CPQ237 Module Hardware Manual

revison：V2.0

1 Product introduction

1.1 Description

CPQ237 is a 2.4G power amplification wireless communication module based on Qualcomm Atheros AR9531 in Shenzhen Kan Pei Electronics Technology Co., Ltd. The CPQ237 series module has rich peripheral interface and powerful software support platform, which can carry out the two software development. It can support a variety of peripherals to meet different needs.

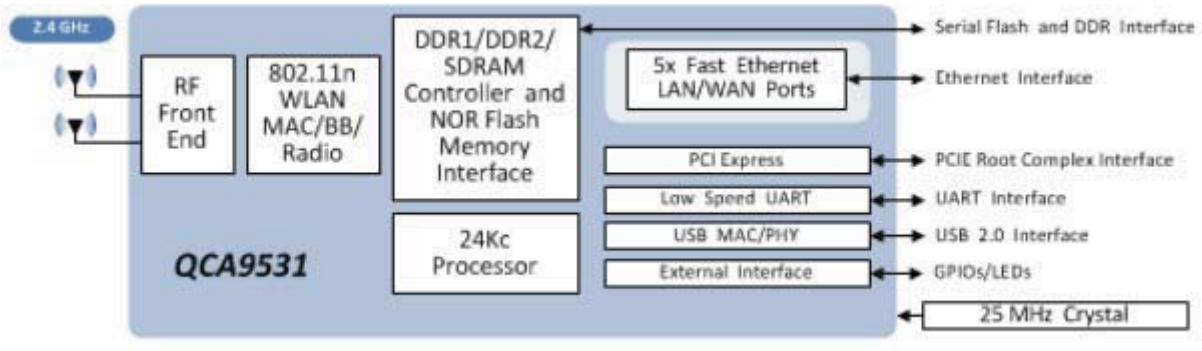
Figure CPQ237 module

1.2 Features

- Package interface: net port, LED lamp, UART
- Customize software development: the system default openwrt, provide SDK, support the various functions of custom development customers can independently development module application software

- Protocol standard: IEEE 802.11b/g/n,WEP,TKIP,AES,WPA,WPA2
- Frequency band: 2.4GHz ISM Band
- Wireless speed: 802.11n, max:300Mbps

1.3 CPQ237Block Diagram.



1.4 Application

- Wireless environment detection
- Remote video surveillance
- High power router
- Smart home control

2 CPQ237 RF parameter

Project	Describe		
Working frequency	2.4000GHz～2.4835GHz;		
RF mode	2T2R		
Frequency tolerance	±20ppm		
EVM	11b	≤0.35	
	11g	6Mbps	≤-5dB
		9Mbps	≤-8dB
		12Mbps	≤-10dB
		18Mbps	≤-13dB
		24Mbps	≤-16dB
		36Mbps	≤-19dB
		48Mbps	≤-22dB
		54Mbps	≤-25dB
	11n	MCS0/8	≤-5dB
		MCS1/9	≤-10dB
		MCS2/10	≤-13dB
		MCS3/11	≤-16dB
		MCS4/12	≤-19dB
		MCS5/13	≤-22dB
		MCS6/14	≤-25dB
		MCS7/15	≤-28dB
Reception sensitivity	PER＜ 8%@802.11b PSDU=1024Bytes	11Mbps	-85dBm
		5.5Mbps	-88dBm
		2Mbps	-89dBm

		1Mbps	-91dBm
	PER＜10%@11g PSDU=1000Bytes	6Mbps	-89dBm
		9Mbps	-88dBm
		12Mbps	-85dBm
		18Mbps	-83dBm
		24Mbps	-80dBm
		36Mbps	-76dBm
		48Mbps	-71dBm
		54Mbps	-70dBm
	PER＜10%@11n HT20 PSDU=1024Bytes	MCS0/8	-83dBm
		MCS1/9	-80dBm
		MCS2/10	-78dBm
		MCS3/11	-75dBm
		MCS4/12	-71dBm
		MCS5/13	-67dBm
		MCS6/14	-66dBm
		MCS7/15	-65dBm
	FER＜10%@11n HT40 PSDU=1024Bytes	MCS0/8	-80dBm
		MCS1/9	-77dBm
		MCS2/10	-75dBm
		MCS3/11	-72dBm
		MCS4/12	-68dBm
		MCS5/13	-64dBm
		MCS6/14	-63dBm
		MCS7/15	-62dBm
Throughput	11b		≥5Mbps
	11g		≥20Mbps
	11n（HT20）		≥85Mbps
	11n（HT40）		≥160Mbps

3 External interface description

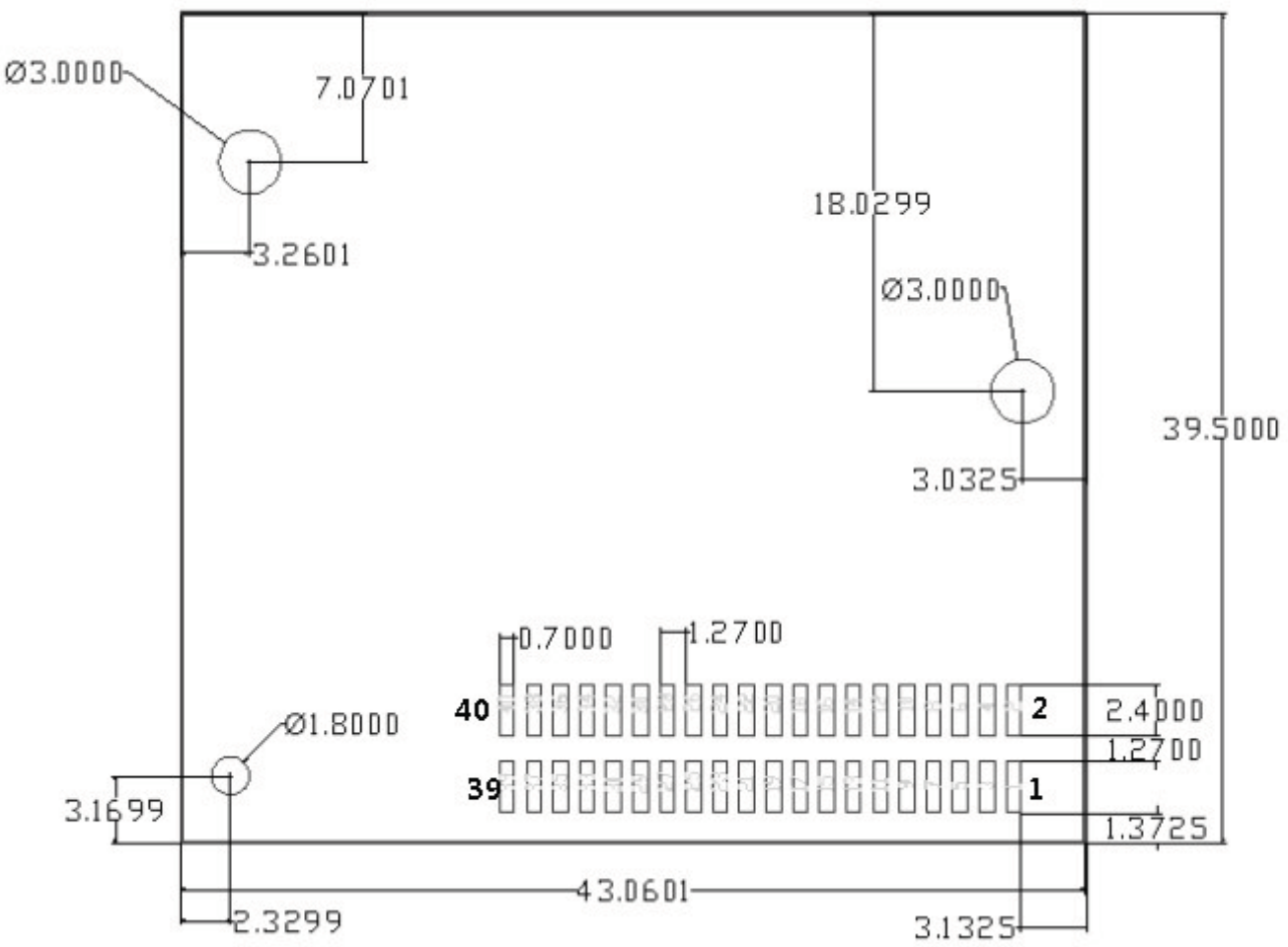
The CPQ237 series module provides the following external interfaces:

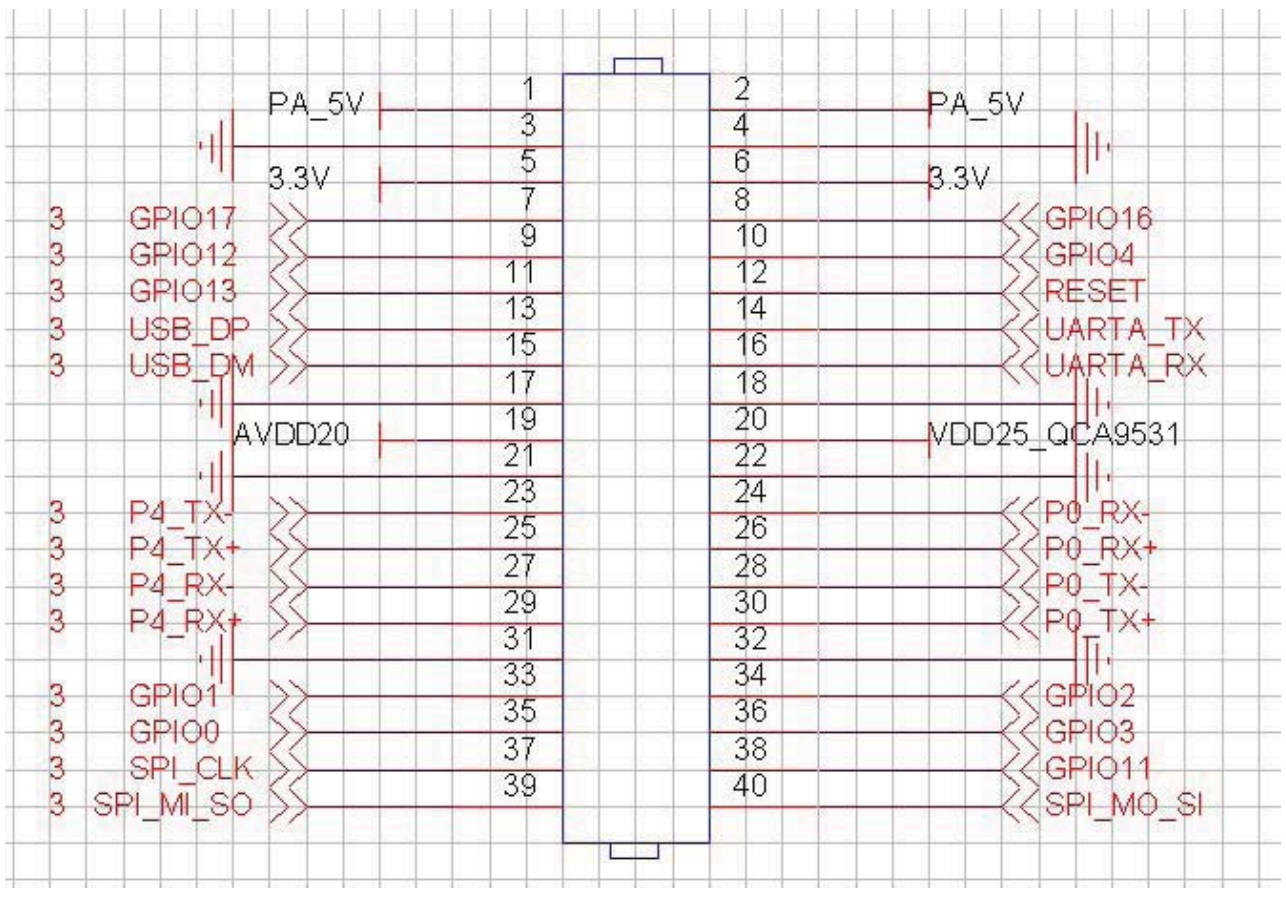
Interface	describe
Power input	3.2V - 3.4V DC DC power input (recommended value 3.3V)
USB	USB2.0 Full speed/High speed
UART0	2 line serial communication format, which can be used for debugging software
GPIOs	Multiple programmable GPIO ports for device and function extension
LAN/WAN	Net mouth, 1WAN 1LAN
Antenna interface	Antenna connection and radio frequency performance test

3.1 Pin Definition

The CPQ237 series module provides double row needle connection, as shown in Figure 3-1 below.

CPQ237 module TOP VIEW: top layer Perspective

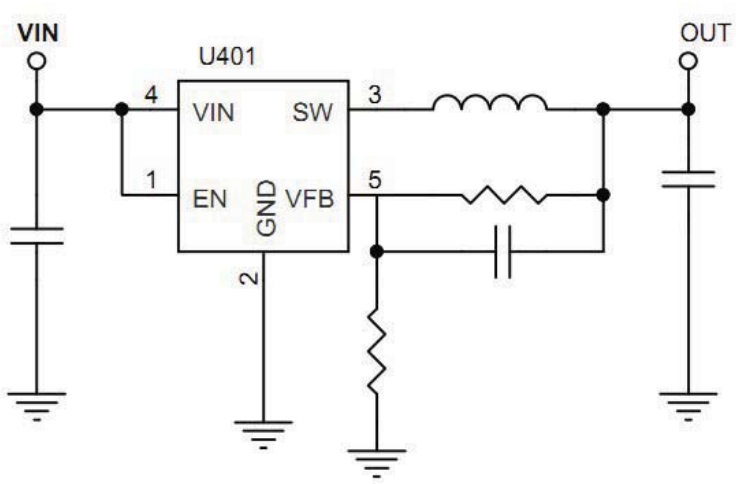




PIN	Network name	TYPE	Describe	PIN	Network name	TYPE	Describe
1	PA_5V	P	5V input	2	PA_5V	P	5V input
3	GND	G	GND	4	GND	G	GND
5	VDD33	P	3.3Vinput	6	VDD33	P	3.3Vinput
7	GPIO17	I/O		8	GPIO16	I/O	
9	GPIO12	I/O		10	GPIO4	I/O	
11	GPIO13	I/O		12	RESET	I/O	Reset pin
13	USB_DP	I/O		14	UARTA_TX	I/O	Data transmission
15	USB_DM	I/O		16	UARTA_RX	I/O	Data transmission
17	GND	G	GND	4	GND	G	GND
19	2.0VD	P	Output 2.0V	20	VDD25	P	Output2.5V
21	GND	G	GND	4	GND	G	GND
23	P4_TX-	I/O	P4_TX-	24	P0_RX-	I/O	P0_RX-
25	P4_TX+	I/O	P4_TX+	26	P0_RX+	I/O	P0_RX+
27	P4_RX-	I/O	P4_RX-	28	P0_TX-	I/O	P0_TX-
29	P4_RX+	I/O	P4_RX+	30	P0_TX+	I/O	P0_TX+
31	GND	G	GND	4	GND	G	GND
33	GPIO1	I/O		34	GPIO2	I/O	
35	GPIO0	I/O		36	GPIO3	I/O	
37	SPI_CLK	I/O		38	GPIO11	I/O	
39	SPI_MISO	I/O		40	SPI_MOSI	I/O	

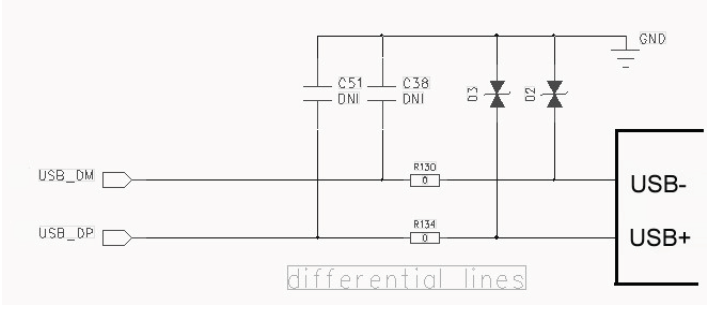
3.2 power supply

VCC input current can supply more than 2A, so it is recommended to use more than 2A power supply. It is recommended to use a LDO or switching power supply with a current output capacity greater than 2 A and shunt capacitors at the power port of the module.
The reference circuit is as follows:



3.3 USB

The CPQ237 module has a standard USB2.0 interface, supporting two speeds of High speed (480 Mbps) and Full peed (12 Mbps). Can work in HOST mode and DEVICE mode.
The reference circuit is as follows:



3.4 UART

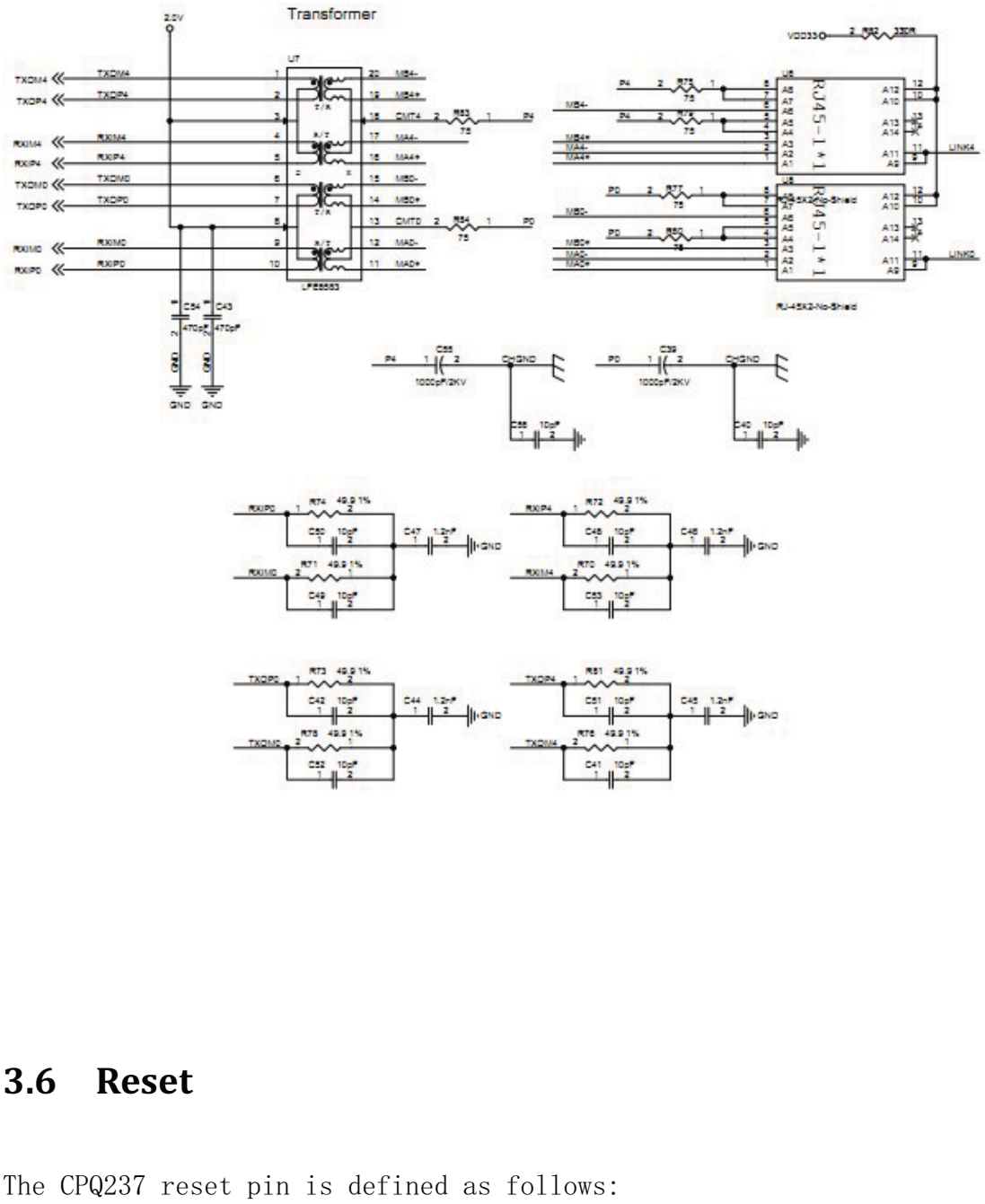
CPQ237 provides a set of 2 line UART interfaces defined as follows:

PIN	Name	Type	Describe
16	UARTA_RX	I	Serial port reception
14	UARTA_TX	O	Serial port transmission

The UART of CPQ237 is tried out and output print information.

3.5 Net mouth

CPQ237 provides 2 net ports
The following diagram can be referred to as follows:



3.6 Reset

The CPQ237 reset pin is defined as follows:

PIN	Name	Type	Describe
12	RESET	I/O	rsset

3.7 GPIO

CPQ237 provides the GPIO interface, defined as follows:

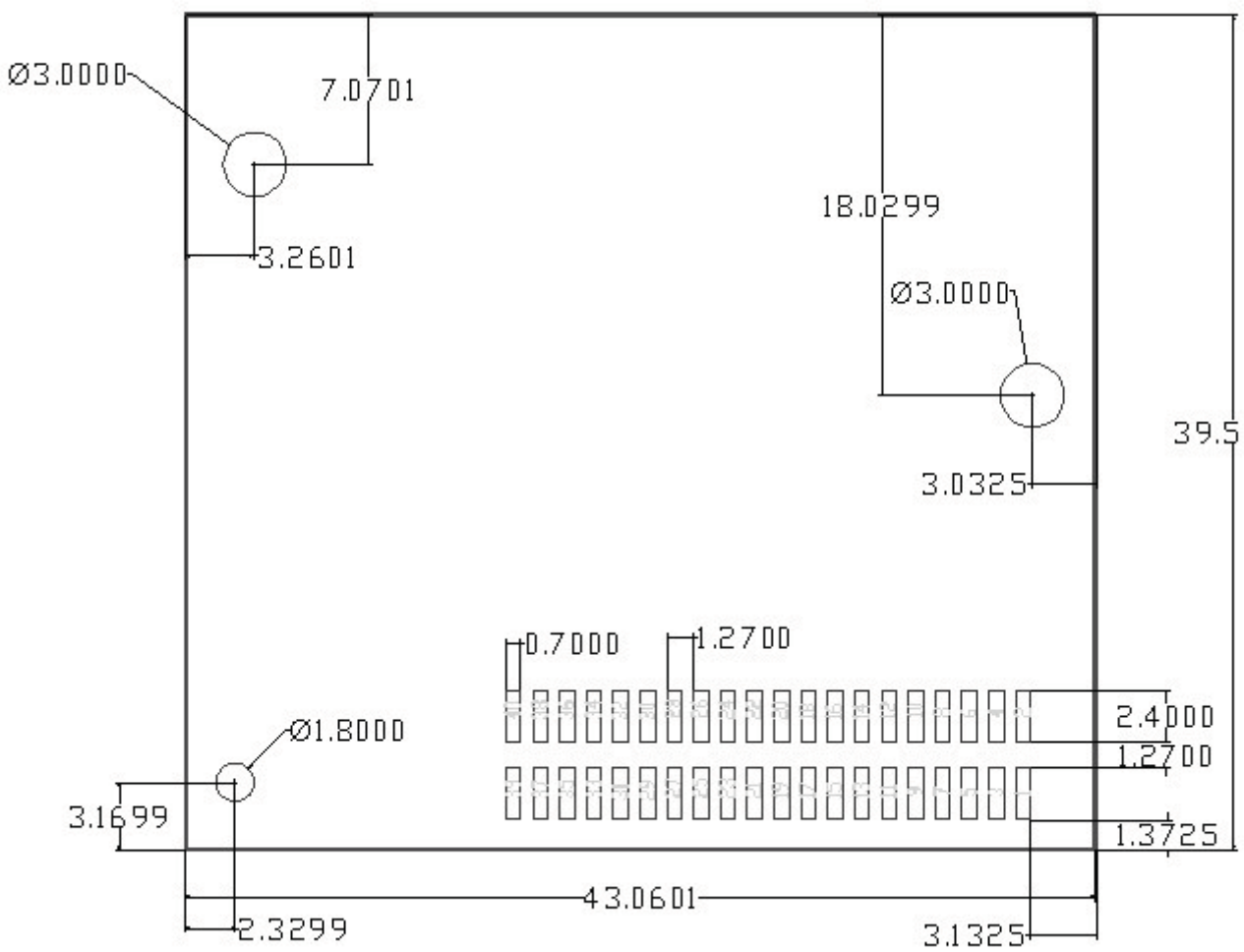
PIN	Name	Type	Describe
7	GPIO17	I/O	GPIO
8	GPIO16	I/O	GPIO
9	GPIO12	I/O	GPIO
10	GPIO4	I/O	GPIO
33	GPIO1	I/O	GPIO
34	GPIO2	I/O	GPIO
35	GPIO0	I/O	GPIO
36	GPIO3	I/O	GPIO
38	GPIO11	I/O	GPIO

3.8 Antenna instructions

The CPQ237 module adopts an external antenna, and the PCB board is integrated with the IPEX genuine joint, which is convenient to install the antenna with high gain.

CPQ237 Antenna port diagram

4 Structural packaging



Ordering Information

Revison number	Description
CPQ237 V1.0	Wifi+PA amplifier base module, external antenna

Limited Single-Modular Transmitter

Common Base-board

The module is designed to only be utilized in the WiFiRanger shown below.

Figure 1: Top View of Common Base-board which Hosts the WiFi Module

Assembled Products

The are produced with a standard PVC enclosure that does not affect wireless transmission and reception characteristics.

Assembled

The has both external 0dBi antennas

Figure : Assembled with Two 0dBi 2.4GHz Antennas connected to WiFi module.

Warning

Changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

NOTE: 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 in a residential installation.

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. However, there is no guarantee that interference will not occur in a particular installation.

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:

1. Reorient or relocate the receiving antenna.

2. Increase the separation between the equipment and receiver.

3. Connect the equipment into an outlet on a circuit different from that to which the receiver is
   connected.

4. Consult the dealer or an experienced radio/TV technician for help.

Any company of the host device which install this modular with limit modular approval should perform the test of radiated emission and spurious emission according to FCC part 15C : 15.247 ; IC RSS 247 ; 15.209 ; RSS GEN requirement, Only if the test result comply with FCC part 15C : 15.247 ; IC RSS 247 ; 15.209 ; RSS GEN requirement, then the host can be sold legally.

FCC Statement

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: 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 in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. 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.

FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: ***XXXXXXX*** Or Contains FCC ID: ***XXXXXXXX***”

when the module is installed inside another device, the user manual of this device must contain below warning statements;

1. 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.

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

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product