AMIC A9230-D Series RFID Reader
User Manual

Rev. 1.0C

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1. Introduction

Thank you for purchasing AMIC's A9230-D RFID reader system. AMIC's A9230-D RFID reader family is a feature rich HF RFID reader system incorporates flexibility, expandability, and durability. AMIC provides two antennas of different dimensions for use with A9230-D RFID readers. The A9290-A-0C antenna has dimension of 165 (L) x 85 (W) x 18 (D) mm and the A9290-A-0D has dimension of 218 (L) x 163(W) x 20 (D) mm. The availability of these two antennas enables the flexibilities of A9230-D RFID reader under different applications. A9230-D RFID reader system should be used with only these two antennas separately or simultaneously depending on the A9230-D model used. These antennas can be purchased through AMIC's authorized distributors and must be installed only by qualified professional specialists. Unlike competing products, A9230-D can be the base platform for your automation needs which require contactless RFID technology.

The included OpenWare RFID GUI Software provides a graphical window based user interface for AMIC's reader systems. It is built upon the AMIC OpenWare RFID Framework and can be used to demonstrate the features and functions of AMIC RFID reader systems. System integrators can use it to develop system software utilizing AMIC's RFID reader systems.

2. Delivery Content

Please check that the box contains the following items:

Model Number: A9230-D-001-485 and A9230-D-002-485

1. Reader controller x 1
2. USB cable x 1
3. RS-485 cable with RJ-45 connector x 1
4. Utility CD x 1

Model Number: A9230-D-001-USB and A9230-D-002-USB

1. Reader controller x 1
2. USB cable x 1
4. Utility CD x 1

Model Number: A9230-D-001-232 and A9230-D-002-232

1. Reader controller x 1
2. USB cable x 1
3. RS-232 cable x 1
4. Utility CD x 1

If you find anything missing in the box, please contact your authorized AMIC representative.

3. Installation

The A9230-D series RFID readers are designed for easy installation. Please follow the instructions in the following paragraphs for making connection to power, to antenna(s), and to host controlling computer.

3.1 Antenna Installation

Warning: Professional installation of antenna is required.

A9230-D series RFID readers have two different antennas designed specifically for this family of readers. The A9290-A-0C antenna has dimension of and the A9290-A-0D has dimension of. Both employee flat panel design for convenient antenna deployment. Please note that the antenna(s) should only be installed or maintained by qualified professional specialists and only the above two mentioned antennas could be used in conjunction with A9230-D series RFID readers. Please consult a qualified professional specialist for antenna selection and installation and have the qualified specialists refer to separate antenna installation instructions for details. Fail to follow the above warning could result in violations of relevant FCC regulations and void product warranty.

3.2 Host Connection

AMIC's A9230-D series RFID readers come with models incorporating three different types of host interface: RS-485 interface for A9230-D-001-485 and A9230-D-002-485 models, RS-232 interface for A9230-D-001-232 and A9230-D-002-232 models, and USB interface for A9230-D-001-USB and A9230-D-002-USB models.

The models with RS-485 interface are designed for daisy-chain operations. User of this RFID reader can connect up to 255 reader units on the same RS-485 bus. For models equipped with RS-232 and USB host interface, each reader unit must be connect to a host controller (PC, controlling server, or PLC) for proper operations.

A9230-D-001-485 and A9230-D-002-485 models:

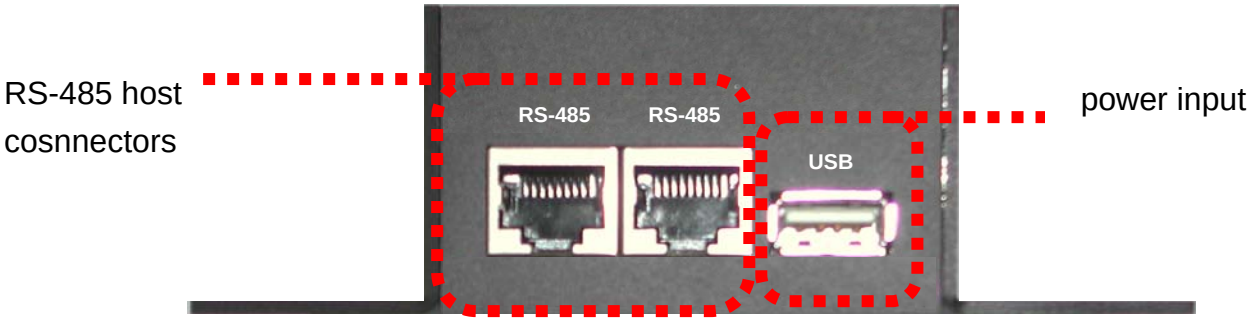
Connect the supplied RS-485 cable to the reader by inserting the RS-45 connector to any of the available two RJ-45 receptacles. Connect the flying-leads as described in paragraph 3.3 for host connection. The second RJ-45 receptacle on the reader can be used to daisy-chain other A9230-D readers equipped with RS-485 interface.

A9230-D-001-232 and A9230-D-002-485 models:

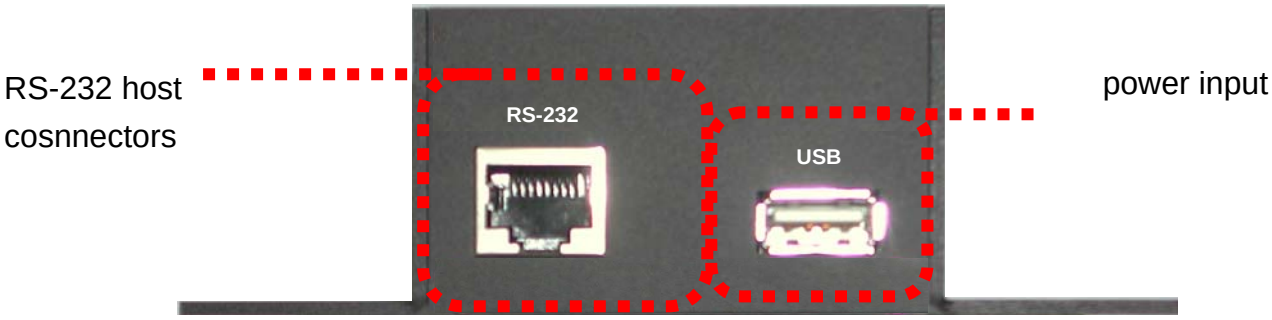
Connect the supplied RS-232 cable to the reader and the host controller (PC, server controller, or PLC)

A9230-D-001-USB and A9230-D-002-USB models:

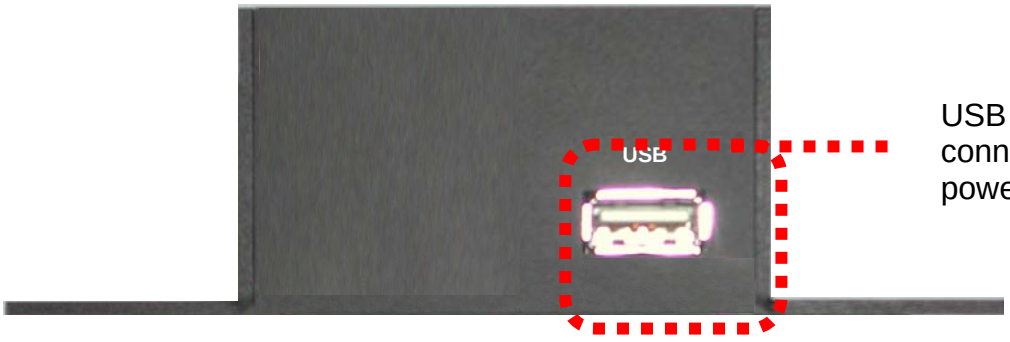
Connect the supplied USB cable to the USB receptacle on the reader. The USB interface provides both DC power and data connection for the A9230-D-001-USB and A9230-D-002-USB readers.



Back Panel for A9230-D-001-485 and A9230-D-002-485



Back Panel for A9230-D-001-232 and A9230-D-002-232

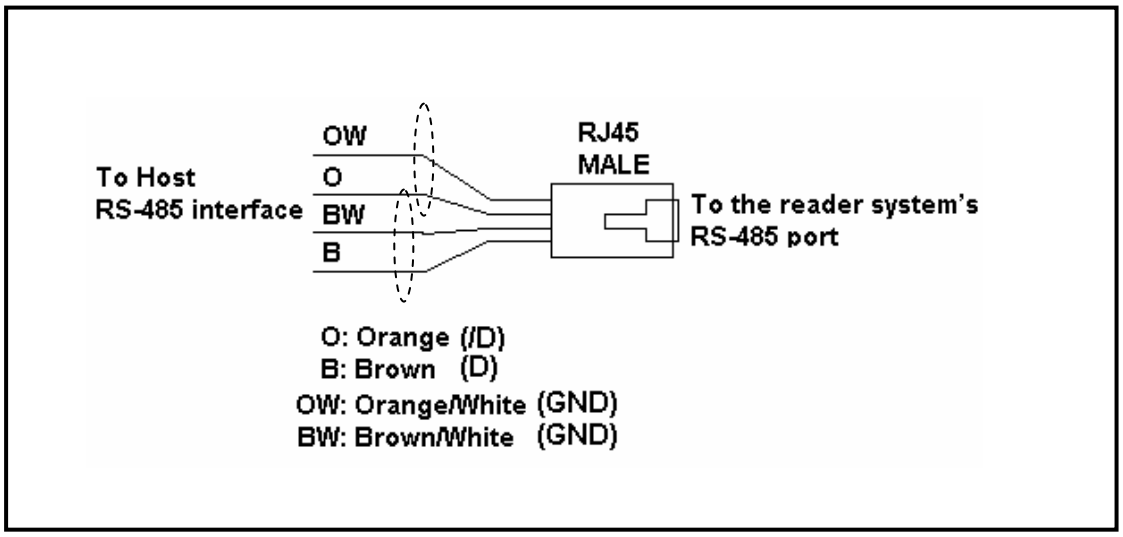


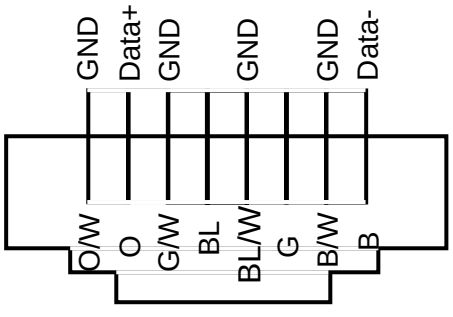
Back Panel for A9230-D-001-USB and A9230-D-002-USB

3.3 Host Interface Cable Set ups

3.3.1 RS-485 Cable Interface for A9230-D-001-485 and A9230-D-002-485 models

A typical RS-485 network consists of either two wires or four wires. A9230-D-001-485 and A9230-D-002-485 RFID reader's RS-485 interface uses RJ-45 type connector. Proper wire connections should be made before inserting the cable into the RS-45 connector. It is recommended that signal wire be twisted with ground wire as shown in the diagram below to minimize noise and interference. Pin 8 (B) of the RJ-45 connector should be used for the non-inverting RS-485 data signal. Pin 2 (O) of the RJ-45 connector should be used for the inverting RS-485 data signal. Ground should be connected to Pin 7 (BW) and Pin 1 (OW) of the RJ-45 connector.



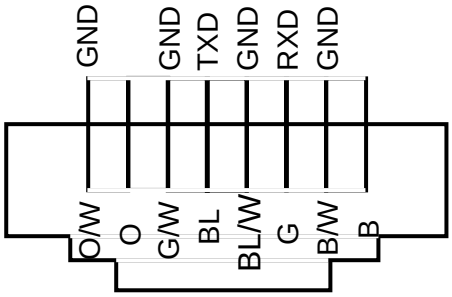


3.3.2 RS-232 Cable Interface for A9230-D-001-232 and A9230-D-002-232 models

A9230-D-001-232 and A9230-D-002-232 use RS-232 protocol to communicate with the host controller. The RS-232 signals are passed through the RJ-45 connector on the back panel. RS-232 communication parameters should be set up as below:

- RS-232 Data Rates (Baud Rates): 115.2kbps
- No parity bit
- 8 data bits
- 1 stop bit

The three-wire interface for RS-232 signal connections through the RJ-45 connector is show in the diagram below:

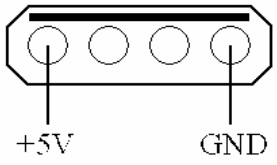


3.3.3 USB Interface for A9230-D-001-USB and A9230-D-002-USB

A9230-D-001-USB and A9230-D-002-USB RFID readers use standard USB interface to communicate with the host controller. High quality USB cabled that can be easily obtained through local any local office supply stores can be used. USB cable with plug type connector at both cable ends should be used.

3.4 Power Connection (for all models)

The A9230-D series RFID readers receive DC power (+5V) through its USB connector. Therefore, the USB cable must be used to connect either to a +5V DC source, a PC, or other host device which can provide +5V DC power through the USB connection. For USB host interface models, only the USB cable needs to be connected. For all other models, both the host interface cable and the USB cable must be connected for proper operation.



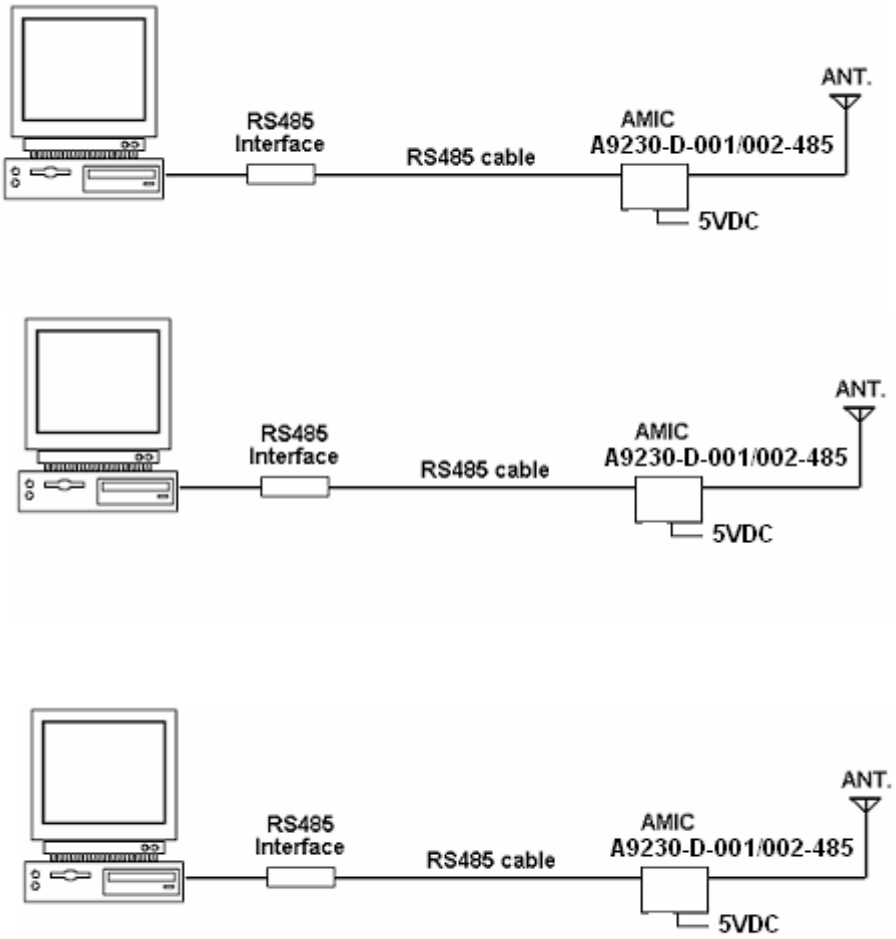
3.5 Reader LED Indicators

Indicator	Indicator Description	
ACT	Flashing LED indicates healthy reader operation	
ANT1	**LED On:** Antenna port 1 is being used	**LED Off:** Antenna port 1 is not used
ANT2	Reserved for future use	
ANT3	Reserved for future use	
ANT4	Reserved for future use	

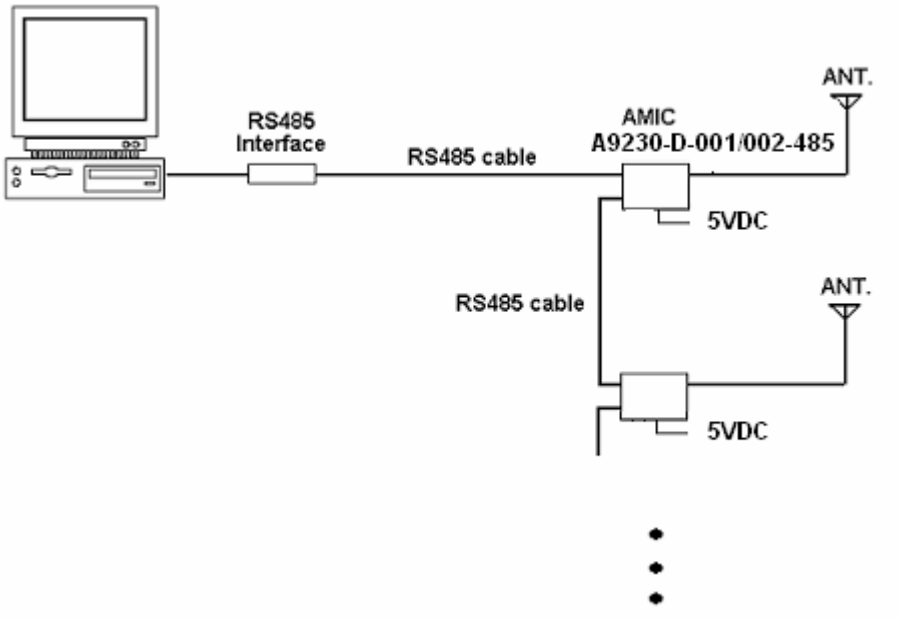
3.6 Connection Diagram

AMIC's A9230-D reader system can be used in two different configurations. The first configuration consists of one reader system on the RS-485 network. Reader address needs to be in the default setting (software configurable, address = 0x01). The second configuration consists of up to 255 readers maximum on the same RS-485 network. This configuration requires the setting of the reader address through software to ensure that each reader is using a unique address on the RS-485 network.

3.6.1 Single Reader System Configuration



3.6.2 Daisy Chained Configuration (for RS-485 models only)



4 Software

4.1 Host System Requirements

The included AMICWare RFID Expert GUI Software requires the following system environment for proper installation:

Minimum host controller requirement:

Pentium 133MHz
32MB RAM
One RS-232 port (UART 16550A or compatible)
10MB of free disk space
Resolution: 1024 x 768 with small fonts
Color depth: 16 Bit (65536)

Host operating systems supported:

Windows 2000
Windows XP

4.2 Software Installation

Insert the enclosed CD-ROM into computer’s CD-ROM drive. After a short while the Welcome screen shall display. Follow the instruction on the screen for software installation.

Appendix 1: Tag Descriptions

Appendix 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”.

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)

Appendix 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”.

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)

Appendix 2. Revision History

Revision	Date	Description	By
1.0	08/30/2006	Initial creation	R. Lin

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 Corp. Modification could void authority to use this equipment.