

San Juan Diversity Radio

Annual Inspection – October 2023

LUMMEN[®]

This report comprises 5 different radio hops. One hop between Bellingham and Mt. Constitution, and 4 between Mt. Constitution and Friday Harbor.

Indications of a properly operating link:

No Alarms

RSL within ± 3 dB of calculated

$E_b/N_0 \geq 19$ dB

Signal to Noise Ratio (SNR) ≥ 24 dB

Equalizer Stress typically 30, but < 150

Each radio indicates a properly operating link, despite the ATPC Alarm indication. That alarm indicates that the Automatic Transmit Power Control circuit is off, which is the normal operating condition for microwave radio systems operating within CTL.

There is also an Alarm indication on the .171 radio, which is located in Bellingham. This alarm is a Port 2 Open alarm, which indicates that the Management cable is disconnected. This is due to the Bellingham radio not being connected to the local CO-LAN. Management is done via the Mt. Constitution LAN, with data transmitted via the radio link.

Currently, the Bellingham radio system has a throughput of approximately 144 Mbps. All other radio systems are not currently carrying traffic.

Bellingham to Mount Constitution

Horizon® - 10.64.120.171

Not secure | 10.64.120.171

DragonWave HORIZON WEB MANAGEMENT

HOME PERFORMANCE CONFIGURATION DIAGNOSTICS ALARMS TOOLS CONTACTS

Modem Up
Radio Up
Wireless Link: Up

System Licensed Speed	400 Mbps
System Current Speed	400 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW106AHF1002
Network Management Interface port	port2 extended
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.120.171
Subnet Mask	255.255.255.0
Gateway	10.64.120.161
Radio Band	fcc11_1_40
Tx Frequency	10935000 KHz
Rx Frequency	11425000 KHz

Radio Tx On
Tx Power 16.8 dBm
RSL -37.6 dBm
SNR 37.97 dB
Eb/No 29.30 dB
Equalizer Stress 42
Atpc Status Off
Loopback Off
AAM Off
HAAM Off
RLS Off
Redundancy off

Alarms: Yes

Refresh every seconds

Notes: 0 turns off the self-refresh.

More information:
System Name: BLHMWAQ0300R001
System Location: Bellingham Main
Manage your Peer Horizon® system: 10.64.120.170

Horizon® - 10.64.120.170

Not secure | 10.64.120.170

DragonWave HORIZON WEB MANAGEMENT

HOME PERFORMANCE CONFIGURATION DIAGNOSTICS ALARMS TOOLS CONTACTS

Modem Up
Radio Up
Wireless Link: Up

System Licensed Speed	400 Mbps
System Current Speed	400 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW105AHG1001
Network Management Interface port	port2 extended
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.120.170
Subnet Mask	255.255.255.0
Gateway	10.64.120.161
Radio Band	fcc11_1_40
Tx Frequency	11425000 KHz
Rx Frequency	10935000 KHz

Radio Tx On
Tx Power 19.5 dBm
RSL -39.9 dBm
SNR 38.69 dB
Eb/No 30.00 dB
Equalizer Stress 30
Atpc Status Off
Loopback Off
AAM Off
HAAM Off
RLS Off
Redundancy off

Alarms: No

Refresh every seconds

Notes: 0 turns off the self-refresh.

More information:
System Name: Mt Constitution - Bellingham
System Location: Mt. Constitution
Manage your Peer Horizon® system: 10.64.120.171

Mount Constitution to Friday Harbor – Radio 1

The image displays two side-by-side screenshots of the Horizon Web Management interface, showing the configuration and status of a radio system. The left screenshot is for a radio at Mount Constitution (IP 10.64.120.165), and the right screenshot is for a radio at Friday Harbor (IP 10.64.32.101).

System Status (Left Screenshot - 10.64.120.165):

- Modem: Up
- Radio: Up
- Wireless Link: Up
- Radio Tx: On
- Tx Power: 19.1 dBm
- RSL: -45.8 dBm
- SNR: 39.82 dB
- Eb/No: 31.10 dB
- Equalizer Stress: 33
- Atpc Status: Off
- Loopback: Off
- AAM: Off
- HAAM: Off
- RLS: Off
- Redundancy: off
- Alarms: No

Parameter	Value
System Licensed Speed	300 Mbps
System Current Speed	300 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW107AHE1003
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.120.165
Subnet Mask	255.255.255.0
Gateway	10.64.120.161
Radio Band	fcc11_2_40
Tx Frequency	11545000 KHz
Rx Frequency	11055000 KHz

System Status (Right Screenshot - 10.64.32.101):

- Modem: Up
- Radio: Up
- Wireless Link: Up
- Radio Tx: On
- Tx Power: 19.0 dBm
- RSL: -44.4 dBm
- SNR: 39.35 dB
- Eb/No: 30.70 dB
- Equalizer Stress: 26
- Atpc Status: Off
- Loopback: Off
- AAM: Off
- HAAM: Off
- RLS: Off
- Redundancy: off
- Alarms: No

Parameter	Value
System Licensed Speed	300 Mbps
System Current Speed	300 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW108AHE1003
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.32.101
Subnet Mask	255.255.255.0
Gateway	10.64.32.1
Radio Band	fcc11_2_40
Tx Frequency	11055000 KHz
Rx Frequency	11545000 KHz

System Information:

- System Name: MTC5WAQAQ01R001 (Left) / FRHRWAXQ00R001 (Right)
- System Location: Mt. Constitution - A1 - Upper Dish - Left (Left) / Friday Harbor - A1 - Upper Dish - Left (Right)
- Manage your Peer Horizon@ system: 10.64.32.101 (Left) / 10.64.120.165 (Right)

Refresh every seconds (Left) / seconds (Right)

Notes: 0 turns off the self-refresh.

Mount Constitution to Friday Harbor Radio 2

The image displays two side-by-side screenshots of the Horizon Web Management interface. Both interfaces show system status and configuration details for a radio unit.

Left Interface (10.64.120.166):

- Modem: Up
- Radio: Up
- Wireless Link: Up
- Radio Tx: On
- Tx Power: 19.2 dBm
- RSL: -44.8 dBm
- SNR: 39.42 dB
- Eb/No: 30.70 dB
- Equalizer Stress: 32
- Atpc Status: Off
- Loopback: Off
- AAM: Off
- HAAM: Off
- RLS: Off
- Redundancy: off
- Alarms: No

System Licensed Speed	300 Mbps
System Current Speed	300 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW107AHE1002
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.120.166
Subnet Mask	255.255.255.0
Gateway	10.64.120.161
Radio Band	fcc11_2_40
Tx Frequency	11505000 KHz
Rx Frequency	11015000 KHz

System Name: MTCSWAQAQ03R001
System Location: Mt. Constitution - A2 - Upper Dish - Right
Manage your Peer Horizon@ system: 10.64.32.102

Refresh every 0 seconds

Notes: 0 turns off the self-refresh.

Right Interface (10.64.32.102):

- Modem: Up
- Radio: Up
- Wireless Link: Up
- Radio Tx: On
- Tx Power: 19.1 dBm
- RSL: -44.8 dBm
- SNR: 40.30 dB
- Eb/No: 31.60 dB
- Equalizer Stress: 32
- Atpc Status: Off
- Loopback: Off
- AAM: Off
- HAAM: Off
- RLS: Off
- Redundancy: off
- Alarms: No

System Licensed Speed	300 Mbps
System Current Speed	300 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW108AHE1002
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.32.102
Subnet Mask	255.255.255.0
Gateway	10.64.32.1
Radio Band	fcc11_2_40
Tx Frequency	11015000 KHz
Rx Frequency	11505000 KHz

System Name: FRHRWAXQ04R001
System Location: Friday Harbor - A2 - Upper Dish - Right
Manage your Peer Horizon@ system: 10.64.120.166

Refresh every 10 seconds

Notes: 0 turns off the self-refresh.

Mount Constitution to Friday Harbor Radio 3

The image displays two side-by-side screenshots of the Horizon Web Management interface, showing the configuration and status of two different radio systems.

Left Screenshot (IP: 10.64.120.167):

- System Status:** Modem (Up), Radio (Up), Wireless Link (Up), Radio Tx (On), Tx Power (18.9 dBm), RSL (-42.6 dBm), SNR (39.19 dB), Eb/No (30.50 dB), Equalizer Stress (40).
- Configuration Table:**

System Licensed Speed	400 Mbps
System Current Speed	400 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW107AGM1002
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.120.167
Subnet Mask	255.255.255.0
Gateway	10.64.120.161
Radio Band	fcc11_2_40
Tx Frequency	11465000 KHz
Rx Frequency	10975000 KHz
- System Name:** Mt. Constitution - Friday Harbor
- System Location:** Mt. Constitution-Lower-B1
- Peer System:** 10.64.32.103

Right Screenshot (IP: 10.64.32.103):

- System Status:** Modem (Up), Radio (Up), Wireless Link (Up), Radio Tx (On), Tx Power (19.0 dBm), RSL (-42.9 dBm), SNR (40.00 dB), Eb/No (31.30 dB), Equalizer Stress (40).
- Configuration Table:**

System Licensed Speed	400 Mbps
System Current Speed	400 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW108AGM1002
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.32.103
Subnet Mask	255.255.255.0
Gateway	10.64.32.1
Radio Band	fcc11_2_40
Tx Frequency	10975000 KHz
Rx Frequency	11465000 KHz
- System Name:** FRHRWAXQ05R001
- System Location:** Friday Harbor - Lower - B1
- Peer System:** 10.64.120.167

Both screenshots include a navigation menu (HOME, PERFORMANCE, CONFIGURATION, DIAGNOSTICS, ALARMS, TOOLS, CONTACTS) and a refresh interval setting (currently 0 seconds).

Mount Constitution to Friday Harbor Radio 4

The image displays two side-by-side screenshots of the Horizon Web Management interface. Both interfaces show system status and configuration details for a radio system.

Left Interface (IP: 10.64.120.168):

- Modem: Up
- Radio: Up
- Wireless Link: Up
- Radio Tx: On
- Tx Power: 19.2 dBm
- RSL: -42.0 dBm
- SNR: 39.47 dB
- Eb/No: 30.80 dB
- Equalizer Stress: 34
- Atpc Status: Off
- Loopback: Off
- AAM: Off
- HAAM: Off
- RLS: Off
- Redundancy: off
- Alarms: No

System Licensed Speed	400 Mbps
System Current Speed	400 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW105AGM1003
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.120.168
Subnet Mask	255.255.255.0
Gateway	10.64.120.161
Radio Band	fcc11_1_40
Tx Frequency	11425000 KHz
Rx Frequency	10935000 KHz

Refresh every seconds

Notes: 0 turns off the self-refresh.

Right Interface (IP: 10.64.32.104):

- Modem: Up
- Radio: Up
- Wireless Link: Up
- Radio Tx: On
- Tx Power: 19.2 dBm
- RSL: -42.1 dBm
- SNR: 39.12 dB
- Eb/No: 30.40 dB
- Equalizer Stress: 36
- Atpc Status: Off
- Loopback: Off
- AAM: Off
- HAAM: Off
- RLS: Off
- Redundancy: off
- Alarms: No

System Licensed Speed	400 Mbps
System Current Speed	400 Mbps
System Mode	hc40_277_256qam
Software/Hw Inventory	Software/Hw inventory
Unit Serial Number	DW106AGM1003
Network Management Interface port	port2
RLS ShutDown	Off
Telnet Access	On
SNMP Access	Off
SSH Server Status	Ready
IP Address	10.64.32.104
Subnet Mask	255.255.255.0
Gateway	10.64.32.1
Radio Band	fcc11_1_40
Tx Frequency	10935000 KHz
Rx Frequency	11425000 KHz

Refresh every seconds

Notes: 0 turns off the self-refresh.

ANTENNA AND TOWER ROUTINE INSPECTION

SITE NAME - Mt. Constitution

SITE LOCATION - Orcas *Island*

SITE CLLI - MTCSWAQA

DATE – 10/26/2023

INSPECTED BY – Root/Harris

Antenna and Tower Routine Inspection

1. Tower - Structure

Inspect	OK	Dev.	NA
Nuts and bolts for tightness.	_x_	___	___
Guy wire for proper tension	___	___	_x_
Guy wire condition – Fraying, broken, etc	___	___	_x_
Condition of concrete footings. (Cracking, settling & etc.)	___	___	_x_
Paint - Fading, peeling, etc.	_x_	___	_x_
Ladders & steps - safe and secure	_x_	___	___
Safety climbing device - safe and secure	_x_	___	___
Grounding and lightning protection - satisfactory	_x_	___	___
Structural units – damaged or missing	_x_	___	___
Tower lighting - operating correctly	___	___	_x_

2. Antenna & Waveguide

Waveguide - properly supported	___	_x_	___
Flex waveguide - good condition	___	___	_x_
Connector Heads - sealed properly	_x_	___	___
Flex waveguide jumpers – correctly placed	___	___	_x_
Antenna nut and bolts – tight and secure	_x_	___	___
Antenna mount – tight and secure	_x_	___	___
Azimuth and stiff arms – tight and secure	_x_	___	___
Antenna covers – good condition	_x_	___	___
Waveguide hatch – sealed and grounded	_x_	___	___

Note: If any Deviations are found explain in detail in notes section.

Antenna and Tower routine inspection

3. Air Pressure

Inspect	OK	DEV.	NA
Dehydrator Manifold – installed properly	___	___	_x_
Pressure – correct for antenna and system	___	___	_x_
Waveguide system – tight – no air leaks	___	___	_x_
Pressure alarm switches – installed and functioning	___	___	_x_
Horn antennas – water traps and proper pressure	___	___	_x_

4. Environment

Path obstructions - Trees, shrubs, weeds and buildings.	_x_	___	___
Security - Gates, fences and doors secure.	_x_	___	___
General appearance – Weeds, Trash & etc.	_x_	___	___

5. Deviations notes, exceptions and recommendations

Explain in detail:

Item 2: Found 5 transmission line supports either bent or damaged. Replaced during the inspection.

ANTENNA AND TOWER ROUTINE INSPECTION

SITE NAME – Friday Harbor

SITE LOCATION – San Juan Island

SITE CLLI - FRHRWAAW

DATE - 10/26/2023

INSPECTED BY – Root/Harris

Antenna and Tower Routine Inspection

6. Tower - Structure

Inspect	OK	Dev.	NA
Nuts and bolts for tightness.	_x_	___	___
Guy wire for proper tension	___	___	_x_
Guy wire condition – Fraying, broken, etc	___	___	_x_
Condition of concrete footings. (Cracking, settling & etc.)	_x_	___	___
Paint - Fading, peeling, etc.	_x_	___	___
Ladders & steps - safe and secure	_x_	___	___
Safety climbing device - safe and secure	_x_	___	___
Grounding and lightning protection - satisfactory	_x_	___	___
Structural units – damaged or missing	_x_	___	___
Tower lighting - operating correctly	___	___	_x_

7. Antenna & Waveguide

Waveguide - properly supported	_x_	___	___
Flex waveguide - good condition	___	___	_x_
Connector Heads - sealed properly	_x_	___	___
Flex waveguide jumpers – correctly placed	___	___	_x_
Antenna nut and bolts – tight and secure	_x_	___	___
Antenna mount – tight and secure	_x_	___	___
Azimuth and stiff arms – tight and secure	_x_	___	___
Antenna covers – good condition	_x_	___	___
Waveguide hatch – sealed and grounded	_x_	___	___

Note: If any Deviations are found explain in detail in notes section.

Antenna and Tower routine inspection

8. Air Pressure

Inspect	OK	DEV.	NA
Dehydrator Manifold – installed properly	___	___	_x_
Pressure – correct for antenna and system	___	___	_x_
Waveguide system – tight – no air leaks	___	___	_x_
Pressure alarm switches – installed and functioning	___	___	_x_
Horn antennas – water traps and proper pressure	___	___	_x_

9. Environment

Path obstructions - Trees, shrubs, weeds and buildings.	_x_	___	___
Security - Gates, fences and doors secure.	_x_	___	___
General appearance – Weeds, Trash & etc.	_x_	___	___

10. Deviations notes, exceptions and recommendations

Explain in detail:

ANTENNA AND TOWER ROUTINE INSPECTION

SITE NAME – Bellingham C.O.

SITE LOCATION – Bellingham, WA.

SITE CLLI – BMLMWA01

DATE – 10/27/2023

INSPECTED BY – Root/Harris

Antenna and Tower Routine Inspection

11. Tower - Structure

Inspect	OK	Dev.	NA
Nuts and bolts for tightness.	_x_	___	___
Guy wire for proper tension	___	___	_x_
Guy wire condition – Fraying, broken, etc	___	___	_x_
Condition of concrete footings. (Cracking, settling & etc.)	_x_	___	___
Paint - Fading, peeling, etc.	_x_	___	___
Ladders & steps - safe and secure	_x_	___	___
Safety climbing device - safe and secure	___	___	_x_
Grounding and lightning protection - satisfactory	_x_	___	___
Structural units – damaged or missing	_x_	___	___
Tower lighting - operating correctly	___	___	_x_

12. Antenna & Waveguide

Waveguide - properly supported	_x_	___	___
Flex waveguide - good condition	_x_	___	___
Connector Heads - sealed properly	_x_	___	___
Flex waveguide jumpers – correctly placed	_x_	___	___
Antenna nut and bolts – tight and secure	_x_	___	___
Antenna mount – tight and secure	_x_	___	___
Azimuth and stiff arms – tight and secure	_x_	___	___
Antenna covers – good condition	_x_	___	___
Waveguide hatch – sealed and grounded	_x_	___	___

Note: If any Deviations are found explain in detail in notes section.

Antenna and Tower routine inspection

13. Air Pressure

Inspect	OK	DEV.	NA
Dehydrator Manifold – installed properly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure – correct for antenna and system	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waveguide system – tight – no air leaks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure alarm switches – installed and functioning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horn antennas – water traps and proper pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

14. Environment

Path obstructions - Trees, shrubs, weeds and buildings.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Security - Gates, fences and doors secure.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General appearance – Weeds, Trash & etc.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Deviations notes, exceptions and recommendations

Explain in detail: