EMC Technologies Report Number: M040236_Cert_WLAN_BPad

APPENDIX C – Operational Description

Introduction

The USI 802.11 Type I Compact flash Wireless network module, "CF-BA-G-02 ", is a full function 802.11b 11 Mbps wireless network module which provnides CF+ host interface with type 1 mechanical design. The design of two External antenna connectors provides flexibility on antenna design.

CF-B-AG-02 is a standard product that is approved as one of USI's Wi-Fi NIC module product lines. It provides user friendly interface to enable the host system users to manage and access to the network by wireless.

The small size design, low power consumption and excellent radio performance make it the best solution for OEM customers who require CF type 802.11b Wi-Fi NIC adapters, such as, Access Point, wireless router , PDA, mini-Printer, wireless camera , Tablet PC etc.

For the Hardware features, Agere "Beagle" chipset solution is adopted. In additional to the classic radio performance of Agere solution, Two antenna connector providing antenna diversity switching supporting robust and smooth data connection under multi-path (office) environment.

New feature such as WOL (Wake on LAN), 802.11d are supported for new application and requirement.

In addition to WEP, WPA and TKIP are supported to provide the security on your network.

For the software and driver development, USI provides standard drivers base on listed OS and processors for OEM.
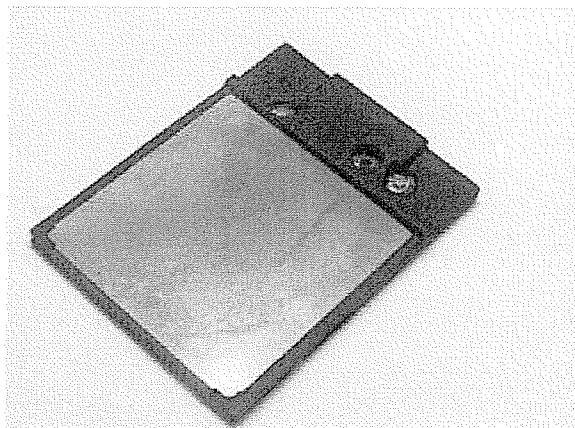
Features

- Small size and type I CF card design suitable for system integration.

- 2400-2483.5 MHz single SKU for world wide market.

- Support 802.11d for universal regulation.

- Easy to use on mobile and handheld devices with CF type I interface.

- Two antenna connectors support antenna diversity to extend the range performance and maintain the robust wireless link under multi-path fading environments.

- Support Wi-Fi and radio regulatory compliance.

OEM Deliverables

- CF-B-AG-02 with packing
- Test Platform including application (PDA, PCMCIA card, reference antenna), Software utility which supporting customer for integration, performance test, and homologation.

Temperature, humidity

Operating Temperature	0° to 70° Celsius	
Non Operating Temperature	- 15° to 85° Celsius	
Humidity range	5% to 95%	Non condensing, relative humidity

Voltage and current

Power supply for the CF-B-AG-02 will be provided by the host via the board to board connector.

Voltage

Operating Voltage	5 / 3.3 Volt	Tolerance 0.3 Volt. tolerance
Voltage ripple	+/- 2%	Max value not exceeding Operating voltage

Current

Continuous Transmit	265 mA	Typical at 3.3V
Continuous Receive	165 mA	Typical at 3.3V
Sleep mode	15 mA	Typical at 3.3V

Wireless Specifications

The CF-B-AG-02 complies with the following features and standards;

Features	Description
WLAN Standards	IEEE 802 Part 11b (802.11b)
Antenna connector	Two antenna connectors support diversity switching.
Data Rates	1,2,5.5, 11 Mbps (802.11b HR)
Medium Access Protocol	CSMA/CA (Collision Avoidance) with ACK

LED specification

The CF-B-AG-02 have no LED providing feedback to the user on the current WLAN activity state.

The signaling are not routed to CF + Interface or other interface

Radio Specifications 802.11b

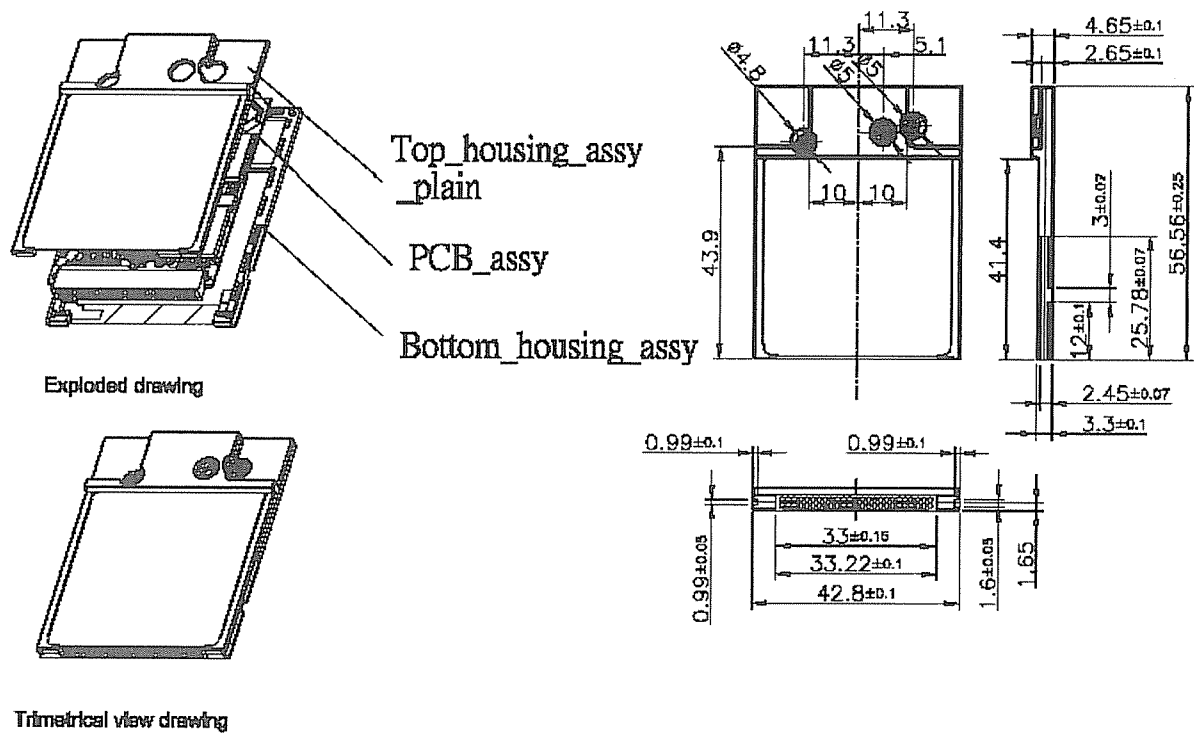The Radio specification is compliant with the spec of 802.11b

Features	Description
Frequency Band	2.4000 – 2.497 GHz (2.4 GHz ISM Band)
Number of selectable Sub channels	14 channels
Modulation	DSSS (Direct Sequence Spread Spectrum), DBPSK, DQPSK, CCK
Supported rates	1,2, 5.5 and 11 Mbps
Maximum receive level	- 4dBm (with PER < 8%)
Output Power	15dBm +/- 1 dBm
Antenna	Two Ceramic antenna with internal diversity switching

Radio Characteristics

Receive Sensitivity	Delay Spread	Data Rate
- 82 dBm	65 ns	11 Mbps
- 87 dBm	300 ns	5.5 Mbps
- 89 dBm	400 ns	2.0 Mbps
- 93 dBm	500 ns	1.0 Mbps

Mechanical Dimensions

Top_housing_assy _plain

PCB_assy

Bottom_housing_assy

Exploded drawing

Trimetrical view drawing

Shock and vibration

The CF-B-AG-02 has been developed and meet the test requirement as listed below :

Vibration

Operating	Frequency sweep from 3-150-3 Hz with a constant 0.25 G input
Non-Operational	Frequency sweep from 3-150-3 Hz with a constant 0.5 G input

Shock

Operational	25 G peak within 3.75 msec in normal base position
Non-Operational	65 G peak in 3.75 msec in normal base position. 30 G within 8 msec square or trapezoidal shock in + and - direction along the 3 axis. (Total 6 shocks)

Configuration

No user configuration needed. The CIS and MAC Address will be loaded during production of the CF-B-AG-02 (FTS).

Security

WEP 64/128, WPA, TKIP.

## Regulatory Body Approvals /Compliance

EMC

- US. FCC CFR47 Part 15-B, Class B
- Canada. CSA C22.2, Class B
- Europe. 89/336/EEC, EMC Directive, including CE Mark
- ETS300 826, EMC standard for 2.4GHz wideband transmission systems
- Korea (MIC)

Radio requirements and approvals

- US/CAN: FCC CFR47 Part 15.247, 15.205, 15.209/ Canada RSS210
- Pan Euro   EN300 328, EN301 489-17, EN60950
- Japan: TELEC ARIB T-66, 33
- Korea: MIC

Functional Block diagram

A simplified block diagram of the CF-B-AG-02 is depicted in the picture below.
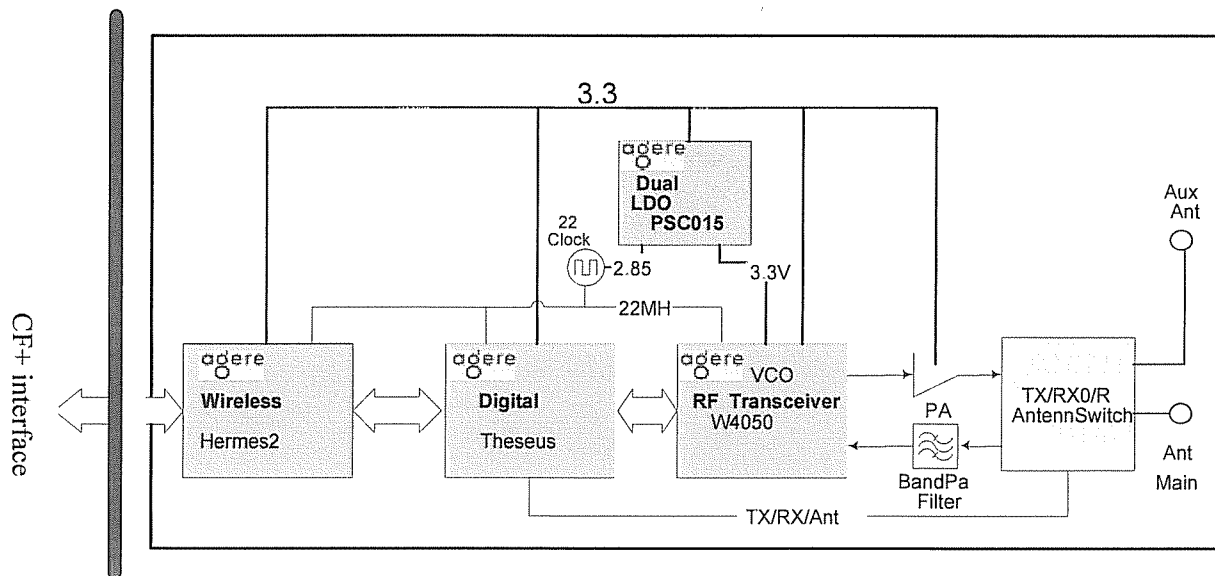
Host Interface

The Host Interface will be compatible with Compact Flash (PCMCIA) standard. 16 bit I/O bus. Signals not used will not be routed to the physical interface (connector).

Pin definition

[...] means optional function of the pin.
PD : Signal pull down internally in the chip by 20K ohm register while initialization.
PU : Signal pull up internally in the chip by 20K ohm register while initialization.
5VT: 5 Volt tolerance pin
xxx_B : Signal pins end with _B are "active Low"

Definition		Draft Description	Type
CF card			
GND	GND1	GND	
D03	HD3	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	O, PD, 5VT, 4mA PC-Card databus
D04	HD4	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	O, PD, 5VT, 4mA PC-Card databus
D05	HD5	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA PC-Card databus
D06	HD6	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D07	HD7	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
-CE_1	HCE1_B	Card Enable1 is driven by the host system and is used as select strobe in both I/O and memory mode. Enables even numbered address bytes.	Input, PU, 5VT
A10	A10	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. The pin is open in B2B module.	N/A
-OE	HOE_B	OUTPUT ENABLE is driven by the host during a memory Read Access.	Input, PU,5VT
A09	HA9	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD,5VT
A08	HA8	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD,5VT

802.11b Compact Flash Type I wireless NIC card ver 1.0

A07	HA7	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD,5VT
VCC	VCC1	Power, 3.3V	Input
A06	HA6	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD, 5VT
A05	HA5	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD, 5VT
A04	HA4	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD, 5VT
A03	HA3	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD, 5VT
A02	HA2	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD, 5VT
A01	HA1	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD, 5VT
A00	HA0	ADDRESS BUS lines driven by the host system which enables addressing of 0.5K address range within HERMES. This address range is mainly used for accessing the CIS in Memory Mode. Signal HA0 is not used in word access mode.	Input, PD, 5VT
D00	HD0	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D01	HD1	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D02	HD2	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
-IOIS16	HIOIS16_B	Control signal to enable engineer testing mode	input
-CD2	CD2 [TDO]	Normal operation , this pin is functionally for card detection. Boundary scan data output. This pin is high impedance	Out, 6mA, 5V tol.

		when TRST_B is active.	
-CD1	CD1	Card detect, connect to CD1	output
D11	HD11	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D12	HD12	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D13	HD13	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D14	HD14	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D15	HD15	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
-CE2	HCE2_B	CARD ENABLE2 is driven by the host system and is used as select strobe in both I/O and memory mode. Enables odd numbered address bytes	Input, PU,5VT
-VS1	VS1	This pin is connected to Ground on module to indicate the voltage of this module is 3.3V card.	Output , 5VT
-IORD	HIORD_B	I/O Read Strobe is driven by the host and is asserted when the host wants to read from an on-chip I/O register	Input, PU,5VT
-IOWR	HIOWR_B	I/O Write Strobe is driven by the host and is asserted when the host wants to write to an on-chip I/O register	Input, PU,5VT
-WE	HWE_B	WRITE ENABLE is driven by the host during a memory Write Access	Input, PU,5VT
IREQ	IREQ_B	INTERRUPT REQUEST to the host. In Memory mode this pin signifies RDY/BSY_typically used during card initialization immediately after reset or power on. Indicates to the host that the device is not able to transfer data	Output, 4mA
VCC	VCC2	Power, 3.3V	Input 500 mA limited by the rating of connector
-CSEL	HCSEL	No connection	N/A
-VS2	VS2	Voltage sense pins to indicate the voltage requirement of this module	Output , 5VT
RESET	HRESET	Used to asynchronously reset the complete Module	Input, PU,5VT,ST
-WAIT	HWAIT_B	HWAIT_B is driven by Hermes and allows for extending the memory or I/O cycle	Output, 4mA
-INPACK	HINPACK_B	INPUT ACKNOWLEDGE is driven by Hermes. Is asserted when the device is selected and the device is responding to an I/O Read command.	Output, 2mA
-REG	HREG_B	ATTRIBUTE MEMORY SELECT is driven by the host system and is used to access the Attribute Memory	Input, PU, 5VT
-SPKR	SPKR_B	N/A	N/A
-STSCHG	HSTSCHG_B	STATUS CHANGE indication to the host. This signal gets active when one of the bits in the PRR or CSR registers are set	Output, 4mA
D08	HD8	Data Input/Output line constitute a bi-directional bus.	IO, PD, 5VT, 4mA

		HD[15:0] are used to access the MODULE MAC Host Interface register	
D09	HD9	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
D10	HD10	Data Input/Output line constitute a bi-directional bus. HD[15:0] are used to access the MODULE MAC Host Interface register	IO, PD, 5VT, 4mA
GND	GND2	GND	

Antenna

CF-B-AG-02 has two antenna connectors to support **diversity scheme.**
Two antenna connectors configure as Main and Aux. Tx is permanently connected to the Main antenna. Rx diversity is supported by the switching between the Main and Aux antenna.

Operating System Compatibility

Drivers are supported for the following OS:

* Windows CE 3.0, 4.0 .NET
* Windows 98/SE, 2000, XP
* Linux, VxWork

Reliability

The CF-B-AG-02 will guarantee a MTBF of 150,000 hrs based on an ambient temperature and workload of 2,920 hours. The workload is based on a unit working for 8 hours per day, 365 days per year.

Wi-Fi is a trademark of the Wireless Ethernet Compatibility Alliance. This product is certified by *Wi-Fi* Alliance.

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