



**Exhibit 10 – Parts List/Tune –up Information**

**SpectraPoint Wireless LLC  
Customer Premises Equipment Roof Unit**

**FCC ID: NNSRTU2000-99**

**Model Number : RTU2000-28-2**

**Information Provided in this Exhibit**

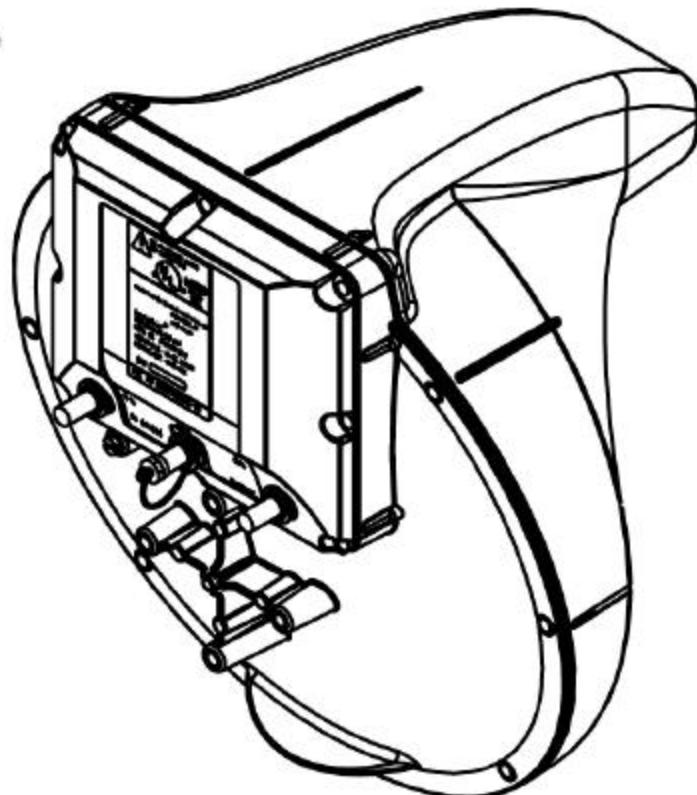
- a) Assembly Drawing – Page 2**
- b) Assembly Parts List Expanded View – Page 3** is an expanded view of the parts list from the Assembly drawing of page 2
- c) Product Information Primer – Pages 4-11** There are no tune up procedures for the hardware device itself. During installation, the hardware is positioned for best signal transmission and reception as well as proper polarization. The Product Information Primer supplies information for installation and adjustment.

8 7 6 5 4 3

3215390-000 1 1

NOTES: UNLESS OTHERWISE SPECIFIED

- 1 TORQUE SCREWS FIND NOS 8, 9 AND 10 TO 8 IN-LBS
- 2 REPLACE NONCONDUCTIVE O-RING SUPPLIED WITH RUE BOARD WITH FIND NO 4
- 3 REPLACE LOCK WASHER SUPPLIED WITH RUE BOARD WITH FIND NO 6
- 4 FIND NO 13 CONSISTS OF TWO LABELS (SHOWN)
- 5 FIND NO 14 CONSISTS OF TWO LABELS (NOT SHOWN, SAME SIZE AS FIND NO 13 LABELS)
- 6 TORQUE JAM NUT, FIND NO 7, TO 36 IN-LBS
- 7 TORQUE SCREWS FIND NO 17 TO 14 IN-LBS



REVISIONS					
REV	ECN NO	DATE	DESCRIPTION	BY	CHG
-		20-Aug-99	INITIAL RELEASE	BD	LH
A	E24403	07-Sep-99	REV PER ECN	LH	LH
B			REV PER ECN	BD	

D C B A

8	6	EX	8001402-001	STL, J5580	SCR, TORK, TPI, PT T10, 6-32 X .315	17
1	1	EX	3215982-001		O-RING, EN1, CPE, ANTENNA	16
1	1	EX	3215980-001		CWR, ELECTRONICS, CPE, ANTENNA	15
2	1	EX	3214978-003		LBL, GEN CERT, CANADA	14
1	0	EX	3214978-004		LBL, GEN CERT, USA	13
1	1	EX	3214979-002		LBL, GEN CERT, RT 110 REMEC	12
1	1	EX	3215363-001		LBL, SAFETY, UL, US AND CANADA	11
5	5	EX	8000458-006		SCR, SHH, A-46 X, 825 SEMS	10
2	2	EX	8000458-004		SCR, SHH, A-46 X, 580 SEMS	9
2	2	EX	8000458-002		SCR, SHH, A-46 X, 312 SEMS, SST	8
3	3	EX	8001368-001		MUT, JAN, 3/8-32 X 1/16	7
3	3	EX	8000368-001	410 SST	MSHP, 1/8, INT., 38410, 6820D, 8481HK, SST	6
1	1	EX	8001158-002		CAP, 1/2 TYPE, CHAIN, O-RING	5
3	3	EX	8001361-002		O-RING, 42610, 9797HK, CONSIL, # 895	4
0	1	EX	3215524-002		ASSY, PCB, RUE, 240 CAN BP, BTP, AGC	3
1	0	EX	3215524-003		ASSY, PCB, RUE, 240 US BP, BTP, AGC	2
1	1	EX	3215388-001		SUB-ASSY, DISH, AGC, FILTERED	1
-000 001 04 PART NUMBER				LIST OF MATERIALS		
STL 019				ITEM NO. 11-AUG-99		
				SpectraPoint WIRELESS, LLC, Richardson, TX		
				ASSY,RTU, FILTER, AGC, 240 BP, CPE ANTENNA		
				3215390-000		
				SCALE: 1:100		
				1 OF 1		

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DRILL HOLLOW LINES	UNLESS OTHERWISE SPECIFIED
ITEM NUMBER	ALL DIMENSIONS ARE IN INCHES
QUANTITY	DRAW ALL SHARP CIGS
DRILL HOLE PREDICTION	TELEFONE:
	RECOMMENDED: 6-32 180
	6-32 400
	6-32 600
	TRACTION: 1/2 X 1/2
	WALL: 1/2
DO NOT SCALE DRAWING	

8 6 5 4 3 2 1

8	8	EA	8001402-001	STL, JS500	SCR, TORX TPR PF T10,6-32 X .375	17
1	1	EA	3219692-001		O-RING, EMI, CPE ANTENNA	16
1	1	EA	3219680-001		CVR, ELECTRONICS, CPE ANTENNA	15
0	1	EA	3214978-003		LBL, GEN CERT, CANADA	14
1	0	EA	3214978-004		LBL, GEN CERT, USA	13
1	1	EA	3214979-002		LBL, GEN CERT, RF I/O REMEC	12
1	1	EA	3215383-001		LBL, SAFETY, UL, US AND CANADA	11
5	5	EA	8000458-006		SCR, SHH, 4-40 X .625 SEMS	10
2	2	EA	8000458-004		SCR, SHH, 4-40 X .500 SEMS	9
2	2	EA	8000458-002		SCR, SHH, 4-40 X .312 SEMS, SST	8
3	3	EA	8001308-001		NUT, JAM, 3/8-32 X 1/16	7
3	3	EA	8000300-101	410 SST	WSHR, LK, INT, .384ID, .692OD, .040THK, SST	6
1	1	EA	8001150-002		CAP, F-TYPE, CHAIN, O-RING	5
3	3	EA	8001391-002		O-RING, .426ID, .070THK, CONSIL-A 895	4
0	1	EA	3215524-902		ASSY, PCB, RUE, 240 CAN BP, BTP, AGC	3
1	0	EA	3215524-903		ASSY, PCB, RUE, 240 US BP, BTP, AGC	2
1	1	EA	3215389-001		SUB-ASSY, DISH, AGC, FILTERED	1
-002	-001	UM	PART NUMBER	MATERIAL / VENDOR PN	DESCRIPTION	ITEM NO.

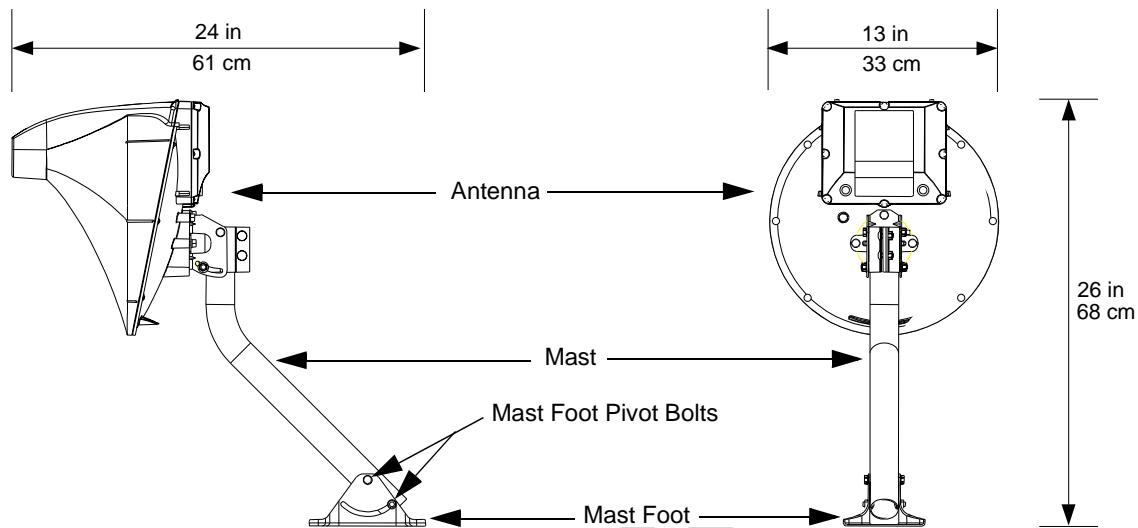
## LIST OF MATERIALS

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**CHIEF MATERIAL**

100

10

**PRODUCT INFORMATION PRIMER (PIP)****SP2000 Rooftop Unit (RTU)****Figure 1. RTU Dimensions**

*Note: Please read the Installation section of the applicable CPE Equipment Manual for more detailed instructions on the installation of the RTU.*

For site-specific parameters, see the Installation Worksheet or similar installation order. A sample Installation Worksheet is provided in Appendix A at the end of the Installation section of the applicable CPE Equipment Manual.

The equipment required to install the NIU is listed in the CPE Installation Tools and Supplies table in the Installation section of the applicable CPE Equipment Manual.

## RTU Equipment Parts

**Table 1. RTU Equipment Parts**

Part	Model Number
SP2000 Rooftop Unit, Canadian Band Plan	RTU2000-28-1
SP2000 Rooftop Unit, U.S. Band Plan	RTU2000-28-2
SP2000 Rooftop Unit, NA-A Band Plan	RTU2000-28-3
All above include the following:	
<ul style="list-style-type: none"><li>• CPE antenna assembly with electronics card</li><li>• Mount assembly with clamp, mast, and foot plate</li><li>• Product Information Primer (PIP), SP2000 Series RTU</li><li>• <i>Optional:</i> Non-Penetrating Roof Mount</li><li>• <i>Supplemental:</i> The following items required for the Non-Penetrating Roof Mount are not provided: (10) Cinder Blocks 16 in x 8 in x 4 in (40 cm x 20 cm x 10 cm) or similar ballast</li></ul>	<p>PIP-005</p> <p>Obtain locally</p>

## Install the RTU

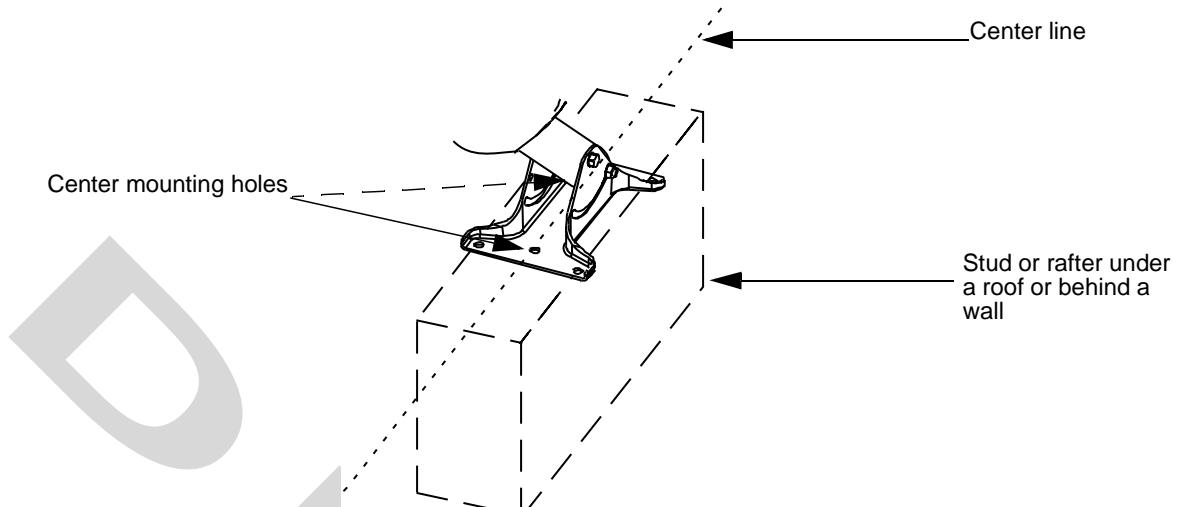
For instructions on installing a non-penetrating roof mount, see the Installation section of the applicable CPE Equipment manual.



**Verify that the RTU mounting location will not interfere with power lines or utility wires that carry dangerous voltage. Contact with the wires can result in severe injury or death.**

### **Attaching the Mast Foot to a Wood-Frame, Cinder Block, Concrete, or Brick**

1. Use a level for aligning the mast foot plate vertically, or parallel to any incline.
2. Secure the mast foot into a sturdy surface to provide a secure base for the mast.
  - a) When mounting the foot to solid wood construction, use six 5/16-in diameter, 1-in long hex lag screws.
  - b) For hollow wall or roof construction, align the foot so bolts or screws through the center holes will penetrate a stud or rafter whenever possible (see [Figure 2](#)). Use two 5/16-in diameter x 1.5-in long lag screws for the center holes. When a stud or rafter cannot be found, fasten the mast foot with four 5/16-in diameter x 3-in long round head toggle bolts.
  - c) When attaching the mast foot to cinder block, concrete, or brick, drill two 1/2-in holes in the surface for the outside holes on each side of the foot. Insert four 5/16-in diameter x 1.5-in long concrete anchors.



**Figure 2. Mast Foot Mounting**

#### **Attaching the Mast to the Foot**

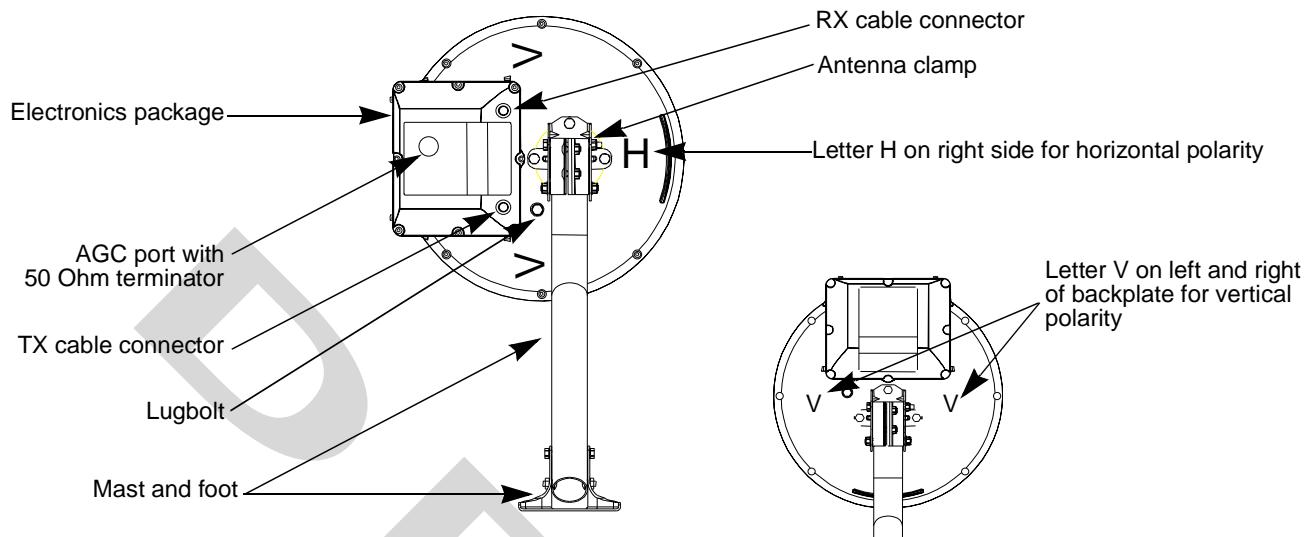
1. Position the mast (see [Figure 1](#)) so the pivot bolt holes align with the hole and slot on the foot.
2. Insert the two mast foot pivot bolts and tighten.

#### **Mount the RTU Antenna**

Use a level to ensure the mast is vertical, and tighten the mast foot pivot bolts (see [Figure 1](#)). Ensure all assembly hardware and cable connections are secure and tight. Check the CPE Installation Worksheet to determine the antenna polarity setting for the particular customer site. The antenna electronics package is located at the top when the antenna is set for vertical polarity and at the side when set for horizontal polarity (see [Figure 3](#)).

#### **Setting the Horizontal or Vertical Polarity**

Face the backside of the antenna (see [Figure 3](#)). For horizontal polarity, attach the post clamp so the letter H is positioned to the right of the backplate. For vertical polarity, attach the clamp so the letter V displays to the left and right of the backplate.

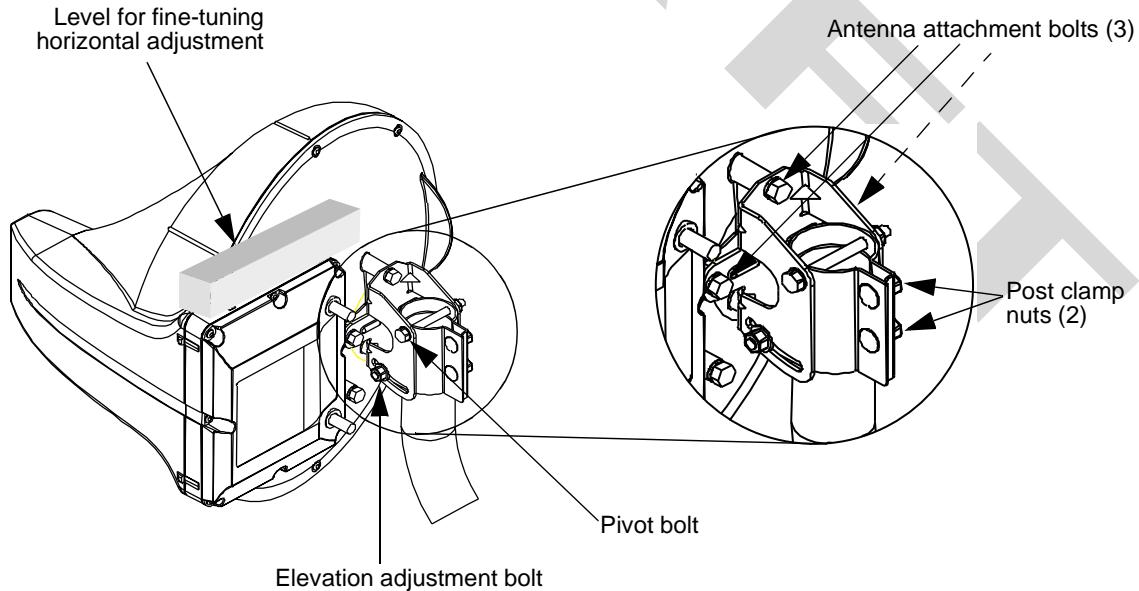


**Figure 3. Antenna Polarity**

#### **Fine-Tuning the Physical Adjustment**

1. Level the antenna.
2. Hold the antenna assembly in place and fasten the post clamp nuts (see [Figure 4](#)).
3. Place a level on top of the electronics package to fine-tune horizontally. If necessary, loosen the antenna attachment bolts.

**Note:** The antenna must be connected to the NIU with the power on before final adjustment.



**Figure 4. Fine-Tuning Antenna Physical Adjustment**

### **Visually Adjusting the Azimuth**

1. Loosen the antenna clamp enough to allow the antenna to be moved left and right.
2. Point the antenna toward the Node visually, using the grooves in the antenna exterior surface for indicating the line of sight.
3. Tighten the post clamp enough to keep the antenna from slipping from the desired position.

### **Install the Antenna Grounding Wire**



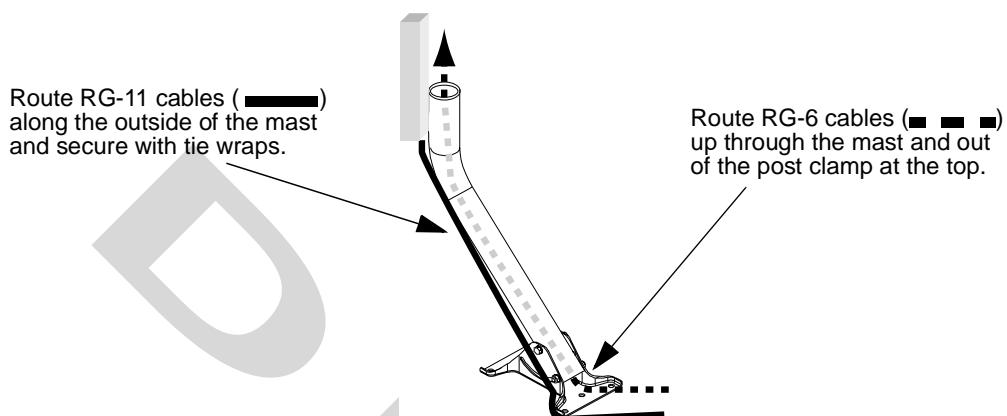
- 1) The ground wire must be located at least 6 feet away from lightning rods, or antennas should be bonded to the lightning protection system (NEC 810-18, 250-81).
- 2) Prior to attaching the ground wire, apply a non-oxidizing agent, such as "NO-OX", to both mating surfaces.
- 3) The antenna lightning ground wire must be #10 copper or #8 aluminum or larger (NEC 810.21).
- 4) Ground wires from the antenna and ground block may run inside the building, but they must be grounded at the nearest accessible location (NEC 810.21).
- 5) Ground wire for lightning protection must be taken from the CPE to earth ground in as straight a line as practicable (NEC 820.40).

### **RTU Grounding Variations**

If an RTU is mounted to a platform attached to the main building lightning protection system, attach a lightning ground wire from the lugbolt on the antenna (see [Figure 3](#)) to the RTU foot.

If an RTU is mounted to a platform that is NOT attached to the main building lightning protection system, connect the lightning grounding wire to the antenna lugbolt (see [Figure 3](#)) and then to the grounding rod outside the building at ground level.

## Attach the Cable to the Mast



**Figure 5. Mast Cable Routing**

## Route the Coaxial Cables

Do not *connect* the cables to the RTU until *after* you have installed the NIU.

### **Routing Cables from the Antenna to the Grounding Block**

1. At the antenna, mark both ends of one coaxial cable as the transmit (TX) cable and both ends of the other cable as the receive (RX) cable.
2. Route the antenna cable from the antenna to the point the cable enters the building.
3. Install a grounding block according to the manufacturer's instructions.



*Do not install grounding blocks on the vertical cable runs.*

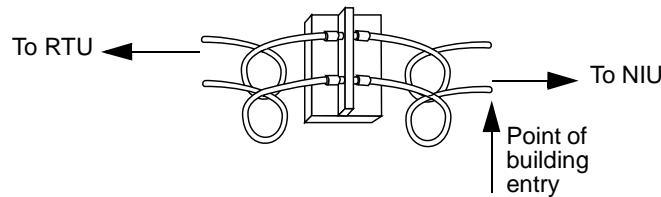
4. Leaving enough cable for drip loops (see [Figure 6](#)), install F-type connectors to the cables following the guidelines provided by the manufacturer. Use dielectric grease where the cable crimps to the connector and on the mating portion of the connector.

**Note:** RG-6 connectors are manufactured with dielectric grease in them.

5. Install connector cover boots on the cable ends and attach the cables to the grounding block with drip loops.

### **Routing Cables from the Grounding Block to the NIU**

1. At the grounding block, attach F-type connectors as in Step 3 above.
2. Choose and mark both ends of one coaxial cable as the transmit (TX) cable and both ends of the other as the receive (RX) cable.
3. Attach the cable to the grounding block as shown in [Figure 6](#).



**Figure 6. Grounding Block with Drip Loops**

4. Route TX and RX cables from the grounding block to the NIU location. Leave drip loops at the grounding block and at the point of building entry.

### Align the RTU Antenna

The NIU should be installed and powered up before final alignment of the RTU. Refer to the NIU Product Information Primer (PIP).

### Connect Coaxial Cables to the RTU



**Never connect the RX cable to the TXIF port. The power flowing through the RX cable can cause damage to the RTU electronics if connected to a TX port.**

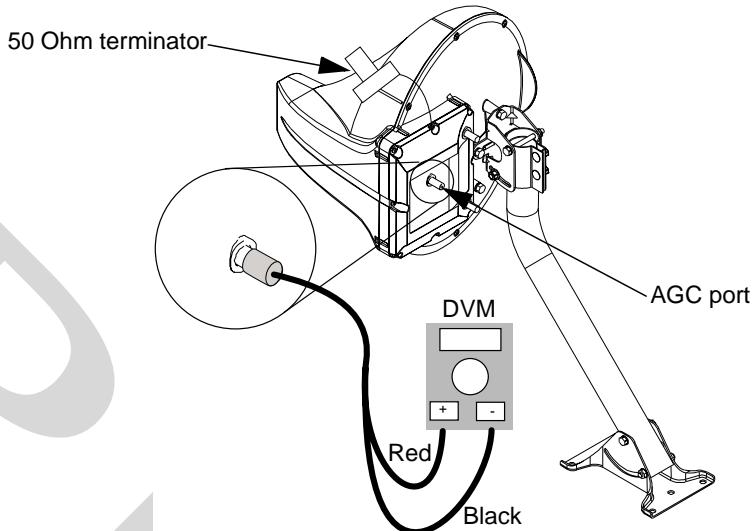
1. Connect the coaxial cable marked RX from the grounding block to the RX port on the RTU.
2. Connect the coaxial cable marked TX from the grounding block to the TX port on the RTU.

***Note: Be sure to leave enough slack in the cable to rotate the RTU assembly and align it with another Node, should that become necessary.***

### Adjusting the Elevation and Azimuth with A Digital Voltmeter (DVM)

1. Disconnect the 50 Ohm terminator from the AGC port (see [Figure 7](#)).
2. Connect the DVM to the AGC port using the AGC test port cable (see [Table 1](#)).
3. Verify that the RX cable from the NIU is connected to the RTU.
4. Connect the red lead (signal) banana plug from the AGC port to the (+) DMV jack, and the black lead (shield) banana plug to the (-) DVM jack.

***Note: The measured value should be between 1 and 5 V DC.***



**Figure 7. Elevation and Azimuth Adjustment with DVM**

5. Holding the antenna assembly from the rear, loosen the elevation adjustment bolt (see [Figure 4](#)).
6. As the antenna is moved through the optimum elevation, the voltage will decrease and then increase. Set the alignment where the AGC voltage is at a minimum.
7. Tighten the elevation adjustment bolt and the pivot bolt.
8. To adjust the azimuth, loosen the post clamp nuts (see [Figure 4](#)).
9. As the antenna is moved through the optimum azimuth, the voltage will decrease and then increase. Set the alignment where the AGC voltage is at a minimum.
10. Tighten the post clamp nuts, elevation adjustment bolt, and pivot bolt.
11. Disconnect the DVM and test port cable, and reconnect the 50 Ohm terminator to the AGC port.

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