



REV.0.1 9/11/2002002

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T60H570.00
MINIPCI IIIA
WLAN/Modem Combo Card

Marketing Requirements Specification

June 13, 2002

0. REVISION HISTORY 3



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0. Revision History

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1. Introduction

Project Name : MINIPCI IIIA WLAN/Modem Combo—Atmel/RFMD+Agere Scorpio
Project Code : T60H570.00

This documentation describes the marketing requirements specification of the Ambit MINIPCI IIIA Wireless LAN/Modem Combo card using Atmel's WLAN and Agere Scorpio chipsets. It is a confidential document of AMBIT.

1.1 Scope

AMBIT MINIPCI IIIA WLAN/Modem Module complied with IEEE 802.11b 11Mbps Standard. It can be used to provide a variety of low-cost wireless network interfaces to build your wireless connection via simply SMT procedure to speed the time to market. The MINIPCI IIIA WLAN/Modem Module that complies with MiniPCI Rev 1.0 Type IIIA specification and combines networking with high-speed Internet access will let people connect to the Internet anywhere, anytime. The ATMEL/RFMD's chips are implemented including AT76C506 BB/MAC, RF2948B Transceiver, RF2494 LNA/Mixer, RF5117 PA.

With V.92 technology, the modem part can achieve the new feature like Fast connect, Modem on Hold, PCM Upstream, and V.44(updates the older compression standard V.42bis). Although the central-site architecture is beginning to move forwards V.92, most of the existing infrastructure only support V.90 equipment. So AMBIT V.92 Internal Modem module support both V.92 and V.90 with a fallback to V.34 for connections where a V.92 or V.90 connection is not negotiated.

1.2 Wireless LAN Function

- Compatible with IEEE 802.11b high rate standard to provide wireless Ethernet speeds of 11Mbps data rate
- Dynamic data rate switching with 11, 5.5, 2 and 1Mbps
- Allows auto fallback data rate for optimized reliability, throughput and transmission range
- Supports IEEE 802.11 compliant Infrastructure mode and Ad-hoc mode
- Supports wireless data encryption with 64/128-bit WEP standard for security
- Dual diversity antenna connectors supported for the multi-path environment

1.3 Modem Function

- ITU-T V.90 data rates with auto-fallback to V.34, V.32terbo, V.32bis and fallbacks
- TIA/EIA 602 standard for AT Command set
- Supports V.42 error correction and V.42bis/MNP5 data compression



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- FAX capabilities: ITU-T V.17, V.29, V.27ter, V.21 Ch2 and TIA/EIA 578 Class1 FAX
- AC'97/MC'97 2.2 compliant
- ACPI Power management compliant with Low power standby mode.
- Modem Call Progress Audio—The call progress signal shall be scaled digitally according to the speaker level setting (ATL1, L2, L3). The modem may use either the AC Link data path or the PWM system input (MOD_AUDIO_MON) on the Mini-PCI connector (pin 111) to provide the call progress audio to the host system.
- Modem Digital Line Guard—The product shall incorporate circuitry to sense whenever the current on the line exceeds approximately 130mA, and should immediately go back on hook.

1.4 Target Country

<u>Tier 1</u>	<u>Tier 2</u>
United States	France
Canada	Germany
Australia	Switzerland
New Zealand	Malaysia
United Kingdom	Singapore
Hong Kong	Japan



2. Hardware Requirements

2.1 Wireless LAN Hardware Features

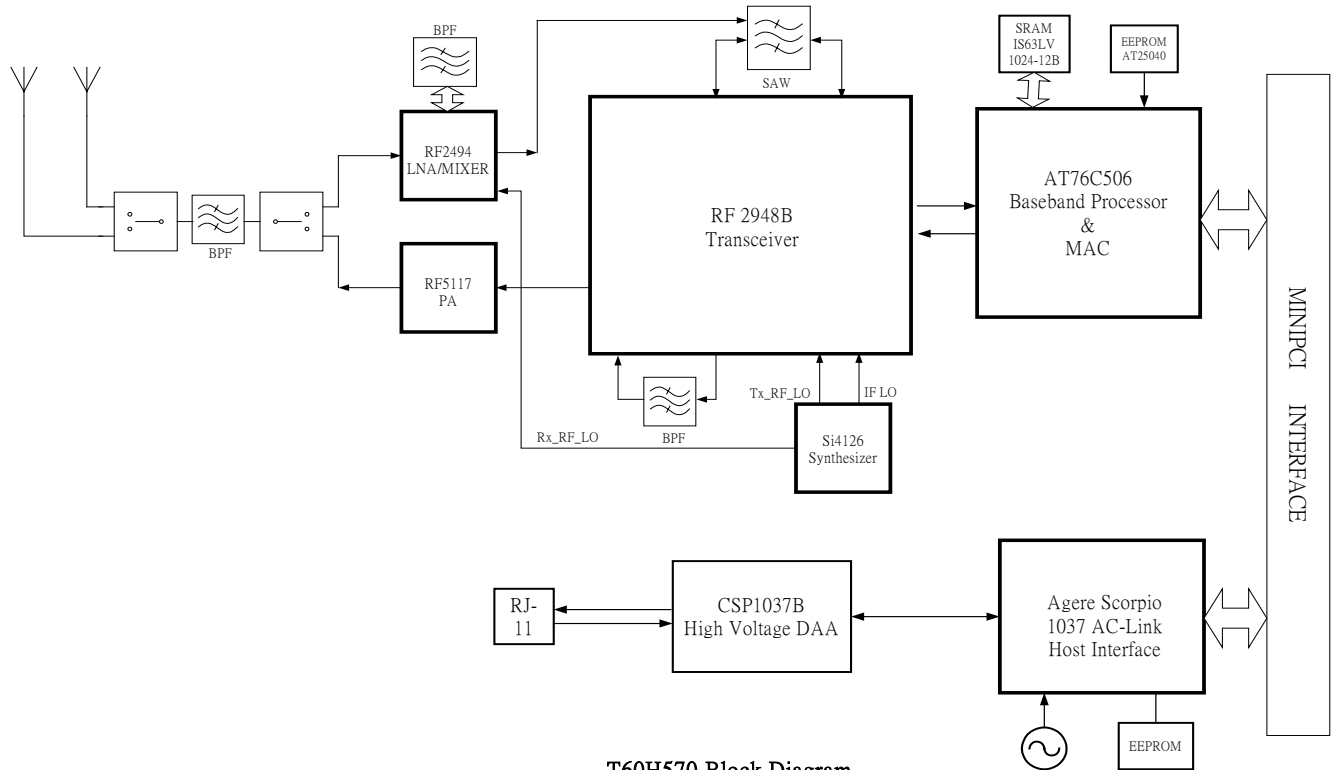
Feature (examples)	Description
Standard	IEEE 802.11b Compliant
Frequency Band	<ul style="list-style-type: none"> • 2.4000 - 2.497 GHz
Number of Selectable Sub-channels	11 channels for United States 13 channels for Europe Countries 14 channels for Japan
Wireless Medium Technology	<ul style="list-style-type: none"> • DSSS
Spreading Modulation	<ul style="list-style-type: none"> • 11-chip Barker Sequence • DBPSK, DQPSK, CCK
Media Access Protocol	<ul style="list-style-type: none"> • CSMA/CA with ACK
Receiver Sensitivity (for PER of <8%)	<ul style="list-style-type: none"> • 11Mbps: < -80 dBm • 5.5Mbps: < -83 dBm • 2Mbps: < -85 dBm • 1Mbps: < -87 dBm
Output Power, including antenna gain	<ul style="list-style-type: none"> • Typical 16dBm
Operating Voltage	<ul style="list-style-type: none"> • 3.3V +/- 5%
Current Consumption	<ul style="list-style-type: none"> • TX: < 600mA max • RX: <400 mA, max
LED Support	The signaling for the LED shall be provided to the host via the Mini PCI connector, pin 11 <ul style="list-style-type: none"> • LED Flashing – AP search mode • LED Solid On – Active Link • LED Off – Radio Power Off

2.2 Analog Modem Hardware Features

Feature (examples)	Description
Standard	Audio Codec '97 specification, revision 2.2
Data Mode Capabilities	V.92, V.90 (a-law, mu-law), V42.bis , MNP5, V.44 field upgradeable, V.42 (LAPM, MNP2-4), V.34 ,V.32bis, V.32, V.23, V.22bis, V.22, V.21, Bell 212A, Bell 103J
Fax Mode Capabilities	TIA-578-A (Class 1), T.30, T.4 (Group 3), , V.17, V.29, V.27ter, V.21 Channel 2 V.34 Fax field upgradeable
Line Interface	Modem part connected to RJ-11 on motherboard through connector (MOLEX connector, part no.:

53780-0290 SMD-2) Surge protector and Ferrite Bead can be placed on modem part circuit.

2.3 Hardware Architecture



T60H570 Block Diagram

Agere CSP1037B: Telephone Line Interface

Agere Scorpio (CSP 1037): AC-97 Interface

RFMD RF5117: Power Amplifier

RFMD RF2494: LNA/Mixer

RFMD RF2948B: Transceiver

ATMEL AT76C506: Integrated MAC and Baseband Processor

Modem part is designed as a secondary device, the BIT_CLK becomes an input and is used as the master clock. Host system should supply BIT_CLK to the modem parts.

2.4 Mechanical Requirements

The Ambit Mini-PCI WLAN/Modem Combo Module shall be 6-layer FR4 PCB design, which meets the requirements of Mini-PCI Type IIIA.

Maximum PCB Dimension (W x L x H) : 59.6mm x 50.8mm x (1.00mm+/-0.1mm)

Module Height (front/PCB/back) w shielding case : 4.8 mm (2.4mm/1.0mm/1.4mm)



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2.5 Antenna Connection

Dual antenna connectors (HRS Compliant) supported on the RF module to improve the performance due to multi-path environment.

3 Software Requirement

3.1 Software setup

1. Utility setup must be able to run in two modes:
 - Normal mode. Setup should display the necessary dialogs to allow the user to select different options for installing the software.
 - Unattended, silent mode. Setup should install without user intervention and using default settings stored in a file.
2. Driver setup can support INF file installation

3.2 Operating System Support

The driver must support the Windows XP Tablet PC Edition Operating Systems at product introduction. The drivers must be WHQL-certified.

3.3 Software/Firmware Upgrade

- Module shall support passive scanning to determine acceptable frequencies, so that only one SKU is required worldwide
- Supports flash upgrade of the firmware image, Software and firmware upgrades must be provided to support future operating systems for the life of the customer product.

3.4 Site Survey Tools

The Utility support Site Survey Tool automatically scans the AP nearby and shows signal strength of each channel. (For WLAN only)

4. Compatibility Requirements

The Ambit WLAN/modem Combo module shall pass the standard test plan which includes hardware compatibility and reliability, and software compatibility test.

5. Regulatory Requirements

5.1 Radio approval requirements

The product must be complied with the radio approval of

- 1) FCC Part15 Subpart C 15.247 and certified by FCC before marketing in USA
- 2) ETSI 300 328 and certified by ETSI before marketing Europe countries
- 3) RCR STD-33 certified by TELEC before marketing Japan



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5.2 Telecom approval requirements

The product must be complied with the Telecom approval of

- 1) FCC part68 and certified by FCC before marketing in USA
- 2) TBR21 before marketing Europe countries
- 3) Certified by JATE before marketing Japan

5.3 EMC requirements

The product must be complied with EMC requirement as follows.

- 1) FCC part 15 Class B before marketing in USA
 - 2) ETS 301 489, CISPR 22 Class B, and EN55024:1998 for European market
- Support, including providing on-site assistance as needed, must be available to assist customer in achieving EMC approval.

5.4 Safety requirements

The subject product must be certified with EN60950 and IEC60950, Second Edition, including Amendments 1, 2, 3, and 4.

5.5 WHQL Compliance

Ambit is responsible for WHQL logo certification of the device driver package for Windows XP operating systems. When Ambit certifies the module and device driver package with WHQL, it must provide customer with the status and the digital signature CAT files as required by Microsoft

6. Reliability, Maintainability and quality

6.1 Reliability

Mean Time Between Failure (MTBF) 30,000 hours

6.2 Maintainability

There should be no scheduled preventive maintenance required.

6.3 Quality

The product quality must be followed-up by Ambit factory quality control system.



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7. Environmental Requirements

7.1 Temperature

7.1.1 Operating Temperature Conditions

The product shall be capable of continuous reliable operation when operating in ambient temperature of 10 degree C to +40 degree C.

7.1.2 Non-Operating Temperature Conditions

Neither subassemblies shall be damaged nor shall the operational performance be degraded when restored to the operating temperature when exposed to storage temperature in the range of -20 degree C to +60 degree C.

7.2 Humidity

7.2.1 Operating Humidity Conditions

The product shall be capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.

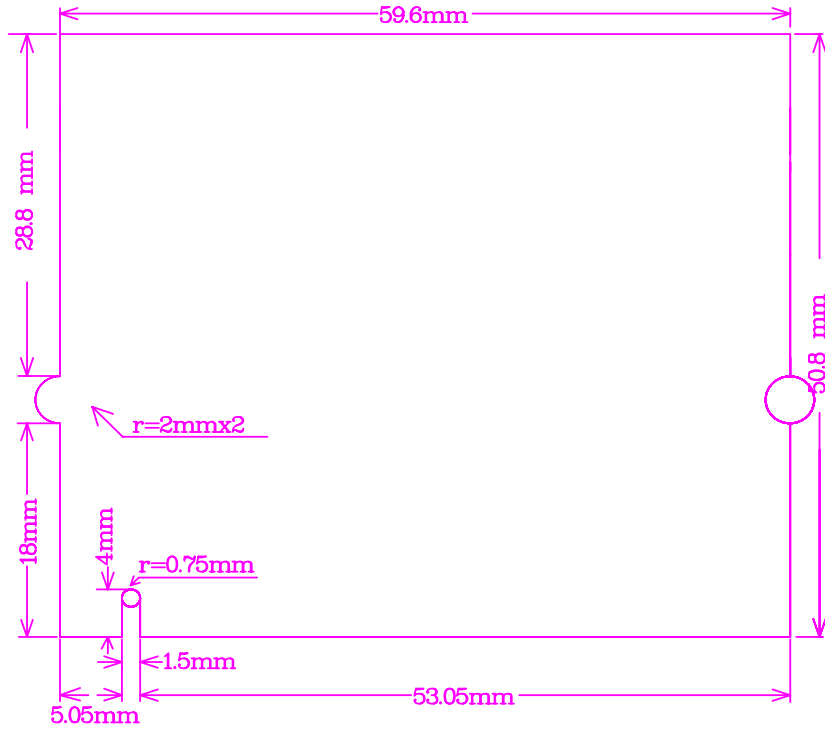
7.2.2 Non-Operating Humidity conditions

The product shall not be damaged nor shall the performance be degraded after exposure to relative humidity ranging from 5% to 90% non-condensing.

Appendix 1. Pin assignment

2	RING	TIP	1
4	8PMJ-1	8PMJ-3	3
6	8PMJ-2	8PMJ-6	5
8	8PMJ-4	8PMJ-7	7
10	8PMJ-5	8PMJ-8	9
12	LED2_YELP	LED1_GRNP	11
14	LED2_YELN	RADIO_PWR_CTRL	13
16	RESERVED	CHSGND	15
18	5V	INTB#	17
20	INTA#	3.3V	19
22	RESERVED	RESERVED	21
24	3.3VAUX	GND	23
26	RST#	CLK	25
28	3.3V	GND	27
30	GNT#	REQ#	29
32	GND	3.3V	31
34	PME#	AD[31]	33
36	RESERVED	AD[29]	35
38	AD[30]	GND	37
40	3.3V	AD[27]	39
42	AD[28]	AD[25]	41
44	AD[26]	RESERVED	43
46	AD[24]	C/BE[3]#	45
48	IDSEL	AD[23]	47
50	GND	GND	49
52	AD[22]	AD[21]	51
54	AD[20]	AD[19]	53
56	PAR	GND	55
58	AD[18]	AD[17]	57
60	AD[16]	C/BE[2]#	59
62	GND	IRDY#	61
64	FRAME#	+3.3V	63
66	TRDY#	CLKRUN#	65
68	STOP#	SERR#	67
70	3.3V	GND	69
72	DEVSEL#	PERR#	71
74	GND	C/BE[1]#	73
76	AD[15]	AD[14]	75
78	AD[13]	GND	77
80	AD[11]	AD[12]	79
82	GND	AD[10]	81
84	AD[09]	GND	83
86	C/BE[0]#	AD[08]	85
88	3.3V	AD[07]	87
90	AD[06]	+3.3V	89
92	AD[04]	AD[05]	91
94	AD[02]	RESERVED	93
96	AD[00]	AD[03]	95
98	RESERVED	5V	97
100	RESERVED	AD[01]	99
102	GND	GND	101
104	M66EN	AC_SYNC	103
106	AC_SDATA_OUT	AC_SDATA_IN	105
108	AC_CODEC_IDO#	AC_BIT_CLK	107
110	AC_RESET#	AC_CODEC_IDI#	109
112	RESERVED	MOD_AUDIO_MCN	111
114	GND	AUDIO_GND	113
116	SYS_AUDIO_IN	SYS_AUDIO_OUT	115
118	SYS_AUDIO_IN GND	SYS_AUDIO_OUT GND	117
120	AUDIO_GND	AUDIO_GND	119
122	MPCIACT#	RESERVED	121
124	3.3VAUX	VCC5VA	123

Appendix 2. Mechanical Drawing



1.Tolerance :
Routing TOL :+/- 0.15mm
V-Cut TOL :+/- 0.25mm



802.11b WLAN/Modem Mini-PCI

Ambit Wireless Mini-PCI Module complied with IEEE 802.11b 11Mbps Standard, it can be used to provide a variety of low-cost wireless network interface card to connect your wireless LAN via fitting into the MiniPCI Type III slot. The Wireless MiniPCI Module that complies with this specification and combines networking with high-speed Internet access will let people connect to the Internet anywhere, anytime.

With seamless roaming, fully interoperability and advanced security with WEP standard, Wireless MiniPCI Module can allow user to switch to different vendors' Access Points through the wireless networks and to prevent from eavesdropping.

Homologation requirement

Radio approval requirements

The product must be complied with the radio approval of

- 1) FCC Part15 Subpart C 15.247 and certified by FCC before marketing in USA
- 2) ETSI 300 328 and certified by ETSI before marketing Europe countries
- 3) RCR STD-33 certified by TELEC before marketing Japan

Telecom approval requirements

The product must be complied with the Telecom approval of

- 1) FCC part68 and certified by FCC before marketing in USA
- 2) TBR21 before marketing Europe countries
- 3) Certified by JATE before marketing Japan

EMC requirements

- 1) The product must be complied with EMC requirement as follows.
- 2) FCC part 15 Class B before marketing in USA
- 3) ETS 301 489, CISPR 22 Class B, and EN55024:1998 for European market

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Features

Target Specification

Wireless LAN Hardware Features

Form Factor & Bus Interface	MiniPCI Type IIIB, compliant to MiniPCI Specification Rev 1.0
Wireless LAN Compliance	IEEE 802.11b
Radio Technology	Direct Sequence Spread Spectrum
Operating Frequency	2.4 ~ 2.497GHz ISM band
Modulation Schemes	DQPSK, DBPSK and CCK
Channel Numbers	1 ~ 11 channels for United States 1 ~ 13 channels for Europe 1 ~ 13 or 14 channels for Japan
WLAN Data Rate	11Mbps with fall back rates of 5.5, 2, and 1Mbps
Spreading	11-chip Barker Sequence
Media Access Protocol	CSMA/CA with ACK
Transmitter Output Power	Typ. 16 dBm
Receiver Sensitivity @ 8% PER	11Mbps <80 dBm 5.5Mbps <-83 dBm 2Mbps < -85 dBm 1Mbps < -87 dBm
Current Consumption	TX: < 600mA max RX: <400 mA, max
Operating Voltage	3.3VDC+/-5%
Roaming	Support roaming between AP with IAPP support.
Network Architecture	Ad-hoc, Infrastructure

Analog Modem Hardware Features

Standard	Audio Codec '97 specification, revision 2.2
Data Mode Capabilities	V.92, V.90, V.34 ,V.32bis, V.32, V.23, V.22bis, V.22, V.21, Bell 212A, Bell 103J
Error Correction & Data compression	V.44, V.42 LAPM, MNP2-4, V42.bis, MNP5,
Fax Mode Capabilities	TIA-578-A (Class 1), T.30, T.4 (Group 3), , V.17, V.29, V.27ter, V.21 Channel 2
Mechanical Requirements	Mini-PCI Type IIIB dimension.

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