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Model : MT 5000

TECHNICAL DESCRIPTION

Content

HANDSET

1. RF/Audio Sections

The radio link between Handset and Base is full duplex at 902/928MHz within the 40 channels. FM modulation is used for the link. The 1st IF frequency is 10.7MHz and the 2nd IF frequency is 450kHz. The operating frequency for the cordless phone is selected from one of the following channels and controlled by the synthesizer IC2 which is programmed by the MCU. Please refer to Table 1 for the Channel Frequency Table.

This section is common to both handset and base as the same ICs are used : LMX1602 (IC2), KA3361 (IC1). LMX1602 is made up of dual serial input PLL frequency synthesizer with 1000MHz prescaler. KA3361 is a narrow-band IF detector IC.

1.1 Receiver

The receiver section is of double conversion with 10.7MHz and 450kHz as the first and second IF. Rx signal from the duplexer circuit is amplified by a Low Noise RF transistor and passed to a mixer (Q2 and IFT1), and it is converted to 10.7MHz IF and it is then double converted to 450kHz IF in the internal mixer of IC1. Voice/data signal is demodulated and output from pin 9 of IC1 The demodulated signal is then divided into two paths, a path is fed into the data amplifier Q606, Q605 The recovered data signal RX_DATA is extracted from the output of Q605. The other path will go through a de-emphasized amplifier and a expander in IC11B. The recovered audio will pass through the audio amplifier Q603 and to the receiver. The recovered signal can be muted by the pin 13 of IC11B, the 2 volume levels of the signal can be controlled by the switch SW1.

1.2 Transmitter

Audio signal (from Microphone for handset / Tip & Ring for base) is first fed into the mic. amplifier and compressor inside IC11A. The signal will pass through a limiter. The AGC and the limiter has the property to limit the maximum signal which feed into the transmitter so that the RF deviation is limited. The transmitter section mainly divided into two parts. They are the voice/data modulator and the Tx power amplifier. The voltage controlled oscillator VCO operated at the Tx frequency controlled by the synthesizer is modulated by the audio and data signals. Modulated signal is amplified by the RF amplifier and sending the signal to the duplexer for radiation by the antenna.

1.3 Duplexer

Two band-pass filters are matched to use as duplexer. The function of the duplexer is to multiplex the transmitting and the receiving signals to a common antenna while providing isolation and rejection of interference and other spurious signals.

1.4 Alerter

The alerting signals include the following : Ringing, Paging, Key Beep and Low battery warning tone. These tones are generated by the MCU to the alerter through the driving circuit formed by Q608 and the associated components.

1.5 Microphone

The condenser microphone is biased by the resistor R622. The signal is applied to the mic. amplifier inside IC11A.

2. MCU

2.1 Battery Detect

IC12 is a voltage detector which is used to detect battery low condition. The detecting accuracy of the voltage detector is +/- 0.15V. The detect pin, BAT_LOW is connected to the pin 3 of the MCU (IC10).

2.2 Carrier Detection

This 40 channels cordless has the features of auto-scanning. This is done by the detection of the RSSI at pin 4 of MCU of handset. During PHONE on or CHANNEL changing, the MCU will select the clearest channel for the RF communication.

BASE

3. RF/Audio sections

The operation of the RF/Audio sections are similar to that of the handset.

4. Telephone Network

4.1 Telephone Interface

Fuse FUSE1 is for over-voltage protection. Relay RL1 controls the on/off hook state and pulse dialing. The Tip & Ring are isolated from the base circuit by the hybrid transformer HYB1, relay RL1, and the photo-coupler IC10.

4.2 Ring Detect

When ring signal is present on the Tip Ring, and envelope waveform of the ring pattern will transfer to pin 61 of MCU IC16 by the photo-coupler IC10 which is used as isolation between Tip Ring and the digital circuit. The MCU will read this waveform and determine whether it will connect the appropriate path.

4.3 Sidetone Cancellation Network

The sidetone cancellation is a hybrid circuit of the Tx and Rx paths of the telephone circuit formed by the hybrid transformer.

5. MCU

5.1 Charging Network

Base charging circuit provides a DC current for handset batter. Resistor R50 controls the current flow.

5.2 LED Display

Direct driving is employed in the control of LED indicators. The indicator are IN USE, CHARGE and dual 7-Segment display , which were used to indicate the corresponding functions are activated.

5.3 Carrier Detection

This is similar to the handset counterpart.

6. Digital Answering Machine

The IC4 DSP630B, IC5, IC6 and IC7 are used to perform the Digital Answering Machine function. IC4 is a digital speech/signal processing subsystem the implements all functions of speech compression and voice prompts, ARAM management for an digital answering machine. It is operated by taking reference from a crystal of 29.48325MHz. IC5 is the ROM for storing voice prompt, and IC6 is the ARAM for storing incoming messages and outgoing messages. IC7 is the CODEC for using coding and decoding incoming and outgoing audio signal into and out of IC4.
The audio paths are routed by analog switches IC3 which are controlled by MCU.

TAIFENG RF MODULE FREQUENCY TABLE FOR USA

1st IF : 10.7MHZ 2nd IF : 450KHz CH SPACE : 75KHz

REF OSC : 10.25MHz FB : 25KHz

CH	BASE TX	BASE LOCAL	HANDTX	HAND LOCAL
1	902.175	935.575	924.875	891.475
2	902.25	935.65	924.95	891.55
3	902.325	935.725	925.025	891.625
4	902.4	935.8	925.1	891.7
5	902.475	935.875	925.175	891.775
6	902.55	935.95	925.25	891.85
7	902.625	936.025	925.325	891.925
8	902.7	936.1	925.4	892
9	902.775	936.175	925.475	892.075
10	902.85	936.25	925.55	892.15
11	902.925	936.325	925.625	892.225
12	903	936.4	925.7	892.3
13	903.075	936.475	925.775	892.375
14	903.15	936.55	925.85	892.45
15	903.225	936.625	925.925	892.525
16	903.3	936.7	926	892.6
17	903.375	936.775	926.075	892.675
18	903.45	936.85	926.15	892.75
19	903.525	936.925	926.225	892.825
20	903.6	937	926.3	892.9
21	903.675	937.075	926.375	892.975
22	903.75	937.15	926.45	893.05
23	903.825	937.225	926.525	893.125
24	903.9	937.3	926.6	893.2
25	903.975	937.375	926.675	893.275
26	904.05	937.45	926.75	893.35
27	904.125	937.525	926.825	893.425
28	904.2	937.6	926.9	893.5
29	904.275	937.675	926.975	893.575
30	904.35	937.75	927.05	893.65
31	904.425	937.825	927.125	893.725
32	904.5	937.9	927.2	893.8
33	904.575	937.975	927.275	893.875
34	904.65	938.05	927.35	893.95
35	904.725	938.125	927.425	894.025
36	904.8	938.2	927.5	894.1
37	904.875	938.275	927.575	894.175
38	904.95	938.35	927.65	894.25
39	905.025	938.425	927.725	894.325
40	905.1	938.5	927.8	894.4