MRX2010

802.11n Wireless LAN Module

09-10-2008 **User Manual**

1 General description

The MRX2010 is a highly integrated wireless LAN transceiver module that compliant to the 802.11n Draft 2.0 mode. As such it operates in the 2.4GHz as well as the 5GHz frequency range. Backwards compatibility to today's established modes 802.11 a/b/g is guaranteed.

Separated into function blocks, the form factor and the electrical interface comply with the Mini-PCI interface standard (mPCI type IIIA).

The split between those function blocks can be described as following:

- Power Management Unit (PMU); converts the power supply from the mPCI interface to the internally required supply voltages
- MAC / Baseband (BB); baseband controller for 802.11n and 802.11 a/b/g with mPCI interface
- PHY / Radio-IC (Radio); data conversion from baseband to RF with MiMo interface and channel selection
- RF-frontend (RF-FE); features 2 x 3 MiMo with low noise, high linearity RF-power-amplifiers and switches

2 Features

- Chipset Metalink WLAN*Plus* MtW8151 / MtW8171
- 2x3 MIMO, 2 transmitters 3 receivers
- 20 MHz/40 MHz bandwidth support
- PHY rates up to 300 Mbps
- Sweet spot optimisation of throughput (payload): 20 meters / 60 Mbps
- Network Standards:
  - 802.11n draft 2.0
  - 802.11a/b/g
- TX mode:
  - 2 x TX at 802.11n draft 2.0, and 802.11a/g
  - 1 x TX at 802.11b

- Modulation modes:
  - OFDM with BPSK, QPSK, 16QAM and 64QAM
  - DBPSK, DQPSK, CCK

FEC:

Convolution code, Advance coding (LDPC)

QoS:

Enhanced Distributed Channel Access (EDCA), as specified in the WMM specification

Security

802.11i compliant

64- / 128-bit key WEP, AES, TKIP, WPA, WPA2

Antenna Interface connector	3 x UFL
Communication Interface	Mini PCI 3A
Dimensions (HxWxD)	50.8 x 59.6 x 4.2 mm
Weight	14 g

Lead-free RoHS compliant

Software	Linux device driver – Linux 2.4 Linux device driver – Linux 2.6 Firmware

3 Applications

The MRX2010 module can be used in following application areas:

- Digital STB, IP STB, PVR, DVR, DMA
- HD TV
- Digital Media Server
- Residential Gateway, AP, Wireless A/V Extensions, Video Distribution Systems
- Game Consoles

4 Ordering information

Table 1. Ordering information

Type number	Name	Description	Version
MRX2010	3112 297 15761	Dual band type with mPCI interface	-

5 Block diagram

The high-level MRX20xx block diagram shows the basic module architecture based on the Metalink WLAN*Plus* chipset supporting various communication interfaces like mPCI, NXP- or ST-proprietary interfaces.

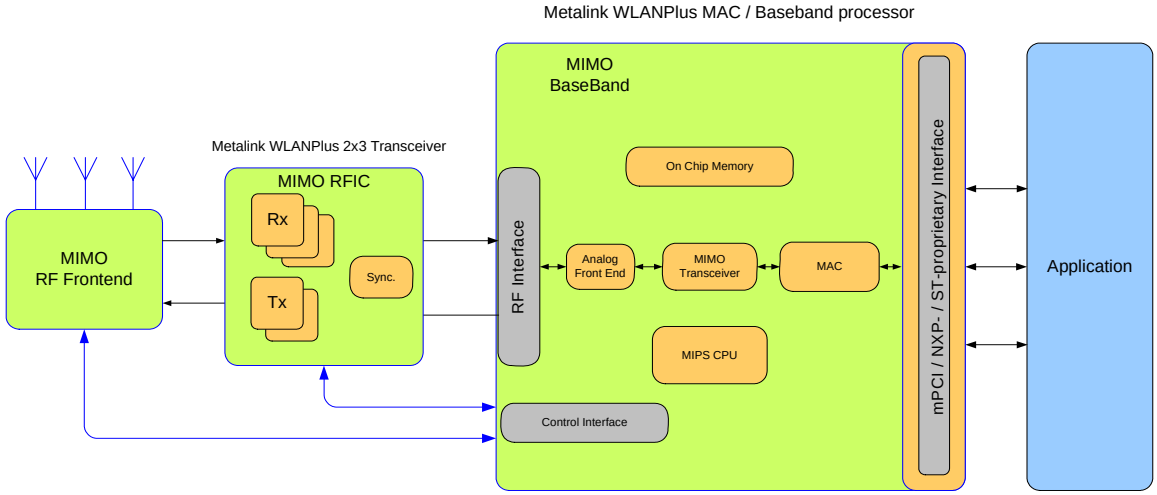

Fig 1. Generic family Block Diagram

The MRX2010 block-diagram contains the discrete 2x3 MIMO-Frontend, the MTW8151 RF-chip followed by the MTW8171 baseband-chip and an mPCI communication interface.

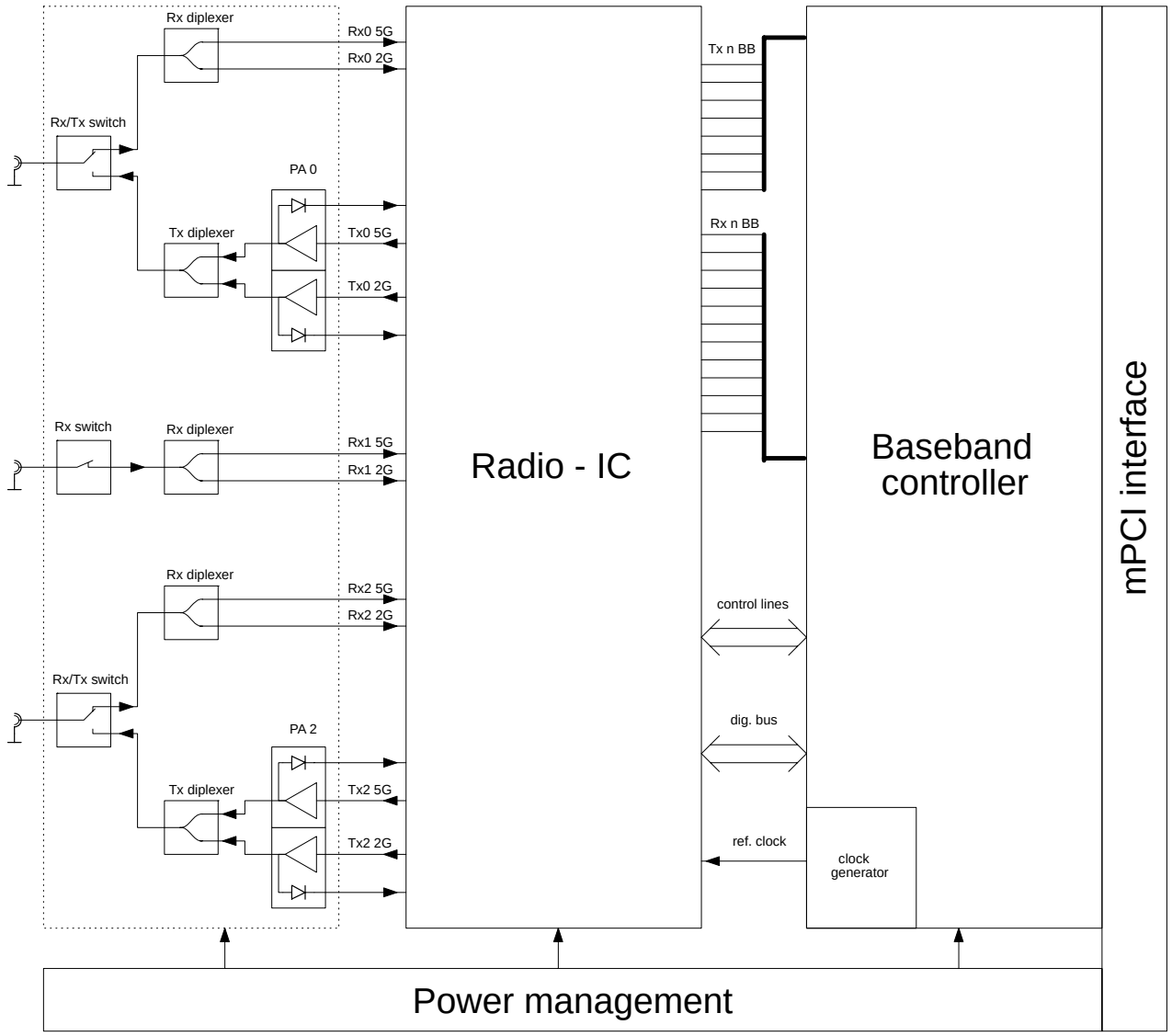

Fig 2. MRX2010 Block Diagram

6 Pinning information

Table 2. Pin description

Pin	Signal	Function	Pin	Signal	Function	Pin	Signal	Function	Pin	Signal	Function
1	TIP	N.C.	2	RING	N.C.	63	3.3V		64	FRAME#	
	KEY			KEY		65	CLKRUN#		66	TRDY#	
3	8PMJ-3	N.C.	4	8PMJ-1	N.C.	67	SERR#		68	STOP#	
5	8PMJ-6	N.C.	6	8PMJ-2	N.C.	69	GROUND		70	3.3V	
7	8PMJ-7	N.C.	8	8PMJ-4	N.C.	71	PERR#		72	DEVSEL# GROUND	
9	8PMJ-8	N.C.	10	8PMJ-5	N.C.	73	C/BE[1]#		74	GROUND	
11	LED1_GRNP	N.C.	12	LED2_YELP	N.C.	75	AD[14]		76	AD[15]	
13	LED1_GRNN	N.C.	14	LED2_YELN	N.C.	77	GROUND		78	AD[13]	
15	CHSGND	N.C.	16	RESERVED	N.C.	79	AD[12]		80	AD[11]	
17	INTB#	N.C.	18	5V	N.C.	81	AD[10]		82	GROUND	
19	3.3V		20	INTA#		83	GROUND		84	AD[09]	
21	RESERVED	N.C.	22	RESERVED	N.C.	85	AD[08]		86	C/BE[0]#	
23	GROUND		24	3.3VAUX	N.C.	87	AD[07]		88	3.3V	
25	CLK		26	RST#		89	3.3V		90	AD[06]	
27	GROUND		28	3.3V		91	AD[05]		92	AD[04]	
29	REQ#		30	GNT#		93	RESERVED	N.C.	94	AD[02]	
31	3.3V		32	GROUND		95	AD[03]		96	AD[00]	
33	AD[31]		34	PME#		97	5V	N.C.	98	RESERVED_WIP5	N.C.
35	AD[29]		36	RESERVED	N.C.	99	AD[01]		100	RESERVED_WIP5	N.C.
37	GROUND		38	AD[30]		101	GROUND		102	GROUND	
39	AD[27]		40	3.3V		103	AC_SYNC	N.C.	104	M66EN	
41	AD[25]		42	AD[28]		105	AC_SDATA_IN	N.C.	106	AC_SDATA_OUT	N.C.
43	RESERVED	N.C.	44	AD[26]		107	AC_BIT_CLK	N.C.	108	AC_CODEC_ID0#	N.C.
45	C/BE[3]#		46	AD[24]		109	AC_CODEC_ID1#	N.C.	110	AC_RESET#	N.C.
47	AD[23]		48	IDSEL		111	MOD_AUDIO_MON	N.C.	112	RESERVED	N.C.
49	GROUND		50	GROUND		113	AUDIO_GND		114	GROUND	
51	AD[21]		52	AD[22]		115	SYS_AUDIO_OUT	N.C.	116	SYS_AUDIO_IN	N.C.
53	AD[19]		54	AD[20]		117	SYS_AUDIO_OUT GND	N.C.	118	SYS_AUDIO_IN GND	N.C.
55	GROUND		56	PAR		119	AUDIO_GND		120	AUDIO_GND	
57	AD[17]		58	AD[18]		121	RESERVED	N.C.	122	MPCIACT#	N.C.
59	C/BE[2]#		60	AD[16]		123	VCC5VA	N.C.	124	3.3VAUX	N.C.
61	IRDY#		62	GROUND							

7 Ratings

7.1 Environmental conditions

Table 3. Under non-operational conditions

Symbol	Parameter	Conditions	Min	Max	Unit
T_{AMB}	Ambient temperature	-	-25	+85	ºC
Rh	Relative humidity	-	-	95	%

Table 4. Under Operational conditions

Symbol	Parameter	Conditions	Min	Max	Unit
T_{AMB}	Ambient temperature	-	0	+60	ºC
Rh	Relative humidity	-	-	75	%

8 Mechanical Data

8.1 Mechanical outline and dimensions

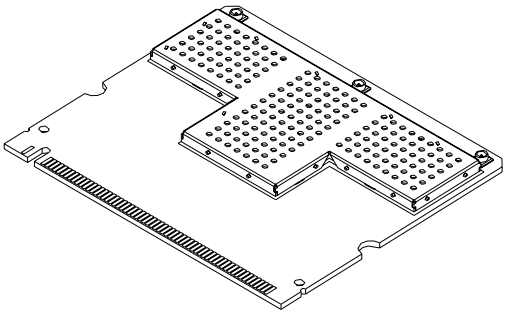

Fig 3. Module outline

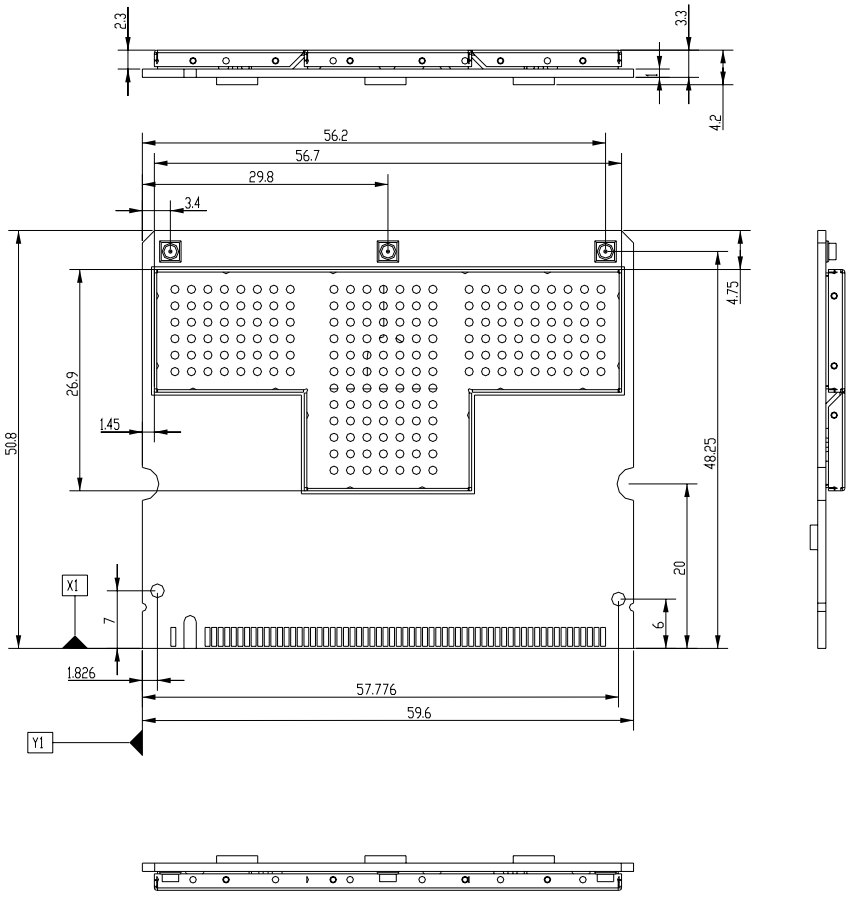

Fig 4. Module dimensions

8.2 Product Labelling

Fig 5. Module Labelling

8.3 Labelling information for the End customer

The end product should have the following data/info on the product:

- FCC ID : WOPMRX2010C2
- The FCC logo
- The FCC warnings

Example:

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

MODEL: MRX2010 FCC ID: WOPMRX2010C2

8.4 Mounting of the module board

1. After confirming that the front and backside of module boards are correct, insert the module board at an angle of 20° to 30° into the innermost part of the connector.
2. Pushing down the module board downwards, when load is kept applied; the latches at both sides will be turned on. The total mating force should not exceed 51.5 N.
3. If the module board is held by the latches and does not get up, mounting will finish.

Be sure to confirm that latches at both sides are turned on correctly e.g. half fitting, remove the board in accordance with the next paragraph 8.4.1 how to remove the module board and refit it once again by starting the fitting procedure.

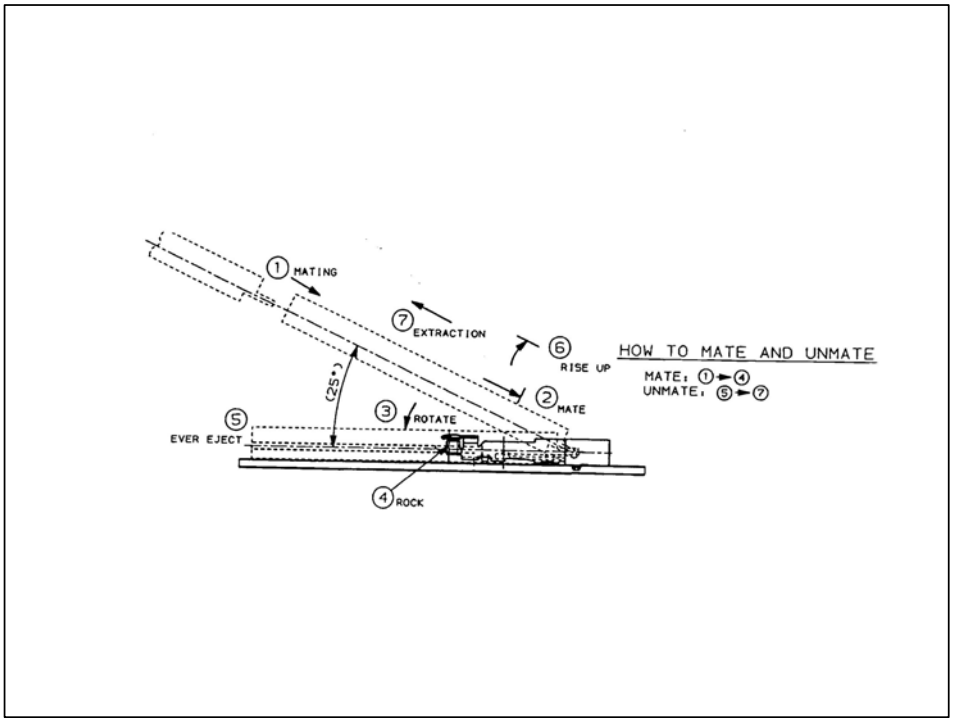

Fig 6. Module mounting

8.4.1 How to remove the module board

1. Move both sides of Latch simultaneously in the outward direction from the module.
2. When the lock is released, the board will tilt approximately 25° in angle to the connector. The board must be pulled out straight and softly in the angle direction.

9 Packaging information

The products are packed in the carton box and transferred to customers by Pallet Transport

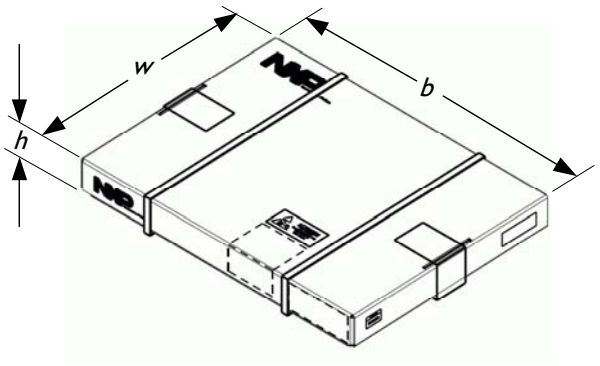

Fig 7. Example of carton box

Carton Boxes are made of Corrugated Fibreboard, which are free of environmentally banned substances.

Table 5. Package information

Package	Dimension L x W x H (cm)	Number of sets	Gross weight (kg)
Carton	44 x 33 x 8	280	4.5
Pallet	120x105x105	20160	345

10 Regulatory Information

FCC Information to User:

This product does not contain any user serviceable components and is to be used with approved antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals.

FCC Guidelines for Human Exposure (Warning):

In order to comply with RF exposure limits, the user is advised to maintain a distance of at least 20 cm from the antenna structure of this device while it is in use.

The antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Electronic Emission Notices:

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference

2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency Interference statement:

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area may cause harmful interference, in which case the user will be required to correct the interference at his own expense.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

11 Legal information

11.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification
Product [short] data sheet	Production	This document contains the product specification

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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