

AIA1801-200-04

UltraSpeed[™] Industrial Ethernet NetBridge[™]

User's Manual



Version 1.0



IMPORTANT SAFETY INFORMATION

- **1.** Please read all instructions before installing and operating AIA1801-200-04 and keep all instructions for later reference.
- 2. Please follow all performance and safety requirements for each installation, including any applicable laws, regulations, codes and standards.
- 3. Do follow all the warnings and instructions marked on the product.
- 4. AIA1801-200-04 is NOT field serviceable and should not be opened under any circumstance.
- 5. Abound is not responsible or liable for indirect or consequential damage resulting from the use or application of this product.



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Electronic Emission Notices

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.
- (2) This device will accept any interference received, including interference that may cause undesired operation.

Audience

The information in this manual is composed for technicians, engineers and network administrators who are installing and maintaining a control system that includes the AIA1801-200-04 NetBridges. You should have a basic knowledge of:

- (1) Microsoft Windows OS
- (2) Ethernet Networks Installation and Maintenance

Support

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Please contact your local Aboundi representative if you need an on-site support.



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1. Introduction



The traditional Ethernet network cabling for the industrial automation I/O device network requires the deployment of new CAT5 wiring in addition to the legacy I/O process and control infrastructure. This addition of another paralleled wiring infrastructure at the I/O network level increases the Total Cost of Ownership (TCO) and ongoing operational maintenance expenditures. Aboundi's patent pending AIA1801-200 series of UltraSpeedTM Industrial Ethernet NetBridgeTM allows a Plug-and-Play simplicity utilizing the existing robust floor DC power electrical wiring as means of providing the network service. The Aboundi solution dramatically reduces the Total Cost of Operation (TCO) with its product line installation flexibility.

The robust AIA1801-200 NetBridgeTM enclosure is designed to withstand the harsh industrial operating environments.

1.1. Features

- Virtual CAT5TM capability layer the Ethernet communication over the power wires and thus eliminates need for a separate communication wiring
- Compatible with all Ethernet ready I/O modules
- Simple Plug-and-Play installation
- 168-bit Tri-DES encryption for secure data transmission
- Robust housing
- Supports Industrial operating temperature
- DIN-Rail ready mounting installation



- Ident-and-Connect[™] feature allows ease of network setup and monitoring
- Web configurable
- Up to 300 meters of operational distance
- Compliance with IEEE802.3u 100BASE-TX

1.2. Product Package

Before starting installation, please make sure the AIA1801-200-04 package includes the following five items:

- 1) Quick Installation Guide
- 2) AIA1801-200-04 unit
- 3) Female type 4-PIN Terminal Block
- 4) CD-ROM (containing Ultra NetBridge[™] Utility for Windows and User's Manual).

If anything from the above items is missing, please contact your vendor.

1.3. VirtualCAT5[™] Network Topology Examples

Example 1 – VirtualCAT5TM Linear Ethernet Network

AIA1801-200-04 enables to utilize DeviceNet/CAN Open compatible cables to establish the EtherNet/IP networks on the automation control system. With the VirtualCAT5TM capability, the deployment won't need additional Ethernet switches for the device level connections. The maximum number of connected AIA1801-200-04 can up to 32 in a physical wiring. The graphic below shows an example of a linear network.



Fig. 1.5.1 VirtualCAT5[™] Linear Network Example



Example 2 – VirtualCAT5TM Star Topology Ethernet Network

For some plants, the cables connect the devices with a multiple ports tap to be easy maintenance and better locations. AIA1801-200-04 Ethernet bridges can be directly connected to the multiple device ports tap to form a star topology network on the field. The Indent-and-Connect[™] capability of the AIA1801 series will automatically establish a highly efficient network transmission for peer-to-peer or master-client network structure without additional configuration. The maximum number of connected AIA1801-200-04 can up to 32 in a physical wiring. The graphic below shows an example of a start topology network.



Fig. 1.5.2 VirtualCAT5[™] Star Topology Network Example



2. Install AIA1801-200-04

2.1. LED

The following figure shows the AIA1801-200-04 LED indicator.





2.2. Communication Interfaces

The following figure shows the communication interfaces.



Terminal Strip for Power and Communication

	PIN	Definition
	1	24Vdc+, data
	2	24Vdc-, data
1224	3	24Vdc+, data
1234	5	24Vdc-, data

Terminal Difinition



2.3. Din Rail Mounting

Follow the steps below to mount AIA1801-200-04 on a DIN rail.

- 1. Determine a proper DIN rail. This product's grounded through the DIN rail to the chassis ground. Please make sure the material of the DIN rail to mount is good conductor to avoid improper or intermittent grounding.
- 2. Holding the AIA1801-200-04 body and hook the latch over the DIN rail.
- 3. Push down the unit to lock on the latch.



Figure 2.3.1 - AIA1801-200-04 on The DIN Rail

2.4. Connect the Ethernet RJ45 Ports

Follow the steps below to connect the Ethernet RJ45 port on the AIA1801-200-04 unit.

1. Locate the Ethernet RJ45 port on the bottom of the unit as shown in the figure 2.4.1.





Figure 2.4.1 - Ethernet Port on AIA1801-200-04

2. Connect one end of an Ethernet cable with RJ45 jack to the Ethernet port on the unit.



Figure 2.4.2 – Ethernet Cable on AIA1801-200-04 RJ45 port

- 3. Connect the other end of the Ethernet cable to the Ethernet port on the I/O module or the device with Ethernet interface.
- 4. Locate the terminal strip on the bottom of the unit as shown in the figure 2.4.3.



Figure 2.4.3 – 4-Pin Terminal Strip on AIA1801-200-04

5. Insert the two wire of the power line into the terminal strip and screw it tight as indicated on Fig. 2.4.4.





Figure 2.4.4 – Insert power line

6. Insert another pair of DC power line into the terminal strip as shown on the Fig. 2.4.5 in order to connect to the next AIA1801-200-04 unit.



Figure 2.4.5 – Insert another power line

Repeat step 1 to 6 to connect all the Ethernet devices on a VirtualCAT5 network. See the Fig. 2.4.6 to see an example.





Figure 2.4.6 – Daisy Chain Connection

2.5. Inspect The Connectivity

Follow the steps below to verify the connection on the cable is established and ready to go.

- Power on the 24V DC power supply for the device network and all connected AIA1801-200-04 units should be powered on. The LED indicator should be also turned on.
- 2. Please examine the LED indicator and check the application bandwidth status LED. If the color is blue or purple, the quality of connection is good. See the figure 2.5 for the LED definition.





Figure 2.6 – LED Indication Definition

3. At this point, the essential deployment is completed. For some advanced configuration, you may want to customize these AIA1801-200 units by using the Ultra NetBridge[™] Utility or via web configuration described by the next two chapters.



3. Install Ultra NetBridge™ Utility

If you need to do advance settings for AIA1801-200, please follow the steps below to install the Ultra NetBridgeTM Utility.

3.1. System Requirement

Before installing Ultra NetBridgeTM Utility, make sure the PC meets these requirements for hardware installation:

- 1. Microsoft Windows XP, Vista or Windows 7
- 2. Pentium®1.6 GHz processor, equivalent or higher
- 3. One free Ethernet port connecting to UltraSpeedTM Series Ethernet NetBridgeTM
- 4. 30Mbyte free disk space

3.2. Software Installation

Before the installation, please close the application (if an older version is running) and uninstall it

To install the application just run the setup executable program **utility-setup.exe** in the Product CD-ROM, and follow the steps of the installation wizard. To start the Ultra NetBridge^m Utility installation, press "Next>":



4.



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Next screen shows our license agreement. Please select 'I accept the agreement' and click "Next" to next step.

🌿 Setup - Aboundi Ultra NetBridge Utility			
License Agreement Please read the following important information before continuing.			
Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.			
END-USER SOFTWARE LICENSE AGREEMENT			
THE ABOUNDI NetBridge UTILITY AND RELATED DOCUMENTATION (THE "SOFTWARE") IS MADE AVAILABLE TO YOU UNDER THE TERMS OF THIS ABOUNDI END-USER SOFTWARE LICENSE AGREEMENT (THE "AGREEMENT"). BY CLICKING THE "YES" BUTTON, OR BY INSTALLING OR USING THE ABOUNDI NetBridge UTILITY, YOU ARE CONSENTING TO BE BOUND BY THE AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS AND CONDITIONS OF THIS AGREEMENT, DO NOT INSTALL OR USE ANY PART OF THIS ABOUNDI NetBridge UTILITY.			
I accept the agreement			
C I do not accept the agreement			
< Back Next >	Cancel		

Next screen allows you to select the installation folder for the application. Click "**Next>**" to next step:

🄀 Setup - Aboundi Ultra NetBridge Utility
Select Destination Location Where should Aboundi Ultra NetBridge Utility be installed?
Setup will install Aboundi Ultra NetBridge Utility into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files (x86)\Aboundi\Ultra NetBridge Utility Browse
At least 4.2 MB of free disk space is required.
< Back Next > Cancel



Please click "Next>" to install at the default Start Menu:

🄀 Setup - Aboundi Ultra NetBridge Utility	- IX
Select Start Menu Folder Where should Setup place the program's shortcuts?	
Setup will create the program's shortcuts in the following Start Menu folde	r.
To continue, click Next. If you would like to select a different folder, click Browse.	
Aboundi\Ultra NetBridge Utility Browse	
< Back Next >	ancel

You can create a desktop icon on your windows desktop, click "Next>" to next step:

烯 Setup - Aboundi Ultra NetBridge Utility			_ 🗆 🗙
Select Additional Tasks Which additional tasks should be performed	?		
Select the additional tasks you would like Se Ultra NetBridge Utility, then click Next.	tup to perform v	while installing Abo	oundi
Additional icons:			
Create a desktop icon			
	i Da d		[
	< <u>B</u> ack	<u>N</u> ext >	Cancel



You are ready to extract and copy the files to your computer, it's the chance to change the installation settings by clicking the "<Back" button. Click "Install" button to start installation.

🌿 Setup - Aboundi Ultra NetBridge Utility	_ 🗆 🗙
Ready to Install Setup is now ready to begin installing Aboundi Ultra NetBridge Utility on your computer.	
Click Install to continue with the installation, or click Back if you want to review or change any settings.	
Destination location: C:\Program Files (x86)\Aboundi\Ultra NetBridge Utility	A
Start Menu folder: Aboundi\Ultra NetBridge Utility	
Additional tasks: Additional icons: Create a desktop icon	
۲. ۲	-
< Back	Cancel

Please wait for Installation progress bar finish. Press **"Cancel"** button to abort the installation process.

Decompressing Files In C:\Program Files\Aboundi\Ultra NetBridge cygwin1.dll				
76 %				
Cancel				



5.

Utility has been installed. Click the "Finish" to quit Setup window.



Run the Utility

When utility is installed, please run the utility from Start / Programs or double-click the Ultra



NetBridge[™] Utility icon *M*[™] on the Windows Desktop.

Configure IP Address (Optional)

1. Start the program and the main window will show up.



evice Name	Network ID	MAC Address	IP Address	Location		1
Powerline Devices	detected	Phu Tx(Mhns)	Phy Bx(Mbps)	MAC Address	Location	

2. Click on the "Search Device(s)" Button on the bottom right corner to start finding the connected Aboundi devices. The time for searching devices depends on the network quality of the number of connected Aboundi devices. When the program is performing scanning, it shows the message on the screen.

	_ 2	
ny Rx(Mbps)		

υ,

3. When the searching finishes, the connected devices will be displayed on the list.



Ultra NetBridge Uti Main Device History	About					
Local Device :						_
Device Name	Network ID	MAC Address	IP Addres	s Locatio	n	-
3400 ori	Electric-Connect	0004DB017880	192.168.1	1.56 Hewph	ew	- -
3 Powerline Devices	s detected					
Device Name	Network ID	Phy Tx(Mbps)	Phy Rx(Mbps)	MAC Address	Location	
Device 2	Electric-Connect	104 Mbps	165 Mbps	0004DB015A65		
Device 1	Electric-Connect	174 Mbps	192 Mbps	0004DB017469		
Rename Device	Specify Location Configu	re Device			Se	arch Device(s)
						Close

4. Select the device you want to configure and click the "Configure Device" button or double click the device to enter the configuration dialog.

0004DB016FC2 Configuration	x
Network Security Advanced	
IP Address Settings	
IP Configuration : Fixed	
IP Address : 192.168.1.77	
Subnet Mask : 255.255.255.0	Update
Default Gateway IP Address : 192.168.1.8	Refresh
Network ID Settings Electric-Connect (default: Electric-Connect)	
	Close



- 5. You are able to change the IP configuration of the individual NetBridge[™]. The default IP configuration is "Fixed" and the IP Address were set to "0.0.0.0". The IP Address will be set when you want to use the web based configuration from a web browser or you'd like to ping the NetBridge[™] from other device in the network. Select "DHCP" option to get an IP address assigned by an available DHCP server in the network. Select 'Fixed' option and fill in the values to all the text boxes then press the "Update" button to take effect.
- 6. Read more information about other configuration from the *Ultra NetBridge Utility User Guide* installed along with the software.



7. Web Configuration

The AIA1801-200-04 UltraSpeed[™] NetBridge[™] provides Web based configuration by your PC Web browser, such as Microsoft Internet Explorer. This approach can be adopted in any MS Windows, Mac or UNIX based platforms. You can configure the NetBridge[™]'s IP address using the Ultra Netbridge[™] Utility before they use the Web Configuration

7.1. Start-up and Log in

Activate your browser, enter the IP address of NetBridge[™] in the Location (for Netscape) or Address (for IE) field and press ENTER. For example: http://192.168.1.176.

After the connection is established, you will see the web user interface of NetBridgeTM. At the **Password** filed, enter the password (the factory default value is **admin**) and then click **Log in**.



Figure 4.1.1 User Main Menu

If the password is correct, the web appearance will be changed as shown in Figure 3.1.2. As listed in its **Connection Info** page, there are several options for system administration.



AIA1801-200-04 - Windows Internet	ernet Explorer							
☆ Ø AIA1801-200-04				• 🖻 🖶 • 📴• 🖉• 🗇• 🞯•				
AIA1801-200-04 Industrial Ethernet NetBridge Configuration Version 1.0								
Admin Main Menu	General Information							
Connection Info Configuration Change Password Firmware Upgrade	MAC Address		IP Address					
	0004DB017880		192.168.1.127					
Factory Reset Reboot	Available Connections							
Log out	Direct Connections:							
	MAC Address	Phy Tx Throughput	Phy Rx Throughput	Network Id				
	0004DB017469	99 Mbps	123 Mbps	Electric-Connect				

Figure 4.1.2 Connection Info Page

7.2. Connection Info

The Connection Info page displays basic Information about the NetBridgeTM

- 1. General Information: MAC and IP addresses and the number of boots.
- 2. Available Connections: Display the list of all NetBridgeTM devices discovered on the current logical power line or coax networks and the connectivity status.



7.3. Configuration

The Configuration page displays the current settings of the NetBridge[™] including Security, Network, VLAN, QoS, System Information.



Figure 4.3 Connection Info Page



7.3.1.Security Page

The Security page enables you to modify the Network Identifier, Encryption Key and the Mac mode. displays the current settings of the NetBridgeTM including Security, Network, VLAN, QoS and System Information.

CATA1801-200-04 - Windows Internet Explorer							
🚱 💽 🗢 🙋 http://192.168.1.127/		💌 🛃 🐓 🗙 🔎 Web Search	P -				
🙀 🔏 AIA 1801-200-04		🏠 • 🔂 - 🖻 🖶 •	⊡•• Ø• @• @• *				
AIA1801-200-04 Industrial Ethernet NetBridge Configuration Version 1.0							
Admin Main Menu	Security Configuration						
Connection Info Configuration • Security • Network Change Password Firmware Upgrade Factory Reset Reboot	Item Network Identifier Encryption Key Save Cancel MAC Node Save Cancel	Settings Electric-Connect Disabled					

Figure 4.3.1 Security Page



7.3.2.Network Page

The Network page enables you to modify the network settings of the NetBridgeTM.



Figure 4.3.2 Network Page



7.4. Change Password

You can change the administration password for the NetBridgeTM in the Change Password page.



Figure 4.4 Change Password Page



7.5. Firmware Upgrade

You can upgrade the firmware for the NetBridge[™] in the Firmware Upgrade page.



Figure 4.5 Firmware Upgrade Page



7.6. Factory Reset

You can reset the NetBridge[™] to the factory default settings from the Factory Reset page.



Figure 4.6 Factory Reset Page



7.7. Reboot

You can reboot the NetBridge[™] remotely from the Reboot page.

C AIA1801-200-04 - Windows Interne	et Explorer	X	😰 😔 🗙 🔎 Web Search	×				
🙀 🌈 AIA1801-200-04			🟠 • 🖾 - 🖾 🖶 •	· 🗗 • Ø• @• @• *				
AIA1801-200-04 Industrial Ethernet NetBridge Configuration Version 1.0								
Admin Main Menu	Reboot							
Connection Info Configuration Change Password Firmware Upgrade Factory Reset Reboot	Item Hardware Reboot	Reboot	Settings					

Figure 3.7 Reboot Page

8. Default Settings

Administration Password: admin

IP Address: 0.0.0.0

Network Identifier: Electric-Connect

Mac Node: Client