MG300 Circuit Description

1. Introduction

The model MG3000 is a 40 channel (902.125 - 927.100Mhz) cordless telephone. The whole unit is divided into two main parts as follow :

a. A remote Handset.
b. A Base unit.

2. Functional Blocks of the Remote Handset

2.1 Keyboard matrix and function LED
2.2 MCU and MCU interface
2.3 Antenna and RF module
2.4 Compander
2.5 Data shaper
2.6 Charge detector
2.7 Low battery detector
2.8 Buzzer amplifier

3. Circuit Block Description

3.1 Keyboard matrix and function LED

Pin 4 to pin7, pin 10 to pin 11 and pin 25 of the U5 ACT13H MCU form a keyboard, and the talk LED is controlled by the pin 12 of the MCU.

3.2 MCU and MCU interface

The handset and the base is link up by the pins(9,24 in HS and 21,24 in Base). Besides, the PLL of the RF Module is controlled by the pins 15,17 and 18 of the MCU.

3.3 Antenna and RF module

ANT is the common point for transmitting and receiving through antenna. MD1 is a RF module which consists of Duplexer, Power amplifier, Mixer & IF, RXVCO, TXVCO, VCC & TXVCC control, Synthesizer and DEMO Audio Output circuits.

3.4 Compander

A compander U2 is used for improving the S/N of the transmit and receive audio signal.

3.5 Data shaper

The information which sending from base unit, is recovered by the amplifier U3C.

3.6 Charge detector

ZD1, D7, D6, C43, R70, R68 and R69,D4, C42, R71, D5 form a charge detector to direct the charging signal to the MCU pin 26.

3.7 Low battery detector

A battery low detector is built-in by the U3B which detects the battery dropping and sends a signal to pin 19 of MCU.

3.8 Buzzer amplifier

Q2 is a buzzer amplifier driven directly by the MCU pin 23.

4. Functional Blocks of the Base unit

4.1 Power supply
4.2 MCU and MCU interface
4.3 Antenna and RF module
4.4 Compander
4.5 Data shaper
4.6 Charge detector
4.7 Line audio interface
4.8 Ring detector
4.9 Led function board
4.10 Noise detector and carrier detector

5. Circuit Block Description

5.1 Power supply

BU1 7805 regulate the input DC 9V to 5V which provides power to every part of the circuit.

5.2 MCU and MCU interface

The heart of the base is BU5 ACT13B MCU that communicates with the PLL of BMD1 through pins 5,6 and 7. Transmitter is controlled by the signal TX_DC which output from MCU via pin 20. MCU pins 6 to 11 consist of a resistor ladder for generating DTMF signal. The communication between Handset and Base is via the pin 24 and pin 26 through the RF link.

5.3 Antenna and RF modulator

ANT is antenna transmit and receive signal. BMD1 is a RF modulator which consist of Duplexer, Power amplifier, Mixer & IF, RXVCO, TXVCO, VCC & TXVCC control, Synthesizer and DEMO Audio Output circuits.

5.4 Compander

A compander BU4 is used for improving the S/N of the transmit and receive audio signal.

5.5 Data shaper

The information which sending from handset unit, is recovered by the amplifier BU2A.

5.6 Charge detector

BQ5 is a charge detector to direct the charging signal to the MCU pin 25.

5.7 Line audio interface

BR72, BK1, BR73, BC17, BL3, BL4 and BTR1 line transformer are the audio interface to the telephone line. The transformer is also used for telephone isolation.

5.8 Ring detector

BC44, BR71, BZD3, BZD2, BD7, BU7(K817) and BR67 form a ring detector which feed the signal through pin 26 of MCU.

5.9 LED function board

BLED1 is used for indicating "IN USE" OR "CHARGING" when handset is on cradle.

5.10 Carrier detector

The RF Module BMD1 pin 12 is an output pin of the carrier detector signal , it is sent to BU5 pin 23.When there is carrier, it is Low; when there is noise, it is High. BU5 finds the clear channel by this pin 23.

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4. CHANNEL FREQUENCIES for USA

Unit: MHz

NO.	BASE TX	HANDSET TX	NO.	BASE TX	HANDSET TX
1	902.125	926.125	21	902.625	926.625
2	902.150	926.150	22	902.650	926.650
3	902.175	926.175	23	902.675	926.675
4	902.200	926.200	24	902.700	926.700
5	902.225	926.225	25	902.725	926.725
6	902.250	926.250	26	902.750	926.750
7	902.275	926.275	27	902.775	926.775
8	902.300	926.300	28	902.800	926.800
9	902.325	926.325	29	902.825	926.825
10	902.350	926.350	30	902.850	926.850
11	902.375	926.375	31	902.875	926.875
12	902.400	926.400	32	902.900	926.900
13	902.425	926.425	33	902.925	926.925
14	902.450	926.450	34	902.950	926.950
15	902.475	926.475	35	902.975	926.975
16	902.500	926.500	36	903.000	927.000
17	902.525	926.525	37	903.025	927.025
18	902.550	926.550	38	903.050	927.050
19	902.575	926.575	39	903.075	927.075
20	902.600	926.600	40	903.100	927.100

5. CIRCUIT BLOCK DIAGRAM