12. Schematic Description and Diagram

1. CIRCUIT DESCRIPTIONS OF HANDSET RF

1-1 INTRODUCTION

The system uses the T.D.D.method that the system receives RX signals and transmits TX signals through only one antenna and carrier frequency. The system also uses the TDMA method using one slot among 24 slots. The frequency range of TX and RX is from 1881.792MHz to 1897.344MHz. The equipment uses DECT RF module.

1-2 DESCRIPTION

1) ANTENNA
   The system uses the antenna of •/4 herical type to communicate with the microwave signal.
2) RF module
   The operating voltage of this module is 3.6Vdc normally and supplied by BATT directly.
   The clock of module uses 13.824MHz. The outgoing siginals of module are SLICE OUT, DEMODE OUT, VCC REF and RSSI siginal.

   This RF module°s pin assignments are as follows.

A) Vcc	:	9 and 10 are TX POWER SUPPLY.
		28 is the supply voltage for other circuits within RF Module.
B) GND	:	1,3,5,6,7,15,30,31 and 32.
C) TX PA RAMP	:	It controls transmit power AMP.(pin number : 8)
		In case of °H°state, it turns on the TX power AMP.
		In case of °L° state, it turns off the TX power AMP.
		Its pin number is 5
D) SLICE OUT		The reference voltage of data comparator (pin number : 16).
		In case of °H° state, it holds reference voltage.
		In case of °L° state, it is S-field tracking mode.
E) DEMODE OUT	:	This pin presents demodulated signal (pin number : 18).
F) SLICE CTRL	:	It controls the tracking or holding of data slice (pin number : 17).
		In case of °H° state, it keeps data slice.
		In case of °L° state, it is tracking mode.
G) PLL CTRL	:	This pin controls PLL power (pin number : 20). This pin is active °L° state.
H) PLL ENABLE	:	This pin is synthesizer enable input(pin number : 21).
I) BATT. SAVE	:	This controls the main power of RF module (pin number : 25).
		In case of °H° state, the RF module°s power is supplied.
J) PLL DATA	:	This is synthesizer data input pin binary (pin number : 22).
K) TX ENABLE	:	This controls the power of transimitting circuit(pin number : 13).
		In case of °L° the power is to supply TX circuit.
L) PLL CLOCK	:	This is synthesizer clock input for serial registers(pin number : 23).
M) RX ENABLE	:	This controls RX path and antenna switch(pin number : 14).
		In case of °L° the RX path turn on.
N) VCO BND S/W	:	This is the input of VCO band switch (pin number : 27).
		In case of °H° it selects transmitting ferquency.
		In case of °L° it selects receiving frequency.
O) VCC REF	:	This is 2.9Vdc reference output for BMC interface (pin number : 29).
P) TX DATA	:	This is transmit data input(pin number : 26). When it is not active this pin goes to high impedance state
Q) SYS CLOCK	:	This is RF module clock input pin(pin number : 24) and its frequency is 13.824MHz.
R) RSSI	:	This is RSSI output pin(pin number : 19) and its voltage level is related to signal level.

2. CIRCUIT DESCRIPTIONS OF HANDSET LOGIC

2-1 INTRODUCTION

The HANDSET LOGIC B°D controls its RF part and TX & RX AUDIO signals, and controls charging current and performs lots of user oriented functions by sensing the keys, and controls LCD displays, MIC and buzzer.

2-2 KEY PAD

The KEY PAD consists of 3×6 matrix key. The 6 rows are connected with 6 ports of CPU and the CPU usually controls these ports to keep its level high. Respectively, the 3 columns are connected with 3 ports of the CPU and the CPU usually controls these ports to keep its level low. If a certain key is pressed, the column and the row are short- circuited and the column's voltage become high.
The CPU senses the change of the voltage condition, then changes all row's level low and generates pulse(strobe) signal to 6 rows in order. At this moment, there is no signal on the unpressed column, but the strobe signal is detected on the pressed column. That indicates the key is pressed.

2-3 EEPROM

The EEPROM used in the HANDSET is PCF8594C which is made by PHILIPS.
The EEPROM stores the initial data, it's ID number, telephone numbers for the memory dial function and country adaptation value including volume data.

2-4 RSSI DETECTOR

The RF module outputs DC voltage in proportion to the RF input level through the internal RSSI circuit and the MPU checks the point of the DC voltage level. This pin is used for channel and slot scanning.

2-5 POWER SUPPLY CIRCUIT

The power used in HANDSET is a rechargeable BATTERY(3.6VDC, 530mAH) which is combined with 3 batteries of 1.2V Ni-MH in serial.

2-6 TX & RX AUDIO CIRCUITS

The TX audio signal from the CONDENSER MIC goes to the MPU whose reference level is 4mVrms.
The MPU converts this audio signal to digital using internal DSP. These digital voice signals are transmitted to BASE SET by HAND SET RF.
The RX digital signal from the BASE RF inputs the HAND SET RF module and then that digital siginal is converted into analog audio by the MPU. These audio signals go to the ear piece directly.

2-7 CURRENT CHARGE CIRCUIT

This equipment's charging method uses normal and trickle charge. Normal charge is 0.1c for 15 hours after full discharge and then this equipment goes to trickle charge mode continuously.
Normal or trickle mode is selected by the MPU pin xx. In case of normal charge mode, the MPU goes to °HIGH° state and turns on Q18. The Q20 is controlled by Q18.

3. CIRCUIT DESCRIPTIONS OF BASESET RF

3-1 INTRODUCTION

The circuit of BASESET RF is similar to that of HANDSET RF. The difference between two circuits is only antenna method. In DECT, the antenna of BASE has 2 kinds. One is vertical ANT.and another is horizontal ANT.

3-2 DESCRIPTION

1) ANTENNA
   The system uses the antenna whose length is $\cdot \lambda/4$ to communicate with the microwave signal.
   Because of high frequency characteristic DECT has diversity antenna. One is vertical ANT.
   and another is horizontal ANT.

2) RF module
   The operating voltage of this module is 5Vdc and supplied by power adaptor.
   The clock of module uses 13.824MHz. The out siginals of module are SLICE OUT,
   DEMODE OUT,VCC REFand RSSI siginal.
   This RF module°s pin assignments are as follows.

A) Vcc	:	9 and 10 are TX POWER SUPPLY.
		28 is the supply voltage for other circuits within RF Module.
B) GND	:	1,3,5,6,7,15,30,31 and 32.
C) TX PA RAMP	:	It controls transmit power AMP.(pin number : 8)
		In case of °Hl°state, it turns on the TX power AMP.
		In case of °Lo°state, it turns off the TX power AMP.
		Its pin number is 8.
D) SLICE OUT	:	The reference voltage of data comparator (pin number : 16).
		In case of °Hl°state, it keeps reference voltage.
		In case of °Lo°state, it is S-field tracking mode.
E) DEMODE OUT	:	This pin outputs demodulated signal (pin number : 18).
F) SLICE CTRL	:	It controls the tracking or hold of data slice (pin number : 17).
		In case of °Hl°state, it keeps data slice.
		In case of °Lo°state, it is tracking mode.
G) PLL CTRL	:	This pin controls PLL power (pin number : 20). This pin is active °Lo°state.
H) PLL ENABLE	:	This pin is synthesizer enable input(pin number : 21).
I) BATT. SAVE	:	This controls the main power of RF module (pin number : 25).
		This pin is pulled up by resistor.
J) PLL DATA	:	This is synthesizer data input pin binary (pin number : 22).
K) TX ENABLE	:	This controls the power of transimitting circuit(pin number : 13).
		In case of °Lo°, the TX circuit power is supplied.
L) PLL CLOCK	:	This is synthesizer clock input for serial registors(pin number : 23).
M) RX ENABLE	:	This controls RX path and antenna switch.(pin number : 14).
		In case of °Lo°, the RX path turns on.
N) VCO BND S/W	:	This is the input of VCO band switch (pin number : 27).
		In case of °Hl°,it selects transmitting frequency.
		In case of °Lo°,it selects receiving frequency.
O) VCC REF	:	This is 2.9Vdc reference output for BMC interface (pin number : 29).
P) TX DATA	:	This is TX DATA input(pin number : 26). When it is not active this pin goes to high impedance state.
Q) SYS CLOCK	:	This is RF module clock input pin(pin number : 24) and its frequency is 13.824MHz.
R) RSSI	:	This is RSSI output pin(pin number : 19) and its voltage level is related to signal level.

4. CIRCUIT DESCRIPTIONS OF BASESET LOGIC

4-1 INTRODUCTION

The BASE LOGIC B°d controls the RF PART, the TX/RX AUDIO process, the telephone line interface and the charging circuit.

4-2 DESCRIPTION

a) TELEPHONE LINE INTERFACE

The telephone line interface separates DC and AC components on the telephone line.
The DC components are used for the SPEECH IC OPERATION and the AC COMPONENTS which mean an AUDIO signal passes to the AUDIO PROCESS CIRCUIT that the two TEL-LINES are connected to the HOOK RELAY.
This HOOK RELAY is operated by the MPU and a switching TR.
The audio signal flows into the BRIDGE DIODE which confirms receiving the constant polarity even though the DC polarity of TEL-LINE is reversed. This line flows into the switching circuit normally and the switching TRs(Q503, Q504, and Q505) are switched to make pulses and Q506 is used for matching the DC impedance during pulse dialing. The tel-line passes to the SPEECH IC(TEA1118AT) which separate the DC and the AC components.
The IC passes the AC component(which means the audio signal) to audio process circuit and carries over the TX audio signal passed from audio process circuit. The DTMF signal which is generated by MPU itself send to SPEECH IC through TX audio path. The ring signal coupled with the C505 goes to the U501(PHOTO COUPLER) and goes to the MPU with the form of the rectangular wave.

b) POWER SUPPLY CIRCUIT

The power supplied from the 9V ADAPTOR is divided into 3 parts.
The one regulated to 5V by the U504(KA7805) is supplied to the RF B°d, another regulated to 5V by the U503(KA7805) is supplied to the LOGIC PART and the third 9V is supplied to the charging circuit, Relay and SPK AMP.

c) RING DETECTOR

When it receives the ring signal from the telephone line, the ring detector(U1:PHOTO COUPLER) generates the pulse signal according to frequency of ringing signal. At this moment, MPU receives the pulse signal and generates the ringing signal to Buzzer.

d) TX/RX AUDIO CIRCUIT

The RX audio signal from the TEL LINE goes to the MPU (pin37)through the SPEECH IC.
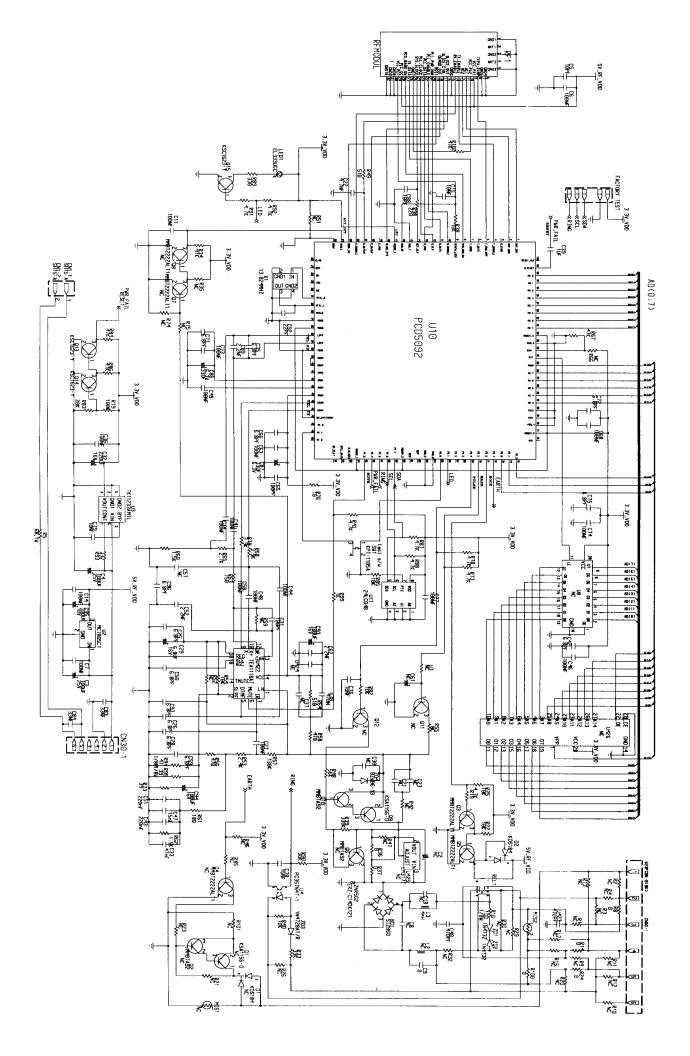The MPU converts this audio signal into digital by internal DSP.
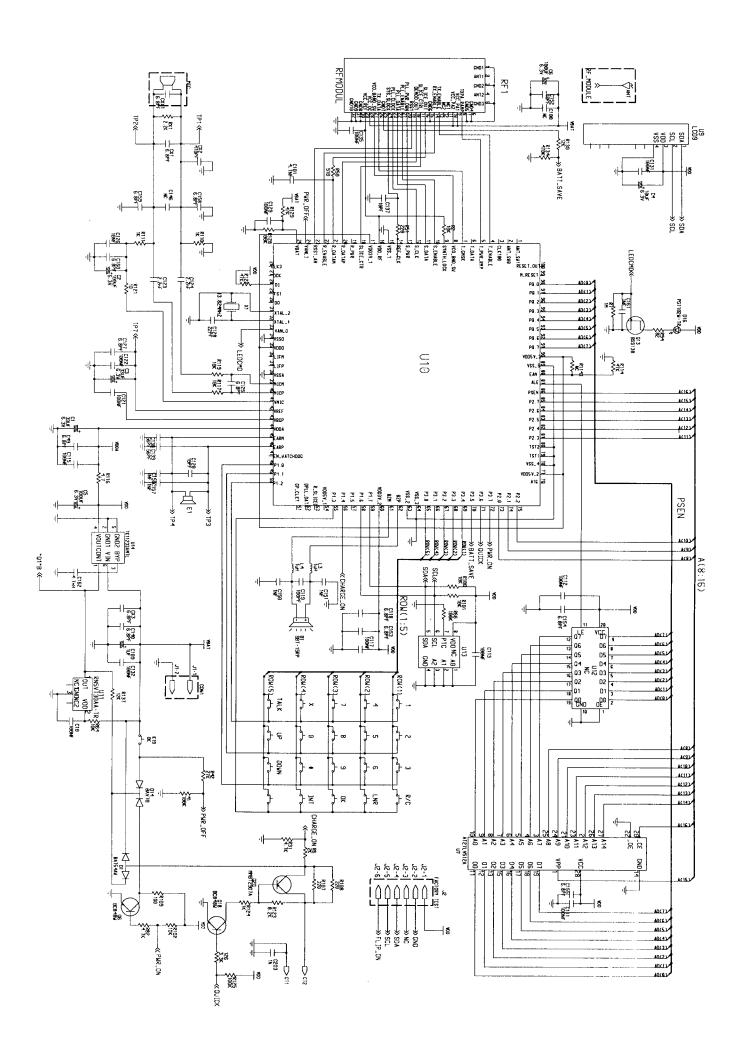These digital voice signals are transmitted to RMT SET by BASE RF.
The TX digital signal from the RMT RF inputs the BASE RF module and then the digital signal is converted into analog audio by the MPU.
Those audio signals go to the TEL LINE through the SPEECH IC

e) INDICATION CIRCUIT

This circuit consists of LEDS to display the baseset operation.

7. CHARGER