

# **ioLogik R2110 User's Manual**

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# ioLogik R2110 User's Manual

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## Introduction

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The ioLogik R2110 is a stand-alone remote digital I/O server that can connect sensors for automation applications over an RS-485 connection.

The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **Optional Liquid Crystal Display Module (LCM)**
- ❑ **Product Features**
- ❑ **Packing List**
- ❑ **Specifications**
- ❑ **Physical Dimensions**
  - Without LCM
  - With Optional LCM
- ❑ **LED Indicators**
- ❑ **Hardware Reference**
- ❑ **Pin Assignments**
  - System Bus
  - TB1 and TB2 (Power Input & RS-485 Connector)
  - TB3 (Digital Input and Output Terminal)

# Overview



(shown with and without optional LCM)

The ioLogik R2110 is a member of the R2000 series of remote I/O servers, which are designed to link sensors, transmitters, transducers, and valves to an RS-485 network.

The ioLogik R2110 can be attached to an ioLogik E2000 series server so I/O points can be accessed from within a single IP environment. One ioLogik E2000 series server can connect up to 31 ioLogik R2000 series servers.

## Optional Liquid Crystal Display Module (LCM)

The ioLogik R2110 supports an optional hot-pluggable liquid crystal display module (LCM) for field management and configuration. The module can be used for on-site configuration or monitoring, and works with any ioLogik E or R series product.

## Product Features

- 12 channels of 24 VDC digital input (DI) with event counter mode and software selectable filtering time
- 8 channels of 24 VDC digital output (DO) with pulse output mode and software selectable pulse width
- Multi-functional I/O supporting DI, event counter, DO, and pulse output
- Supports Modbus/RTU for control by SCADA software, including Wonderware InTouch and GE Intellution iFix32
- Optional LCD module for status display and configuration
- Remote firmware updates via RS-485
- Monitoring and configuration with ioAdmin Windows utility
- Hardware detection over RS-485 with ioAdmin
- MXIO DLL library for I/O status over RS-485
- Built-in watchdog timer with configurable safe I/O channel settings
- Configurable power-on status for output channels
- OHS compliant

# Packing List

The ioLogik R2110 is shipped with the following items:

## *Standard Accessories*

- ioLogik R2110 RS-485 I/O server
- Document & Software CD

## *Optional Accessories*

- LDP1602 ioLogik liquid crystal display module (LCM)

NOTE: Please notify your sales representative if any of the above items are missing or damaged.

# Specifications

## **Serial**

|                        |                                      |
|------------------------|--------------------------------------|
| Interface              | 2-wire RS-485 with Data+, Data-, GND |
| Serial Line Protection | 15 KV ESD for all signals            |

## **Serial Communication Parameters**

|                   |                    |
|-------------------|--------------------|
| Baudrates         | 1200 to 115200 bps |
| Direction Control | Built-in ADDCTM    |
| Parity            | None               |
| Data Bits         | 8                  |
| Stop Bits         | 1                  |
| Flow Control      | None               |
| Speed             | 1200 to 115200 bps |
| Protocol          | Modbus/RTU         |

## **Digital Input**

|                    |                                                             |
|--------------------|-------------------------------------------------------------|
| Channels           | 12 fixed points, source type                                |
| DI COM Power Input | 24 VDC nominal, up to 36 VDC                                |
| Modes              | DI or Event Counter (up to 50 Hz)                           |
| Dry contact        | Logic 0: close to GND<br>Logic 1: open                      |
| Wet contact        | Logic 0: 0 to 3 VDC<br>Logic 1: 10 to 30 VDC (DI COM to DI) |
| Common Type        | 12 points/1 COM                                             |
| Isolation          | 3000 VDC/2000 Vrms                                          |
| Protection         | +36 VDC over voltage protection                             |

## **Digital Output**

|                       |                                                                                                                |
|-----------------------|----------------------------------------------------------------------------------------------------------------|
| Channels              | 8 fixed points, sink type                                                                                      |
| Modes                 | DO or Pulse Output (up to 50 Hz)                                                                               |
| DO Power Input        | 24 VDC nominal, up to 30V                                                                                      |
| Output Current Rating | 200 mA max. per channel                                                                                        |
| Optical Isolation     | 3000 VDC / 2000 Vrms                                                                                           |
| Protection            | 170°C min. over temperature shutdown<br>+36 VDC over voltage protection<br>750 mA over current limit (typical) |

## **System Power Input**

|                   |                                   |
|-------------------|-----------------------------------|
| Power Input       | 24 VDC nominal, 12 to 48 VDC      |
| Power Consumption | 4.68W @24 VDC                     |
| Ground Connection | DIN-rail and wall mounting plates |

**Environmental**

|                       |                                        |
|-----------------------|----------------------------------------|
| Operating Temperature | -10 to 60°C (14 to 140°F), 5 to 95%RH  |
| Storage Temperature   | -40 to 85°C (-4 to 185°F), 5 to 95% RH |
| Altitude              | Up to 2000 m                           |

**Note:** Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

|           |                      |
|-----------|----------------------|
| Shock     | IEC60068-2-27        |
| Freefall  | IEC60068-2-32        |
| Vibration | IEC60068-2-6         |
| MTBF      | > 200,000 hrs @ 25°C |

**Agency Approvals**

|     |                                                                                                                                                                                                                                                                                                                  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC | FCC Part 15, CISPR (EN 55022) Class A<br>CE-IEC61000-4-2 (ESD), Level 2/3<br>CE-IEC61000-4-3 (RS), Level 2<br>CE-IEC61000-4-4 (EFT), Level 2<br>CE-IEC61000-4-5 (Surge), Level 3<br>CE-IEC61000-4-6 (CS), Level 2<br>CE-IEC61000-4-8 (PM), Level 1<br>CE-IEC61000-4-11 (Dip)<br>CE-EN61000-6-2<br>CE-EN61000-6-4 |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|        |        |
|--------|--------|
| Safety | UL 508 |
|--------|--------|

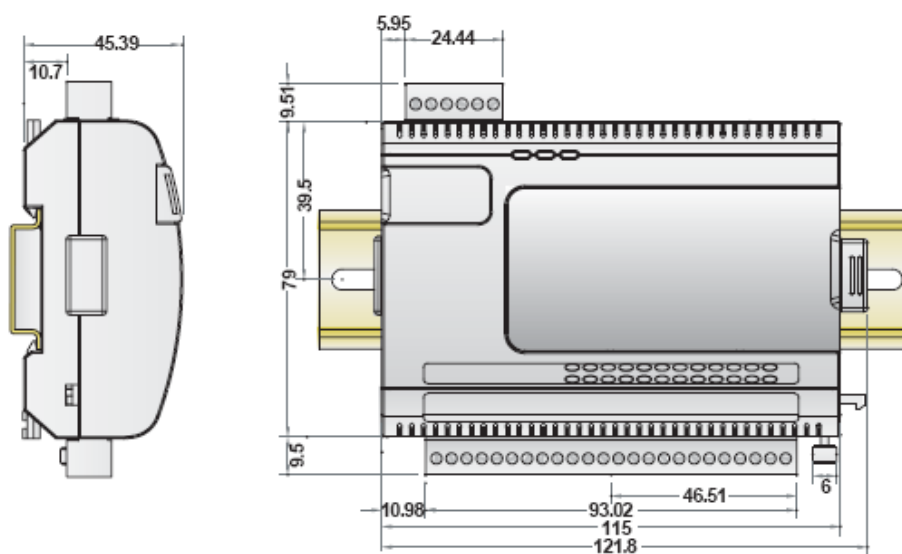
|                 |         |
|-----------------|---------|
| <b>Warranty</b> | 5 years |
|-----------------|---------|

**Accessories**

|                                     |                                                                                                                |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Liquid Crystal Display Module (LCM) | Hot-pluggable attachment for IP display, DI/DO status<br>16×2 character display<br>Backlit screen<br>5 buttons |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------|

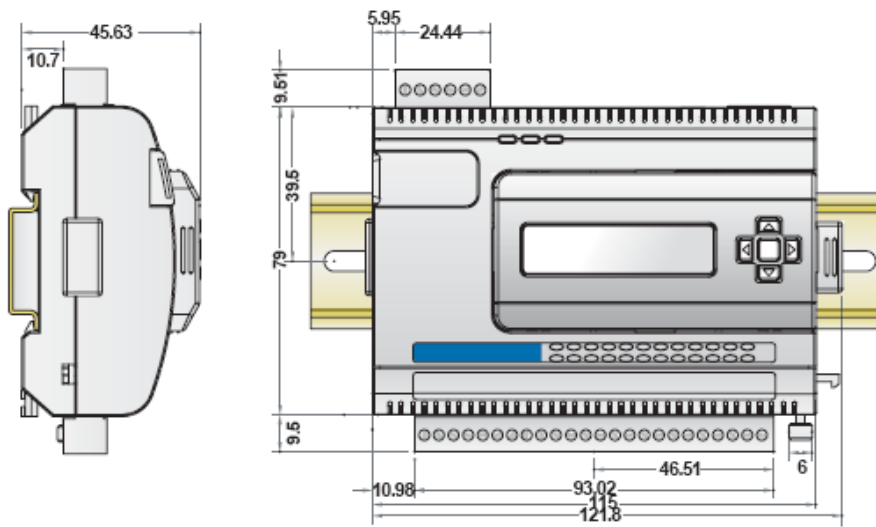
## Physical Dimensions

### Without LCM

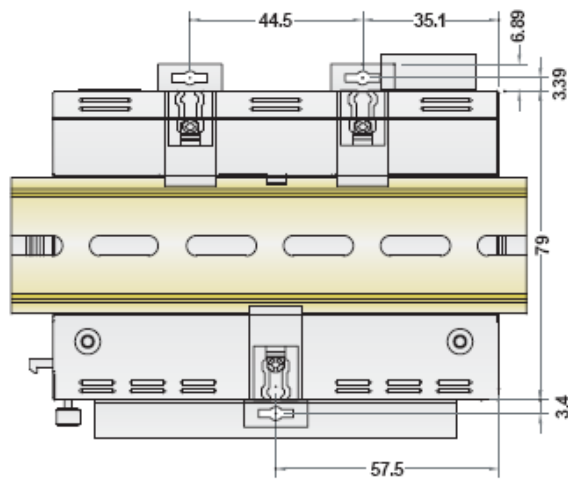


Unit=mm

## With Optional LCM



Unit=mm



Unit=mm

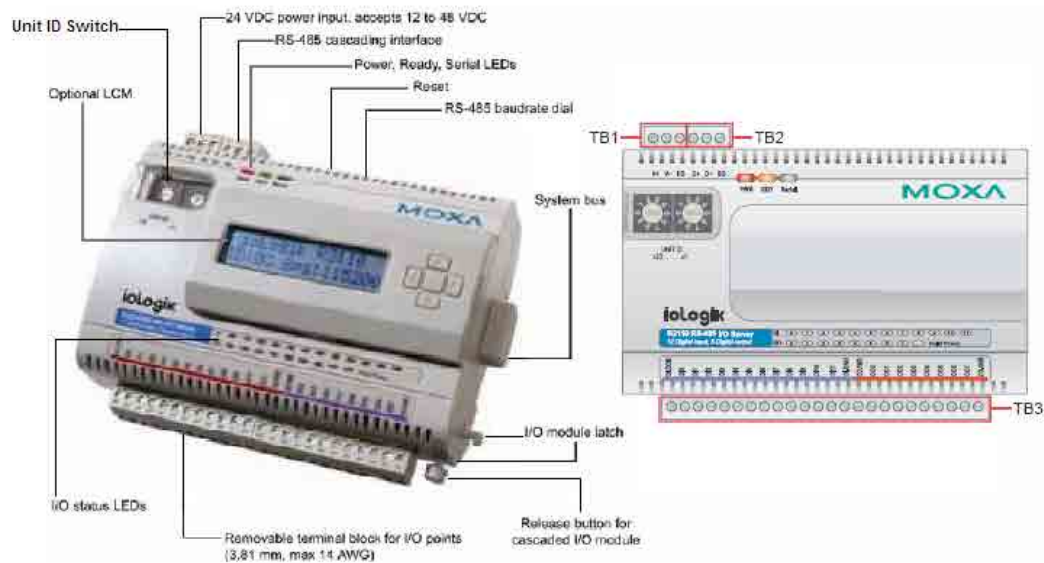
## LED Indicators

| System LEDs |                        |                                            |
|-------------|------------------------|--------------------------------------------|
| PWR         | red                    | Power is on                                |
|             | off                    | Power is off                               |
| RDY         | red                    | System error                               |
|             | green (steady)         | ioLogik is functioning normally            |
|             | green & red (flashing) | ioLogik is in Safe Status                  |
|             | off                    | Power is off or there is a power problem   |
| Serial      | (flashing)             | Serial port is receiving/transmitting data |

| I/O LEDs          |       |                |
|-------------------|-------|----------------|
| DI × 12<br>DO × 8 | green | ON status      |
|                   | off   | OFF status     |
| DO PWR            | red   | Field power in |
|                   | off   | No power in    |

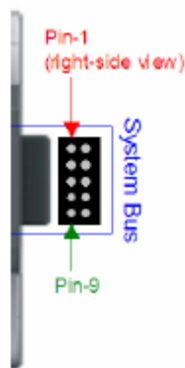
# Hardware Reference



**NOTE** The reset button restarts the server and resets all settings to factory default. Use a pointed object such as a straightened paper clip to hold the reset button down for 5 sec. The RDY LED will turn red as you are holding the reset button down. The factory defaults will be loaded once the RDY LED turns green again. You may then release the reset button.

## Pin Assignments

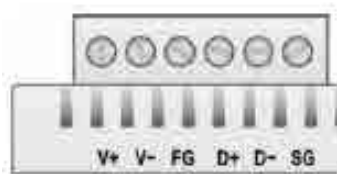
### System Bus



| Pin    | 1  | 2  | 3  | 4  | 5  |
|--------|----|----|----|----|----|
| Signal | V+ | V- | V+ | V- | NC |

| Pin    | 6  | 7     | 8    | 9     | 10  |
|--------|----|-------|------|-------|-----|
| Signal | NC | Data+ | SYNC | Data- | GND |

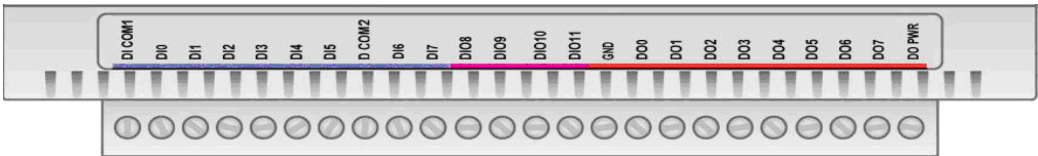
### TB1 and TB2 (Power Input & RS-485 Connector)



|        | TB1 (Power Input) |    |    | TB2 (RS-485) |    |    |
|--------|-------------------|----|----|--------------|----|----|
| Pin    | 1                 | 2  | 3  | 4            | 5  | 6  |
| Signal | V+                | V- | FG | D+           | D- | SG |

NOTE: FG is Frame Ground, SG is Signal Ground

**TB3 (Digital Input and Output Terminal)**



|               |        |     |     |     |     |     |     |     |     |
|---------------|--------|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Pin</b>    | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
| <b>Signal</b> | DI COM | DI0 | DI1 | DI2 | DI3 | DI4 | DI5 | DI6 | DI7 |

|               |     |     |      |      |        |        |     |     |     |
|---------------|-----|-----|------|------|--------|--------|-----|-----|-----|
| <b>Pin</b>    | 10  | 11  | 12   | 13   | 14     | 15     | 16  | 17  | 18  |
| <b>Signal</b> | DI8 | DI9 | DI10 | DI11 | DI GND | DO PWR | DO0 | DO1 | DO2 |

|               |     |     |     |     |     |        |
|---------------|-----|-----|-----|-----|-----|--------|
| <b>Pin</b>    | 19  | 20  | 21  | 22  | 23  | 24     |
| <b>Signal</b> | DO3 | DO4 | DO5 | DO6 | DO7 | DO GND |

This chapter describes how to install the ioLogik R2110.

The following topics are covered in this chapter:

### **❑ Hardware Installation**

- Connecting the Power
- Grounding the ioLogik R2110
- Connecting to Digital Sensors and Devices
- Setting the RS-485 Baudrate
- Modbus/RTU Devices

### **❑ Software Installation**

# Hardware Installation

## Connecting the Power

Connect the 12 to 48 VDC power line to the ioLogik R2110's terminal block (TB1). If power is properly supplied, the power LED will glow a solid red color until the system is ready



### ATTENTION

**Disconnect the power before installing and wiring.**

Disconnect the power cord before installing and/or wiring your ioLogik R2110.

**To protect your system, power up the ioLogik first, then the sensors.**

When powering down, shut off power to the sensors first, then the ioLogik.

**Do not exceed the maximum current for the wiring.**

Determine the maximum possible current for each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

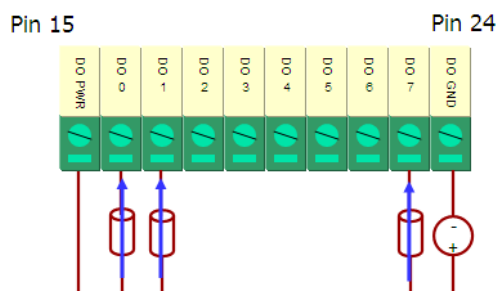
If the current exceeds the maximum rating, the wiring could overheat, causing serious damage to your equipment.

## Grounding the ioLogik R2110

The ioLogik R2110 is equipped with two grounding points, one on the back wall-mounting plate and the other on the DIN-rail attachment.

## Connecting to Digital Sensors and Devices

### Digital Output



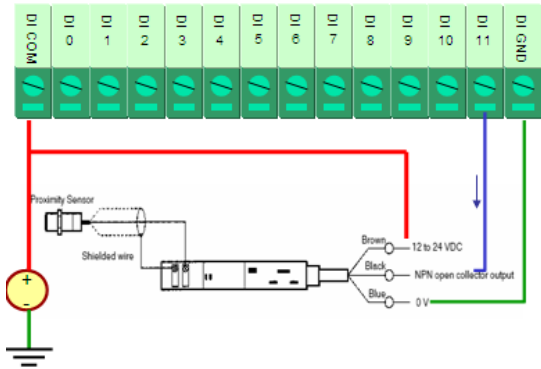
### Digital Input, Dry Contact



Digital Input, Wet Contact



Digital Input, Example



Setting the RS-485 Baudrate

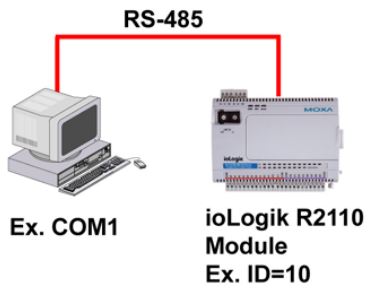
The RS-485 port is used to communicate with other RS-485 devices or to link to another ioLogik RS-485 I/O server. The RS-485 port can run Modbus/RTU or I/O command sets. The baudrate is set by a physical dial on the back of the ioLogik R2110. The default settings are baudrate = 115200, parity check = N, data bits = 8, and stop bit = 1.

|                                                                                     |                                                 |                                                                                                             |
|-------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|  | Baudrate for RS-485<br>(parameters are N, 8, 1) | Dial setting and corresponding baudrate:<br>0:115200 1:57600 2:38400 3:19200<br>4:9600 5:4800 6:2400 7:1200 |
|-------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------|

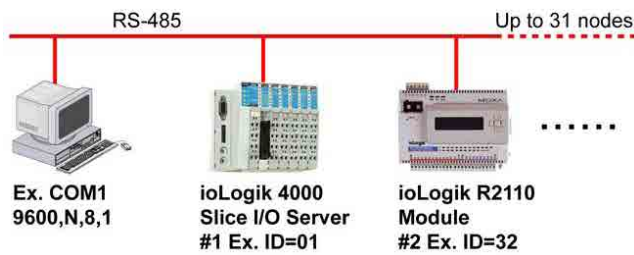
Modbus/RTU Devices

The RS-485 port runs Modbus/RTU and can connect to any Modbus device. You may use different methods to connect different combinations of ioLogik R2000 servers and other Modbus devices. Some examples are shown below:

Connecting One Modbus/RTU Device



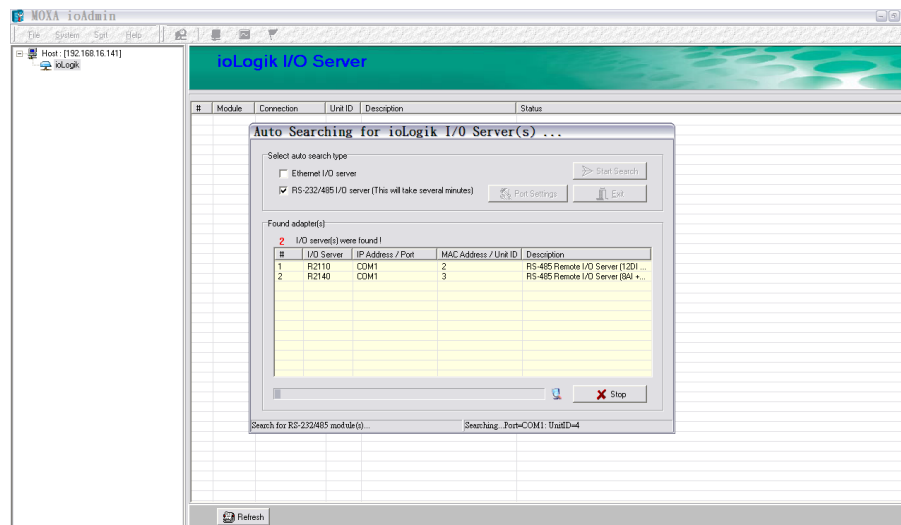
## Connecting Multiple Modbus/RTU Devices



## Software Installation

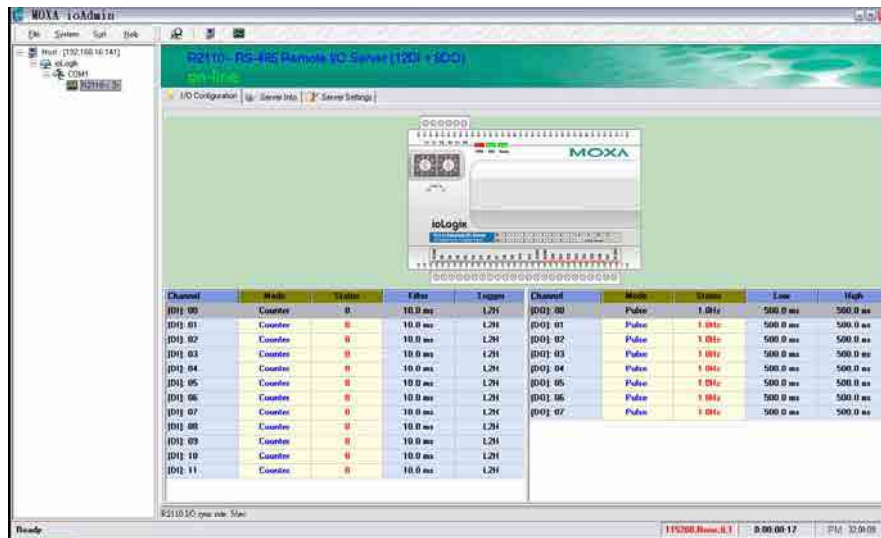
ioAdmin is a Windows utility that can connect to the ioLogik R2110 for configuration and management. The ioLogik R2110 may also be configured through the optional LCM.

1. **Install from the Document and Software CD:** Insert the Document and Software CD into the host computer. In the root directory of the CD, locate and run SETUP.EXE. The installation program will guide you through the installation process and install the ioAdmin utility. You can also install the MXIO DLL library or ioEventLog separately.
2. **Open ioAdmin:** After installation is finished, run ioAdmin from **Start → Program Files → MOXA → IO Server → Utility → ioAdmin**.
3. **Search for the server:** On the menu bar, select **System → Auto Scan Remote I/O Server**. In the dialog window, select **RS-232/485 I/O server** and click **Start Search**.



If ioAdmin is unable to find the ioLogik R2110, there may be a problem with your COM port settings. Click **Port Settings** to view or modify the settings.

4. **Monitor I/O status:** Once the unit is found by ioAdmin, you may view the status of all attached I/O devices on ioAdmin's main screen.



You may now use ioAdmin to setup or configure the unit.

## Using ioAdmin

---

This chapter goes over the functions available in ioAdmin, the ioLogik R2110's main configuration and management utility.

The following topics are covered in this chapter:

❑ **Introduction to ioAdmin**

- Searching for the Unit

❑ **ioAdmin Main Screen**

- Main Screen Overview
- Wiring Guide

❑ **Menu Items**

- File
- System
- Sort
- Help
- Quick Links

❑ **Main Window**

- I/O Configuration Tab (General)
- Server Info Tab
- Server Settings Tab (General)

❑ **ioAdmin Administrator Functions**

- I/O Configuration Tab (Administrator)
- Server Settings Tab (Administrator)
- Firmware Update Tab
- Watchdog Tab
- Server Context Menu

# Introduction to ioAdmin

The ioLogik I/O server may be managed and configured over the Ethernet by ioAdmin, a Windows utility provided with your ioLogik R2110. ioAdmin's graphical user interface gives you easy access to all status information and settings.

The ioLogik R2110 also supports configuration by web console and by optional LCM, but full configuration and management is only available through ioAdmin.

ioAdmin also includes Click&Go logic control for the configuration of your Active Ethernet I/O system.

ioAdmin consists of following software:

- **ioAdmin with Click&Go Logic**
- **ioLogik 2000 Wiring Guide**
- **ioLogik 4000 Wiring Guide**

## Features of ioAdmin

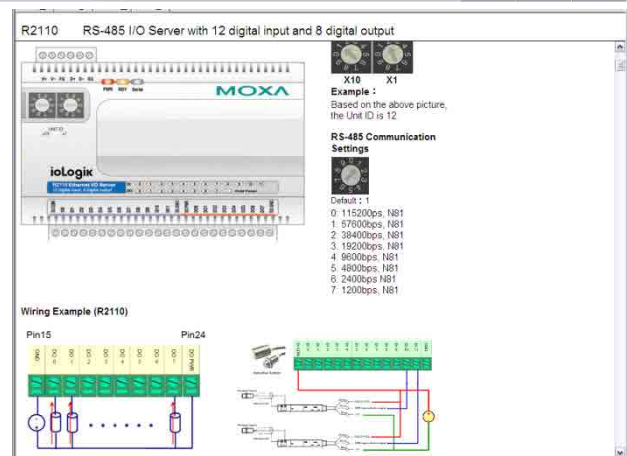
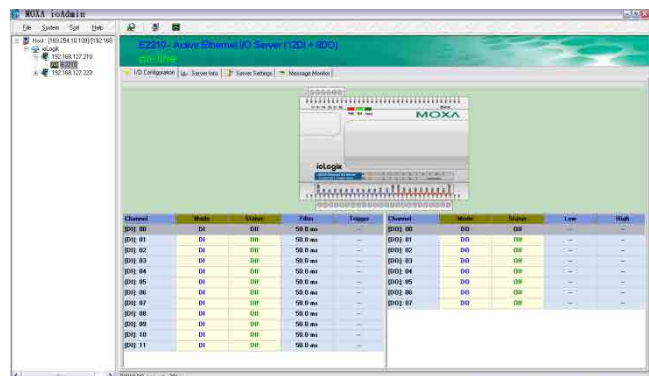
### Remote Management

Over the RS-485 network, ioAdmin allows users to

- find and configure multiple ioLogik servers
- monitor and configure attached I/O devices
- test I/O devices
- reset the server

### On-line Wiring Guide

An on-line wiring guide can be opened from within ioAdmin for your convenience. The easily accessible wiring guide can save administrators much time while planning or troubleshooting.



## Configuration File

ioAdmin allows the entire configuration of the ioLogik R2110 to be saved as a file. The file is viewable as text and can serve three purposes:

- as a record or backup of configuration
- as a template for the configuration of other servers
- as a quick reference guide for you to configure Modbus drivers in a SCADA system

The file includes the following information:

- file name, date, and time
- model information
- Modbus addresses

## Server Management List

ioAdmin can import and export a list of ioLogik servers that are being managed. This file can make it easier to manage all devices on the network, and includes the following information:

- server name
- module type
- IP address
- unit ID

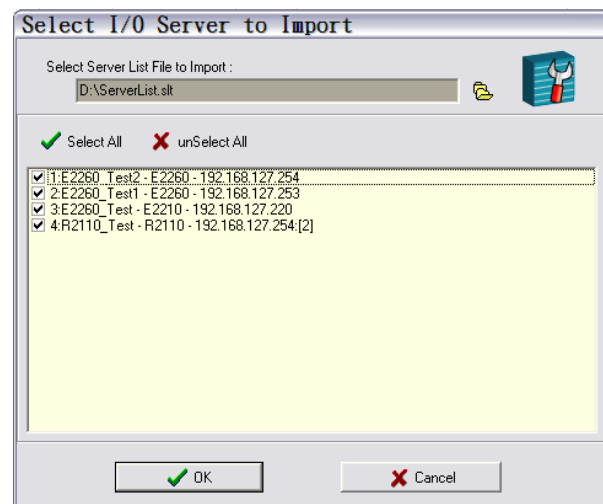
```
ioLogik R2110 Remote I/O Server Configuration
=====
Date: 2007/11/16
Time: 下午 02:59:31
Firmware: V1.2 Build07052213

[1. Model]
-----
MOD_TYPE=R2110 - RS-485 Remote I/O Server (12DI + 8DO)
MOD_LOC=
MOD_NAME=

[2. I/O Configurations]
-----
DI00=0,(DI),          DI00_FILTER=1,(0.50ms)
DI01=0,(DI),          DI01_FILTER=1,(0.50ms)
DI02=0,(DI),          DI02_FILTER=1,(0.50ms)
DI03=0,(DI),          DI03_FILTER=1,(0.50ms)
DI04=0,(DI),          DI04_FILTER=1,(0.50ms)
DI05=0,(DI),          DI05_FILTER=1,(0.50ms)
DI06=0,(DI),          DI06_FILTER=1,(0.50ms)
DI07=0,(DI),          DI07_FILTER=1,(0.50ms)
DI08=0,(DI),          DI08_FILTER=1,(0.50ms)
DI09=0,(DI),          DI09_FILTER=1,(0.50ms)
DI10=0,(DI),          DI10_FILTER=1,(0.50ms)
DI11=0,(DI),          DI11_FILTER=1,(0.50ms)

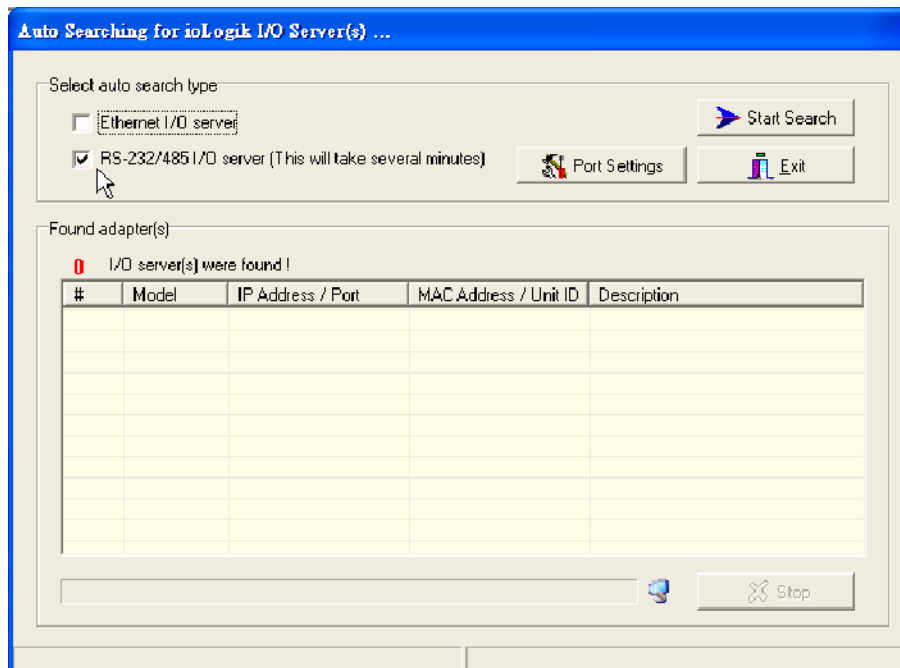
DO00=0,(DO),          DO00_PWN=0,(OFF),      DO00_SAFE=0,(OFF)
DO01=0,(DO),          DO01_PWN=0,(OFF),      DO01_SAFE=0,(OFF)
DO02=0,(DO),          DO02_PWN=0,(OFF),      DO02_SAFE=0,(OFF)
DO03=0,(DO),          DO03_PWN=0,(OFF),      DO03_SAFE=0,(OFF)
DO04=0,(DO),          DO04_PWN=0,(OFF),      DO04_SAFE=0,(OFF)
DO05=0,(DO),          DO05_PWN=0,(OFF),      DO05_SAFE=0,(OFF)
DO06=0,(DO),          DO06_PWN=0,(OFF),      DO06_SAFE=0,(OFF)
DO07=0,(DO),          DO07_PWN=0,(OFF),      DO07_SAFE=0,(OFF)

[3. Modbus address table]
-----
```

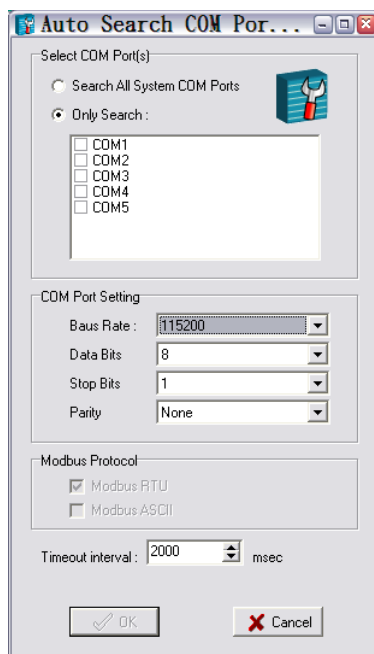


## Searching for the Unit

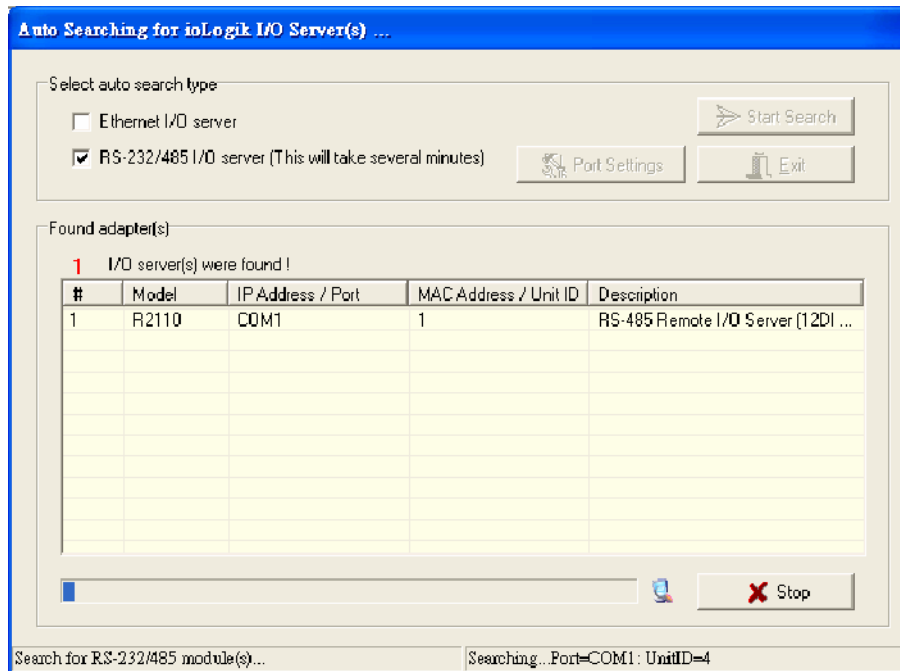
After opening ioAdmin, you will need to find your unit over the RS-485 connection. From the pull-down menu, choose **System - Auto Scan Remote I/O Server**.



Select **RS-232/485 I/O server** and click **Port Settings** to set/verify the serial port settings.



When you click **Start Search**, ioAdmin will begin searching up to 99 ports for your ioLogik unit. The timeout interval is for RS-485 communication and defaults to 2000 ms. As soon as your ioLogik R2110 appears as shown below, you may click **Stop**. Otherwise, ioAdmin will continue to search all 99 ports.



### ATTENTION

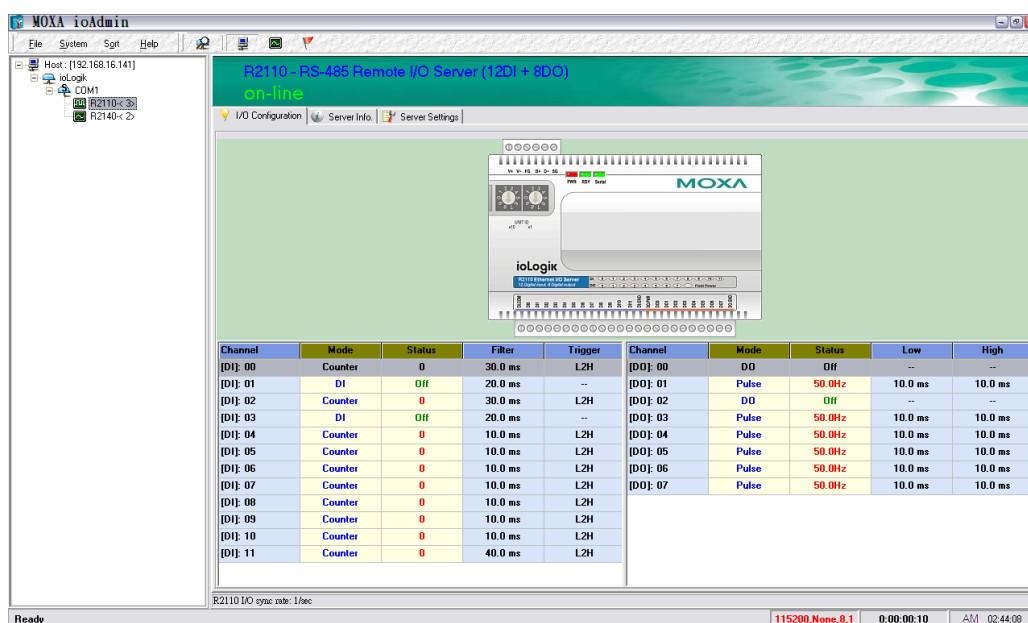
If ioAdmin is unable to find your ioLogik R2110, make sure that the baudrates match. Please refer to Chapter 2 for setting or viewing the baudrate.



### ATTENTION

Even if ioAdmin is unable to find your ioLogik R2110, you may still access the On-line Wiring Guide. Please refer to the On-line Wiring Guide section for details.

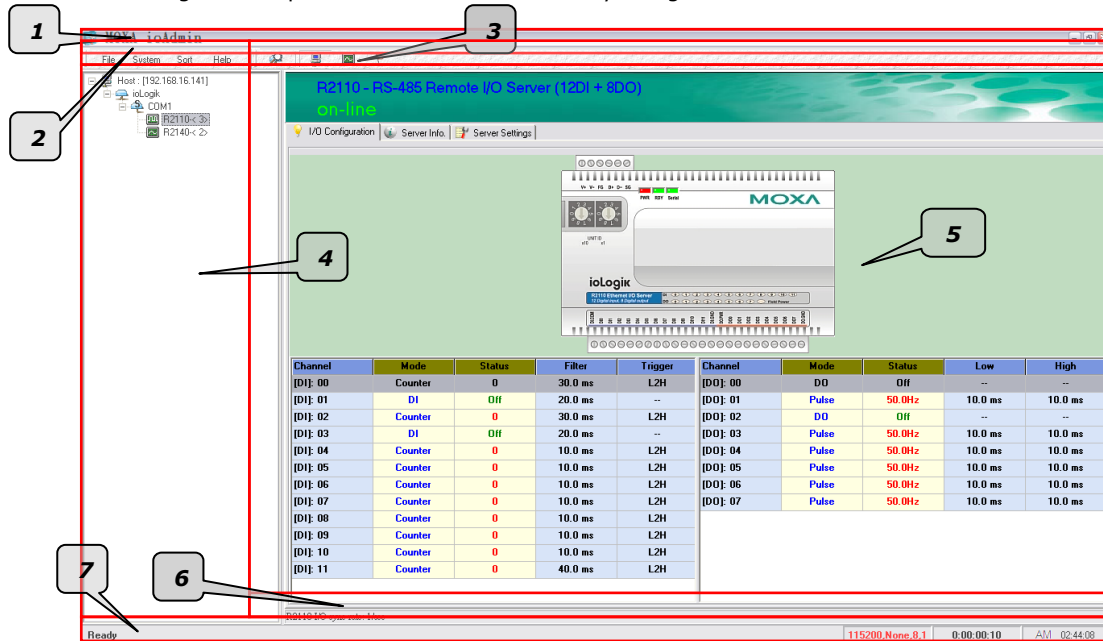
Once the ioLogik R2110 has been found by ioAdmin, you may monitor I/O status from the first tab of ioAdmin. You can also configure each DI and DO channel from this tab after first logging in under the Management tab.



# ioAdmin Main Screen

## Main Screen Overview

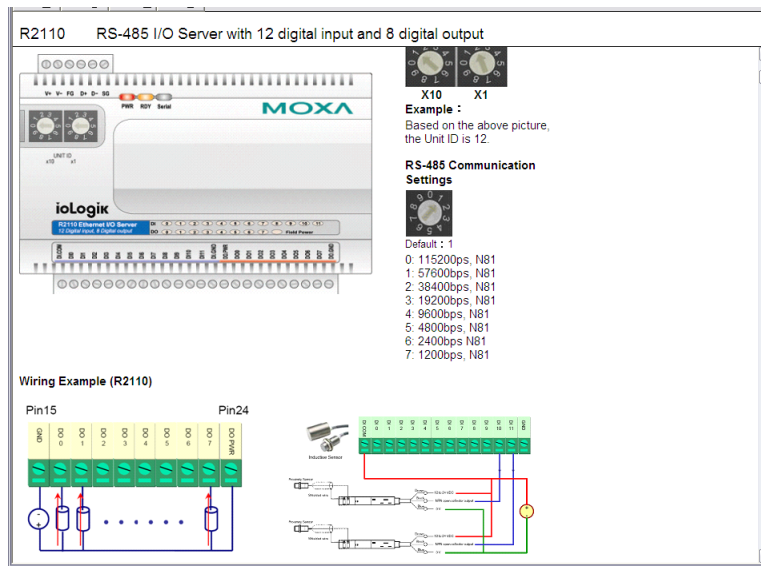
This is ioAdmin's main screen. The main window defaults to the I/O Configuration tab, which displays a graphic of the ioLogik R2110 and the status of every I/O channel below it. The other tabs in the main window take you to server and network settings, and further functions are available when you log on as an administrator. Note that configuration options are not available until you log on as an administrator.



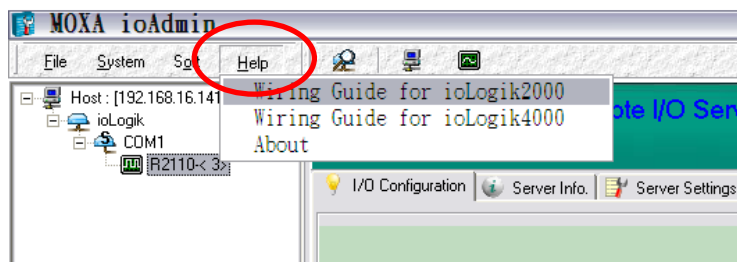
|                      |
|----------------------|
| 1. Title             |
| 2. Menu bar          |
| 3. Quick link        |
| 4. Navigation panel  |
| 5. Main window       |
| 6. Sync. rate status |
| 7. Status bar        |

## Wiring Guide

ioAdmin provides a wiring guide to the ioLogik R2110. You may access the wiring guide by right-clicking the graphic of the ioLogik R2110 in the I/O Configuration tab. Select "Wiring Guide" in the submenu to open a help file showing the wiring information and electrical characteristics of the ioLogik R2110.



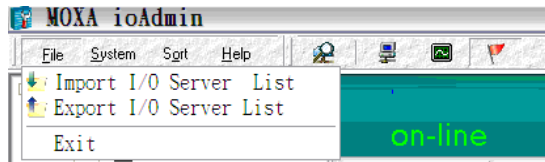
You may also access the On-line Wiring Guide through the Help menu on the menu bar.



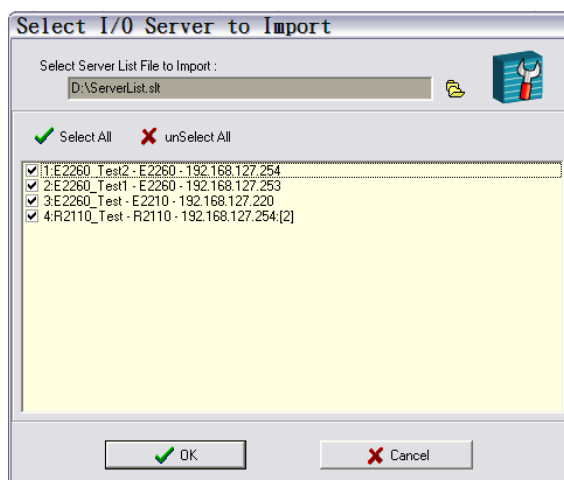
# Menu Items

## File

From the **File** menu, you can export the list of I/O servers that are currently displayed in the navigation panel. You also can import a list of I/O servers into ioAdmin.



When importing a server list, you will be prompted to select which servers on the list need to be imported.



The file will have a .SLT extension and can be opened as a text file. The server list will provide the following information for each server:

- server name
- module type
- IP address
- unit ID

## System

Several operations are possible from the **System** menu.

**Auto Scan Active Ethernet I/O Server** will search for ioLogik servers on the network. When connecting for the first time or recovering from a network disconnection, you can use this command to find I/O servers that are on the network.

**Network Interface** allows you to select a network to use, if the PC has multiple network adapters installed.

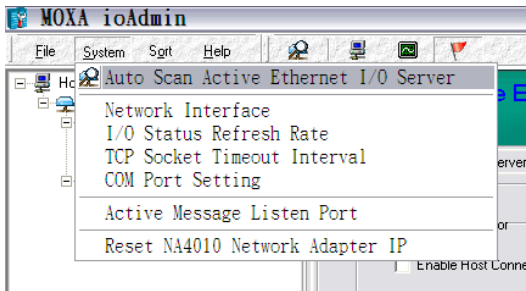
**I/O Status Refresh Rate** is used to adjust how often the I/O server is polled for device status. The current rate is displayed on the status bar at the bottom of the window. Note that higher sync rates result in higher loads on the network.

**TCP Socket Timeout Interval** allows you to select the preferred timeout value for TCP socket communication.

**COM Port Setting** is used to set the parameters for Modbus communication, such as baudrate, data bits, and timeout interval. For most applications, this will involve connecting to ioLogik R-Series devices.

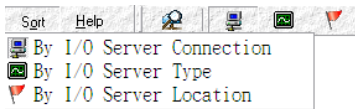
**Active Message Listen Port** specifies the port number to use for Active Ethernet I/O messages. If your network uses a firewall, you can coordinate this setting with your firewall settings to ensure that active messages get through.

**Reset NA4010 Network Adapter IP** is used to re-assign an IP address to the NA-4010 network adapter, for ioLogik 4000 systems.



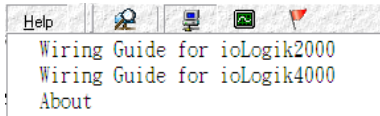
Sort

The **Sort** menu allows the server list in the navigation panel to be sorted by connection, type, and location.



Help

In the **Help** menu, you can view wiring guides and information about ioAdmin.



Quick Links

Quick links are provided to search for I/O servers on the network and sort the server list.

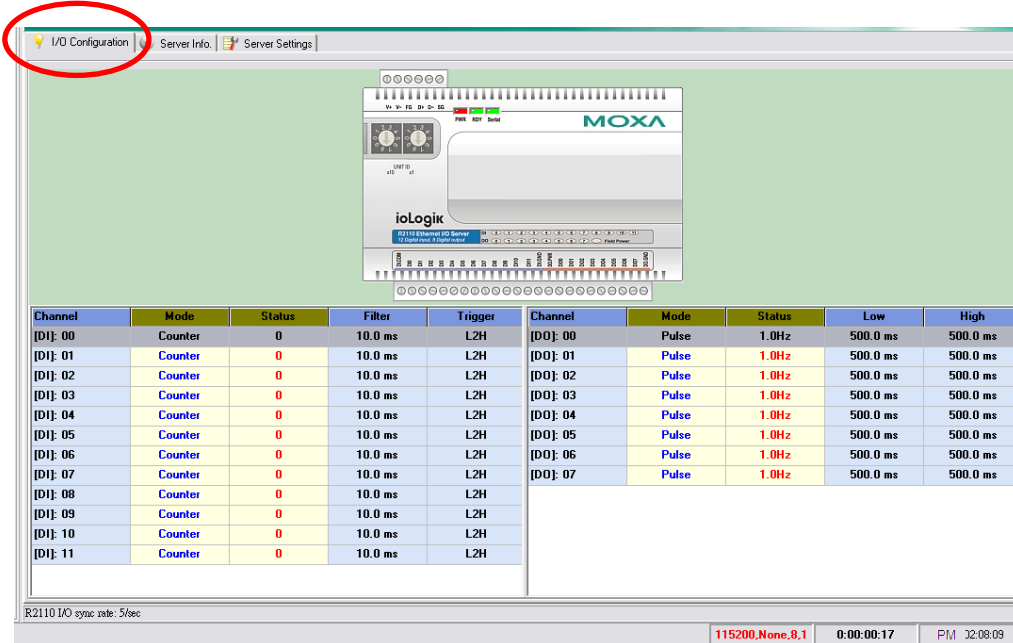


|                                                                                     |                                |
|-------------------------------------------------------------------------------------|--------------------------------|
|  | Search network for I/O servers |
|  | Sort by connection             |
|  | Sort by I/O server type        |
|  | Sort by location               |

# Main Window

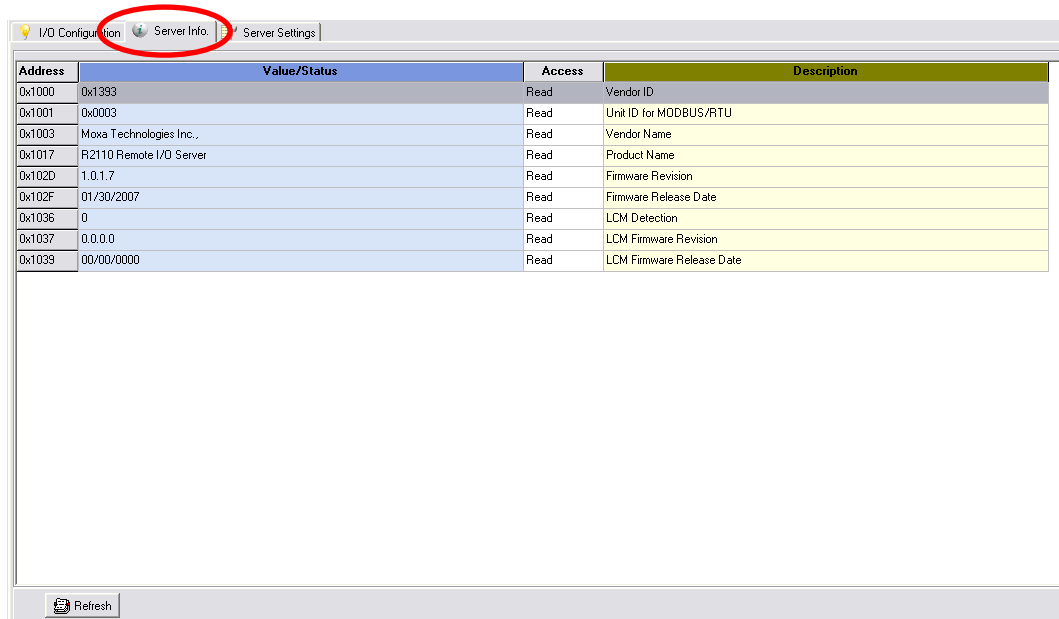
## I/O Configuration Tab (General)

The **I/O Configuration** tab shows the status of every I/O channel. This is the default tab when you first open ioAdmin.



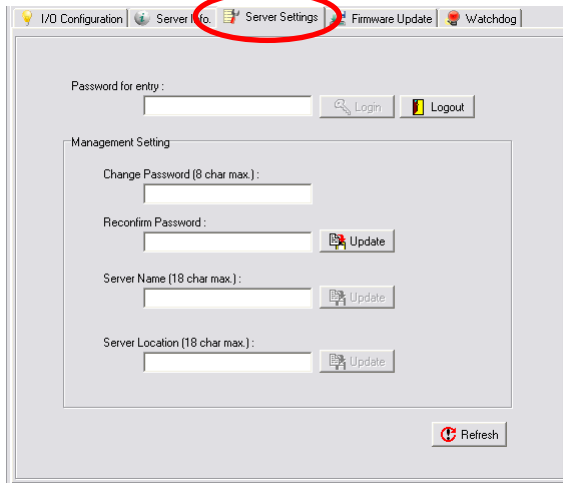
## Server Info Tab

The **Server Information** tab provides the Modbus addresses for all system configurations. This helps you verify the access authority of each address. The screen also displays a clear explanation of each item.



## Server Settings Tab (General)

The **Server Settings** tab is where you log in as an administrator. This is required in order to gain access to the ioLogik R2110 configuration options. If no administrator password has been set up, simply click on **Login** and leave the **Password for entry** field blank. Additional information on ioAdmin administrator functions is provided later in this chapter.



## ioAdmin Administrator Functions

For full access to all configuration options, log in as an administrator in the Server Settings tab. This is required whenever you start up ioAdmin or boot up/restart the ioLogik R2110. When you install the ioLogik R2110 for the first time, the password will be blank and you may simply click on **Login**. Additional tabs and functions will be available after logging in.

When making configuration changes, you will need to click on **Update** or on **Apply** to save the changes. Some changes will require a restart of the ioLogik R2110 in order to take effect, and you will be given the option to restart the computer if necessary.

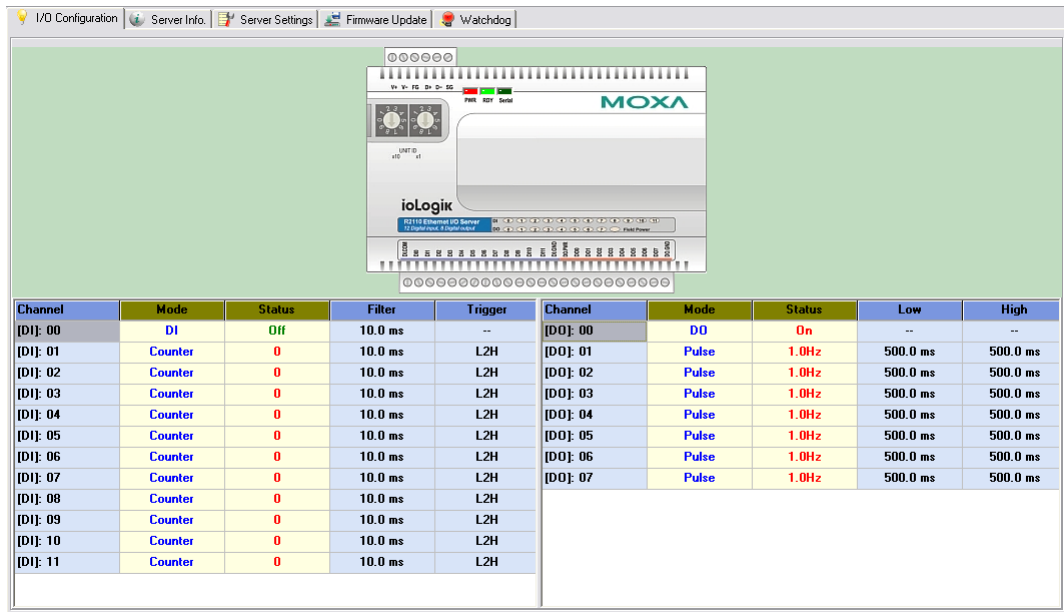


### ATTENTION

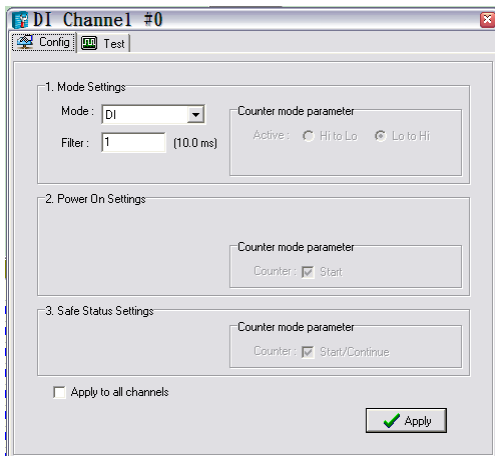
You **MUST** log in to access any administrator function, including Network, Communication Watchdog Timer, and Firmware Update tabs. If you forget the password, you may hold down the Reset button to clear the password and load factory defaults. **This will result in the loss of all configuration settings!**

# I/O Configuration Tab (Administrator)

When logged on as an administrator, you may double click on a channel in the **I/O Configuration** tab to configure that channel's settings.



## Configuring Digital Input Channels



The R2110 is equipped with 12 DI (digital input) channels that can be separately set to "DI" or "Event Counter Mode." In DI mode, the specifications are as follows:

| Type        | Logic 0 (OFF) | Logic 1 (ON) |
|-------------|---------------|--------------|
| Dry contact | close to GND  | open         |
| Wet contact | 0 to3 V       | 10 to 30 V   |

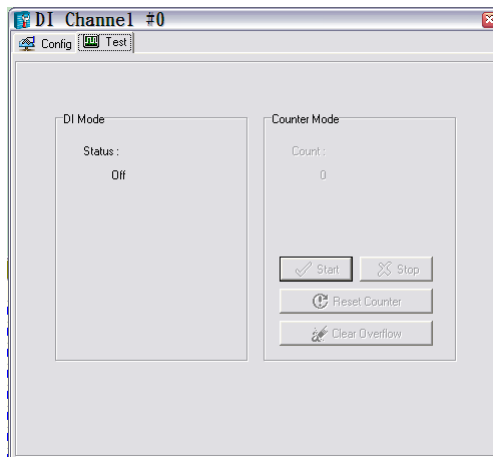
In Event Counter mode, the ioLogik's DI channel accepts limit or proximity switches and counts events according to the ON/OFF status. You may select from two modes, "Lo to Hi" or "Hi to Lo." When "Lo to Hi" is selected, the counter value increases while the switch is pushed. When "Hi to Lo" is selected, the counter value increases when the switch is push and released. The sampling rate of the counter is 50 Hz. This function is designed for low speed switching, not for motor control.

To eliminate the problem of bouncing with the switch, the ioLogik R2110 provides software filtering. It is configurable in multiples of 10 ms. For example, a setting of 2 would mean a 20 ms filter (2 × 10 ms). The maximum value allowed by the software filter is 65535. Setting the filter to "0" causes the system to filter all signals.

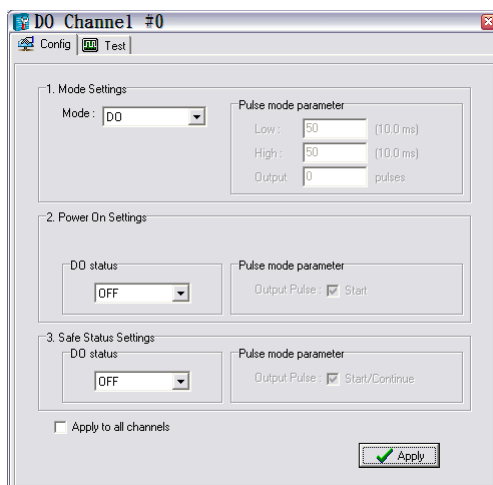
**Power On Settings:** For DI channels in Event Counter mode, you may configure whether or not counting begins at power up.

**Safe Status Settings:** For DI channels in Event Counter mode, you can configure whether or not counting starts or continues when Safe Status has been activated. When the network connection is lost as specified in the Host Connection Watchdog, the ioLogik R2110 will start or stop the counter according to the channel's Safe Status settings. Note that the Host Connection Watchdog is disabled by default, and must be enabled for Safe Status settings to have effect.

**Test I/O:** You can test DI channels in the **Test** tab. You may see how the status or counter value responds when the attached input device is manipulated.



## Configuring Digital Output Channels



The ioLogik R2110 is equipped with 8 DO (digital output or sink) channels that can be set individually to "DO" or "Pulse Output" mode. In DO mode, the specification is as follows.

| Type    | Logic 0 (OFF) | Logic 1 (ON) |
|---------|---------------|--------------|
| DO mode | Open          | Short        |

In Pulse Output mode, the selected digital output channel will generate a square wave as specified in the pulse mode parameters. The Low and High parameters are in multiples of 10.0 ms, with a maximum setting of 65535. To set the low level width for 500 ms, you would enter 50 (because  $50 \times 10 \text{ ms} = 500 \text{ ms}$ ). A setting of **100** for both Low and High would generate a square wave with a 2-second cycle. The **Output** parameter specifies the number of pulses to send. When set to **0**, the system will send pulses indefinitely.

**Power On Settings:** Use this field to set the initial status for the DO channel when the ioLogik is powered on.

**Safe Status Settings:** Use this field to specify how the DO channel responds to a break in network communication. When the network connection is lost as specified in the Host Connection Watchdog, the ioLogik R2110 will reset all channels according to their Safe Status settings. Note that the Host Connection Watchdog is disabled by default, and must be enabled for Safe Status settings to have effect.

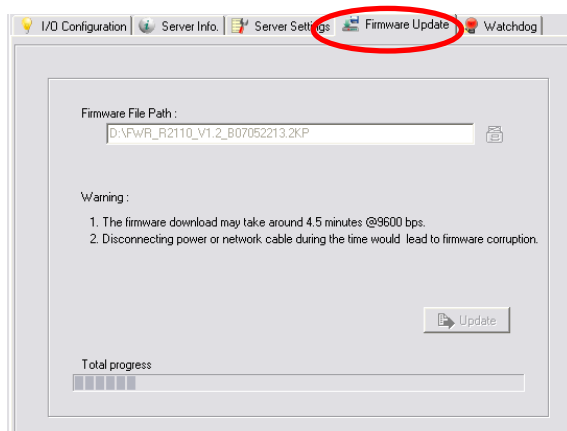
**Test I/O:** You can test the DO channel in the **Test** tab,

## Server Settings Tab (Administrator)

You may set up a password, server name, and location in the **Server Settings** tab.

## Firmware Update Tab

The ioLogik R2110 supports remote firmware updates through the **Firmware Update** tab. Enter the path to the firmware file or click on the icon to browse for the file. Click on **Update** to update the firmware. The wizard will lead you through the process until the server is restarted.



### ATTENTION

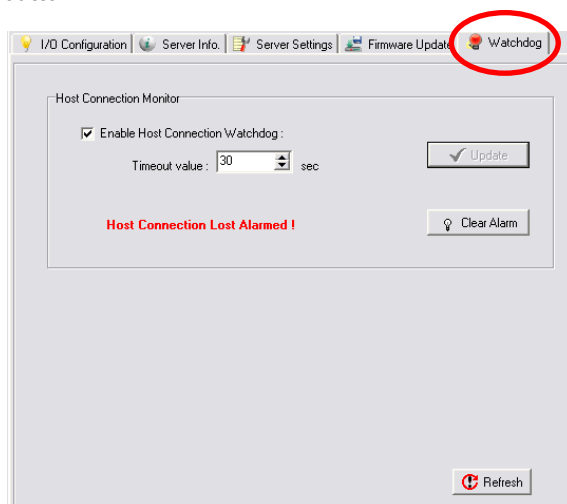
**Do not interrupt the firmware update process!** An interruption in the process may result in your device becoming unrecoverable.

After the firmware is updated, the ioLogik will restart and you will have to log in again to access administrator functions.

The firmware on any attached I/O expansion module, such as an ioLogik R2000 server, must be updated over the RS-485 bus. Firmware on cascaded modules cannot be updated over Ethernet.

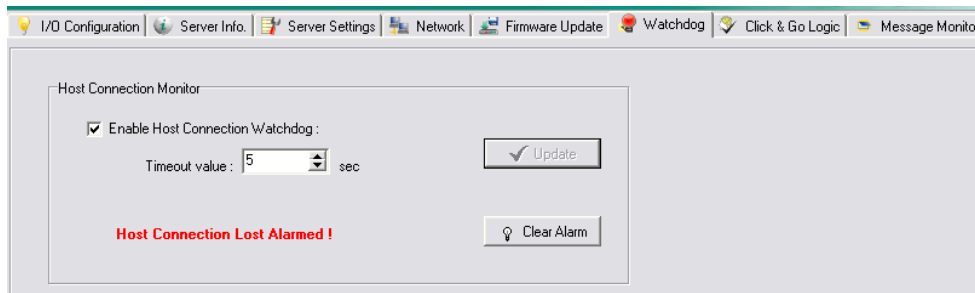
## Watchdog Tab

The **Watchdog** tab is where you configure the Host Connection Watchdog, which is used with the Safe Status settings to define each channel's response to a lost connection. When the ioLogik R2110 loses its connection as specified in the timeout, the Host Connection Watchdog will switch the ioLogik R2110 to Safe Status and all channels will reset to their Safe Status settings. By default, the Watchdog is disabled. To enable the Watchdog, make sure **Enable Host Connection Watchdog** is checked, set the Timeout value, then click the **Update** button.



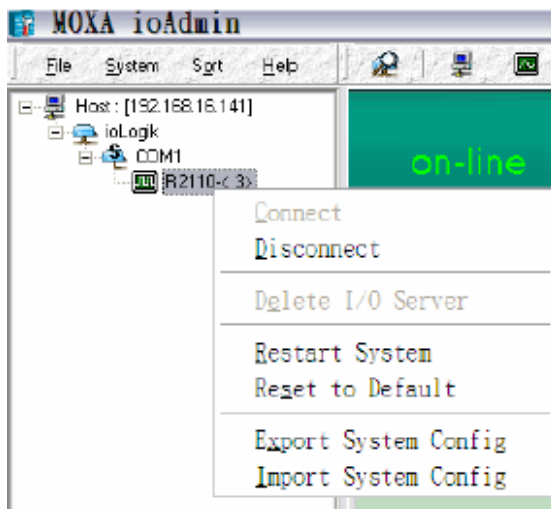
After the Watchdog is enabled, the ioLogik R2110 will enter safe status if the RS-485 connection is lost. Once the connection has been restored, you will need to return to the Watchdog Tab in order to exit safe status.

There will be a message saying "Host Connection Lost", indicating that the server is in safe status. Click **Clear Alarm** to exit safe status and return to normal operation.



## Server Context Menu

The server context menu is accessed by right clicking on the server model name in the navigation panel.



### Connect

Select this command to have ioAdmin attempt a re-connection to the selected ioLogik server.

### Disconnect

Select this command to have ioAdmin drop the connection with the selected ioLogik server.

### Delete I/O Server

Select this command to have ioAdmin remove the selected server.

### Restart System

Select this command to restart the ioLogik from a remote site. You will need to log in as an administrator to use this function.

### Reset to Default

Select this command to reset all settings, including console password, to factory default values. You will need to log in as an administrator to use this function.

## **Export System Config**

Select this command to export the configuration of the ioLogik to a text file. You will need to log in as an administrator to use this function. It is strongly recommended you use this method to back up your configuration after you have finished configuring the ioLogik for your application.

## **Import System Config**

Select this command to reload a configuration that was exported to a text file. You will need to restart the ioLogik in order for the new configuration to take effect. This command may be used to restore a configuration after loading the factory defaults, or to duplicate a configuration to multiple ioLogik units.

## Cascading with Other I/O Servers

---

The ioLogik R2110 can act both as a standalone I/O server and as an extension module to other I/O servers. This chapter explains how to use the ioLogik R2110 as an extension module to ioLogik E2000 I/O servers.

The following topics are covered in this chapter:

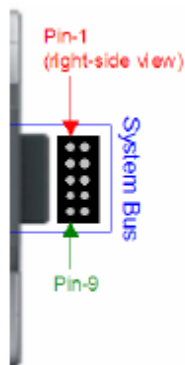
- ❑ **Introduction**
- ❑ **Cascading System Bus**
- ❑ **Hardware Installation**
- ❑ **Using ioAdmin with Cascaded I/O Servers**
  - Adding One I/O Server
  - Adding Two or More I/O Servers
  - Removing Cascaded I/O Servers
- ❑ **Limitations**

# Introduction

The ioLogik R2110 can serve as an extension module to provide additional I/O channels to an ioLogik E2210 or E2240 Ethernet I/O server. Up to 31 units can be chained or cascaded together using each unit's built-in connectors.

## Cascading System Bus

The I/O servers connect to each other over the cascading system bus, which uses RS-485 and Modbus protocols. Pin assignments for the female system bus connector are shown below. This is the connector that protrudes from the right side of the unit.



| Pin    | 1  | 2  | 3  | 4  | 5  |
|--------|----|----|----|----|----|
| Signal | V+ | V- | V+ | V- | NC |

| Pin    | 6  | 7     | 8    | 9     | 10  |
|--------|----|-------|------|-------|-----|
| Signal | NC | Data+ | SYNC | Data- | GND |

## Hardware Installation

To install the ioLogik R2110 as an extension module, simply snap it into place alongside the ioLogik E2000 and the two units will lock together. Press the release button to detach the unit.



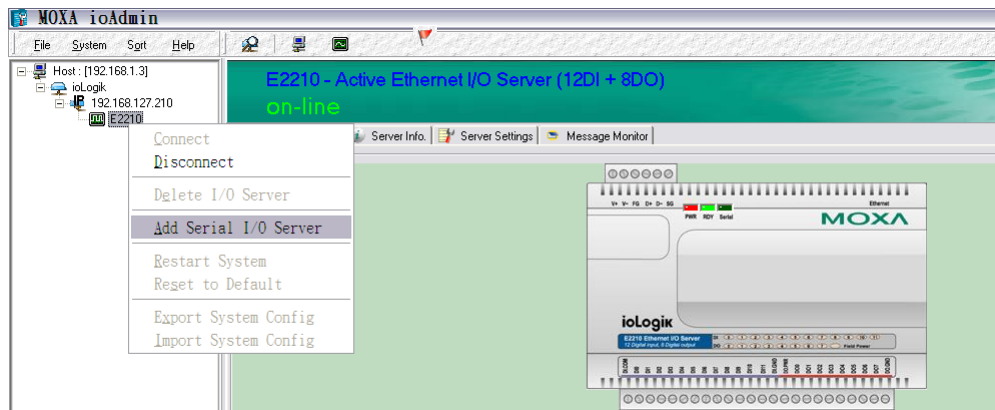
Power is provided through the ioLogik E2000's system bus. Depending on the power requirements of your application, external power can also be supplied to the unit through the unit's power terminals.

# Using ioAdmin with Cascaded I/O Servers

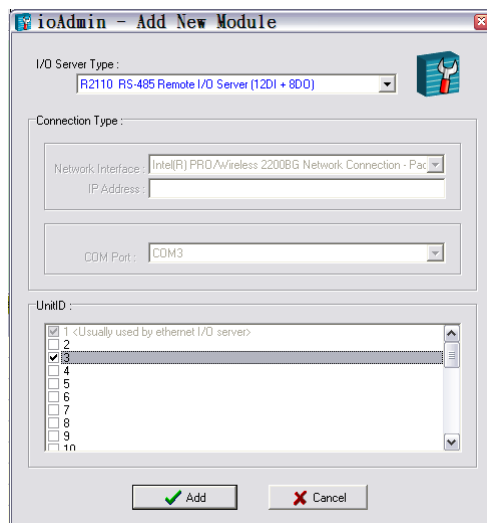
## Adding One I/O Server

ioAdmin can be used to access the I/O channels of all cascaded I/O servers. In the following instructions, the ioLogik E2210 and R2110 are used as examples:

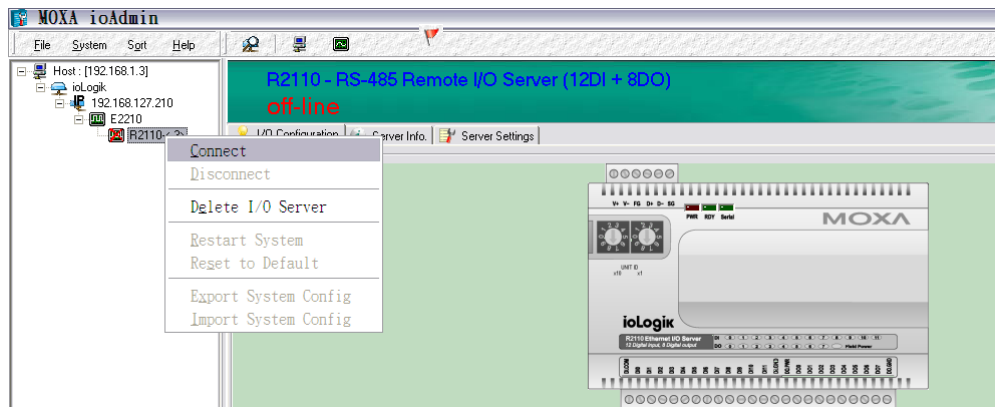
1. Verify that the E2210 has been installed and has been opened in ioAdmin. Snap the E2210 and R2110 together. Set the unit ID for the R2110 starting from "2".
2. In ioAdmin, right-click the E2210 in the navigation panel and select **"Add Serial I/O Server"** in the context menu.



3. Select the appropriate I/O Server type and UnitID ("R2110 RS-485" and "3" in this example). Click **"Add"**.



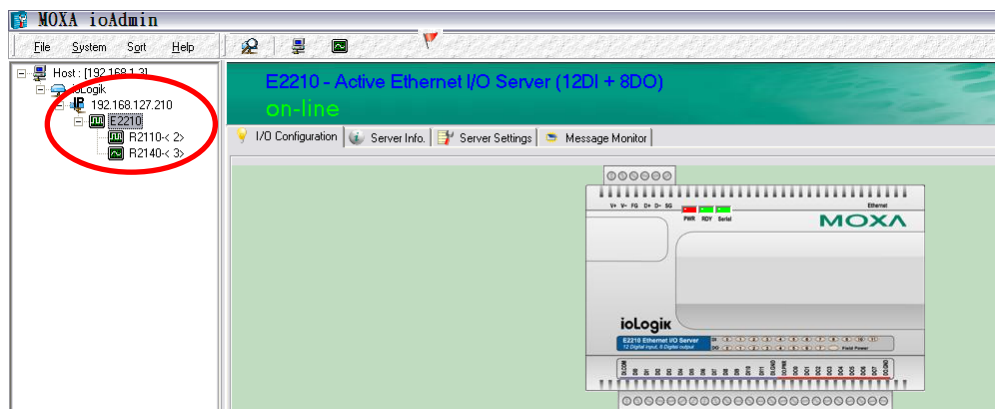
- The R2110 will appear with its unit ID under the E2210 in ioAdmin's navigation panel. If the R2110 appears off-line, open its context menu in the navigation panel and select **"Connect"** to bring it on-line. Once the R2110 is on-line, you will be able to use ioAdmin to monitor and control its I/O channels.



## Adding Two or More I/O Servers

Multiple I/O servers can be cascaded together for even more I/O channels. The following instructions show how multiple cascaded I/O servers are accessed in ioAdmin, using the ioLogik E2210, R2110, and R2140 as examples:

- Verify that the E2210 has been installed and has been opened in ioAdmin. Snap the R2110 onto the E2210, then snap the R2140 onto the R2110. Set the unit IDs for the R2110 and R2140.
- In ioAdmin, right-click the E2210 in the navigation panel and select "Add Serial I/O Server" in the context menu.
- Select the appropriate I/O Server type and UnitID. Click **"Add"**.
- Repeat steps 2 and 3 using the appropriate selections for the R2140.
- Both the R2110 and R2140 will appear with their unit IDs under the E2210 in ioAdmin's navigation panel. If a server appears off-line, open its context menu in the navigation panel and select **"Connect"** to bring it on-line. Once all I/O servers are on-line, you will be able to use ioAdmin to monitor and control each server's I/O channels.



## Removing Cascaded I/O Servers

To remove a cascaded I/O server in ioAdmin, right-click the desired server in the navigation panel and select "Delete I/O Server" in the context menu.

## Limitations

There are some limitations when using the ioLogik R2110 as an extension module to ioLogik E2000 servers. Although each I/O channel on a cascaded module can be monitored and controlled over Ethernet, the cascaded module will not support the following items:

- Click&Go
- Active messaging
- SNMP trap messages
- E-mail messages
- Upgrade firmware

# Liquid Crystal Display Module (LCM)

The ioLogik R2110 supports an optional detachable liquid crystal display module (LCM) for easier field maintenance. The LCM is hot-pluggable and can be used to configure the network settings or display other settings. When plugged in, the module displays the ioLogik R2110 "home page," and pressing any button takes you into the settings and configuration.

## LCM Controls

The up and down buttons navigate between the current options. The right and left buttons enter and exit the submenus. The center button is used when modifying settings or restarting the server.

| Button | Function                                                                   |
|--------|----------------------------------------------------------------------------|
| Up     | go to the previous item                                                    |
| Down   | go to the next item                                                        |
| Left   | exit the current submenu and return to the previous menu (go up one level) |
| Right  | enter the selected submenu (go down one level)                             |
| Center | enter/exit editing mode                                                    |

An "e" in the upper right hand corner of the display indicates that the parameter can be modified. Press the center button on the LCM to modify that parameter's settings.

## LCM Options

| Display                           | Explanation / Actions                                                                                                                                                                                                                                |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ioLogik R2110<br>ID:01 Bps:115200 | This is the default "home page" showing the unit ID and baudrate. Press the down button to view the submenus.                                                                                                                                        |
| <ioLogik R2110><br>server         | Enter this submenu to display information about the specific server you are viewing: <ul style="list-style-type: none"> <li>serial number</li> <li>name</li> <li>location</li> <li>R2110 f/w ver</li> <li>lcm f/w ver</li> <li>model name</li> </ul> |
| <ioLogik R2110><br>serial port    | Enter this submenu to display the RS-485 serial communication port settings: <ul style="list-style-type: none"> <li>RS-485 Setting: 115200,n,8,1</li> </ul>                                                                                          |

| Display                         | Explanation / Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ioLogik R2110><br>i/o setting  | <p>Enter this submenu to access I/O channel status. DI channels may be ON/OFF or CT (for event counter). DO channels may be ON/OFF or Pulse. Here are examples of settings that you might see:</p> <ul style="list-style-type: none"><li>• DI-00 = ON</li><li>• DI-07 [CT] = 0</li><li>• DO-01 = [Pulse] = 1 Hz</li><li>• DO-03 = ON, or OFF</li></ul> <p>Press up or down to navigate through the different I/O channels without having to go back to the previous menu.</p> |
| <ioLogik R2110><br>save/restart | <p>Enter this submenu to display the <b>restart now</b> submenu. Enter the <b>restart now</b> submenu to display the <b>restart</b> option. Press the center button to modify this option, then select <b>enable</b> to save changes and reboot the I/O server. The <b>disable</b> option has no effect.</p>                                                                                                                                                                  |

**ATTENTION**

Any configuration changes that are made through the LCM will not take effect until the ioLogik R2110 is restarted.

## Modbus/RTU Address Mappings

---

### R2110 Modbus Mapping

#### 0xxxx Read/Write Coils (Functions 1, 5, 15)

| Reference | Address | Data Type | Description                              |
|-----------|---------|-----------|------------------------------------------|
| 00001     | 0x0000  | 1 bit     | CH0 DO value<br>0: off    1: on          |
| 00002     | 0x0001  | 1 bit     | CH1 DO value<br>0: off    1: on          |
| 00003     | 0x0002  | 1 bit     | CH2 DO value<br>0: off    1: on          |
| 00004     | 0x0003  | 1 bit     | CH3 DO value<br>0: off    1: on          |
| 00005     | 0x0004  | 1 bit     | CH4 DO value<br>0: off    1: on          |
| 00006     | 0x0005  | 1 bit     | CH5 DO value<br>0: off    1: on          |
| 00007     | 0x0006  | 1 bit     | CH6 DO value<br>0: off    1: on          |
| 00008     | 0x0007  | 1 bit     | CH7 DO value<br>0: off    1: on          |
| 00009     | 0x0008  | 1 bit     | CH0 DO power-on value<br>0: off    1: on |
| 00010     | 0x0009  | 1 bit     | CH1 DO power-on value<br>0: off    1: on |
| 00011     | 0x000A  | 1 bit     | CH2 DO power-on value<br>0: off    1: on |
| 00012     | 0x000B  | 1 bit     | CH3 DO power-on value<br>0: off    1: on |
| 00013     | 0x000C  | 1 bit     | CH4 DO power-on value<br>0: off    1: on |
| 00014     | 0x000D  | 1 bit     | CH5 DO power-on value<br>0: off    1: on |
| 00015     | 0x000E  | 1 bit     | CH6 DO power-on value<br>0: off    1: on |
| 00016     | 0x000F  | 1 bit     | CH7 DO power-on value<br>0: off    1: on |
| 00017     | 0x0010  | 1 bit     | CH0 DO safe value<br>0: off    1: on     |
| 00018     | 0x0011  | 1 bit     | CH1 DO safe value<br>0: off    1: on     |

| Reference | Address | Data Type | Description                                          |
|-----------|---------|-----------|------------------------------------------------------|
| 00019     | 0x0012  | 1 bit     | CH2 DO safe value<br>0: off 1: on                    |
| 00020     | 0x0013  | 1 bit     | CH3 DO safe value<br>0: off 1: on                    |
| 00021     | 0x0014  | 1 bit     | CH4 DO safe value<br>0: off 1: on                    |
| 00022     | 0x0015  | 1 bit     | CH5 DO safe value<br>0: off 1: on                    |
| 00023     | 0x0016  | 1 bit     | CH6 DO safe value<br>0: off 1: on                    |
| 00024     | 0x0017  | 1 bit     | CH7 DO safe value<br>0: off 1: on                    |
| 00025     | 0x0018  | 1 bit     | CH0 DO pulse operate status<br>0: off 1: on          |
| 00026     | 0x0019  | 1 bit     | CH1 DO pulse operate status<br>0: off 1: on          |
| 00027     | 0x001A  | 1 bit     | CH2 DO pulse operate status<br>0: off 1: on          |
| 00028     | 0x001B  | 1 bit     | CH3 DO pulse operate status<br>0: off 1: on          |
| 00029     | 0x001C  | 1 bit     | CH4 DO pulse operate status<br>0: off 1: on          |
| 00030     | 0x001D  | 1 bit     | CH5 DO pulse operate status<br>0: off 1: on          |
| 00031     | 0x001E  | 1 bit     | CH6 DO pulse operate status<br>0: off 1: on          |
| 00032     | 0x001F  | 1 bit     | CH7 DO pulse operate status<br>0: off 1: on          |
| 00033     | 0x0020  | 1 bit     | CH0 DO power-on pulse operate status<br>0: off 1: on |
| 00034     | 0x0021  | 1 bit     | CH1 DO power-on pulse operate status<br>0: off 1: on |
| 00035     | 0x0022  | 1 bit     | CH2 DO power-on pulse operate status<br>0: off 1: on |
| 00036     | 0x0023  | 1 bit     | CH3 DO power-on pulse operate status<br>0: off 1: on |
| 00037     | 0x0024  | 1 bit     | CH4 DO power-on pulse operate status<br>0: off 1: on |
| 00038     | 0x0025  | 1 bit     | CH5 DO power-on pulse operate status<br>0: off 1: on |
| 00039     | 0x0026  | 1 bit     | CH6 DO power-on pulse operate status<br>0: off 1: on |
| 00040     | 0x0027  | 1 bit     | CH7 DO power-on pulse operate status<br>0: off 1: on |
| 00041     | 0x0028  | 1 bit     | CH0 DO safe pulse operate status<br>0: off 1: on     |
| 00042     | 0x0029  | 1 bit     | CH1 DO safe pulse operate status<br>0: off 1: on     |
| 00043     | 0x002A  | 1 bit     | CH2 DO safe pulse operate status<br>0: off 1: on     |
| 00044     | 0x002B  | 1 bit     | CH3 DO safe pulse operate status<br>0: off 1: on     |

| Reference | Address | Data Type | Description                                                                                                             |
|-----------|---------|-----------|-------------------------------------------------------------------------------------------------------------------------|
| 00045     | 0x002C  | 1 bit     | CH4 DO safe pulse operate status<br>0: off      1: on                                                                   |
| 00046     | 0x002D  | 1 bit     | CH5 DO safe pulse operate status<br>0: off      1: on                                                                   |
| 00047     | 0x002E  | 1 bit     | CH6 DO safe pulse operate status<br>0: off      1: on                                                                   |
| 00048     | 0x002F  | 1 bit     | CH7 DO safe pulse operate status<br>0: off      1: on                                                                   |
| 00049     | 0x0030  | 1 bit     | CH0 DI counter status<br>0: off      1: on                                                                              |
| 00040     | 0x003 1 | 1 bit     | CH1 DI counter status<br>0: off      1: on                                                                              |
| 00041     | 0x0032  | 1 bit     | CH2 DI counter status<br>0: off      1: on                                                                              |
| 00042     | 0x0033  | 1 bit     | CH3 DI counter status<br>0: off      1: on                                                                              |
| 00043     | 0x0034  | 1 bit     | CH4 DI counter status<br>0: off      1: on                                                                              |
| 00044     | 0x0035  | 1 bit     | CH5 DI counter status<br>0: off      1: on                                                                              |
| 00045     | 0x0036  | 1 bit     | CH6 DI counter status<br>0: off      1: on                                                                              |
| 00056     | 0x0037  | 1 bit     | CH7 DI counter status<br>0: off      1: on                                                                              |
| 00057     | 0x0038  | 1 bit     | CH8 DI counter status<br>0: off      1: on                                                                              |
| 00058     | 0x0039  | 1 bit     | CH9 DI counter status<br>0: off      1: on                                                                              |
| 00059     | 0x003A  | 1 bit     | CH10 DI counter status<br>0: off      1: on                                                                             |
| 00060     | 0x003B  | 1 bit     | CH1 1 DI counter status<br>0: off      1: on                                                                            |
| 00061     | 0x003C  | 1 bit     | CH0 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value |
| 00062     | 0x003D  | 1 bit     | CH1 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value |
| 00063     | 0x003E  | 1 bit     | CH2 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value |

| Reference | Address | Data Type | Description                                                                                                              |
|-----------|---------|-----------|--------------------------------------------------------------------------------------------------------------------------|
| 00064     | 0x003F  | 1 bit     | CH3 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value  |
| 00065     | 0x0040  | 1 bit     | CH4 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value  |
| 00066     | 0x0041  | 1 bit     | CH5 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value  |
| 00067     | 0x0042  | 1 bit     | CH6 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value  |
| 00068     | 0x0043  | 1 bit     | CH7 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value  |
| 00069     | 0x0044  | 1 bit     | CH8 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value  |
| 00070     | 0x0045  | 1 bit     | CH9 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value  |
| 00071     | 0x0046  | 1 bit     | CH10 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value |

| Reference | Address | Data Type | Description                                                                                                                                    |
|-----------|---------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 00072     | 0x0047  | 1 bit     | CH1 1 DI clear counter value<br>Read:<br>0: no action<br>Write:<br>1: clear counter value<br>0: return illegal data value                      |
| 00073     | 0x0048  | 1 bit     | CH0 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:      0: clear overflow status<br>1: return illegal data value  |
| 00074     | 0x0049  | 1 bit     | CH1 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:      0: clear overflow status<br>1 : return illegal data value |
| 00075     | 0x004A  | 1 bit     | CH2 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value    |
| 00076     | 0x004B  | 1 bit     | CH3 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value    |
| 00077     | 0x004C  | 1 bit     | CH4 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value    |
| 00078     | 0x004D  | 1 bit     | CH5 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value    |
| 00079     | 0x004E  | 1 bit     | CH6 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value    |
| 00080     | 0x004F  | 1 bit     | CH7 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value    |

| Reference | Address | Data Type | Description                                                                                                                                   |
|-----------|---------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 00081     | 0x0050  | 1 bit     | CH8 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value   |
| 00082     | 0x0051  | 1 bit     | CH9 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value   |
| 00083     | 0x0052  | 1 bit     | CH10 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value  |
| 00084     | 0x0053  | 1 bit     | CH1 1 DI counter overflow status<br>Read:<br>0: normal      1: overflow<br>Write:<br>0: clear overflow status<br>1: return illegal data value |
| 00085     | 0x0054  | 1 bit     | CH0 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00086     | 0x0055  | 1 bit     | CH1 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00087     | 0x0056  | 1 bit     | CH2 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00088     | 0x0057  | 1 bit     | CH3 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00089     | 0x0058  | 1 bit     | CH4 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00090     | 0x0059  | 1 bit     | CH5 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00091     | 0x005A  | 1 bit     | CH6 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00092     | 0x005B  | 1 bit     | CH7 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00093     | 0x005C  | 1 bit     | CH8 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00094     | 0x005D  | 1 bit     | CH9 DI counter trigger : 0=Low to High, 1=High to Low                                                                                         |
| 00095     | 0x005E  | 1 bit     | CH10 DI counter trigger : 0=Low to High, 1=High to Low                                                                                        |
| 00096     | 0x005F  | 1 bit     | CH1 1 DI counter trigger : 0=Low to High, 1=High to Low                                                                                       |
| 00097     | 0x0060  | 1 bit     | CH0 DI counter power-on status<br>0: off      1: on                                                                                           |
| 00098     | 0x0061  | 1 bit     | CH1 DI counter power-on status<br>0: off      1: on                                                                                           |
| 00099     | 0x0062  | 1 bit     | CH2 DI counter power-on status<br>0: off      1: on                                                                                           |
| 00100     | 0x0063  | 1 bit     | CH3 DI counter power-on status<br>0: off      1: on                                                                                           |
| 00101     | 0x0064  | 1 bit     | CH4 DI counter power-on status<br>0: off      1: on                                                                                           |
| 00102     | 0x0065  | 1 bit     | CH5 DI counter power-on status<br>0: off      1: on                                                                                           |
| 00103     | 0x0066  | 1 bit     | CH6 DI counter power-on status<br>0: off      1: on                                                                                           |
| 00104     | 0x0067  | 1 bit     | CH7 DI counter power-on status<br>0: off      1: on                                                                                           |

| Reference | Address | Data Type | Description                                           |
|-----------|---------|-----------|-------------------------------------------------------|
| 00105     | 0x0068  | 1 bit     | CH8 DI counter power-on status<br>0: off      1: on   |
| 00106     | 0x0069  | 1 bit     | CH9 DI counter power-on status<br>0: off      1: on   |
| 00107     | 0x006A  | 1 bit     | CH10 DI counter power-on status<br>0: off      1: on  |
| 00108     | 0x006B  | 1 bit     | CH1 1 DI counter power-on status<br>0: off      1: on |
| 00109     | 0x006C  | 1 bit     | CH0 DI counter safe status<br>0: off      1: on       |
| 00110     | 0x006D  | 1 bit     | CH1 DI counter safe status<br>0: off      1: on       |
| 00111     | 0x006E  | 1 bit     | CH2 DI counter safe status<br>0: off      1: on       |
| 00112     | 0x006F  | 1 bit     | CH3 DI counter safe status<br>0: off      1: on       |
| 00113     | 0x0070  | 1 bit     | CH4 DI counter safe status<br>0: off      1: on       |
| 00114     | 0x0071  | 1 bit     | CH5 DI counter safe status<br>0: off      1: on       |
| 00115     | 0x0072  | 1 bit     | CH6 DI counter safe status<br>0: off      1: on       |
| 00116     | 0x0073  | 1 bit     | CH7 DI counter safe status<br>0: off      1: on       |
| 00117     | 0x0074  | 1 bit     | CH8 DI counter safe status<br>0: off      1: on       |
| 00118     | 0x0075  | 1 bit     | CH9 DI counter safe status<br>0: off      1: on       |
| 00119     | 0x0076  | 1 bit     | CH10 DI counter safe status<br>0: off      1: on      |
| 00120     | 0x0077  | 1 bit     | CH1 1 DI counter safe status<br>0: off      1: on     |

## 1xxxx Read Only Coils (Function 2)

| Reference | Address | Data Type | Description   |
|-----------|---------|-----------|---------------|
| 10001     | 0x0000  | 1 bit     | CH0 DI value  |
| 10002     | 0x0001  | 1 bit     | CH1 DI value  |
| 10003     | 0x0002  | 1 bit     | CH2 DI value  |
| 10004     | 0x0003  | 1 bit     | CH3 DI value  |
| 10005     | 0x0004  | 1 bit     | CH4 DI value  |
| 10006     | 0x0005  | 1 bit     | CH5 DI value  |
| 10007     | 0x0006  | 1 bit     | CH6 DI value  |
| 10008     | 0x0007  | 1 bit     | CH7 DI value  |
| 10009     | 0x0008  | 1 bit     | CH8 DI value  |
| 10010     | 0x0009  | 1 bit     | CH9 DI value  |
| 10011     | 0x000A  | 1 bit     | CH10 DI value |
| 10012     | 0x000B  | 1 bit     | CH11 DI value |

### 3xxxx Read Only Registers (Function 4)

| Reference | Address | Data Type | Description                    |
|-----------|---------|-----------|--------------------------------|
| 30001     | 0x0000  | word      | CH0 DI counter value hi-byte   |
| 30002     | 0x0001  | word      | CH0 DI counter value lo-byte   |
| 30003     | 0x0002  | word      | CH1 DI counter value hi-byte   |
| 30004     | 0x0003  | word      | CH1 DI counter value lo-byte   |
| 30005     | 0x0004  | word      | CH2 DI counter value hi-byte   |
| 30006     | 0x0005  | word      | CH2 DI counter value lo-byte   |
| 30007     | 0x0006  | word      | CH3 DI counter value hi-byte   |
| 30008     | 0x0007  | word      | CH3 DI counter value lo-byte   |
| 30009     | 0x0008  | word      | CH4 DI counter value hi-byte   |
| 30010     | 0x0009  | word      | CH4 DI counter value lo-byte   |
| 30011     | 0x000A  | word      | CH5 DI counter value hi-byte   |
| 30012     | 0x000B  | word      | CH5 DI counter value lo-byte   |
| 30013     | 0x000C  | word      | CH6 DI counter value hi-byte   |
| 30014     | 0x000D  | word      | CH6 DI counter value lo-byte   |
| 30015     | 0x000E  | word      | CH7 DI counter value hi-byte   |
| 30016     | 0x000F  | word      | CH7 DI counter value lo-byte   |
| 30017     | 0x0010  | word      | CH8 DI counter value hi-byte   |
| 30018     | 0x001 1 | word      | CH8 DI counter value lo-byte   |
| 30019     | 0x0012  | word      | CH9 DI counter value hi-byte   |
| 30020     | 0x0013  | word      | CH9 DI counter value lo-byte   |
| 30021     | 0x0014  | word      | CH10 DI counter value hi-byte  |
| 30022     | 0x001 5 | word      | CH1 0 DI counter value lo-byte |
| 30023     | 0x001 6 | word      | CH1 1 DI counter value hi-byte |
| 30024     | 0x001 7 | word      | CH1 1 DI counter value lo-byte |

### 4xxxx Read/Write Registers (Functions 3, 6, 16)

| Reference | Address | Data Type | Description                             |
|-----------|---------|-----------|-----------------------------------------|
| 40001     | 0x0000  | word      | CH0 DO pulse output count value hi-word |
| 40002     | 0x0001  | word      | CH0 DO pulse output count value lo-word |
| 40003     | 0x0002  | word      | CH1 DO pulse output count value hi-word |
| 40004     | 0x0003  | word      | CH1 DO pulse output count value lo-word |
| 40005     | 0x0004  | word      | CH2 DO pulse output count value hi-word |
| 40006     | 0x0005  | word      | CH2 DO pulse output count value lo-word |
| 40007     | 0x0006  | word      | CH3 DO pulse output count value hi-word |
| 40008     | 0x0007  | word      | CH3 DO pulse output count value lo-word |
| 40009     | 0x0008  | word      | CH4 DO pulse output count value hi-word |
| 40010     | 0x0009  | word      | CH4 DO pulse output count value lo-word |
| 40011     | 0x000A  | word      | CH5 DO pulse output count value hi-word |
| 40012     | 0x000B  | word      | CH5 DO pulse output count value lo-word |
| 40013     | 0x000C  | word      | CH6 DO pulse output count value hi-word |
| 40014     | 0x000D  | word      | CH6 DO pulse output count value lo-word |
| 40015     | 0x000E  | word      | CH7 DO pulse output count value hi-word |
| 40016     | 0x000F  | word      | CH7 DO pulse output count value lo-word |
| 40017     | 0x0010  | word      | CH0 DO pulse low signal width           |
| 40018     | 0x001 1 | word      | CH1 DO pulse low signal width           |
| 40019     | 0x0012  | word      | CH2 DO pulse low signal width           |
| 40020     | 0x0013  | word      | CH3 DO pulse low signal width           |
| 40021     | 0x0014  | word      | CH4 DO pulse low signal width           |

| Reference | Address | Data Type | Description                                                            |
|-----------|---------|-----------|------------------------------------------------------------------------|
| 40022     | 0x001 5 | word      | CH5 DO pulse low signal width                                          |
| 40023     | 0x0016  | word      | CH6 DO pulse low signal width                                          |
| 40024     | 0x0017  | word      | CH7 DO pulse low signal width                                          |
| 40025     | 0x001 8 | word      | CH0 DO pulse high signal width                                         |
| 40026     | 0x0019  | word      | CH1 DO pulse high signal width                                         |
| 40027     | 0x001A  | word      | CH2 DO pulse high signal width                                         |
| 40028     | 0x001B  | word      | CH3 DO pulse high signal width                                         |
| 40029     | 0x001C  | word      | CH4 DO pulse high signal width                                         |
| 40030     | 0x001D  | word      | CH5 DO pulse high signal width                                         |
| 40031     | 0x001E  | word      | CH6 DO pulse high signal width                                         |
| 40032     | 0x001F  | word      | CH7 DO pulse high signal width                                         |
| 40033     | 0x0020  | word      | CH0 DO mode<br>0: DO      1: pulse                                     |
| 40034     | 0x0021  | word      | CH1 DO mode<br>0: DO      1: pulse                                     |
| 40035     | 0x0022  | word      | CH2 DO mode<br>0: DO      1: pulse                                     |
| 40036     | 0x0023  | word      | CH3 DO mode<br>0: DO      1: pulse                                     |
| 40037     | 0x0024  | word      | CH4 DO mode<br>0: DO      1: pulse                                     |
| 40038     | 0x0025  | word      | CH5 DO mode<br>0: DO      1: pulse                                     |
| 40039     | 0x0026  | word      | CH6 DO mode<br>0: DO      1: pulse                                     |
| 40040     | 0x0027  | word      | CH7 DO mode<br>0: DO      1: pulse                                     |
| 40041     | 0x0028  | word      | CH0 DI / counter filter                                                |
| 40042     | 0x0029  | word      | CH1 DI / counter filter                                                |
| 40043     | 0x002A  | word      | CH2 DI / counter filter                                                |
| 40044     | 0x002B  | word      | CH3 DI / counter filter                                                |
| 40045     | 0x002C  | word      | CH4 DI / counter filter                                                |
| 40046     | 0x002D  | word      | CH5 DI / counter filter                                                |
| 40047     | 0x002E  | word      | CH6 DI / counter filter                                                |
| 40048     | 0x002F  | word      | CH7 DI / counter filter                                                |
| 40049     | 0x0030  | word      | CH8 DI / counter filter                                                |
| 40050     | 0x003 1 | word      | CH9 DI / counter filter                                                |
| 40051     | 0x0032  | word      | CH10 DI / counter filter                                               |
| 40052     | 0x0033  | word      | CH1 1 DI / counter filter                                              |
| 40053     | 0x0034  | word      | CH0 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value |
| 40054     | 0x0035  | word      | CH1 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value |
| 40055     | 0x0036  | word      | CH2 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value |

| Reference | Address | Data Type | Description                                                             |
|-----------|---------|-----------|-------------------------------------------------------------------------|
| 40056     | 0x0037  | word      | CH3 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value  |
| 40057     | 0x0038  | word      | CH4 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value  |
| 40058     | 0x0039  | word      | CH5 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value  |
| 40059     | 0x003A  | word      | CH6 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value  |
| 40060     | 0x003B  | word      | CH7 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value  |
| 40061     | 0x003C  | word      | CH8 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value  |
| 40062     | 0x003D  | word      | CH9 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value  |
| 40063     | 0x003E  | word      | CH10 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value |
| 40064     | 0x003F  | word      | CH11 DI mode<br>0: DI<br>1: counter<br>Other: return illegal data value |

## Function 8

| Sub-function | Data Field (Request) | Data Field (Response) | Description               |
|--------------|----------------------|-----------------------|---------------------------|
| 0x0001       | 0x0000               | Echo Request Data     | Reboot                    |
| 0x0001       | 0xFF00               | Echo Request Data     | Reset to factory defaults |

## Factory Default Settings

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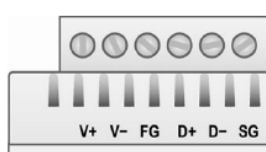
The ioLogik R2110 is configured with the following factory defaults:

|                               |                |
|-------------------------------|----------------|
| <b>RS-485 Unit ID</b>         | 1              |
| <b>Baudrate</b>               | 115200 Kbps    |
| <b>Communication Watchdog</b> | Disable        |
| <b>DI Channel Mode</b>        | DI             |
| <b>Filter Time</b>            | 1 × 10 ms      |
| <b>Counter Trigger</b>        | Lo to Hi       |
| <b>Counter Status</b>         | Stop           |
| <b>DO Channel Mode</b>        | DO             |
| <b>DO Safe Status</b>         | Off            |
| <b>Power On Status</b>        | Off            |
| <b>Pulse Low Width</b>        | 1 × 10 ms      |
| <b>Pulse Hi Width</b>         | 1 × 10 ms      |
| <b>Output Pulses</b>          | 0 (continuous) |
| <b>Password</b>               | NONE           |
| <b>Module Name</b>            | NONE           |
| <b>Module Location</b>        | NONE           |

## Pinouts and Cable Wiring

### Pin Assignment of Terminal Blocks

#### Power (TB1) and RS-485 (TB2)

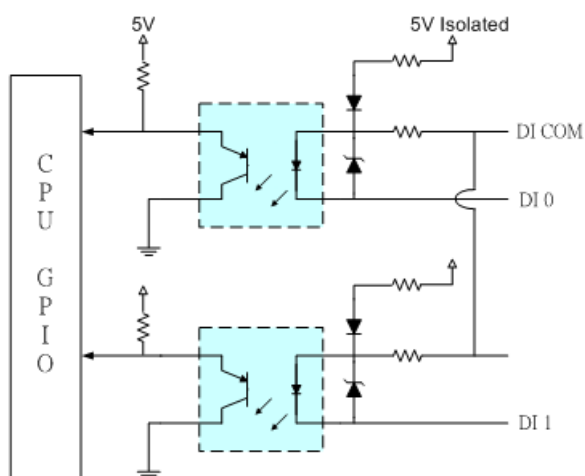


#### I/O (TB3)

| Pin    | 1      | 2       | 3      | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12     |
|--------|--------|---------|--------|-----|-----|-----|-----|-----|-----|-----|-----|--------|
| Signal | DI COM | DI0     | DI1    | DI2 | DI3 | DI4 | DI5 | DI6 | DI7 | DI8 | DI9 | DI10   |
| Pin    | 13     | 14      | 15     | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  | 24     |
| Signal | DI11   | DI. GND | DO.PWR | DO0 | DO1 | DO2 | DO3 | DO4 | DO5 | DO6 | DO7 | DO.GND |

### Digital Input

#### Structure



## Dry Contact

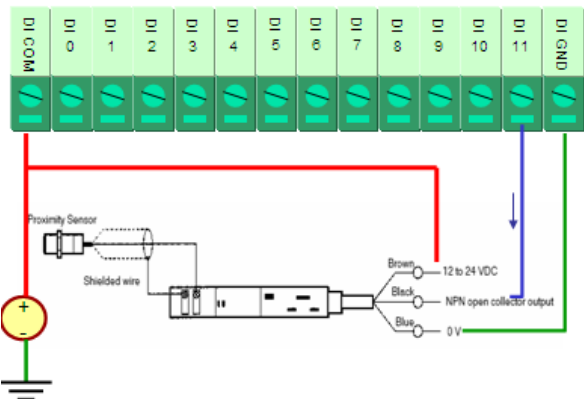


## Wet Contact



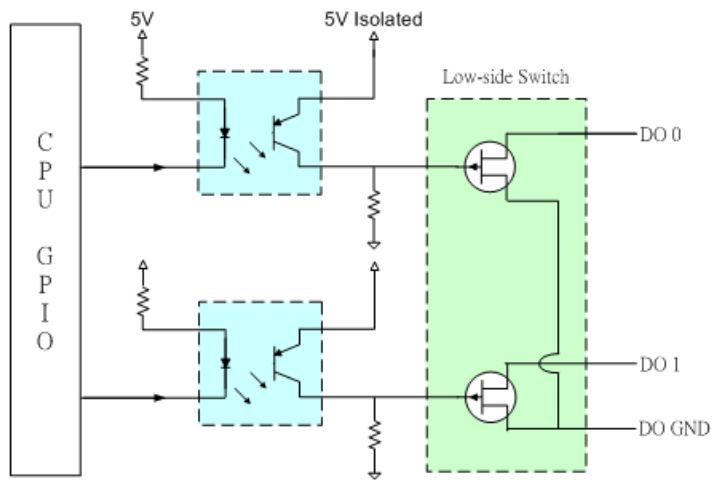
**NOTE** If you are using wet contacts, you must connect "DI COM" to power. For testing purposes, you may connect "DI COM" to the V+ terminal of a power supply.

## Example

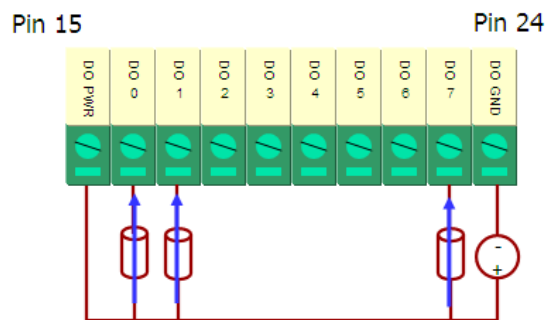


# Digital Output

## Structure



## Output Channel



\* DO PWR is for powering up the **field Power** LED.