Technical Description

This 2.4GHz 40 channel cordless phone operates in the 24000-2483.5MHz Industrial, Scientific and Medical (ISM) band. It consists of the Hummingbird baseband device U204 RF109 transceiver, U302 RF110 power amplifier and U205 / U202 R6753 baseband controller.

Baseband controller

The U205 or U202 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 9.6 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, such as keypad, LED, LCD, and EEPROM. System performance enhanced by control functions for a secure serial link between handset and base station.

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.

The U103 is D16521 is a generic PineDSPCore™ based chip. It contains the DSP Firmware version D16500F - Flash interface, Triple Rate Coder®. D16521 consists of: PineDSPCore™ with embedded DSP Firmware of D16500F. Host interface for External µC interface support. PLL block providing clock generation from low 4.096 MHz frequency. It include CID detector to support CID Type I and Type II. U104 is KW29W040 flash ROM for voice storage.

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 U302 RF110 power amplifier (PA) inputs and outputs are differential RF signal.

It has impedance matching networks between the PA output and the U301 RX/TX switch.

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 antenna and passes through the U301 T/R switch and an FL1 RF bandpass filter. The FL1 RF bandpass filter is used to minimize the overloading of the front-end of the radio. The FL1 RF bandpass filter has 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 U304 RF109.The U304 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 U205 R6753 baseband controller.

U301 Transmit Received (T/R) switch

The transmit and receive functions of the switch are enabled by the TXEN and RXEN control signals from the U205 R6753 baseband controller IC.

LO Generation.

The LO signal is generated by a programmable PLL frequency synthesizer in the U304 RF109 and an external 2.4 GHz VCO (U305).
The U304 RF109 synthesizer requires differential input signals, from the external VCO, to generate the LO frequency. A BALUN transformer (L310) is used to generate differential signals from the single-ended U305 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.