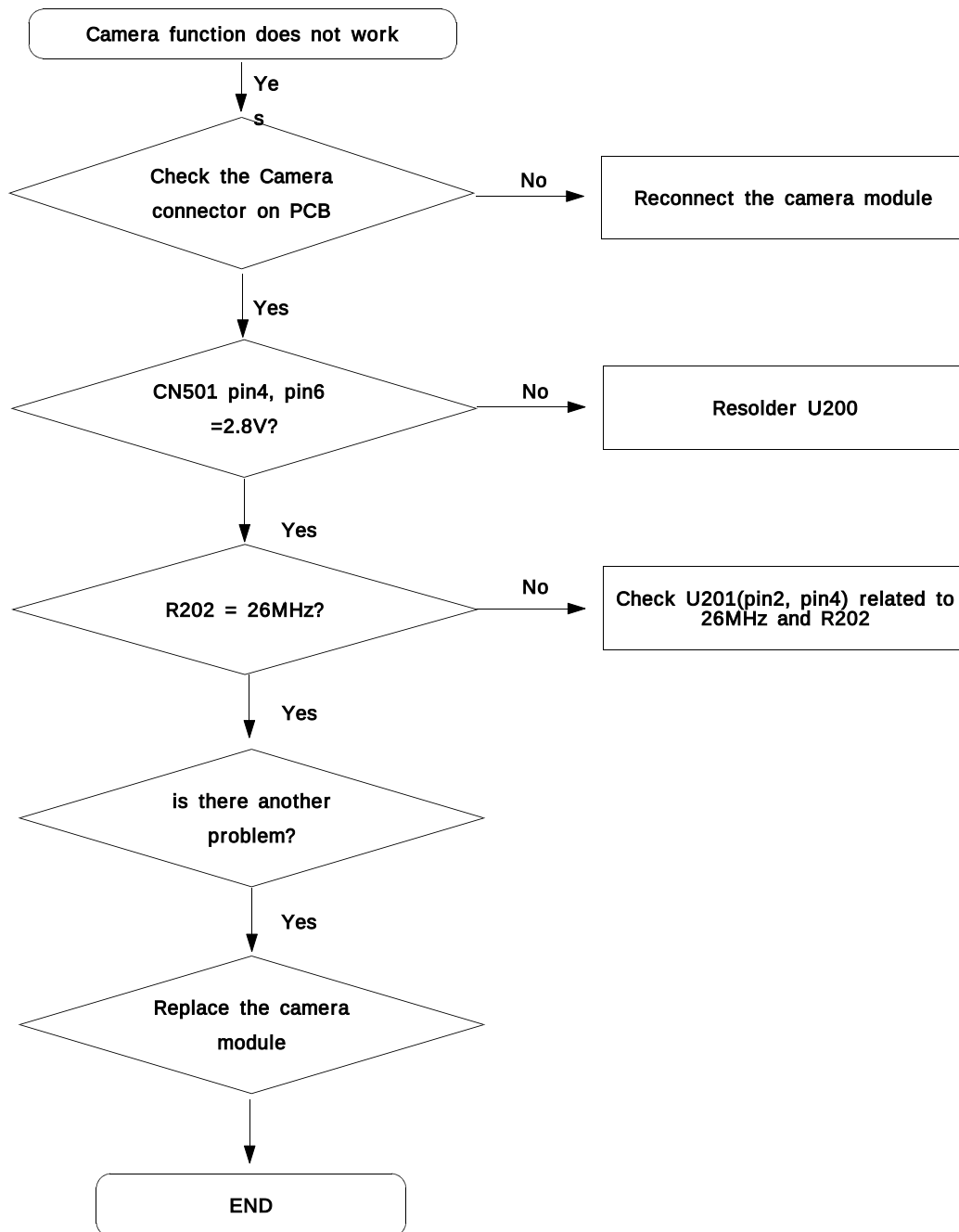


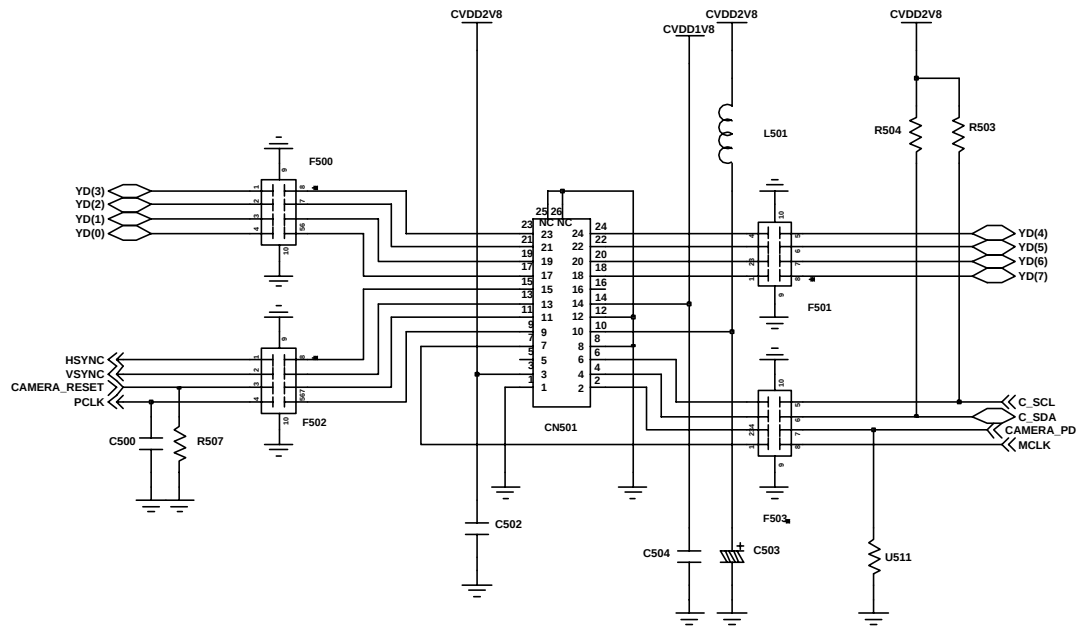


## 7-10. Key Back Light

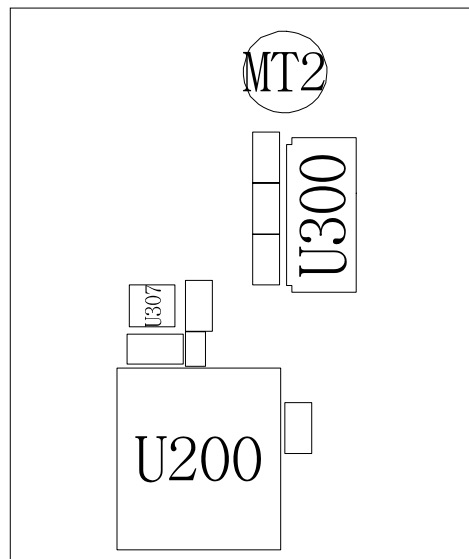
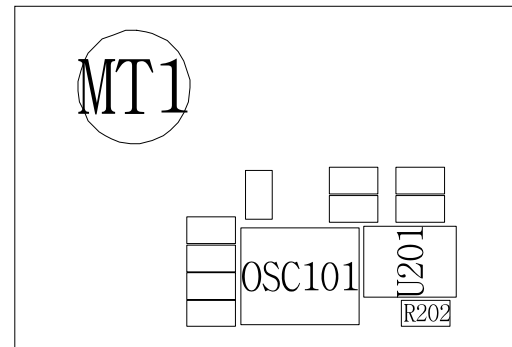
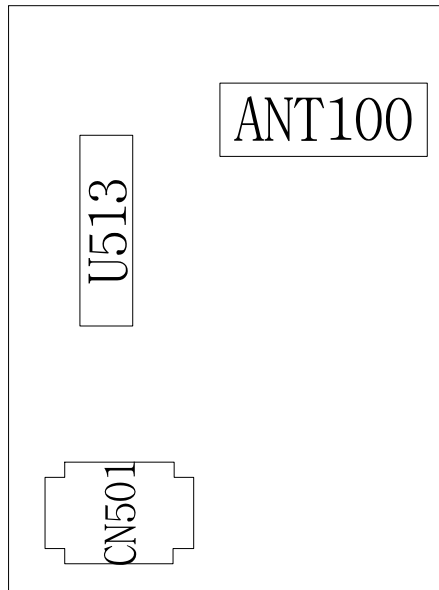


## 7-11. Camera part

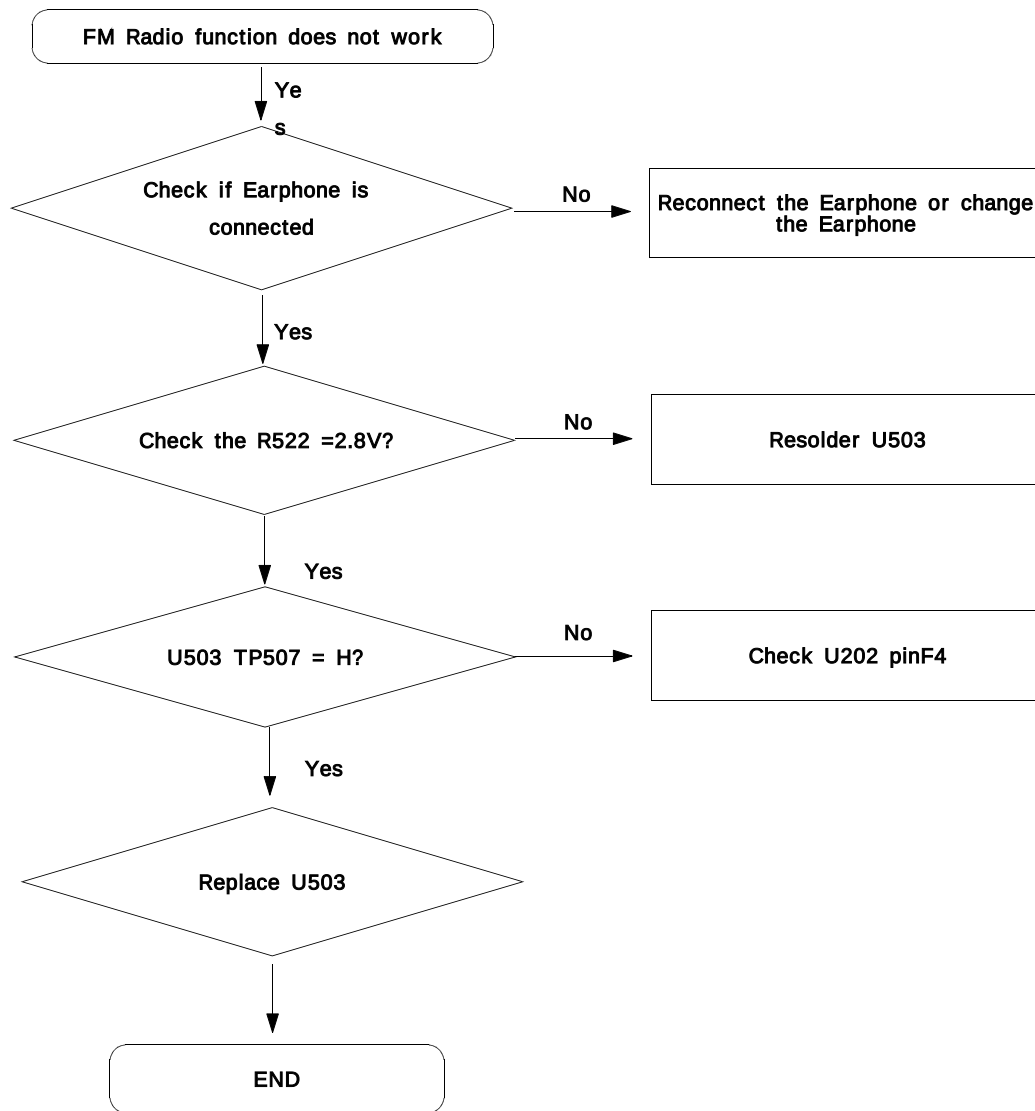


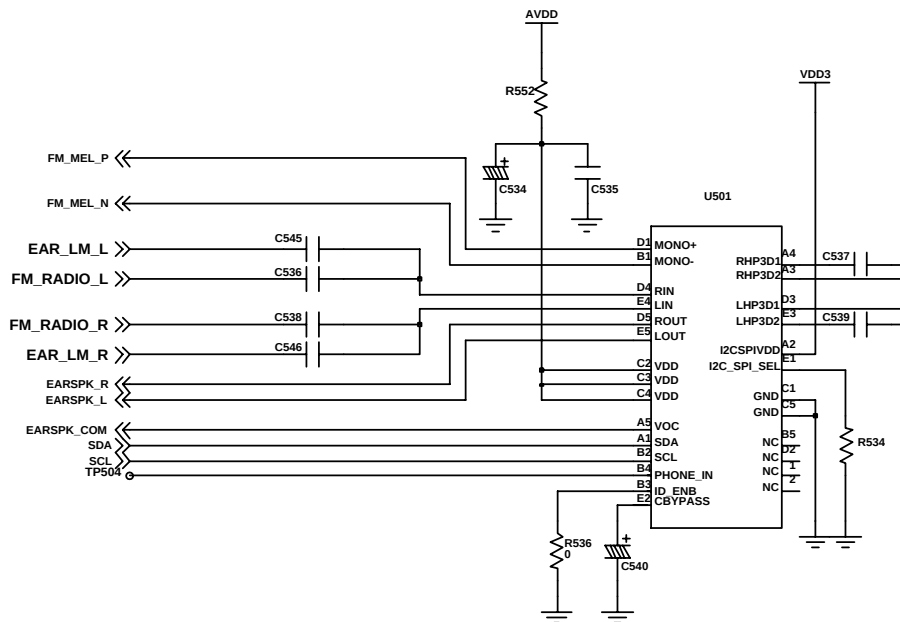
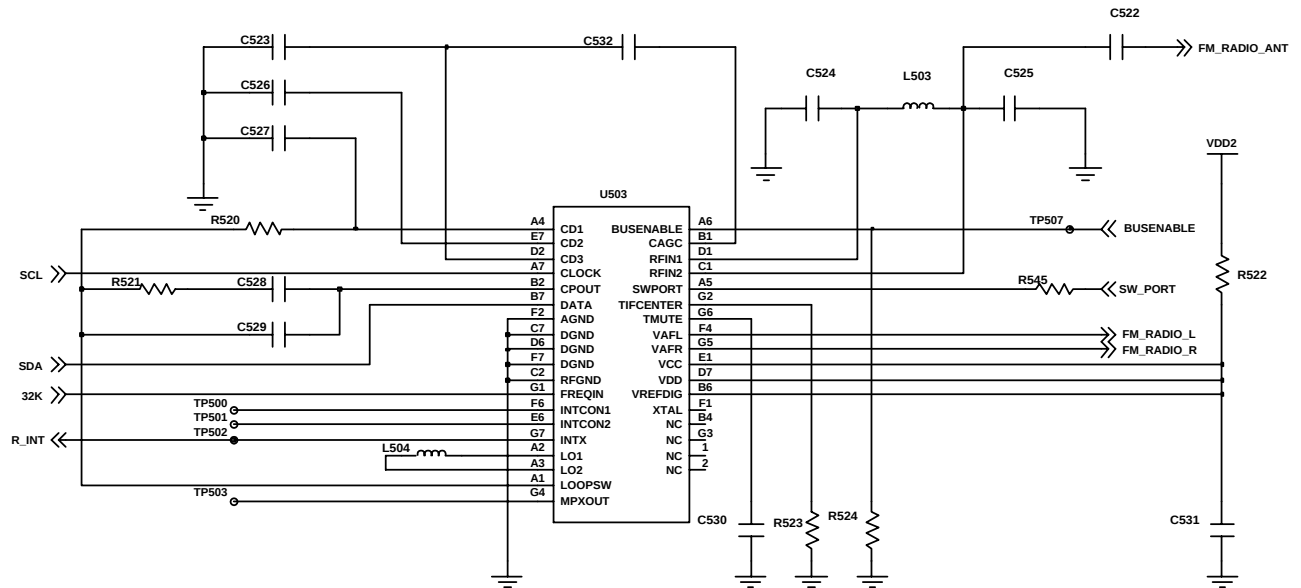


### SEMCO CAMERA(AU60E)

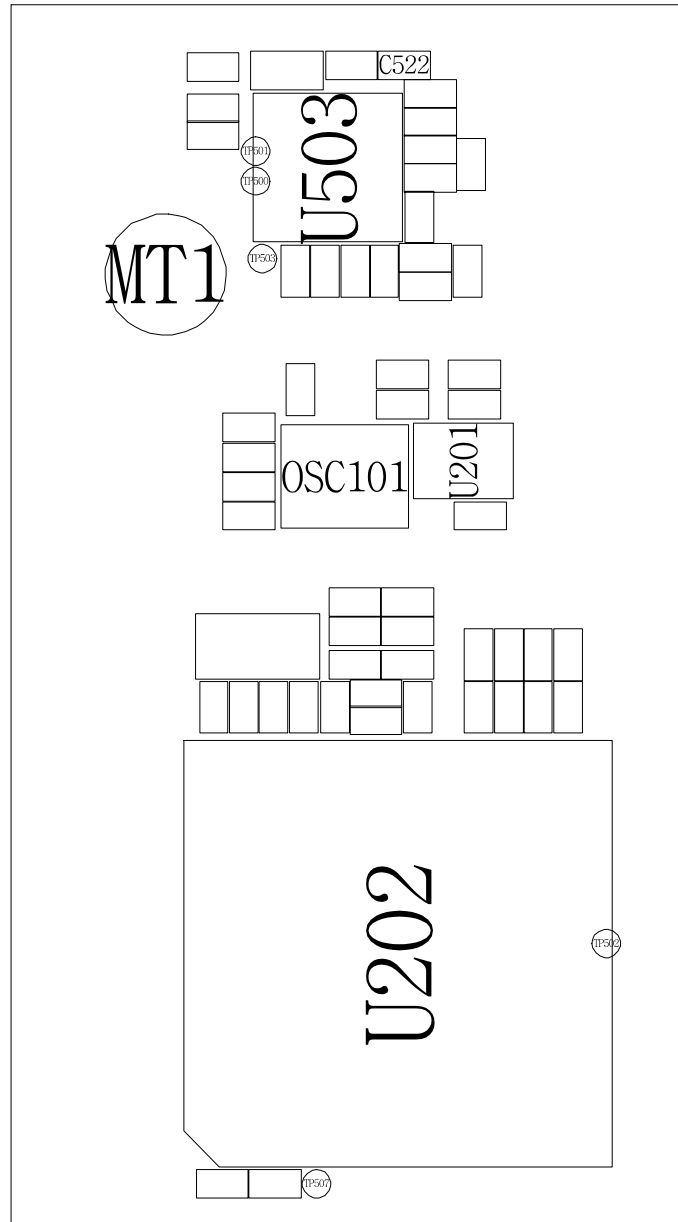


## 7-12. FM Radio part

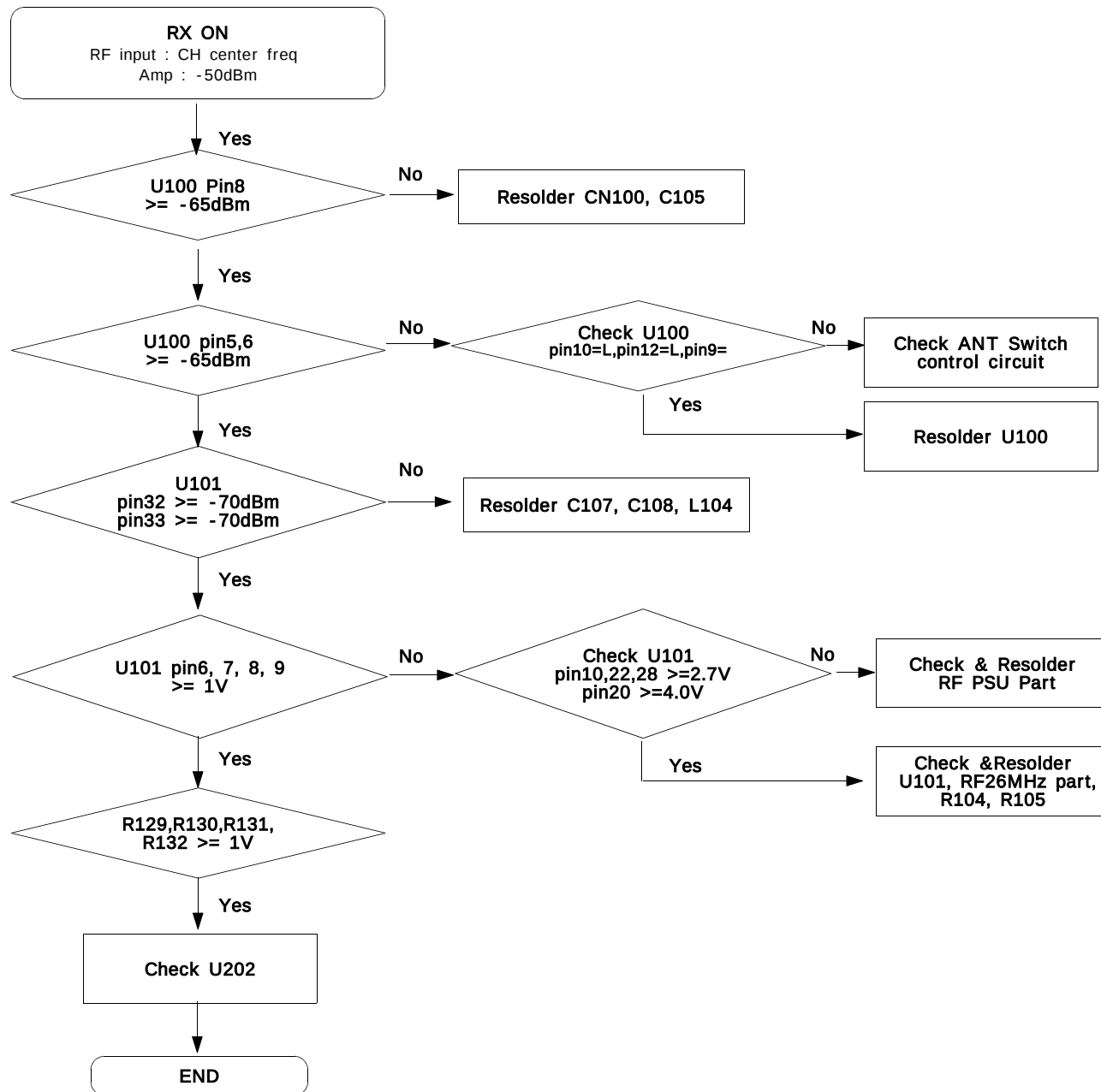


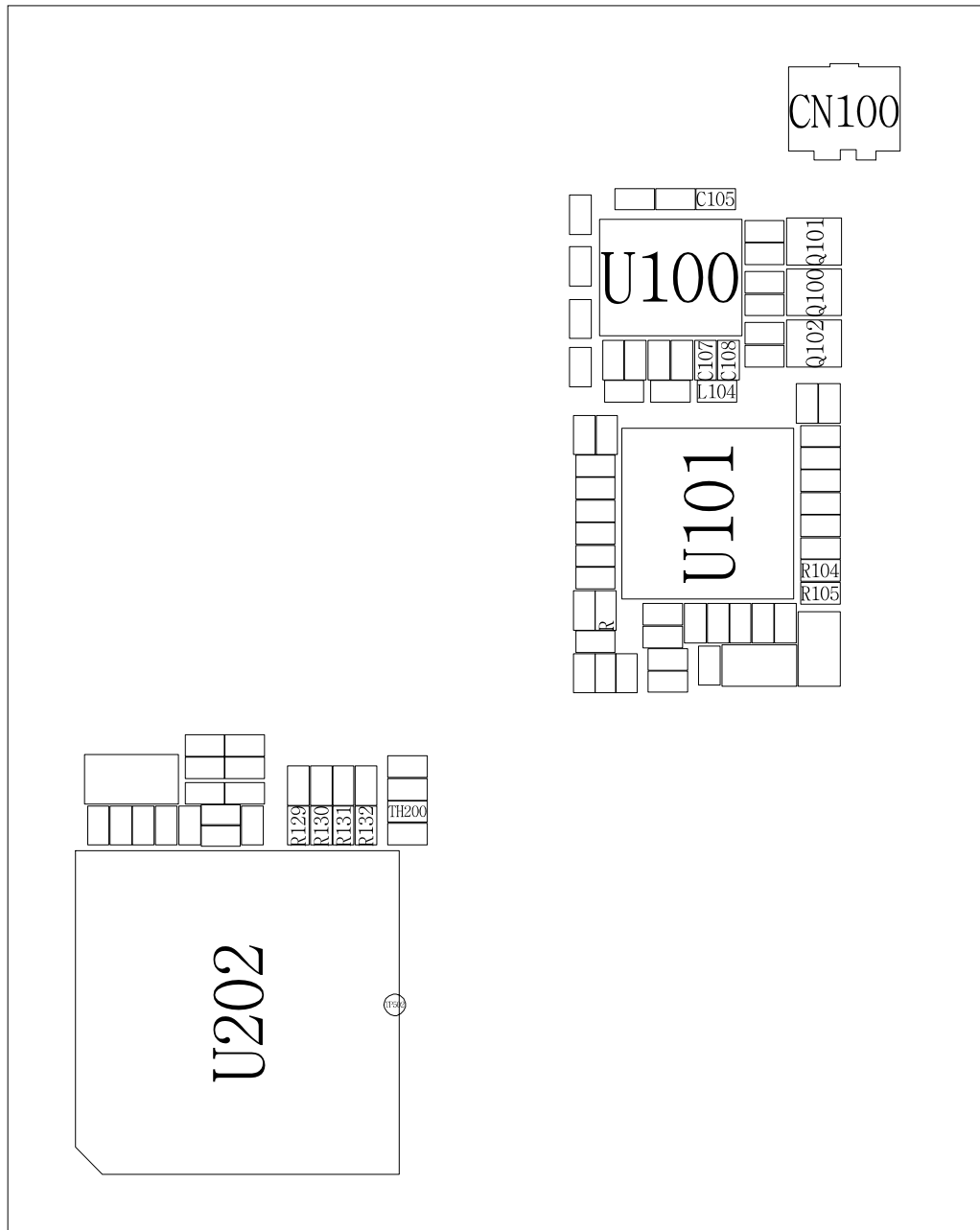


## FM RADIO

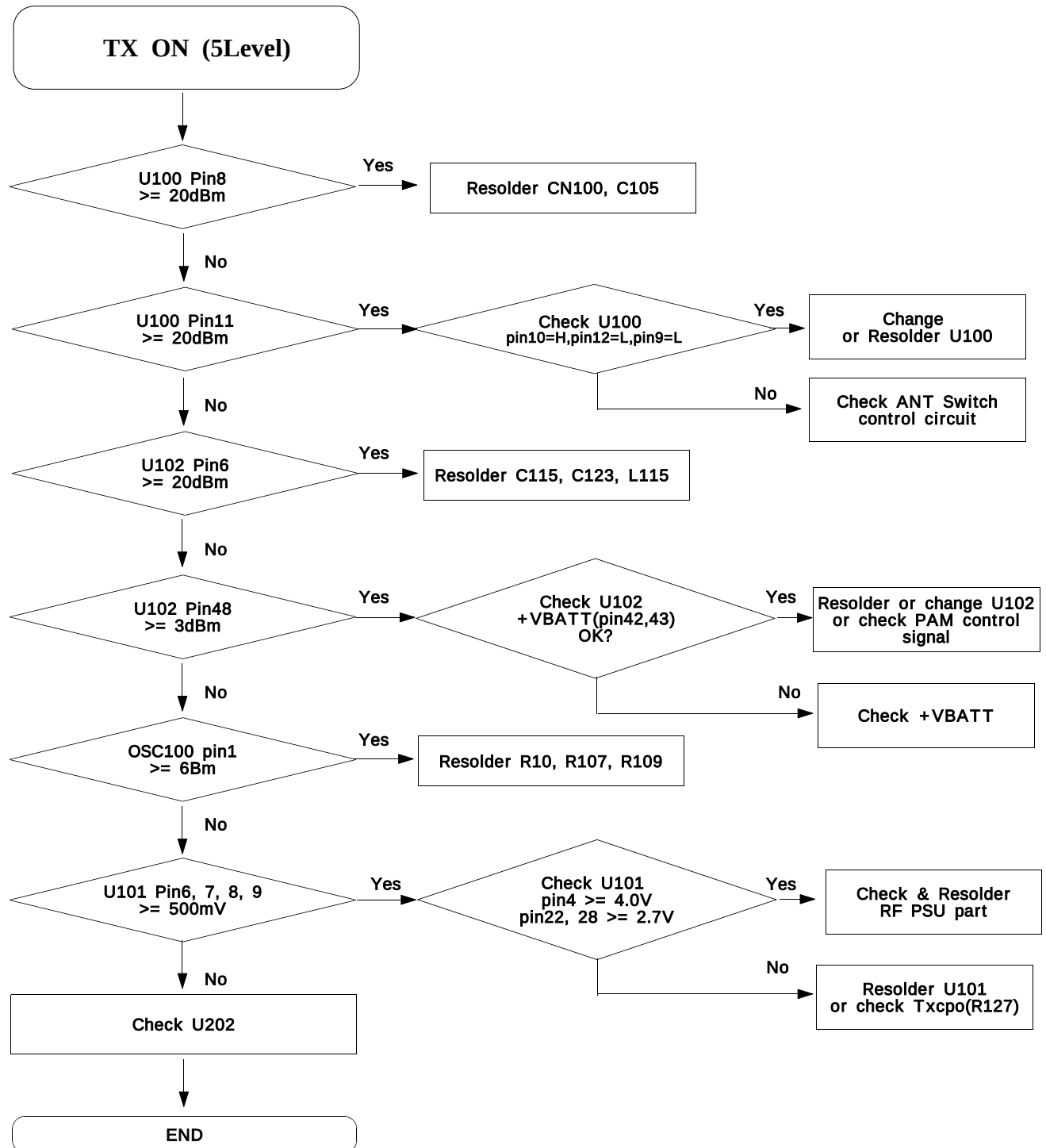


## 7-13. GSM Receiver

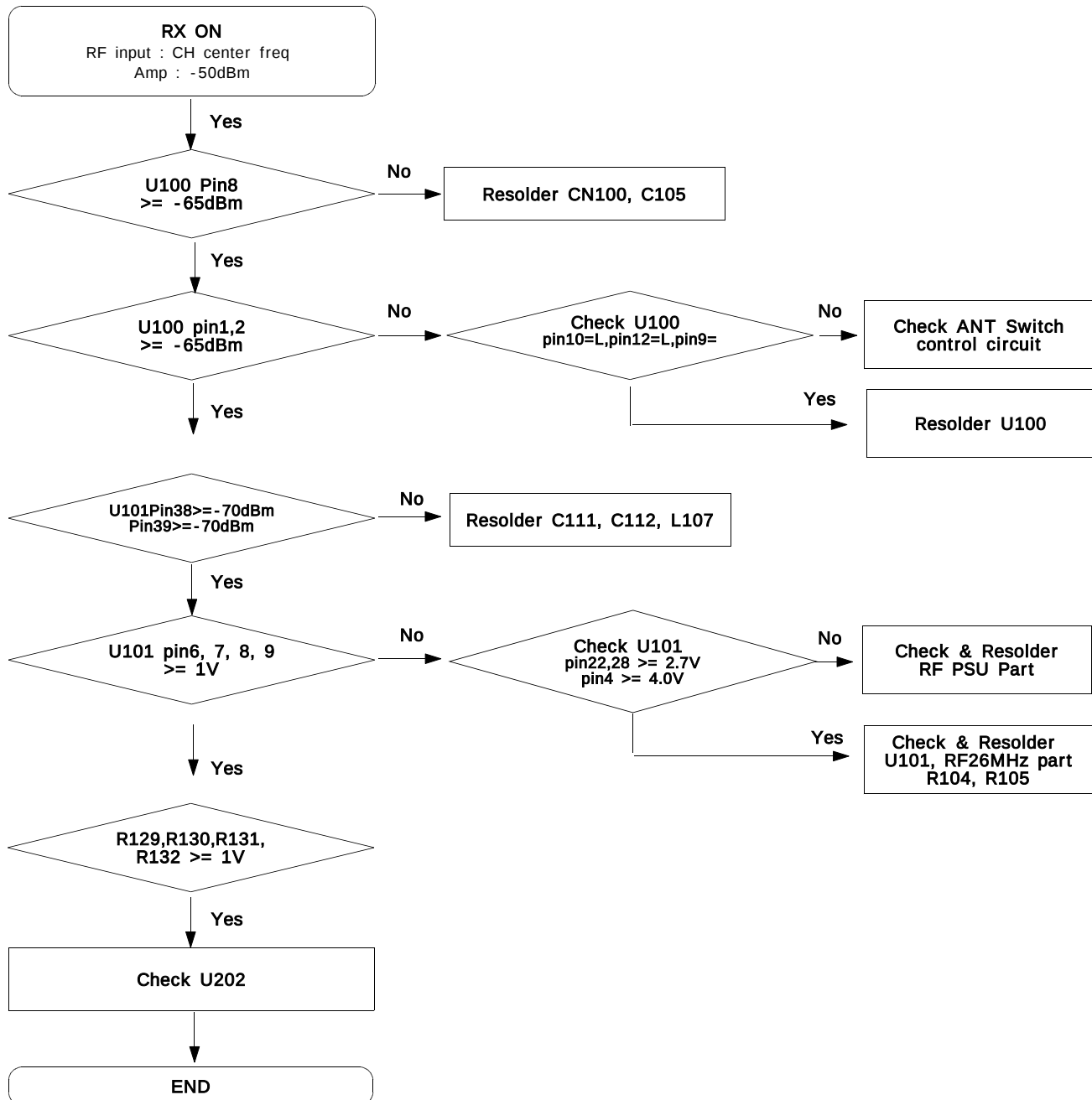


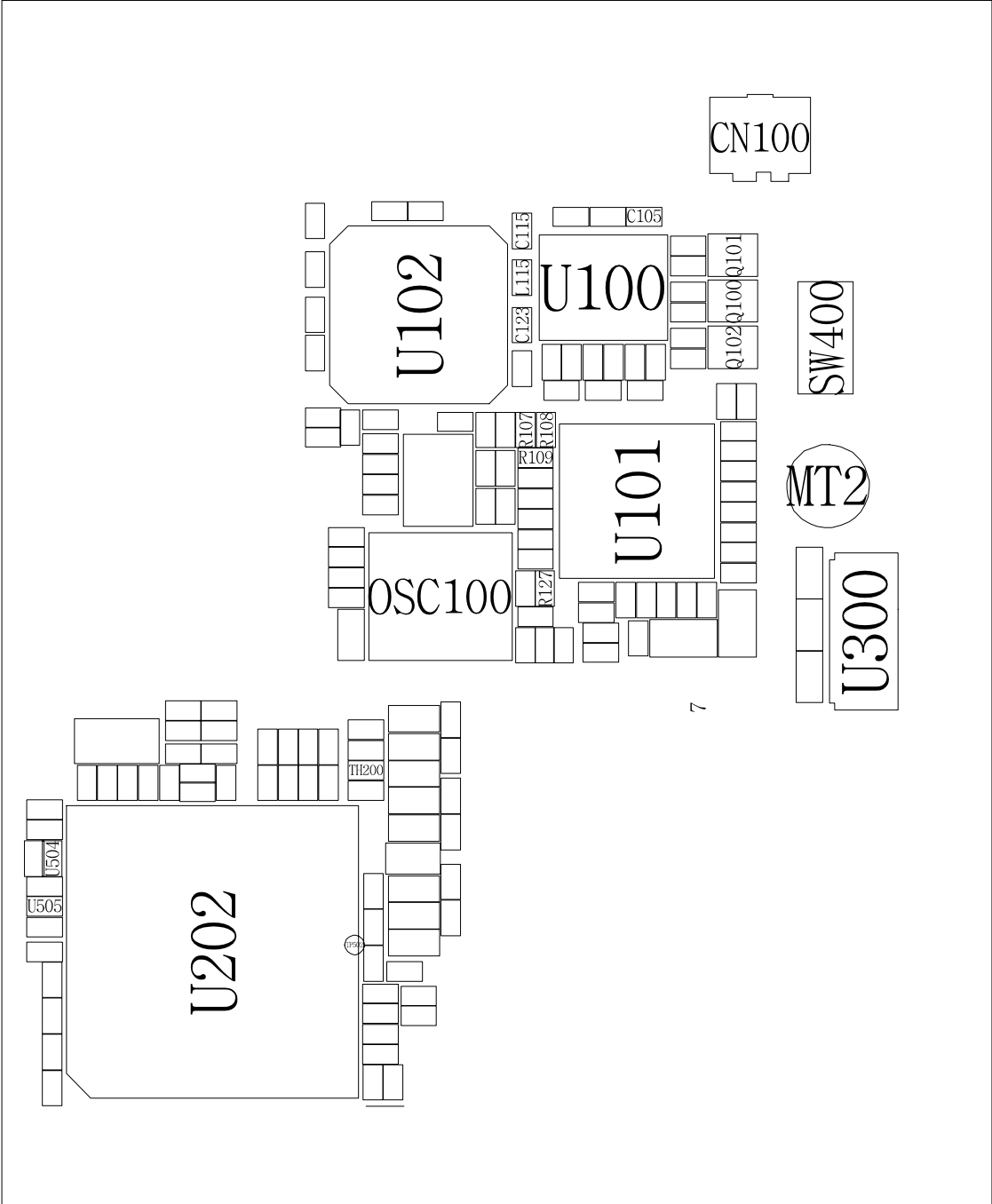


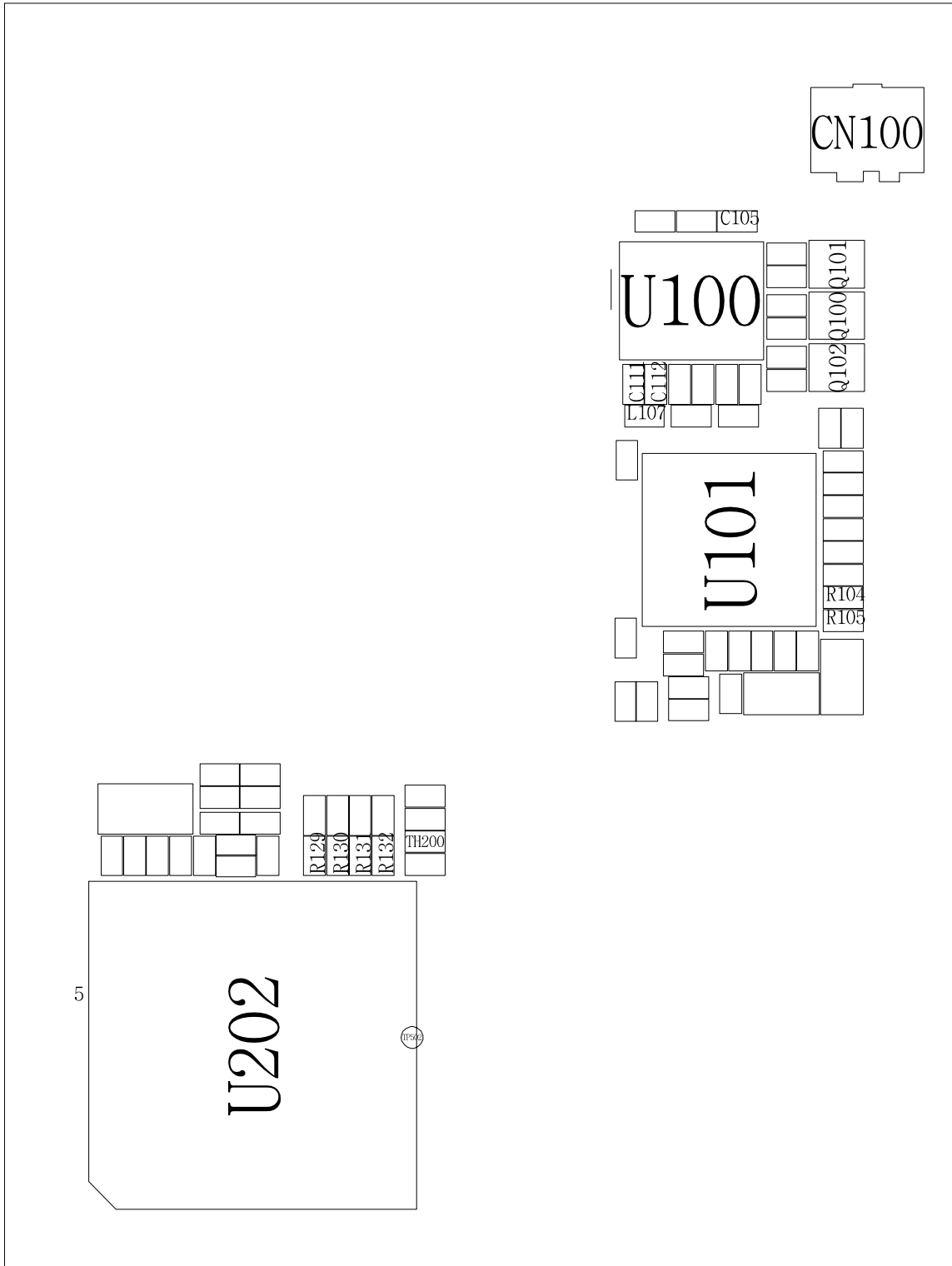
## 7-14. GSM Transmitter



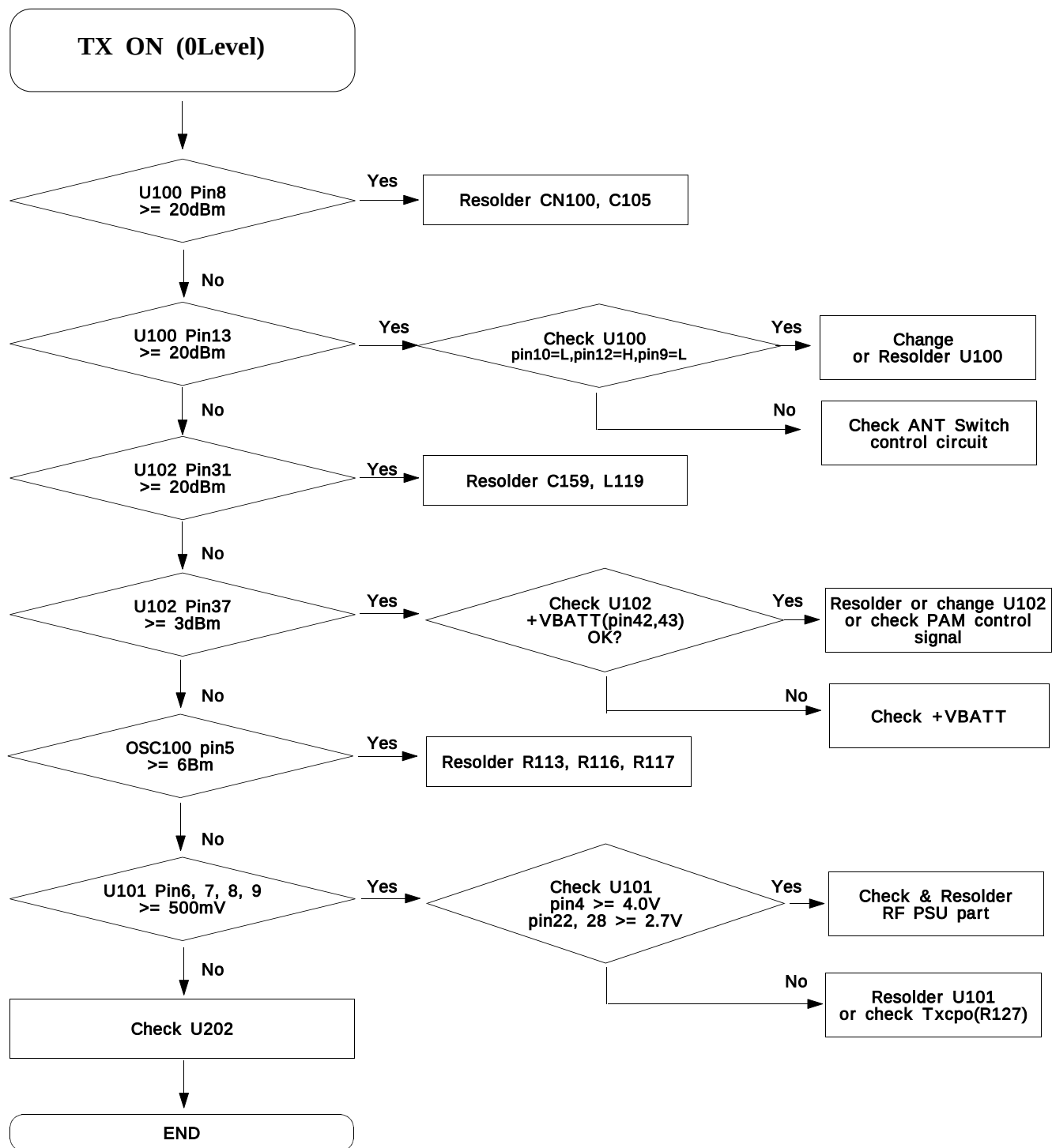
## 7-15. DCS Receiver

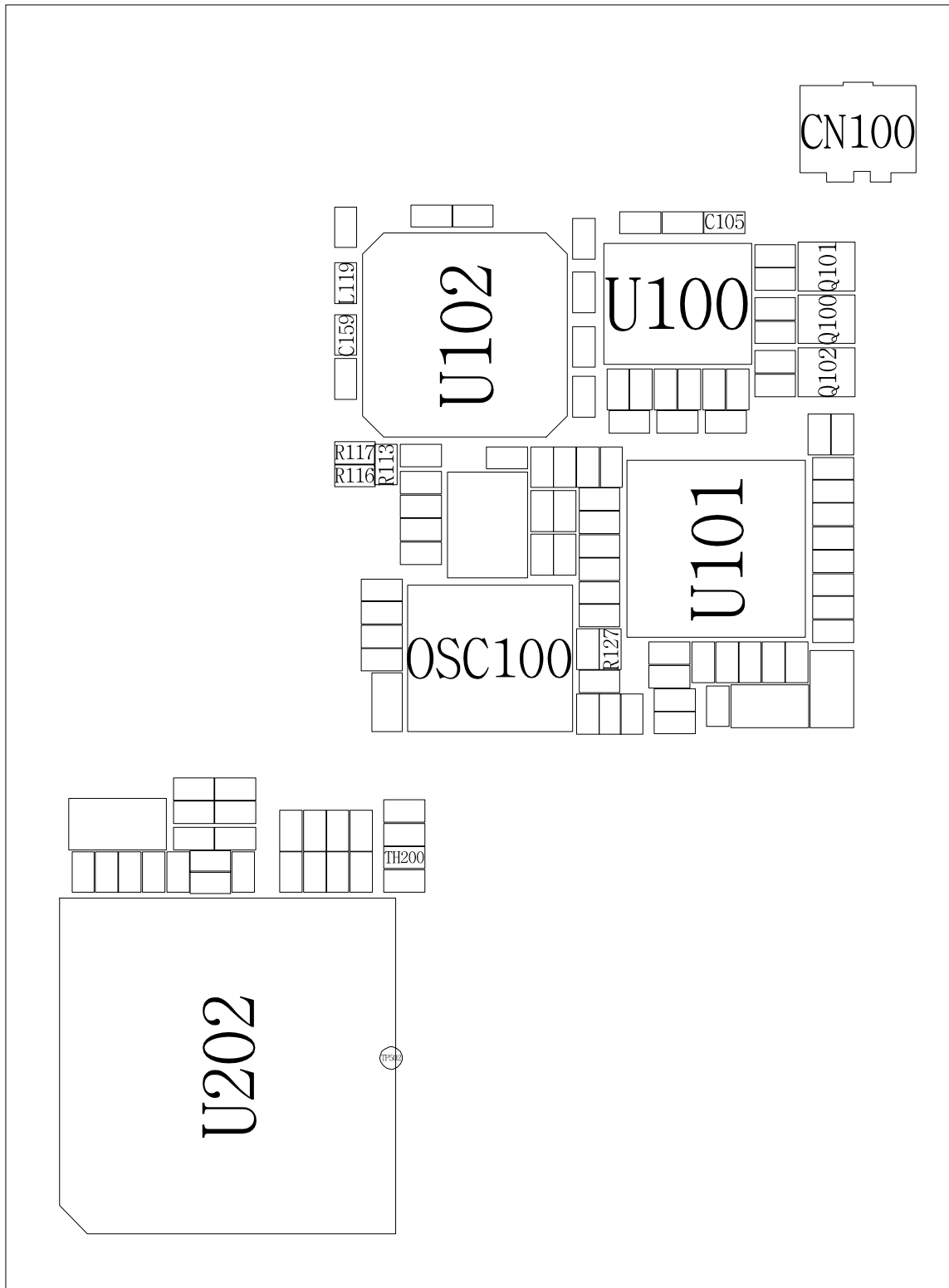




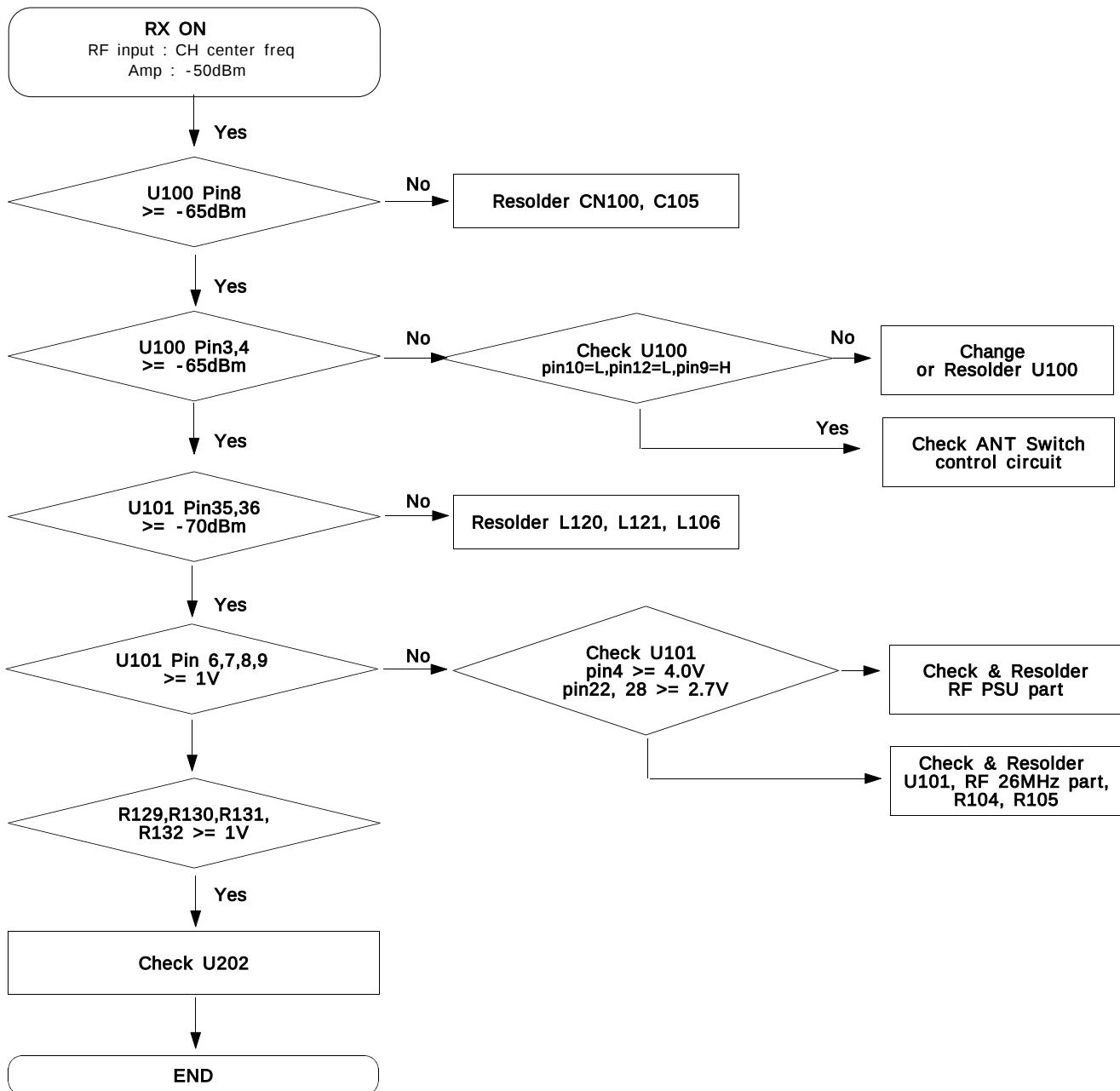


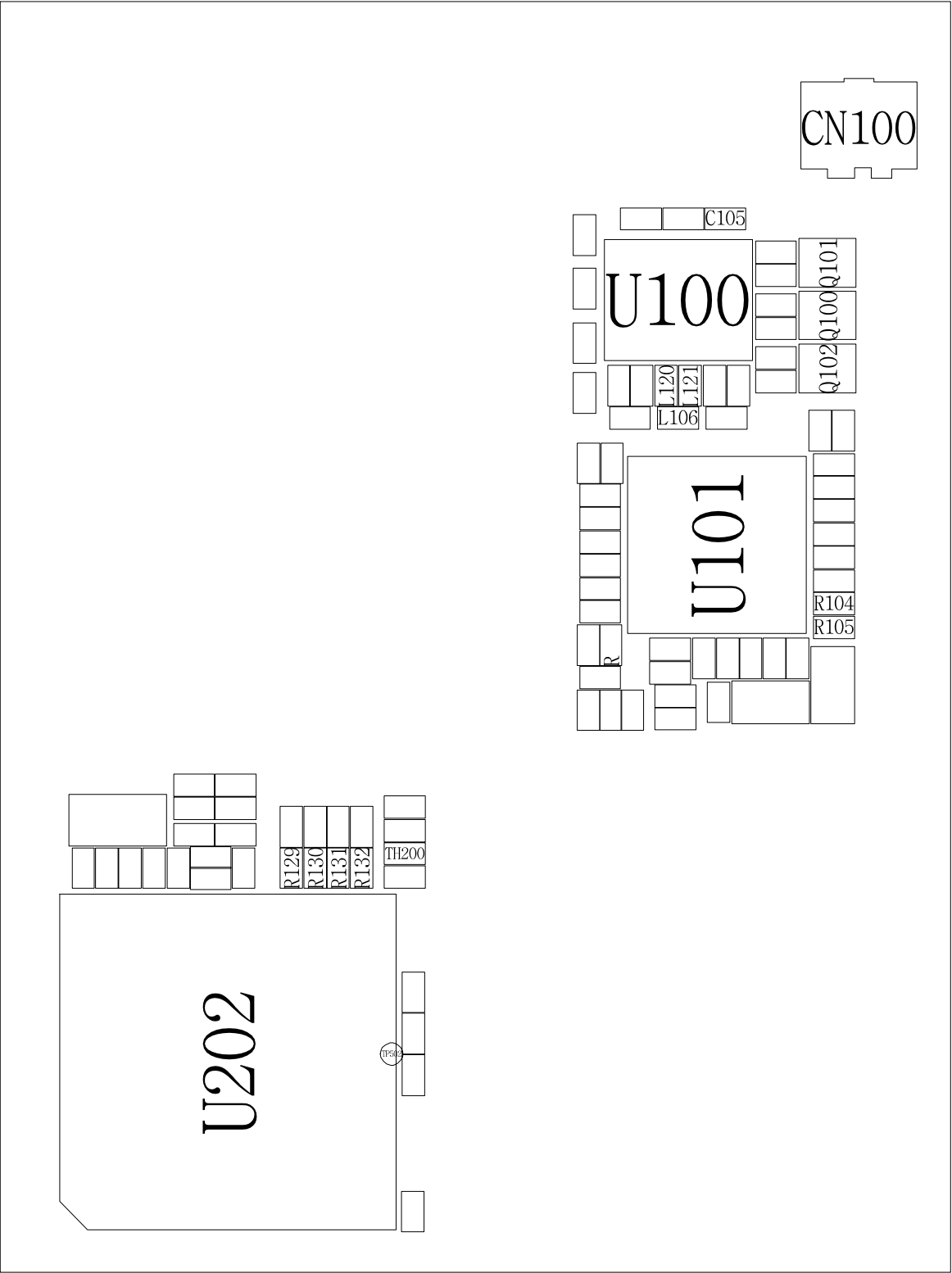
## 7-16. DCS Transmitter





## 7-17. PCS Receiver





## 7-18. PCS Transmitter

