



Models : 2011 RF Module

User Manual

11 Mbps RF Module



"No more Wires"

Features

- Utilizing Intersil Prism II Technology
- 2.4 ~ 2.5 GHz ISM band operations
- Data rate up to 11 mbps
- Single heterodyne conversion
- Direct Sequence Spread Spectrum Technology
- +10 to +27 dBm transmitter power out
- Includes additional LNA for receiver front end.
- Diversity ANT for better receiver signal
- System targeting IEEE 802.11b standard except Tx power out. Set Tx power out as required by Application or per Country Regulation.
- Small size :
3.40" x 2.05" x 0.750"
(86 x 52 x 19 mm).
- All Spec FCC part 15 ISM Band Non License compliant Radio.



Overview

The GINA-2011 is a small, versatile high performance RF Module that delivers data up to speeds of 11Mbps/s. The Module is designed to provide up to 0.5 watt (27dBm) output power. The GINA-2011 RF Module is available as a plug-in module for those Researcher who wish to interface it with their own designed controllers.

GINA-2011 operates at 2.4 GHz Direct Sequence Spread Spectrum (DSSS) Modulation physical layer can be compliant with IEEE 802.11b standard insures interoperability with other Wireless LAN products.

GINA-2011's highly integrated digital modulation transceiver module can also be used for factory automation equipment and barcode readers, embedded systems, and other applications.

APPLICATIONS

- | | | |
|----------------------------|-------------------------------------|----------------------------|
| • Wireless Network | • Last-Mile Telephone | • PLC / Router Connections |
| • Wireless Internet | • Camera Surveillance Control (PTZ) | • Computer Data Links |
| • Mobile Scanner | • Industrial Automation | • Traffic Controls |
| • Remote Guidance Vehicles | • GPS Data Link | • Remote Networking |
| • Robotic Remote Control | • Power & Gas Utilities | • High Speed File Transfer |

11 Mbps RF Module

RECEIVER

Frequency Range :

- ▶ 2.4 ~ 2.4835 GHz

Data Rate :

- ▶ 1 ~ 11 Mbits/s

Sensitivity 10-6 @ :

- ▶ -96 dBm for 1 Mbit/s
- ▶ -93 dBm for 2 Mbits/s
- ▶ -89 dBm for 5.5 Mbits/s
- ▶ -87 dBm for 11 Mbits/s

Noise Figure :

- ▶ Less than 10 dB

Supply Current :

- ▶ 150 mA without sleep mode
- ▶ 100 mA with sleep mode

"No more Wires"

TRANSMITTER

Frequency Range :

- ▶ 2.4 ~ 2.4835 GHz

Data Rate :

- ▶ 1 ~ 11 Mbits/s

Output Power :

- ▶ +10 ~ +27 dBm (adjustable)

Note : Tx supply voltage requires at least 6.0V DC for 25 ~ 27 dBm typical power output

Spurious Output :

- ▶ FCC Part 15

Supply Current :

- ▶ 650 mA at Maximum Out.

UNIT SPECIFICATION

Supply Voltage

- ▶ 3.3v DC required for basic voltage
- ▶ 6.0 v DC TX section to get MAX power 27 dBm
- ▶ 5.0 v DC to operate for TX section, but TX power will be 24 dBm

Supply Current :

- ▶ 300 mA for 3.3v line required at TX condition
- ▶ 500 mA for 6.0v or 5.0v line when TX is ON

TX Duty Cycle :

- ▶ 30 % for TX 70 % for RX

Temperature Range :

- ▶ -20°C ~ +60°C

Antenna Connector :

- ▶ 2x MMCX connector (for Diversity)

Interface Connector :

- ▶ 50 PIN 1.27 mm standard female connector
(.050"x.050" SAMTEC SOCKET SFM Series)
P/N : SFML-125-T1-S-D-A

LED Indicator :

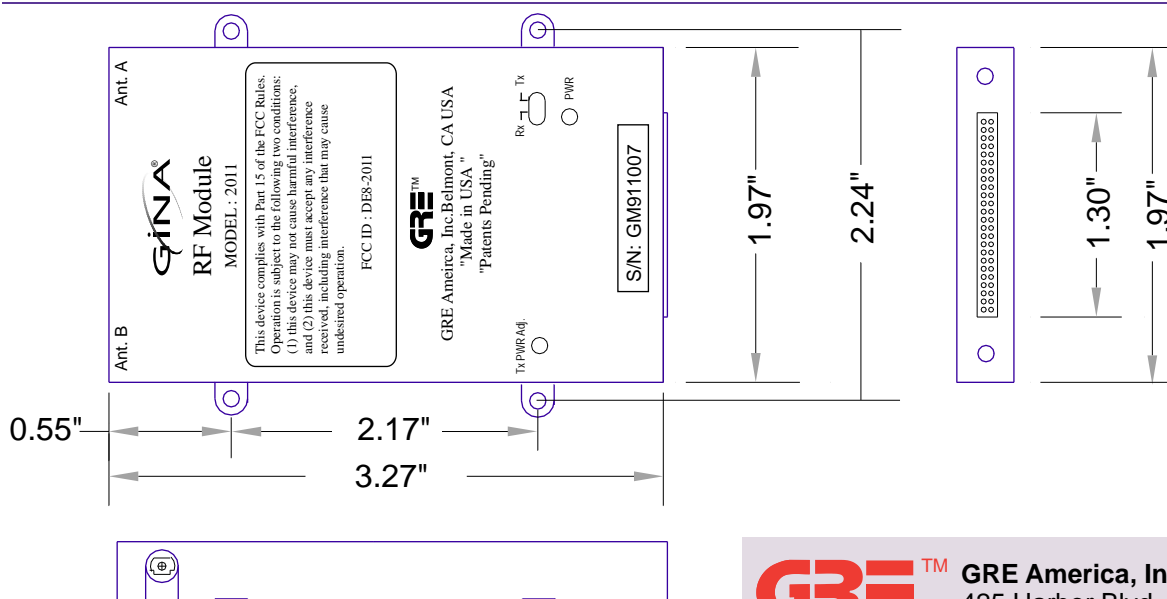
- ▶ DC PWR, TX ON, RX Receiver

Adjustment :

- ▶ TX power adjustment by POT volume

Approvals :

- ▶ FCC Part15, DE8-2011



WARNING

RADIATION.

RF energy at microwave frequencies is present with this equipment. Personnel should not be exposed to high RF energies, and should not be in front of the antenna when the equipment is switched on.

All accessible RF connections must be terminated when the radio is powered on.

The radio should not be powered on with any of its covers removed.

INFORMATION TO USERS.

"Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."



ANTENNA WARNING

EACH INDIVIDUAL ANTENNA USED FOR THIS TRANSMITTER MUST BE INSTALLED TO PROVIDE A MINIMUM SEPARATION DISTANCE OF 20 CM OR MORE FROM ALL PERSONS AND MUST NOT BE CO-LOCATED WITH ANY OTHER ANTENNA FOR MEETING RF EXPOSURE REQUIREMENTS.

GINA 2011 RF Module Voltage Requirement

The GINA 2011 RF Module requires a device controller to set Local oscillator, Set BASEBAND processor for actual operating condition. It also requires proper I/O DC level because semiconductor is very tight margin for I/O level.

The RF Module requires 3.3V and 6 Volt DC. Module has internal regulator to support 3.0V and 2.8 Volt. The device controller must be designed with 3 Volt working Voltage for I/O to RF Module. However it is not suitable if apply beyond 3.5V DC because majority of semiconductor Chip I/O level will be cross to Maximum specification point.

The 5 volt line is used for Transmitter final amplifier chip. The module 2011 has Current source voltage control MOS FET device to protect final amplifier chip. The final transmitter device is not linear output power versus voltage source. More likely the transmitter out is linear out with negative bias to GATE of Final amplifier. Nature of this performance comes from GaAs HFET parameter.

This negative bias to the GATE is regulated from 3.3volt line, so that transmitter out is set for Maximum to 27 dBm level.

However the 6 volt should not exceed more than 6 volt, due to some of the control line using 3 volt line to execute switching device.

Transmitter is not design to operate at 100% duty cycle.

Best performance is less than 30% duty cycle.

GINA 2011 RF Module **is not designed or intended** for any portable or handheld devices such as telephone set, PCMCIA devices or Portable PC's.

GINA 2011 RF Module

Overview

Introduction

GINA RF Module 2011 is designed with the Prism II 11Mbit Intersil chipset to obtain a maximum performance data rate up to 11Mbit/sec. We are also focusing beyond the IEEE 802.11b application standard. The RF Module can provide an adjustable transmitter output power from 10 dBm to 27dBm (500 mW). The Receiver front end is installed with an extra low noise amplifier in order to perform extended distance wireless communications.

The RF Module size is also as small as a name card so as to cover any typical OEM application to fit this very small size. However this RF Module cannot work without a Controller. The Prism II chipset requires that you configure each register value while programming from the other controller unit.

2. Requirement

GINA RF Module uses the Prism II chip set. The base band chip, RF up / down chip and the IF chip are required to be programmed from the Controller (similar to a MAC device). Therefore you should understand the basic theory about how it is necessary to program to these chips. The Data Book (included in this PDF download Application Notes from Intersil) also describes a more detailed technical information on “ How to Program ”.

Module are using chip as below.

HFA3861B-----Base band

HFA3783N-----IF

HFA3683AIN-----RF up/down

2a The RF Module requires the User to basically enable the transmit or receive mode via the controller unit. You must also select the antenna port because the RF Module features a dual antenna port for diversity operations. This selection is executed via the base band chip - HFA3861.

2b DC voltage required to module.

3.3 v DC -----max current 300mA

6.0v DC -----max current 650 mA

(5.0 VDC still will operate however the Tx out power will be at 24 dBm maximum)

Programming

2c Please be sure to follow these requirements when you are programming the RF Module.

Master clock -----44.000 Mhz

IF center frequency -----374 Mhz

Therefor 1st LO frequency need to program to HFA3683AIN RF up/down chip.

LO = Frx/tx - 374 Mhz Frx/tx is receive or transmit frequency between 2400~24835 Mhz.

2d Also IF chip HFA 3783IN need to program .

Main clock -----44.000 Mhz

LO required to program -----2 x 374 Mhz which is 748 Mhz.

2e Base band chip HFA 3861B must also be programmed.

However this program will be up to the design of your system.

You should be familiar with and understand the HFA 3861B programming requirement.

Main clock is 44.000 MHz

PIN Description

RF Module PINOUTS			
H=3v L=.5v or less O = out put from Module I = input to Module			
PINNo.	PIN Name	Type	DESCRIPTION
1	TR_SW_N	I	Control antenna switch.H for RX. L for TX on.
2	RADIO_PD	I	Enable VCO. Normally set to H
3	LE_RF	I	Programming HFA3683 (pin21)for PLL latch enable
4	GND		
5	GND		
6	GND		
7	S_DATA	I	Programming HFA3861B(pin 3,64 internally connected).
8	RX_DATA	O	Recovered RX data from HFA3861(pin53)
9	TX_CLK	O	TX clock from HFA3861 (pin 55) to controller
10	TX_RDY	O	Output from HFA3861(pin 59)for other device
11	RX_PE	I	HFA3861(pin 61)receiver enable active H
12	NOT USE		
13	NOT USE		
14	NOT USE		
15	VCCS	I	HFA3861 digital voltage(pin2,8,37,41,57) 3.3V required
16	NOT USE		
17	3.3v	I	Supply voltage to Module.current will up to 300 ma
18	3.3v	I	Same as above
19	3.3v	I	Same as above
20	NOT USE		
21	NOT USE		
22	CAL_EN	I	Controlled HFA3783(pin42)
23	LE_IF	I	HFA3783(pin20) PLL latch enable

RF Module PINOUTS			
H=3v L=.5v or less O = out put from Module I = input to Module			
24	PA_PE	I	Enable TX amplifier .normally set to H
25	6.0v	I	Using TX final AMP stage and RX LNA.It is required 650mA current when TX is on.20mA for RX is on.
26	TR_SW	I	Control antenna switch H for TX. L for Receive.
27	PE1	I	power enable control for HFA 3783,3683(PE1 pin)
28	PE2	I	power enable control for HFA 3783,3683(PE2 pin)
29	SCLK_RF_IF	I	clock to program PLL for HFA3783(pin18)3683(pin23)
30	SD_RF_IF	I	data to program PLL for HFA3783(pin19) ,3683(pin22)
31	NOT USE		
32	RX_CLK	O	Receive clock out from HFA3861 (pin52)
33	MD_RDY	O	Data packet ready from HFA3861 (pin54)
34	TX_DATA	I	Transmit data to HFA3861 (pin58)
35	CCA	O	Clear Channel Assessment out from HFA3861(pin60)
36	TX_PE	I	HFA3861(pin62) transmitter control. Active H
37	RESET_BB	I	Reset for HFA3861(pin63)
38	NOT USE		
39	S_CLK	I	Clock for programming HFA3861(pin4)
40	BB_R/W	I	Input to HFA3861(pin5) for programming
41	CS_BB	I	Chip select input to HFA3861(pin6) for programming
42	NOT USE		
43	NOT USE		
44	NOT USE		
45	NOT USE		
46	NOT USE		
47	NOT USE		
48	NOT USE		
49	6.0v	I	Same voltage as pin 25
50	6.0v	I	Same voltage as pin 25

Connector Layout



LED Indicator

3 LED indicator

Module has 3 different LED located inside of shield case.

Power on RED color LED

TX on RED color LED

RX condition by GREEN color LED.-----sharing CCA output from HFA3861.

4 Antenna connector

Module has two antenna connector located on right side and left side.

Marked "A" on Right side

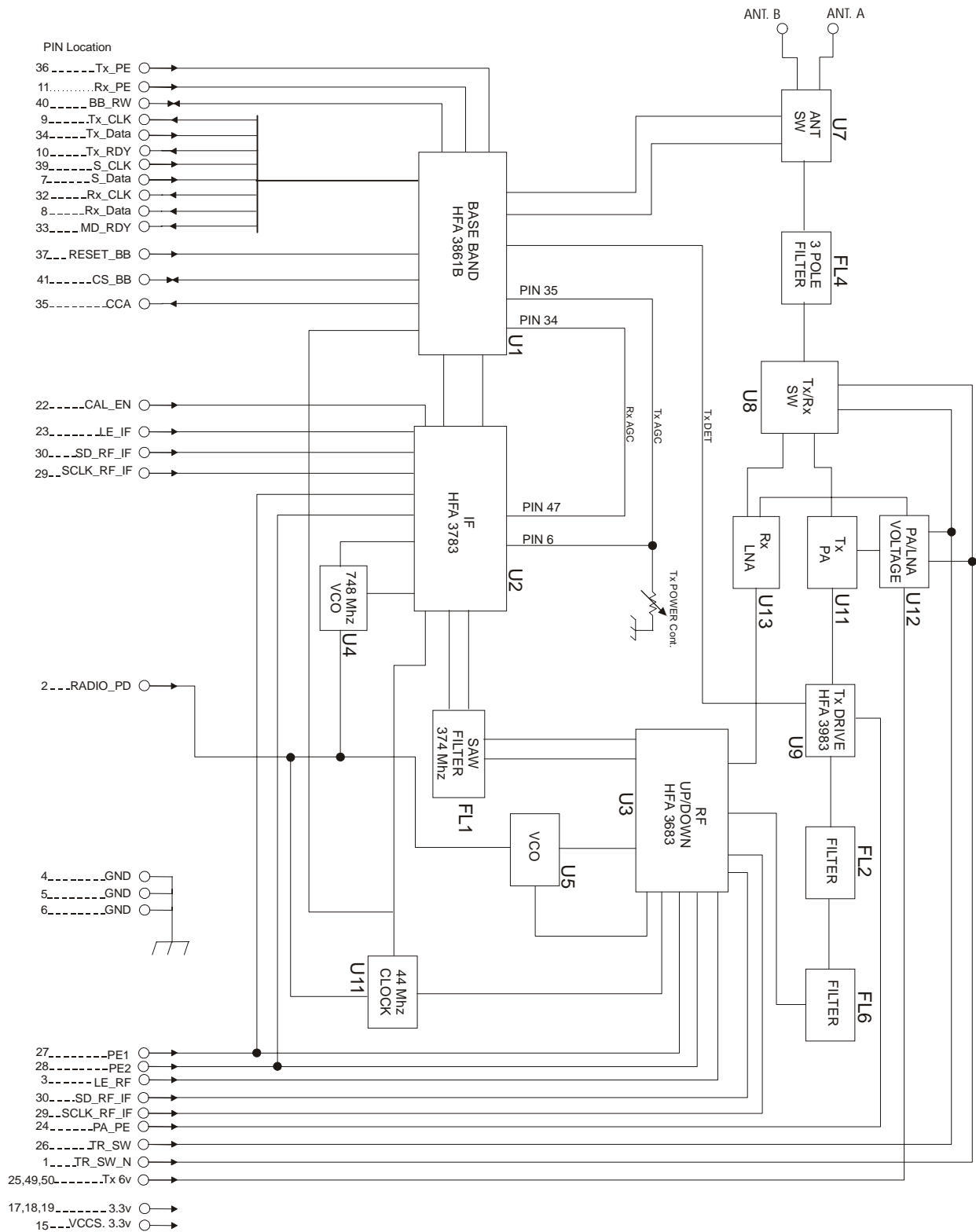
Marked "B" on Left side

NOTE: You can program and select A or B by HFA3861B CR9 and CR40. This will depend upon how you elect to configure your system either for a single antenna or diversity antenna.

5 Technical information

GRE America Inc. cannot provide any schematic diagram (s) or component (s) specifications for any Customers / End Users for any reasons. GRE America will however provide a Block Diagram for reference and in order to familiarize you with the RF Module.

RF Block Diagram.



Transmitter Register Values

Typical Register value for Intersil Baseband HFA3861B “Transmitter” at 11 mbps

BaseBand Configuration [X]

Control Registers

0	13	1	04	2	48	3	48	4	80	5	03	6	04	7	00
8	00	9	A0	10	B7	11	18	12	00	13	00	14	00	15	5C
16	82	17	20	18	C4	19	17	20	0A	21	0F	22	20	23	0C
24	2D	25	20	26	90	27	18	28	76	29	0A	30	24	31	C0
32	00	33	00	34	00	35	0C	36	26	37	5B	38	7F	39	29
40	0F	41	20	42	20	43	10	44	10	45	10	46	10	47	1E
48	1E	49	08	50	00	51	00	52	00	53	00	54	00	55	00
56	00	57	00	58	21	59	00	60	00	61	00	62	00	63	00

AGC Registers

0	0C	1	10	2	14	3	18	4	1C	5	20	6	24	7	28
8	2E	9	34	10	38	11	3C	12	3F	13	43	14	46	15	48
16	46	17	50	18	55	19	5A	20	63	21	6D	22	76	23	7F
24	7F	25	7F	26	7F	27	7F	28	7F	29	7F	30	7F	31	7F

GRE

Receiver Register Values

Typical Register value for Intersil Baseband HFA3861B “Receiver” at 11 mbps

BaseBand Configuration [X]

Control Registers

0	13	1	04	2	48	3	48	4	80	5	03	6	04	7	00
8	00	9	A0	10	B1	11	18	12	00	13	00	14	00	15	5C
16	82	17	20	18	C4	19	17	20	0A	21	0F	22	20	23	0C
24	2D	25	20	26	90	27	18	28	76	29	0A	30	24	31	C0
32	00	33	00	34	00	35	0C	36	26	37	5B	38	7F	39	29
40	0F	41	20	42	20	43	10	44	10	45	10	46	10	47	1E
48	1E	49	08	50	00	51	1D	52	0A	53	04	54	00	55	02
56	03	57	60	58	23	59	07	60	28	61	05	62	1C	63	2C

AGC Registers

0	0C	1	10	2	14	3	18	4	1C	5	20	6	24	7	28
8	2E	9	34	10	38	11	3C	12	3F	13	43	14	46	15	48
16	46	17	50	18	55	19	5A	20	63	21	6D	22	76	23	7F
24	7F	25	7F	26	7F	27	7F	28	7F	29	7F	30	7F	31	7F

GRE

Warranty

Limited Warranty

General

GRE America, Inc. warrants all parts of each new product to be of sound design, good material and workmanship, and will repair or exchange any parts proven to be defective under normal use at no charge for a period of 12 months from the date of sale to the end user.

Defects will be corrected by GRE America. There will be no charge for labor for a period of 12 months from the date of original sale, except as provided below. Overtime premiums and/or expedited handling and shipping costs must be paid by the owner.

Warranty Limitations

This warranty does not apply to equipment or parts that have been subject to accident, abuse, incorrect service, alterations, service by non-authorized service personnel, misuse, or on units upon which the warranty seal has been removed, altered, or mutilated.

A copy of the warranty certificate or purchase receipt must be supplied to GRE America when requesting service.

Equipment must be sent to GRE America at the owner's expense and will be returned via surface carrier at no cost to the owner.

This warranty is strictly limited to the terms indicated herein, and no other warranties or remedies thereunder, express or implied, shall be binding on GRE America.

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