



T77H298 WiFi Module USER MANUAL

Project Name	WiFi Module
Revision	00
Foxconn project code	T77H298

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1.Introduction

The T77H298 802.11b/g/n module provides wireless modem functionality utilizing direct sequence spread spectrum and OFDM/CCK technology. This module is based on Broadcom BCM43362KUBG solution which is with integrated 2.4GHz IEEE802.11 b/g/n (MAC/baseband/radio), power amplifiers (PA), and power management unit (PMU).

1.1 Scope

The wireless LAN is compliant to IEEE 802.11b and IEEE 802.11g and IEEE 802.11n standard. The data rate of 802.11b is up to 11Mbps and fallback rates of 5.5, 2, 1Mbps. The data rate of 802.11g is up to 54Mbps and fallback rates of 48,36,24,18,12,9, 6Mbps. The data rate of 802.11n is up to 65Mbps and fallback rates of 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps for HT20.

1.2 Function

- RoHS and Green Compliant.
- 1X1 IEEE802.11b/g/n based on Broadcom 43362 solution.
- SDIO Interface.
- Module is powered by the host with a 3.3V +/- 10% supply.
- Two on-board PCB antennas.

2.WIFI ALLIANCE CONFORMANCE

The Module is certified by the Wi-Fi Alliance. The Module and standard PC driver passes the Wi-Fi System Interoperability Test Plan including the following:

A. IEEE 802.11-2007 Standard for LAN/MAN

Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

B. IEEE P802.11n-2009 Standard for Information Technology

Telecommunications and information exchange between systems - Local and metropolitan area networks – Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
Amendment 5: Enhancements for Higher Throughput

C. Supported security:

- WPA™ and WPA2™ (Personal) support for powerful encryption and authentication
- AES and TKIP acceleration hardware for faster data encryption
- Secure Easy setup for simple Wi-Fi setup and WPA2/WPA security configuration

3. Hardware Specification

3.1 IEEE802.11b mode

Radio Technology	Direct Sequence Spread Spectrum (DSSS)
Operating Frequency	2412 ~ 2484MHz ISM band
Modulation Schemes	DQPSK, DBPSK and CCK
Channel Numbers	11 channels for United States 13 channels for Europe Countries
Data Rate	1Mbps , 2Mbps, 5.5Mbps and 11Mbps
Media Access Protocol (MAC)	CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)
Transmitter Output Power	802.11b: 20.50 dBm
Receiver Sensitivity	Typical -91dBm for 1Mbps @ 8% PER Typical -90dBm for 2Mbps @ 8% PER Typical -87dBm for 5.5Mbps @ 8% PER Typical -85dBm for 11Mbps @ 8% PER

3.2 IEEE802.11g mode

Radio Technology	Orthogonal Frequency Division Multiplexing (OFDM)
Operating Frequency	2412 ~ 2484MHz ISM band
Modulation Schemes	BPSK, QPSK, 16QAM, 64QAM
Channel Numbers	11 channels for United States 13 channels for Europe Countries
Data Rate	6Mbps, 9, 12, 18, 24, 36, 48, and 54Mbps
Media Access Protocol (MAC)	CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)
Transmitter Output Power	802.11g: 22.60 dBm
Receiver Sensitivity	Typical -85dBm for 6Mbps @ 10% PER Typical -83dBm for 9Mbps @ 10% PER Typical -81dBm for 12Mbps @ 10% PER Typical -79dBm for 18Mbps @ 10% PER Typical -76dBm for 24Mbps @ 10% PER Typical -73dBm for 36Mbps @ 10% PER Typical -70dBm for 48Mbps @ 10% PER Typical -68dBm for 54Mbps @ 10% PER

3.3 IEEE802.11n (HT20) mode

Radio Technology	Orthogonal Frequency Division Multiplexing (OFDM)
Operating Frequency	2412 ~ 2484MHz ISM band
Modulation Schemes	BPSK, QPSK, 16QAM, 64QAM
Channel Numbers	11 channels for United States 13 channels for Europe Countries
Data Rate	6.5Mbps, 13, 19.5, 26, 39, 52, 58.5 and 65Mbps
Media Access Protocol (MAC)	CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)
Transmitter Output Power	802.11n (20MHz): 21.80 dBm
Receiver Sensitivity	Typical -85dBm for 6.5Mbps @ 10% PER Typical -82dBm for 13Mbps @ 10% PER Typical -80dBm for 19.5Mbps @ 10% PER Typical -77dBm for 26Mbps @ 10% PER Typical -73dBm for 39Mbps @ 10% PER Typical -69dBm for 52Mbps @ 10% PER Typical -68dBm for 58.5Mbps @ 10% PER Typical -67dBm for 65Mbps @ 10% PER

4.Product Requirements

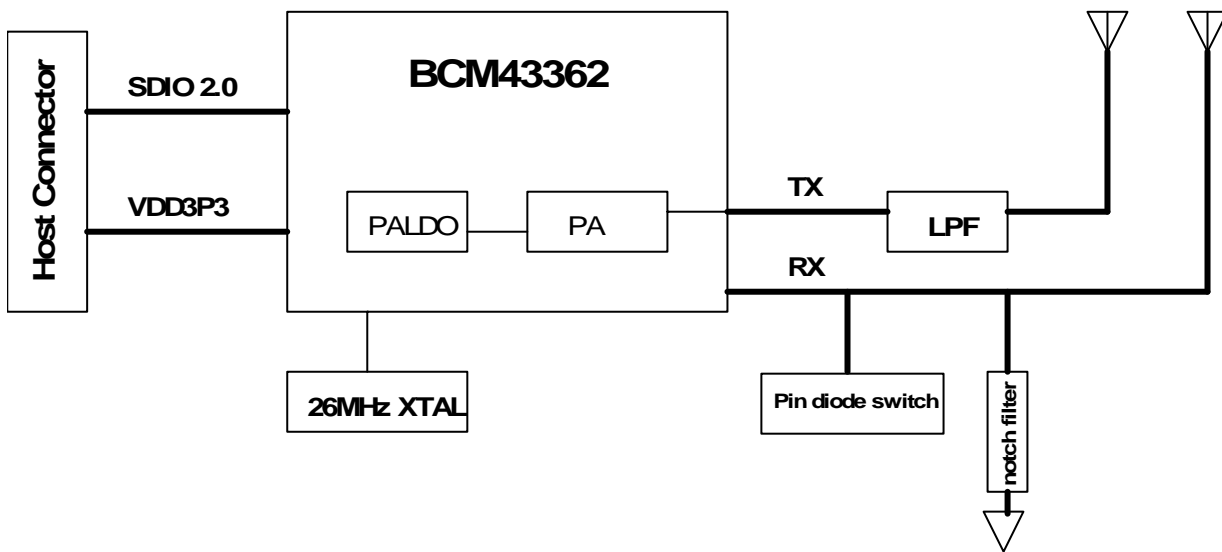
4.1 Hardware Requirements

Form factor	32 mm x21mm module with 8-pin B.T.B connector
Host Interface	SDIO interface
PCB	4-layer design
Antenna connector	RF switch connector

4.2 Hardware Architecture

The T77H298 802.11b/g/n module is based on Broadcom BCM43362 solution which is with integrated 2.4GHz IEEE802.11 b/g/n (MAC/baseband/radio), power amplifiers (PA), and power management unit (PMU).This module is powered from the host (3.3V) and interfaces to the host with SDIO signals and with two on-board antennas and one on-board 26 MHz XTAL.

The functional block diagram is shown as below.



5.Interface of connector

Manufacturer Part number: HC5204F-PT

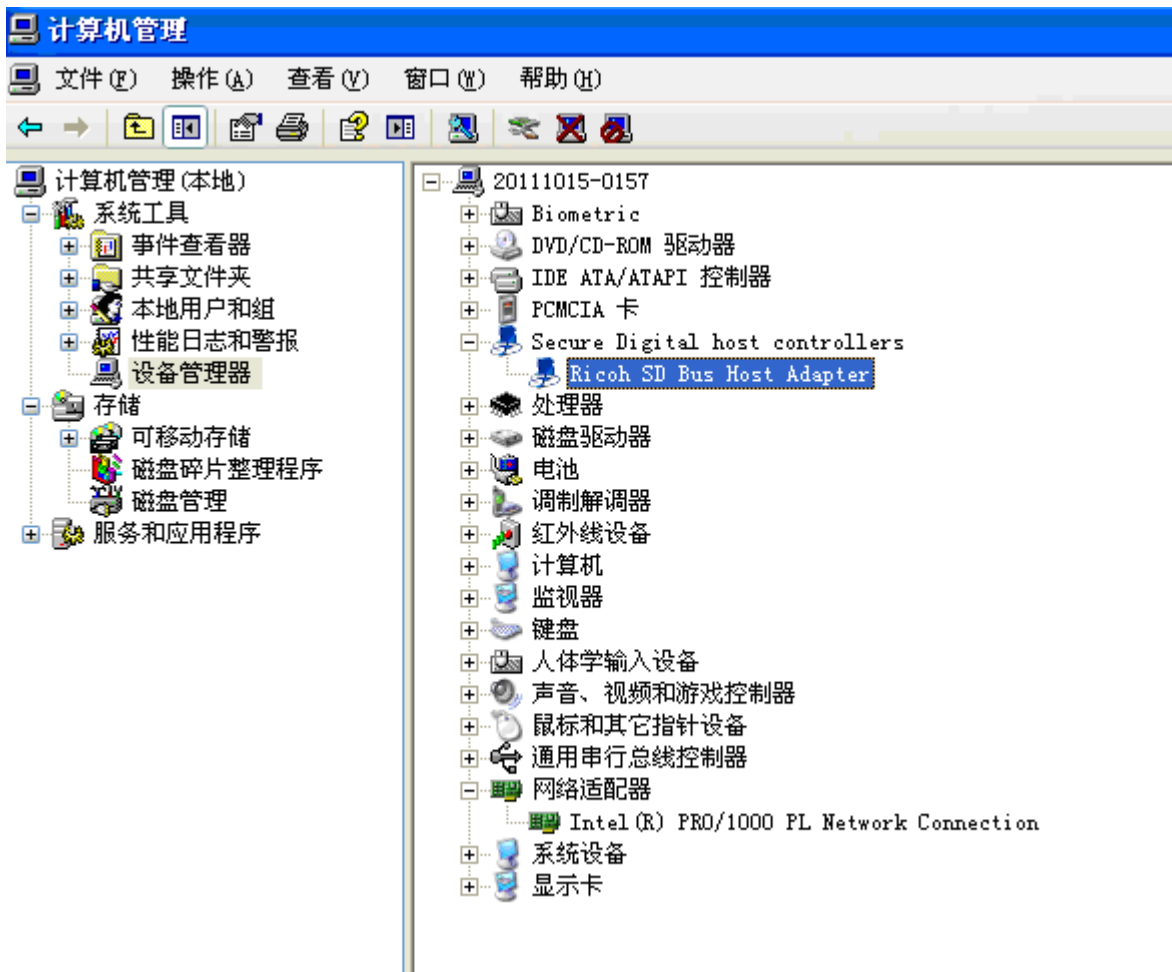
Pin	Pin Name	I/O	Note
1	GND		
2	VDD3P3		SDIO power supply
3	SDIO_DATA0	I/O	SDIO port data 0
4	SDIO_DATA1	I/O	SDIO port data 1
5	SDIO_DATA3	I/O	SDIO port data 3
6	SDIO_CLK	I	SDIO port clock
7	SDIO_DATA2	I/O	SDIO port data 2
8	SDIO_CMD	I	SDIO port command

6.Windows XP Wireless Utility and install

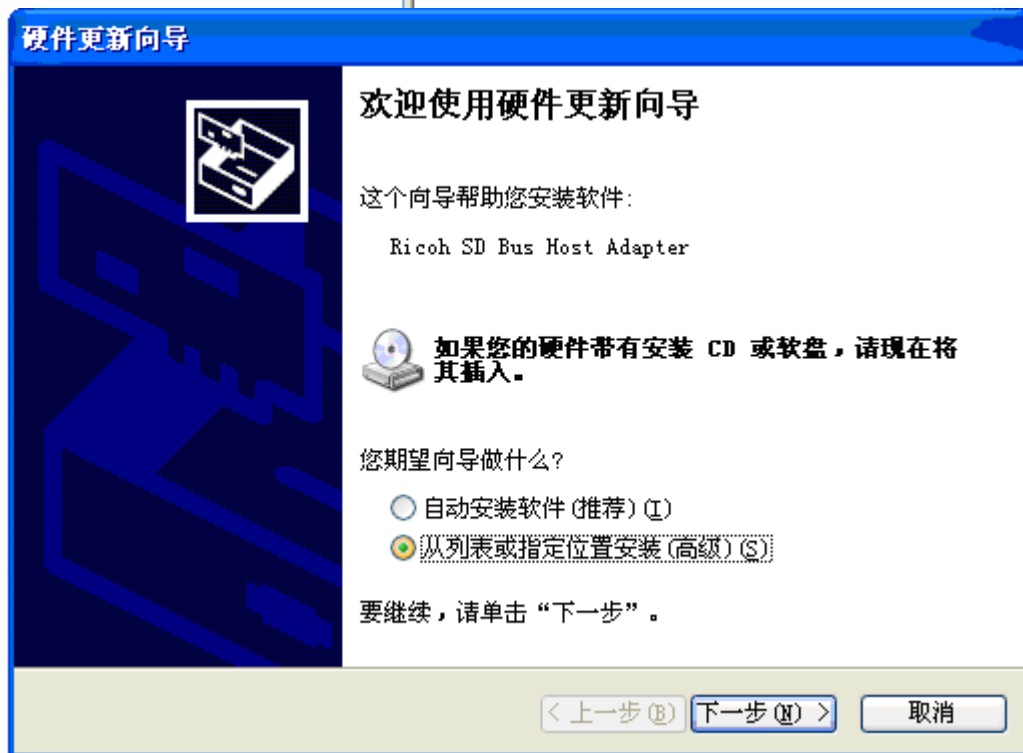
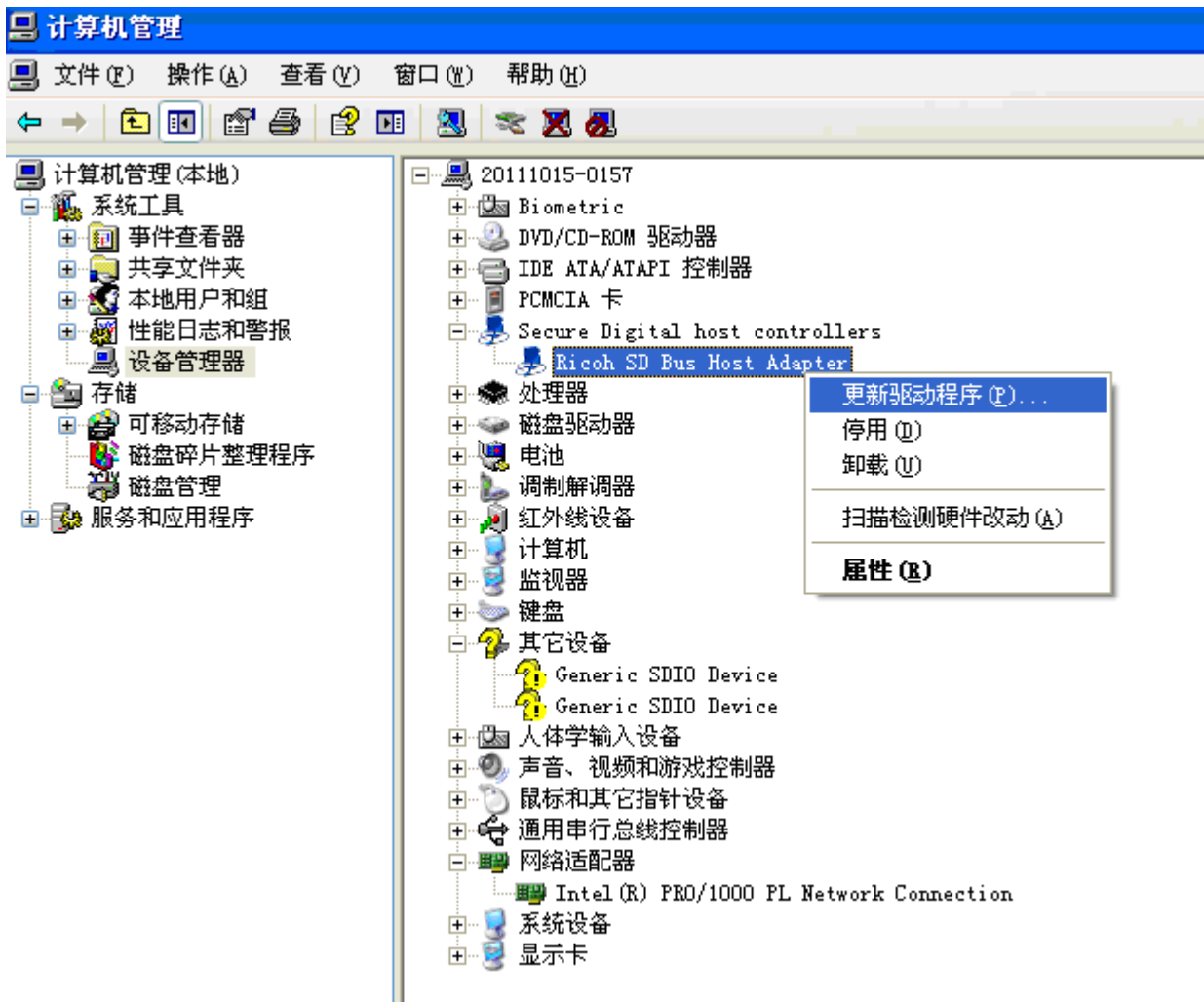
Remark: The module is for printer, it is used in the Linux OS, so this Windows driver is just for reference. To install the driver files, complete below steps:

1, place **nvr.am.txt** in C:\WINDOWS\system32\drivers

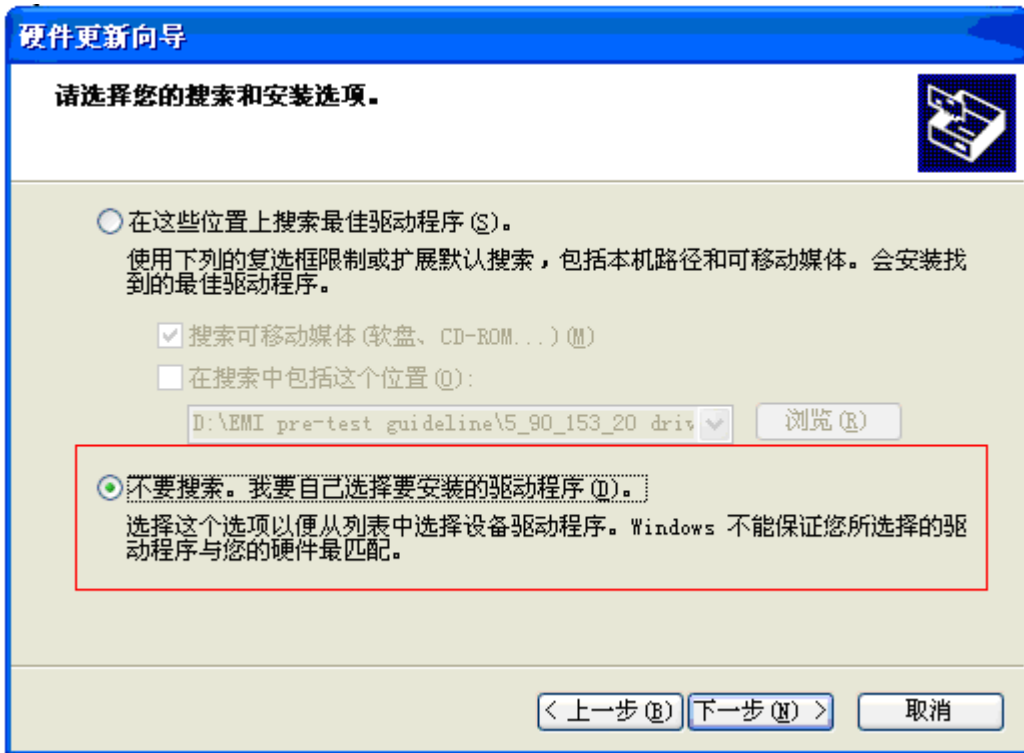
2, Find out **Ricoh SD Bus Host Adapter** in device management of your notebook as shown below picture.



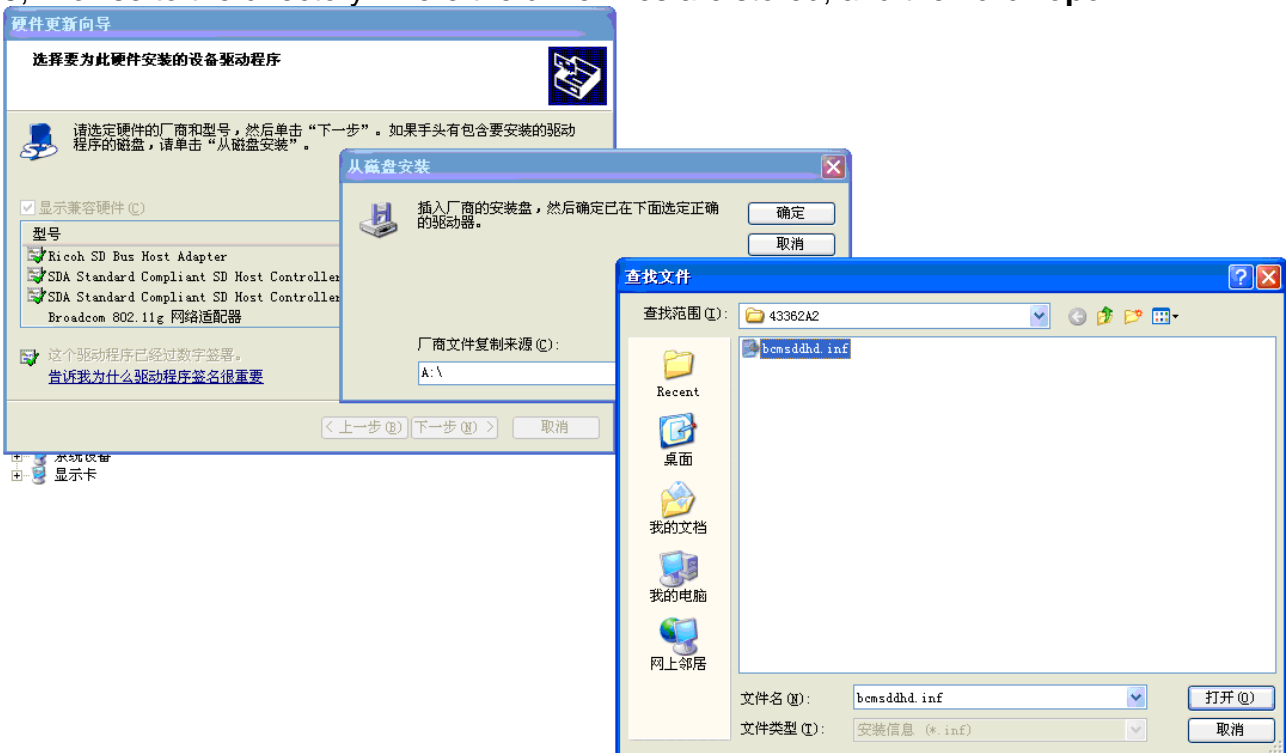
3, Insert DUT into SDIO slot of notebook, then Install driver based on **Ricoh SD Bus Host Adapter** directly.



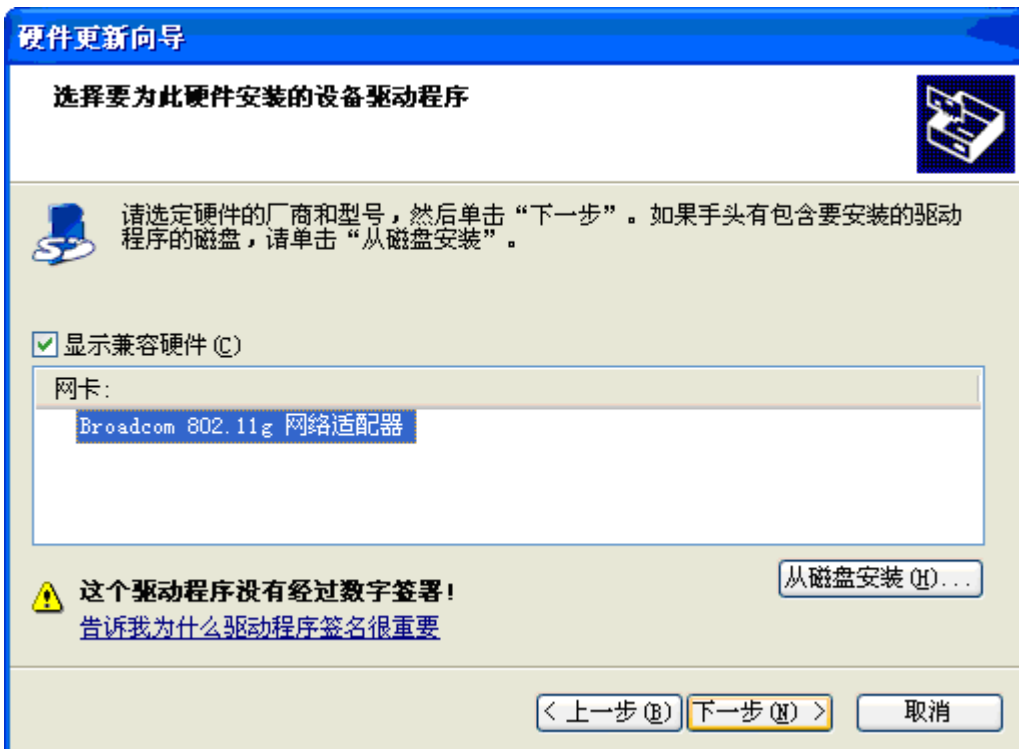
4, choose **Don't search, I will choose the driver to install**, and then click **Next**.



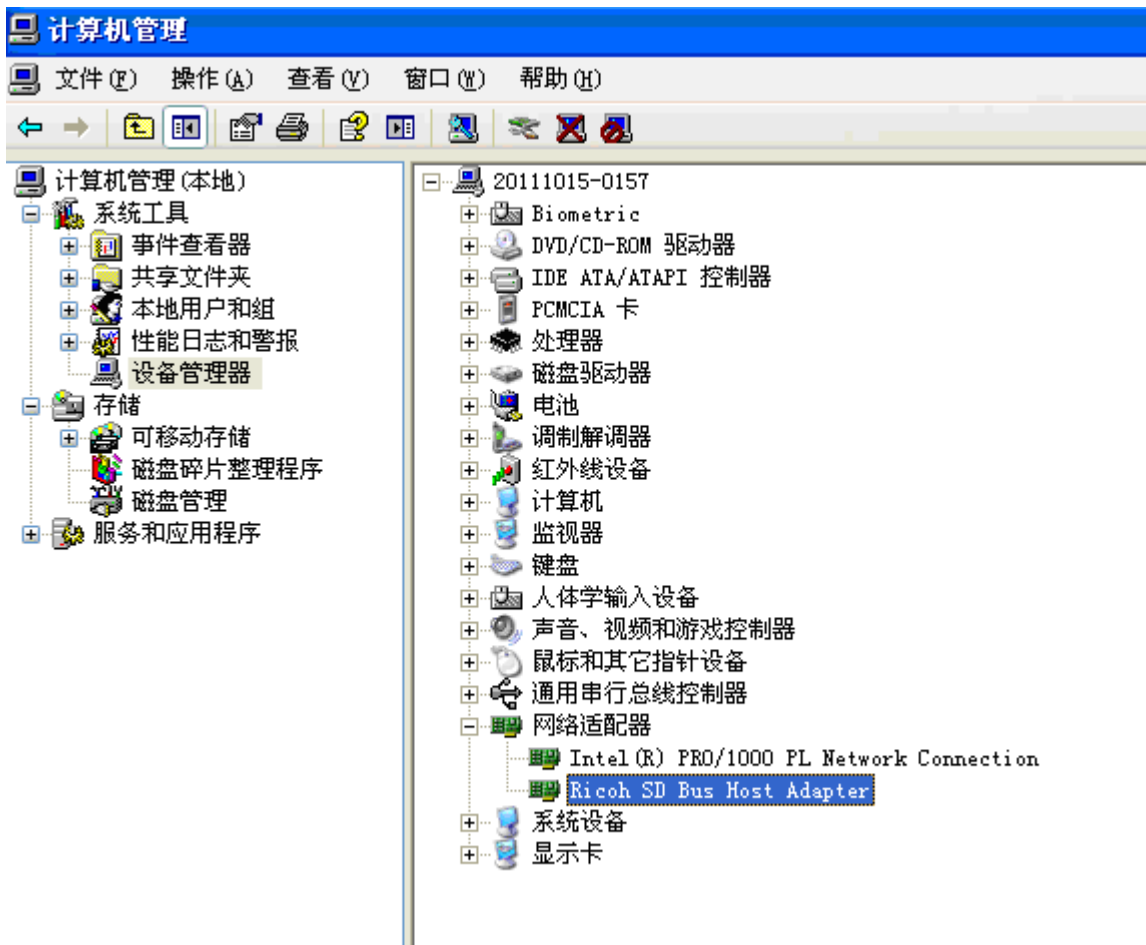
5, Browse to the directory where the driver files are stored, and then click **open**.



6, click **next**



7, The driver is successfully installed if you see **Ricoh SD Bus Host Adapter** in network adapter



Industry Canada statement:

This device complies with RSS-210 of the Industry Canada 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.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

***This device is intended only for OEM integrators under the following conditions:
(For module device use)***

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and

2) The transmitter module may not be co-located with any other transmitter or antenna. As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et

2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne. Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: 1112C-T77H298".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 1112C-T77H298".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Federal Communication Commission Interference 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.

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 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 Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: B3QT77H298". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

For Taiwan 警語：(電信管制射頻器材使用)

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Note: 1. 本模組於取得認證後將依規定於模組本體標示審驗合格標籤 2. 系統廠商應於平台上標示「本產品內含射頻模組： XXXyyyLPDzzzz-x (NCC ID) 」字樣