A7130 17dBm module specification
MD7130-F07 (-05)

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Revision History

Rev. No.	History	Issue Date	Remark
0.0	Initial issue MD7130-F07-03	July, 2011	Preliminary
0.1	Update module version to MD7130-F07-04 Changed C3 from 470pF to 1nF. Disable Gaussian filter setting.	Oct, 2011	
0.2	Update module version to MD7130-F07-05 Changed L9 from 3nH to 3.3nH, C10 from 1.5pF to 1pF, R10 from 33 ohm to 47 ohm.	Jan, 2012	
0.3	Correct the bill of material	Mar, 2012	

Table of Contents

1. General Description

The MD7130-F07 module is designed for 2.4GHz ISM band with 17dBm output power wireless applications using AMICCOM's A7130 FSK/GFSK transceiver and A7700 RF Front End IC. This module features a fully programmable frequency synthesizer by SPI. The data rate is 4Mbps.

2. Electrical specification

Item	Specification	Remark
Supply voltage	3.3V+/-0.1(V)	
Current consumption	4uA @Sleep mode. 0.3mA @Idle mode. 2.7mA @Stand-by Mode. 12.5mA @PLL Mode. 118mA @Tx power = 17dBm 31.3mA @Rx mode	typical
Frequency	2400 – 2483.5 MHz	ISM band
Transmit output power	17 dBm @ room temperature	Typical **Annotation 1**
Rx sensitivity	-89 dBm @ 4M mode, Dev = 1MHz.	Typical, BER≦1E-3,
Modulation	2.4GHz FSK/GFSK	
Interface	10 pin 2.0mm header	
PCB Dimension	23(L) x 22(W) x 0.8(H) mm^3 without PCB antenna	
Operating temperature	-40℃ ~ 85 ℃ (Depend on crystal Spec., example: Fork type_ -10℃ ~ 60℃)	

Annotation:

1. a. In order to turn off 5dBm TX power.
   Register:[24] IF calibration II → b[7] PWORS→disable, Value:0x7F,
   b. In order to separate RX and TX signal to RFI and RFO.
   Register: [2A] DASP0 →b[6] RFSP →enable, Value:0x74

3. Interface

Pin No.	Pin name	Comment	Note
1	REGI33	RF module supply voltage input	3.3V
2	CKO OR GND	If R12 =0 ohm and R11= NC, the interface pin (CKO OR GND) is defined GND. If R11 =0 ohm and R12= NC, the interface pin (CKO OR GND) is defined CKO.	
3	GIO2	General Purpose I/O 2	
4	GIO1	General Purpose I/O 1	
5	SDIO	SPI Data I/O	
6	SCK	SPI Clock	
7	SCS	SPI Chip Selection	
8	TX SW	RF front end PA/LNA select	
9	RX SW	RF front end PA/LNA select	
10	GND	GND	

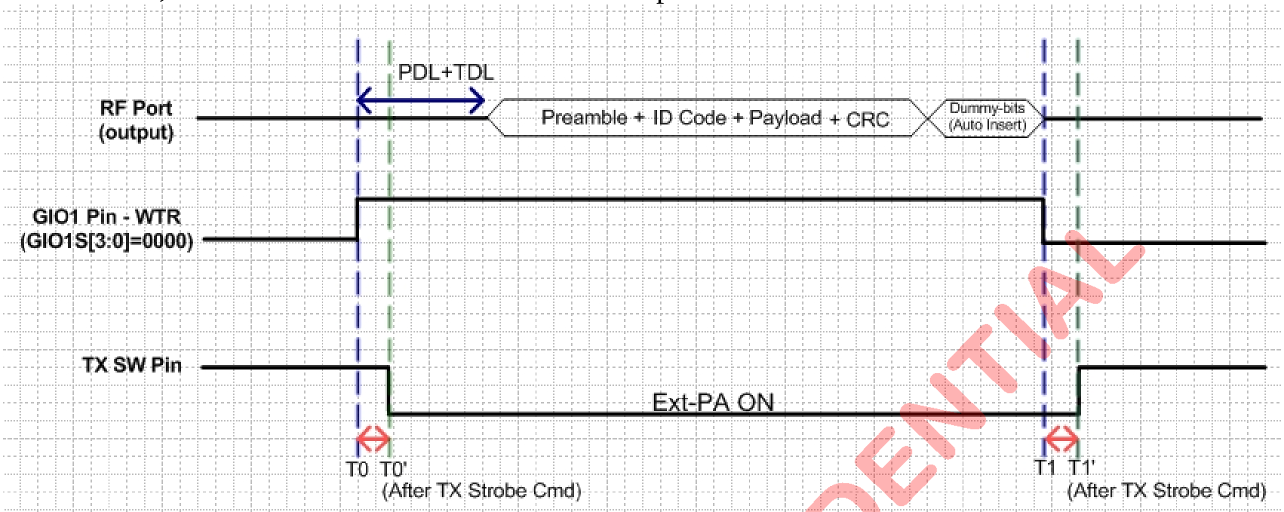
4. PA & LNA control state

Control function	RX ON	TX ON	TR/X OFF	Inhibition
TX SW	1	0	1	0
RX SW	0	1	1	0

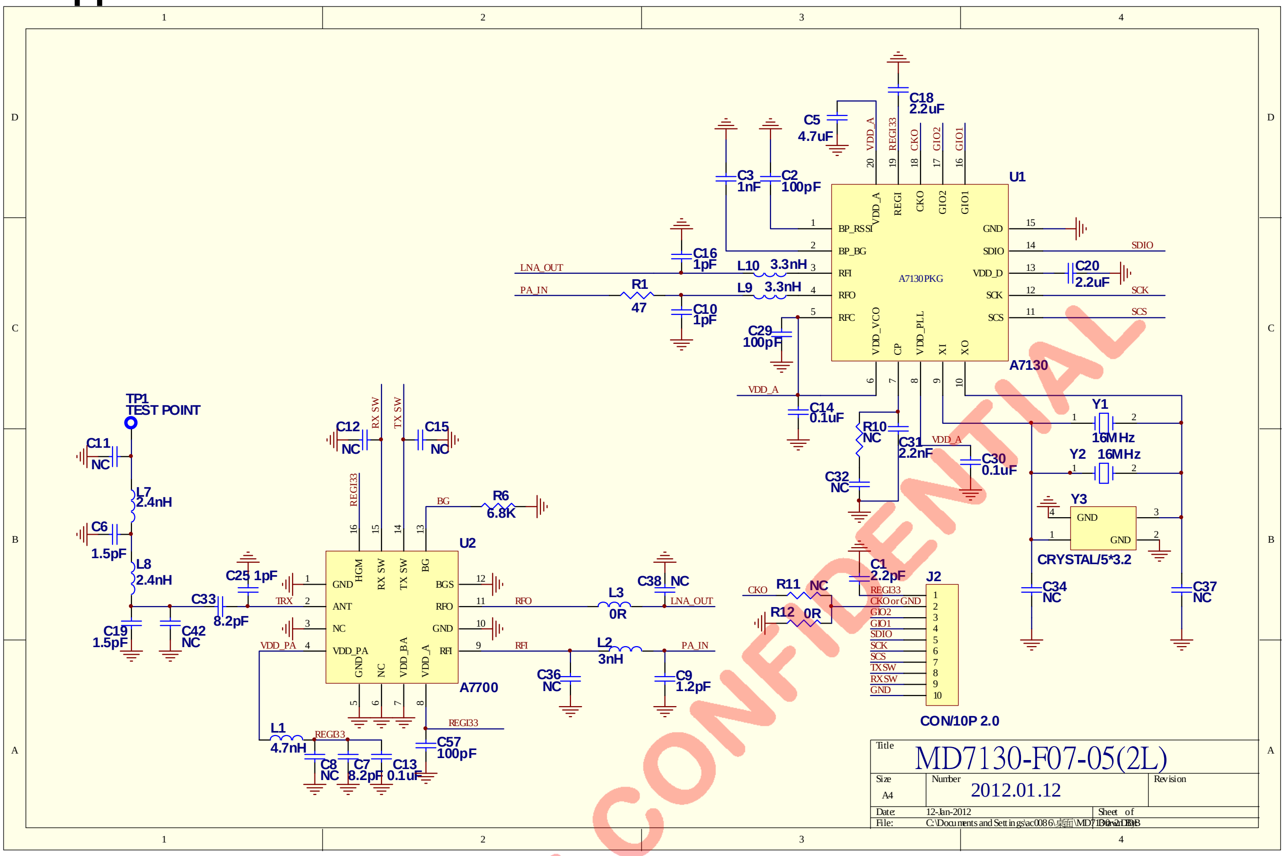
5. External PA Control

TX SW (Ext-PA Switch)

In such case, user' MCU needs to connect TX SW pin to control external PA as shown below.



6. Application circuit



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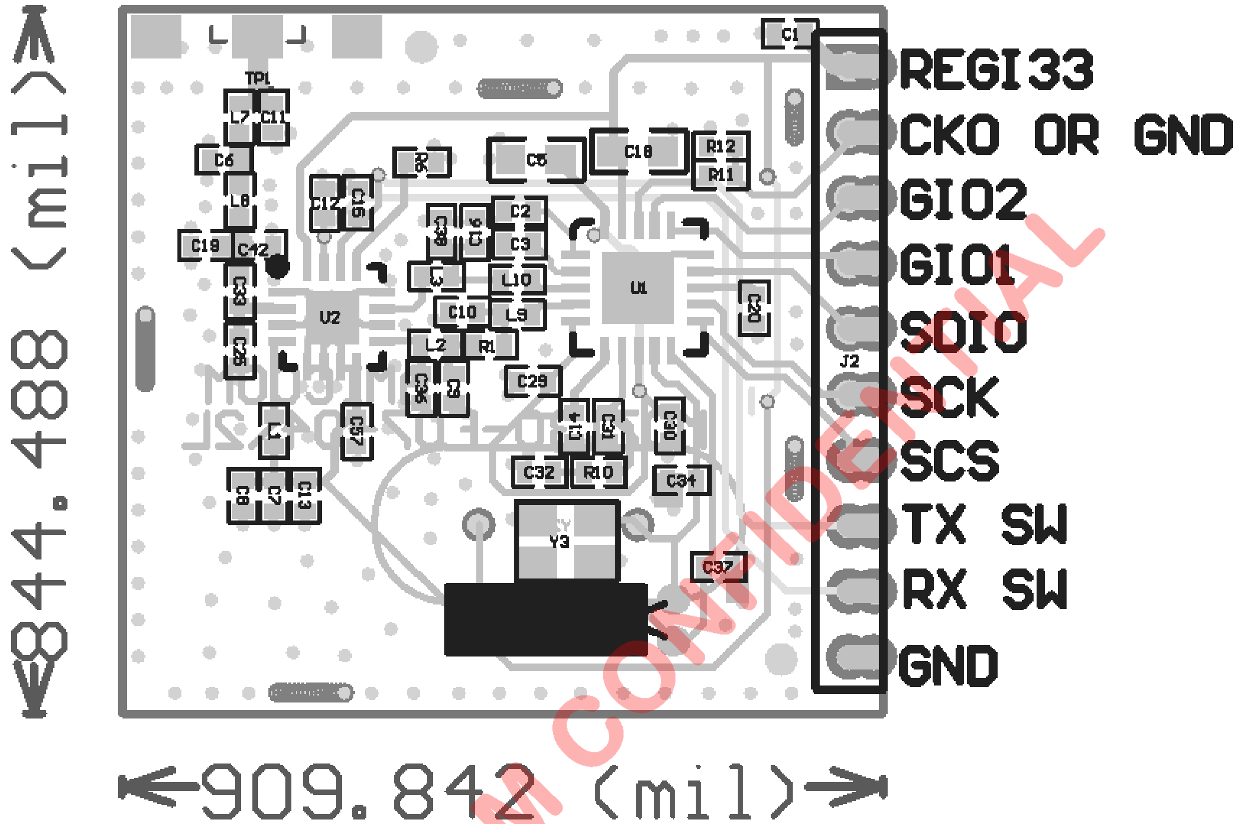
7. Reference Layout



1. The back plate of the IC should connect to GND.
2. When using cylinder crystal, please take special care as below:
   (1) Please don’t apply solder to the body directly, as it may cause characteristic deterioration.
   (2) Please fix the unit firmly with elastic glue on the board.
   (3) Please don’t cut or bend the leads within 0.5 mm from the base of the cylinder body.
   (4) Please don’t use ultrasonic washing and ultrasonic welding on the unit, because it may be damaged.

8. Module photograph

9. Bill of Material

Item	Component	Description	Size	Value	Tol.	Part Number	Remark
1	C1	C0G ceramic capacitor	0402	2.2pF	±0.25pF	Murata GRM1555C1H2R2C	
2	C2	C0G ceramic capacitor	0402	100pF	±5%		
3	C3	C0G ceramic capacitor	0402	1nF	±5%		
4	C5	Y5V ceramic capacitor	0603	4.7uF	±20%		
5	C6	C0G ceramic capacitor	0402	1.5pF	±0.25pF	Murata GRM1555C1H1R5C	
6	C7	C0G ceramic capacitor	0402	8.2pF	±0.5pF	Murata GRM1555C1H8R2D	
7	C9	C0G ceramic capacitor	0402	1.2pF	±0.25pF	Murata GRM1555C1H1R2C	
8	C10	C0G ceramic capacitor	0402	1pF	±0.25pF	Murata GRM1555C1H1R0C	
9	C13	X7R ceramic capacitor	0402	0.1uF	±10%		
10	C14	X7R ceramic capacitor	0402	0.1uF	±10%		
11	C16	C0G ceramic capacitor	0402	1pF	±0.25pF	Murata GRM1555C1H1R0C	
12	C18	Y5V ceramic capacitor	0603	2.2uF	±10%		
13	C19	C0G ceramic capacitor	0402	1.5pF	±0.25pF	Murata GRM1555C1H1R5C	
14	C20	X5R ceramic capacitor	0402	2.2uF	±10%		
15	C25	C0G ceramic capacitor	0402	1pF	±0.25pF	Murata GRM1555C1H1R0C	
16	C29	C0G ceramic capacitor	0402	100pF	±5%		
17	C30	X7R ceramic capacitor	0402	0.1uF	±10%		
18	C31	X7R ceramic capacitor	0402	2.2nF	±10%		
19	C33	C0G ceramic capacitor	0402	8.2pF	±0.5pF	Murata GRM1555C1H8R2D	
20	C57	C0G ceramic capacitor	0402	100pF	±5%		
21	L1	Chip inductor	0402	4.7nH	±0.3nH	Murata LQG15HS4N7S	
22	L2	Chip inductor	0402	3nH	±0.3nH	Murata LQG15HS3N0S	
23	L3	Chip resistor	0402	0R			
24	L7	Chip inductor	0402	2.4nH	±0.3nH	Murata LQG15HS3N0S	
25	L8	Chip inductor	0402	2.4nH	±0.3nH	Murata LQG15HS2N4S	
26	L9	Chip inductor	0402	3.3nH	±0.3nH	Murata LQG15HS3N3S	
27	L10	Chip inductor	0402	3.3nH	±0.3nH	Murata LQG15HS3N3S	
28	R1	Chip resistor	0402	47R	±5%		
29	R6	Chip resistor	0402	6.8K	±5%		
30	Y1 or Y2 or Y3	Crystal	Y1=2mm × 6mm Y2= DIP Type 49S Y3= SMD 3.2*2.5	16MHz, CL=18pF	±20ppm		昌禾: Aurum Technology Inc. 友桂: YOKETAN CROP. 台灣嘉碩: TAI-SAW
31	U1	2.4 GHz Transceiver	QFN20_4*4	A7130PKG			AMICCOM
32	U2	RF Front End with PA and LNA	QFN16_3*3	A7700PKG			AMICCOM
33	C8		0402	NC			
34	C11		0402	NC			
35	C12		0402	NC			
36	C15		0402	NC			
37	C32		0402	NC			
38	C34		0402	NC			
39	C36		0402	NC			
40	C37		0402	NC			
41	C38		0402	NC			
42	C42		0402	NC			
43	R10	Chip resistor	0402	NC			
44	R11	Chip resistor	0402	0R or NC			**Annotation 1**
45	R12	Chip resistor	0402	0R or NC			**Annotation 1**

Annotation:

1. If R12 =0 ohm and R11= NC, the interface pin (CKO OR GND) is defined GND.
   If R11 =0 ohm and R12= NC, the interface pin (CKO OR GND) is defined CKO.