AX220xx Product Introduction

Revision 1.03
July 13th, 2012

Revision History

Revision	Date	Description
0.10	2010/12/01	Preliminary release.
1.00	2011/03/04	1. Updated the order information in Section 3. 2. Updated the latest AX220xx development boards and WiFi module board pictures in Figure 18~20. 3. Updated some descriptions in Section 5, 6 and Appendix A.
1.01	2011/04/22	1. Updated some descriptions in Section 3 and 6. 2. Updated Figure 21 “Software Modules Block Diagram” in Section 7. 3. Updated Appendix A “Frequently Asked Questions”.
1.02	2011/08/01	1. Updated some descriptions in Section 3 and 6 2. Updated Figure 20 “AXM22001-2A-B 802.11b/g WiFi Module Board (with Airoha AL2230S RF chip)” 3. Added Figure 21 “AXM22001-2A-C 802.11b/g WiFi Module Board (with Airoha AL2230S RF chip)” 4. Removed the detailed FAQ items in Appendix A and redirect users to refer to AX22001 FAQs web page for detailed FAQs information.
1.03	2012/07/13	1. Added Section 9 Flash Programming Utility. 2. Added Section 10 Mass Production Solution.

Table of Contents

List of Figures

1. Introduction

This document provides an overview of AX220xx family and AX220xx reference design solutions.

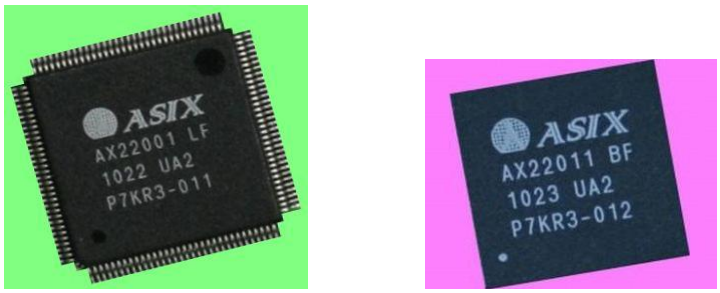


Figure 1. AX220xx Family

AX220xx, Single Chip Micro-controller with TCP/IP and 802.11 WLAN MAC/Baseband, is a System-on-Chip (SoC) solution which offers high performance dual-CPU architecture with on-chip 1MB shared Flash as Program Memory, on-chip 64KB Data Memory for Main CPU (MCPU), on-chip 32KB Data Memory for WiFi CPU (WCPU), TCP/IP accelerator, 802.11a/b/g compatible WLAN MAC/Baseband, Fast Ethernet MAC, and rich communication peripherals for wide varieties of application which need access to the wired/wireless LAN or Internet. Please refer to AX220xx datasheet for detailed descriptions.

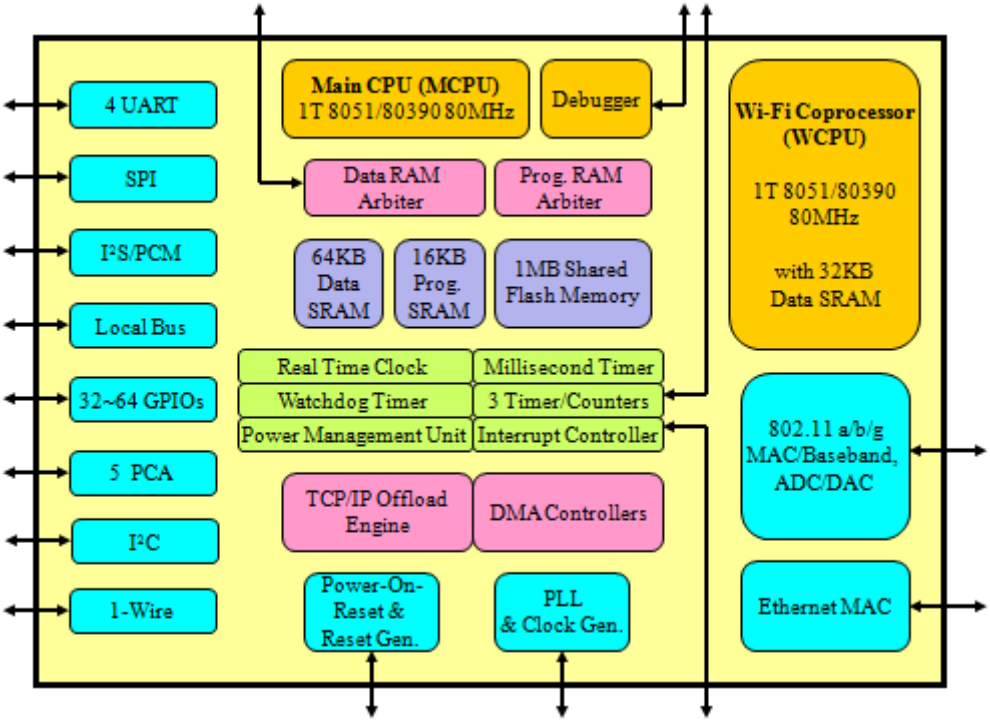


Figure 2. AX220xx Block Diagram

2. Selection Guide

AX220xx family currently consists of 2 variations targeted for different application requirements, as listed below.

Part Number	Embedded Flash (Bytes)	Embedded Data RAM (Bytes)	802.11a/b/g WLAN MAC/Baseband	Ethernet MAC (Mbps)	Ethernet MAC Interface	Wake-on -LAN
AX22001	1M	64K	v	10/100	(Rev-)MII/ (Rev-)RMII	v
AX22011	1M	64K	v	10/100	(Rev-)MII/ (Rev-)RMII	v

Part Number	TCP/IP Accelerator	IP/TCP/UDP Checksum	Programmable Counter Array	16-bit Timer/ Counters	Watchdog Timer	RTC	UART	I²C	SPI
AX22001	v	v	5	3	1	1	4	1	v
AX22011	v	v	5	3	1	1	4	1	v

Part Number	I²S or PCM	1-Wire	External Memory Interface	Local Bus	GPIOs	E-Pad Package	Temperature Range(°C)
AX22001	1	1	-	v	32	LQFP-128	0 ~ +70
AX22011	1	1	v	v	64	LFBGA-180	0 ~ +70

Figure 3. AX220xx Family Selection Guide

3. Ordering Information

The following is the ordering information of AX220xx family chips and AX220xx reference design boards. Please contact ASIX's Sales (sales@asix.com.tw) for details.

Part Number	Description
AX22001 LF	128-pin LQFP Lead Free package, commercial temperature range: 0 to 70℃.
AX22011 BF	180-pin LFBGA lead Free package, with External Memory Interface, commercial temperature range: 0 to 70℃.

Model Name	AX220xx Development/ Module Boards	Description
AXM22001-2A-EVB-GEN-1	AX22001 802.11b/g Generic Development Board	This is a generic development board with AX22001 802.11b/g WiFi module board for RS-232 to WiFi reference design or SPI to WiFi reference design.
AXM22001-2A-EVB-SPK-2	AX22001 802.11b/g WiFi Speaker Reference Design Board	This is a WiFi speaker reference design board with AX22001 802.11b/g WiFi module board.
AXM22001-2A-B	AX22001 802.11b/g WiFi Module Board	This WiFi module board contains AX22001 and Airoha AL2230S and provides the pin headers to be used primarily with AX22001 development board and reference design boards.
AXM22001-2A-C	AX22001 802.11b/g WiFi Module Board	This surface mountable WiFi module board contains AX22001 and Airoha AL2230S and provides the castellated mounting holes to be soldered directly on user's host PCB.

4. Target Applications

AX220xx provides cost effective wire or wireless networking solution to enable simple, easy, and low cost Internet connection capability for many applications, such as consumer electronics, networked home appliances, industrial equipments, security systems, remote data collection equipments, remote control, remote monitoring, and remote management.

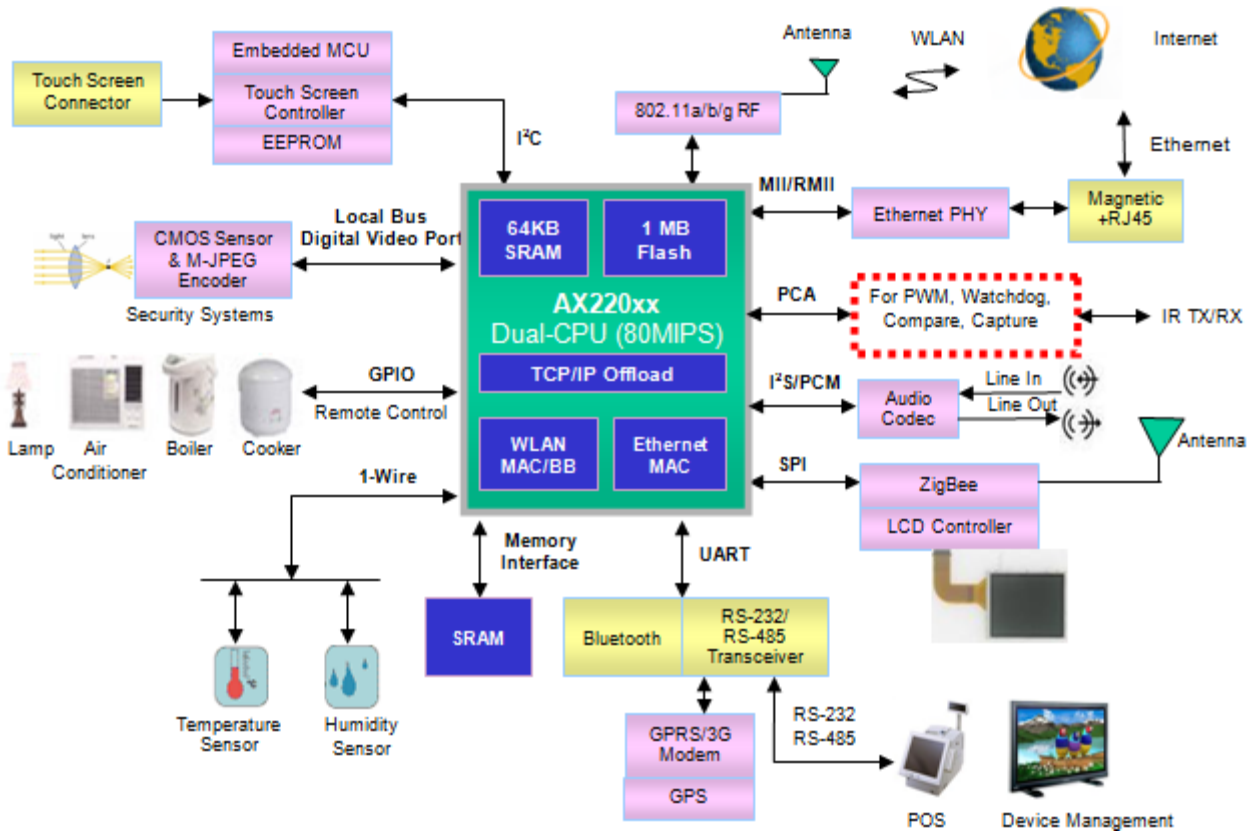


Figure 4. AX220xx Target Applications

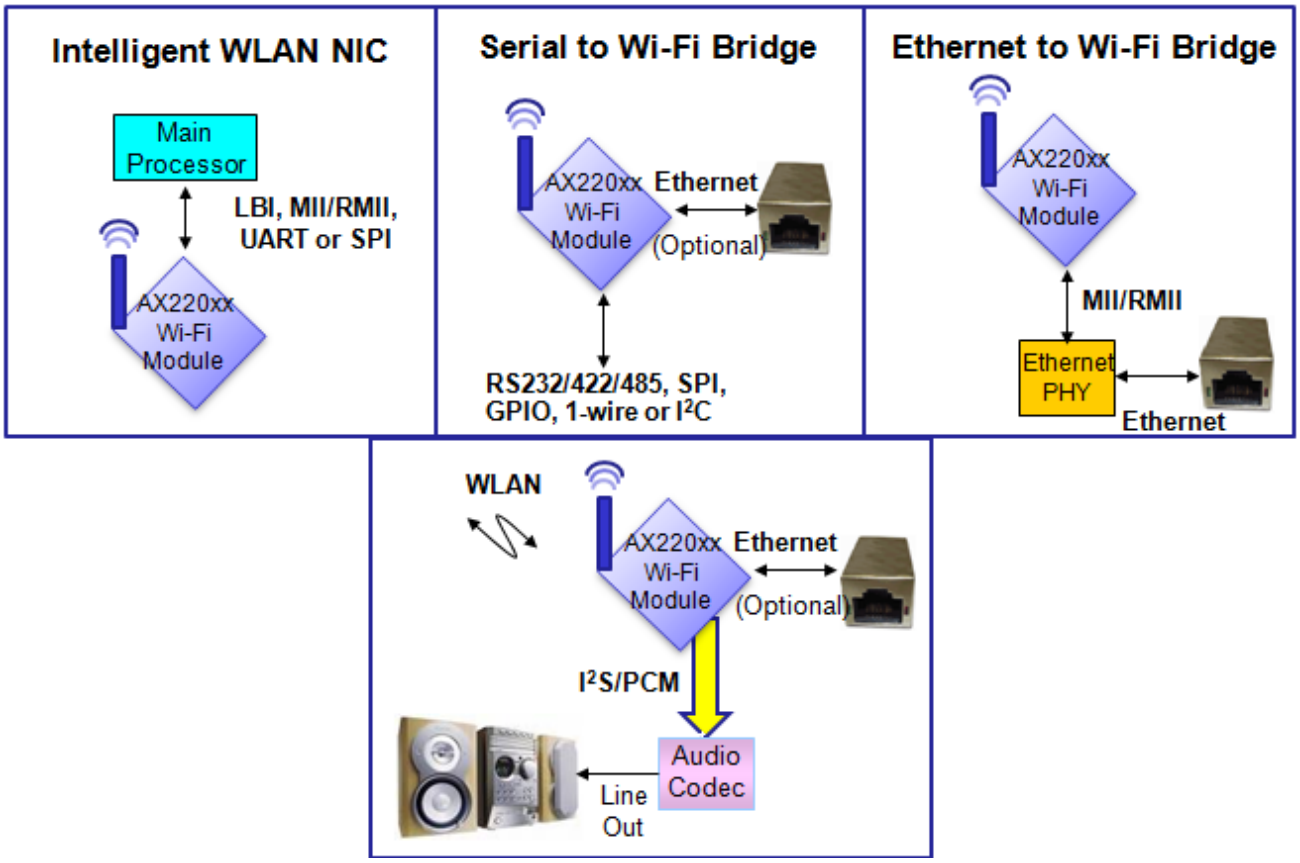


Figure 5. Major AX220xx Target Application Types

The following are some typical AX220xx target applications and examples.

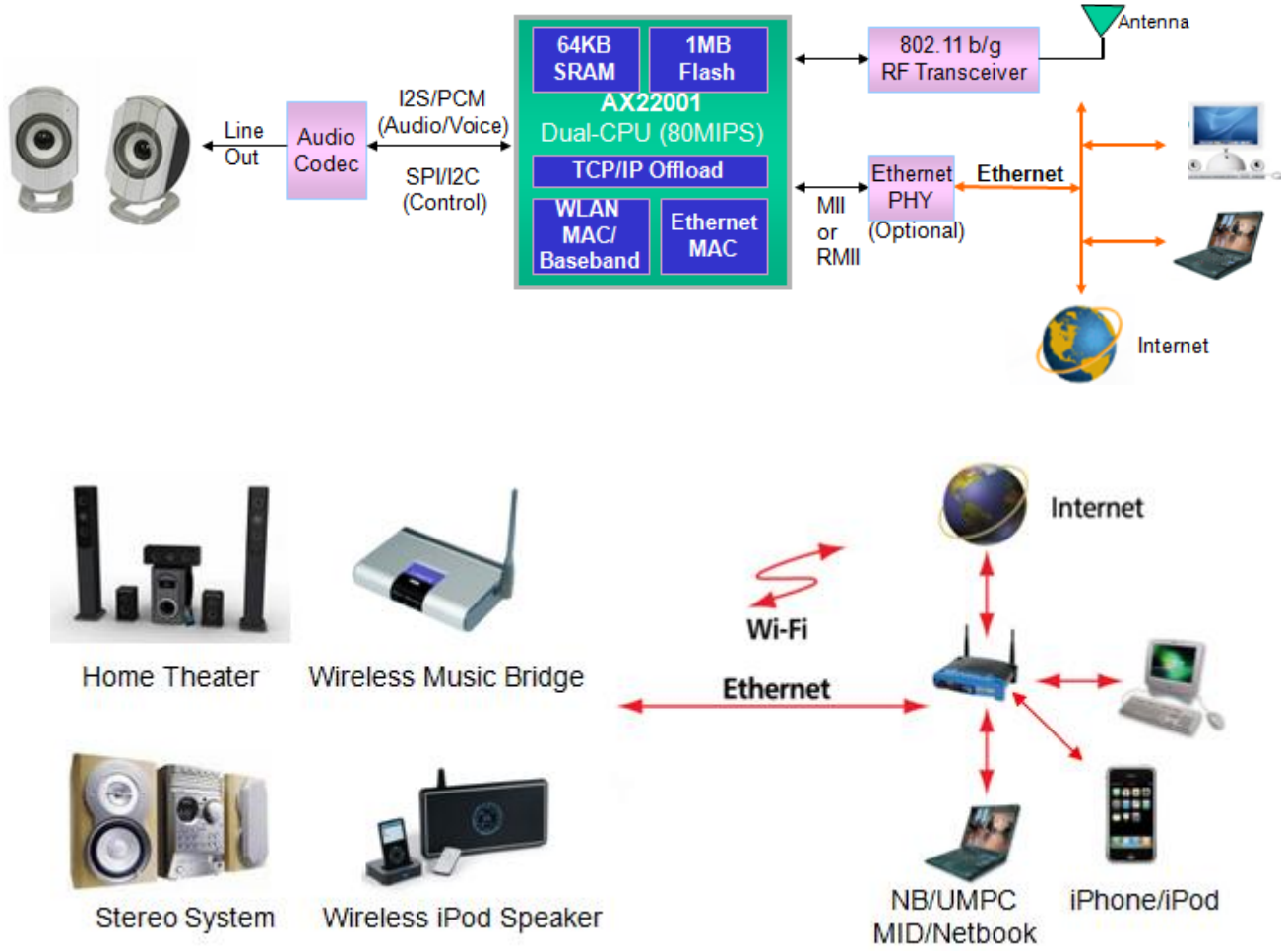


Figure 6. WiFi Speaker Application

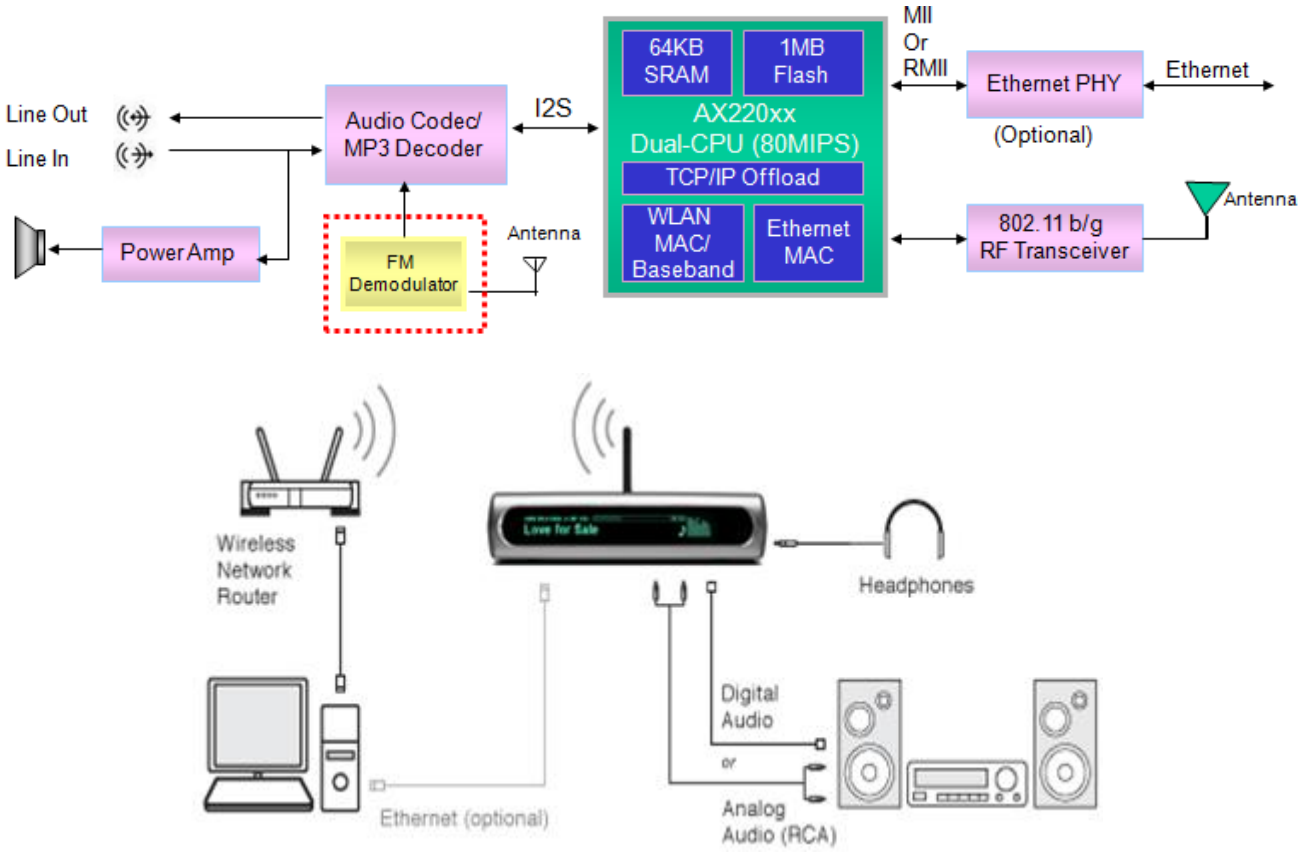


Figure 7. WiFi Internet Radio Application

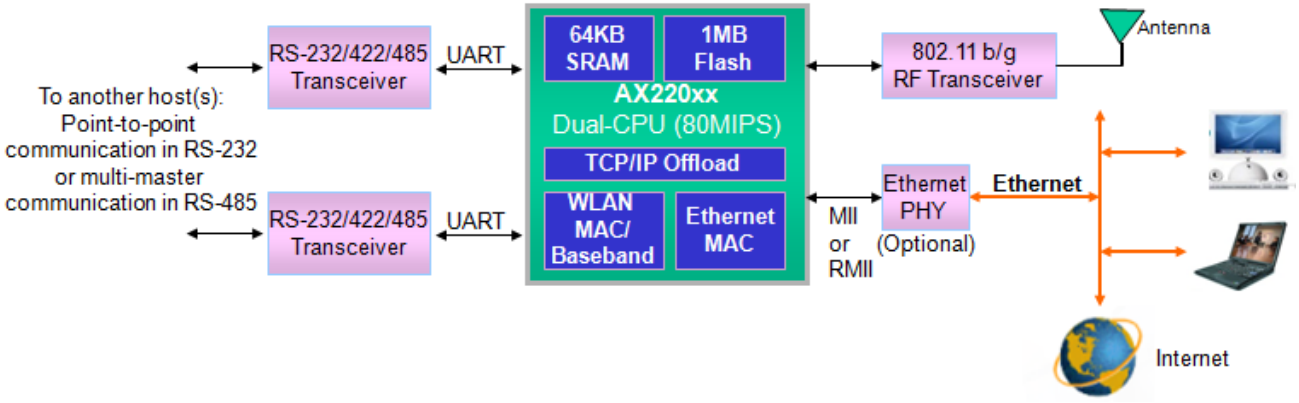


Figure 8. RS-232 to WiFi Bridging Application

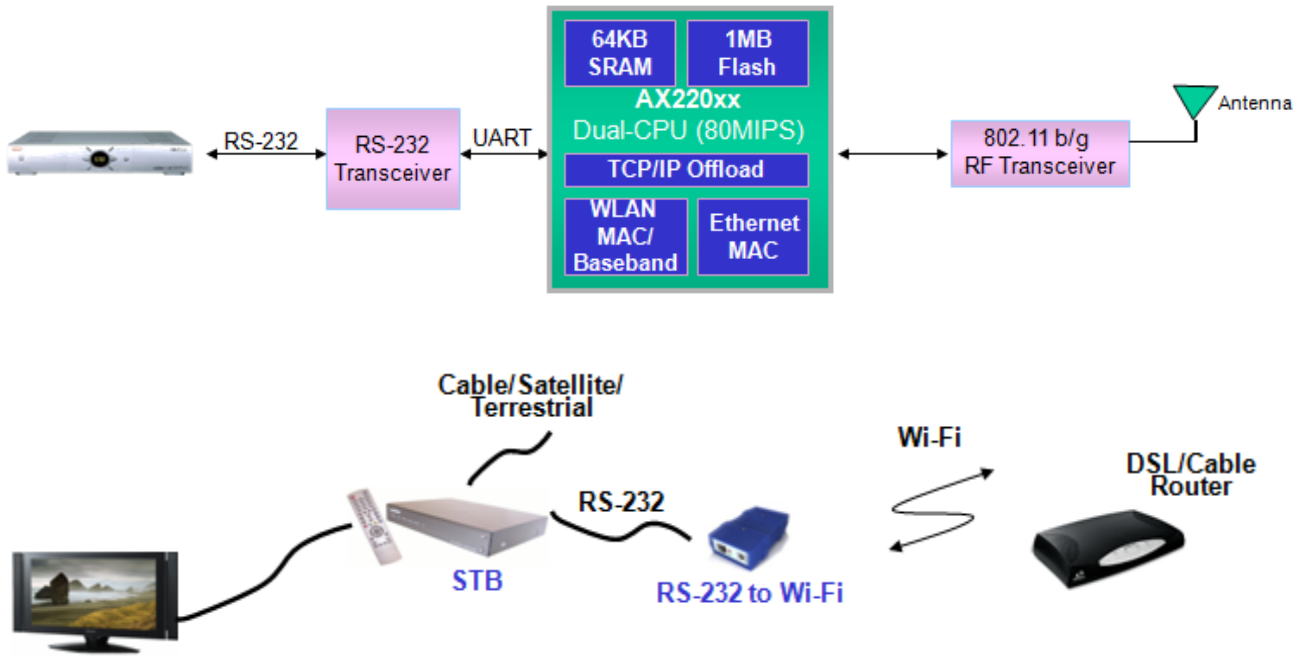
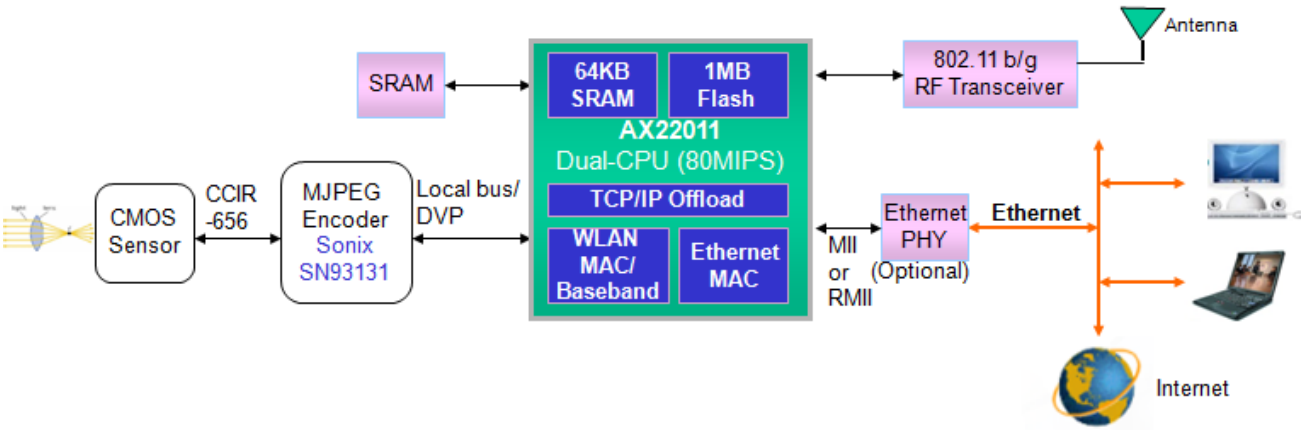


Figure 9. RS-232 to WiFi Converter Application



Robot or Toy
with Wi-Fi IP Camera

Figure 10. WiFi Network Camera Application

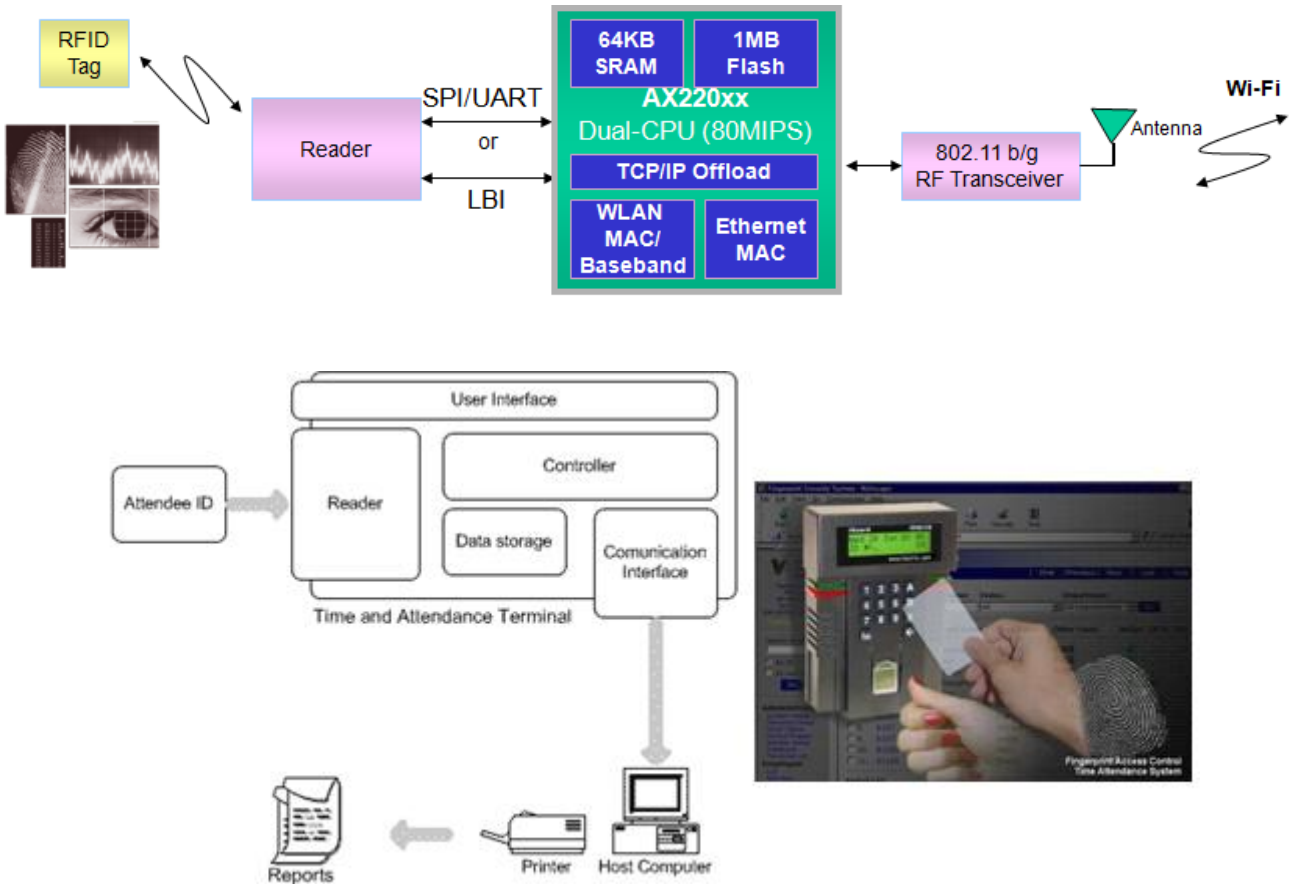


Figure 11. WiFi RFID Application

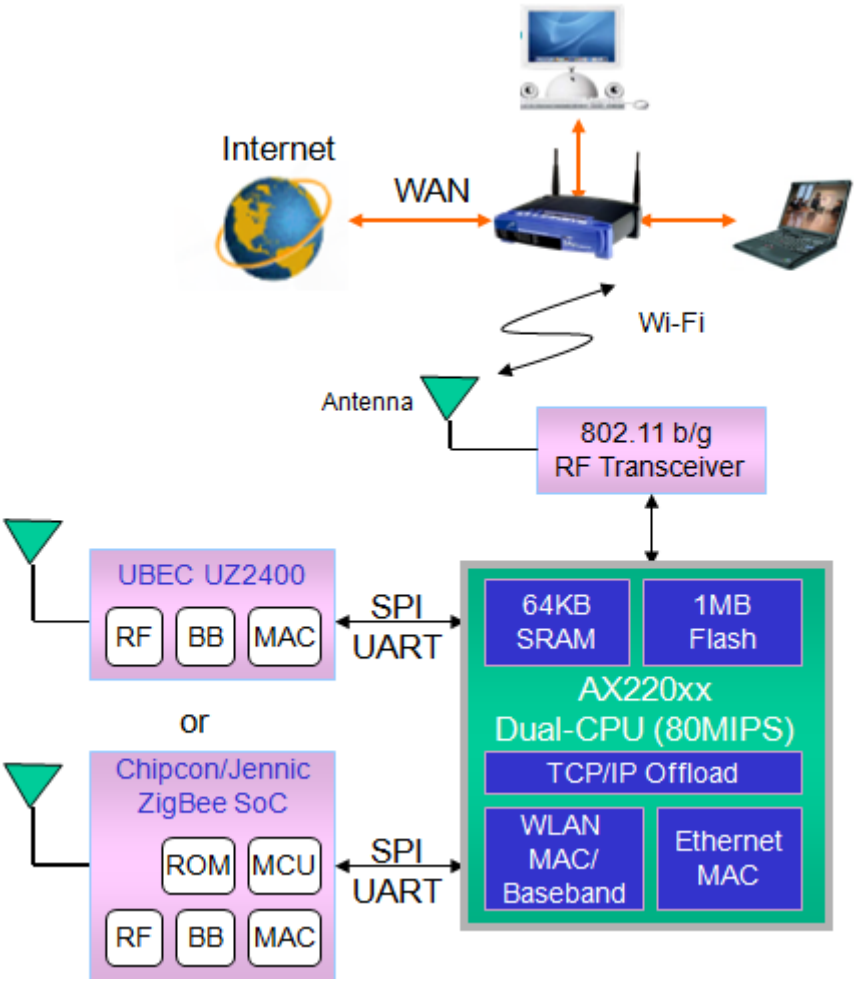


Figure 12. ZigBee to WiFi Bridging Application

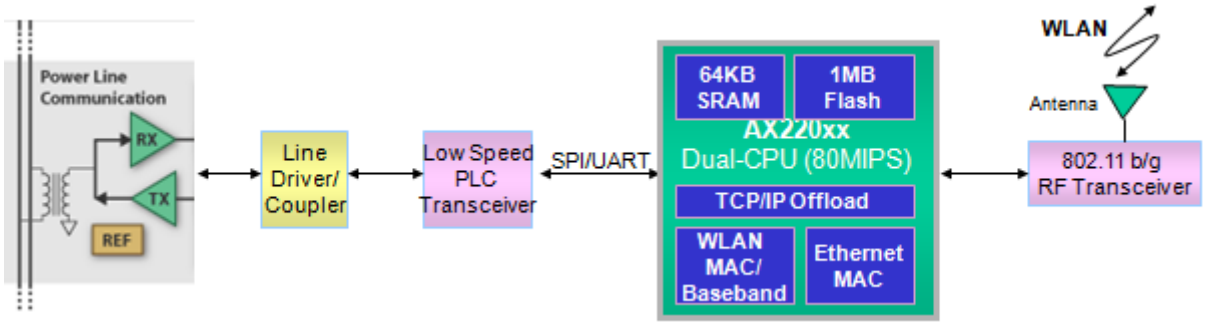


Figure 13. Low Speed PLC (Power Line Communication) to WiFi Converter Application

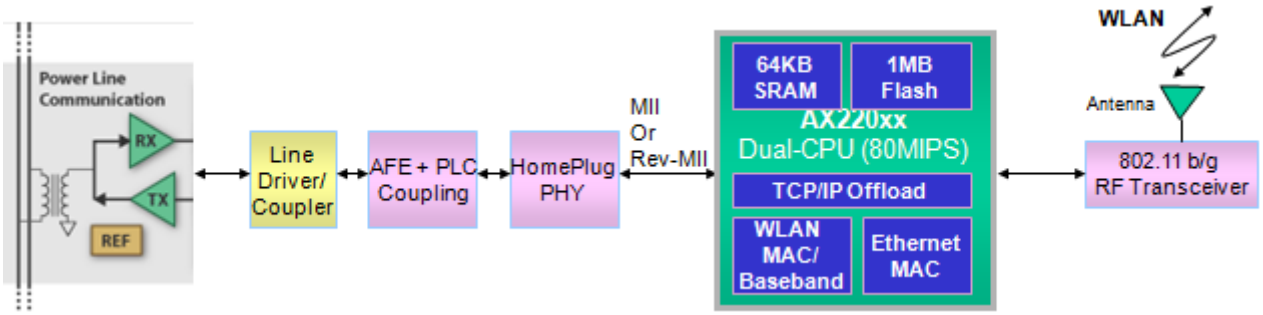


Figure 14. HomePlug to WiFi Bridging Application

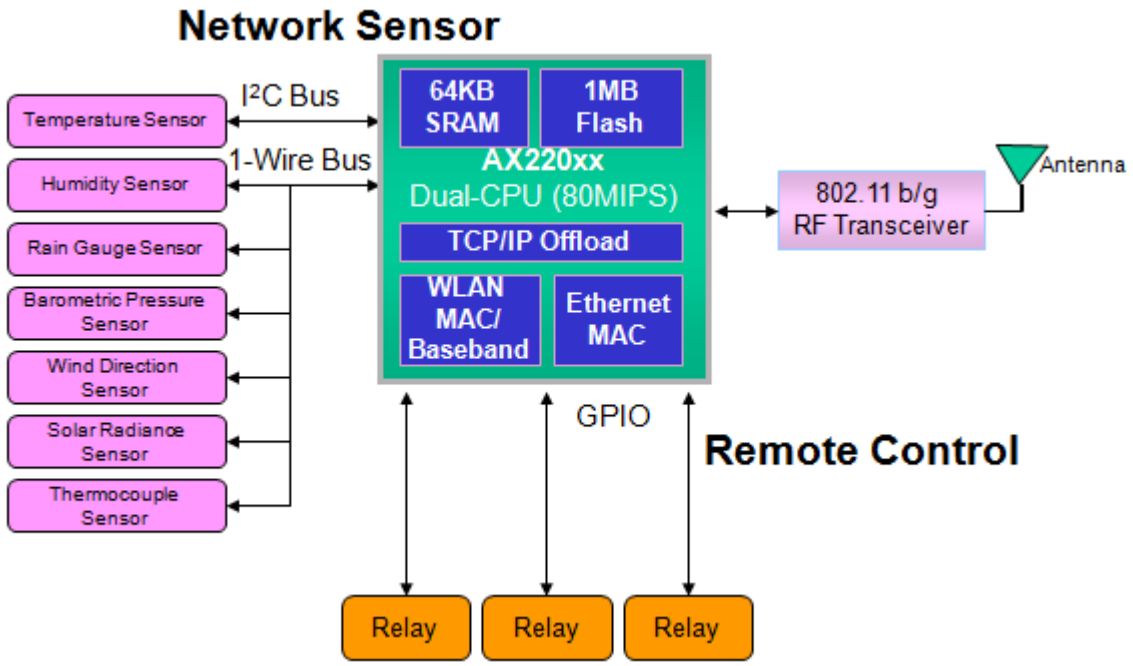


Figure 15. Wireless Environment Monitoring or Network Sensor and Remote Control Application

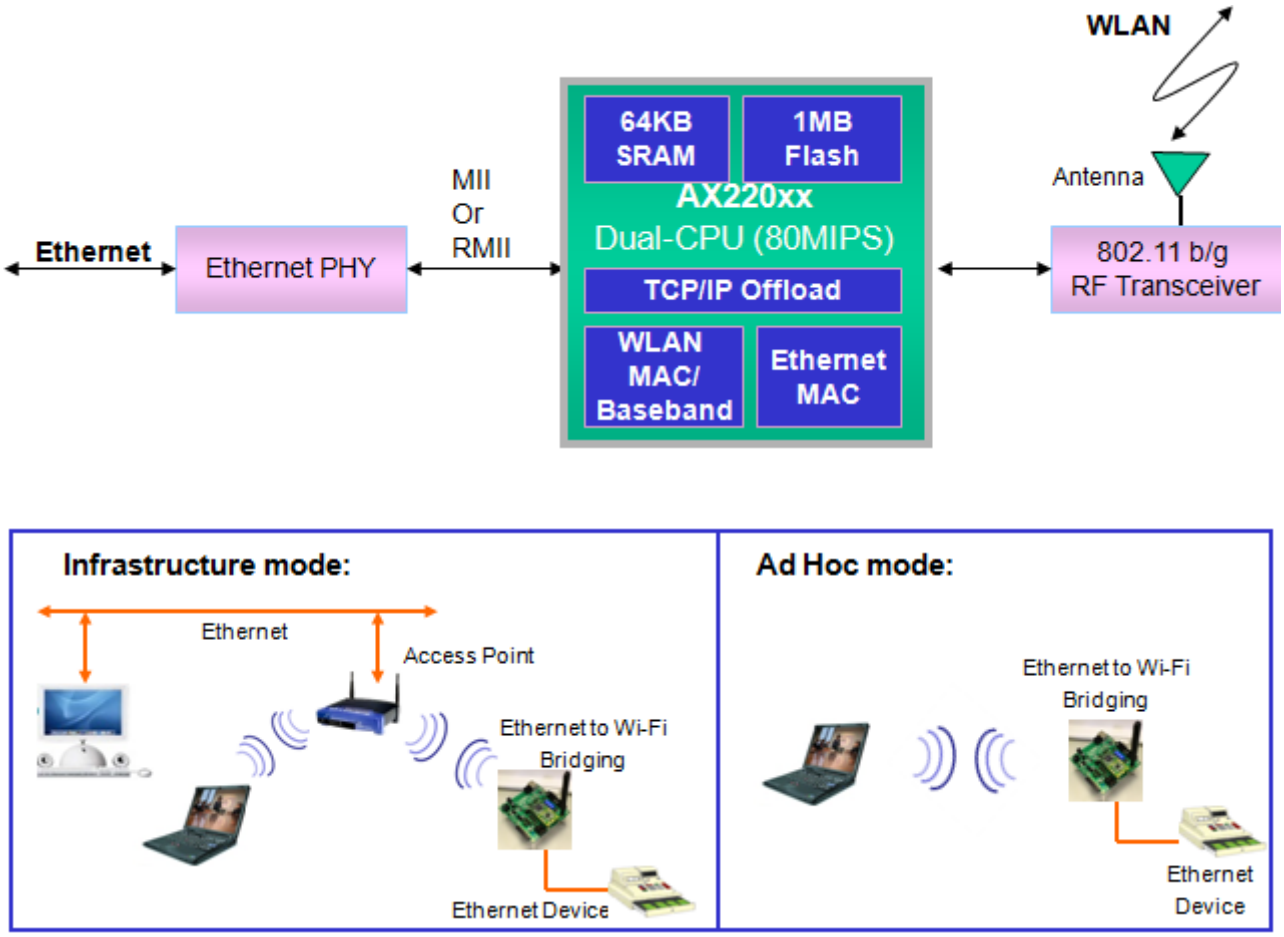


Figure 16. Ethernet to WiFi Bridging Application

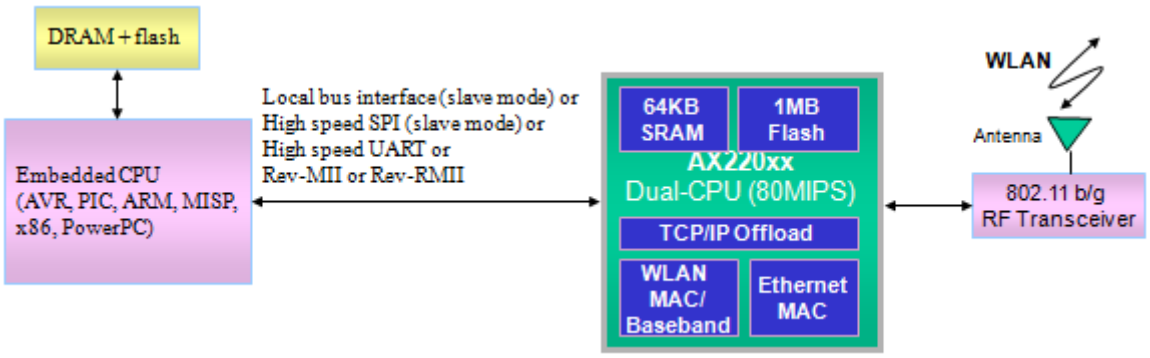


Figure 17. TCP/IP and WLAN Offload Co-processor Application

5. Reference Design Boards

Currently, ASIX provides some AX220xx reference design applications such as **AX22001 WiFi Speaker Reference Design**, **AX220xx RS-232 to WiFi Reference Design**, and **AX220xx SPI to WiFi Reference Design** for customer evaluation purpose. These reference design boards allow customers to quickly verify the AX220xx reference design related software and hardware components. ASIX will provide more reference designs for AX220xx family later. For most up-to-date information, please contact ASIX Sales staffs at sales@asix.com.tw.

The following photo is the AXM22001-2A-EVB-SPK-2 802.11b/g WiFi Speaker Reference Design Board.

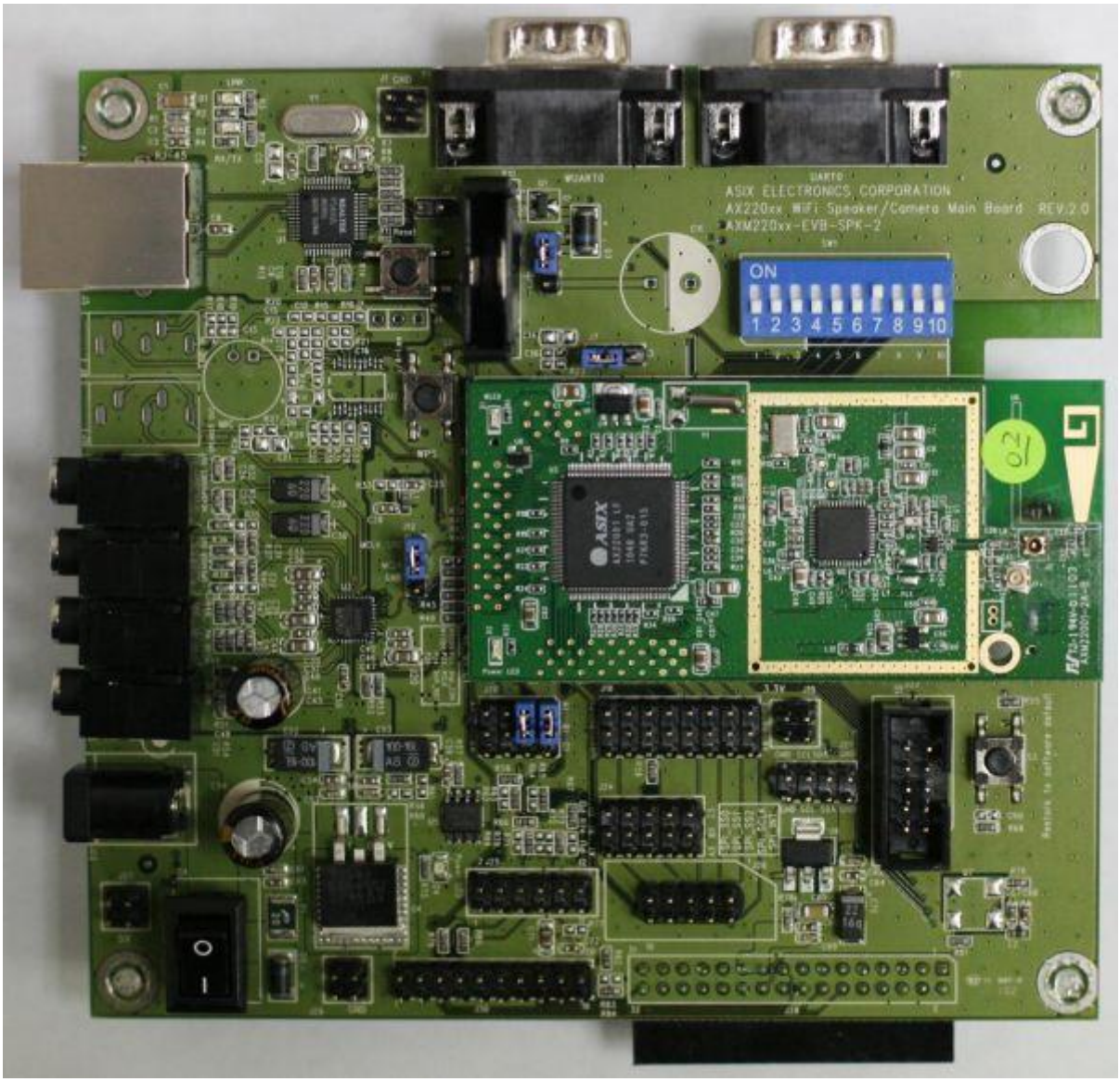


Figure 18. AXM22001-2A-EVB-SPK-2 802.11b/g WiFi Speaker Reference Design Board

The following photo is the AXM22001-2A-EVB-GEN-1 802.11b/g WiFi Generic Development Board, which can be used for RS-232 to WiFi reference design or SPI to WiFi reference design.

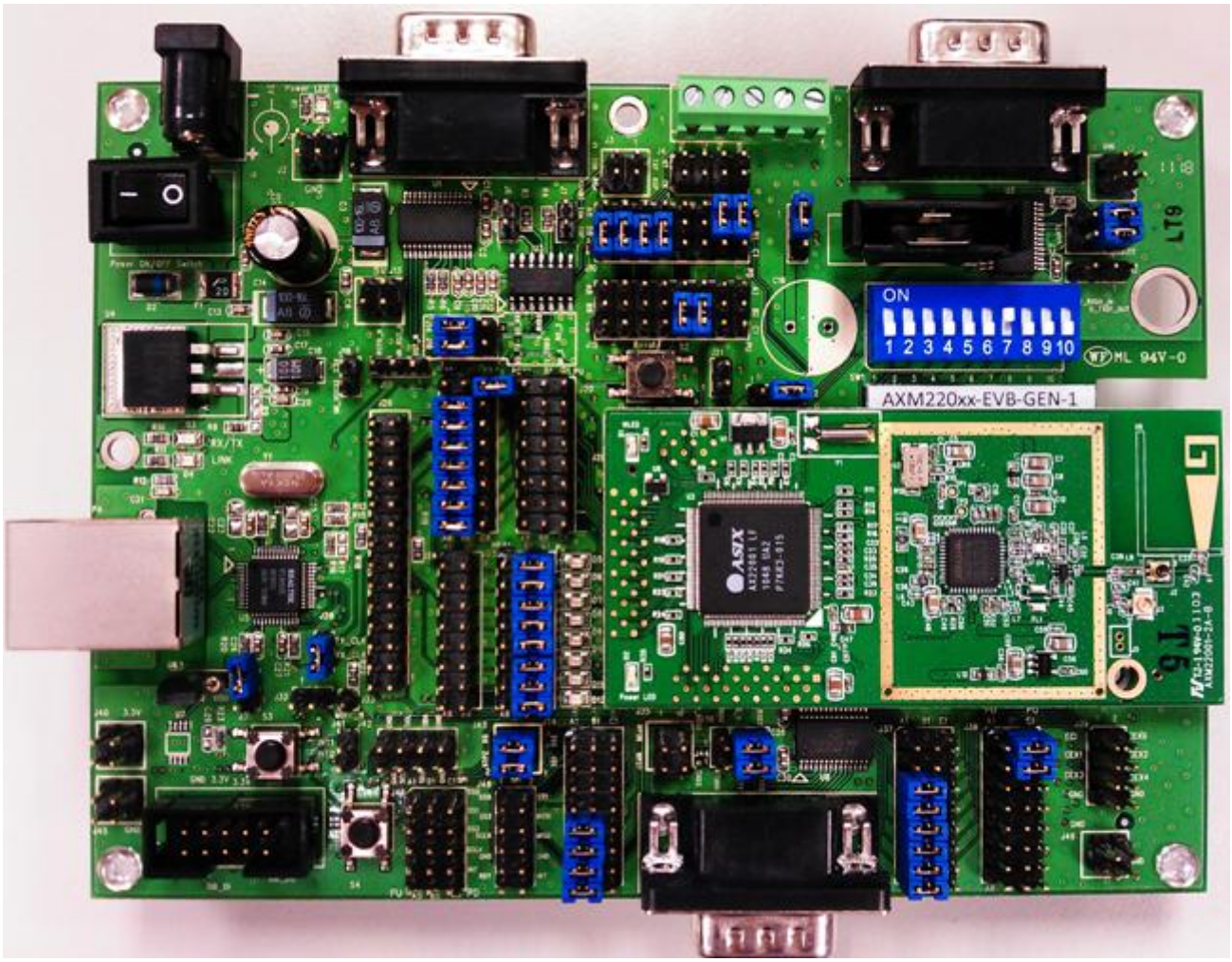


Figure 19. AXM22001-2A-EVB-GEN-1 802.11b/g WiFi Generic Development Board

6. WiFi Module Solutions

The **AXM22001-2A-B 802.11b/g WiFi Module Board** is a RF calibrated and tested WiFi module and provides the pin header to be used primarily with AX22001 development board and reference design boards.

The **AXM22001-2A-C 802.11b/g WiFi Module Board** is a surface mountable WiFi module and provides the castellated mounting holes to be soldered directly on user's host PCB. The module integrates AX22001 and Airoha AL2230S RF transceiver on board to provide a complete WiFi module solution with various user or host interfaces supported.

The AXM22001-2A-C module offers smaller-form-factor, lower-cost, pre-calibrated RF front-end and pre-certified WiFi module to free the user from RF and antenna design tasks and regulatory compliance testing, ultimately providing quicker time to market. User can design his host board with desired function and interface circuits and assemble it with the AXM22001-2A-C module board through the castellated mounting holes.

Please refer to respective module board datasheets or contact ASIX Sales staffs at sales@asix.com.tw for details.

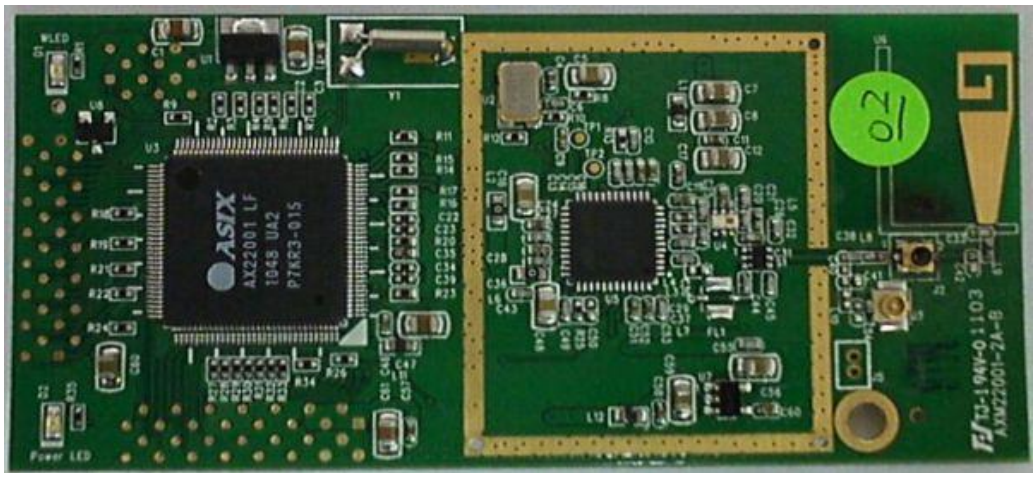


Figure 20. AXM22001-2A-B 802.11b/g WiFi Module Board (with Airoha AL2230S RF chip)

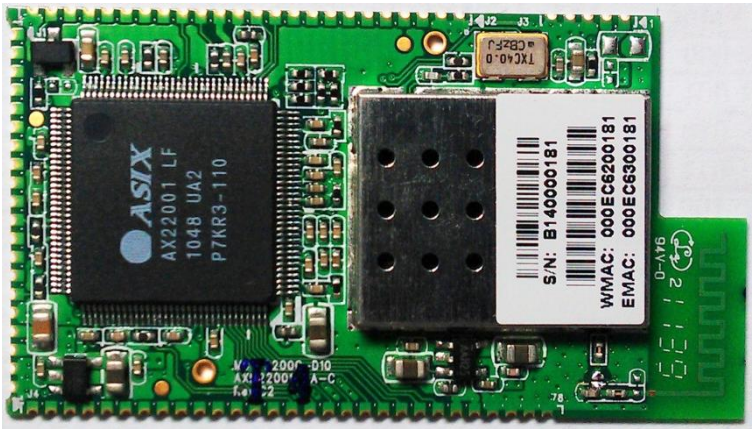


Figure 21. AXM22001-2A-C 802.11b/g WiFi Module Board (with Airoha AL2230S RF chip)

7. Software Modules

ASIX provides various software modules and its application notes for customers to develop with AX220xx hardware platform. All the AX220xx software modules are developed on Keil C development environment. Some software modules are optional and configurable depending on user's application needs. Please contact ASIX Sales staffs at sales@asix.com.tw for details.

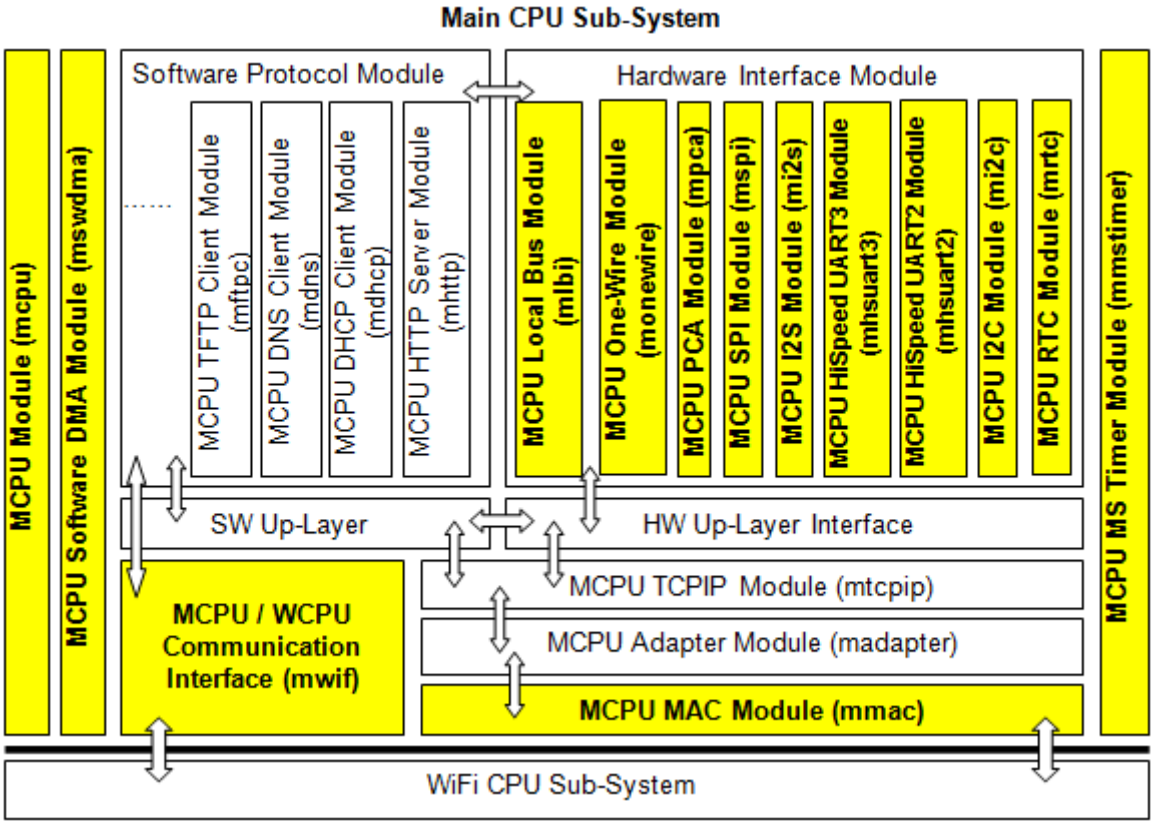


Figure 22. Software Modules Block Diagram

8. Software Development Tools

8-1. Software Compiler Tool

All the software modules for AX220xx family are developed in C language on Keil IDE development environment. User can purchase the Keil IDE Development Environment from Keil's web site at http://www.keil.com/c51/selector.asp. In general, user needs to purchase the PK51 development tool for C-language compiler, debugger and simulator. User can also download the Keil C51 evaluation software for free from Keil's web site, but the evaluation software can only compile the sample codes with less than 2K bytes binary code.

8-2. Software Debugger Tool

AX220xx currently provides two debug tool solutions, one is the UART console debug; another is the Digital Core Design (DCD)'s DoCD HAD2 debugger. All the AX220xx software modules support some basic UART console debug function by default. If user needs more powerful debug tool like source level debug, AX220xx reference design board supports the DCD's DoCD Hardware Debugger – the HAD2 module. Through the HAD2 module, the software running on AX220xx reference design board can be real-time debugged.

User can purchase the HAD2 module from DCD and download the debugger software from DCD's web site at http://www.dcd.pl/. Please refer to DCD's provided DoCD HAD2 debugger documents for procedures to set up the DoCD HAD2 debugger environment.

Figure 23. DoCD HAD2 Debugger Module

Note: The DoCD HAD2 Debugger is optional for AX220xx user, and it can be purchased from Digital Core Design's web site (http://www.dcd.pl/). If you don't have the DoCD HAD2 Debugger, you can still debug AX220xx software through UART console debug method.

➢ DoCD HAD2 Debugger Key Features:

AX220xx execution control
R/W all contents of AX220xx
Real-time hardware watch-points and breakpoints
Source Level debugging
Software watch-points and breakpoints
AX220xx Flash programming
Supports Keil, IAR and others
Source code tracing

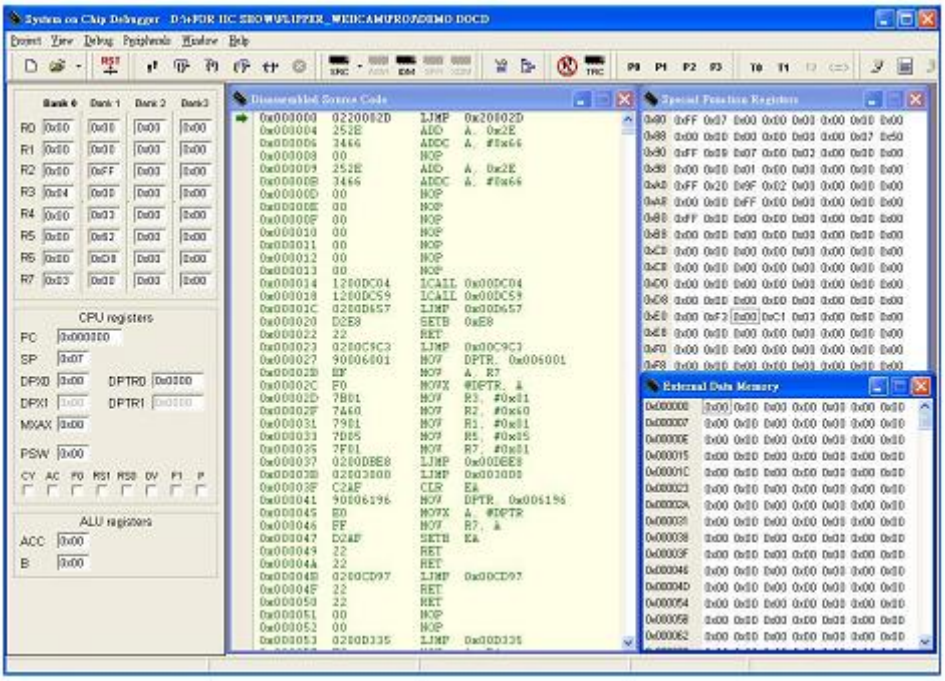


Figure 24. DoCD Debugger Software Interface

9. Flash Programming Utility

ASIX Electronics provides an application named AX220xx Windows In-System Programming tool (AX220xxISP.exe) to program AX220xx Flash memory and Hardware Configuration data through UART0 or UART2 port.

AX220xx Windows ISP tool is Windows dialog-based software program that can be run on Windows machine. The ISP program supports baud rates 921600 bps and 115200 bps.

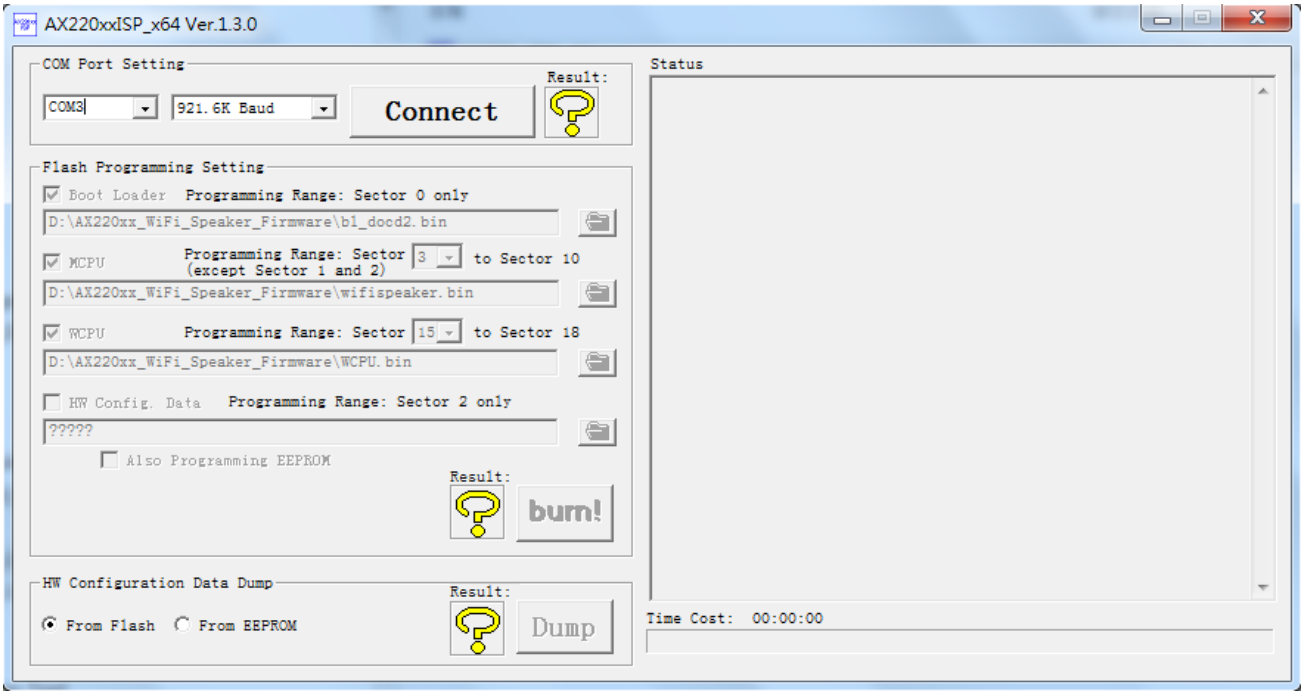


Figure 25. Main Window of AX220xx Window ISP Tool

10. Mass Production Solution

To support the mass production for those products using AX220xx chip. ASIX Electronics provides an AX220xx Customer Production Solution for AX220xx customers. The AX220xx Customer Production Solution is a Windows dialog-based software tool that can be used to test AX220xx chip on a product. Source codes as well as the binary files are provided that customers can modify the sample codes to meet the real requirements in mass production. For most up-to-date information, please contact ASIX Sales staffs at sales@asix.com.tw.

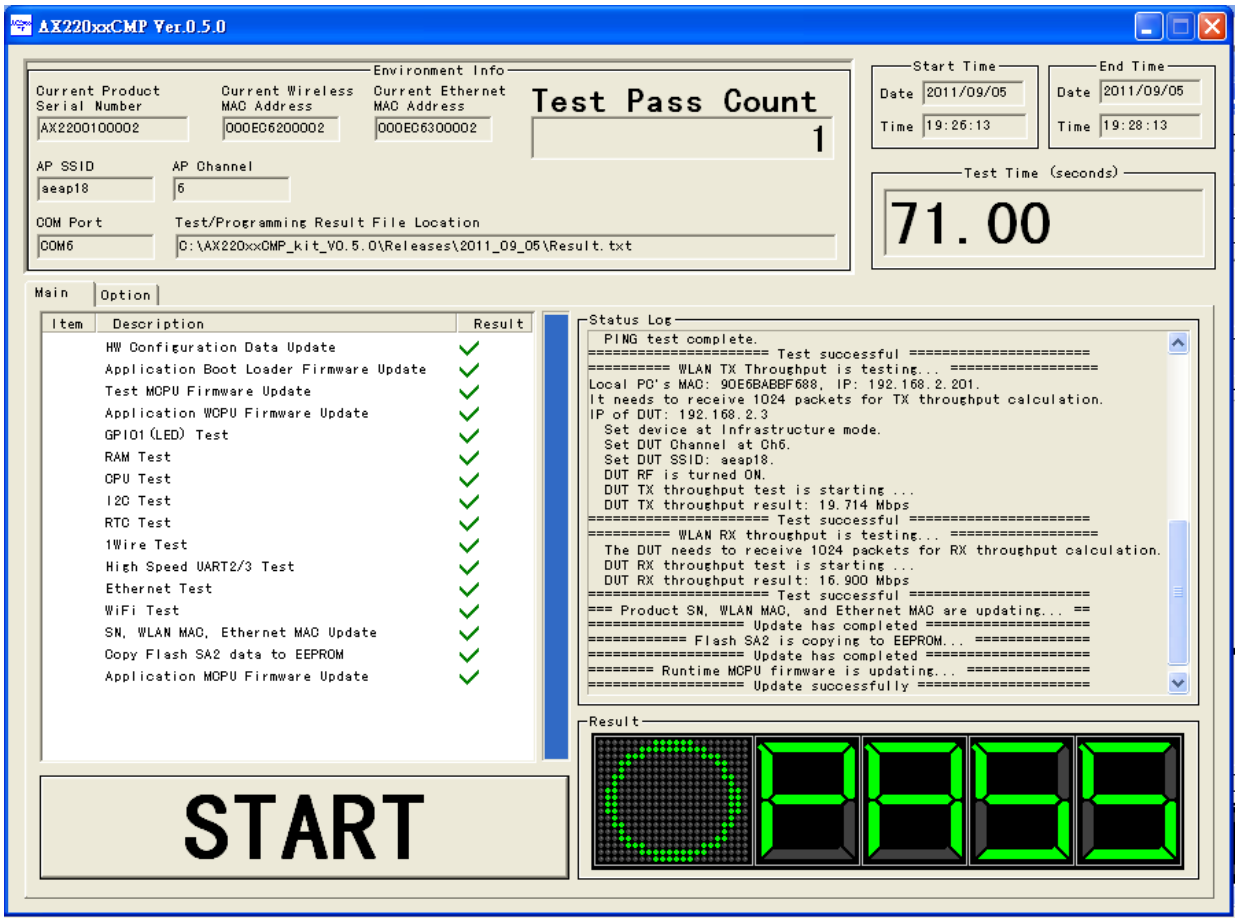


Figure 26. Main Window of AX220xx Customer Mass Production Tool

Appendix A: Frequently Asked Questions

Users can learn some basic information about AX220xx family from AX22001 FAQs web page (http://www.asix.com.tw/faq.php?op=faqdetail&PItemID=106). If you can't find the answers to your questions, please feel free to contact ASIX Support staffs at support@asix.com.tw.

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