

INTERTEK TESTING SERVICES

EXHIBIT 1
GENERAL DESCRIPTION

INTERTEK TESTING SERVICES

1.0 General Description

1.1 Product Description

The Cobra CP-9135 is a 900MHz Cordless Phone (Two Lines). The unit is capable of either tone or pulse dialing. The internal power supply's isolation is accomplished through a power transformer having an adequate dielectric rating. The circuit wiring is consistent under the requirement of part 68.

The handset unit consists of a keypad with twelve standard keys (0,...9,*,#), 8 function keys (Line 1, Line 2, Intcm, Conf., Flash, LNR/P, MEM & Hold), and one channel switch key. A talk key is provided to control pick/release telephone line in a toggle base.

The base unit has a page key, which is used to page the handset unit. And it also consists of a Keypad with twelve standard Keys (0,...9,*,#), nine function Keys (L1, L2, Cont Mute, Lnr/P, Flash, Mem, Hold & Speaker).

The circuit description is listed in the following page.

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

US 900M Frequencies Table

1	902.15	926.85
2	902.25	927.05
3	902.45	927.25
4	902.65	927.45
5	902.85	927.65
6	903.05	927.85
7	903.25	926.05
8	903.45	926.25
9	903.65	926.45
10	903.85	926.65
11	902.10	926.90
12	902.30	927.10
13	902.50	927.30
14	902.70	927.50
15	902.90	927.70
16	903.10	927.90
17	903.30	926.10
18	903.50	926.30
19	903.70	926.50
20	903.90	926.70
21	902.20	927.00
22	902.40	927.20
23	902.60	927.40
24	902.80	927.60
25	903.00	927.80
26	903.20	925.90
27	903.40	926.20
28	903.60	926.40
29	903.80	926.60
30	904.00	926.80

FCC ID: NV69125

V69105

CP9135 900MHz CORDLESS TELEPHONE WITH 2 LINE CIRCUIT DESCRIPTION

1

1. HANDSET UNIT

1.1. RF Receiver

The received signal from base unit is filtered and amplified by two stage filter(F2), amplifier(Q5), filter(F5) and amplifier(Q3). This amplified signal is mixed with RX LO (Q6, D3) signal.

The RX LO is controlled by PLL IC (U5) pin14. The PLL is programmed by microprocessor through serial data pins 11,13 and 18.

The mixer(Q8) output 10.7MHz intermediate frequency is amplified by (Q11) and filtered by (F3). This IF frequency enter the FM demodulator IC(U4) pin 3. The input signal is amplified by internal amplifier and filtered by external 10.7MHz ceramic filter.

1.2. Audio Signal

The IF signal is demodulated by external tank circuit (IFT1 and C2). The demodulated audio signal is fed into Scrambler IC(U4) and the Scrambler convert the scrambled signal to normal audio signal. The audio output from scrambler IC pin 14 is connected to pin 16 of compandor IC (U3) for expansion. The expanded audio output from (U3) pin 19 is finally amplified by transistor (Q4) and ac coupled to the receiver.

1.3. Ringer and Digital Signal

After the base unit detected the ring, it transmit the data code signal including security code to handset. The recovered data is amplified and filtered by IC(U2). The amplified data signal is passed to comparator and the output signal is connected to pin25 of Microprocessor IC (U6). If the code is correct, the ring signal output from pin no.24 of the Microprocessor IC (U6) is applied to buzzer driver Q6 to activate the buzzer.

1.4. Battery Charging

When the handset is placed on the base unit, the battery will be charged by constant current source (Z1, DAPI) and it is detected by Microprocessor IC(U6).

1.5. Voice transmission

Voice signal from condenser Mic is coupled to compandor IC(U3) pin 8 for compression. The compressed output signal is fed into IC (U4) through pin 10 for scrambling. The scrambled signal is passed to IC (U3) pin 3 for filtering.

1.6. Modulator and Oscillator

The audio signal from (U3) pin 1 output is frequency modulated by (D2). The oscillator is formed by Q1, L10, D2. The oscillator frequency is controlled by PLL IC(U5). This carrier frequency is amplified by Q2 and filtered by F1. Then the RF signal is transmitted through antenna.

CP9135 900MHz CORDLESS TELEPHONE WITH 2 LINE CIRCUIT DESCRIPTION

2

2. BASE UNIT

2.1. RF Receiver

The received signal from handset unit is filtered and amplified by two stage filter(F2), amplifier(Q5), filter(F5) and amplifier(Q3). This amplified signal is mixed with RX LO (Q6, D3) signal.

The RX LO is controlled by PLL IC (U5) pin14. The PLL is programmed by microprocessor through serial data pins 11,13 and 18.

The mixer(Q8) output 10.7MHz intermediate frequency is amplified by (Q11) and filtered by (F3). This IF frequency enter the FM demodulator IC(U4) pin 3. The input signal is amplified by internal amplifier and filtered by external 10.7MHz ceramic filter. The IF signal is demodulated by external tank circuit (IFT1 and C2). The demodulated audio output from the pin DEMO_OUT of the RF module.

2.2 Telephone Line Interface

Line 1

Line 1 Interface:

The main component of the Line 1 interface is the modular jack (J1), 0.5A fuse (F1), hybrid transformer (T1), op-amp LM324 (U2B) and reed relay (RL1).

Line Detect:

The main component of the line detect is the four 1N4007 (D1-4), three resistors (R18, R52, R96) and transistor 2SC2712 (Q1). Its function is to provide the line status information to the MCU.

Ringer Detect:

The main component of the ringer detect is the LM324 (U2A), four 10M ohm resistors (R90-93) and transistor 2SC2712 (Q2). Its function is to detect the ringer signal from the line and provide digital signal to the MCU.

Line 2

Line 2 Interface:

The main component of the Line 1 interface is the modular jack (J2), 0.5A fuse (F2), hybrid transformer (T2), op-amp LM324 (U6B) and reed relay (RL2).

Line Detect:

The main component component of the line detect is the four 1N4007 (D8-11), three resistors (R35, R44, R97) and transistor 2SC2712 (Q11). Its function is to provide the line status information to the MCU.

Ringer Detect:

The main component of the ringer detect is the LM324 (U6A), four 10M ohm resistors (R133-136) and transistor 2SC2712 (Q5). Its function is to detect the ringer signal from the line and provide digital signal to the MCU.

2.3 Phone Mode

Line 1

When Line 1 is used during phone mode, the audio signal from the Line 1 interface (pin 7 of LM324 at U2B) pass through the analogue switch 4066 (U10D) which is controlled by signal L1_MU from MCU. Then the signal goes through the summer amplifier LM324 (U6D) to the compressor inside the compandor DBL5015 (U8) at pin 8. The signal from the compressor (pin 3 at U8) enter into the scrambler TC35481 (pin 10 at U9) and output at pin 8. The output signal then goes into filter inside the compandor DBL5015 (across pin 1 and 2 at U8) and finally reach the RF module through the pin MOD_IN. The audio signal transmit to the handset through 900MHz radio frequency signal.

CP9135 900MHz CORDLESS TELEPHONE WITH 2 LINE CIRCUIT DESCRIPTION

3

The 900MHz signal from the handset is demodulated by the RF module and output at pin DEMO_OUT. The demodulated signal enter into the scrambler TC35481 (pin 12 at U9) and output at pin 14. Then the signal goes into the expandor of the compandor DBL5015 (pin 16 at U8) and output at pin 19. Then the signal from the expandor goes into the amplifier inside the speaker phone IC (across pin 6 and 7 at U5). The output from the amplifier goes into the analogue switch U10A which is controlled by L1_MU. Then the signal goes into the amplifier LM324 at U2C and output to telephone line through the Line 1 interface.

Line 2

When Line 2 is used during phone mode, the audio signal from the Line 2 interface (pin 7 of LM324 at U6B) pass through the analogue switch (U4B) which is controlled by signal L2_MU from MCU. The signal goes through the summer amplifier LM324 (U6D), the compressor inside the compandor DBL5015 (U8), the scrambler TC35481, the filter inside the compandor DBL5015 (across pin 1 and 2 of U8), the RF module and then finally reach the handset.

The 900MHz signal from the handset is demodulated by the RF module and output at pin DEMO_OUT. The demodulated signal enter into the scrambler TC 35481 (U9), compandor DBL5015 (U8), amplifier inside the speaker phone IC (pin 6 and 7 at U5), the analogue switch U4C which is controlled by signal L2_MU from MCU, the amplifier LM324 at U6C and output to telephone line through the Line 2 interface.

2.4 Speaker Phone Mode

Line 1

When Line 1 is used for speakerphone mode, the signal from the microphone is entered into the speakerphone IC (pin 11 at U5) and output at pin 6. Then the signal pass through the switch 4066 (U10A) which is controlled by the signal L1_MU, the amplifier at U2C and the Line 1 interface.

The signal from the Line 1 interface pass through the LM324 U2B, the analogue switch 4066 (U10D) which is controlled by the signal L1_MU, the summer amplifier LM324 (U6D), the switch (Q9) which is controlled by the signal SP_MU. Then the signal goes into the amplifier LM324 (U2D), the speaker phone IC (U5). Finally the signal is amplified by the speaker amplifier LM386.

Line 2

When Line 2 is used for speakerphone mode, the signal from the microphone is entered into the speakerphone IC (pin 11 at U5) and output at pin 6. Then the signal pass through the switch 4066 (U4C) which is controlled by the signal L2_MU, the amplifier at U6C and the Line 2 interface.

The signal from the Line 2 interface pass through the LM324 U6B, the analogue switch 4066 (U4B) which is controlled by the signal L2_MU, the summer amplifier LM324 (U6D), the switch (Q9) which is controlled by the signal SP_MU. Then the signal goes into the amplifier LM324 (U2D), the speaker phone IC (U5). Finally the signal is amplified by the speaker amplifier LM386.

2.5 Intercom Mode

The communication between handset and base is built during intercom mode. The signal from the microphone enters into the speakerphone IC and output at pin 8. Then the signal passes through the switch 4066 (U10C) which is controlled by signal INT_EN from MCU and goes into the compressor inside the compandor DBL5015 (U8), the scrambler TC35481 (U9), the filter inside the compandor DBL5015 (across pin 1 and 2 at U9) and finally to the pin MOD_IN of the RF module.

In the opposite direction, the demodulated signal output from the pin DEMO_OUT of the RF module. The signal goes into the scrambler TC35481 (U9), expandor inside the compandor DBL5015 (U8), the switch 4066 at U10B, the amplifier at U2D and reach the speaker phone IC at pin 21 of U5. Finally the signal output from the speaker phone IC is amplified by the LM386 (U11) and provide signal to the speaker.

CP9135 900MHz CORDLESS TELEPHONE WITH 2 LINE CIRCUIT DESCRIPTION

4

2.6 Conference Mode

During the conference mode, the Line 1 interface and Line 2 interface are connected together through the switch 4066 (U4D) which is controlled by the signal CONF provided by the MCU.

2.7 Busy/Shutter Dial Tone Detect

The circuit is formed by the amplifier (LM324 at U3C) and the comparator (LM324 at U3D). The circuit detect the signal from the amplifier at pin 14 of LM324 and output the digital signal to the pin 26 (BUS_DET) at MCU.

2.8 Digital Signal

The digital data output from the pin 36 (TX_DATA) of the MCU to the MOD_IN of the RF module. The data is then transmitted to the handset through the 900MHz RF signal.

The data signal from the handset is received by the RF module and the discovered data signal is output at pin DEMO_OUT of the RF module. The data signal is then pass through the amplifier (LM234 at U3B) and the comparator (LM324 at U3A). The comparator provides the digital data signal to the pin 38 of the MCU.

2.9. Battery Charging

The charging circuit is formed mainly by the components R55, R58, R71 and Q14. It uses the power from the DC jack to charge the battery in the handset while the handset on the base unit cradle. When the handset is placed on the base unit cradle, the voltage at the collector pin of the transistor Q14 is pulled low and trigger the CRA_DET at pin 39 of the MCU U1. At this moment, the charging LED (D104) is turned on.

2.10. 5 Bit DTMF Generator

The DTMF generator is formed mainly from the resistor R78 - 82. It is acted as a D to A converter. The output from the DTMF generator is then fed into the amplifier inside the speaker phone IC (pin 7 and 8 of U5).

If Line 1 is used, the DTMF signal will pass through the switch 4066 at U10A, the amplifier (U2C) and the Line 1 interface.

If Line 2 is used, the DTMF signal will pass through the switch 4066 at U4C, the amplifier (U6C) and the Line 2 interface.

The output from the DTMF generator is also fed into the speaker amplifier LM386 (U11) so that the DTMF tone can be heard from the speaker.

2.11. RF Transmitter

The audio signal from (U3) pin 1 output is frequency modulated by (D2). The oscillator is formed by Q1, L10, D2. The oscillator frequency is controlled by PLL IC(U5). This carrier frequency is amplified by Q2 and filtered by F1. Then the RF signal is transmitted antenna.

2.12. Reset

The reset circuit is formed by the components diode D12, resistor 100K, capacitor C66 and transistor Q13. The circuit is reset every time the Base is powered up.