

AX88772B Product Introduction

Revision 1.10 June 21st, 2010



Revision History

Revision	Date	Description
1.00	2010/04/29	Initial release
1.10	2010/06/21	1. Added AX88772B USB to 100Base-TX Ethernet (with RMII)
		Demo Board related information.
		2. Updated the Selection Guide in Section 3.
		3. Updated AX88772B demo boards naming in Section 4 and 7.
		4. Updated Figure 9 "AX88772B USB to 100Base-TX Ethernet Demo
		Board" picture in Section 7-1.
		5. Modified some descriptions in Section 8.



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1. Introduction

The AX88772B Low-power USB 2.0 to 10/100M Fast Ethernet controller is a high performance and highly integrated ASIC which enables low cost, small form factor, and simple plug-and-play Fast Ethernet network connection capability for desktops, notebook PC's, Ultra-Mobile PC's, docking stations, game consoles, digital-home appliances, and any embedded system using a standard USB port.

The AX88772B features a USB interface to communicate with a USB Host Controller and is compliant with USB specification V1.1 and V2.0. The AX88772B implements a 10/100Mbps Ethernet LAN function based on IEEE802.3, and IEEE802.3u standards with embedded SRAM for packet buffering. The AX88772B integrates an on-chip 10/100Mbps Ethernet PHY to simplify system design.

The AX88772B provides an optional Multi-Function-Bus portion A and B (MFA and MFB) for external PHY or external MAC for different application purposes. The MFA/MFB can be a reduce-media-independent interface (RMII) for implementing 100BASE-FX Ethernet or HomePNA functions. The MFA/MFB can also be a Reverse Reduced-MII (Reverse-RMII) for glueless MAC-to-MAC connections to any MCU with Ethernet MAC RMII interface. In addition, the MFA/MFB can be configured as general purpose I/O.

The following URL provides detailed online resources of ASIX Electronics high-speed USB-to-LAN solutions: (Refer to http://www.asix.com.tw/products.php?op=ProductList&PLine=71)

Low-power USB2.0 to 10/100M Fast Ethernet Controller

AX88772B -- Low-Power USB2.0 to 10/100M Fast Ethernet Controller

This document provides an overview of AX88772B Low-Power USB to 10/100M Fast Ethernet controller product.



2. Block Diagram

The following is AX88772B block diagram,

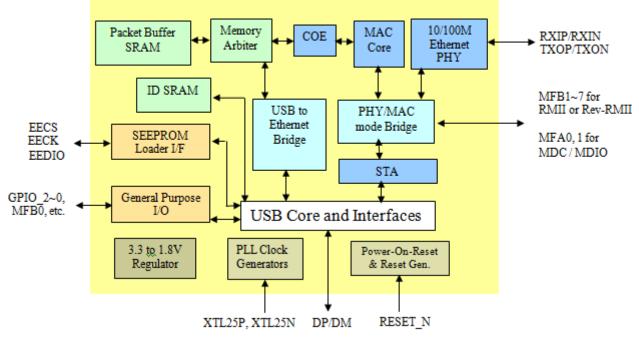


Figure 1. Block Diagram



2-1. Typical System Block Diagrams

• Hosted by USB to operate with internal Ethernet PHY only

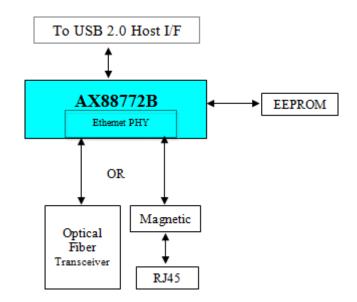


Figure 2. USB 2.0 to LAN Adaptor (MAC mode)

• Hosted by USB to operate with either internal Ethernet PHY or RMII (in MAC mode)

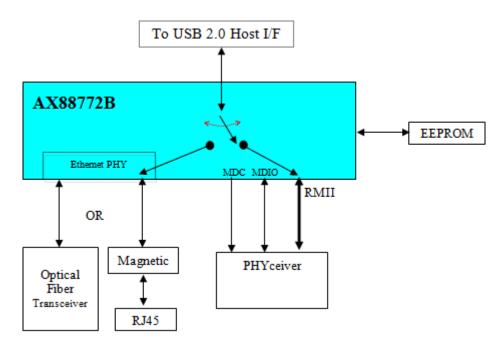


Figure 3. USB 2.0 to Fast Ethernet and external PHYceiver Combo (MAC mode)



• Hosted by USB to operate with either internal Ethernet PHY (in MAC mode) or Reverse-RMII (in PHY mode)

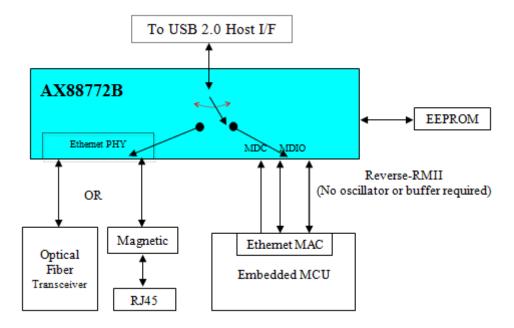


Figure 4. Bridging Embedded MCU to USB 2.0 Host Interface (PHY mode)

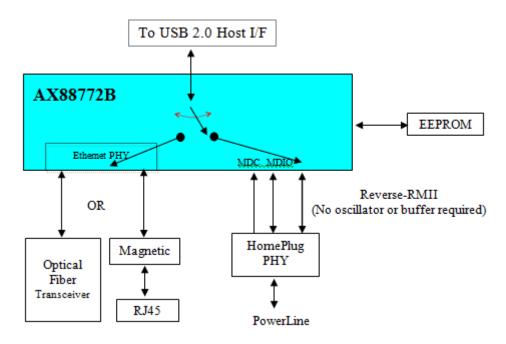


Figure 5. USB 2.0 to HomePlug Adaptor (PHY mode)





3. Selection Guide

The following is the selection guide of ASIX Electronics USB to Ethernet family for different requirement applications. Please visit ASIX Electronics' High-Speed USB-to-LAN product web page (<u>http://www.asix.com.tw/products.php?PLine=71</u>) and contact ASIX's Sales (<u>sales@asix.com.tw</u>) for details.

Part No.	USB Speed	USB Hub	Ethernet MAC/ PHY (Mbps)	MAC Interface	HP Auto-MDIX
AX88760	High(2.0)	3-port	10/100		v
AX88178	High(2.0)	-	10/100/1000 (MAC only)	MII/GMII/RGMII	•
AX88772B	High(2.0)	-	10/100	RMII/Rev-RMII	v
AX88772A	High(2.0)	-	10/100		v
AX88172A	High(2.0)	-	10/100	(Rev-)MII/ Rev-RMII	v
AX88772	High(2.0)	-	10/100	MII	-

Part No.	IP/TCP/UDP Checksum	Wake-on-LAN	Serial Interface	Temperature Range (°C)	Package
AX88760	-	v	-	0 ~ +70	LQFP-100
AX88178	-	v	-	0 ~ +70	LQFP-128
AX88772B	v	v	•	0 ~ +70/ -45 ~ +85	LQFP-64
AX88772A		v	I ² C, SPI and UART	0 ~ +70	LQFP-64
AX88172A	•	v	I ² C, SPI and UART	0 ~ +70	LQFP-80
AX88772		v	-	0 ~ +70	LQFP-128

Figure 6. AX88772B Selection Guide



4. Ordering Information

The following are the ordering information of AX88772B silicon and AX88772B demo boards. Please contact ASIX's Sales (<u>sales@asix.com.tw</u>) for more details.

Part Number	Description
AX88772BLF64 PIN, LQFP Package, Commercial grade 0°C to +70 °C	
	(Green, Lead-Free)
AX88772BLI 64 PIN, LQFP Package, Industrial grade -40°C to +85 °C	
	(Green, Lead-Free)

AX88772B Demo Boards	Description		
AX88772B USB to 100Base-TX	This is a USB dongle for AX88772B USB to 100Base-		
Ethernet Demo Board	TX Ethernet application		
AX88772B USB to 100Base-TX	This is a general-purpose demo board for AX88772B		
Ethernet (with RMII) Demo Board	USB to 100Base-TX Ethernet (with optional RMII/Rev-		
Ethernet (with Kiviii) Denio Board	RMII interface) application		
AX88772B USB to 100Base-FX	This is a general-purpose demo board for AX88772B		
1x9 SC Ethernet Demo Board	USB to 100Base-FX 1x9 SC Fiber Ethernet (with		
1x9 SC Ethernet Denio Board	optional RMII/Rev-RMII interface) application		
	This is a general-purpose demo board for AX88772B		
AX88772B USB to 100Base-FX	USB to 100Base-FX POF (Plastic Optical Fiber) Fiber		
POF Ethernet Demo Board	Ethernet (with optional RMII/Rev-RMII interface)		
	application		

Figure 7. AX88772B Silicon and Demo Boards Ordering Information



5. Target Applications

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The following are some PC/Internet and consumer electronics target applications for your reference.

PC/Internet

Port Replicator for Mobile Computer Docking Station USB KVME Internet Security Card Reader UWB/802.11n/WiMAX USB Dongle Switch USB Key USB Dongle UMPC Pocketable Computer Media Gateway **Consumer Electronics** č TiVo Box Game Console Portable Media Player ePiano IP STB DVD-Recorder/DVR IPTV

Figure 8. AX88772B Target Applications



6. AX88x72A Mass Production Solutions

To support the mass production for those products using AX88772B chips. ASIX provides the Windows SROM Programming Tool and Windows Production Test Tool solutions for AX88772B customers. This chapter provides a brief introduction for both solutions. Please refer to "AX88772B EEPROM User Guide" for details.

6-1. The Windows SROM Programming Tool

ASIX Electronics provides a Windows SROM Programming tool for users to easily program the Serial EEPROM of AX88772B on a typical Windows 7/Vista/XP/2000 PC. This AX88772B Windows SROM Programming Tool supports to customize the MAC address, Serial Number, Vendor ID and Product ID, etc. for AX88772B based application systems in mass production.

🏥 ASIX AX88x72A / 772B / 760 / 772 / 178 SROM Tool	1.18.0	- • • 🔀
Device Sel. AX88772B with BOTM	SROM Size (byte): C 256 @ 512
- Mac Address	_ ID	Max Power
Current 00000000002 Increase by	Vendor 0B95	High Speed 4 mA
		mgn speed [- mk
Maximum FFFFFFFFFF 1	Product 772B	Full Speed 4 mA
Serial Number	Ext Phy	Characteristics
Current 000002 Increase by 1	ID None 🔻	🔲 Bus Power
		🔽 Remote Wakeup Enable
Maximum FFFFFF Base on Mac Address	e[0x17] FFFF	🗖 AutoDetach
String		Reload Eeprom Bar-Code
Manufacture ASIX Elec. Corp.		🗌 Reload 📄 Enable
Product AX88772B		Safety Setting
FIDddec		🔽 Disable Setting
		Programmed Mac Address
Program Save Load Load SROM	Dump Preview	00 00 00 00 00 01
		Convert Help Exit
15 5A FD 75 20 12 29 35 00 00 00 00 00 01 09		Convert Help Exit
6E 22 7F 12 19 0E 44 04 44 04 44 04 44 04 9C		
00 06 10 E0 42 24 47 12 50 35 FF FF 00 00 FF 88 09 0E 03 30 00 30 00 30 00 30 00 30 00 31		
12 01 00 02 FF FF 00 40 95 0B 2B 77 01 00 01		
03 01 09 02 35 00 01 01 04 E0 02 09 04 00 00		
FF FF 00 07 07 05 81 03 08 00 0B 07 05 82 02	00	
02 00 07 05 03 02 00 02 00 07 05 84 02 00 02	00	
07 05 05 02 00 02 00 FF 04 03 30 00 FF FF 12	01	
00 02 FF FF 00 08 95 0B 2B 77 01 00 01 02 03	01	
09 02 35 00 01 01 04 E0 02 09 04 00 00 05 FF	FF	
00 07 07 05 81 03 08 00 A0 07 05 82 02 40 00		
07 05 03 02 40 00 00 07 05 84 02 40 00 00 07		
05 02 40 00 00 DD FF FF AA AA BB BB 22 03 41		
53 00 49 00 58 00 20 00 45 00 6C 00 65 00 63		
2E 00 20 00 43 00 6F 00 72 00 70 00 2E 00 12		
41 00 58 00 38 00 38 00 37 00 37 00 32 00 42	•	
EEPROM write OK.		

Figure 9. AX88772B Windows SROM Programming Tool



6-2. The Windows Production Test Tool

ASIX Electronics provides a Windows Production Test tool for users to run some basic network function tests and program the EEPROM of their AX88772B based application systems during production. This tool is used for testing the USB to Ethernet Network Adapter product that uses ASIX AX88772B chip.

This tool supports to send/receive packets in different Ethernet speed modes, and program EEPROM. This tool can be run on a Windows 7/Vista/XP/2000 PC, which installs the special AX88772B Windows test driver. This tool also needs a separate server PC to run the test server tool. The test server tool on server PC can receive packets from the "device under test" product, and then reply back.

🚻 ASIX AX88x72A/AX88772B/AX88760/AX	(88772 Production Test v1.7.0
Test EEPROM Setting Log Test Items	
PING Test	Result
100Mbps Full-Duplex Test	
100Mbps Half-Duplex Test	\checkmark
10Mbps Full-Duplex Test	✓
10Mbps Half-Duplex Test	×.
EEPROM Program	~
Result	
Error Message	START
,	Exit

Figure 10. AX88772B Windows Production Test Tool



7. AX88772B Demo Boards

ASIX Electronics provides several AX88772B demo boards for users to evaluate the basic functions of AX88772B on different target applications. If you need to purchase the AX88772B demo boards, please contact ASIX's Sales (<u>sales@asix.com.tw</u>) for more details.

7-1. AX88772B USB to 100Base-TX Ethernet Demo Board

The following is the picture of AX88772B USB to 100Base-TX Ethernet demo board for your reference.

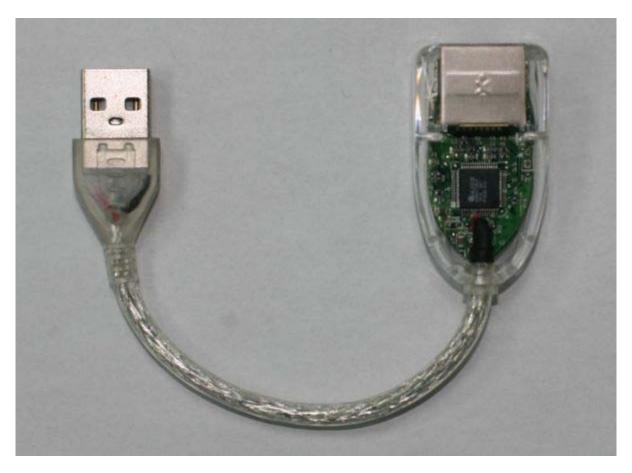


Figure 11. AX88772B USB to 100Base-TX Ethernet Demo Board



7-2. AX88772B USB to 100Base-TX Ethernet (with RMII) Demo Board

The following is the picture of AX88772B USB to 100Base-TX Ethernet (with RMII) demo board for your reference.

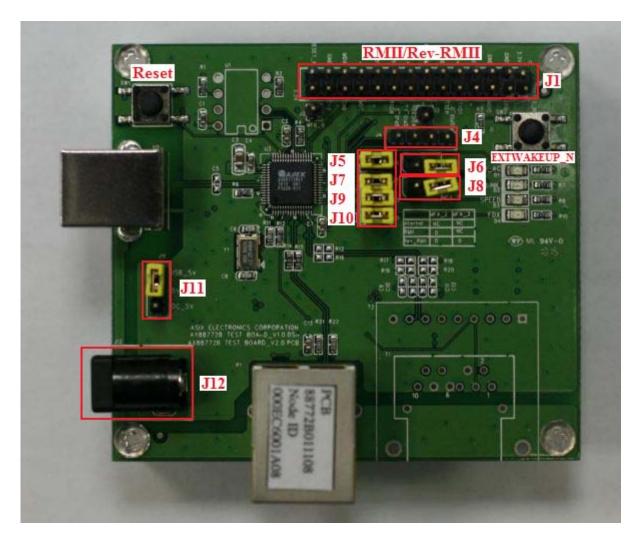


Figure 12. AX88772B USB to 100Base-TX Ethernet (with RMII) Demo Board



7-3. AX88772B USB to 100Base-FX 1x9 SC Ethernet Demo Board

The following is the picture of AX88772B USB to 100Base-FX 1x9 SC Ethernet demo board for your reference.

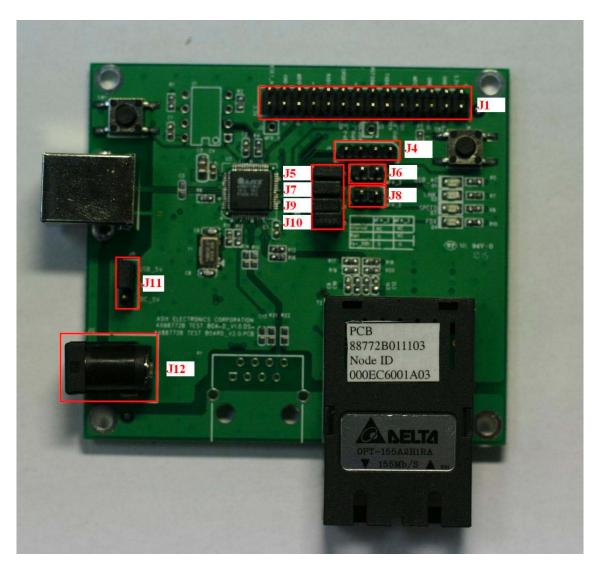


Figure 13. AX88772B USB to 100Base-FX 1x9 SC Ethernet Demo Board



7-4. AX88772B USB to 100Base-FX POF Ethernet Demo Board

The following is the picture of AX88772B USB to 100Base-FX POF Ethernet demo board for your reference.

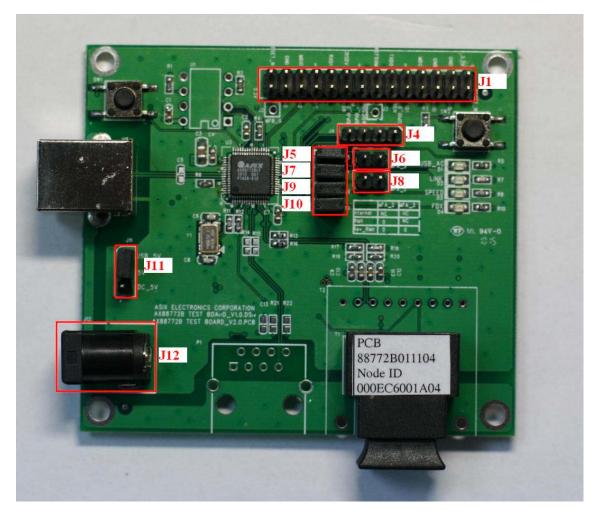


Figure 14. AX88772B USB to 100Base-FX POF Ethernet Demo Board



The following is the jumper configuration table of the AX88772B USB to 100Base-TX/FX Ethernet (with RMII) demo boards.

Jumper	Setting	Description
J1	$\begin{array}{c} 27 & 1 \\ J1 \\ 28 & 2 \end{array}$	The J1 is the RMII/Reverse-RMII interface headers. Please refer to AX88772B USB to 100Base- TX/FX Ethernet (with RMII) Demo Boards Reference Schematic for details.
J4	J4 1234 Pole #1: GPIO2 Pole #2: VCC 3.3V Pole #3: GPIO1 Pole #4:GPIO0/PME	AX88772B GPIO Pins
J6/J8	J6 I J8 I (Default)	Set AX88772B to Internal Ethernet PHY
	J6 💶 J8	Set AX88772B to RMII mode
	J6 🔲 J8 💼	Reserved
	J6 🔜 J8	Set AX88772B to Reverse-RMII mode
J5/J7/J9/J10	J5 J7 J9 J10 J5 : PHY_N J7 : RMII_N J9 : MDIO J10 : MDC	The multi-function pins (PHY_N, RMII_N, MDIO, MDC) for RMII/Reverse-RMII pins.
	J5 J7 J9 J9 (Default) J5 : MFA3 J7 : MFA2 J9 : MFA1 J10 : MFA0	The multi-function pins (MFA0 ~ MFA3) for LED display purpose. Please refer to PIN configuration of MFA in section 2.2 of AX88772B datasheet for details.
J11/J12	J11 123 (Default) Pole #1: USB_5V Pole #2: 5V Pole #3: DC_5V	Set AX88772B USB to 100Base-TX/FX Ethernet (with RMII) demo boards to Bus-power mode. The J12 connector doesn't need to be connected.
	J11	Set AX88772B USB to 100Base-TX/FX Ethernet (with RMII) demo boards to Self-power mode. The J12 connector should be connected to a 5V power adapter.

Figure 15. AX88772B USB to 100Base-TX/FX Ethernet with RMII Demo Boards Jumper Setting Table



8. Related Technical Archives

The following is the AX88772B product web page for your reference. You can download some basic AX88772B related technical archives from this AX88772B product web page.

AX88772B – Low-pin-count USB 2.0 to 10/100M Fast Ethernet controller (http://www.asix.com.tw/products.php?op=pItemdetail&PItemID=105;65;86&PLine=65)

AX88772B Technical Archives	Туре	Availability*
AX88772B Product Introduction	Document	This document
AX88772B Product Brief	Document	Public Release
AX88772B USB to 100Base-TX Ethernet Demo	Schematic	Public Release
Board Reference Schematic		
AX88772B USB to 100Base-TX/FX Ethernet with	Schematic	Public Release
RMII Demo Boards Reference Schematic		
AX88772B Windows 7 64-bit Driver	Driver	Public Release
AX88772B Windows 7 32-bit Driver	Driver	Public Release
AX88772B Windows Vista 64-bit Driver	Driver	Public Release
AX88772B Windows Vista 32-bit Driver	Driver	Public Release
AX88772B Windows XP 64-bit Driver	Driver	Public Release
AX88772B Windows XP 32-bit Driver	Driver	Public Release
AX88772B Linux Drivers	Driver	Public Release
AX88772B WinCE 6.0 Driver	Driver	Public Release
AX88772B WinCE 5.0/Mobile 5/Mobile 6 Driver	Driver	Public Release
AX88772B Apple Mac OSX 10.5/10.6 Drivers	Driver	Public Release
AX88772B Datasheet	Document	MyASIX Membership
AX88772B USB-to-LAN Application Design Guide	Document	MyASIX Membership
AX88772B USB to 100Base-TX Ethernet Demo	PCB	MyASIX Membership
Board PCB file		
AX88772B USB to 100Base-TX/FX Ethernet with	PCB	MyASIX Membership
RMII Demo Boards PCB file		
AX88772B USB to 100Base-TX Ethernet Demo	Gerber	MyASIX Membership
Board Gerber files		
AX88772B USB to 100Base-TX/FX Ethernet with	Gerber	MyASIX Membership
RMII Demo Boards Gerber files		
AX88772B USB to 100Base-TX Ethernet Demo	BOM	MyASIX Membership
Board BOM File		
AX88772B USB to 100Base-TX Ethernet with RMII	BOM	MyASIX Membership
Demo Board BOM file		
AX88772B USB to 100Base-FX 1x9 SC Ethernet	BOM	MyASIX Membership
Demo Board BOM file		
AX88772B USB to 100Base-FX POF Ethernet	BOM	MyASIX Membership
Demo Board BOM file		
AX88772B IBIS Model	IBIS	MyASIX Membership
AX88772B Reliability Report	Report	MyASIX Membership
AX88772B EEPROM/Manufacture User Guide	Document	Contact ASIX Sales



AX88772B Product Introduction

AX88772B Windows SROM Programming Tool	Utility	Contact ASIX Sales
AX88772B Windows Production Test Tool	Utility	Contact ASIX Sales
AX88772B Linux SROM Programming Tool	Utility	Contact ASIX Sales
AX88772B WinCE SROM Programming Tool	Utility	Contact ASIX Sales
AX88772B DOS SROM Programming Tool	Utility	Contact ASIX Sales
AX88772B Windows IEEE 802.3 compliant test	Utility	Contact ASIX Sales
driver		
AX88772B Hardware Throughput Test Report	Report	Contact ASIX Sales
AX88772B RoHS Report	Report	Contact ASIX Sales
AX88772B USB-IF Compliant Test Report	Report	Contact ASIX Sales
AX88772B 10M/100M IEEE 802.3 Compliant Test	Report	Contact ASIX Sales
Reports		

Figure 16. AX88772B Related Technical Archives

Availability Type	Description
Public Release	Please download the technical archives from <u>AX88772B product web page</u> directly.
MyASIX Membership	Please register MyASIX membership from MyASIX register web page
	(http://www.asix.com.tw/RegLogin.php?mod=thisis) first and then download the
	technical archives from <u>AX88772B product web page</u> .
Contact ASIX Sales	Please contact ASIX's Sales (sales@asix.com.tw) for more details.

Figure 17. Technical Archives Availability Type





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