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Hardware Specification

For

ORiNOCO Mini PCI IEEE802.11b

Preliminary Specification

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CHANGE SHEET

TITLE: Target Hardware Specification For NIC type 2 Mini PCI

Rev.	Date	Description of change			Approval & Date
		Pages	Par.		
A	05-03-00	all	all	Initial version	

Data Sheet status

Data sheet status	Product status	Definition
Target specification	Development	This specification contains the design targe goal specifications for product developmen Specifications may change in any manner.
Preliminary specification	Qualification	This specification contains preliminary data and possible supplementary data will be published at a later date.
Functional specification	Production	This specification contains final product functional specification.

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

1.1. Scope

This document specifies the hardware functions and requirements for the WaveLAN/MiniPCI Network Interface Card (NIC) operating in the 2.4GHz band.

1.2. Functional Summary

The Network Interface Card is capable to operate in quasi-static indoor environments. It functions as an interface between the mini-PCI Host bus and the Wireless Local Area Network (WLAN) transport medium (free space).

The Network Interface Card covers 1Mbit/s DBPSK and 2Mbit/s DQPSK modulation as defined in the IEEE802.11 PHY standard for Direct Sequence Spread Spectrum (DSSS). A enhanced functionality, it also covers 5.5Mbit/s and 11Mbit/s Complementary Code Keying (CCK). These Physical Layer characteristics comply with the regulations of the Federal Communication Committee (FCC) Part 15, Japanese MPT and European ETS regulations. The 2.4GHz ISM band is used for information transmission in compliance with government regulations.

2. REFERENCE DOCUMENTS

2.1. EMC radio and safety regulations and standards

1	USA	FCC CFR47 Rules and Regulations Part 2 and Part 15, Radio Frequency De
2	USA	UL1950 Product Safety Standard for IT Equipment.
3	Canada	ISC RSS-210 Low-Power Radio Communication Devices.
4	Japan	VCCI Voluntary Control Council for Interference of IT Equipment.
5	Japan	MPT ordonnance 78/79 and MPT announcement 579 Radio Regulations.
6	Europe	ETS 300-826 General EMC standard.
7	Europe	ETS 300-328 Wide-Band Transmission systems in 2.4GHz ISM band.
8	Europe	EN55022 EMC emissions for IT Equipment.
9	Europe	EN60950 Product Safety Standard for IT Equipment.
10	International	CISPR 22 EMC emissions for IT Equipment.
11	International	IEEE.C95,1-1991 Standard for Safety Levels w.r.t. Human Exposure to RF E fields 3kHz-300GHz.
12	International	IEC950 Product Safety Standard for IT Equipment.

2.2. Other documents and standards

13	P802.11	Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, November 18, 1997.
14	IEEE Std 802.11b/D4.1	Draft supplement to IEEE802.11 - 1997 edition (CCK addition)
15	White Paper	Lucent Technologies WCND certification white paper
16	Mini PCI spec.	Mini PCI specification rev. 1.0 October 1999
17	SCPS045C.PDF	Texas Instruments TI1410 data sheet, 2000
18	PCI local bus specification	PCI local bus specification rev. 2.2, December 18, 1998

3. GENERAL DESCRIPTION

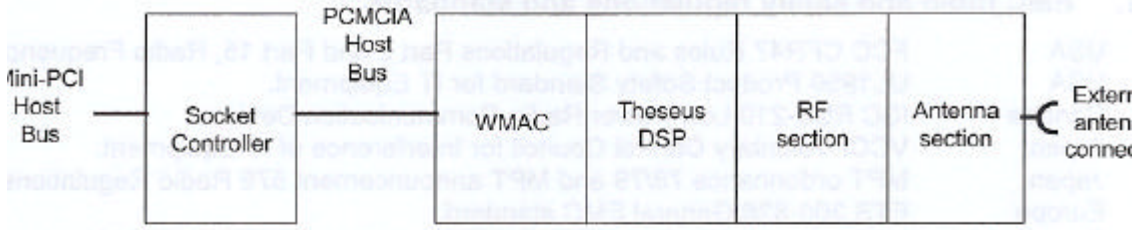

Figure 1. Functional diagram of the mini-PCI card.

3.1. Socket Controller

The socket controller is the transformer from the Mini PCI bus signaling to the PCMCIA signaling, which is the protocol that is used by the Wireless Medium Access Controller. The socket controller functionality can be found in theTI1410 Datasheet [Ref 17].

3.2. Wireless Medium Access Controller function

The Wireless Medium Access Control (WMAC) function of the NIC provides for the data communication protocol and control of the Physical Layer. The WMAC function is built up the Hermes WMAC controller with 128Kx8 peripheral flash EEPROM and 2 x 128Kx8 peripheral RAM.

In this document, the Wireless Medium Access Controller function is referred to as WMAC

3.3. PHY controller function

The PHY controller function of the NIC is implemented by a DSP ASIC and provides the core Physical Layer functionality and control of the RF Section. It communicates with the WMAC for data exchange, Physical Layer control and parameter setting.

In this document, the PHY controller is referred to as DSP.

3.4. RF function

The RF function of the NIC provides the functionality in which the spreaded signal from the DSP is modulated onto an RF carrier and transmitted, while received RF signals are demodulated and the resulting spreaded signal is passed to the DSP. Its hardware implementation is referred to as RF Section.

3.5. Antenna function

The Antenna function of the NIC provides a single RF connection to an external Diversity Antenna, or two RF connections using on-board diversity switching. Antenna selection is controlled by the DSP.

4. PHYSICAL ENVIRONMENT

The Network Interface Card shall comply with the Mini-PCI Specification, October 1999.

4.1. Dimensions

The Network Interface Card shall comply to the Mini PCI Specification, October 1999 [Ref. 16], Section 5.4.5: Type IIIA Form Factor and Section 5.4.7: Type IIIa PCB Details.

Figure 2 gives an overview of the main dimensions and positions of RF connectors.

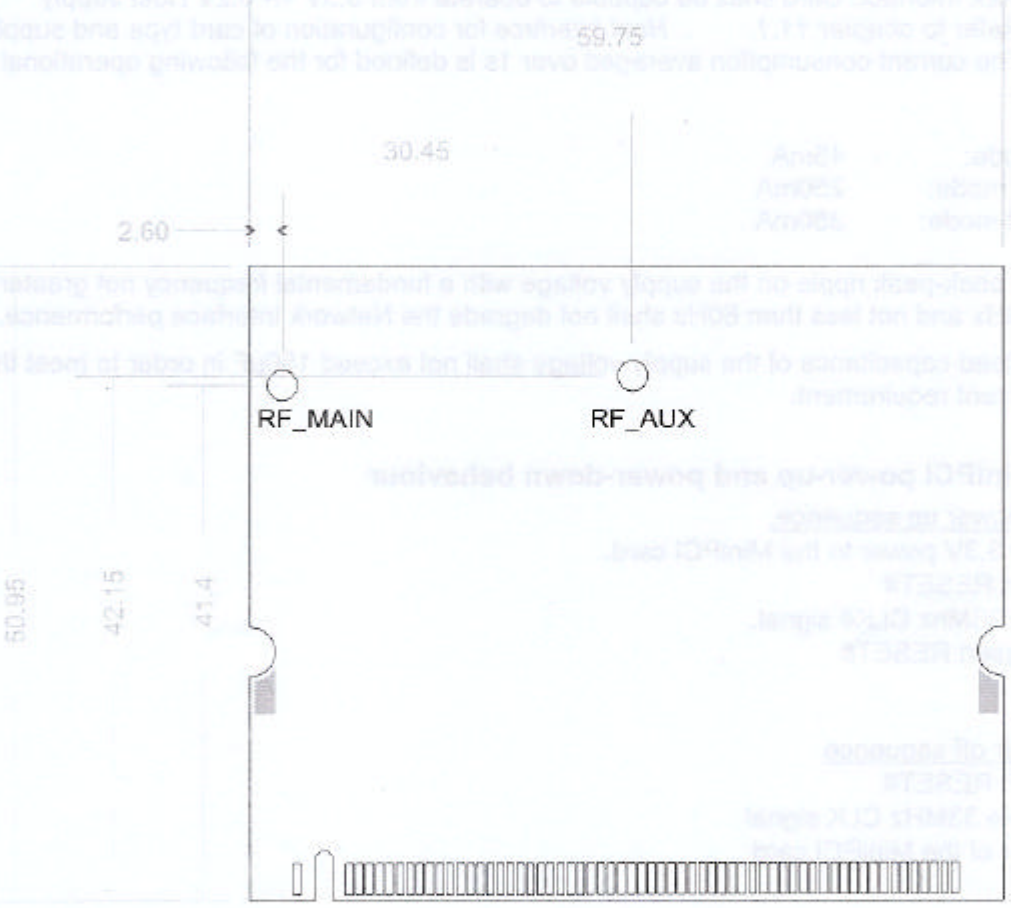

Figure 2. Board dimensions and location of RF-connectors. All dimensions in mm

4.2. Operating and Storage Environment

The Network Interface Card shall be capable to pass the environmental tests as specified in "Mini PCI Specification, October 1999 [Ref. 16], Section 5.6 Thermal Guidelines".

Operating temperature range:	0°C to 60°C ambient temperature.
Relative humidity when operational:	95% maximum (non condensing).
Storage temperature range:	-20°C to 75°C ambient temperature.
Relative humidity during storage:	95% maximum (non condensing).

5. OPERATIONAL ENVIRONMENT

The Network Interface Card shall comply with the "PCI Local Bus Specification [Ref. 18]", with exceptions as mentioned in "Mini PCI Specification" [Ref. 16].

Function specific signals, like AC97 link interface, audio and ethernet signals are not supported, with exception of LED signals. Some signals are used for test or other purposes Details can be found in chapter 11. INTERFACES.

5.1. Power supply

The Network Interface Card shall be capable to operate from 3.3V +/- 0.2V Host supply voltage. Refer to *chapter 11.1. Host interface* for configuration of card type and supply voltage. The current consumption averaged over 1s is defined for the following operational modes:

Doze mode:	45mA
Receive mode:	250mA
Transmit mode:	350mA

A 120mV peak-peak ripple on the supply voltage with a fundamental frequency not greater than 150kHz and not less than 60Hz shall not degrade the Network Interface performance.

The total load capacitance of the supply voltage shall not exceed 150µF in order to meet the inrush current requirement.

5.2. MiniPCI power-up and power-down behaviour

MiniPCI power up sequence.

- Apply 3.3V power to the MiniPCI card.
- Assert RESET#
- Apply 33Mhz CLK# signal.
- De-assert RESET#

PCI Power off sequence

- Assert RESET#
- Disable 33MHz CLK signal
- Power of the MiniPCI card

6. CONFIGURABILITY

6.1. PCI configuration data

The configuration header is compliant with the PCI specification as a CardBus bridge header. The table below shows the main parameters of the PCI configuration header.

Parameter	Offset	Value	Remark
VendorID	00h	104Ch [fixed]	TI
DeviceID	02h	AC50h [fixed]	PCI1410
PCI Class code	09h	060700h [fixed]	This register recognizes the PCI1410 as a bridg device (06h), and CardBus bridge device (07h) with a 00h programming interface
Header type	0Eh	02h [fixed]	the PCI1410 configuration space adheres to the CardBus bridge PCI header
Subsystem vendor ID	40h	12A3h	Lucent Technologies [loaded from EEPROM]
Subsystem ID	42h	ABXXh	PCI Product identification AB – Lucent Technologies / ORiNOCO product line Product revision XXh [loaded from EEPROM]
System control	80h	00449060	chip configuration [loaded from EEPROM]
Multifunction routing	8Ch	01000002	chip configuration [loaded from EEPROM]
Miscellaneous control	90h	616000C0	chip configuration [loaded from EEPROM]

6.2. Function configuration registers.

The WMAC only supports the Configuration Option Register (COR) located in the attribute memory space at address 3E0h. The Host software shall obtain this address from CISTPL_CONFIG.

b7	b6	b5	b4	b3	b2	b1	b0
CRESET	LevIREQ	Configuration Index					

CRESET

COR reset bit. Setting this bit places the Network Interface Card in reset state. This is equivalent to the Host asserting HRESET, except that this bit is not cleared. The Host shall clear this bit by writing 00h to the COR register in order to assure that the NIC continues as memory-only card after the software reset.

LevIREQ

When set, the WMAC shall generate level-mode interrupts. When cleared, the WMAC shall generate pulse-mode interrupts. The WMAC supports both interrupt modes.

By default, the level-mode interrupt shall be used.

Configuration index

The NIC is configured as memory-only card if the configuration index is 00h. The card is configured as I/O card by writing 01h to the configuration index.

By default, the card is configured as I/O card by writing 41h to the COR register.

6.3. Card Information Structure

The Card Information Structure (CIS) is accessible by the Host through the attribute ad space. The WMAC downloads the CIS from its non-volatile memory in the attribute mer after a reset.

6.4. PC Card Configuration parameters

All configuration parameters of the Network Interface are stored in non-volatile memory the WMAC and are accessible by the Host. Refer to the Functional Specification for He WMAC Controller.