Relay Control User Manual

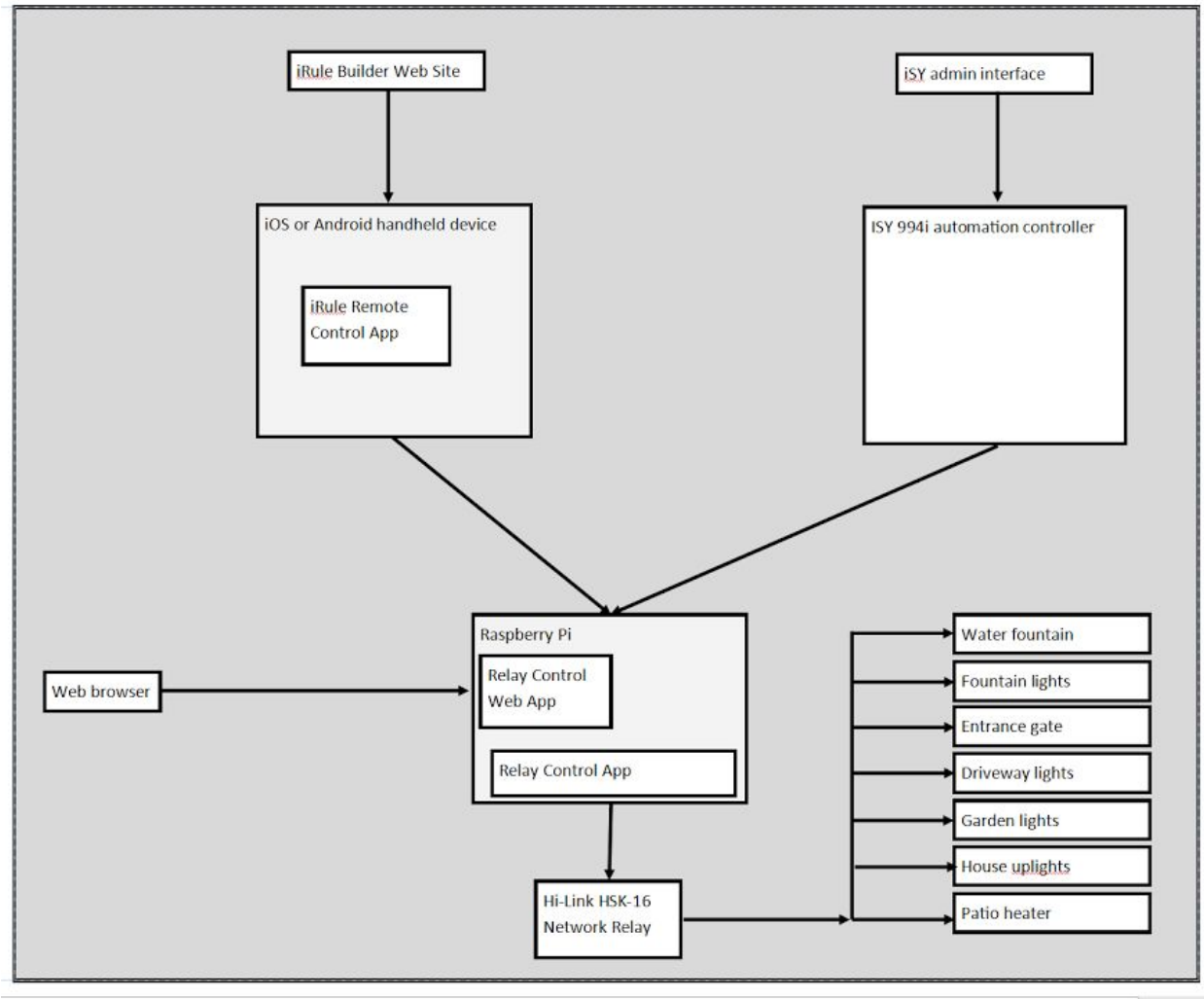
Table of Contents

Overview

Here we explain how the RelayControl web site, iRule mobile device app, and ISY relay work together to provide home or office automation from a mobile device.

This documentation covers:

1. RelayControl Web application and how to use it with the iRule application and ISY controller for home automation.
2. Demonstrate how to use iRule to create a sample iRule sample. This sample app will control garden sprinkler.
3. ISY Utility.
4. How to enter boards and relays in Relay Control and migrate those to the ISY Controller.
5. The role of the HL-Link HSK-16 Network Relay.



iRule builder—is a website tool, located here, that generates the **iRule Remote Control App**. The iRule app creates a remote control connects so that you can control home automation devices from your iOS or Android cell phone or tablet.

With iRule Builder visual design tools, you create a graphic design containing buttons that you associate with devices and commands. Then Builder creates an app based on that that you download to your cell phone or tablet.

The iRule apps work both with directed connected devices and the Insteon line of devices. Insteon the Insteon ISY Home Automation Controller that we discuss in this manual.

The iRule app connects to devices using a local network, like the 192.* network you have in your home or office.

It has some canned modules that communicates with devices using sessions (such as the Elk security module) but only supports very simple commands for general, user-defined operations.

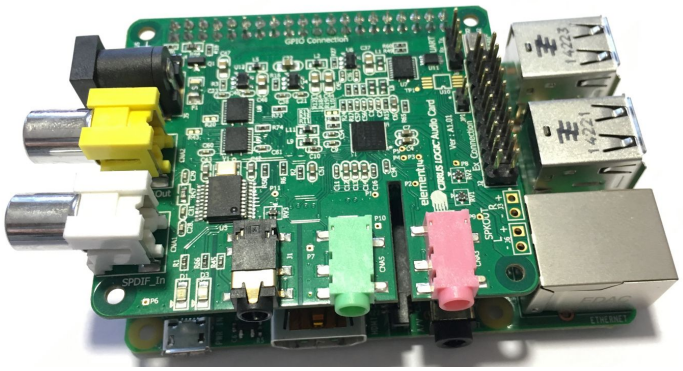
Controlling home automation devices from the iRule app through the ISY controller provides functions that you could not do with ISY alone. For example, with the iRule app you can see camera video output in the iRule app. Yet the ISY turns on the camera when the motion detector attached to the ISY detects motion.

Another example of how the two devices work together are creating what are called **scenes.** This is where one device controls another other. For example, if you have one switch to turn on the outside lights and another to turn on the garage lights then turning on the garage lights might turn off the outside lights.

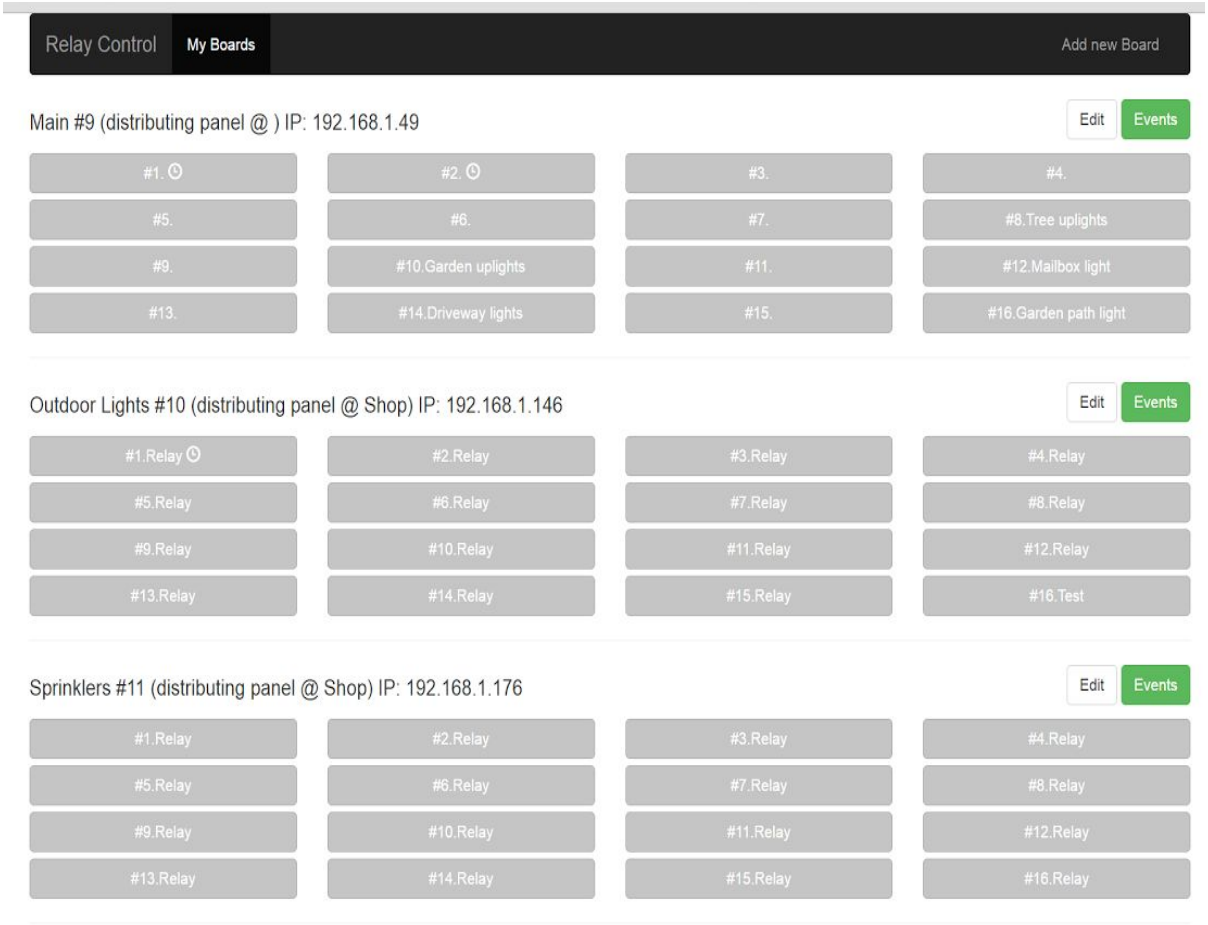
FInally, iRule can control certain Instead devices that the Insteon ISY controller does not yet support directly.

So you can see that you need both.

Raspberry Pi —is a stand-alone, single board computer that acts as a bridge between the relay cards and the two external ways to control the cards, which are your iOS or Android device and your ISY994i automation controller.



Relay Control Web app—You first configure the relays using this app. Then you export those definitions to the iRule Remote Control app and ISY automation controller as command strings that are specific to these controllers.



Relay Control app—runs on your Raspberry Pi in the background and works as a network gateway to connect to your home automation devices.

Hi-Link HS16 relay board—you connect whatever devices you want to control from the remote control here, such as motors and lights**.** This board is controlled directly by the Relay Control App that runs on your Raspberry Pi.

ISY994i automation controller—is a stand-alone, single-board computer that runs proprietary software. It understands how to control a wide variety of networked devices as well as the **Insteon** line of home automation devices. Unfortunately it doesn't yet support network sessions required by the Hi-Link HS16 relay board. To provide that we use the Relay Control program.

The ISY is an automation controller without any direct, user-friendly interface (We show the screen prints at the end of this document.). Its actions are triggered through the user's interaction with devices. For example, when you turn on the pantry light, ISY knows to keep it on for 10 minutes after the user occupancy sensor detects that someone has left the room and to turn it off if someone turns off the kitchen lights. Or when you open the driveway gate, it sequences the driveway lights and turns them off 2 minutes later.

Relay Control Installation

Follow these instructions to install NetRelay on Debian Linux. The Raspberry Pi runs a variation of Debian called **Raspbian**.

iRule Builder

Here we give an overview of the iRule Builder and how you use it to build an Android or iOS remote control app to control devices.

Note: For an introduction for how to use the iRule screen you can watch this Youtube video.

The Connection between the iRule Website and iRule Mobile App
When you build the Android or iOS app on the iRule builder you then login to the app and sync (download) the app from the iRule Builder website. That is how the app loads the configuration you created there.

The app displays the remote control interface with the buttons you have placed there and interprets the commands (macros) you have attached to each button.

In the final stage of configuration you tell the app the exact home devices you are controlling. Here you specify IP addresses and give devices local names such as **downstairs TV**. For the example we explain here the device will be the **Relay Control** website and a **Garden Sprinkler** and **Garden Light** attached to the ISY controller.

Basic Steps to build iRule App
Here we show you how to build a sample remote control app using the iRule builder.

The basic procedure to building an app is:

1. Pick a handset device, e.g., Samsung S6 and orientation, e,g, landscape.
2. Add buttons.
3. Indicate what device you will control. It can be a canned one, like DirecTV, or one that you setup yourself, like Relay Control.
4. Configure text strings **Device Network Codes** to define **On, Off, dim lights,** or commands. Drag those macros to the button to associate command with button.
5. Attach macros to the buttons by dragging **Device Network Codes** (device instructions) from the device screen to the button you have placed on the app screen.
6. Save the app.
7. Login to iRule Builder mobile app which you get from iTunes or Google Play.

8. Sync app to mobile phone.
9. Configure IP address (gateway) of devices you want control.
10. Finished. Use remote control.

Note: When you are in iRule app on your mobile device it will look in iRule Builder for a handset with that same screen dimension. If you do not see your device listed just pick one with the same screen size when you set up the handset in iRule Builder. Otherwise it will say that no such device exists.

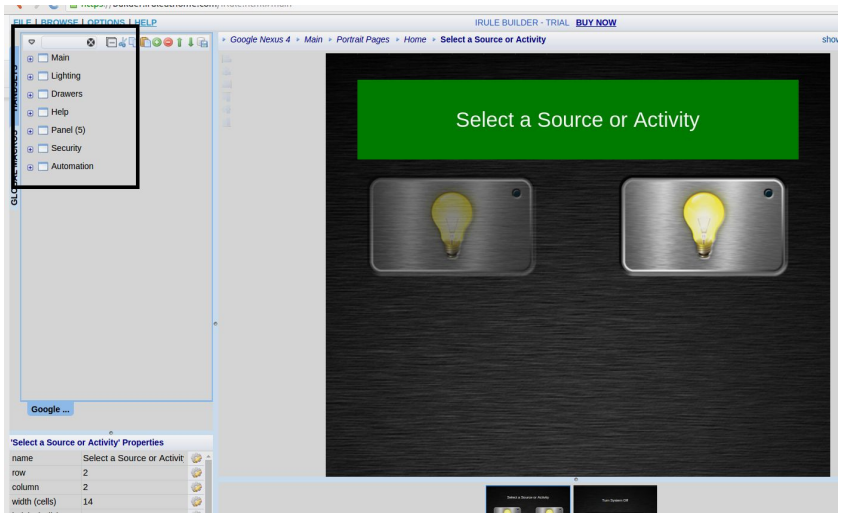
iRule Screens Explained

There are too many steps involved to generate a complete app to show you step-by-step instructions. Instead we given a general explanation of how to associates button to screens and devices to buttons.

To get started iRule has a wizard to build the basic screen. You just need to attach device instructions to each button.

Here is the main screen. Each screen is called an **Activity**. The top Activity is called **main**. Activities below that have whatever name you give them or it comes from whatever device you pick when you run the wizard, like **Home Automation**.

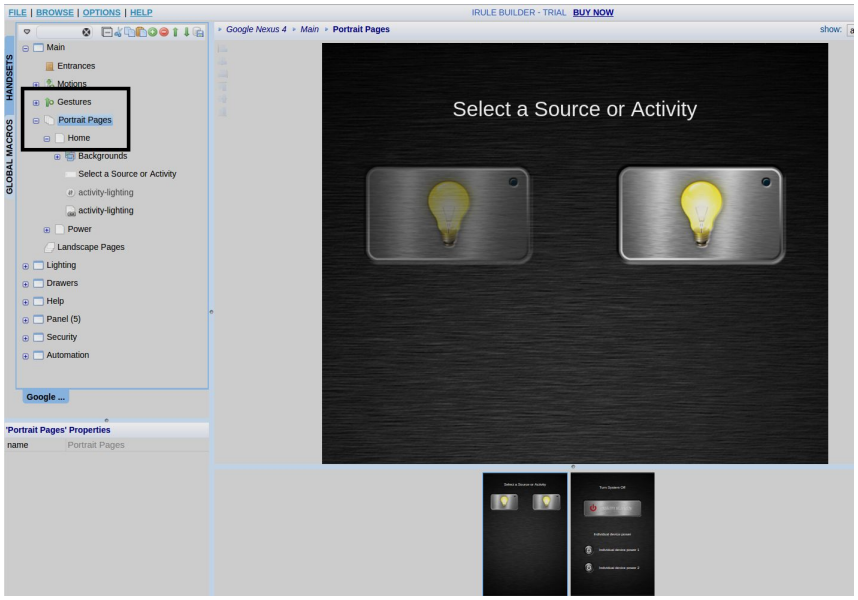
A main activity might or might not have subscreens (activities). It might be enough that your remote control just have one main screen and no sub screens. That depends on how many devices you attach and how you logically group them. For example, one activity might be **Home Security** and another might be **Television**.



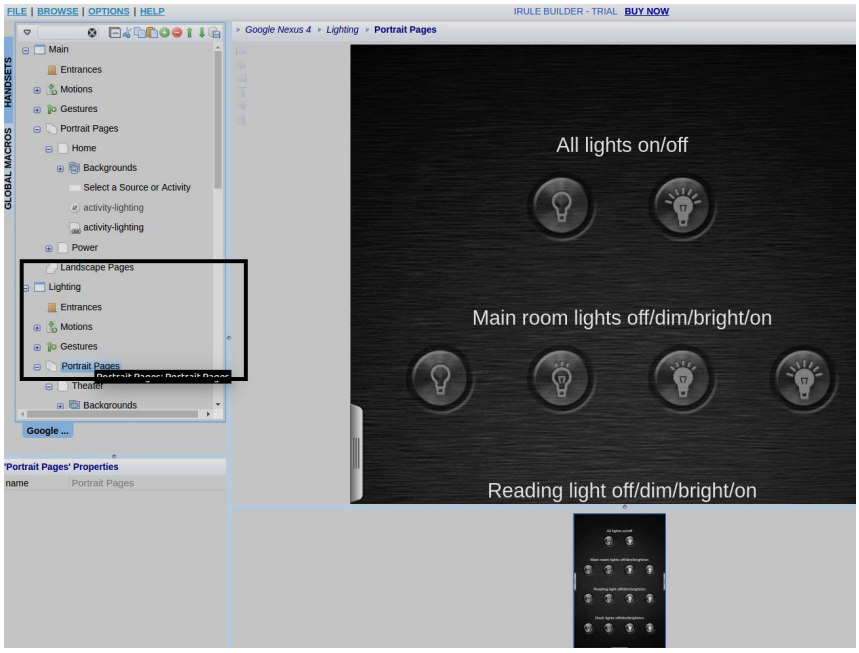
An **Activity** means a screen that you kick off from the main screen. In this example we have **Lighting**, **Security**, and **Automation**.

If you expand **Main** and then click **Portrait Pages** or **Landscape** in the left-hand panel that shows you what activities you have.

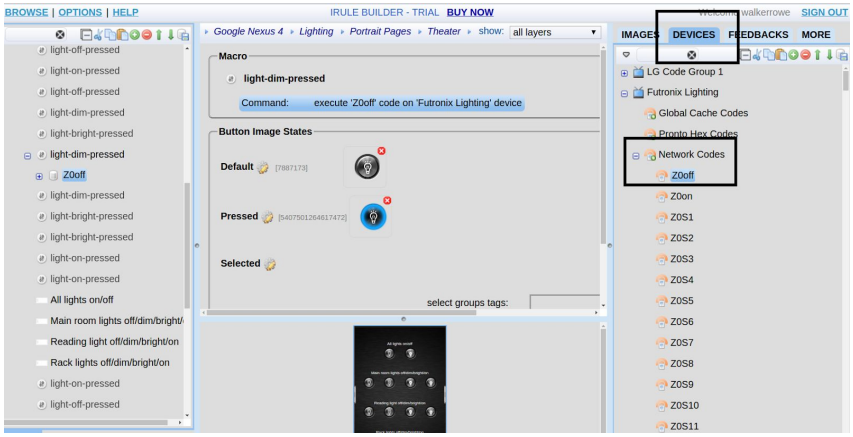
In this example we have one main activity with buttons that call up two other two activities (sub menus) below that. If you hover the mouse over the button you will see what logic is attached to that button, such as **open activity** or **turn on device**.



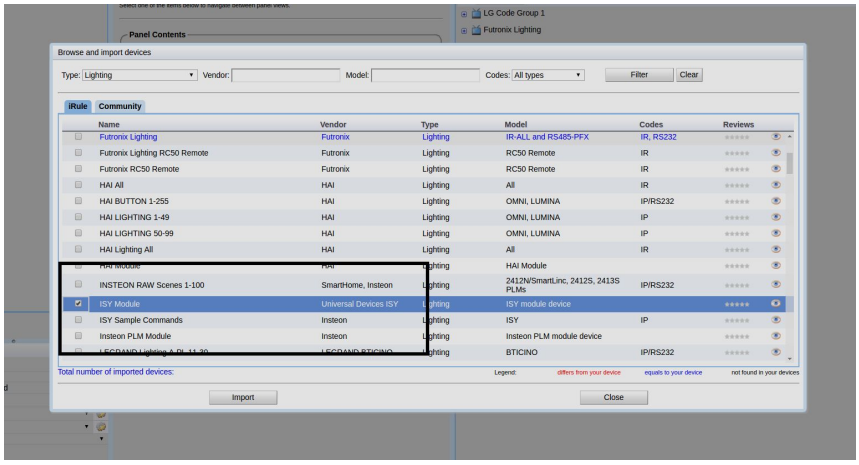
Here is the view when you click Portrait Pages or Landscape Pages to expand those. (Whether it is portrait or landscape depends on what device orientation you picked when you set up the handset.)



Here are the buttons placed on this screen. These are all dim now because no logic has been attached to the buttons yet.



On the right hand side of the screen are the **Devices** and **Network Codes**. You click on a button and then drag the Network code onto the button to associate the command sent to the device with the button. In this example we pick **Z0off** on the **light-dim-pressed** button.

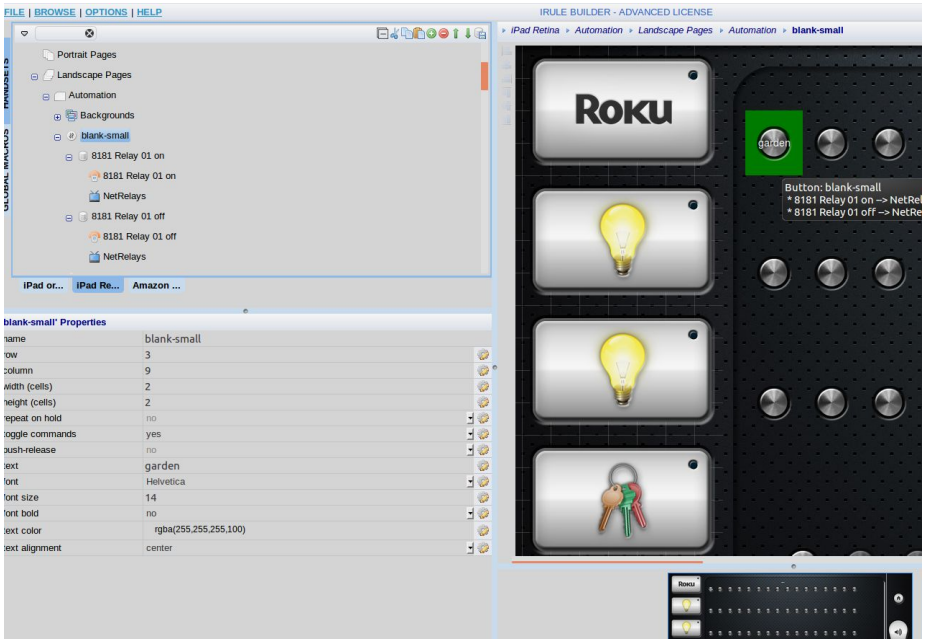


Here is what the devices screen looks like when you are selecting which devices you want to make available to be attached to the remote control.

Below we explain in more detail how to add devices.

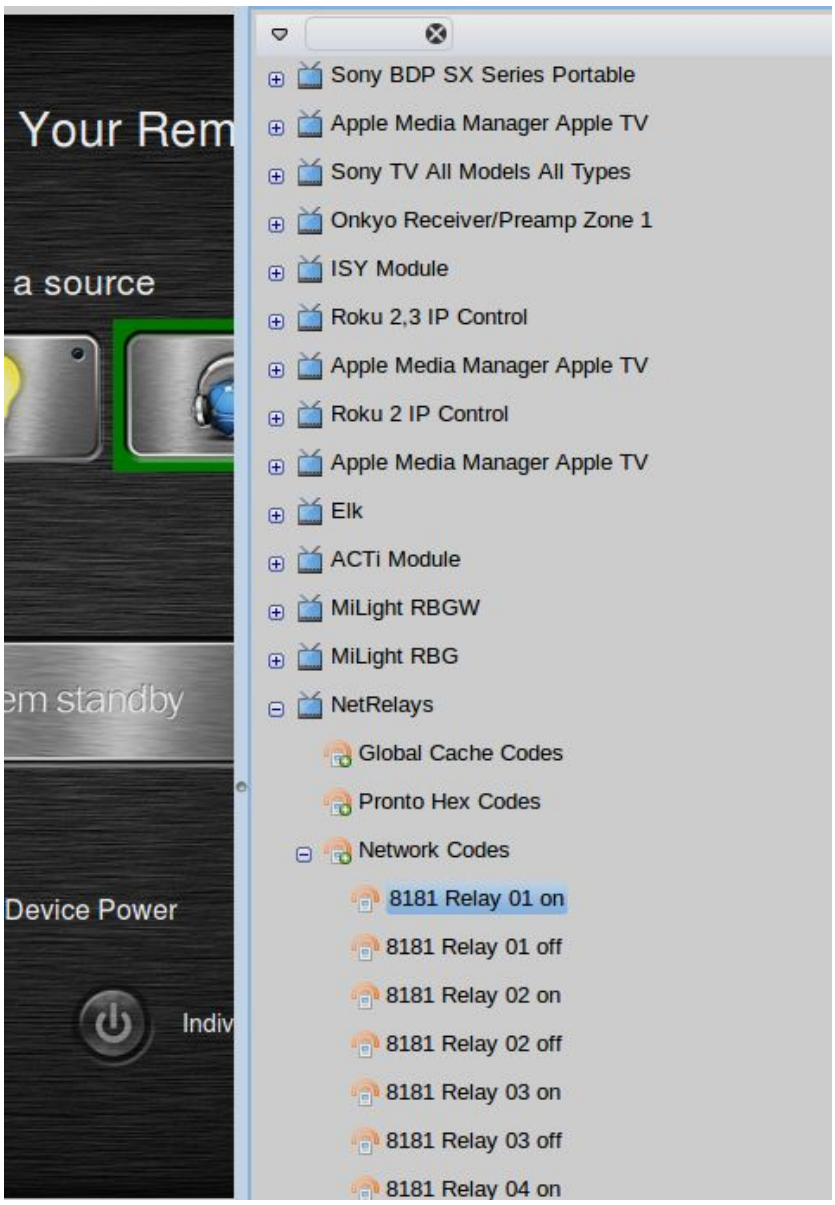
Home Automation Example

Here we give an example for using Relay Control, the ISY controller, and iRule Builder for setting up a home automation system. We show one button that will turn on the sprinkler system in the garden.



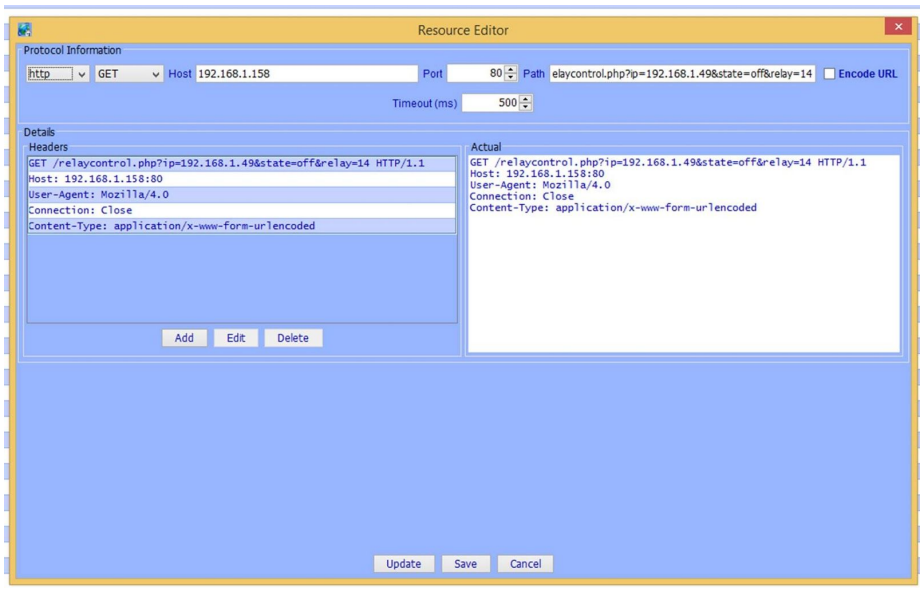
In the upper left panel, select **Automation** then **Landscape Pages**.

Then click **blank-small**. That is the button that is green. You can see what logic is attached to that screen by hovering the mouse over that.



On the right side of the screen on the devices tab you can see the logic that is attached to **8181 Relay 01 On** and **8181 Relay 01 Off**.

Here under the Devices tab we see **8181 Relay 01 On** and **8181 Relay 01 Off**.



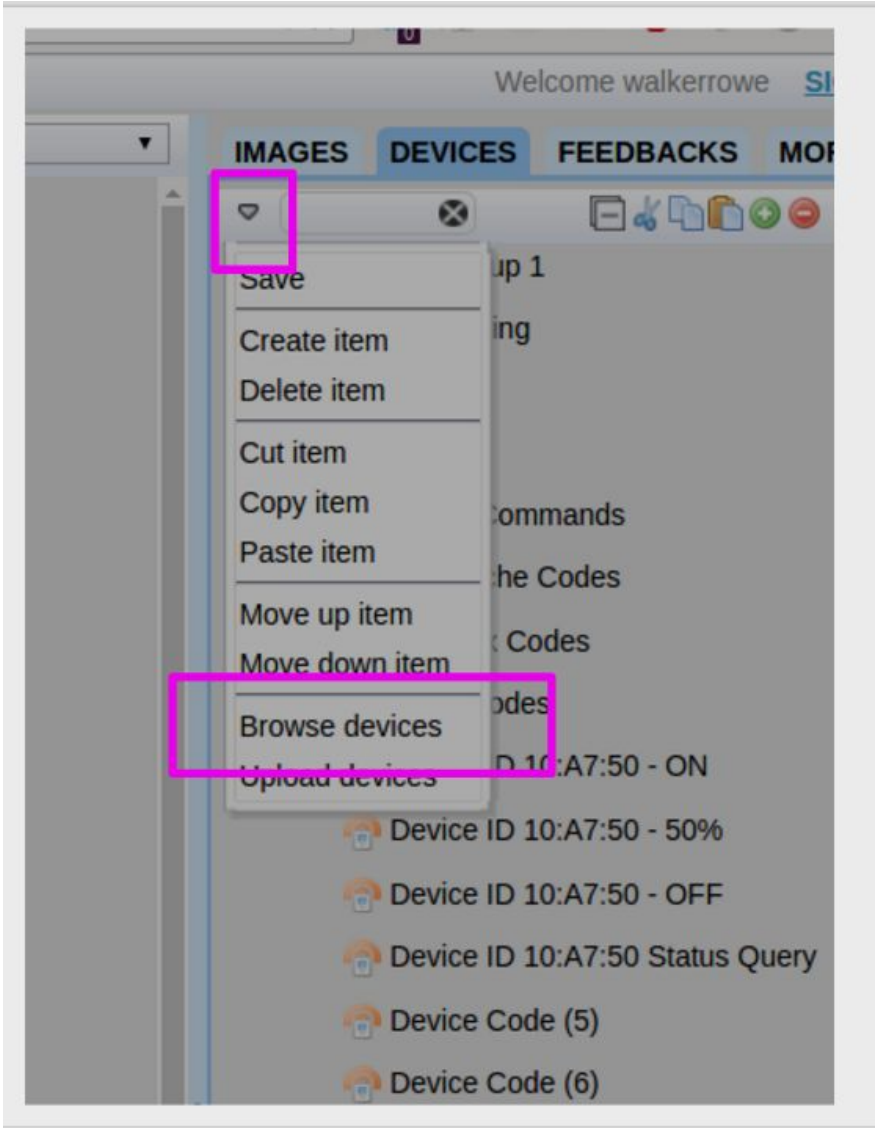
Here is how iRule is tied to the ISY Controller.

In the ISY screen for this relay you see **/relaycontrol.php?ip=192.168.1.49&state=on&relay=1**

That points back to the Relay Control website to send instructions there.

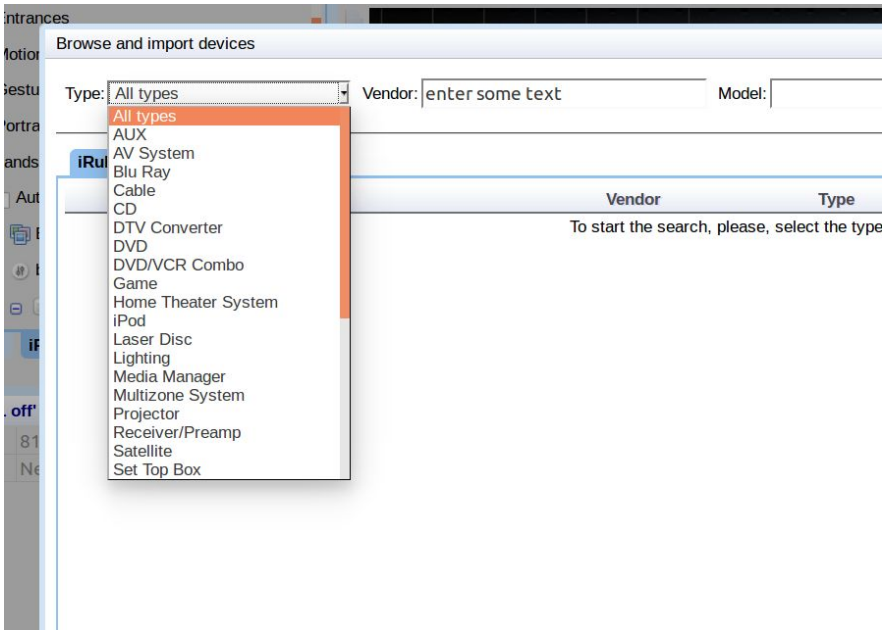
To get to that screen in ISY admin choose **configuration/network/network resources**. Then double-click on one of the resources to get this properties dialog.

Add Devices to iRule

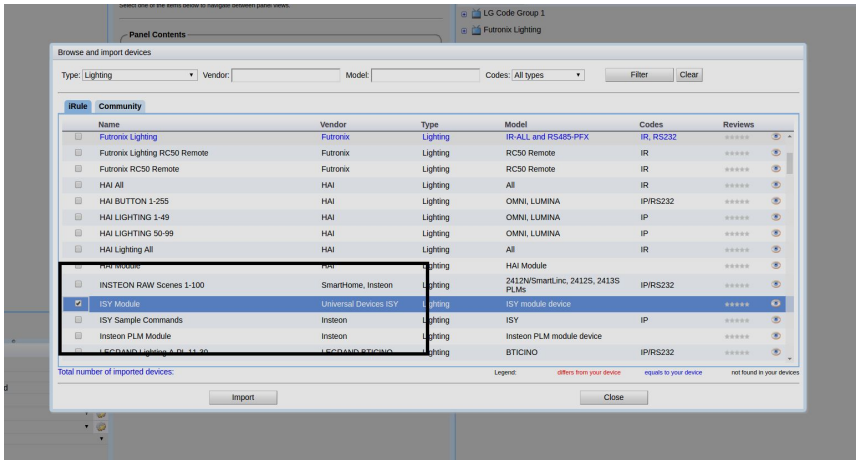


There are many device commands also stored in iRule. You use the search screen to add the ones that you need for your app.

To add a device, you click the **Devices** tab then **Browse devices**.



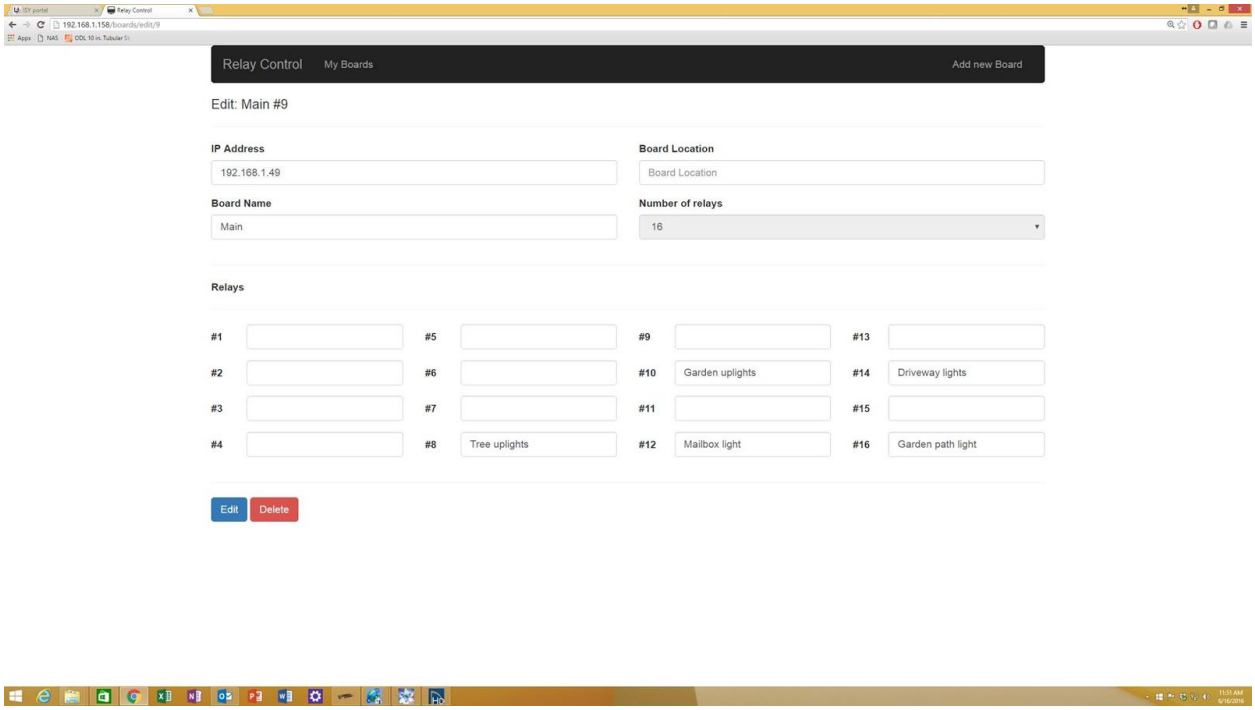
Type some text to search on like **Vendor**.



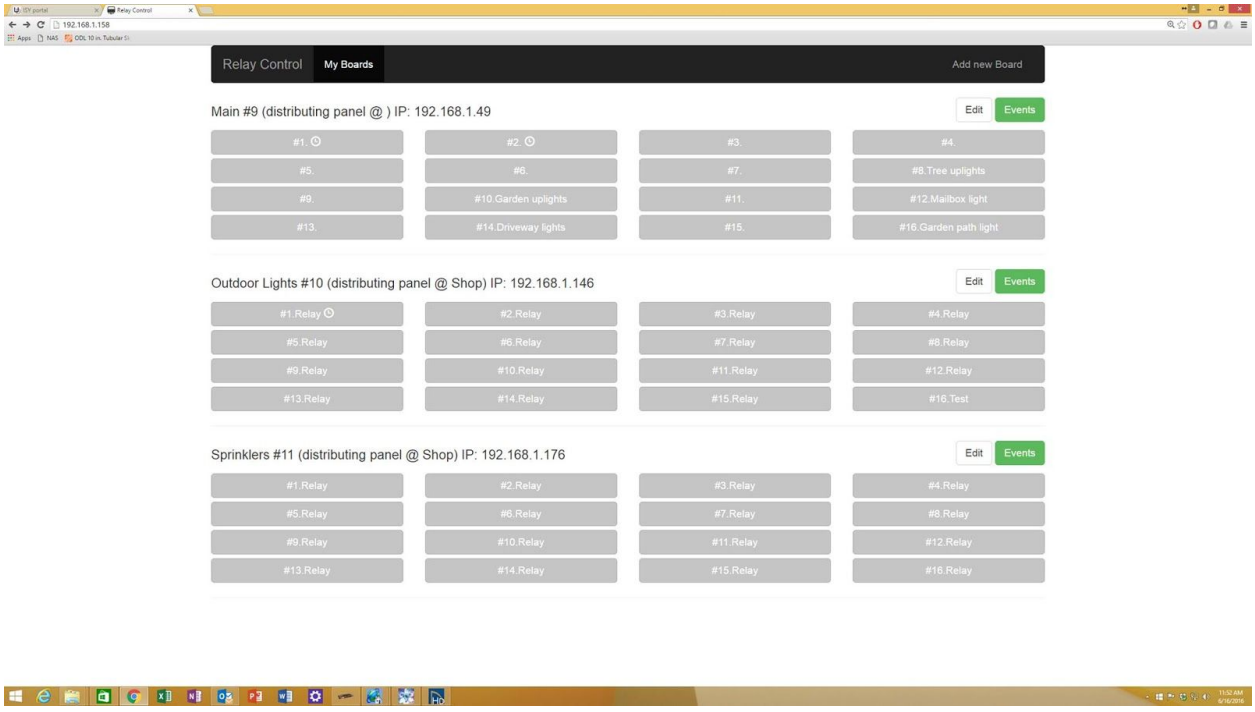
The screen lists the devices after the search screen. Click **Import** to add them to the list of available devices.

Relay Control Screen for Garden Lights

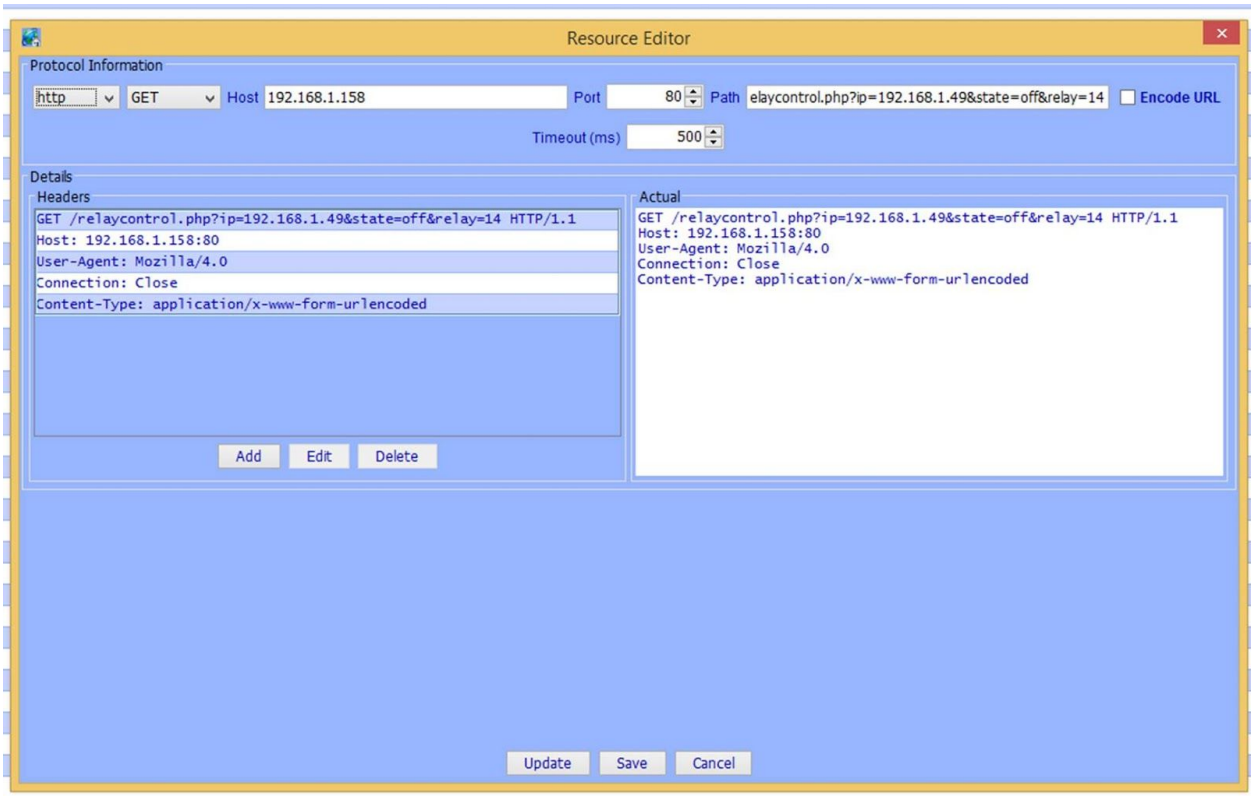
This is the screen is where you configure the ISY boards and relays.. Assuming you have installed Relay Control, you get to this screen by clicking **http://(IP address)/raspberry/NetRelay/**



Enter boards here.



And then enter relays.



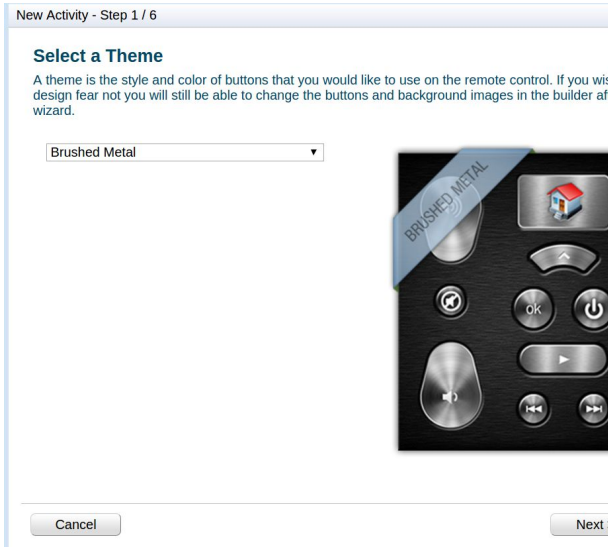
And here is that information once it has been exported to ISY. It provides the URL for /relaycontrol.php in Relay Control so that Relay Control can maintain the device **session.**

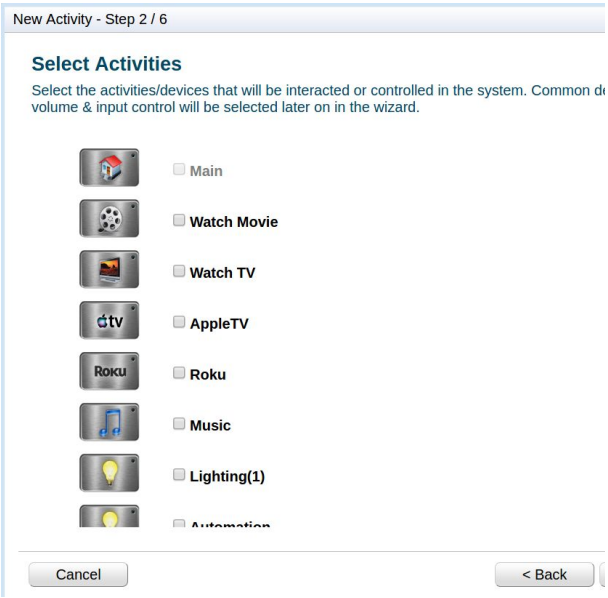
A **session** means treat the entire app as complete entity with devices that are marked as **on** or **off** and maintaining devices in a state of readiness so that they can receive more complex commands that just on or off like **rotate left** or **dim lights**.

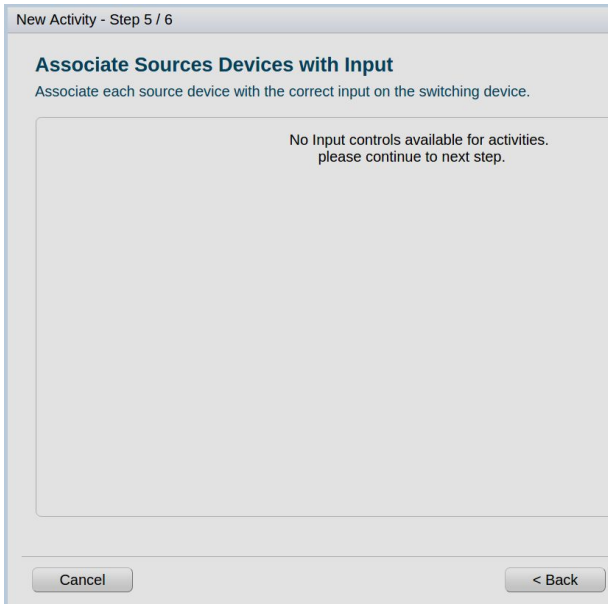
iRule New Activity Wizard

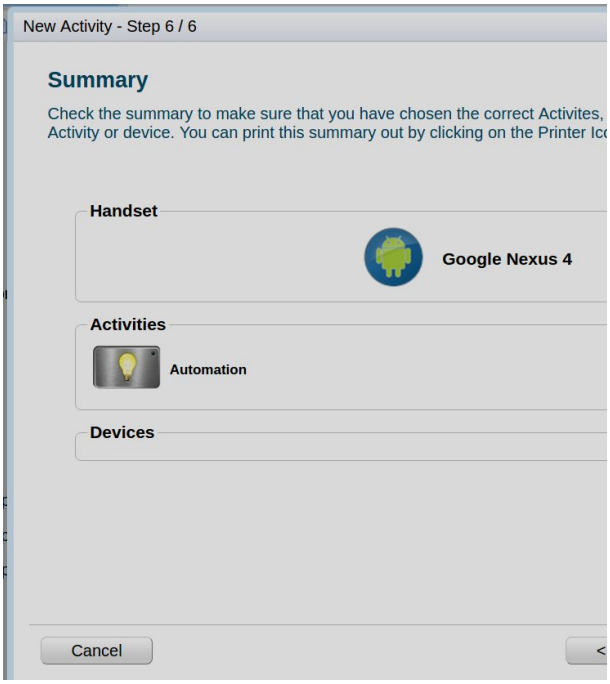
When you first login to iRule builder it will run the Activity Wizard. That builds a basic application with one activity screen for each device that you pick, like Roku.

The screens are self-explanatory. So we show them below without explanation.









Install iRule App on Mobile Device

Having completed your iRule app, now you need to install it on your cell phone or tablet.

From the iRule main menu select **File/Save** then **File/Backup**. Then install the iRule App from iTunes or Google Play on your mobile device.

The procedure is this. Below we show the screens.

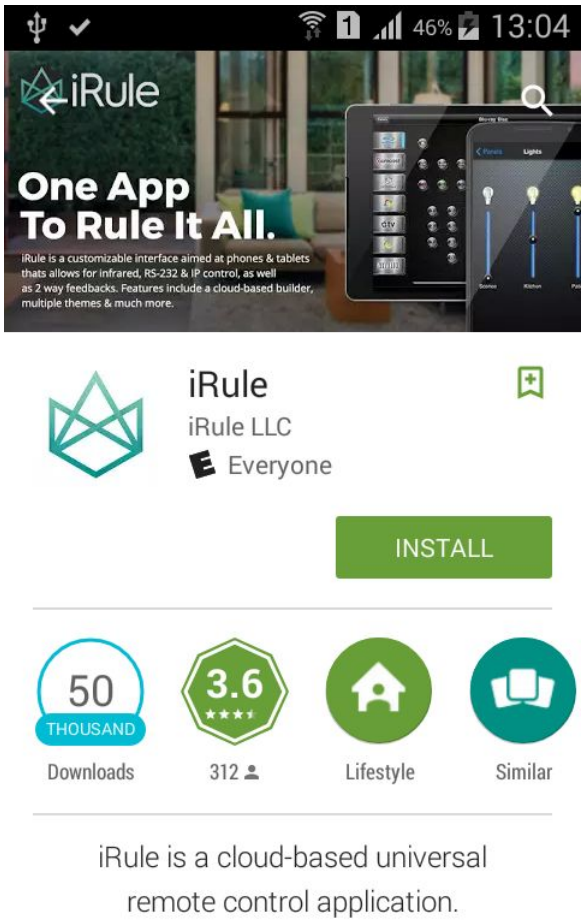
- Install iRule App on mobile device.
- Login to register with the iRule cloud.
- Download handset configuration.
- Configure gateway (Raspberry Pi) IP address.
- Configure device (relay board) IP address.

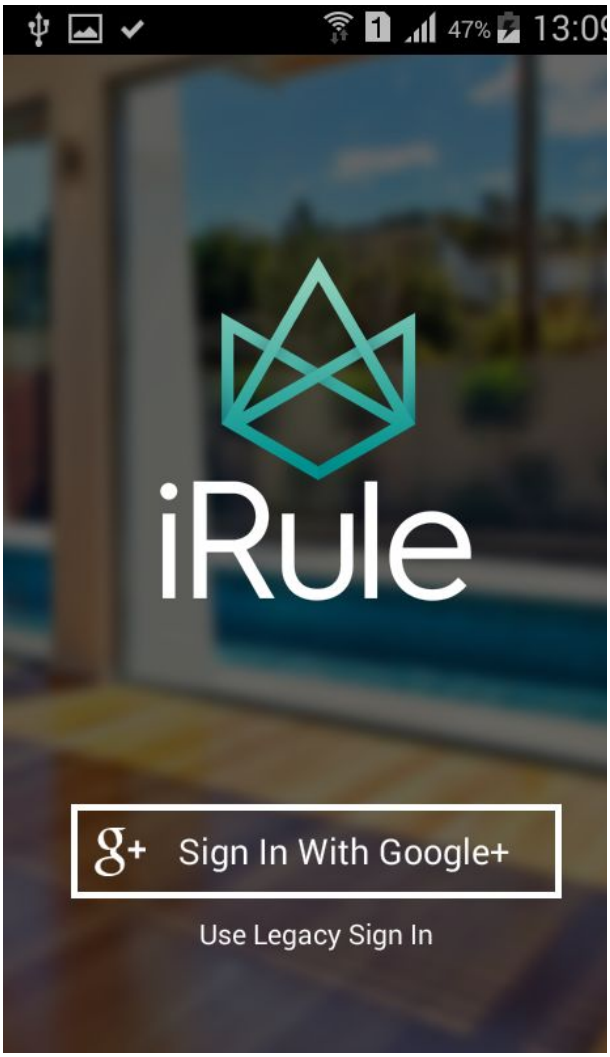
Note: If you get the error error **no available handsets** when you try to do the sync that means the screen size of your mobile device does not match any of the handsets you have configured in iRule. When you create a handset in iRule, if you do not see your device manufacturer and model just pick one with the same screen size.

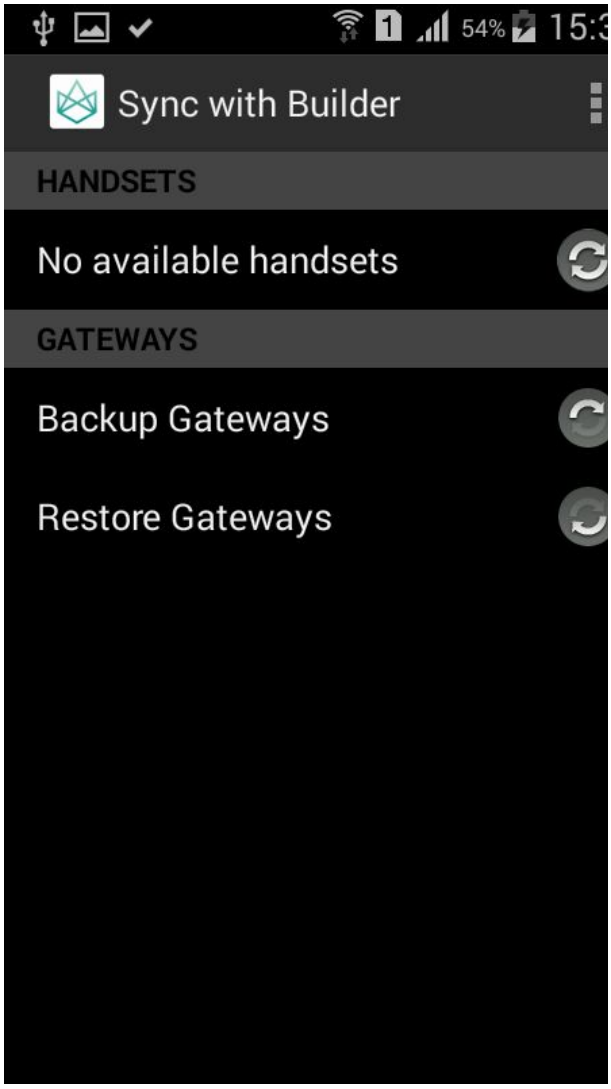
Sync iRule App to Mobile Device

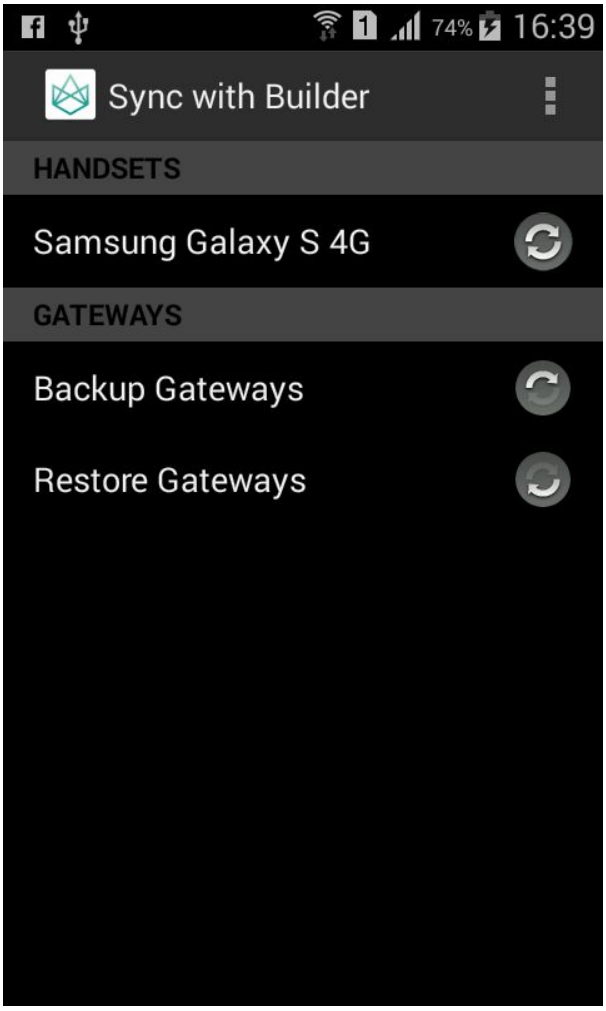
Here are the screens that show installing the iRule app, logging in, syncing (downloading) the app you have built in iRule, and configuring the IP addresses of the boards or other devices.

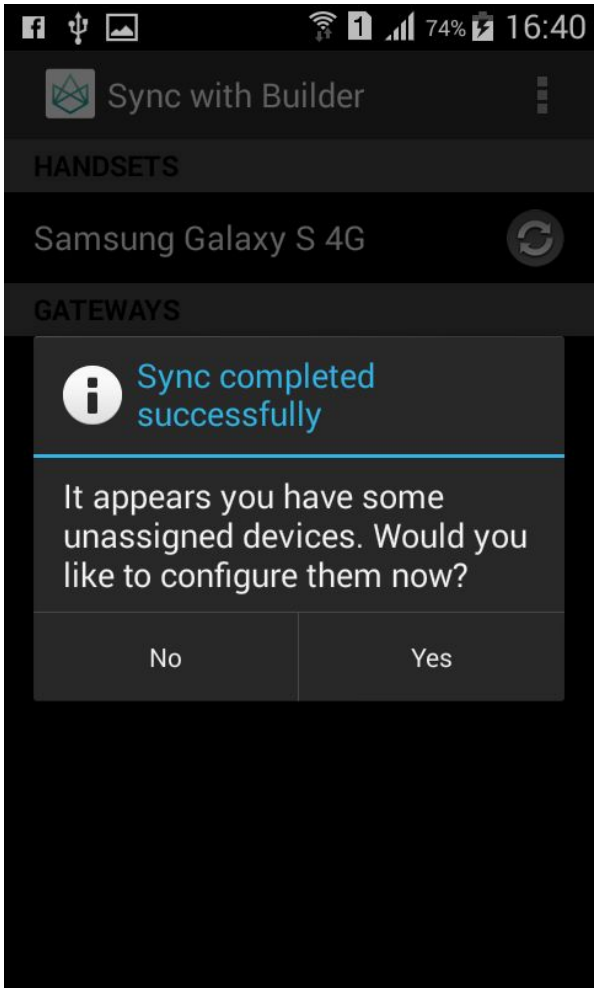
Since these screens too are self-explanatory we do not give any explanation.

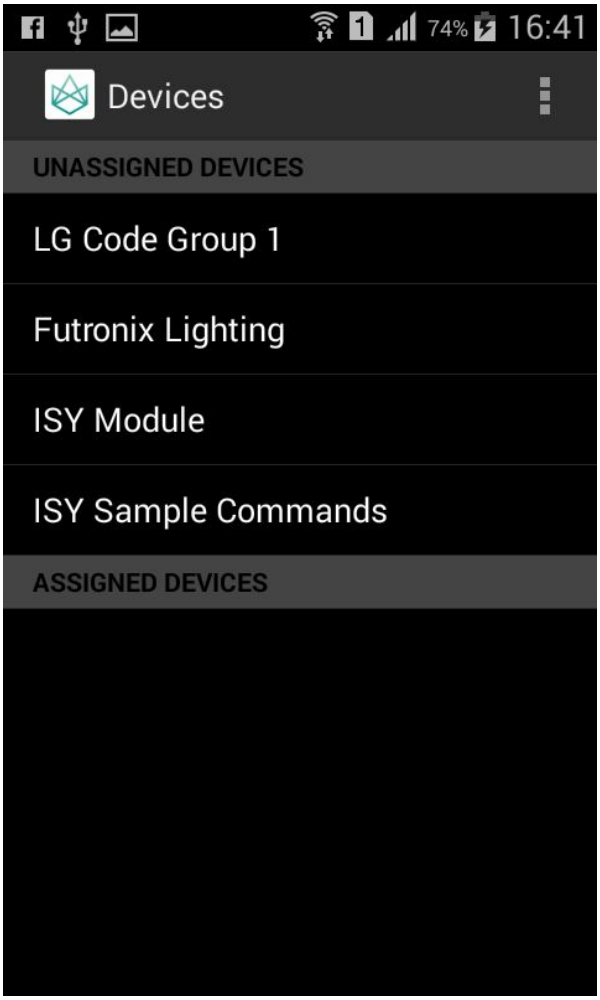


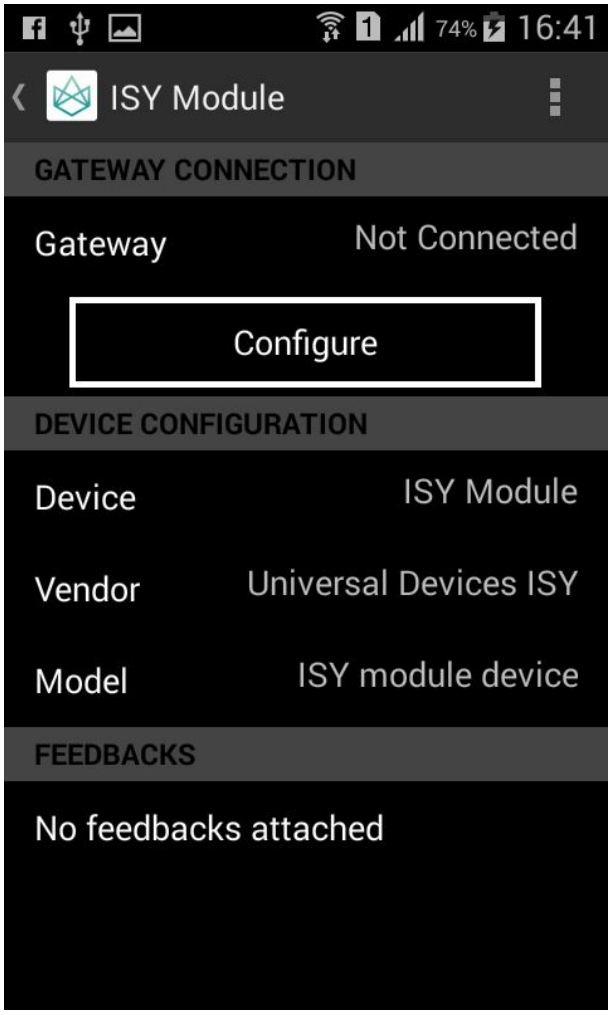


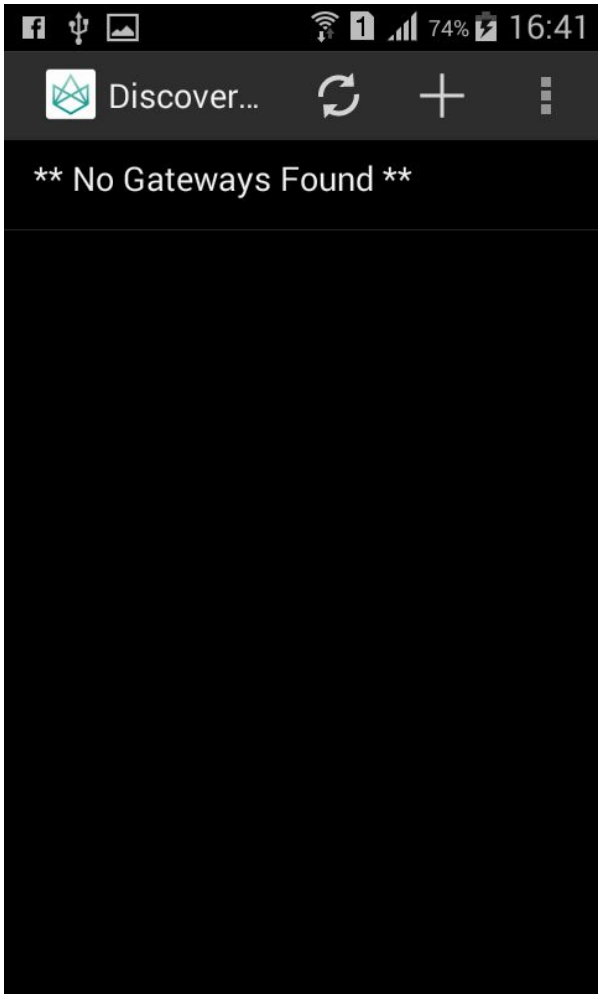










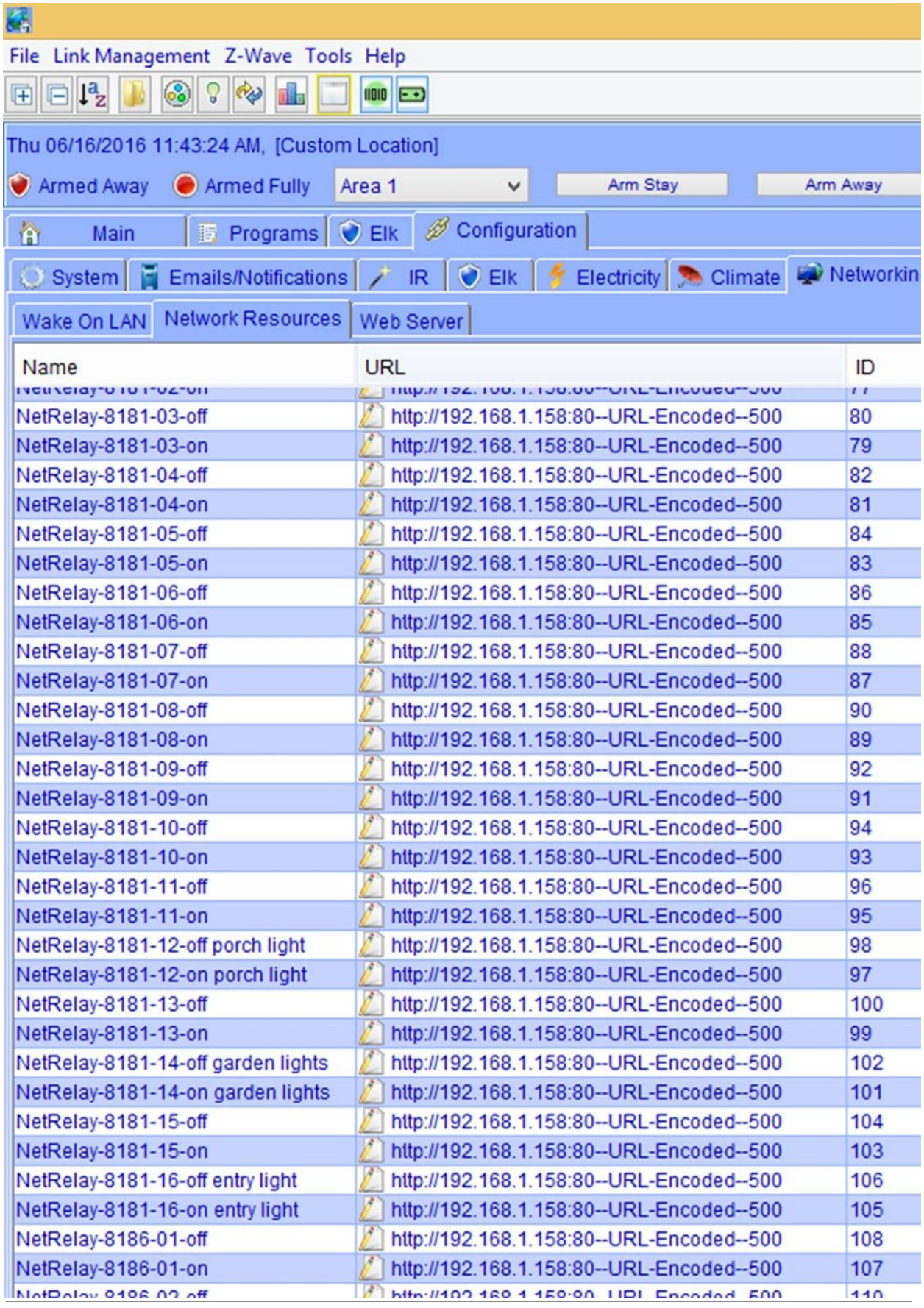


ISY Administrator Console

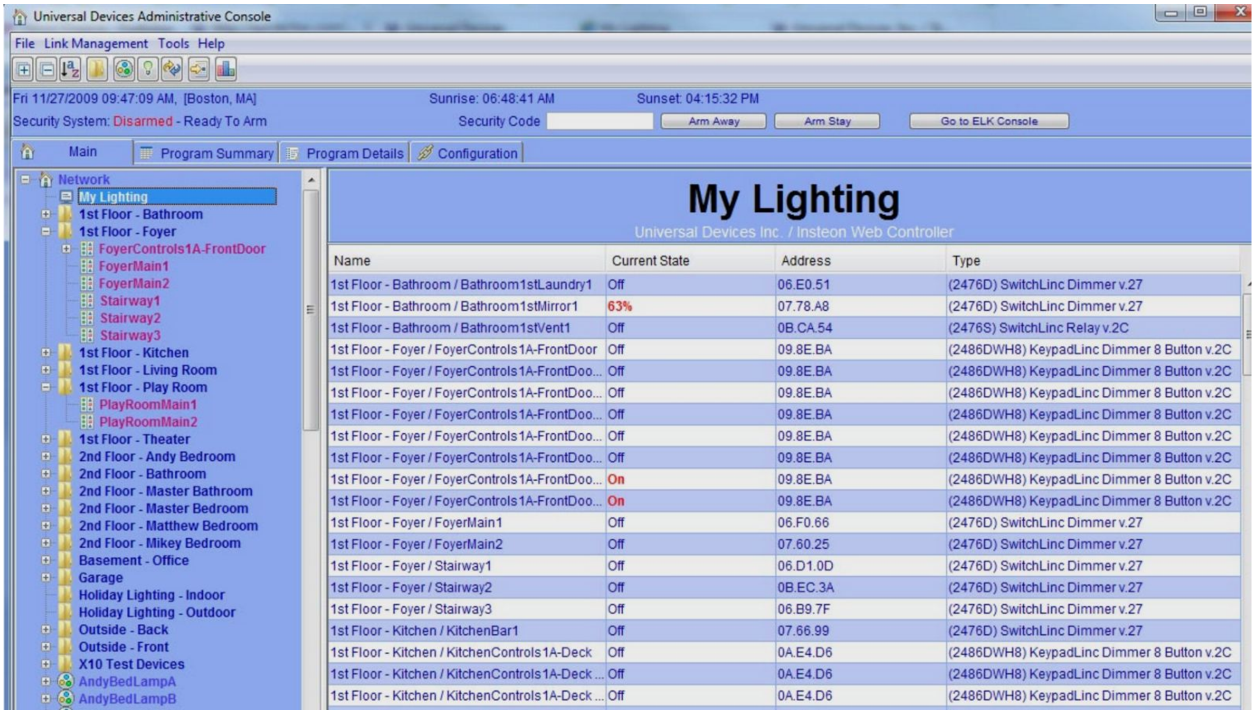
Follow the manufacturer's instructions for setting up the ISY controller card. Then login to the ISY administrator console.

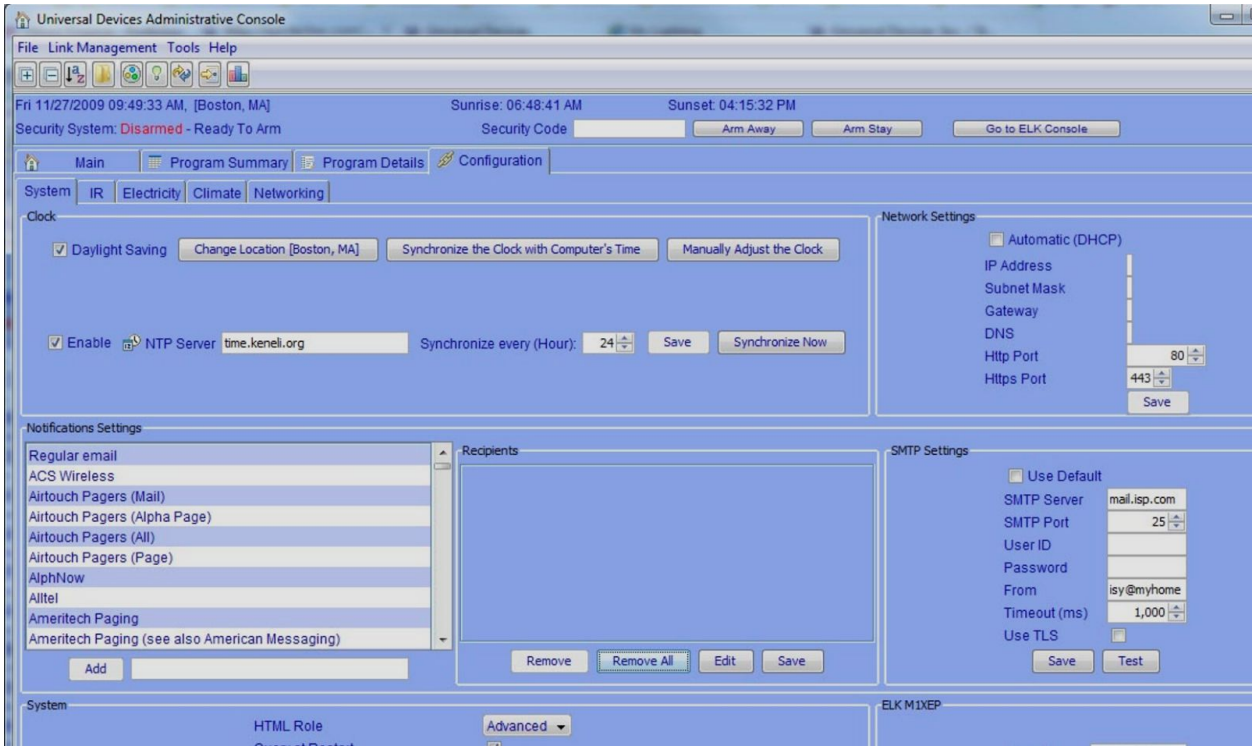
Then, ISY has a clunky config file import function. It simply downloads a new config file, overwriting the old one. So you can't simply add new configurations to the ISY. That's why we have written the ISY Utility explained below.

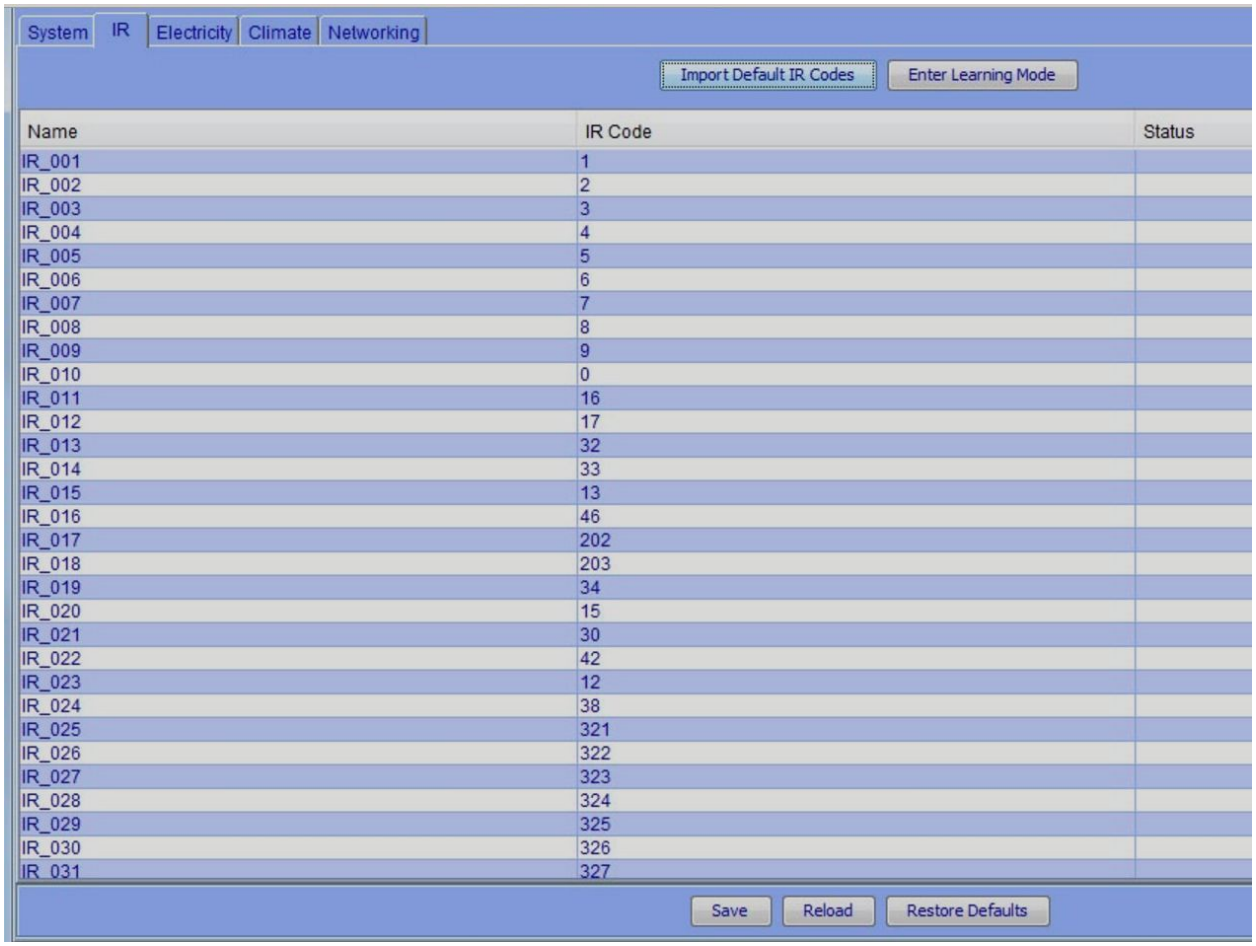
Below we show all the ISY screens. But first here is the screen related to the Garden Sprinkler and Garden Lights device we have set up in this example.

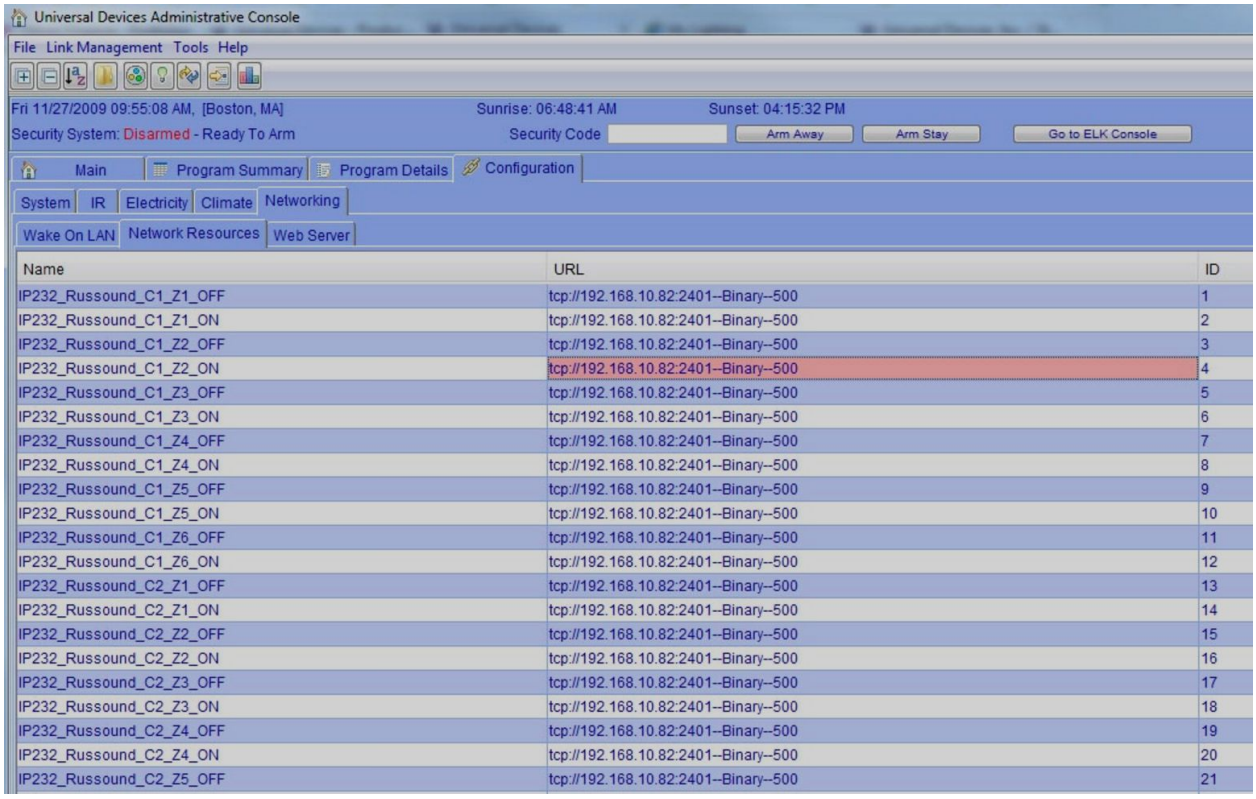


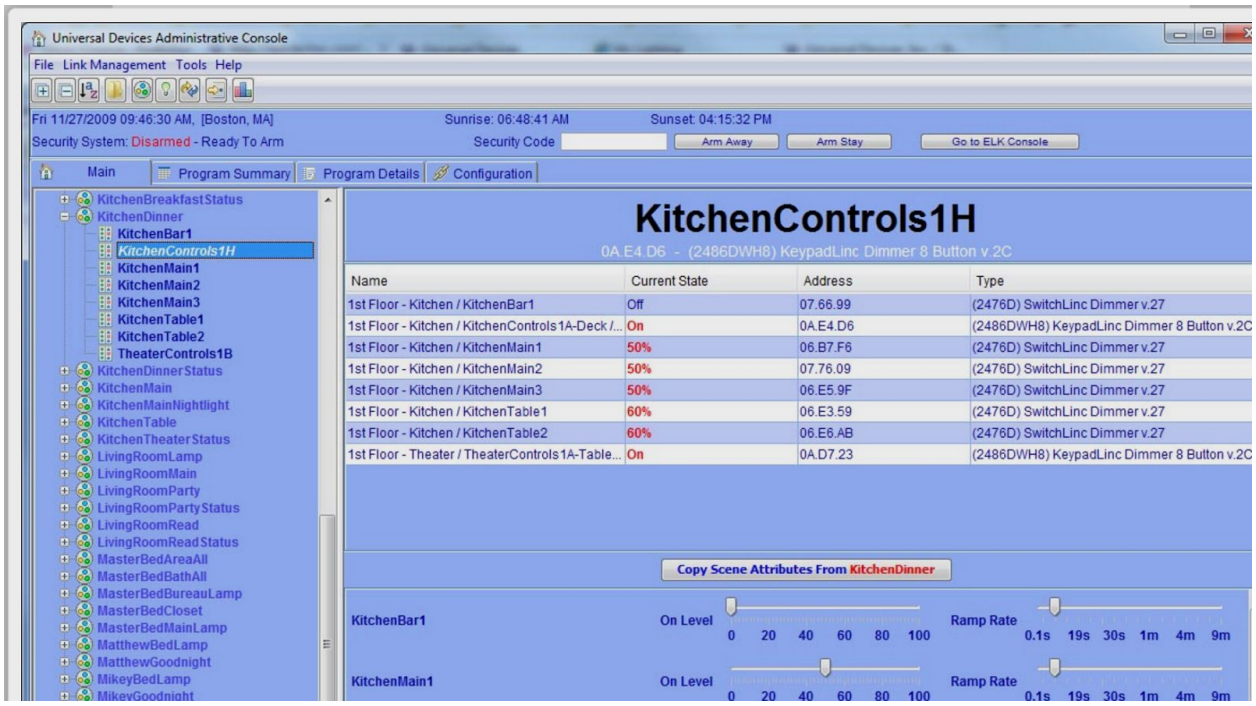
ISY Config Screens

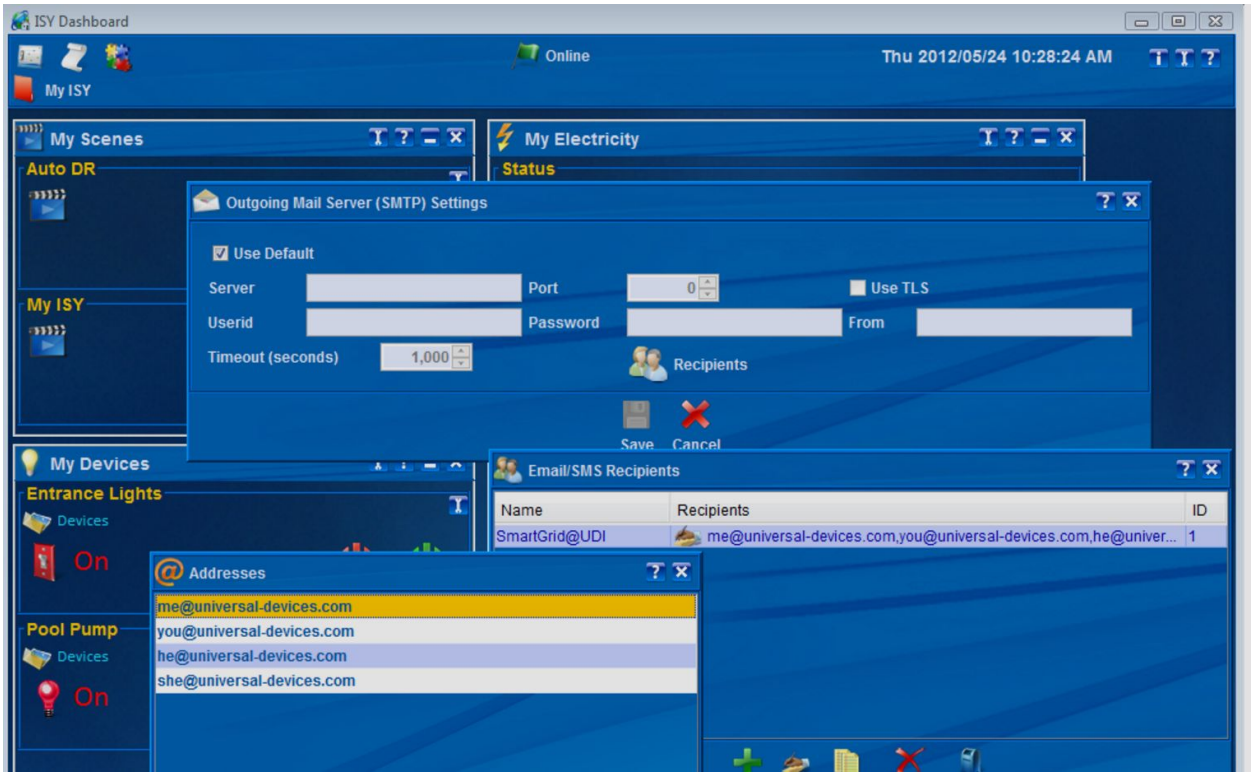







Universal Devices Administrative Console
File Link Management Tools Help
Fri 11/27/2009 09:55:08 AM, [Boston, MA]
Sunrise: 06:48:41 AM
Sunset: 04:15:32 PM
Security System: Disarmed - Ready To Arm
Security Code
Arm Away
Arm Stay
Go to ELK Console
Main
Program Summary
Program Details
Configuration
System
IR
Electricity
Climate
Networking
Wake On LAN
Network Resources
Web Server
Name
URL
ID
IP232_Russound_C1_Z1_OFF tcp://192.168.10.82:2401--Binary--500 1
IP232_Russound_C1_Z1_ON tcp://192.168.10.82:2401--Binary--500 2
IP232_Russound_C1_Z2_OFF tcp://192.168.10.82:2401--Binary--500 3
IP232_Russound_C1_Z2_ON tcp://192.168.10.82:2401--Binary--500 4
IP232_Russound_C1_Z3_OFF tcp://192.168.10.82:2401--Binary--500 5
IP232_Russound_C1_Z3_ON tcp://192.168.10.82:2401--Binary--500 6
IP232_Russound_C1_Z4_OFF tcp://192.168.10.82:2401--Binary--500 7
IP232_Russound_C1_Z4_ON tcp://192.168.10.82:2401--Binary--500 8
IP232_Russound_C1_Z5_OFF tcp://192.168.10.82:2401--Binary--500 9
IP232_Russound_C1_Z5_ON tcp://192.168.10.82:2401--Binary--500 10
IP232_Russound_C1_Z6_OFF tcp://192.168.10.82:2401--Binary--500 11
IP232_Russound_C1_Z6_ON tcp://192.168.10.82:2401--Binary--500 12
IP232_Russound_C2_Z1_OFF tcp://192.168.10.82:2401--Binary--500 13
IP232_Russound_C2_Z1_ON tcp://192.168.10.82:2401--Binary--500 14
IP232_Russound_C2_Z2_OFF tcp://192.168.10.82:2401--Binary--500 15
IP232_Russound_C2_Z2_ON tcp://192.168.10.82:2401--Binary--500 16
IP232_Russound_C2_Z3_OFF tcp://192.168.10.82:2401--Binary--500 17
IP232_Russound_C2_Z3_ON tcp://192.168.10.82:2401--Binary--500 18
IP232_Russound_C2_Z4_OFF tcp://192.168.10.82:2401--Binary--500 19
IP232_Russound_C2_Z4_ON tcp://192.168.10.82:2401--Binary--500 20
IP232_Russound_C2_Z5_OFF tcp://192.168.10.82:2401--Binary--500 21


Universal Devices Administrative Console
File Link Management Tools Help
Fri 11/27/2009 09:46:30 AM, [Boston, MA]
Sunrise: 06:48:41 AM
Sunset: 04:15:32 PM
Security System: Disarmed - Ready To Arm
Security Code
Arm Away
Arm Stay
Go to ELK Console
Main
Program Summary
Program Details
Configuration
KitchenBreakfastStatus
KitchenDinner
KitchenBar1
KitchenControls1H
KitchenMain1
KitchenMain2
KitchenMain3
KitchenTable1
KitchenTable2
TheaterControls1B
KitchenDinnerStatus
KitchenMain
KitchenMainNightlight
KitchenTable
KitchenTheaterStatus
LivingRoomLamp
LivingRoomMain
LivingRoomParty
LivingRoomPartyStatus
LivingRoomRead
LivingRoomReadStatus
MasterBedAreaAll
MasterBedBathAll
MasterBedBureauLamp
MasterBedCloset
MasterBedMainLamp
MatthewBedLamp
MatthewGoodnight
MikeyBedLamp
MikeyGoodnight
KitchenControls1H
0A.E4.D6 - (2486DWH8) KeypadLinc Dimmer 8 Button v.2C
Name
Current State
Address
Type
1st Floor - Kitchen / KitchenBar1 Off 07.66.99 (2476D) SwitchLinc Dimmer v.27
1st Floor - Kitchen / KitchenControls1A-Deck /... On 0A.E4.D6 (2486DWH8) KeypadLinc Dimmer 8 Button v.2C
1st Floor - Kitchen / KitchenMain1 50% 06.B7.F6 (2476D) SwitchLinc Dimmer v.27
1st Floor - Kitchen / KitchenMain2 50% 07.76.09 (2476D) SwitchLinc Dimmer v.27
1st Floor - Kitchen / KitchenMain3 50% 06.E5.9F (2476D) SwitchLinc Dimmer v.27
1st Floor - Kitchen / KitchenTable1 60% 06.E3.59 (2476D) SwitchLinc Dimmer v.27
1st Floor - Kitchen / KitchenTable2 60% 06.E6.AB (2476D) SwitchLinc Dimmer v.27
1st Floor - Theater / TheaterControls1A-Table... On 0A.D7.23 (2486DWH8) KeypadLinc Dimmer 8 Button v.2C
Copy Scene Attributes From KitchenDinner
KitchenBar1
On Level
0 20 40 60 80 100
Ramp Rate
0.1s 19s 30s 1m 4m 9m
KitchenMain1
On Level
0 20 40 60 80 100
Ramp Rate
0.1s 19s 30s 1m 4m 9m



ISY Utility

Use this program to edit board and relay information in Relay Control and then upload that to the ISY Controller. You can run this utility runs on your Raspberry Pi or anywhere you have Python installed on the local network.

1) Download the syconfig.py program from Github here. You need Python installed to run this utility.

2) Edit this line to indicate some folder where the program can save its zipped configuration file.

   ZIP_PATH_FILE = 'Config.zip'

   For example **/var/www/html/Config.zip** is the default home folder for the Apache web server installed on the Raspberry Pi.

3) Run the program like this from a command prompt:

   ./isyconfig.py (ip Address of Relay Cntrol admin page) (IP Address or ISY admin page)

Raspberry Pi

You need to do these three items on the Raspberry Pi. Look for instructions on those on Google and on the Raspberry Pi web site:

1. Install Raspbian.

2. Install relay card with web server.

3. Configure relay card information in web server.