Direct Sequence Spread Spectrum Wireless Transceiver Chip Set

The Intersil 2.4GHz PRISM® chip set is a highly integrated six-chip solution for RF modems employing Direct Sequence Spread Spectrum (DSSS) signaling. Significant integration of transmit and receive functions employ the following ICs: complete integrated DSSS engine, the HFA3824; a quadrature modulator/ demodulator, integrated with an IF limiter amplifier with RSSI, the HFA3724, HFA3726; a combined LNA/Mixer and upconverter/preamplifier, the HFA3624; a high performance, low noise amplifier for increased receiver sensitivity, the HFA3424; a dual synthesizer, the HFA3524 and a monolithic RF power amplifier, the HFA3925. Each of the functions may be used individually or in any combination in support of a variety of RF modem applications.

The PRISM chip set is intended to support various data rates including systems targeting the proposed IEEE 802.11 standard “Direct Sequence Physical layer (DS-PHY)”. Differential BPSK and QPSK signaling is employed with differential encoding and decoding of packetized data. A PN sequence rate of up to 22MCPS is supported for up to a 16 chip PN code. Integrated programmable low pass filters are used on the HFA3724 to allow chip rates from 2.75MCPS to 22MCPS. A flexible general purpose data and control interface is provided for parameter configuration and for transferring data packets between the PHY and Media Access Control (MAC) layers. Data rates of up to 2MBPS for DBPSK and 4MBPS for DQPSK are supported.

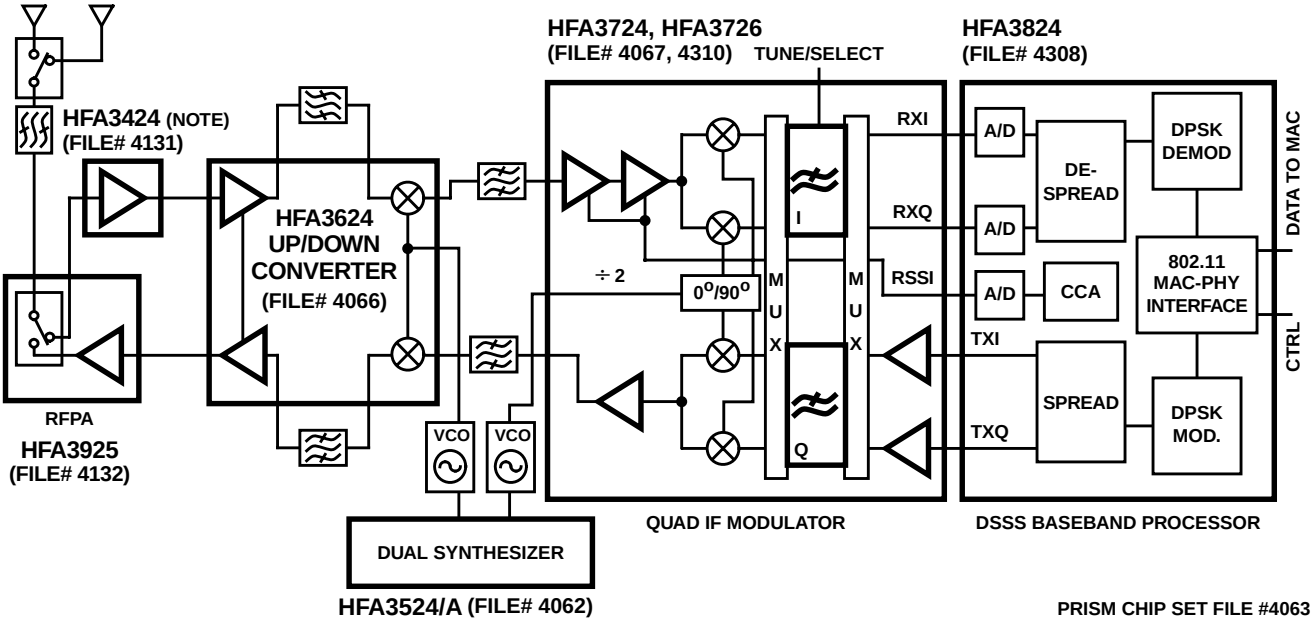
Features

- Provides Antenna-to-Bits™ Data Stream
- Low Voltage Operation from 2.7V to 5.5V
- 2.4GHz - 2.5GHz ISM Band Operation
- Single Heterodyne Conversion
- Programmable Antialiasing and Shaping Filters
- 10MHz to 400MHz IF Operation with RSSI
- Autonomous Half Duplex Direct Sequence Modem
- Selectable DBPSK, DQPSK Signalling
- Antenna Diversity Selection
- Direct Sequence Physical Layer (DS-PHY)
- Differential Data Encoding/Decoding
- Programmable 16-Bit PN Code
- Data Rates up to 4MBPS DQPSK
- Power Management Control
- Low Profile PCMCIA-Compatible Surface Mount Packaging

Applications

- Systems Targeting IEEE 802.11 Standard
- PCMCIA Wireless Transceiver
- WLAN RF Modems
- TDMA Packet Protocol Radios
- Part 15 Compliant Radio Links

Typical Application Diagram



PRISM CHIP SET FILE #4063

NOTE: Required for systems targeting 802.11 specifications.

Antenna to Bits™ is a trademark of Intersil Corporation.

Typical 802.11 DS-PHY System Level Performance (Note 5) (Measured at a diversity antenna port)

Receiver

- Frequency Range . . . . . 2.4GHz - 2.4835GHz
- Step Size 1MHz
- Cascaded Noise Figure 6.8dB
- Sensitivity . . . . . -93dBm, 1MBPS, 8E-2 FER (Note 1)
  -90dBm, 2MBPS, 8E-2 FER (Note 1)
- Input Intercept Point . . . . . -17dBm
- IF Frequency. 280MHz
- IF Bandwidth. 17MHz
- Image Rejection 80dB
- Adjacent Channel Rejection . . . . . >35dB
- Supply Voltage . . . . . 2.7V - 5.5V

Transmitter

- Frequency Range . . . . . 2.4GHz - 2.4835GHz
- Step Size 1MHz
- Output Power . . . . . +18dBm
- Spurious Outputs . . . . . Targeting ISM/802.11
- Transmit Spectral Mask . . . . . -32dBr at First Side-Lobe
- IF Frequency. 280MHz
- Supply Voltage . . . . . 2.7V - 5.5V

General Specifications

- Targeted Standard . . . . . IEEE 802.11
- Data Rate . . . . . 1MBPS DBPSK
  2MBPS DQPSK
- Range. . . . . 400ft Indoor (Note 2)
  3700ft Outdoor (Note 2)
- RX/TX Switching Speed. 2µs
- Power Savings Modes
  - Mode 1: 190mA at 1µs Recovery (Notes 3, 4)
  - Mode 2: 70mA at 25µs Recovery (Notes 3, 4)
  - Mode 3: 60mA at 2ms Recovery (Notes 3, 4)
  - Mode 4: 30mA at 5ms Recovery (Notes 3, 4)
- Average Current
  (Without Power Savings Modes) . . . . . 298mA (Note 6)
- Average Current
  (With Power Savings Modes) . . . . . 60mA (Note 7)

NOTES:

1. FER = Frame Error Rate or Packet Error Rate.
2. Range Test using AND-C-107 omnidirectional antenna.
3. Supply current includes AM79C930 MAC Processor.
4. Recovery time is for the PRISM 2.4GHz Chip Set only and does not include programming latency of the AM79C930 MAC Processor.
5. Refer to Application Note AN9624 for more information on the “PRISM DSSS PC Card Wireless LAN Description”.
6. Based on average current consumption for “typical” application.
7. Power savings modes refer to AN9665. Average radio current consumption for “typical” application.

Sales Office Headquarters

NORTH AMERICA
Intersil Corporation
P. O. Box 883, Mail Stop 53-204
Melbourne, FL 32902
TEL: (321) 724-7000
FAX: (321) 724-7240

EUROPE
Intersil SA
Mercure Center
100, Rue de la Fusee
1130 Brussels, Belgium
TEL: (32) 2.724.2111
FAX: (32) 2.724.22.05

ASIA
Intersil Ltd.
8F-2, 96, Sec. 1, Chien-kuo North,
Taipei, Taiwan 104
Republic of China
TEL: 886-2-2515-8508
FAX: 886-2-2515-8369