

Control your UPB Devices from the RUC-02 in three different ways:

- Schedule
- Buttons on the Control Panel (and your mobile device)
- Commands (commands generated from other UPB transmitters)

One of the primary applications for the Web Mountain RUC-02 is to provide automated control for UPB (Universal Powerline) devices. With the RUC-02, you can control your UPB devices from a schedule, by pressing a button on the RUC's Control Panel (or your mobile device), or by triggering from a UPB command detected on the Powerline Network.

In order to setup this control, we will use what we refer to as Triggers using an IF THIS THEN THAT procedure. We will go through all three trigger types, but let's start with the Schedule Trigger. From the Home Page, click on the Trigger item on the left hand menu. Notice there are two sections—Receive and Send.



Schedule Triggers

For a Scheduled Trigger, use the dropdown on the left side of the Receive block and select Sched (Sched is the default setting and will come up when the Trigger menu item is selected. Here is what the Receive block with Schedule selected looks like:

Triggers

Receive Command

<p>Command Type: <input style="width: 100%;" type="text" value="(S) Sched"/></p>	<p>Trigger Name: <input style="width: 80%;" type="text" value="Landscape Lights On"/></p> <p>H: <input style="width: 40px;" type="text" value="0"/> (24 hr clock)</p> <p>M: <input style="width: 40px;" type="text" value="0"/></p> <p>Use Hrs and Mins as:</p> <p> <input type="radio"/> Actual Time <input type="radio"/> Time before sunrise <input type="radio"/> Time after sunrise <input checked="" type="radio"/> Time before sunset <input type="radio"/> Time after sunset </p> <p> <input checked="" type="checkbox"/> Sun (S) <input checked="" type="checkbox"/> M (M) <input checked="" type="checkbox"/> Tue (T) <input checked="" type="checkbox"/> W (W) <input checked="" type="checkbox"/> Thu (R) <input checked="" type="checkbox"/> F (F) <input checked="" type="checkbox"/> Sat (U) </p> <p> <input checked="" type="radio"/> Send on schedule <input type="radio"/> Random (+/- 30 min) </p> <p> <input type="radio"/> Home <input type="radio"/> Vacation <input checked="" type="radio"/> Both </p>
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First, you must give the Trigger a name. Pick something descriptive so that you know what it means later. Then, you need to select the TIME you want the Trigger to activate. This is the IF THIS part of the equation. For example, if it is SUNSET, THEN do something. Or IF IT IS 11:15 PM, THEN do something. NOTICE that the Hours (H) use a 24 hour clock. 11 PM would be 23:00. For SUNRISE, either pick Time Before Sunrise or Time After Sunrise. One you pick one of those, then the Hours / Minutes allow you to select the amount of time before sunrise or the amount of time after Sunrise that the trigger activates. For example, if you selected Time Before Sunrise and set Hours to 0 and Minutes to 15, the trigger would fire 15 minutes before sunrise. Same with SUNSET. You can select which days of the week the trigger will fire by checking or unchecking the days of the week.



There are two other options:

- You can decide to send the trigger command on Schedule, or Randomize the time (+ / - 30 minutes). When you send On Schedule, it will send out the command exactly at the time you selected, for example SUNSET or 11:15 PM. If you Randomize, then the command can be sent anytime within the range of + / - 30 minutes and it will be different each time it triggers.
 - You can also set up Triggers to only run in the HOME or the AWAY modes (or both). By default, the MODE is set on the Device Configuration page (with the default being HOME mode). If the system is in the HOME mode, then only Triggers set to run in the HOME mode or BOTH will run. VACATION mode triggers will not run in this mode.
- NOTICE that this example trigger has a name of Landscape Lights On and is set to run at SUNSET (since the Hours and Minutes are set to 0), every day of the week, ON SCHEDULE, and in BOTH Modes (Home and Vacation).
- Ok, now let’s look at the SEND section. This section is the THEN DO THIS part of the IF THIS THEN THAT equation. There are two types of UPB commands—UPB Direct and UPB Link (also known as a SCENE). A Direct Command controls a device while a Link Command (scene) controls a scene. Let’s start with the Direct Command. From the dropdown on the left, select UPB Direct (default). Here is the next Send Command block.

Here is where you configure what UPB command is to be sent. If you have exported your UPB network into the RUC using the Export feature within Upstart, then the NID (Network ID) will already be shown as your network’s NID. Similarly, with that export, all of your devices will show up in the dropdown to the right of DID where it says “Other Device”. However, if you have not exported your network into the RUC from Upstart, then you will need to manually enter in your UPB network’s NID, then make sure the

Dropdown says “Other Device”, then manually enter the Device ID of the device you wish to control. Next, use the dropdown next to CMD and select the appropriate command, such as Activate. You can set the # of Transmissions from 1 to 4. Then, make sure the Com Port is set to the appropriate port where the Serial PIM is connected to the RUC. Then, press Add Trigger.



That’s all there is to creating UPB trigger in the RUC-02.

I had mentioned that you can export your UPB network from Upstart into the RUC-02. I won’t discuss how to do that in this application note but if you had done that, then the Dropdown next to DID would be populated with all the individual devices from your network and would look like this:

Notice that the dropdown shows Loft—Test AM. The device name is Test AM and it’s in room Loft and it has Device ID 1 (populated in the text box next to DID and the name).

Ok, now let’s verify that the Trigger was properly programmed into the RUC. Go to the Bottom of the Trigger page and you will see this:

Trigger List

Buttons - View Page(s) View None ▾

Schedules - View View None ▾

Commands - View View None ▾

When you click on the dropdown next to Schedules—View, you will get two options:

- View None
- View All

Select View all.
You will see this:

Trigger List

Buttons - View Page(s) View None ▾

Schedules - View View All ▾

Commands - View View None ▾



This sections shows all of your triggers, in this case, all of your Schedule Triggers. Right now, since we have only added one trigger, there is only one shown. If you had 20 Schedule Triggers, they would all show up here. Notice that for each trigger, it shows you the Trigger Name, the time it is set to run, the days of the week when it will run and whether it is sent on Schedule or Randomized. Then, notice that it also shows the Room—Device Name, and the programmed Command, in this case Activate.

Also, there are three buttons where you can manually RUN the Trigger without having to wait for the Receive action (in this case, a scheduled time), EDIT the trigger (for example, changing the time from 11:00 PM to 11:15 PM), and you can DELETE the trigger.

When you are in the EDIT mode, you will see that the Receive dropdown (Sched) and Send Dropdown (UPB Device) are grayed out. You can not edit these two items. To change those, you will need to Delete the trigger and re-enter it.

Now, for this UPB device, we programmed it to turn ON by using an Activate command. Now, we need to add a second trigger to turn it OFF. So, you program it just like you programmed the ON time. First, in the RECEIVE section, select a different unique trigger name (Landscape Lights OFF), but now we're going to select an ACTUAL TIME.

We'll use 23:00 hours or 11 PM. Send ON SCHEDULE, and select BOTH.

In the SEND section, select UPB Direct in the Command Type dropdown, a NID of 1 and a DID of 1 (just like in the other trigger), but now select the DEACTIVATE command. Use 2 for the # of Transmissions, COM1. Here it is with the selections:

Then click on Add Trigger.

Triggers

Receive Command	
Command Type: (S) Sched	Trigger Name: Landscape Lights Off H: 23 (24 hr clock) M: 0 Use Hrs and Mins as: <input checked="" type="radio"/> Actual Time <input type="radio"/> Time before sunrise <input type="radio"/> Time after sunrise <input type="radio"/> Time before sunset <input type="radio"/> Time after sunset <input checked="" type="checkbox"/> Sun (S) <input checked="" type="checkbox"/> M (M) <input checked="" type="checkbox"/> Tue (T) <input checked="" type="checkbox"/> W (W) <input checked="" type="checkbox"/> Thu (R) <input checked="" type="checkbox"/> F (F) <input checked="" type="checkbox"/> Sat (U) <input checked="" type="radio"/> Send on schedule <input type="radio"/> Random (+/- 30 min) <input type="radio"/> Home <input type="radio"/> Vacation <input checked="" type="radio"/> Both
Send Command	
Command Type: (D) UPB Direct	NID: 1 DID: 1 Loft - Test AM CMD: Deactivate # of Transmissions: 2 Com Port: (1) COM1
Add Trigger	



Now go back to the bottom, select View All from the Schedules—View dropdown and you’ll see both Schedule triggers we’ve added—one for the ON time and one for the OFF time.

Trigger List

Buttons - View Page(s) View None v

Schedules - View View All v

Landscape Lights On Run at Time: Sunset SMTWRFU Send on Schedule Direct: Loft - Test AM, Command: Activate	Run Edit
	Delete
Landscape Lights Off Run at Time: 11:00 PM SMTWRFU Send on Schedule Direct: Loft - Test AM, Command: Deactivate	Run Edit
	Delete

Ok, we’ve added in a couple of UPB Direct Scheduled triggers. Now, let’s add a UPB Link Scheduled trigger. The process is almost identical to the UPB Direct process. In fact, the Receive section is IDENTICAL but choose a different unique Trigger name and select the time that is appropriate for this link trigger. In this example, let’s call the Trigger “Leave Home” and run it at 7:15 AM every weekday but not on weekends. Here is the Receive Section:

Receive Command

Command Type: <input type="text" value="(S) Sched"/>	Trigger Name: <input type="text" value="Leave Home"/> H: <input type="text" value="7"/> (24 hr clock) M: <input type="text" value="15"/> Use Hrs and Mins as: <input type="radio"/> Actual Time <input type="radio"/> Time before sunrise <input type="radio"/> Time after sunrise <input checked="" type="radio"/> Time before sunset <input type="radio"/> Time after sunset <input type="checkbox"/> Sun (S) <input checked="" type="checkbox"/> M (M) <input checked="" type="checkbox"/> Tue (T) <input checked="" type="checkbox"/> W (W) <input checked="" type="checkbox"/> Thu (R) <input checked="" type="checkbox"/> F (F) <input type="checkbox"/> Sat (U) <input checked="" type="radio"/> Send on schedule <input type="radio"/> Random (+/- 30 min) <input type="radio"/> Home <input type="radio"/> Vacation <input checked="" type="radio"/> Both
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But, now, in the Send Section, select UPB Link from the Command Type dropdown on the left. Enter in your NID, then enter in the Link # that is associated with the Leave Home Scene (in this case, Scene 2 is associated with the LEAVE HOME scene). If you have exported your network from Upstart, then all the Scenes will show up in the dropdown to the right of the LID (Link ID) text box. Select your command (Activate in this case). Select your # of transmissions and make sure the COM port is set to the port where the Serial PIM is plugged in (normally COM1). Here is the completed Send Section:

Now, click on Add Trigger. If we now go down to the bottom and click on the Schedule—View dropdown, we’ll see all three triggers—the two Direct Triggers and the one Link Trigger.

Trigger List

Buttons - View Page(s) View None

Schedules - View View All

- Landscape Lights On
Run at Time: Sunset -00:05 | SMTWRFU | Send on Schedule
Direct: Loft - Test AM, Command: Activate

Run Edit Delete
- Leave Home
Run at Time: Sunset -07:15 | MTWRF | Send on Schedule
Link #2: Scene002, Command: Activate

Run Edit Delete
- Landscape Lights Off
Run at Time: 11:00 PM | SMTWRFU | Send on Schedule
Direct: Loft - Test AM, Command: Deactivate

Run Edit Delete

Commands - View View None



Ok, that was Schedule Triggers. Easy, wasn't it?

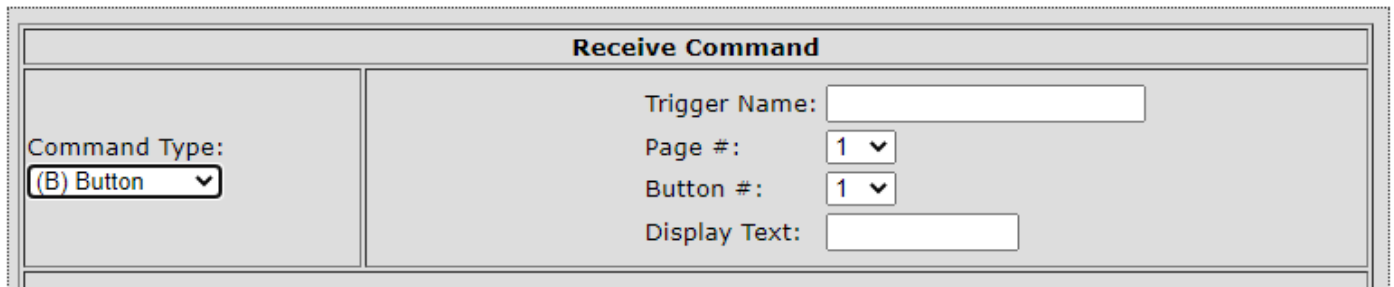
One word of caution with Schedule Triggers. At the current time, the RUC cannot reliably run two schedule triggers at the same time. If you need to control multiple devices at the same time, setup a Link / Scene and add all devices to that Scene, or setup two separate triggers spaced one minute apart.

Now, let's move to Button triggers. Again, referring to IF THIS, THEN DO THAT, a Button Trigger would be IF THIS Button is pressed then, do this action.

Button Triggers

For a Button Trigger, use the dropdown on the left side of the Receive block and select Button. Here is what the Receive block with Button selected looks like:

Triggers



Receive Command	
Command Type:	Trigger Name: <input type="text"/>
(B) Button	Page #: 1
	Button #: 1
	Display Text: <input type="text"/>

First, just like with a Schedule trigger, you must give the Trigger a name. Pick something descriptive so that you know what it means later. Now, we need to discuss what the Page #s and Button # refer to.

When you enter a Button Trigger, you are creating a button that will show up on the Control Panel (on the left hand menu on the RUC User Interface (UI), right under Triggers). The Control Panel serves two purposes. First, the Control Panel gives you a simple user interface from any browser to quickly and manually control UPB devices and scenes. Second, the Control Panel is how our mobile app for the RUC is set-up—the buttons that show up on the Control Panel are the buttons you see on the app, albeit with a prettier interface. The Control Panel has 10 pages and you can have 10 buttons per page, for a total of 100 buttons. Just remember that in many cases, you will need an Activate (or ON) button and also a Deactivate (or OFF) button for each device and or Scene.

Buttons can be used to create Button triggers that send out any of the command types listed as Send Types (UPB Direct, UPB Link, Email, Ethernet, GET / POST, or MODE).

As an example, you could easily setup a Button Trigger to change the mode from Home to Vacation and back again.



Here are a couple of screenshots showing the Control Panel and also what the Control Panel looks when mirrored into our mobile app:



Control Panel Web Mountain RUC

- Home
- Networking Config
- Device Config
- Admin
- UPB Transmission
- UPB Status
- Receive
- Triggers
- Control Panel
- Export/Voice
- Backup/Restore

Upper

Loft Cans On	Loft Cans Off
Loft Overhead On	Loft Overhead Off
Loft Fan On	Loft Fan Off
Loft On	Loft Off
Upper BR Light On	Upper BR Light Off

[Master Bed Room](#) | [Downstairs](#) | [External](#) | [Music](#) | [WLED Xmas Lights](#) | [Christmas](#) | [Upper](#) | [Ethernet](#) | 9 | 10

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Notice that the buttons that were added to the Control Panel are identical to what shows up on the app. This is how you design the user interface on the mobile app.

Also, notice that the pages on the Control Panel are listed as 1—10, but you can relabel the numbers to names for greater clarity.



At this point, you should give some thought as to how you want to layout the Control Panel User Interface. Consider making a page refer to devices or scenes in a room and then relabel that page to a room name, for example, Kitchen, or Master Bedroom, or Outside. Then, add Button triggers to that page that correspond to that room. However, you can organize them as you desire.

Next, the layout of the buttons on the pages are 1—5 in the first column, then 6—10 in the second column. So, if you need an ON and an OFF button for a device, you might want to put the ON button at button #1, then the OFF button at button #6, to the right of the ON button.

So, you’ve given some thought as to how you want the buttons laid out—now it’s time to create the buttons. You’ve already given the Trigger a name, so now use the Page # dropdown and select the page where you want your new button to be located (pages will be shown as #s if you haven't labeled them or will show the label name if you did give the page a name). Then, use the Button # dropdown and select the button location where you want this button.

Now, you get to create the label or name that goes on the actual button. Normally, this will match the label you provided for the Trigger Name above, but it doesn’t have to— just realize that long names will wrap on the button making it harder to read the button label—shorter and sweeter is better.

Now, go the SEND section and setup your UPB Direct or UPB Link just as you did for a Schedule trigger—the setup is identical. Do you remember how you did that? If not, go back to page 3 of this Application Note and follow those instructions.

Once you’ve setup the Send section, click on Add Trigger. That’s it—you’ve created a button trigger!

To verify the Trigger, go to the bottom of the page , under Trigger List, and use the dropdown next to BUT-TONS—View Page(s). However, notice there’s a difference with this View—you can Select View None, View All, or you can select a single page from the 10 pages of the Control Panel. Here’s a small example:

Trigger List

Buttons - View Page(s)

Loft Cans On
 Page: Upper Button: 1 Text: Loft Cans On
 Direct: Loft - Cans, Command: Activate
 NetworkID #55 | Com Port: 1

Run
Edit
Delete

This shows you the page the button is on, the text for the button, the device or scene being controlled, and the command, along with the NID and Com port. Also, just like with the Schedule Trigger, you can Run, Edit, or Delete the Trigger.



Command Triggers

Ok, now let's show you how to setup a Command Trigger. Again, referring to IF THIS, THEN DO THAT, a Button Trigger would be IF THIS UPB COMMAND IS RECEIVED ON THE AC POWERLINE then do some action.

While the RUC-02 is normally used as a Transmitter to send commands out to control devices and scenes, it can also monitor the powerline and detect any command that might be sent from another device on the UPB network. It can then use those commands to trigger sending out a separate UPB command (or other Send command if desired).

NOTE: The RUC cannot trigger based on a Command it sends itself—it must be triggered by a command it detects on the powerline, meaning it had to come from another device.

Here is the Receive section for a Command Trigger:

Triggers

Receive Command	
Command Type: (C) Command ▾	Trigger Name: <input type="text"/>
	Regex: <input type="text"/>
	Delay H <input type="text"/> M <input type="text"/> S <input type="text"/>

The Command Trigger Receive section is very simple from a UI standpoint but more complicated from a user standpoint. As always, you first start by giving the Trigger a name that describes its function.

However, the next step is entering in the Regex. The Regex refers to the actual UPB command as denoted in its ASCII format. For example, a good example of a Regex is 87000101FF2058. A few words on the structure of a UPB command are called for now.

A very simple UPB command is built like follows (there are much more complicated options):

- A prequel (in most cases, a hex 0x14)
- 4 characters that describe some UPB options
(starts with 0/1 for devices, 8/9 for links)
- 2 character (hex) NID
- 2 character Destination ID (hex) - who you're sending it to
- 2 character Source ID (hex) - who's sending the command
- 2 character checksum for error checking
- A suffix (normally a hex 0x0D, hex for a carriage return)



Command Triggers

So, let's break down our sample Regex, 87000101FF2058.

We don't need to add the leading 0x14 or the trailing 0x0D. The RUC will add those automatically for you. So, just concentrate on the command in between those two.

The 8700 indicates it's a Scene command and it's only sent one time (other info that I won't go into)

The next 01 is the UPB NID

The next 01 is the Destination ID, in this case it refers to Scene 001, since it's a Scene command.

The FF is the source ID. FF normally indicates some kind of controller (like the RUC). If it the command is sent from a UPB device, this will show the Device ID of that device.

The "20" indicates an Activate command. A "21" would be a Deactivate command.

The 58 is the checksum.

So, now you're asking yourself "How in the world would I figure out what command to use for the Regex?"

There are two ways. First, you can generate it yourself. We have a UPB command calculator we can provide that will allow you to generate the command. But, the second method is much easier.

Setup the device that you're going to use to generate the command. Then, create the conditions and send the command (press a button, cause a sensor to send the command, etc). Now, go to the RUC User Interface and select the left hand menu item Receive. Look at the last received command—that should be the command you're looking for. If you need help, email us at sales@webmtn.com and we'll help you out.

So, when would you use a Command Trigger? Here's an example:

You are using a UPB IO module, such as the Web Mtn CM-01, to detect when your garage door opens. When it opens, the CM-01 detects this and sends out a command (say 87000101FF2058) to turn on Scene 1 and turn on the hallway lights. However, you either have to program the CM-01 to turn off the lights when the garage door closes, or you have to manually turn off the lights. With a Command Trigger, you can now tell the lights that once they turn on, wait X amount of time, say 5 minutes, and turn off.

That brings us to the Delay part of the Receive section of a Command Trigger. Notice that you can add delay in hours, minutes and seconds. So, here is where you setup the delay. You can only have 23 hours, 59 minutes, or 59 seconds of delay.

NOTE: Delays of less than 5 seconds or so won't be all that accurate, due to the processor timing.

Now, I'm sure you have another question. What happens if I want to have a command trigger that might come from many different devices? For example, I want to trigger on a UPB command, NID of 1, LID of 1, and an Activate command, but this command could come from more than one device?

That's where Wild Cards come in.....



Wild Cards for use with Command Triggers

So, let’s say that you have two UPB wall controllers located in different spots of your home. And, both are programmed with a button that will send the same command, let’s say turn on outside spots lights. So, if you hear a noise outside, you can go to either of these wall controllers and turn on the outside spot lights. And, then after 10 minutes, you want the lights to turn off. Each of these controllers will send basically the same command, but their Source ID is going to be different. Rather than setting up two different command triggers, we can use Wild Cards and only make one Command Trigger. Let’s take an example using our old favorite standby Regex, 87000101FF2058.

Wild cards use periods and asterisks to represent ignore characters. For example, you could represent the above string using wild cards like this:

PU8...0101..20.*

The “.” character means “don’t care – it can be any character”. The “*” wild card means ignore any characters after the last one. Using wild cards, you can ignore some of the more esoteric functional characters (# of times to send, the source ID, etc) and make the capture command easier to determine. YOU DO NEED TO PUT the period (.) after the *.

So, now the Command Trigger is going to trigger when it receives a link command from any source for a NID of one and a LID of one and an Activate command.

Another example using wild cards:

Original command A90401010220FFFF31

Using wild cards A...0101..20.*

Now you know you’re looking for a trigger command that is a link command, NID=1, LID=1, and command = Activate. We don’t care about any of the other characters in the original command.

Ok, now that we have the Receive section of the Command Trigger setup, it’s time to setup the Send section. Again, this is setup just like you did for a Schedule Trigger or a Button Trigger. If you don’t remember how to do that, go back to Page 3 of this App Note and refresh your memory.

Then, to verify the Trigger, drop down to the bottom of the page, and click on the dropdown next to Command Trigger and you’ll see this:

Trigger List

Buttons - View Page(s)

Schedules - View

Commands - View

Test Pattern: 87000101**2058 Link #1: All, Command: Activate NetworkID #55 Com Port: 1	<input type="button" value="Run"/> <input type="button" value="Edit"/>
	<input type="button" value="Delete"/>



Summary—Using the RUC-02 to Trigger UPB Commands

Well, there you have it. You now know how to create Schedule, Button, or Command Triggers in order to control UPB devices. It might look complicated, but once you've done a few, you'll get the hang of it and see how intuitive it is.

The RUC-02 is a powerful UPB controller and offers other options for UPB control. One of the most notable other options for UPB control is Voice Control using Amazon Alexa. But, that's the topic of another Web Mtn Application Note!

If you need any help or further assistance with your RUC-02, just contact us at 303-627-1856 or sales@webmtn.com, and be sure to read through our other RUC-02 Application Notes!

