Technical Description

This 2.4GHz 40 channel cordless phone operates in the 2400 -2483.5MHz Industrial, Scientific and Medical (ISM) band. It consists of the Hummingbird baseband device U203/U503 RF109 transceiver, U201/U501 RF110 power amplifier and U103/U403 R6815 baseband controller.

Baseband controller

The U103 or U403 baseband controller consists of 1) an ASIC, into which are integrated a baseband modem, audio modem, and a controller, and 2) a linear audio codec.

It requires a 19.2 MHz crystal oscillator to generator the system reference clock.

The baseband modem provides all modulation, encoding, spreading, scrambling, TDD control, AGC, AFC, decoding, and timing required for a diSSTance cordless telephone system. (Conexant's diSSTance™ (digital Spread Spectrum) technology.)

The audio modem consists of an ITU G.726-compliant 40 kbps or 32kbps ADPCM engine that interfaces to the audio codec. Built-in DTMF and ring tone with audio path control complete the interface for audio support functions.

The controller, and embedded MC19 (65C02) micro-controller core, performs all control and monitoring functions required for a digital spread spectrum (DSS) telephone. Interfaces are provided for all peripheral functions needed for a complete DSS telephone.

The audio codec is ITU G.714-compliant. It converts analog signals from the PSTN and microphone to and from digital voice samples for the audio modem. It has buit-in electret microphone interfaces and independent audio channels for line and speaker interfaces.

Transmit path

The baseband digital data input is shaped by external filter. The shaping of the baseband data determines the spectral shape of the transmitted RF signal.

The base and handset station power amplifier (PA) operates from a 3 VDC supply.

The U201/U501 RF110 power amplifier (PA) inputs and outputs are differential RF signal.

It has impedance matching networks between the PA output and the TX antenna.

This model is designed to provide automatically selectable High, Medium, and Low output power modes. Depending on the distance between base and handset, the system automatically sets the desired power mode. The nominal step size from High to Medium power mode is 10 dB, and from Medium to Low power mode the nominal step size is 14.5 dB.

Receive Path

The signal is received at the RX antenna and passes through the FL201/FL1 RF bandpass filter. The FL201/FL1 RF bandpass filter is used to minimize the overloading of the front-end of the radio. Those RF bandpass filters have 3 dB passband range from 2404.8MHz to 2475 MHz.
The output of the bandpass filter is ac-couple to the Low Noise Amplifier (LNA) of the U203/U503 RF109.The U203/U503 RF109 downcoverts the RF signal into In-phase (I) and Quadrature (Q) baseband signals. The differential I and Q baseband signals are dc-coupled to the U103/U403 R6815 baseband controller.

Transmit and Received antennas

The transmit antenna is adopted at the front stage of impedance matching network. The receive antenna also located before the FL201/FL1 with 50 ohm impedance.

LO Generation.

The LO signal is generated by a programmable PLL frequency synthesizer in the U203/U503 RF109 and an external 2.4 GHz VCO (U204/U504).
The U204/U504 RF109 synthesizer requires differential input signals, from the external VCO, to generate the LO frequency. LC lead-lag network is applied in order to generate differential signals from the single-ended U204/U504 VCO output.

Table 1. 2.4 GHz RF Channel and Synthesizer Frequency Settings

Channel Number	Channel Number (Subset)	Rx / Tx VCO Frequency (MHz)	S5	S4	S3	S2	S1	S0
1	0	2404.8	0	0	1	0	0	0
2	0'	2406.6	0	0	1	0	0	1
3	1	2408.4	0	0	1	0	1	0
4	1'	2410.2	0	0	1	0	1	1
5	2	2412.0	0	0	1	1	0	0
6	2'	2413.8	0	0	1	1	0	1
7	3	2415.6	0	0	1	1	1	0
8	3'	2417.4	0	0	1	1	1	1
9	4	2419.2	0	1	0	0	0	0
10	4'	2421.0	0	1	0	0	0	1
11	5	2422.8	0	1	0	0	1	0
12	5'	2424.6	0	1	0	0	1	1
13	6	2426.4	0	1	0	1	0	0
14	6'	2428.2	0	1	0	1	0	1
15	7	2430.0	0	1	0	1	1	0
16	7'	2431.8	0	1	0	1	1	1
17	8	2433.6	0	1	1	0	0	0
18	8'	2435.4	0	1	1	0	0	1
19	9	2437.2	0	1	1	0	1	0
20	9'	2439.0	0	1	1	0	1	1
21	10	2440.8	0	1	1	1	0	0
22	10'	2442.6	0	1	1	1	0	1
23	11	2444.4	0	1	1	1	1	0
24	11'	2446.2	0	1	1	1	1	1
25	12	2448.0	1	0	0	0	0	0
26	12'	2449.8	1	0	0	0	0	1
27	13	2451.6	1	0	0	0	1	0
28	13'	2453.4	1	0	0	0	1	1
29	14	2455.2	1	0	0	1	0	0
30	14'	2457.0	1	0	0	1	0	1
31	15	2458.8	1	0	0	1	1	0
32	15'	2460.6	1	0	0	1	1	1
33	16	2462.4	1	0	1	0	0	0
34	16'	2464.2	1	0	1	0	0	1
35	17	2466.0	1	0	1	0	1	0
36	17'	2467.8	1	0	1	0	1	1
37	18	2469.6	1	0	1	1	0	0
38	18'	2471.4	1	0	1	1	0	1
39	19	2473.2	1	0	1	1	1	0
40	19'	2475.0	1	0	1	1	1	1

The C7505 software supports North America, Australia and New Zealand RF frequency plans for 900 MHz and only North America frequency plan for 2.4 GHz.