Wireless Local Area Network PC Card

The Intersil WLAN PC Card (Note 1) is a complete wireless high speed modem utilizing the Intersil PRISM® Direct Sequence Spread Spectrum Wireless Transceiver chip set. It provides a sophisticated turnkey solution of hardware and software to system providers or integrators requiring wireless data communications capability and is ideal for integration into computer platforms.

Evaluation kits include two WLAN PC cards, Windows 95 Software and documentation to get your evaluation started quickly. Supporting the IEEE 802.11 network specification for Direct Sequence Spread Spectrum DSSS signaling the card is packaged in a PCMCIA Type II extended cover set. Radio design evaluation can be conducted by using PRISM1KIT-EVAL (PCMCIA card with an open cover set and connector output, two cards per kit) or network performance may be evaluated by using WLANKITPR1-EVAL (PCMCIA card with cover set and integrated antenna, 2 cards per kit). The card provides data rates up to 2Mbps. Outdoor line of sight range in excess of 1000 feet has been demonstrated and indoor range of 300 feet, depending on environment, is achievable. Interoperable Access Points are available from a number of suppliers, enabling a total wireless network solution.

Ordering Information

PART NUMBER	DESCRIPTION	CARDS/SET
WLANKITPR1-EVAL	WLAN Evaluation Kit	2

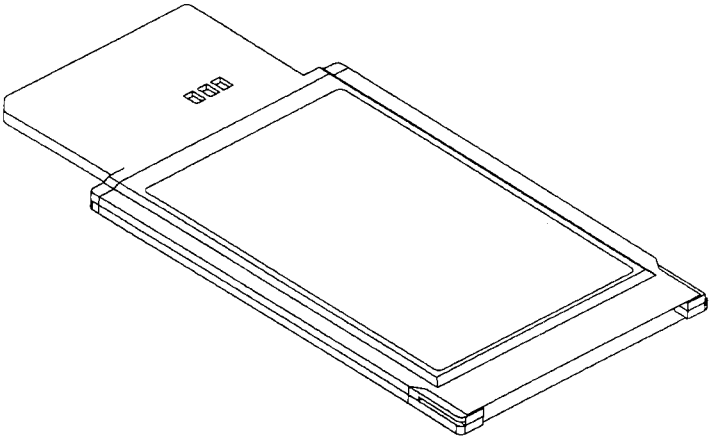
Features

- FCC Certified Under Part 15 to Operate in 2.4GHz ISM Band
- Support for 1 and 2 Megabit Per Second (Mbps) Data Rates
- Supports the IEEE802.11 Direct Sequence Specification
- Microsoft® Windows® 95 NDIS3 and Microsoft Windows 3.1 NDIS2 Network Drivers Available (ODI Network Drivers Planned)
- Integrated Microstrip Antenna
- Microcode/BIOS are Contained in Programmable Nonvolatile Flash Memory
- Radio Range of 300 Feet in an Indoor Environment (Note 2)
- Completely Covered Assembly is Designed to Fully Support PCMCIA's Defined Mechanical and Environmental Stress Conditions
- Intelligent Power Control, Including Low Power Standby Mode

NOTES:

1. Throughout this document, all references to 'PC Card', 'WLAN adapter', 'adapter', or 'card' refer to a covered card assembly conforming to the mechanical size specifications of the PCMCIA Standard Release 2.0, Type II Extended (5.0mm) definition.
2. The range will vary in different operating environments due to effects such as building construction.

Packaging



Microsoft® and Windows® are registered trademarks of Microsoft Corporation.

CAUTION: These devices are sensitive to electrostatic discharge; follow proper IC Handling Procedures.
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Functional Overview

The WLAN PC Card is designed to operate in the 2.4GHz ISM frequency band, channels 1 to 11, as specified by the FCC in the USA and ETSI in Europe (refer to Table 3). The Card will also operate with reduced performance (due to filter selection) on channel 14, specified for use in Japan. Radio Transmitters must be certified in a country prior to use. Refer to Table 4 for a list of countries and agencies that have approved the WLANKITPR1-EVAL for operation.

The Intersil PRISM Chip Set and AMD PCNet Mobile allows for high level integration allowing for reduced size, increased throughput, improved radio performance and faster time to market. The WLAN PC card implements Direct Sequence Spread Spectrum DSSS technology providing superior noise and signal jamming immunity including less severe impact from unintentional radiators such as microwave ovens. The user can connect the PC Card in an ad-hoc peer to peer networking scheme, allowing for instant network setup in any office environment. By using an access point, the wireless LAN can be set up to allow for a greater number of users to interconnect, and to increase the coverage area. With a portal, the wireless LAN can be easily connected into an existing wired LAN, allowing for easy expansion of the service.

To learn more about what the IEEE802.11 is, refer to:

- Tech Brief TB337 “A Brief Tutorial on Spread Spectrum and Packet Radio” [1].

For a more detailed description of radio operation, please refer to:

- Data sheet “PRISM 2.4GHz Chip Set” [2] and:
- Application Note AN9624 “PRISM1KIT-EVAL DSSS PC Card Wireless LAN Description” [3].

For more specific software questions, refer to:

- Application Note AN9666 “Wireless LAN Evaluation Kit SW Installation and Usage” [4].

The MAC Protocol Handler (AMD® PCNet™ Mobile) (AM79C930)

The PCNet Mobile device (AM79C930) and its firmware are responsible for running the 802.11 protocol in the WLAN card. This section describes the features of IEEE 802.11 that are implemented. Further information can be obtained from the following documents:

1. AMD PCNet Mobile WLAN Controller, Firmware Overview (available from AMD)
2. Firmware Interface Specification for IEEE 802.11/D5 (available from AMD)

Contact AMD’s web site:
http://www.amd.com/products/npd/npd.html
select Available Literature
or PCnet Family Drivers

The functions supported by the STA (station) Firmware are:

- DCF (Distributed Coordination Function)
- CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)
- Random Backoff
- RTS/CTS Handshake (Ready To Send/Clear To Send) and NAV Management (Network Allocation Vector)
- MAC Level Acknowledgments (Media Access Control)
- Re-Transmission of Unacknowledged Frames
- Duplicate Detection and Rejection
- Broadcast and Multicast Frames
- Fragmentation and Re-Assembly
- Power Management (Planned)
- Timestamp Synchronization
- Probe Generation
- Beacon Generation in an Ad-Hoc Network
- Probe Response Generation in an Ad-Hoc Network

Card Information Structure

The standard Intersil WLAN PC Card will be supplied with the following information embedded in the CIS. It should be noted that in most systems this information is displayed when the card is inserted. Customization of the CIS for specific customer requirements is available upon request, to enable customer information to be displayed when the card is inserted.

TABLE 1.

FUNCTION NAME	CONTENT
Manufacturer’s ID	00
Function ID	Network Adapter
Product Revision	5
Manufacturer	AMD
Product	AM79C930
PROG	
LOT	

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PCNet™ is a trademark of Advanced Micro Devices, Inc.

Network Driver Software

The Intersil WLAN PC Card will be supplied with NDIS2, NDIS3 and ODI network drivers. These drivers will be tested with the following network operating systems:

TABLE 2. SOFTWARE COMPATIBILITY TESTING

MANUFACTURER	TITLE	VERSION	DRIVER
Microsoft	Windows for Work Groups	3.11	NDIS2
Microsoft	Windows 95		NDIS3
Microsoft	Windows NT		NDIS3
Novel	Netware		ODI
IBM	OS2		ODI

Contact the factory for latest software status or visit our PRISM web site: http://www.intersil.com/prism/prism.htm

IEEE 802.11 International Agreement and Frequency Assignments

The IEEE802 LAN committee has forged an international agreement providing for wireless data communication standards for the frequency range of 2.4GHz to 2.4853GHz, as allocated by the FCC in the USA, and in the 2.471GHz to 2.497GHz frequency range, as specified by the regulatory authority in Japan. These standards are designed to focus the industry to develop highly integrated, low cost, interoperable WLAN equipment, of which WLANKITPR1-EVAL is a prime example.

There are 11 channels specified by the FCC in the 2.4GHz to 2.4853GHz range, and one channel in the 2.471GHz to 2.497GHz range, for operation in Japan. The ETSI (European) regulatory body conforms to the USA (FCC) channel assignments with the exceptions of channels 1 and 2 as shown in Table 3.

The available channels of operation in the 2.4GHz to 2.4853GHz and 2.471GHz to 2.497GHz ranges are as follows:

TABLE 3.

CHANNEL ID	FCC CHANNEL FREQUENCIES	ETSI CHANNEL FREQUENCIES	JAPAN FREQUENCY
1	2412MHz	N/A	N/A
2	2417MHz	N/A	N/A
3	2422MHz	2422MHz	N/A
4	2427MHz	2427MHz	N/A
5	2432MHz	2432MHz	N/A
6	2437MHz	2437MHz	N/A
7	2442MHz	2442MHz	N/A
8	2447MHz	2447MHz	N/A
9	2452MHz	2452MHz	N/A
10	2457MHz	2457MHz	N/A
11	2462MHz	2462MHz	N/A
12	N/A	2467MHz	N/A
13	N/A	2472MHz	N/A
14	N/A	N/A	2484MHz

Agency and Regulatory Body Approvals

The WLAN PC Card will comply to the following standards:

TABLE 4.

COUNTRY	APPROVAL	NOTES
USA	FCC part 15, Sec. 15.247, Sec. 15.107 and 15.109	Approved for Intentional Radiators Computer Peripheral
Canada	ICAN RSS-210	Approved
Europe	ETSI 300.328 Nov 96 EMC prETS 300.826	Planned

NOTES:

3. The Intersil FCC Identification Number is: MRF13316C2
4. The IC Approval Number is: CAN2722102478

Absolute Maximum Ratings

Supply Voltage . . . . . -0.3V to 6.0V (Max)
Storage Temperature (Note 5) . . . . . -20^oC to 65^oC

Operating Conditions

Temperature Range . . . . . $0^oC \le T_A \le 55^oC$
Supply Voltage Range . . . . . 4.75V to 5.25V

NOTE:

5. All temperature references refer to ambient conditions.

Caution: These are the absolute maximum ratings for the PC Card product. Exceeding these limits could cause permanent damage to the card.

Electrical Specifications

Test conditions supply voltage: 5V ±5%, $T_A = 25^oC$

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
CURRENT CONSUMPTION						
Average Current (Without Power Saving Mode) (Note 6)	I_{CC}	2% Transmit 98% Receive	-	290	-	mA
Average Current (With Power Saving Mode) (Note 6)	I_{CC}	2% TX 90% Standby 8% RX	-	60	-	mA
Continuous Transmit Mode	I_{CC}		-	488	-	mA
Continuous Receive Mode	I_{CC}		-	287	-	mA
Standby (Note 6)	I_{CC}	Estimated	-	30	-	mA
PC CARD LOGIC LEVELS						
Input HIGH Voltage	V_{IH}		2.4	-	V_{CC} +0.2	V
Input LOW Voltage	V_{IL}		0.0	-	0.8	V
Output HIGH Voltage	V_{OH}	-0.4mA lLOAD	2.8	-	V_{CC}	V
Output LOW Voltage	V_{OL}	4mA ILOAD	-	-	0.45	V
		12mA lLOAD	-	-	0.45	V
		24mA ILOAD	-	-	0.45	V
PC CARD LEAKAGE CURRENT						
Input Leakage Current	L_{IN}		-10	-	10	µA
PC CARD LOADING CAPACITANCE						
Input Capacitance	C_{IN}		-	-	12	pF
Output Capacitance	C_{OUT}		-	-	12	pF
ENVIRONMENTAL SPECIFICATIONS						
Vibration	Vib	10 to 2000Hz, $V_{CC} = 0$	-	-	15	G
Drop	Drop		-	-	75	cm
Torque	T	10^o Max	-	-	11	Lb/Ft^2
ESD	ESD	Non-Operating	-	-	1500	V
X-RAY	X-RAY		-	-	10K	Roentgen
UV	UV	Wavelength 254nm	-	-	15K	µW/cm
Humidity	RH		-	-	98	%
EMI	EMI		-	-	1K	Oersted

Electrical Specifications Test conditions supply voltage: 5V ±5%, T_A = 25°C **(Continued)**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
RF SYSTEM SPECIFICATION						
Antenna Gain	AG	MAX	-	2.5	-	dBi
EIRP	EIRP		-	20	-	dBm
Receive Sensitivity	RX_S	8% PER, 2mB/s	-	-88	-	dBm
Maximum Receive Level	RX_MAX	PER <8%	-	-4	-	dBm
Third Order Intercept Point (Input)	IIP3		-	-24	-	dBm
Image Rejection	IR	PER <8%	-	65	-	dB
IF Rejection	IFR	PER <8%	-	80	-	dB
Adjacent Channel Rejection	ACPR	PER <8% (Note 7)	-	63	-	dB
Noise Figure RF Front End	NF		-	8	-	dB
Data Rate (Physical Layer)	Rate		-	1 and 2	-	Mbps
Data Rate (PC to PC)	THRGH	DQPSK 2Mb Mode	-	1.2	-	Mbps

NOTES:

6. Refer to Application Note “PRISM Power Management Modes” AN9665. [5]
7. The adjacent channel measurement is carried out on two channels specially separated by 25MHz (5 channels).

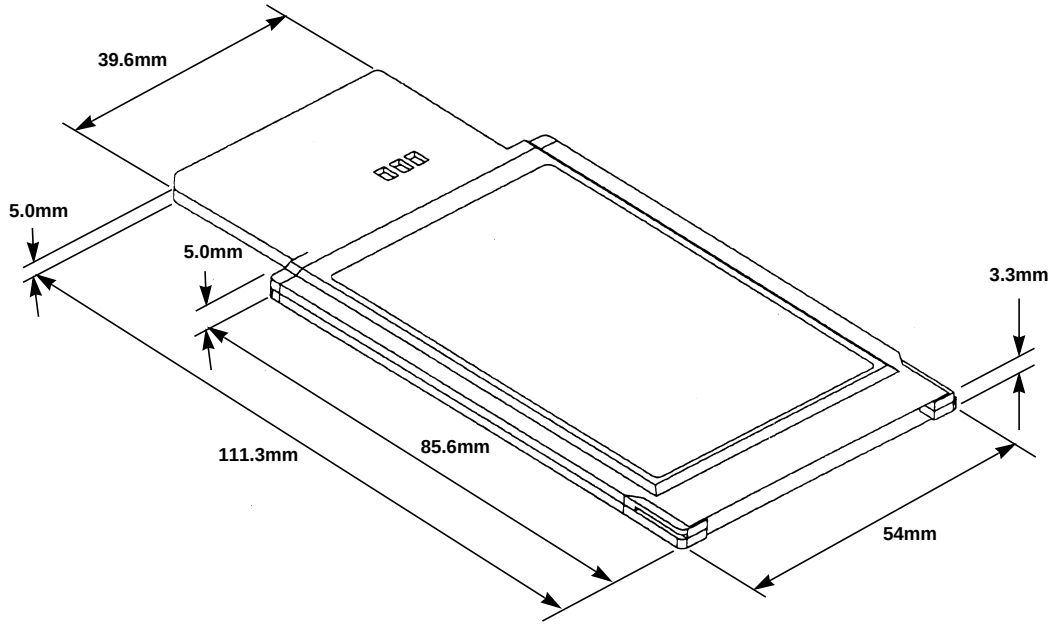
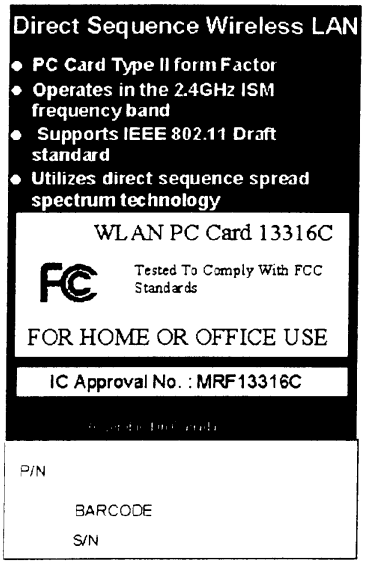


FIGURE 1. DIMENSIONED MECHANICAL DRAWING OF COVERSET

PC Card Labels

The PC Card is offered with generic back label as shown below. Custom label options are available.

Back PC Card Label



References

For Intersil documents available on the internet, see web site http://www.intersil.com/
Intersil AnswerFAX (407) 724-7800.

[1] *TB337 Tech Brief*, Intersil Corporation, “A Brief Tutorial on Spread Spectrum and Packet Radio”, AnswerFAX document No. 82337.

[2] *PRISM 2.4GHz Chip Set Data Sheet*, Intersil Corporation, AnswerFAX document No. 4063.

[3] *AN9624 Application Note*, Intersil Corporation, “PRISM1KIT-EVAL DSSS PC Card Wireless LAN Description”, AnswerFAX document No. 99624.

[4] *AN9666 Application Note*, Intersil Corporation, “Wireless LAN Evaluation Kit SW Installation and Usage”, AnswerFAX Document No. 99666.

[5] AN9665 Application Note, Intersil Corporation, “PRISM Power Management Modes”, AnswerFAX Document No. 99665.

Further information can be found in the following:

- The PCNetMobile (AM79C930) data sheet, http://www.amd.com/products/npd/npd.html.
- Intersil PRISM datasheets, web home page, http://www.intersil.com/prism/prism.htm
- IEEE 802.11 Standards Project (available from the IEEE, New York, USA).
- PC Card V2.1 Standard

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