ISL87060 Modem Chip Set

Intersil's Broadband Wireless Modem chip set offers fiber-like performance and reliability to equipment manufacturers serving fixed wireless infrastructure and access markets.

Intersil's Broadband Wireless Modem solution includes the ISL87060MIK Modulator and ISL87060DIK Demodulator chips; ISL837030 Modem Reference Design; and ISL83700 Evaluation Kit.

These products enable rapid, low-cost deployment of point-to-point microwave systems that support wireless transmission of voice, data, and video at OC-3/STM-1 speeds of up to 155 megabits per second (Mbps).

Target Applications

- High-Capacity Wireless Internet Infrastructure
- Digital Microwave Radios for Interconnection of Cellular Base Stations and Fixed Broadband Wireless Access

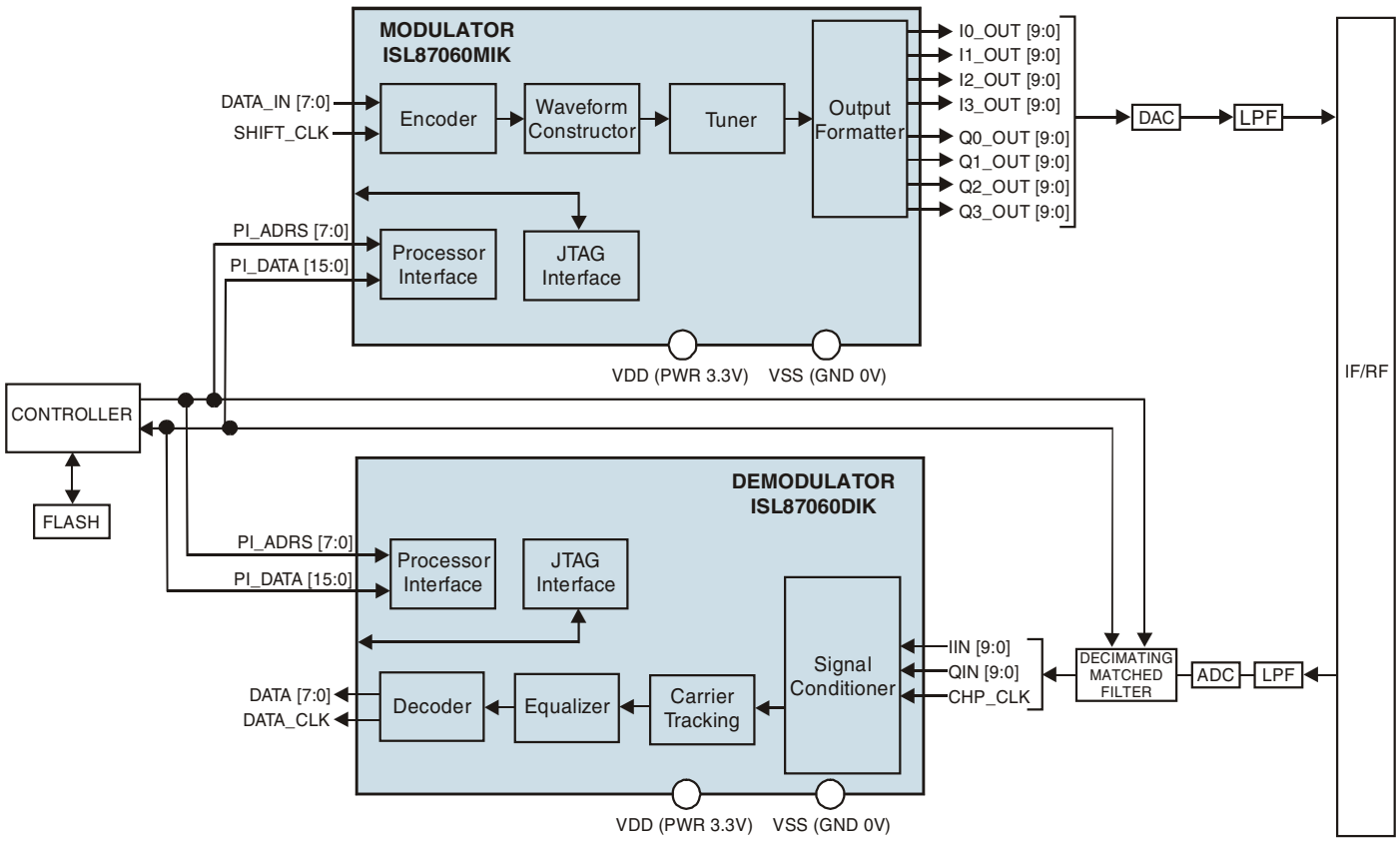
Features

- Programmable modulation: QPSK, 8PSK, 16QAM, 32QAM
- Flexible data rates up to OC-3/STM-1 (155Mbps)
- Programmable symbol rates
- Reed Solomon (RS) encoding/decoding
- Concatenated coding using RS and PTCM inner code
- FCC and ETSI spectral mask compliance
- Powerful equalization

Benefits

- Eliminates the need to develop custom ASICs
- Optimizes wireless link capacity and Bit Error Rate (BER) performance
- Enables rapid prototyping and compliance testing
- Proven technology as demonstrated in the Reference Design
- Complete evaluation kit supports immediate demo requirements, performance evaluation, and lab testing

Modem Reference Design Block Diagram



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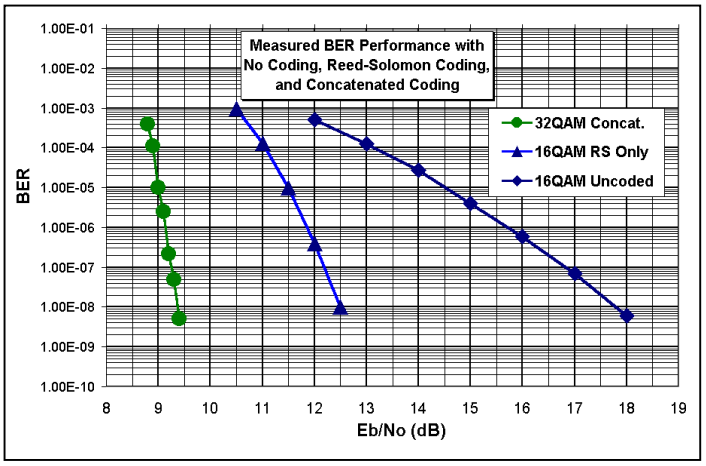
ISL837030 Modem Reference Design

Intersil's Modem Reference Design includes the company's ISL87060 chip set, ISL83700 Evaluation Kit, a Design License, and a complete documentation package, allowing OEMs to easily incorporate this broadband modem solution into their point-to-point radios.

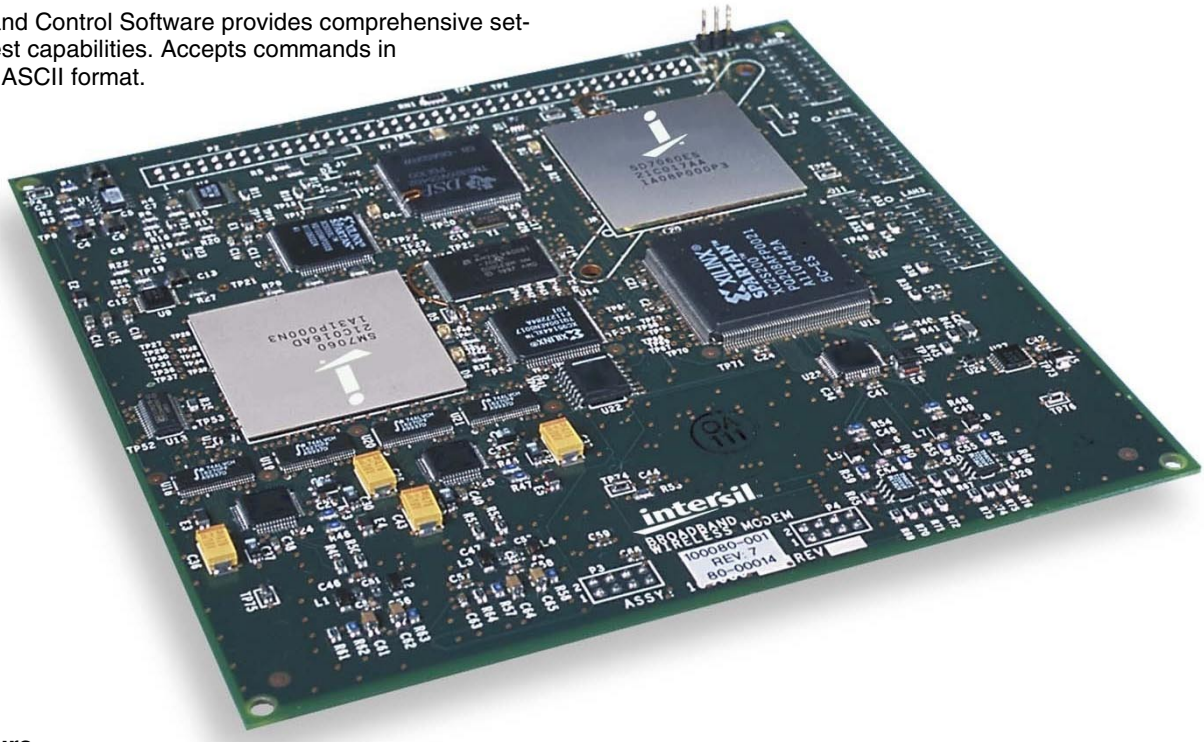
Includes

- Sample Modulator (ISL87060MIK) and Demodulator (ISL87060DIK) chips for development and test.
- ISL83700 Evaluation Kit: The Broadband Wireless Modem Reference Design is mounted in an Evaluation Platform, allowing the Modem PCBA to be set up and tested in a standard lab environment. Includes VHF and L-band daughterboards, and a sophisticated Graphical User Interface (GUI) for Windows® operating systems.
- Complete Documentation Package: Bill of Materials, Schematics, and PCBA Fabrication Files, including Gerber Files, provide information needed for manufacturing. User documentation in PDF format provides supporting information and instructions.
- Monitor and Control Software provides comprehensive set-up and test capabilities. Accepts commands in binary or ASCII format.



The Power of Concatenated Coding

Same Bandwidth. Same Data Rate. Dramatic Reduction in Amplifier Cost.



Architecture

The Broadband Wireless Modem Reference Design provides a flexible, high-performance, economical solution for fixed wireless applications. The modem architecture consists of three main functions:

1. **Modulator.** Converts byte-wide parallel data, encodes and digitizes it, and generates a differential baseband analog signal. This signal can then be up-converted to any IF/RF frequency the user requires.
2. **Demodulator.** Accepts a differential analog baseband signal and converts it to byte-wide digital data and clock.
3. **Controller.** Incorporates everything necessary to control and monitor the modem.

ISL83700 Modem Evaluation Kit

The ISL83700EVAL Evaluation Kit provides a means to efficiently evaluate the performance of Intersil's ISL87060 Modem Chip Set and ISL837030 Reference Design. This kit includes everything needed to exercise and monitor the performance of the modem in a laboratory or manufacturing test environment.

Includes

- Reference Design Modem PCBA
- Evaluation PCBA and Platform
- IF Up/Downconverter PCBAs
  - VHF (140MHz to 350MHz)
  - L-band (800MHz to 2000MHz)
- Built-in BER Test Capability
- Firmware/Software Upgrade capability
- Universal Power Supply and Power Cable
- Cable Assemblies: (1) PC Serial Port, (1) PC Parallel Port, and (2) Data interface
- User Documentation in PDF format and On-line Help
- Graphical User Interface (GUI) for Windows® operating systems (Windows 98, Windows 2000, Windows NT)

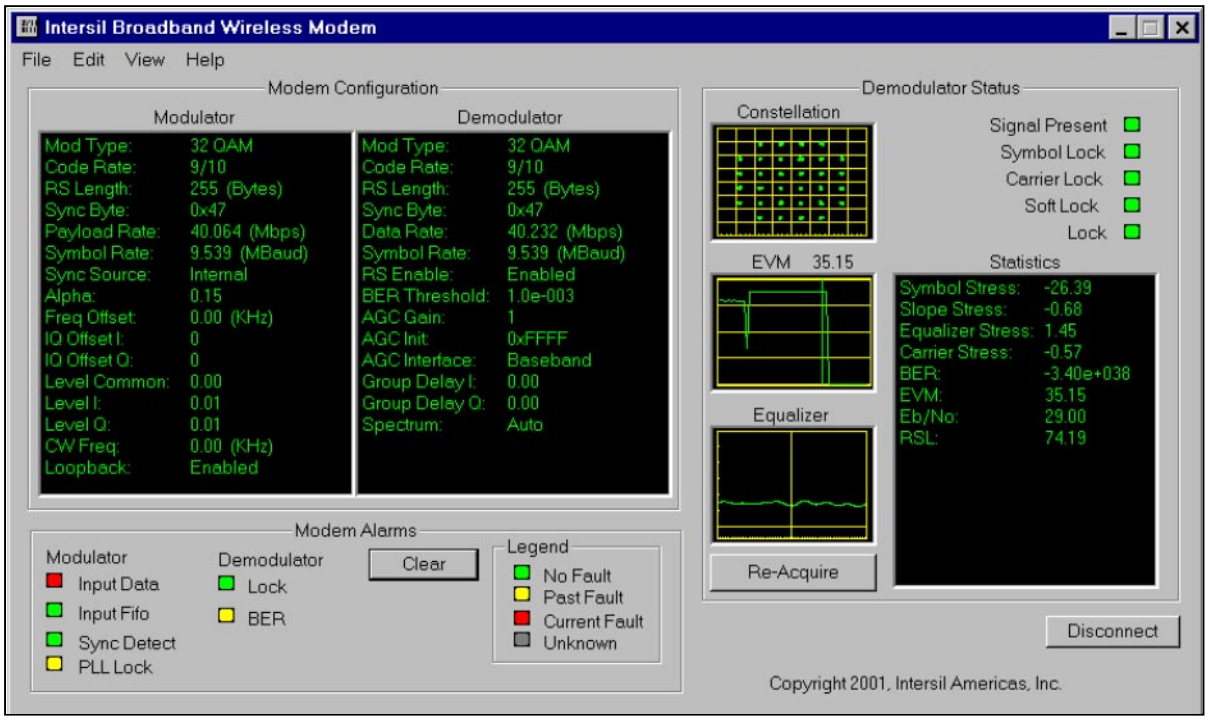
Hardware Interface

- SMA buffered output of the baseband output signals, which allows driving 50Ω test equipment directly
- Level conversion for standard RS-232 serial interface
- Conversion of TTL single-ended data interfaces to differential LVDS for interfacing to standard BER test sets

Ordering Information

PART NUMBER	DESCRIPTION
ISL837030REF	Reference Design
ISL87060MIK	Modulator Chip[1]
ISL87060DIK	Demodulator Chip[1]
ISL83700EVAL	Evaluation System

[1] *Purchase of Chip Set requires Reference Design License Agreement and minimum chip order.*



ISL87060 Chip Set Specifications

ISL87060MIK Modulator Chip

Package	352 pin BGA
Dimensions	35mm x 35mm
Thermal Resistance	θ_{JA}=12°C/W, θ_{JC}=0.72°C/W
Supply Voltage (VDD)	3.3V +/- 5%
Maximum Power	3.5W
Maximum Junction Temperature	125°C

ISL87060DIK Demodulator Chip

Package	352 pin BGA
Dimensions	35mm x 35mm
Thermal Resistance	θ_{JA}=12°C/W, θ_{JC}=0.72°C/W
Supply Voltage (VDD)	3.3V +/- 5%
Maximum Power[1]	7.7W
Maximum Junction Temperature	125°C

ISL837030 Modem Reference Design Specifications

Modem Parameters

ITEM		DESCRIPTION
Baud Rate Range		3.0MBaud to 42.514MBaud
Data Rate Range		2.75Mbps to 160Mbps
Reed Solomon Packet Size		(255, 238) (240, 223)
Power Consumption		16W MAX
FEC Modes		FEC disabled, RS FEC only, concatenated convolutional inner code with RS outer code
Modulation and Inner Code Rate	MODULATION	INNER CODE RATE[2]
	QPSK	1
	8PSK	1
	16QAM	3/4, 7/8, 1
	32QAM	4/5, 9/10, 1

Controller Parameters

ITEM	DESCRIPTION
Monitor & Control (M&C) Port	• TTL Level UART, RXD, TXD only • 115.2kBaud • 8 bits • No Parity • 1 Stop Bit

Power Supply Requirements

VOLTAGE	CURRENT
+5VDC ±5%	100mA
+3.3VDC ±5%	4A
-8.75VDC to -12VDC	100mA
+8.75VDC to +12VDC	100mA

Temperature and Humidity Requirements

ENVIRONMENT	OPERATING	STORAGE
Temperature	-40°C to 85°C	-50°C to 150°C
Humidity (non-condensing)	<95%[3]	99%

Size and Weight

Size	6" X 6", 0.71" to 1.8" high depending on heat sink option
Weight	5 oz.

Modulator Parameters

ITEM	DESCRIPTION
Pulse Shape (Alpha)	Programmable (0.15 – 0.35) in 0.05 steps
Baseband Frequency Tuning	± 500kHz, in 1kHz steps
Output Signal Type	• Fully balanced differential • AC Coupled
Baseband Output Level	Nominal: 1.95V p-p Maximum: 2.45V p-p
Tx Constellation EVM	45dB minimum
Baseband Amplitude Imbalance	< 0.05dB, after initial trim
Baseband Phase Imbalance	< 1°
Baseband Output Adjust	+ 2dB to -4dB in 0.1dB steps
Baseband Offset Trim	Programmable ± 35mV into 1.2kΩ load

Demodulator Parameters

ITEM	DESCRIPTION
Carrier Acquisition Range	± 175kHz
Symbol Acquisition Range	± 200ppm of baud rate
Rx Carrier Tracking Range	± 400kHz
Input Signal Type	Balanced differential, DC Coupled
Baseband Input Level	Balanced: 1.00V p-p differential for full scale ADC Unbalanced: 1.00V p-p single ended
Baseband Source Amplitude Error	< 1.0dB maximum
Baseband Source Phase Imbalance	< 3° maximum
Acquisition Time	Baud rate dependent 50ms to 1sec
Reacquisition Time	Baud rate dependent 125ms to 250ms

Reliability

MTBF 213,481 hrs (24.4 yrs) per Bellcore Std TR-332

[1] Heat sink required.

[2] Rate 1 is equivalent to No Inner Code.

[3] Operating humidity tolerance can be increased by conformal coating.

All Intersil products are manufactured, assembled, and tested utilizing ISO9000 quality systems.
Intersil Corporation's quality certifications can be viewed at the web site http://www.intersil.com/design/quality

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Sales Office Headquarters

NORTH AMERICA
Intersil Corporation
2401 Palm Bay Rd., Mail Stop 53-204
Palm Bay, FL 32905
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