OPERATION MANUAL

13.56 MHz RFID Desk Top Reader

FOR A9230-C (ISO 15693)

and

A9231-B (ISO-14443A)

Desk Top Readers

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1. Introduction

AMICWare RFID Expert Software provides a graphical window based on user interface for the AMIC A9230-C and AMIC A9231-B desk top RFID readers. The software is built upon the AMICTek Protocol(-S) and can be used to demonstrate the features, functions and benefits of RFID technology

2. Installation and Startup

2.1 Product Contents

Check the package for the AMICWare RFID Expert Software, it contains one CD-ROM setup disk.

2.2 Installation Requirements

The AMICWare RFID Expert Software requires the following minimum environment:

(1) System requirement:

Minimum: Pentium 133MHz
32MB RAM
UART 16550A (or compatible)
10MB free disk space
Resolution: 1024 x 768 with small fonts
Color depth: 16 Bit (65536)

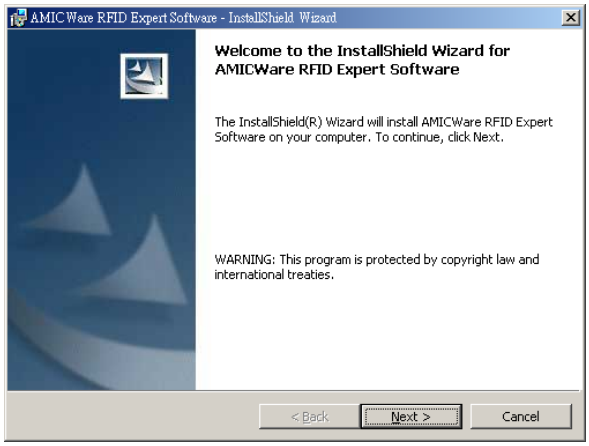
(2) Operating systems :

Windows 98/2000
Windows XP

2.3 Setup

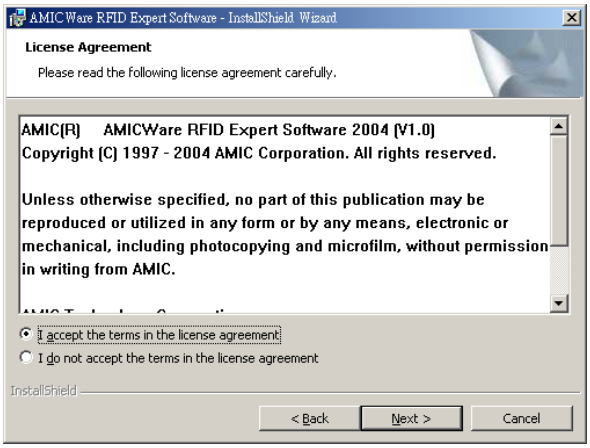
2.3.1 Installation

1. Insert the enclosed CD-ROM into computer's CD-ROM drive. After a short while the Welcome Screen shall be displayed.
   Click the **Next** Button.

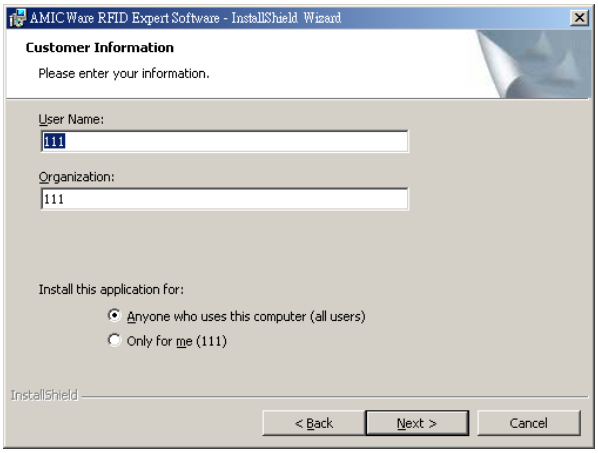


Note If the Welcome Screen is not displayed when the CD-ROM is inserted, go to My Computer, open the Setup Disk (CD-ROM) icon, and double-click the Setup.exe file.

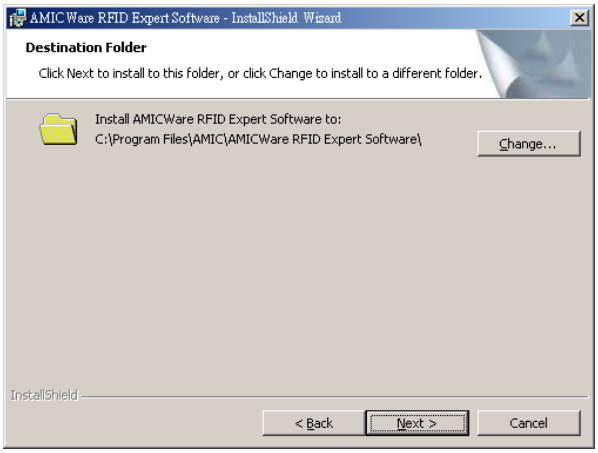
2. The Software License Agreement screen will be displayed.
   Click the **Yes** Button.



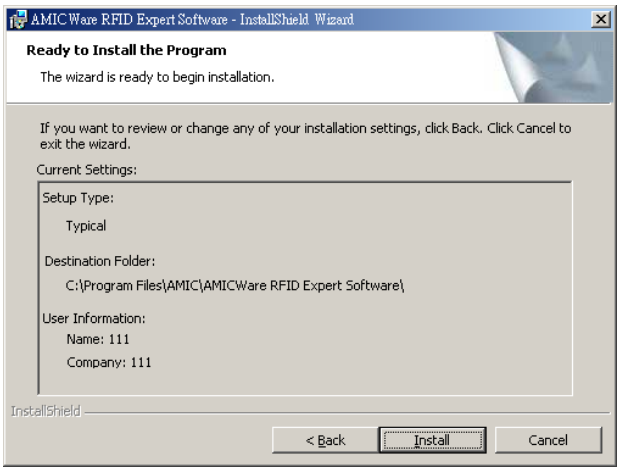
3. The Customer Information Screen will be displayed. Enter the required information, and
Click the **Next** Button.



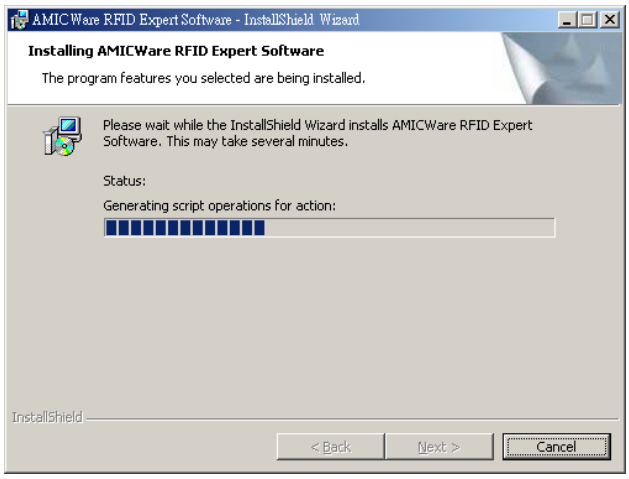
4. The Choose Destination Location Screen will be displayed. Using Browse Button to choose.
Click the **Next** Button.



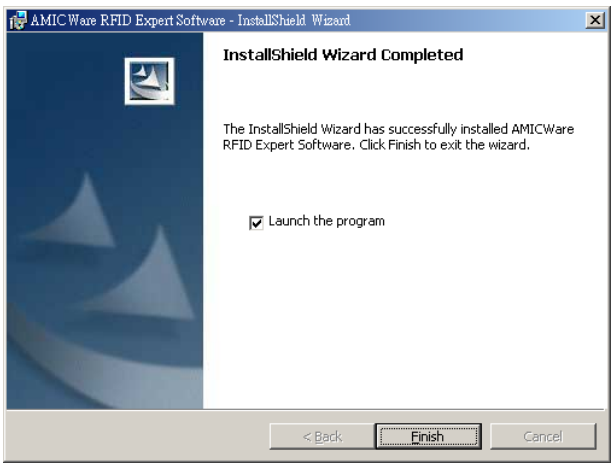
5. The Ready to Install the Program Screen will be displayed. Click the **Install** Button.



6. The Start Copying file Screen will be displayed.



7. When the setup operation is completed, the following screen will be displayed, Click the **Finish** Button.



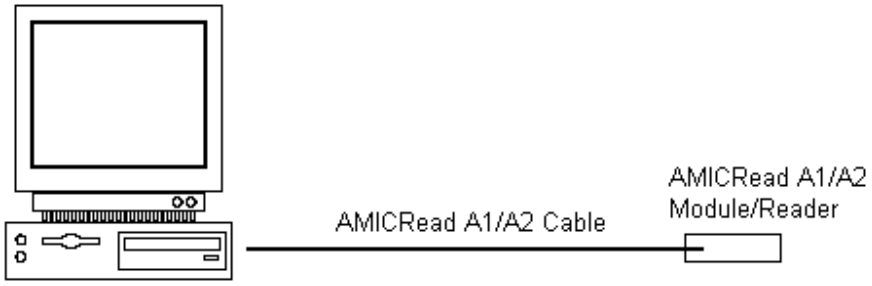
2.3.2 Uninstalling the AMICWare RFID Expert Software

Follow the procedure below to uninstall the AMICWare RFID Expert Software from your computer.

1. Select ***Program/AMICWare RFID Expert Software*** from the Windows Start Menu.
2. Select ***Uninstall AMICRFID***.

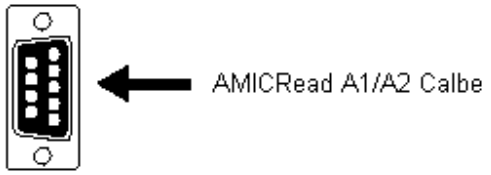
3. Connection

3.1 Connecting the AMICRead A1/A2 module/Reader

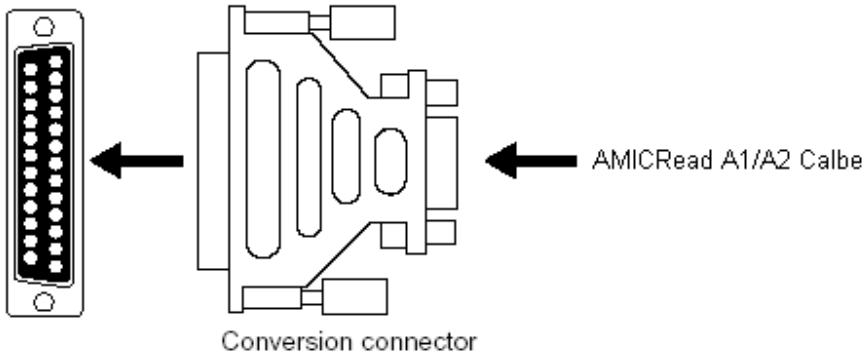


Note The connector on the computer side of the AMICRead A1/A2 Cable is a 9-pin D-sub connector. If the computer has a 25-pin D-sub connector, use a commercially available conversion connector or conversion cable.

For 9-pin D-sub Serial Port Connectors



For 25-pin D-sub Serial Port Connectors



3.2 Starting and Quitting

1. Select ***Program/AMICWare RFID Expert Software/AMICRFID*** from the Windows Start Menu.

2. The AMICWare RFID Expert Software will start.

3. Select ***Exit*** button to close the AMICWare RFID Expert Software.

Default Setting :

The following is default setting on computer side.

COM Port:

COM1

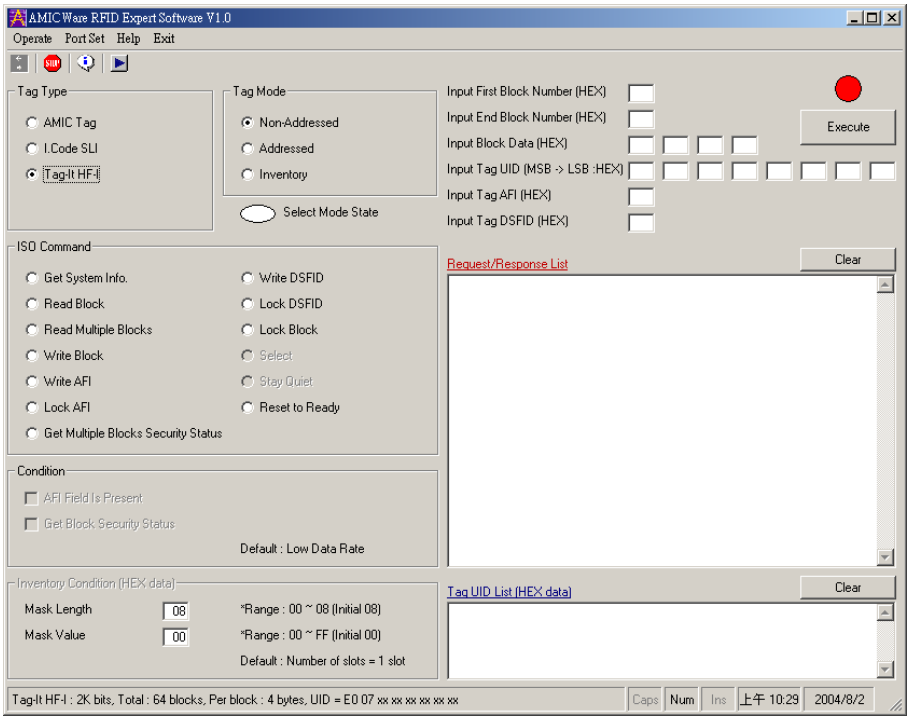
Baud Rate:

9600 bits/sec, N, 8, 1

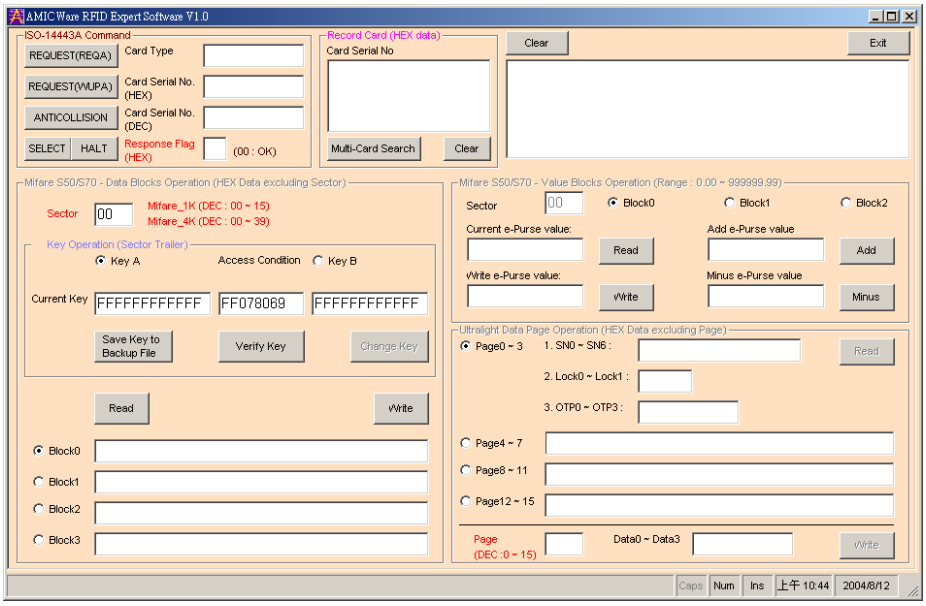
No Parity Bit, 8 Data Bits, 1 Stop Bit.

4. The software will automatically detect desk top reader hardware type and respectively bring up the corresponding operation software as follows.

AMICRead A1 software screen for A9230-C

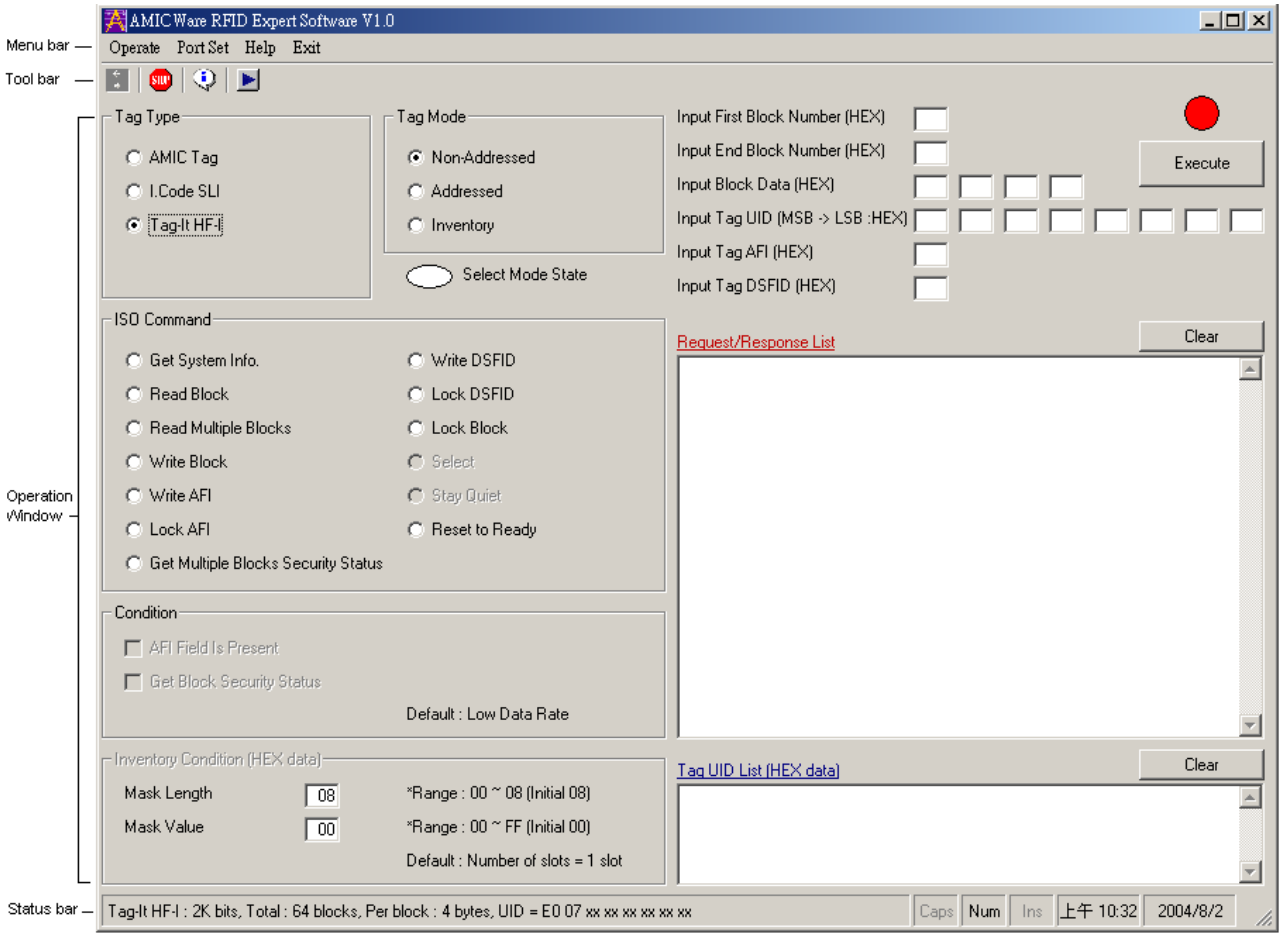


AMICRead A2 software screen for a A9231-B



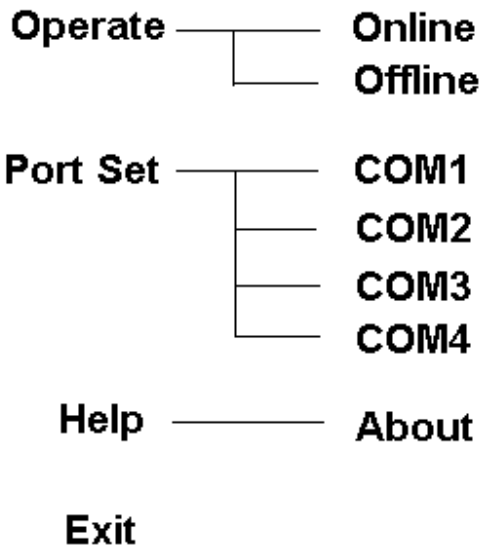
3.3 Screen Configuration for A9230-C desk top reader

The following describes the screen configuration of the AMICWare RFID Expert Software for A9230-C desk top reader (ISO-15693).



Menu Bar

The Menu Bar functions are listed in the following menu tree.



Tool bar

The following shortcut keys can be used from the Tooolbars.

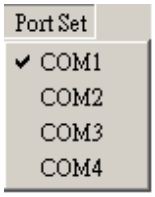
- Online
- Offline
- About
- Execute

Status Bar

The Status Bar displays tag contents and others auxiliary information.

3.3.1 COM Port Setting

Select ***Port Set*** from the Menu Bar.
You can choose COM1, COM2, COM3 or COM4.

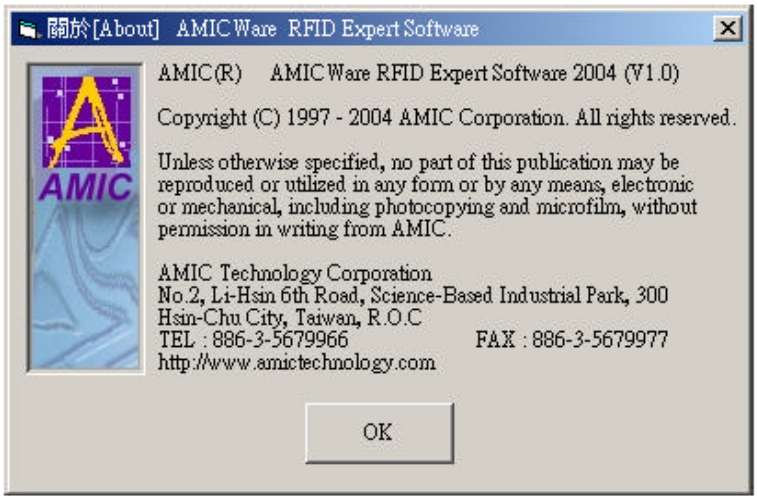


3.3.2 Toolbars Description

1. Online : The COM Port is opened.
   Note : The circle indicator will change to red on the right of the screen.

2. Offline : The COM Port is closed.
   Note : The circle indicator will change to black on the right of the screen.

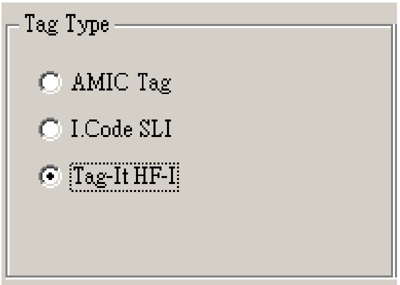
3. About : About the AMICWare RFID Expert Software related information as following.



4. Execute : Send command to AMICRead A1 module/reader.

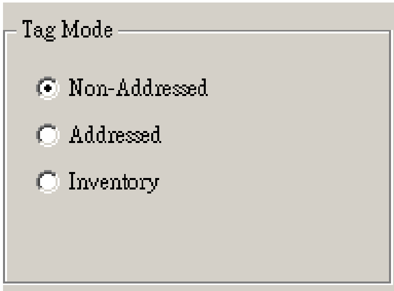
3.3.3 Operation Description

1. Select Tag Type:



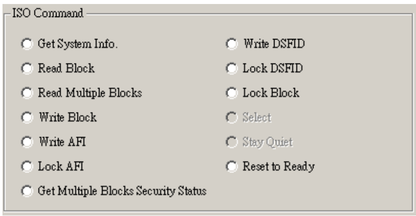
The AMICWare RFID Expert Software fully supports two IC manufacturers (TI, PHILIPS at present) that offer ISO/IEC 15693 compatible tags.

2. Select Tag Mode:

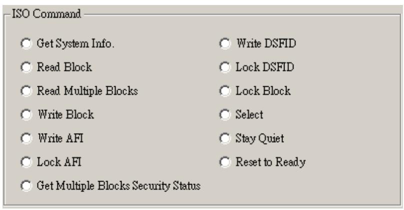


When you make the setting, the AMICWare RFID Expert Software will automatic disable (gray-out) some functions as shown below:

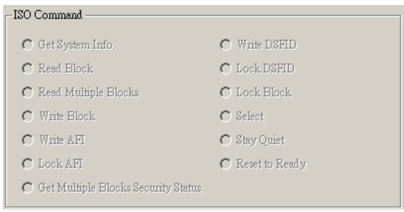
Non-Addressed Mode



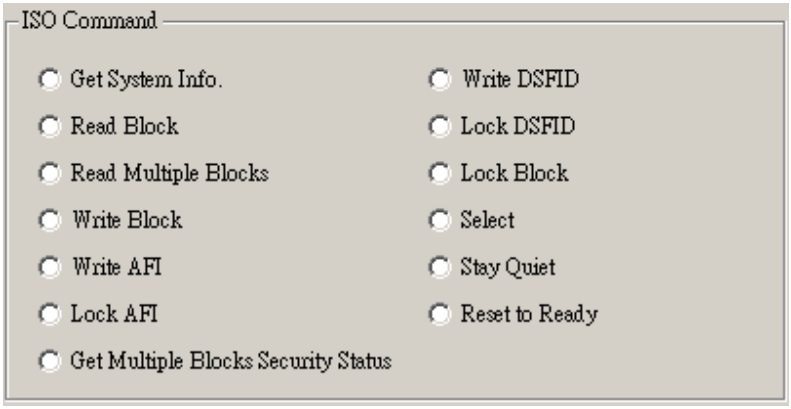
Addressed Mode



Inventory Mode

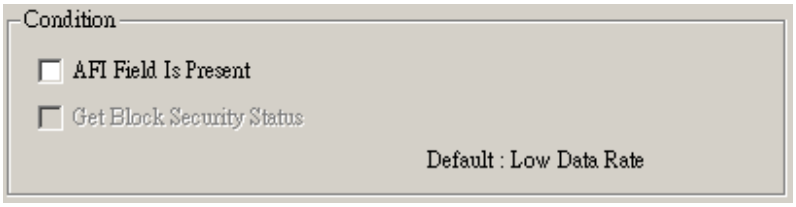


3. Select Function:



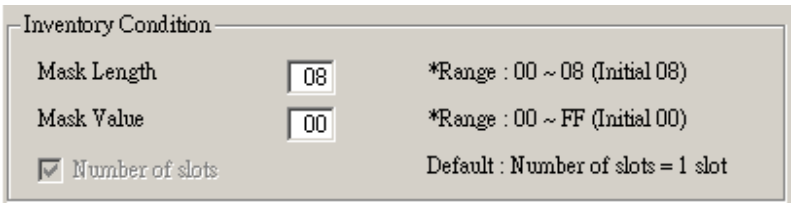
Choose the tag function that you want to perform.

4. Select Condition:



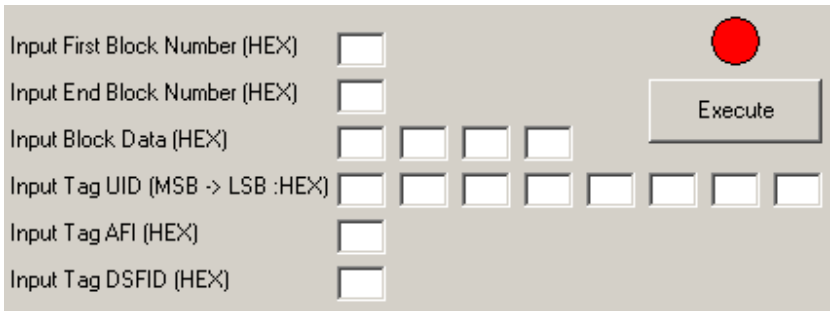
Tag Mode and Function selected will determine the usable function of the Condition items.

5. Select Inventory Condition:



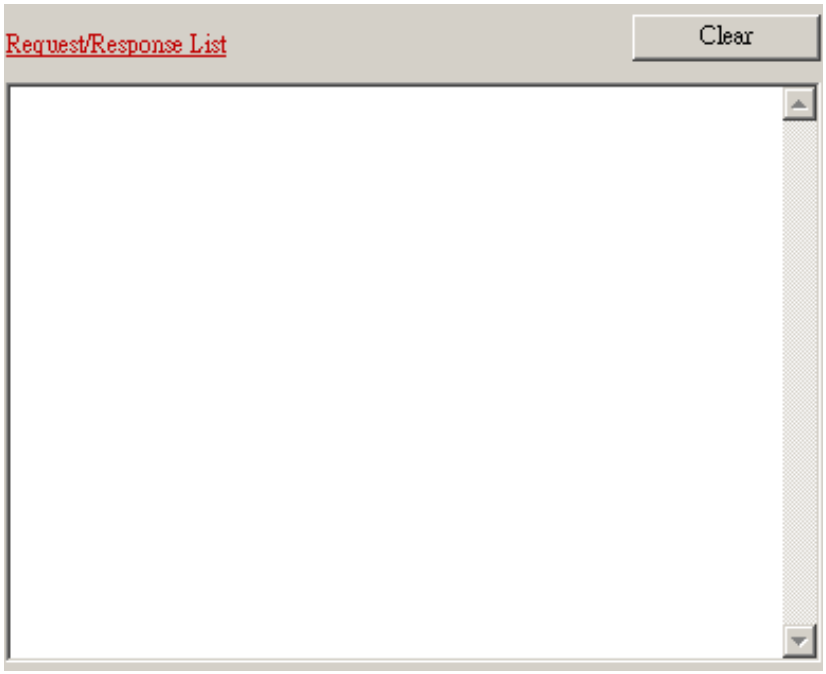
This inventory condition frame is enabled for Inventory Mode only.

6. Data Key in Parts:



The operation of data key in parts, depend on the Function selected.

7. Request/Response List:



The Request/Response List window will record request and response related messages.
The request and response related messages will be cleared, whenever the Clear Button is pressed.

8. Tag UID List:

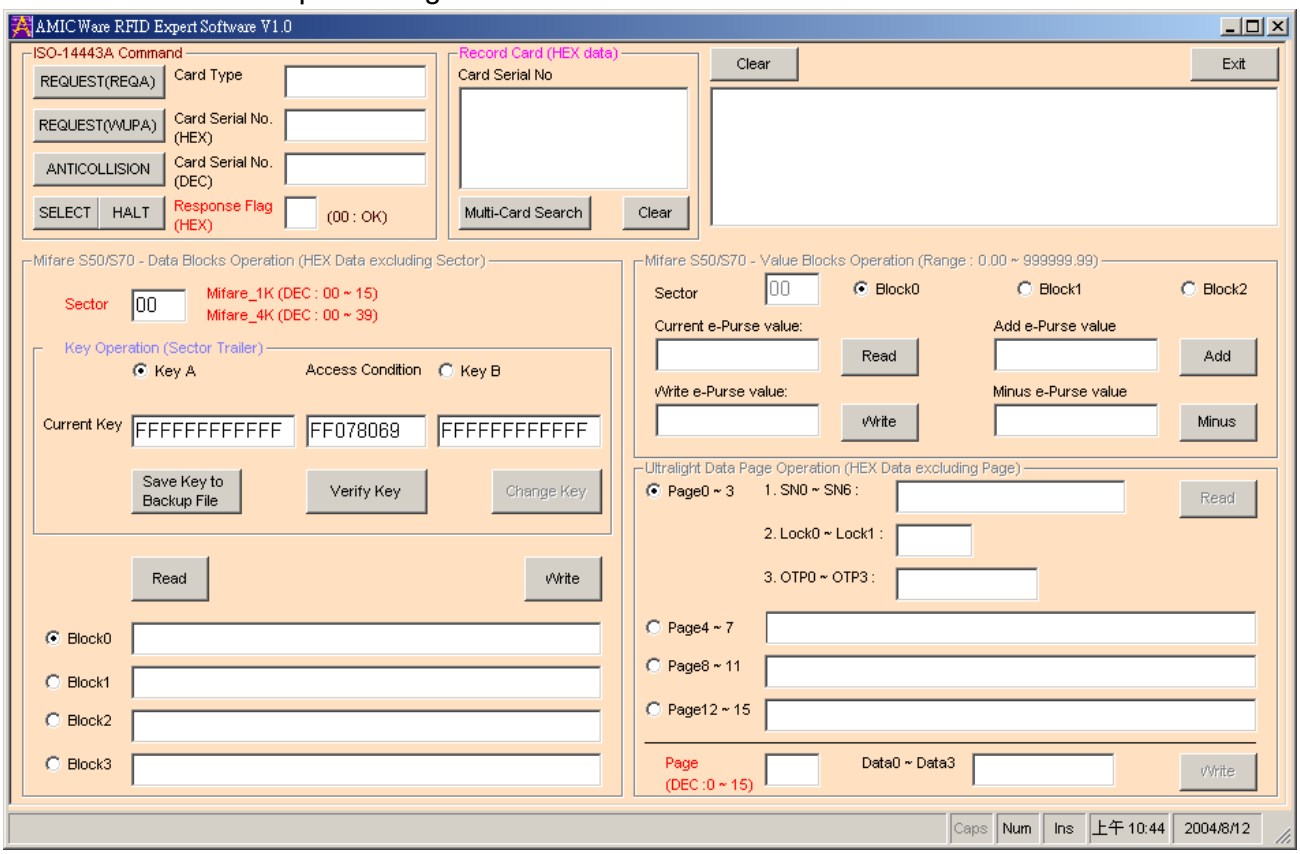
This Tag UID List frame will record Tag UID messages.
The tag UID related messages will be cleared, whenever the Clear Button is pressed.

Note :
For other operation information, refer to the ISO/IEC 15693-3 specification.

3.4 Screen Configuration for A9231-B desk top reader

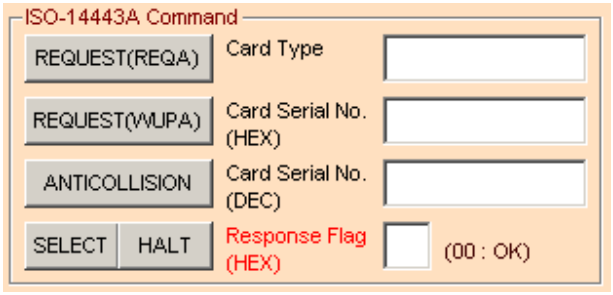
The following describes the screen configuration for AMICWare RFID Expert Software accompanying the AMIC A9231-B (ISO-14443A) desk top reader.

AMICWare RFID Expert Software supports PHILIPS that offer Mifare S50/S70/Ultraligh IC for ISO/IEC 14443A compatible tags.



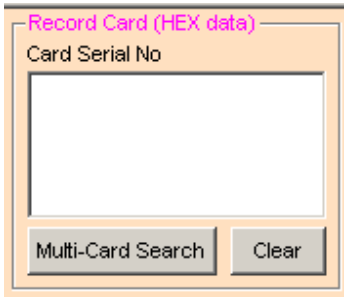
3.4.1 Operation Description

1. ISO-14443A Command:



※ The AMICWare RFID Expert Software fully supports ISO/IEC 14443A command.
※ Choose the command of ISO/IEC 14443A that you want to perform.
※ If any tag is within the field of antenna, the software will automatically identify related information and show it on the right side.

2. Record Card:



※ Record card of Card window will record unique card serial number messages.
※ If two or more cards are within the field of antenna, press Multi-Card Search Button to get multi-card's serial number.
※ The unique card serial number messages will be clear, whenever the Clear Button is pressed.

3. Request/Response List:

※ Request/Response List window will record request and response related messages.

※ Request and response related messages will be cleared, whenever the Clear Button is pressed.

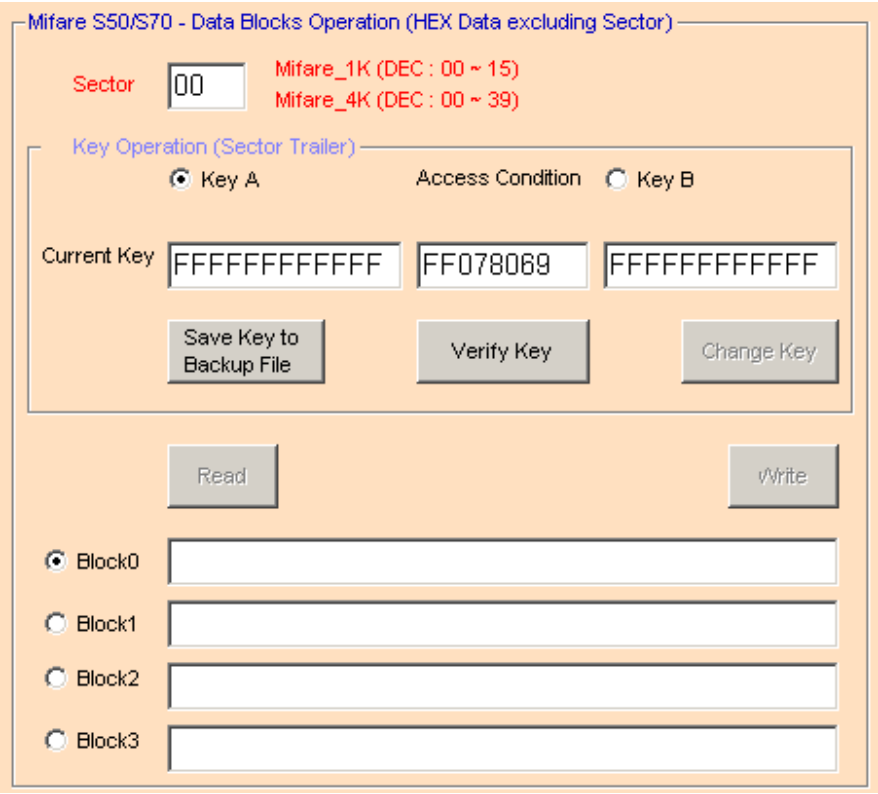
※ AMICWare RFID Expert Software will be closed, whenever the Exit Button is pressed.

4. Operation Frame:

AMICWare RFID Expert Software will automatic enable related operation window according to "Card Type" as shown below:

Note : Mifare S50/S70 can be used for data block or value block (e-Purse function).

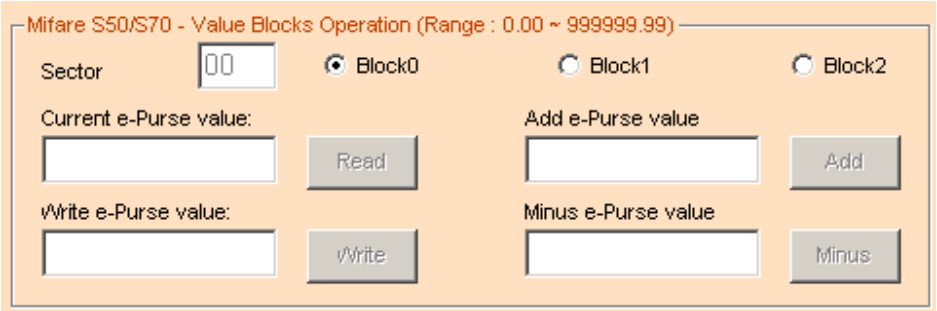
Mifare S50/S70 Data Blocks Operation



※ Setting sector number that you want to operate, then press Verify Key to authentication.
※ If authentication is passed, the grayed-out buttons will be enable.
※ Secret keys A and B will be save to PC file whenever the Save Key to Backup File Button is pressed.
※ The secret keys A and (or) B will be changed to Mifare S50/S70 IC whenever the Change Key Button is pressed

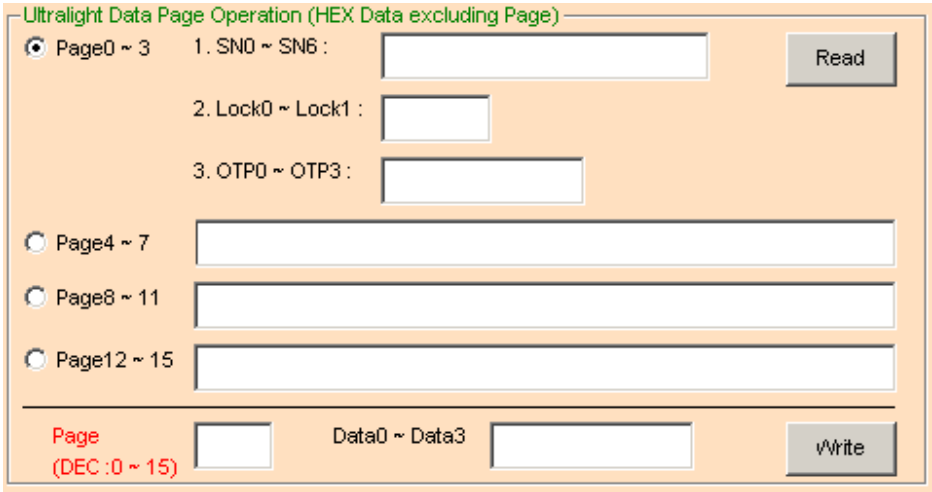
Note : Mifare S50/S70 secret keys A and B has 48 bits and default value of 0xFFFFFFFFFFFF.
Note : Mifare S50/S70 access condition has 32 bits and default value of 0xFF078069.

Mifare S50/S70 Value Blocks Operation



※ If authentication is passed (shown above), the Read button will be enable and the reading of e-Purse value will be allowed. After Read is finished, the other grayed-out buttons will be enabled. Select the function to be performed next

Ultralight Data Page Operation



※ Select the page that you want to read. Press the Read button. Page data will be

displayed at the corresponding place.

※ Select the page that you want to write. Key in Data0 ~ Data3.(hex values). Press Write button and the data will be write to the selected page.

Note :

For other operation information, refer to the ISO/IEC 14443A-3 specification and Mifare S50/S70/Ultralight IC related specification.

Annex 1.Tag Descriptions

Annex 1.1 Tag-It HF-I ISO-15693 (Texas Instruments)

The complete Tag-It HF-I specification can be found in the Texas Instruments publication titled " Tag-It HF-I Transponder Inlays Reference Guide".

Figure 43 - Memory Structure of the Tag-It HF-I

Block #	32 bits (4 bytes per block)			
0 (0x00)				
1 (0x01)				
2 (0x02)				
. . .	. . .	. . .	. . .	. . .
62 (0x3E)				
63 (0x3F)				

※ 2K bits (256bytes) of user memory is available for read/write.
※ The user can permanently lock any block.
※ Once a block is locked it can not be unlocked again.
※ A 64-bit ID (factory programmed) uniquely identifies each Tag-It HF-I chip.

0xE0	0x07	Unique Tag ID – 48 bits (6 bytes)

Annex 1.2 I・Code SLI ISO-15693 (Philips)

The complete I・Code SLI specification in the Philips publication titled ”I・Code SLI Smart Label IC SL2 ICS20 Functional Specification”.

Figure 44 - Memory Structure of the I・Code SLI (version SL2 ICS20)

Block #	32 bits (4 bytes per block)			
0 (0x00)				
1 (0x01)				
2 (0x02)				
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・
26 (0x1A)				
27 (0x1B)				

※ 896 bits (112bytes) of user memory is available for read/write.
※ The user can permanently lock any block.
※ Once a block is locked it can not be unlocked again.
※ A 64-bit ID (factory programmed) uniquely identifies each I・Code SLI chip (SL2 ICS20).

0xE0	0x04	0x01	Unique Tag ID – 40 bits (5 bytes)

Annex 1.3 Mifare S50 (Philips)

Complete Mifare S50 specification can be found in the Philips publication titled "Mifare Standard Card IC MF1 IC S50 Functional Specification".

Figure 28 - Memory Structure of the Mifare S50

Sector	Block	16 bytes per block	Description
15	3		Sector Trailer 15
	2		Data
	1		Data
	0		Data
14	3		Sector Trailer 14
	2		Data
	1		Data
	0		Data
	• • •	• • •	• • •
0	3		Sector Trailer 0
	2		Data
	1		Data
	0		Manufacturer Data

※ 1K byte EEPROM memory is organized in 16 sectors with 4 blocks of 16 bytes each.

※ User can set passwords (Key A, Key B) for each sector.

※ Each sector has a sector trailer containing the secret keys A and B(optional) and access condition for four blocks of that sector.

※ A 32-bit ID (factory programmed) uniquely identifies each Mifare S50 chip.

Unique Tag ID – 32 bits (4 bytes)

Annex 1.4 Mifare S70 (Philips)

Complete Mifare S70 specification can be found in the Philips publication titled "Mifare Standard 4k byte Card IC MF1 IC S70 Functional Specification".

Figure 29 - Memory Structure of the Mifare S70

Sector	Block	16 bytes per block	Description
39	15		Sector Trailer 39
	14		Data
to	•	•	•
	•	•	•
32	•	•	•
	0		Data
31	3		Sector Trailer 31
	2		Data
	1		Data
	0		Data
	•	•	•
	•	•	•
	•	•	•
0	3		Sector Trailer 0
	2		Data
	1		Data
	0		Manufacturer Data

※ 4K byte EEPROM memory is organized in 32 sectors with 4 blocks and in 8 sectors with 16 blocks. One block consists of 16 bytes.

※ User can set passwords (Key A, Key B) for each sector.

※ Each sector has a sector trailer containing the secret keys A and B(optional) and access condition for four blocks of that sector.

※ A 32-bit ID (factory programmed) uniquely identifies each Mifare S70 chip.

Unique Tag ID – 32 bits (4 bytes)

Annex 1.5 Mifare Ultralight (Philips)

Complete Mifare Ultralight specification can be found in the Philips publication titled "Mifare Ultralight Contactless Single-trip Ticket IC MF0 IC U1 Functional Specification".

Figure 30 - Memory Structure of the Mifare Ultralight

Page	Byte Number				Description
0	SN0	SN1	SN2	BCC0	Serial Number
1	SN3	SN4	SN5	SN6	Serial Number
2	BCC1	Internal	Lock0	Lock1	Internal / Lock
3	OTP1	OTP2	OTP3	OTP4	OTP
4	Data0	Data1	Data2	Data3	Data read/write
5	Data4	Data5	Data6	Data7	Data read/write
6	Data8	Data9	Data10	Data11	Data read/write
7	Data12	Data13	Data14	Data15	Data read/write
8	Data16	Data17	Data18	Data19	Data read/write
9	Data20	Data21	Data22	Data23	Data read/write
10	Data24	Data25	Data26	Data27	Data read/write
11	Data28	Data29	Data30	Data31	Data read/write
12	Data32	Data33	Data34	Data35	Data read/write
13	Data36	Data37	Data38	Data39	Data read/write
14	Data40	Data41	Data42	Data43	Data read/write
15	Data44	Data45	Data46	Data47	Data read/write

※ 512 bit EEPROM memory is organized in 16 pages with 4 bytes each.

※ The chip offer read-only locking mechanism, after locking the page becomes read-only memory.

※ Page 3 is the OTP page. It is pre-set to all "0" after production. These bytes may be bit-wise modified by a write command, If a bit is set to "1", it cannot be changed back to "0" again.

※ A 56-bit ID (factory programmed) uniquely identifies each Mifare Ultralight chip.

Unique Tag ID – 56 bits (7 bytes)

Revision History

Revision	Date	Description	By
1.0C	06/01/2004	Initial creation	D.L.
1.0D	06/08/2004	Modify Contents	R.L.
1.0E	08/02/2004	Modify Contents	D. L.
1.0F	03/01/2006	Reader modification	R.L.

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

To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.

FCC INFORMATION

The Federal Communication Commission Radio Frequency Interference Statement includes the following paragraph:

The 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 instruction, may cause harmful interference to radio communication. However, there is no grantee that interference will not occur in a particular installation. If this equipment dose 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.

The user should not modify or change this equipment without written approval Form **AMIC Technology Corporation**.Modification could void authority to use this equipment.

AMICWare RFID Expert Software is developed by AMIC Technology Corporation for RFID SOURCES Corporation