



# Generation 7 Documentation

Manual: Beta version 1  
Software version qsdk5  
Date: 12/7/2017

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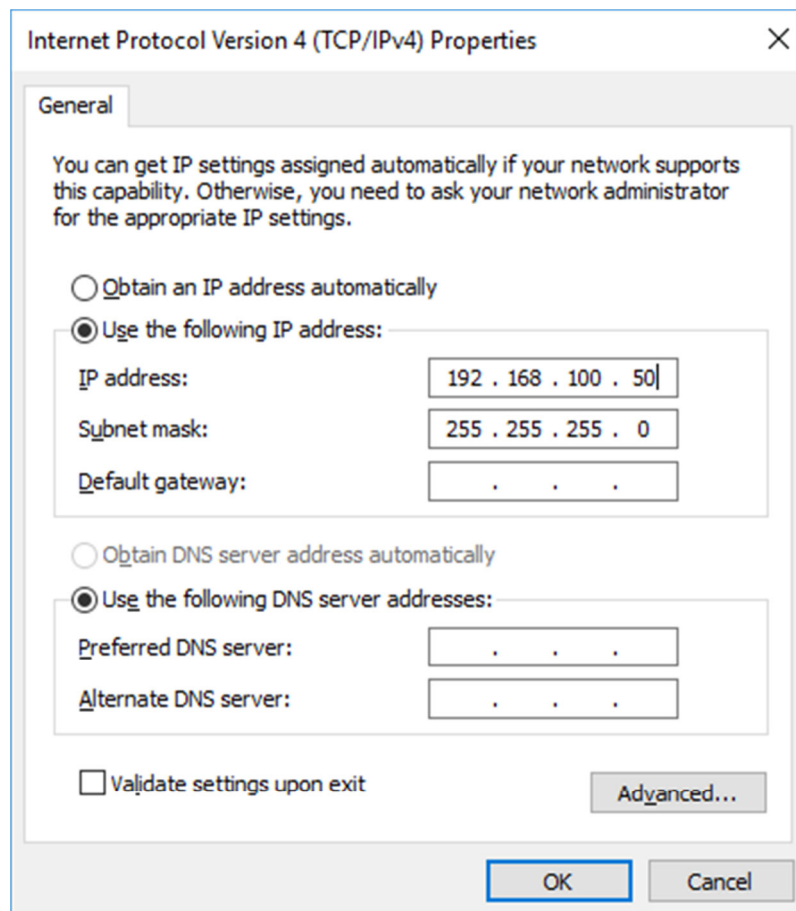
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## Logging into a device

### 1. How to login to the device locally

Note: This device will setup as a DHCP server initially, you should not have to hard set your IP in most cases. If you need to, instructions below:

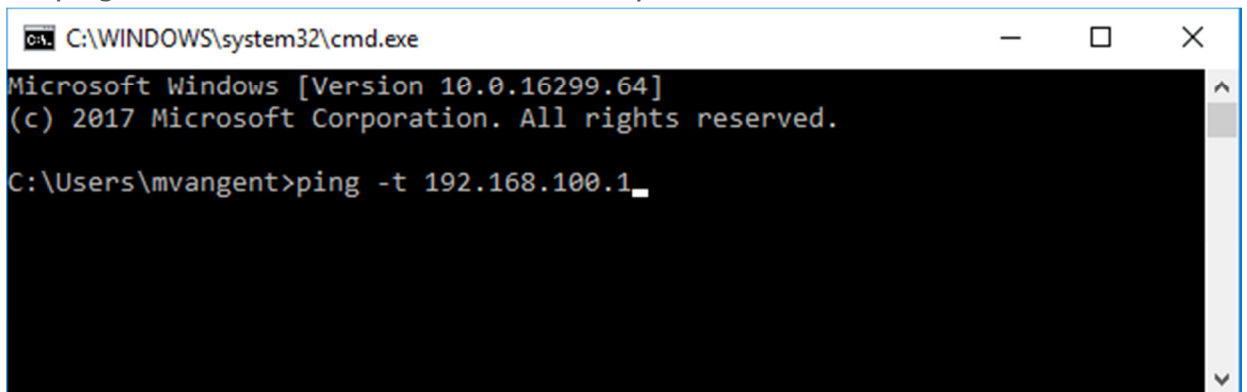
First, hard set a local area connection to a IP address in the range of 192.168.100.X e.g. 192.168.100.50 with a subnet mask of 255.255.255.0 with no gateway.



The image shows a screenshot of the "Internet Protocol Version 4 (TCP/IPv4) Properties" dialog box, specifically the "General" tab. The dialog box has a title bar with a close button (X) in the top right corner. Below the title bar, there is a "General" tab selected. The main content area contains the following elements:

- A text box with the message: "You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings."
- Two radio button options:
  - Obtain an IP address automatically
  - Use the following IP address:
- Three input fields for the selected option:
  - IP address: 192 . 168 . 100 . 50
  - Subnet mask: 255 . 255 . 255 . 0
  - Default gateway: . . .
- Two more radio button options:
  - Obtain DNS server address automatically
  - Use the following DNS server addresses:
- Two input fields for the selected option:
  - Preferred DNS server: . . .
  - Alternate DNS server: . . .
- A checkbox labeled "Validate settings upon exit" which is currently unchecked.
- An "Advanced..." button.
- At the bottom of the dialog box, there are "OK" and "Cancel" buttons.

- Plug in a power-supply to an electrical outlet and then, run a patch cable from the pigtail to the left port (eth0) on the repeater. You will then see a green light on in the water box.
- After, plug the other end of the pigtail (the 4-inch black cable) into the Ethernet port we earlier set to the 192 hard set IP address.
- Open a web browser and try to login to <https://192.168.100.1:8000>
  - a. Find the default login information with the packaging provided
  - b. Troubleshooting logging in
- If you can't get into the device open a command prompt window Ping the 192.168.100.1. If you can't ping the 192.168.100.1 try pinging the 192.168.100.x address we assigned to the local area connection. If you can ping the local area connection than locally it is correct.



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.16299.64]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\mvangent>ping -t 192.168.100.1_
```

- Then go to your local area connection and right-click and go to repair. After it repairs attempt to ping the 192.168.100.1. If you can't go back to the local area connection and disable and then enable it again. Then attempt to ping the 192.168.100.1. You should be able to ping the address and login to the device. If not start back at the beginning step 1.

## Types of Gen 7 Repeaters

PRODUCT CODE	DESCRIPTION
G7RL10S	Single Antenna + External Connectors for up to five dual polarized antennas
G7RL10H	Hex Horn (Dual Polarized Six Antenna array)

*\*Determining what type of repeater you are using at the bottom of the repeater there is a sticker that will list the following information.*

- Product Code: G7RL10H or G7RL10S
- Date Created: MM/YY/DD
- FCC ID: RHK-G7RL10

## Generation 7 Operational Modes

### 1. Gateway

A device that is connected directly to an upstream router and provides service to downstream devices.

### 2. Secured Location

A customer or relay device in a location that is considered secure, device is not likely to have customer caused outages. This scores the device higher in the automatic uplink selection process.

### 3. Customer

Customer Premises Device, includes the concentrator system and performs routing transparent to the customer

## Configuring a Gateway

1. After logging into the relay go to Basic Setup. Next, choose Gateway
2. Set the Horn Configuration to match the device type.

<b>General</b> Operational Mode: Gateway <input type="checkbox"/> Allow Customer Horn Configuration: Hex Horn Location: Tower	<b>Network</b> IP Address: 10.0.202.2 Netmask: 255.255.255.0 Gateway: 10.0.202.1 DNS:
<b>Connection</b> Parent IP Address: 10.0.202.1 VLAN Management: 202 VLAN Range: 100 -- 102 Line Speed: 1000 Mbps	<b>wifi0</b> <span>Scan All</span> <span>Scan</span> Scan Filters: gen7 <input type="checkbox"/> gen6 <input type="checkbox"/> <b>ap</b> <span>Disable</span> ESSID: 04:F0:21:35:27:85 Frequency: 161 - 5805 MHz 80 MHz RX Chainmask: all 4 chains TX Chainmask: all 4 chains TX Power: 17 dBm
<b>wifi1</b> <span>Scan</span> <b>ap</b> <span>Disable</span> ESSID: 04:F0:21:35:27:75 Frequency: 100 - 5500 MHz 80 MHz RX Chainmask: all 4 chains TX Chainmask: all 4 chains TX Power: 17 dBm	<b>wifi2</b> <span>Scan</span> <b>ap</b> <span>Disable</span> ESSID: 04:F0:21:35:27:87 Frequency: auto (136 - 5680 MHz) 80 MHz RX Chainmask: all 4 chains TX Chainmask: all 4 chains TX Power: 17 dBm
<span>Save &amp; Apply</span> <span>Save</span> <span>Cancel</span>	

3. Give the Location a name that will describe the site, this name will show in Netmon
4. Network: This will be the device's 10.x management ip, as a gateway this must be a static ip.



## Configuring the Connection

**Connection**  
Parent IP Address:   
VLAN Management:   
VLAN Range:  --   
Line Speed:  Mbps

1. Set the parent IP Address. This should be the IP of the switch or router that the gateway is directly connected to.
2. Set the Management VLAN. This VLAN is untagged into the device, and is only placed here for documentation purposes.
3. Set the VLAN Range. This is the range of VLAN's that are available to this device for concentrator connections. This range will vary based on the location.
4. Set the Line Speed. This is the amount of upstream bandwidth available for this device, and will factor heavily into the auto uplink selection for customer devices.

## Saving

After configuring the device you will need to save the settings, which will restart the whole network stack and the device will cease to be available at the 192.168.100.1 IP and assume the new IP you assigned in the networking section.

Save & Apply

## Manually Selecting Channels

**NOTE: This is an advanced process and should not be used without consulting R&D first.**

In most cases the Generation 7 Device will channel itself automatically, and thus the Frequency Field should be set to "Auto". This will trigger the "icm" program that will pick the best channel for that card and use it.

**wifi0** Scan All Scan

Scan Filters: gen7  gen6

---

**ap** Disable

ESSID:

Frequency:

RX Chainmask:

TX Chainmask:

TX Power:

---

Mode	MAC	ESSID	Channel Width	Signal	Noise
------	-----	-------	---------------	--------	-------

In some instances, we will have to manually channel the device. This can be done by setting the Frequency in the dropdown menu. **NOTE: If you select a frequency where we are limited on output power, the tx power will be limited to the maximum value for the antenna utilized.**

**wifi0** Scan All Scan

Scan Filters: gen7  gen6

---

**ap** Disable

ESSID:

Frequency:

RX Chainmask:

TX Chainmask:

TX Power:

---

Mode	MAC	ESSID	Channel Width	Signal	Noise
------	-----	-------	---------------	--------	-------

### Manual Power Settings

**NOTE: This is an advanced process and should not be used without consulting R&D first.**

The Generation 7 Device can automatically set its channel power, however in some cases transmit power must be set manually. In that case simply use the TX Power dropdown menu to select your desired power. **NOTE: You will**

**not be able to set a TX Power higher than we are allowed to use on the given frequency.**

The screenshot shows the 'wifi0' configuration page. Under the 'ap' section, the following settings are visible:

- ESSID: 04:F0:21:35:27:C1
- Frequency: 161 - 5805 MHz (80 MHz channel width)
- RX Chainmask: all 4 chains
- TX Chainmask: all 4 chains
- TX Power: 12 dBm

Buttons for 'Scan All', 'Scan', and 'Disable' are also present. A table header at the bottom lists: Mode, MAC, ESSID, Channel Width, Signal, Noise.

## Configuring a Secured Location

1. After logging into the device go to Basic Setup
2. Next set Operational mode to Secured Location
3. Set the Horn Configuration to match the device you are setting up.

The screenshot shows two configuration panels:

- General:** Operational Mode: Secured Location, Horn Configuration: Hex Horn, Location: manufacturing
- Tunnel:** Tunnel Type: PPPOE, Username: rdtest20@digitalpath.net, Password: \*\*\*\*\*

## Configuring The Tunnel:

1. Set the Tunnel Type (PPPOE or ENAT, PPPOE unless otherwise told).
2. Set the Customers Radius Username
3. Set Customers Password.

## Saving

After configuring the device you will need to save the settings, which will restart the whole network stack and the device link up to the concentrator and begin to provide internet within 90 seconds.

Save & Apply

## Manually Selecting an Uplink

**NOTE: This is an advanced process and should not be used without consulting with R&D first.**

Normally the Generation 7 Device will automatically select an uplink and should not require any intervention. In rare instances the uplink will need to be manually set.

1. Login to the device and go to the Basic Setup Page
2. Select the gen7 scan filter and click Scan All
3. Allow the scan to run, this will usually be 90 seconds

The screenshot displays the configuration interface for three WiFi interfaces (wifi0, wifi1, wifi2) and an uplink. Each interface has a 'Scan' button and a 'Disable' button. The 'wifi0' panel includes 'Scan Filters' for gen7 (checked) and gen6 (unchecked). The 'wifi0' and 'wifi1' panels show a loading spinner and the text 'Waiting for scan results ...'. The 'wifi2' and 'uplink' panels show their respective configurations.

Interface	ESSID	Frequency	RX Chainmask	TX Chainmask	TX Power	Status
wifi0	04:F0:21:35:27:C1	auto (52 - 5260 MHz)	all 4 chains	all 4 chains	17 dBm	Waiting for scan results ...
wifi1	04:F0:21:35:27:B8	128 - 5640 MHz	all 4 chains	all 4 chains	17 dBm	Waiting for scan results ...
wifi2	04:F0:21:35:27:B9		all 4 chains	all 4 chains	17 dBm	
uplink	04:F0:21:35:27:87	Channel: 128 - 5640 MHz				

4. Look through the results for your desired uplink SSID.
5. Click the radio button next to your desired uplink.

**wifi2** Scan

---

**ap** Disable

ESSID:

RX Chainmask:  ▼

TX Chainmask:  ▼

TX Power:  ▼

---

**uplink** Disable

ESSID: 04:F0:21:35:27:87

Channel: 128 - 5640 MHz

Channel Width: 80 MHz

---

Mode	MAC	ESSID	Channel Width	Signal	Noise
<input type="radio"/> Gateway	04:F0:21:35:27:87	04:F0:21:35:27:87	136	80	-56 -95
<input checked="" type="radio"/> Customer	04:F0:21:35:27:86	04:F0:21:35:27:86	136	80	-53 -95

6. Press Save & Apply
7. Wait approx. 2 minutes for the device to come back online.

### Manually Selecting Channels

**NOTE: This is an advanced process and should not be used without consulting R&D first.**

In most cases the Generation 7 Device will channel itself automatically, and thus the Frequency Field should be set to "Auto". This will trigger the "icm" program that will pick the best channel for that card and use it.

**wifi0** Scan All Scan

Scan Filters: gen7  gen6

---

**ap** Disable

ESSID:

Frequency:  ▼  ▼

RX Chainmask:  ▼

TX Chainmask:  ▼

TX Power:  ▼

---

Mode	MAC	ESSID	Channel Width	Signal	Noise
------	-----	-------	---------------	--------	-------

In some instances, we will have to manually channel the device. This can be done by setting the Frequency in the dropdown menu. **NOTE: If you select a frequency where we are limited on output power, the tx power will automatically reduce to the highest power allowed for that frequency and antenna, and will not allow higher powers to be set.**

The screenshot shows the configuration interface for the 'wifi0' interface. At the top right, there are 'Scan All' and 'Scan' buttons. Below them, 'Scan Filters' are set to 'gen7' (checked) and 'gen6' (unchecked). Under the 'ap' section, there is a 'Disable' button. The configuration fields are as follows:

- ESSID: 04:F0:21:35:27:C1
- Frequency: 161 - 5805 MHz (dropdown), 80 MHz (dropdown)
- RX Chainmask: all 4 chains (dropdown)
- TX Chainmask: all 4 chains (dropdown)
- TX Power: 12 dBm (dropdown)

At the bottom, there is a table header with columns: Mode, MAC, ESSID, Channel Width, Signal, and Noise.

## Manual Power Settings

**NOTE: This is an advanced process and should not be used without consulting R&D first.**

The Generation 7 Device can automatically set its channel power, however in some cases transmit power must be set manually. In that case simply use the TX Power dropdown menu to select your desired power. **NOTE: You will not be able to set a TX Power higher than we are allowed to use on the given frequency.**

This is a duplicate of the screenshot above, showing the 'wifi0' configuration interface with the same settings: ESSID: 04:F0:21:35:27:C1, Frequency: 161 - 5805 MHz, 80 MHz, RX Chainmask: all 4 chains, TX Chainmask: all 4 chains, and TX Power: 12 dBm.

## Configuring a Customer Device

4. After logging into the device go to Basic Setup
5. Next set Operational mode to Customer
6. Set the Horn Configuration to match the device you are setting up.

General	Tunnel
Operational Mode: <input type="text" value="Customer"/>	Tunnel Type: <input type="text" value="PPPOE"/>
Horn Configuration: <input type="text" value="Hex Horn"/>	Username: <input type="text" value="rdtest20@digitalpath.net"/>
Location: <input type="text" value="manufacturing"/>	Password: <input type="password" value="*****"/>

## Configuring The Tunnel:

4. Set the Tunnel Type (PPPOE or ENAT, PPPOE unless otherwise told).
5. Set the Customers Radius Username
6. Set Customers Password.

## Saving

After configuring the device you will need to save the settings, which will restart the whole network stack and the device link up to the concentrator and begin to provide internet within 90 seconds.

Save & Apply

## Manually Selecting an Uplink

**NOTE: This is an advanced process and should only be used for channel testing.**

Normally the Generation 7 Device will automatically select an uplink and should not require any intervention. In rare instances the uplink will need to be manually set.

8. Login to the device and go to the Basic Setup Page
9. Select the gen7 scan filter and click Scan All
10. Allow the scan to run, this will usually be 90 seconds

The screenshot displays the Basic Setup Page for three WiFi interfaces and an uplink. Each interface has a 'Scan' button and a 'Waiting for scan results ...' indicator.

- wifi0:** Scan Filters: gen7  gen6 . AP settings: ESSID: 04:F0:21:35:27:C1, Frequency: auto (52 - 5260 MHz), 80 MHz, RX Chainmask: all 4 chains, TX Chainmask: all 4 chains, TX Power: 17 dBm.
- wifi1:** AP settings: ESSID: 04:F0:21:35:27:B8, Frequency: 128 - 5640 MHz, 80 MHz, RX Chainmask: all 4 chains, TX Chainmask: all 4 chains, TX Power: 17 dBm.
- wifi2:** AP settings: ESSID: 04:F0:21:35:27:B9, RX Chainmask: all 4 chains, TX Chainmask: all 4 chains, TX Power: 17 dBm.
- uplink:** ESSID: 04:F0:21:35:27:87, Channel: 128 - 5640 MHz, Channel Width: 80 MHz.

11. Look through the results for your desired uplink SSID.
12. Click the radio button next to your desired uplink.



**wifi2** Scan

---

**ap** Disable

ESSID:

RX Chainmask:

TX Chainmask:

TX Power:

---

**uplink** Disable

ESSID: 04:F0:21:35:27:87

Channel: 128 - 5640 MHz

Channel Width: 80 MHz

Mode	MAC	ESSID	Channel Width	Signal	Noise
<input type="radio"/> Gateway	04:F0:21:35:27:87	04:F0:21:35:27:87	136	80	-56 -95
<input checked="" type="radio"/> Customer	04:F0:21:35:27:86	04:F0:21:35:27:86	136	80	-53 -95

13. Press Save & Apply

14. Wait approx. 2 minutes for the device to come back online.

### Manually Selecting Channels

**NOTE: This is an advanced process and should only be used for channel testing.**

In most cases the Generation 7 Device will channel itself automatically, and thus the Frequency Field should be set to "Auto". This will trigger the "icm" program that will pick the best channel for that card and use it.

**wifi0** Scan All Scan

Scan Filters: gen7  gen6

---

**ap** Disable

ESSID:

Frequency:

RX Chainmask:

TX Chainmask:

TX Power:

---

Mode	MAC	ESSID	Channel Width	Signal	Noise
------	-----	-------	---------------	--------	-------

In some instances, we will have to manually channel the device. This can be done by setting the Frequency in the dropdown menu. **NOTE: If you select a frequency where we are limited on output power, the tx power will automatically reduce to the highest power allowed for that frequency, and will not allow higher powers to be set.**

The screenshot shows the configuration interface for the 'wifi0' interface. At the top right, there are 'Scan All' and 'Scan' buttons. Below them, 'Scan Filters' are set to 'gen7' (checked) and 'gen6' (unchecked). The 'ap' mode is selected, with a 'Disable' button. The configuration fields are as follows:

- ESSID: 04:F0:21:35:27:C1
- Frequency: 161 - 5805 MHz (dropdown), 80 MHz (dropdown)
- RX Chainmask: all 4 chains (dropdown)
- TX Chainmask: all 4 chains (dropdown)
- TX Power: 12 dBm (dropdown)

At the bottom, there is a table header with columns: Mode, MAC, ESSID, Channel Width, Signal, and Noise.

## Manual Power Settings

**NOTE: This is an advanced process and should not be used without consulting R&D first.**

The Generation 7 Device can automatically set its channel power, however in some cases transmit power must be set manually. In that case simply use the TX Power dropdown menu to select your desired power. **NOTE: You will not be able to set a TX Power higher than we are allowed to use on the given frequency.**

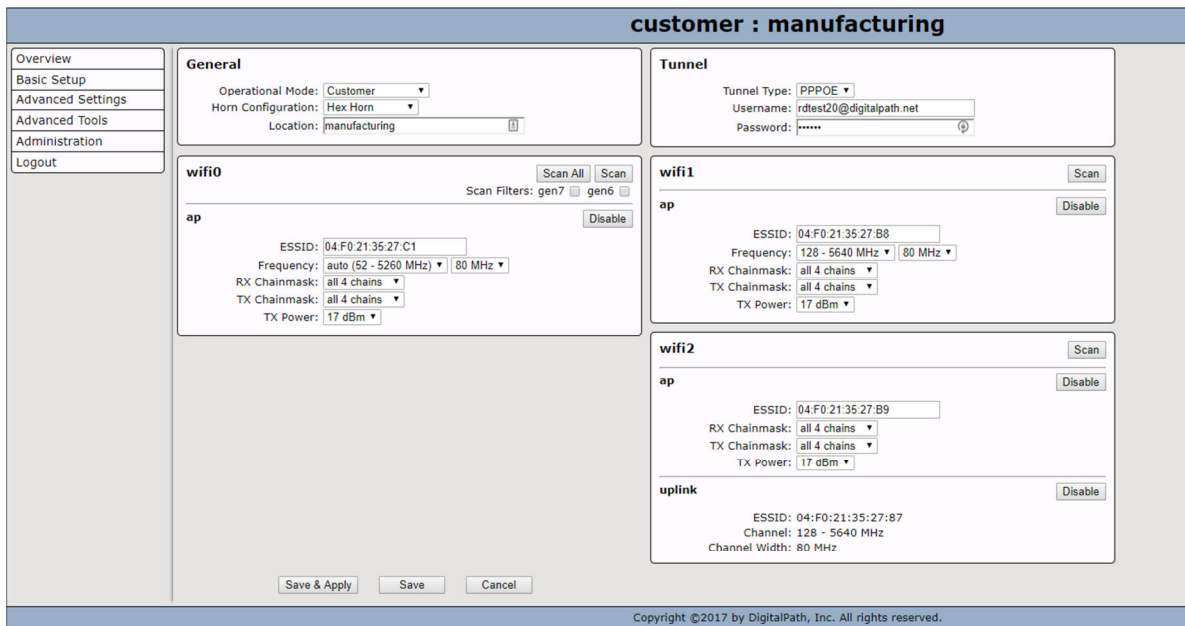
This is a duplicate of the screenshot above, showing the 'wifi0' configuration interface with the same settings: ESSID: 04:F0:21:35:27:C1, Frequency: 161 - 5805 MHz, 80 MHz, RX Chainmask: all 4 chains, TX Chainmask: all 4 chains, and TX Power: 12 dBm.

## Understanding the Status Page

The Gen 7 Repeater's status page is not functional at the time of this manual writing.

## Understanding the Basic Setup Page

The Basic Setup Page has useful information for setting up a device



The General and Tunnel Settings are explained above in the “Configuring a Customer Device” section.

The 3 wifi cards have the following information and options

1. ESSID: This is automatically generated and should not be changed.
2. Frequency: This should be set to auto unless told otherwise. It should be set to 40 or 80MHZ, usually 80MHZ
3. RX Chainmask: This turns on either Chain 1 & 2, or Chain 3 & 4, or both. This enables either one horn, the other horn, or both in the case of a hex horn. On a single horn device this should be Chain 1 & 2.
4. TX Chainmask: This turns on either Chain 1 & 2, or Chain 3 & 4, or both. This enables either one horn, the other horn, or both in the case of a hex horn. On a single horn device this should be Chain 1 & 2.
5. TX Power. This is the transmit power for the device.

## Understanding the Administration Section

The administration section is where Firmware changes can be made, as well as a manual reboot.

<ul style="list-style-type: none"> <li>Overview</li> <li>Basic Setup</li> <li>Advanced Settings</li> <li>Advanced Tools</li> <li style="background-color: #e0e0e0;">Administration</li> <li>Attached Devices</li> <li>Backup / Flash Firmware</li> <li>Reboot</li> <li>Logout</li> </ul>	<p><b>Backup / Restore</b></p> <p>Click "Generate archive" to download a tar archive of the current configuration. To reset the firmware to its initial state, click "Perform reset".</p> <p>Download backup: <input type="button" value="Generate archive"/></p> <p>Reset to defaults: <input type="button" value="Perform reset"/></p> <p>To restore configuration files, you can upload a previously generated backup archive here.</p> <p>Restore backup: <input type="button" value="Choose File"/> No file chosen</p> <p style="text-align: center;"><input type="button" value="Upload archive..."/></p>	<p><b>Flash new firmware image</b></p> <p>Upload a sysupgrade-compatible image here to replace the running firmware. Check "Keep settings" to retain the current configuration.</p> <p>Keep settings: <input checked="" type="checkbox"/></p> <p>Image: <input type="button" value="Choose File"/> No file chosen</p> <p style="text-align: center;"><input type="button" value="Upload firmware..."/></p>
--	---	--

### Backup / Flash Firmware

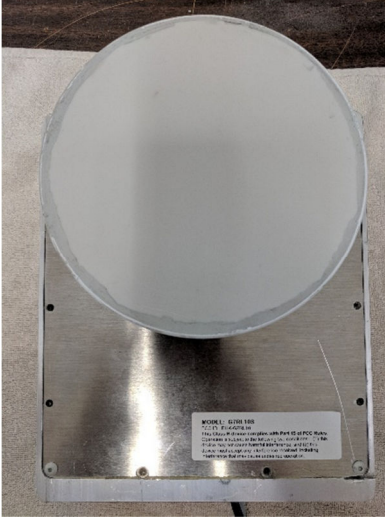

This page lets you backup and restore device config, as well as reset the device to default settings and upload new firmware images

**Reboot:** This will reboot the repeater.

<ul style="list-style-type: none"> <li>Overview</li> <li>Basic Setup</li> <li>Advanced Settings</li> <li>Advanced Tools</li> <li style="background-color: #e0e0e0;">Administration</li> <li>Logout</li> </ul>	<p><b>System - Reboot</b></p> <p>Reboots the operating system of your device.</p> <p style="text-align: center;"><input type="button" value="Perform reboot"/></p>
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## Identifying Types of Repeaters and Antennas

Digitalpath uses many different types of repeater and antenna combinations here are some examples.

	
<p><b>Single Horn</b> 5 GHZ 90 degree Horn (9dBi) with external connectors as shown, 50 degree horns also an option</p>	<p><b>Hex Horn</b> 5 GHZ (6) 50 Degree Horn(13 dBi)</p>



**Single Horn**  
5 GHZ 30 degree Horn (17.5dBi) with external connectors as shown.



**5ghz External Dish**  
Single polarity Vertical  
2 ft 28dbi net Gain

**\*\* Please see RF exposure documentation on this antenna. Must be 1 meter away from a habitable location, such as a mast on a rooftop or tower location. This antenna is used for PTP (Point to Point) links only.**

**5GHZ 2ft 28db Dish** – Dishes are used for longer distance links. They give you a 15 degree beam width. Dishes can be installed on any external 5 GHz port. Point to Point links only in the UNII-3 band (5725-5850MHz).

## Installation Guide

### Hex Horn

The Gen 7 Hex Horn unit is designed to be mounted directly to a 1.5" pipe. It must be installed as pictured below, with a set screw installed to prevent rotation.



The Gen 7 must be cabled such that the ethernet cabling goes from the device, to a Ethernet surge suppressor that is grounded, to a POE Injector, to the customer device.

### Single Horn

The Gen 7 Single Horn unit is designed to use a mounting bracket as pictured below to attach to a variety of pipes, and provide 3 axis's of alignment. All screws must be secured to prevent movement.





The Gen 7 must be cabled such that the ethernet cabling goes from the device, to a Ethernet surge suppressor that is grounded, to a POE Injector, to the customer device.

## FCC Compliance & Installation Statement

### Definitions

15.3(h) **Class A digital device.** A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

15.3(i) **Class B digital device.** A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

### Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### Attention

This device is intended for outdoor use only.



**FCC statement 15.21(a)**

Modifications not expressly approved by Digital Path, Inc could void your authority to operate the equipment. Do not make modifications to the equipment unless authorized by Digital Path, Inc.

**FCC ID**

Relay Point: RHK-G7RL10

**Professional Installation**

***FCC statement 15.27(b)***

This device should be professionally installed by a trained technician. The installer shall be responsible for ensuring that the proper antenna is employed to comply with FCC requirements. The equipment described herein may only be used in accordance with accessories listed in below for FCC ID numbers RHK-G7RL10.

## Parts List & Tune-Up Information

### External RF Cables for Connection to Modularized Connector Ports

This equipment must be professionally installed when utilizing modularized connector ports.

SMA to N-Connector Cable PN # Hana Wireless CA-185 (3') - CA195-NM-SMAM-3

### Ethernet Surge Suppression

Ethernet/Power Surge Suppressor –Mimosa, Inc - Model NID

Ethernet/Power Surge Suppressor – APC  
UL # 13KA – Model PNET1GB

### Power Supply

Great Power Co  
Model: GRT-560110A

Ubiquiti Networks Inc  
Model: GP-C500-120G

## Antenna

### 5GHz

#### UNII – 5150-5250 - 5250-5350 – 5470-5725 and 5725-5850

##### Directional Antenna

<b>DPI Horn</b>	<b>9dBi</b>
<b>DPI Horn</b>	<b>13dBi</b>
<b>DPI Horn</b>	<b>17.5dBi</b>
<b>PacWireless Dish*</b>	<b>28.0 dBi ** (5725-5850MHz only)</b>

\*This equipment must be professionally installed when utilizing modularized connector ports.

\*SMA to N-Connector Cable PN # Hana Wireless CA-185 (3') - CA195-NM-SMAM-3

\*\*Additionally, the 28dBi antenna must have an RF exposure separation of 1-meter from a person. This antenna should be mounted only to rooftops with a pole or mast, or tower locations where a person will not reside within 1-meter of said antenna. This antenna is for PTP (Point to Point) use only.

## Channels and Maximum Power By Antenna (Based on Center Frequency)

Note: Power table below assumes PTMP mode. The 28dBi dish is only PTP mode, and power listed in that table is assumed PTP. This table lists the band-edge and center channels tested.

17.5 dBi 30 Degree Horn 20 MHz	
TxPower	Channel
16	36
16	40
12.5	52
14	64
14.5	100
14	104
14	124
14	125
13.5	140

18 149

18 168

17.5 dBi 30 Degree

Horn

40 MHz

<b>TxPower</b>	<b>Channel</b>
12	40
15	48
12	52
12	60
9	62
14	104
14	106
13.5	140
19.5	152
19.5	165

17.5 dBi 30 Degree

Horn

80 MHz

<b>TxPower</b>	<b>Channel</b>
10	48
10	52
10	108
17.5	149
17.5	164

9dBi 90 Degree Horn

20 MHz

<b>TxPower</b>	<b>Channel</b>
20	36
22	38
22	61
21	62
19	64

22	100
22	152
22	168

9dBi 90 Degree Horn

40 MHz

<b>TxPower</b>	<b>Channel</b>
14	36
17	38
18.5	40
18.5	52
15	64
17.5	100
22	168

9dBi 90 Degree Horn

80 MHz

<b>TxPower</b>	<b>Channel</b>
14	40
16	41
14	60
11.5	102
17	103
19	112
19	149
19	168

13dBi 50 Degree Horn

20 MHz

<b>TxPower</b>	<b>Channel</b>
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16	36
12.5	52
16	64
16.5	100
16.5	104
16.5	124
16.5	128
20	168

13dBi 50 Degree Horn  
40 MHz

<b>TxPower</b>	<b>Channel</b>
12	40
16	42
12	52
15	60
15	62
15	100
17	104
17	106
17	118
17	120
17	140
20	152
22	165

13dBi 50 Degree Horn  
80 MHz

<b>TxPower</b>	<b>Channel</b>
12	52
10	48
13	103
13	108
15	112
17	120
19	163



19	164
28dBi Dish	
20 MHz	
<b>TxPower</b>	<b>Channel</b>
24	149
24	168
28dBi Dish	
40 MHz	
<b>TxPower</b>	<b>Channel</b>
21	149
21	162
20	163
19	165
28dBi Dish (PTP only)	
80 MHz	
<b>TxPower</b>	<b>Channel</b>
15	149
18	168

## Notice of FCC power compliance for transmit power settings

The professional installer of this equipment is prohibited from adjusting radio and antenna power values outside of the recommendations listed in this manual.

## Professional Installation Transmit Power Settings Tables

Antenna type, channel width and frequency band specified. Each each radio must be in a different band (e.g. 5.1, 5.3, 5.5, 5.8 GHz). DFS (Dynamic Frequency Selection) is enabled for the 5250-5350, 5470-5725.

## Uncorrelated Power

Each antenna chain will be utilizing unique data. Each individual chain connected to a radio will utilize different polarizations (H/V). Each antenna with dual polarized antennas connected to the same radio must be oriented in different directions.

**NOTE: The device has an integrated GPS and can determine the distance from the coordinates below. Channels below within 35km should not be used if using manual channel selection. The device will utilize an auto-channel method in operation, unless the channel is set in the UI.**

Table 1. TDWR Location Information

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
AZ	PHOENIX	W 112 09 46	N 33 25 14	5610 MHz	1024	64
CO	DENVER	W 104 31 35	N 39 43 39	5615 MHz	5643	64
FL	FT LAUDERDALE	W 080 20 39	N 26 08 36	5645 MHz	7	113
FL	MIAMI	W 080 29 28	N 25 45 27	5605 MHz	10	113
FL	ORLANDO	W 081 19 33	N 28 20 37	5640 MHz	72	97
FL	TAMPA	W 082 31 04	N 27 51 35	5620 MHz	14	80
FL	WEST PALM BEACH	W 080 16 23	N 26 41 17	5615 MHz	20	113
GA	ATLANTA	W 084 15 44	N 33 38 48	5615 MHz	962	113
IL	MCCOOK	W 087 51 31	N 41 47 50	5615 MHz	646	97
IL	CRESTWOOD	W 087 43 47	N 41 39 05	5645 MHz	663	113

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
IN	INDIANAPOLIS	W 086 26 08	N 39 38 14	5605 MHz	751	97
KS	WICHITA	W 097 26 13	N 37 30 26	5603 MHz	1270	80
KY	COVINGTON CINCINNATI	W 084 34 48	N 38 53 53	5610 MHz	942	97
KY	LOUISVILLE	W 085 36 38	N 38 02 45	5646 MHz	617	113
LA	NEW ORLEANS	W 090 24 11	N 30 01 18	5645 MHz	2	97
MA	BOSTON	W 070 56 01	N 42 09 30	5610 MHz	151	113
MD	BRANDYWINE	W 076 50 42	N 38 41 43	5635 MHz	233	113
MD	BENFIELD	W 076 37 48	N 39 05 23	5645 MHz	184	113
MD	CLINTON	W 076 57 43	N 38 45 32	5615 MHz	249	97
MI	DETROIT	W 083 30 54	N 42 06 40	5615 MHz	656	113
MN	MINNEAPOLIS	W 092 55 58	N 44 52 17	5610 MHz	1040	80
MO	KANSAS CITY	W 094 44 31	N 39 29 55	5605 MHz	1040	64
MO	SAINT LOUIS	W 090 29 21	N 38 48 20	5610 MHz	551	97
MS	DESOTO COUNTY	W 089 59 33	N 34 53 45	5610 MHz	371	113
NC	CHARLOTTE	W 080 53 06	N 35 21 39	5608 MHz	807	113
NC	RALEIGH DURHAM	W 078 41 50	N 36 00 07	5647 MHz	400	113
NJ	WOODBIDGE	W 074 16 13	N 40 35 37	5620 MHz	19	113
NJ	PENNSAUKEN	W 075 04 12	N 39 56 57	5610 MHz	39	113

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
NV	LAS VEGAS	W 115 00 26	N 36 08 37	5645 MHz	1995	64
NY	FLOYD BENNETT FIELD	W 073 52 49	N 40 35 20	5647 MHz	8	97
OH	DAYTON	W 084 07 23	N 40 01 19	5640 MHz	922	97
OH	CLEVELAND	W 082 00 28	N 41 17 23	5645 MHz	817	113
OH	COLUMBUS	W 082 42 55	N 40 00 20	5605 MHz	1037	113
OK	AERO. CTR TDWR #1	W 097 37 31	N 35 24 19	5610 MHz	1285	80
OK	AERO. CTR TDWR #2	W 097 37 43	N 35 23 34	5620 MHz	1293	97
OK	TULSA	W 095 49 34	N 36 04 14	5605 MHz	712	113
OK	OKLAHOMA CITY	W 097 30 36	N 35 16 34	5603 MHz	1195	64
PA	HANOVER	W 080 29 10	N 40 30 05	5615 MHz	1266	113
PR	SAN JUAN	W 066 10 46	N 18 28 26	5610 MHz	59	113
TN	NASHVILLE	W 086 39 42	N 35 58 47	5605 MHz	722	97
TX	HOUSTON INTERCONTL	W 095 34 01	N 30 03 54	5605 MHz	154	97
TX	PEARLAND	W 095 14 30	N 29 30 59	5645 MHz	36	80
TX	DALLAS LOVE FIELD	W 096 58 06	N 32 55 33	5608 MHz	541	80
TX	LEWISVILLE DFW	W 096 55 05	N 33 03 53	5640 MHz	554	31

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
UT	SALT LAKE CITY	W 111 55 47	N 40 58 02	5610 MHz	4219	80
VA	LEESBURG	W 077 31 46	N 39 05 02	5605 MHz	361	113
WI	MILWAUKEE	W 088 02 47	N 42 49 10	5603 MHz	820	113

Latitude and Longitude are specified in NAD 83