

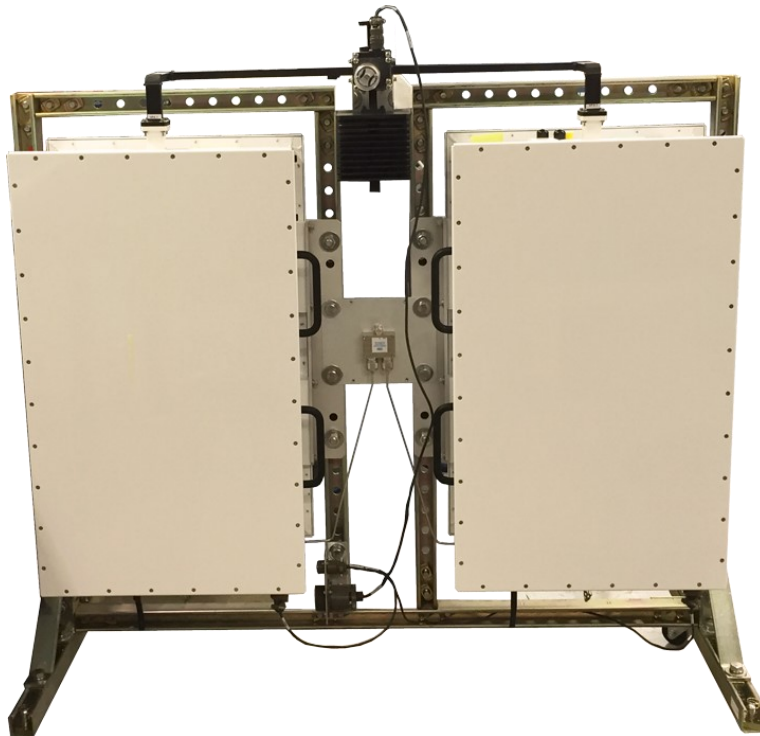


TELEDYNE
PARADISE DATACOM
A Teledyne Technologies Company

High Power Outdoor SSPAs

Redundant and Phase Combined Systems

Installation Manual



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Teledyne Paradise Datacom, a division of Teledyne Defense Electronics LLC, is a single source for high power solid state amplifiers (SSPAs), Low Noise Amplifiers (LNAs), Block Up Converters (BUCs), and Modem products. Operating out of two primary locations, Rancho Cordova, CA, USA and Chelmsford, England, Teledyne Paradise Datacom has more than a 20 year history of providing innovative solutions to enable satellite uplinks, battlefield communications, and cellular backhaul.

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1.0 Introduction

This manual outlines the assembly and mounting procedure for a 1:1 Redundant High Power Outdoor SSPA System.

Before beginning the assembly of the uni-strut mounting kit, verify that the kit includes all of the items in **Table 1-1**. If any items are missing, contact Teledyne Paradise Datacom with the part number and quantity of the shortage.

The following instructions describe the assembly of the uni-strut mounting kit, and the installation of the High Power Outdoor SSPAs and associated switch and waveguide assembly. The system is intended to be free standing and entirely self-supported once properly mounted.

It is important to give consideration to the following:

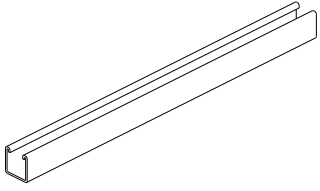
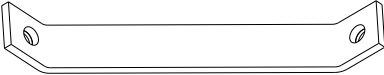
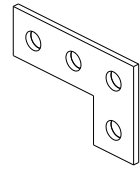
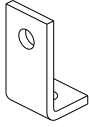







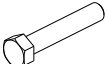
1. Structural integrity of the mounting deck.
2. Accessibility to all local user interfaces. (Ensure SSPA enclosure doors are free to open to the latched position.)
3. Adequate cooling air, 8.00" minimum clearance must be maintained between air intake and any surface that will inhibit air flow.
4. The High Power Outdoor SSPA should never be enclosed in such a manner that airflow is restricted. Normal operating range is -40 to +60°C.
5. Proper weatherized sealing of all connectors.

Warning! The High Power Outdoor SSPAs should not be positioned in such a way that allows falling precipitation to enter the fans at the bottom of the amplifier. Doing so will void your warranty.

1.1 Installation, Uni-Strut Assembly

Reference the parts list in **Table 1-1** and **Figure 1-1**, **Figure 1-2**, and **Figure 1-3** throughout the assembly of the mounting frame.

Table 1-1: Parts List, Mounting Kit Assembly (L213302-1)

Item	Qty.	Description	Image
1	2	UNI-STRUT, 34.5"	
2	2	UNI-STRUT, 37.5"	
3	2	UNI-STRUT, 43.5"	
4	2	UNI-STRUT, 20"	
11	4	CORNER BRACE, 7.5"	
12	8	BRACKET, L, 4-HOLE	
13	2	ANGLE, CONNECTOR, 2-HOLE	
21	36	BOLT, HEX, 1/2-13 X 1.25, SS	
22	40	WASHER, LOCK, 1/2	
23	42	WASHER, FLAT, 1/2, STD	
24	30	NUT, SELF-HOLD, 1/2, SPRINGLESS	
25	6	NUT, SELF-HOLD, 1/2	
26	4	NUT, HEX, 1/2-13, GRADE 5 ZINC	
27	2	WASHER, FLAT, 9/16, D-SHAPE	
28	4	BOLT, HEX, 1/2-13 X 2.75, SS	

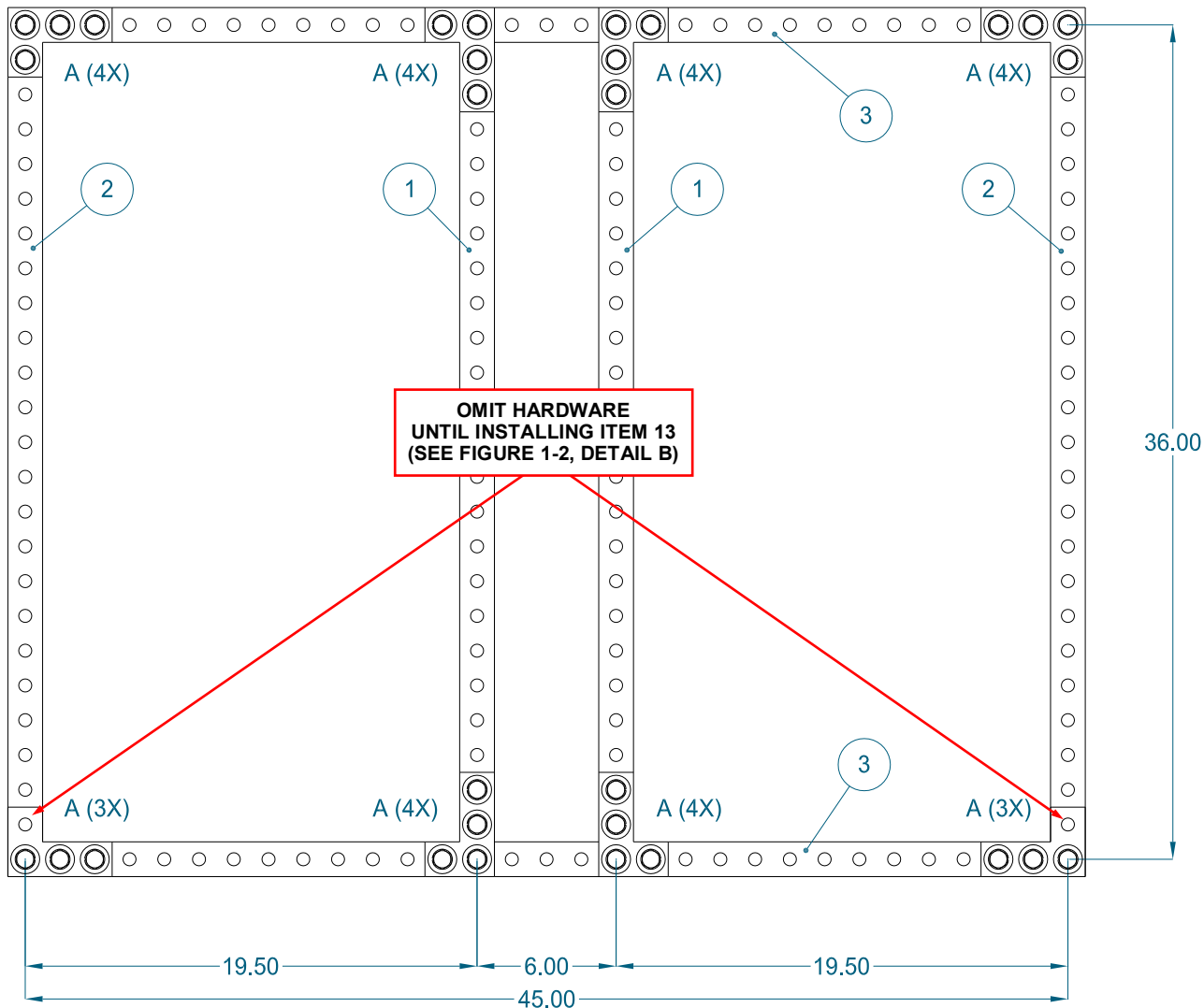


Figure 1-1: Uni-Strut Assembly

1. Arrange the uni-strut sections (Items 1, 2 and 3) as shown in **Figure 1-1**. Secure the 4-hole L-brackets (Item 12) on the flat side of the uni-strut as shown in **Figure 1-1**, and refer to **Figure 1-2, Detail A** for hardware placement.
2. Arrange the 20" sections of uni-strut (Item 4) as shown in **Figure 1-3**,
3. Secure the 2-hole angle connectors (Item 13) to the uni-strut base and frame as shown in **Figure 1-3**, and refer to **Figure 1-2, Detail B** for hardware placement.
4. Attach the corner braces (Item 11) to the uni-strut base and frame as shown in **Figure 1-3**, and refer to **Figure 1-2, Detail C** for hardware placement.
5. Secure all hardware tightly.

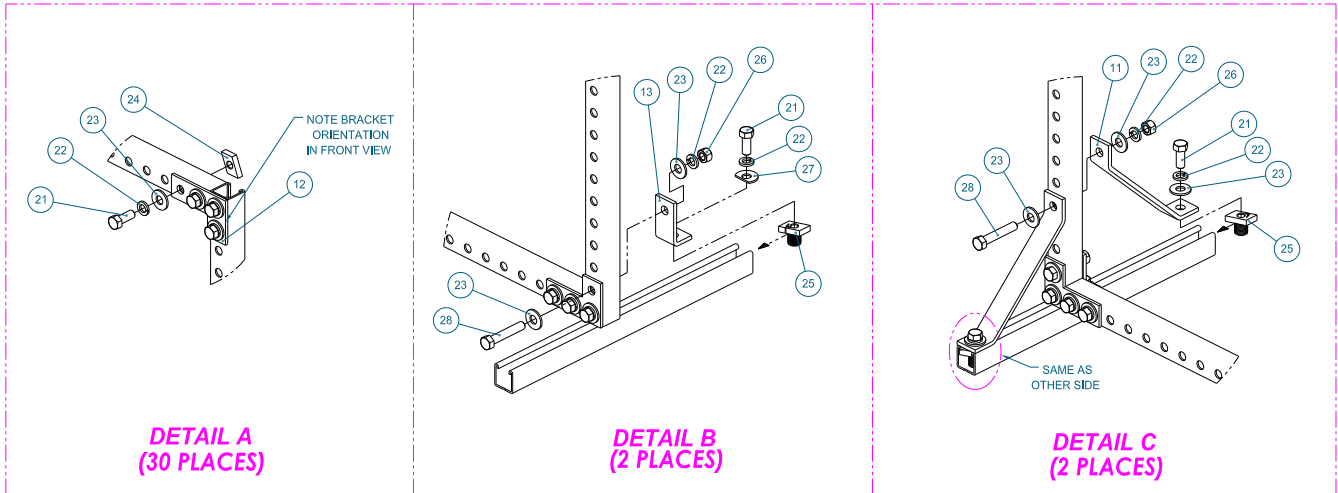
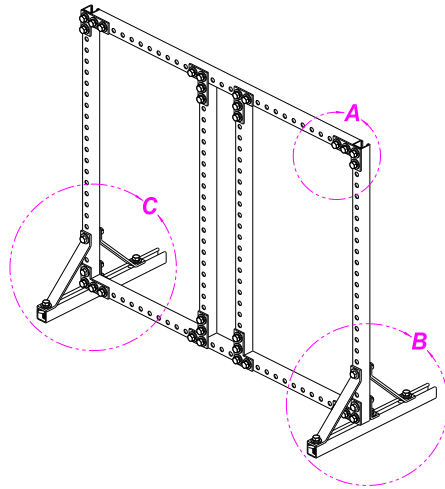


Figure 1-2: Uni-Strut Assembly, Hardware Placement

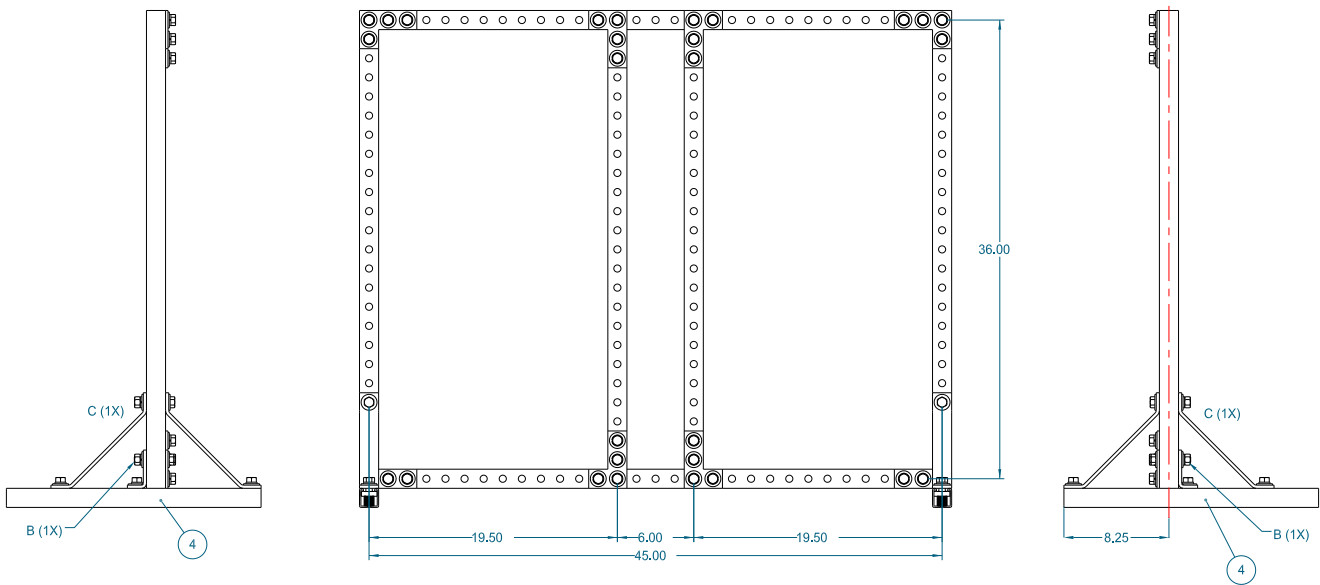


Figure 1-3: Uni-Strut Assembly, Base Strut

1.2 Installation, HPAs to Frame

Warning: The base struts (Item 1) included in the mounting kit should be bolted securely to the location decking prior to mounting the HPAs to the mounting frame. This is to ensure that the mounted SSPA assembly does not tip over during or after system installation.

The HPAs will be mounted to the open channel side of the uni-strut frame. Mounting hardware is provided with the amplifiers. See **Figure 1-4**.

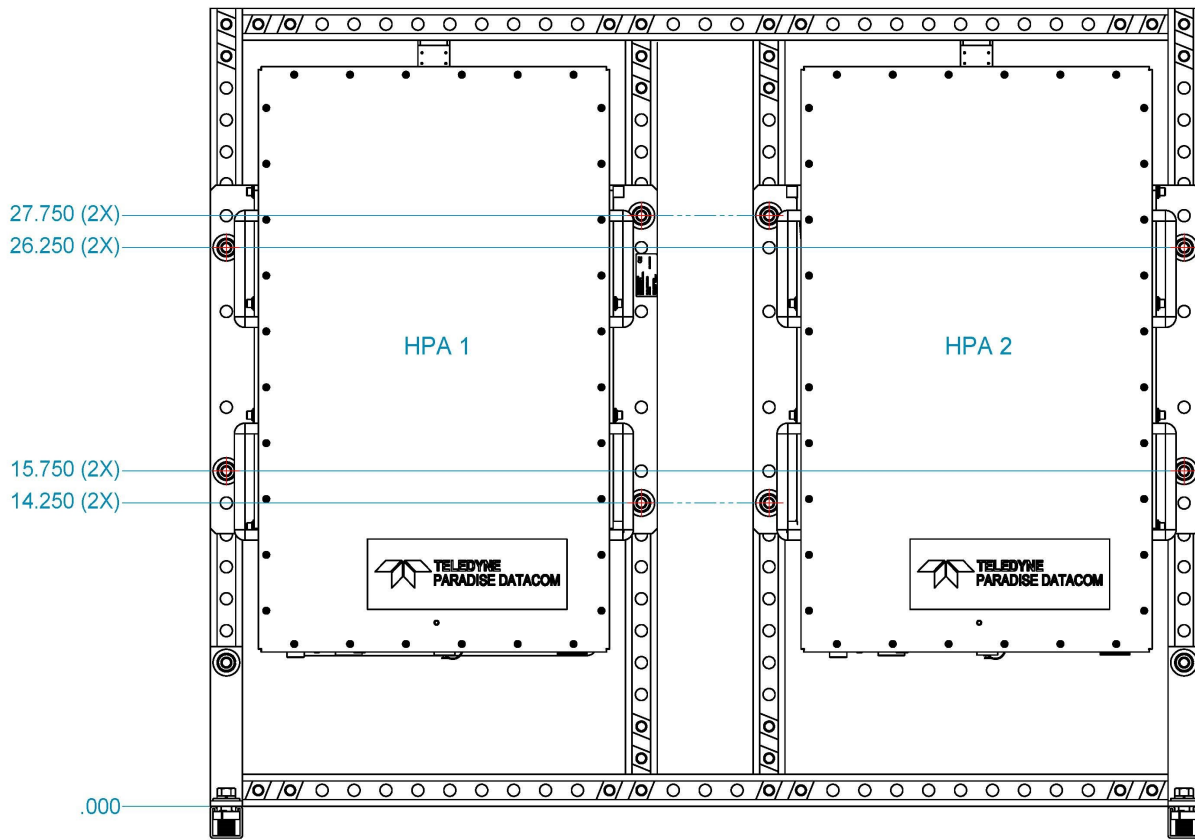


Figure 1-4: Mount HPAs to Frame

Warning: The HPAs each weigh in excess of 100 pounds (45.5 kg). A mechanical lift or at least two persons are required to mount the HPAs to the frame, while a third person installs the hardware.

1. Insert a 1/2-13x2.75 hex bolt with 1/2" flat washer through the flat side of the uni-strut frame at the positions shown in **Figure 1-4** and through the mounting bracket of the HPAs.
2. Secure each bolt with a 1/2" flat washer, 1/2" lock washer and 1/2-13 hex nut.
3. Tighten hardware securely.

1.3 Installation, Waveguide Switch Array

1.3.1 Ku-Band Systems

The redundant system was shipped with the following components that comprise the waveguide switch array: a switch/termination assembly, switch support bracket, and waveguide segments that connect between the output of the HPAs and the switch. See **Figure 1-5**.

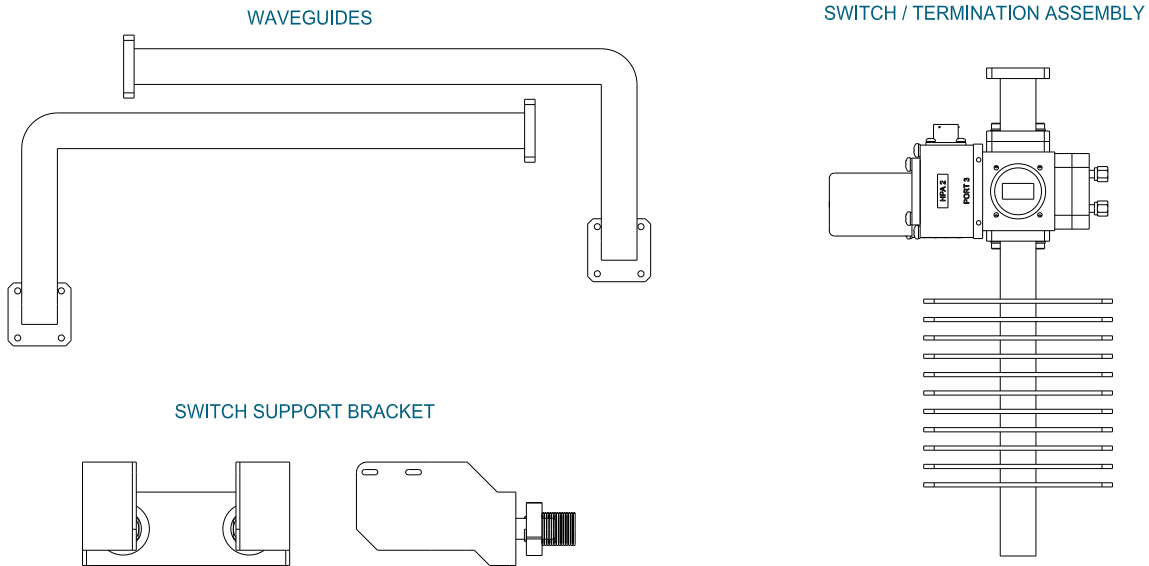


Figure 1-5: Components, Waveguide Switch Array, Ku-Band

The switch support bracket is mounted to the top rail between the HPAs. Mounting hardware was shipped attached to the bracket. See the break-away in **Figure 1-6** for the hardware configuration for mounting the switch support bracket to the frame.

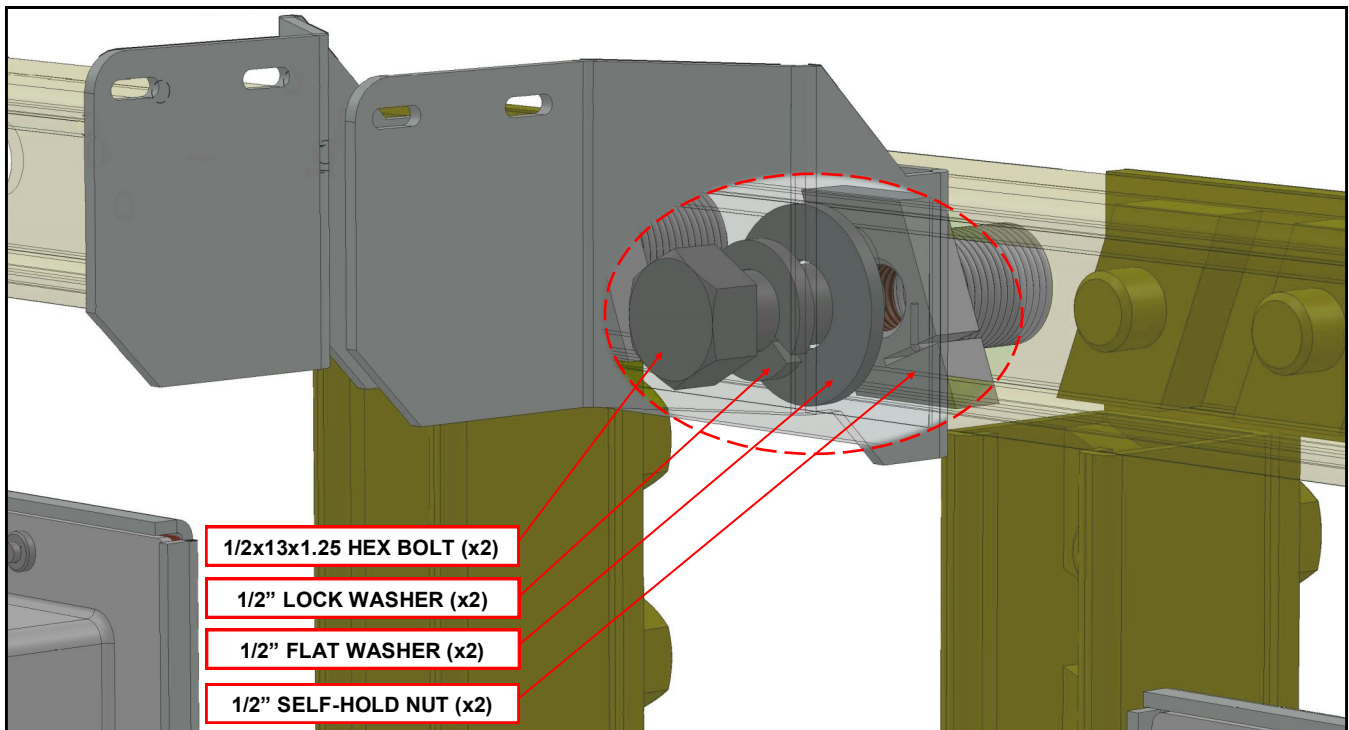


Figure 1-6: Mounting Switch Support to Frame, Ku-Band (typical)

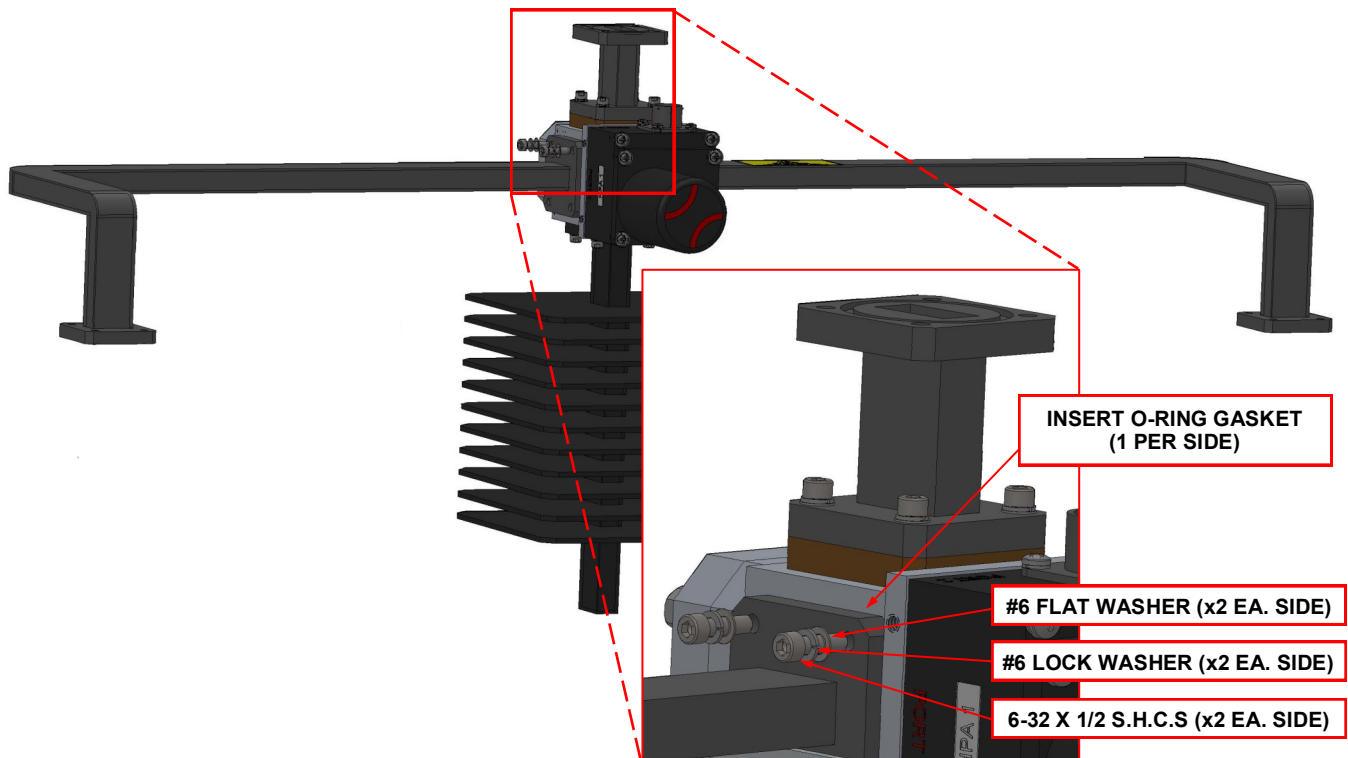


Figure 1-7: Connect Waveguide to Switch, Ku-Band (typical)

Connect the waveguide segments to the switch assembly as shown in **Figure 1-7**. Insert an O-ring gasket (supplied) between the waveguide flange and the switch port for each HPA input. Use the supplied hardware to secure the waveguide segments to the switch assembly as shown in **Figure 1-7**.

Leave out the hardware on the bottom side of the waveguide flanges until later. The mounting holes on the bottom side of the waveguide flanges will be used to mount to the switch support.

Slide the switch assembly into the switch support bracket, making sure the baseball switch faces away from the uni-strut frame. Use the supplied hardware to secure the switch assembly to the support bracket as shown in **Figure 1-8**.

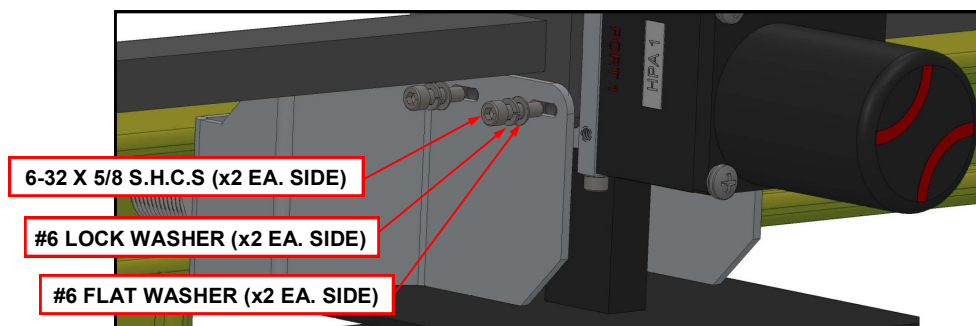


Figure 1-8: Switch Assembly Installation, Ku-Band (typical)

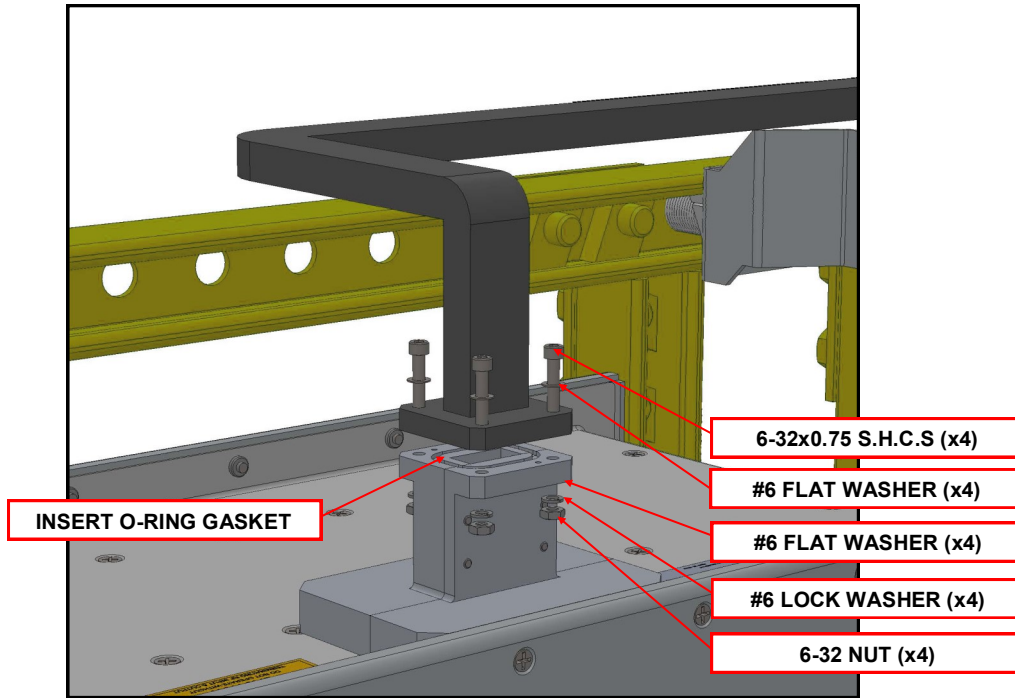


Figure 1-9: Waveguide Installation, Ku-Band (typical)

Insert an O-ring gasket (supplied) between the RF Output waveguide of the HPA and the waveguide segment. Secure the waveguide to the RF Output flange of the HPA with the supplied hardware. **Figure 1-9** shows a typical installation for a Ku-Band HPA. Repeat for each HPA in the system.

1.3.2 C-Band Systems

The C-Band redundant system was shipped with the following components that comprise the waveguide switch array: a switch/termination assembly, switch support bracket, and waveguide segments that connect between the output of the HPAs and the switch. See **Figure 1-10**.

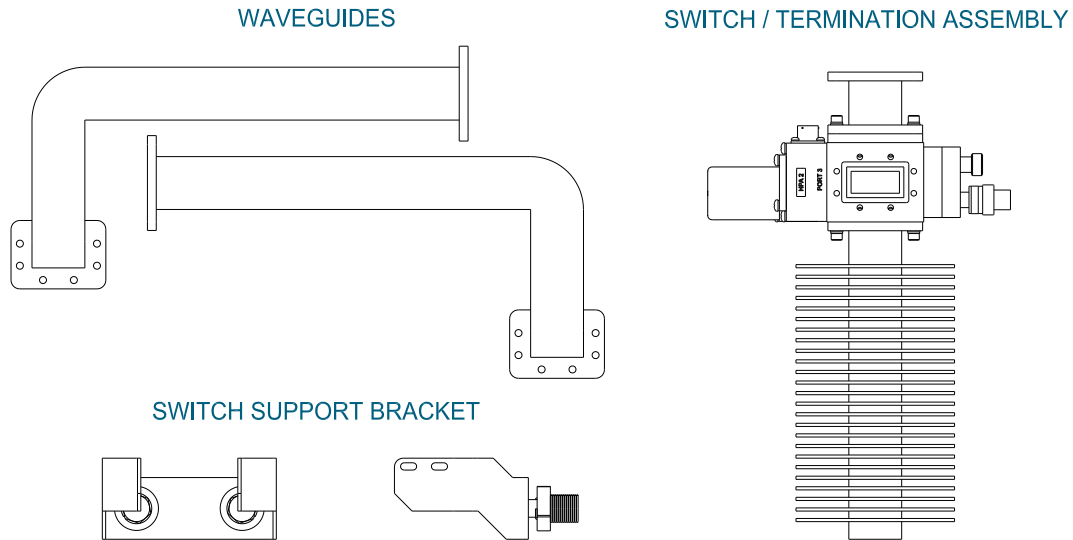


Figure 1-10: Components, Waveguide Switch Array, C-Band

The switch support bracket is mounted to the top rail between the HPAs. Mounting hardware was shipped attached to the bracket. See the break-away in **Figure 1-11** for the hardware configuration for mounting the switch support bracket to the frame.

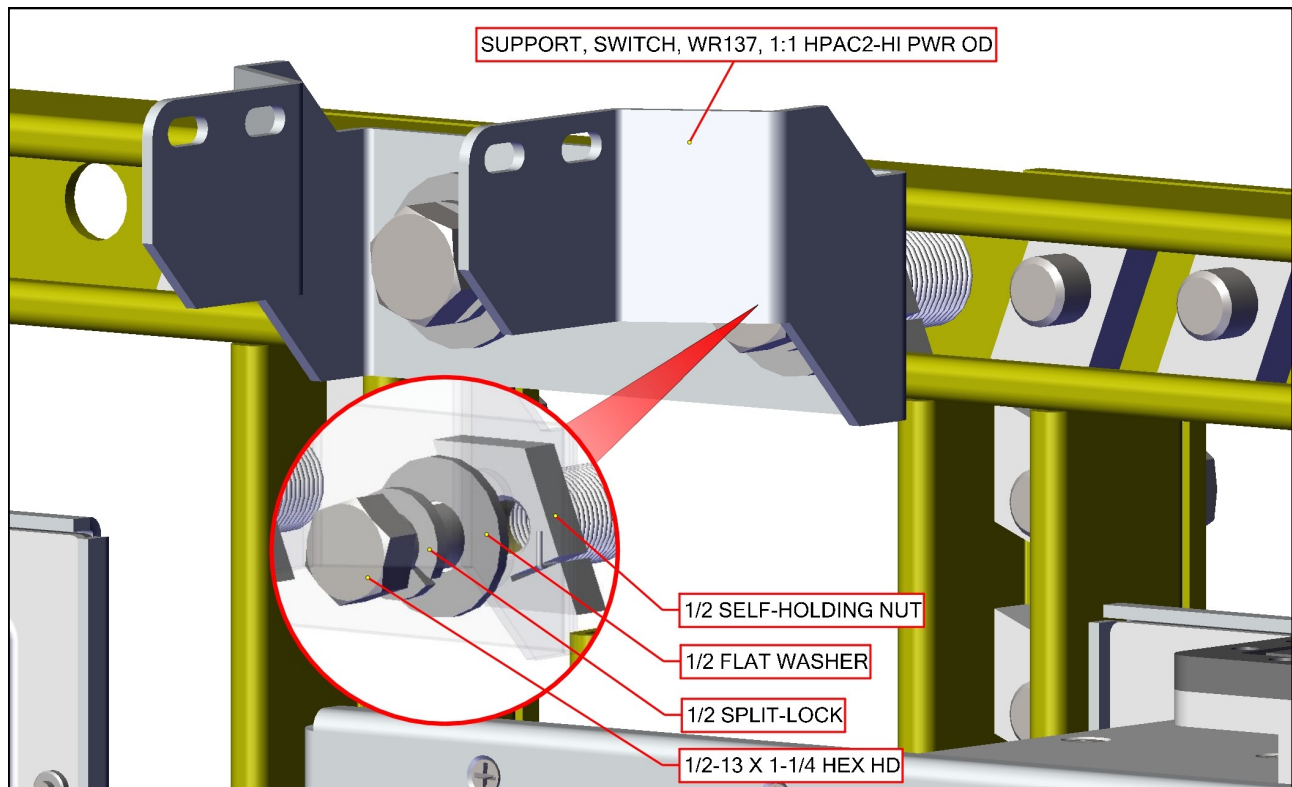


Figure 1-11: Mounting Switch Support to Frame, C-Band (typical)

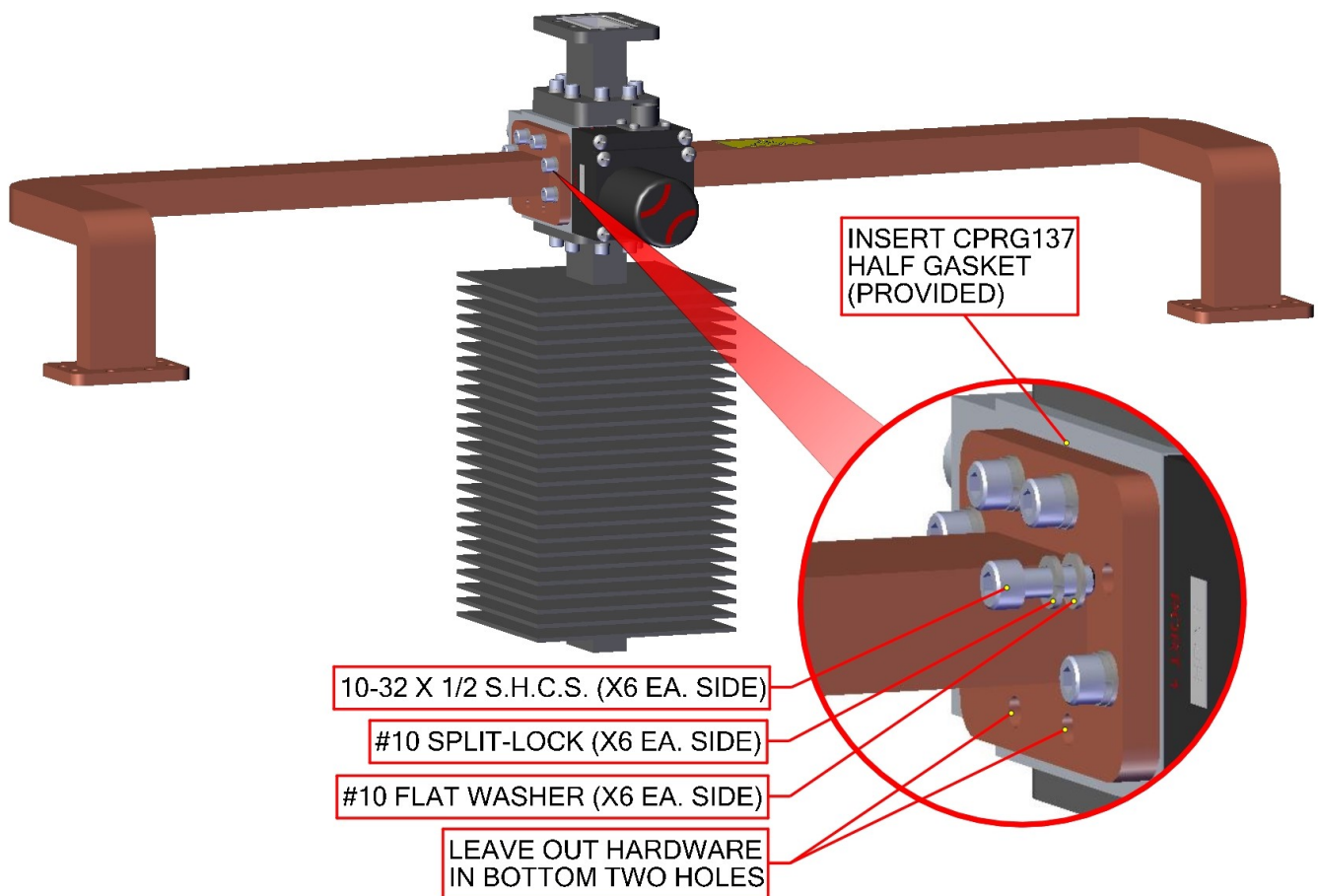


Figure 1-12: Connect Waveguide to Switch, C-Band (typical)

Connect the waveguide segments to the switch assembly as shown in **Figure 1-12**. Insert an half gasket (supplied) between the waveguide flange and the switch port for each HPA input. Use the supplied hardware to secure the waveguide segments to the switch assembly as shown in **Figure 1-12**.

Leave out the hardware on the bottom side of the waveguide flanges until later. The mounting holes on the bottom side of the waveguide flanges will be used to mount to the switch support.

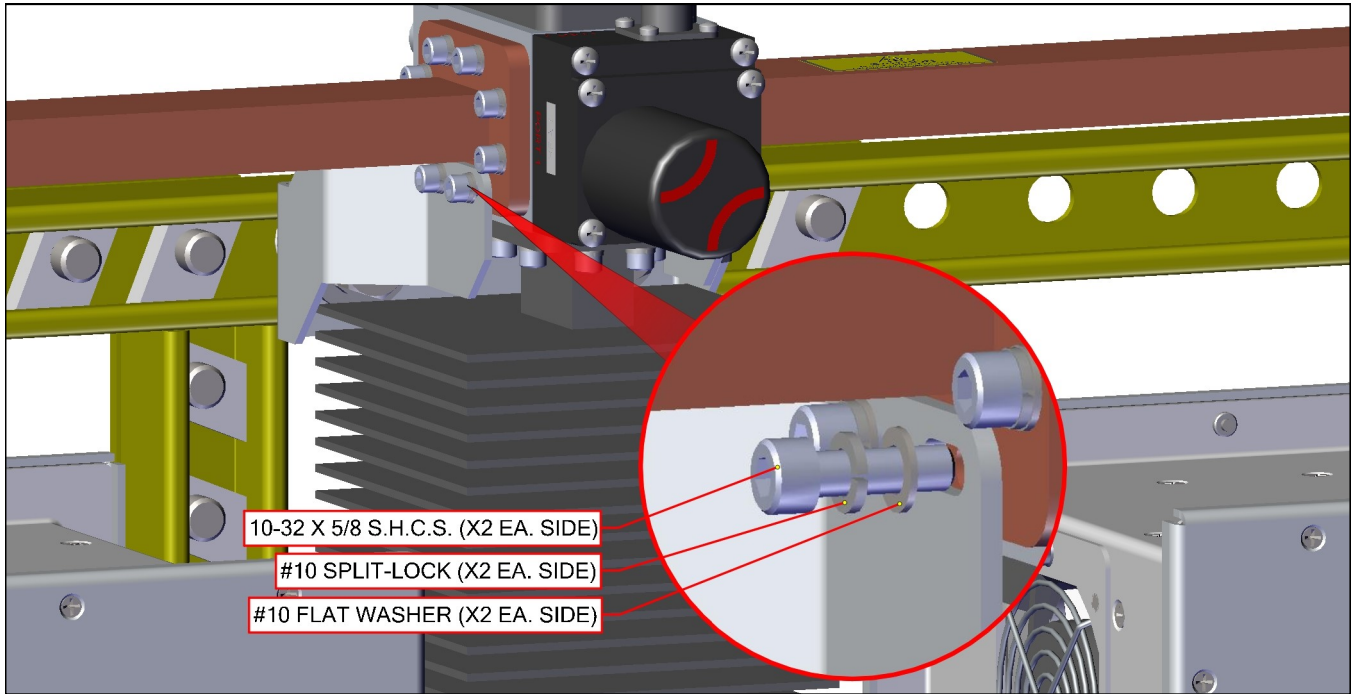


Figure 1-13: Switch Assembly Installation, C-Band (typical)

Slide the switch assembly into the switch support bracket, making sure the baseball switch faces away from the uni-strut frame. Use the supplied hardware to secure the switch assembly to the support bracket as shown in **Figure 1-13**.

Insert a half gasket (supplied) between the RF Output waveguide of the HPA and the waveguide segment. Secure the waveguide to the RF Output flange of the HPA with the supplied hardware. **Figure 1-14** shows a typical installation for a C-Band HPA. Repeat for each HPA in the system.

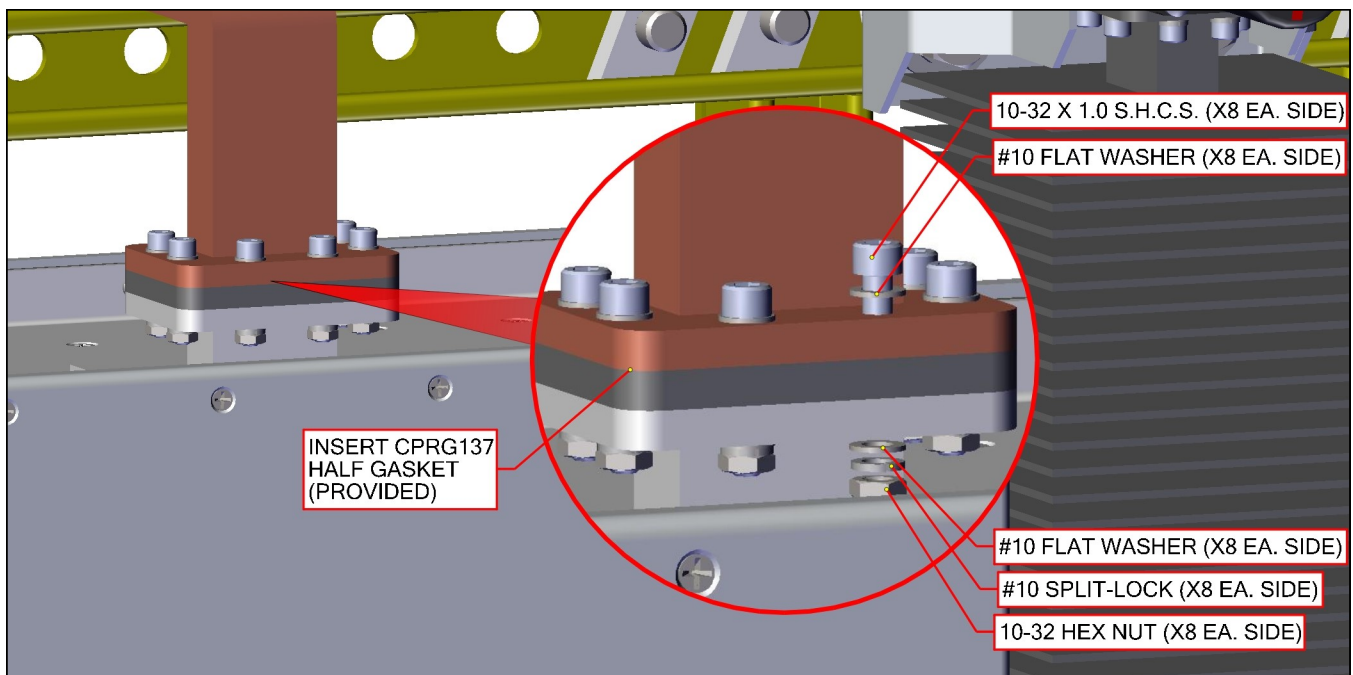
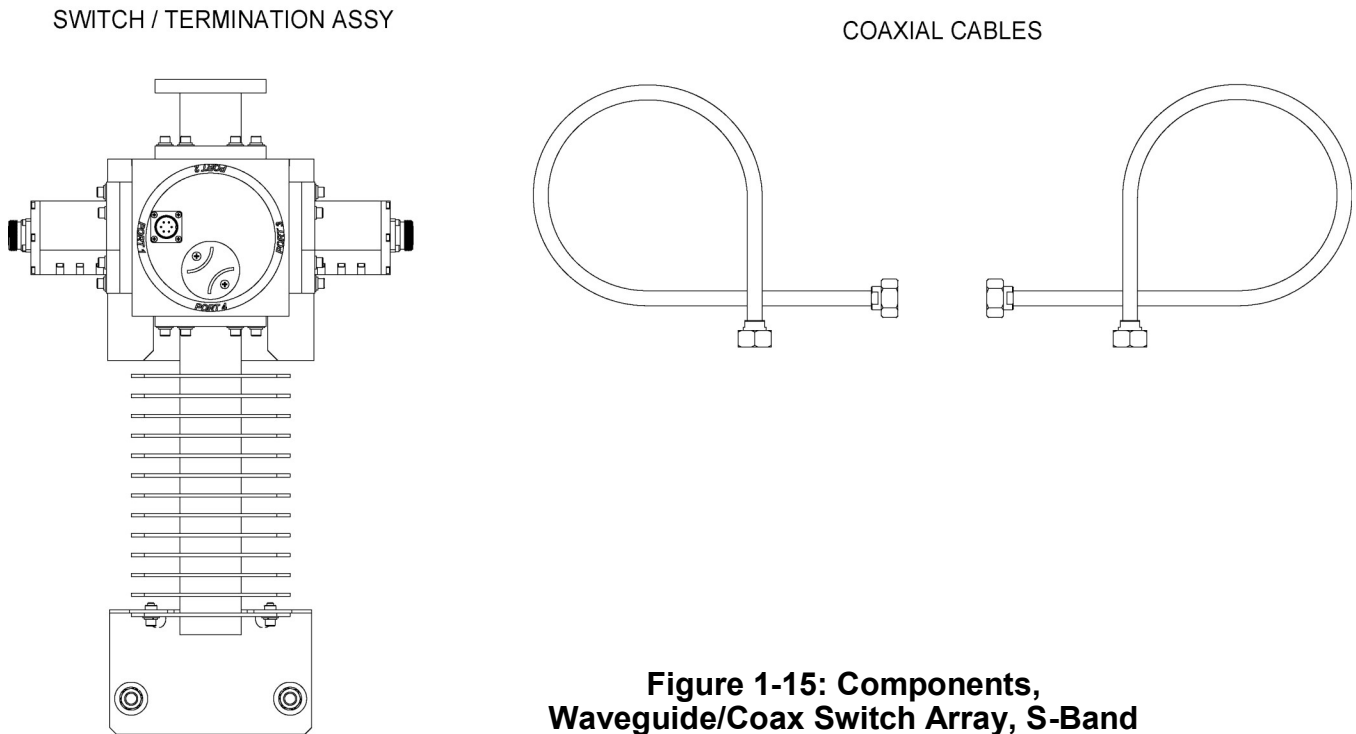


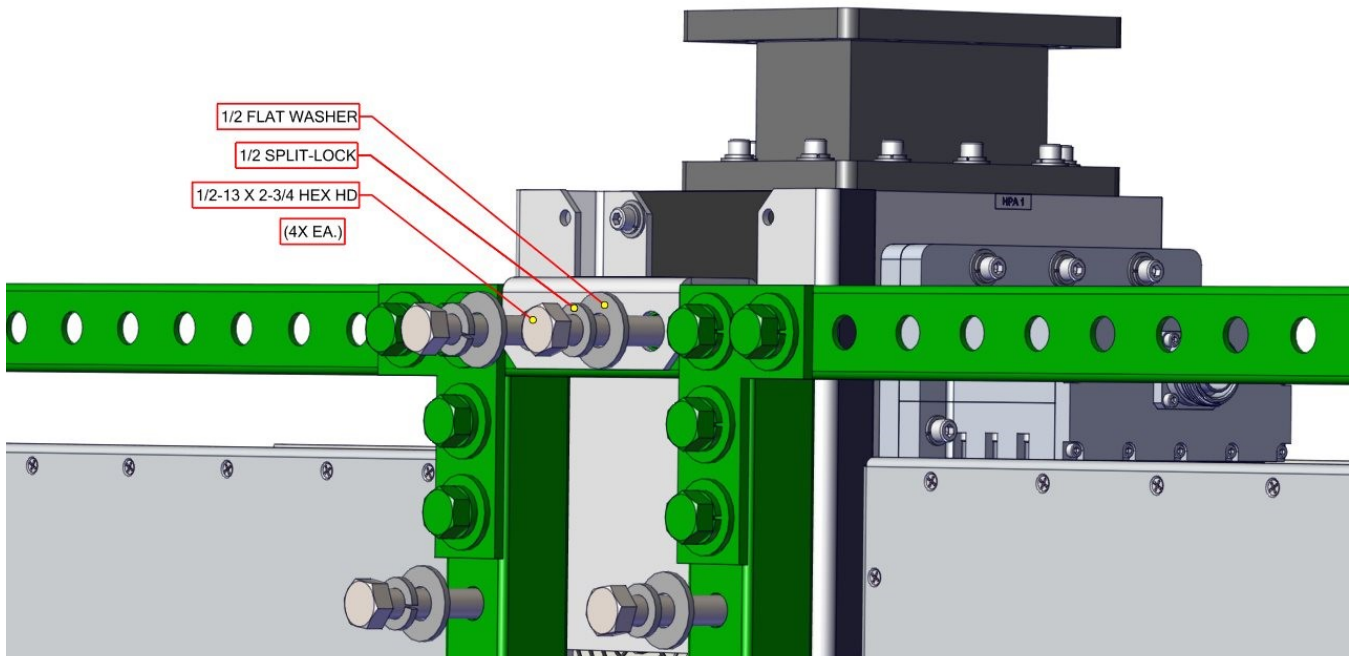
Figure 1-14: Waveguide Installation, C-Band (typical)

1.3.3 S-Band Systems

The S-Band redundant system was shipped with the following components that comprise the waveguide switch array: a switch/termination assembly (with mounting bracket), and coaxial cables that connect between the RF output of the HPAs and the switch. See **Figure 1-15**.



The switch mounting bracket shall be secured to the top rail between the HPAs. Hardware was shipped attached to the mounting bracket. See **Figure 1-16** and **Figure 1-17** for the hardware configuration for mounting the switch support bracket to the frame.



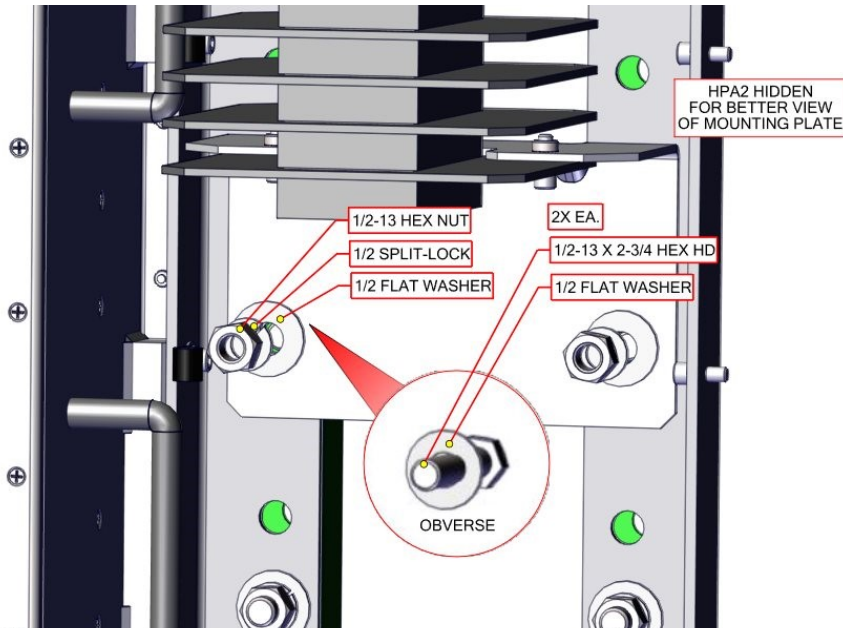


Figure 1-17: Mounting Switch Support to Frame, Bottom, S-Band (typical)

Connect one end of the coaxial cable to the coax-to-waveguide adapter attached to the switch assembly as shown in **Figure 1-18**. Take care to torque the connecting nuts without twisting the coaxial cable. Connect the opposite end of the coaxial cable to the RF Output port of the HPA. Repeat for each HPA in the system.

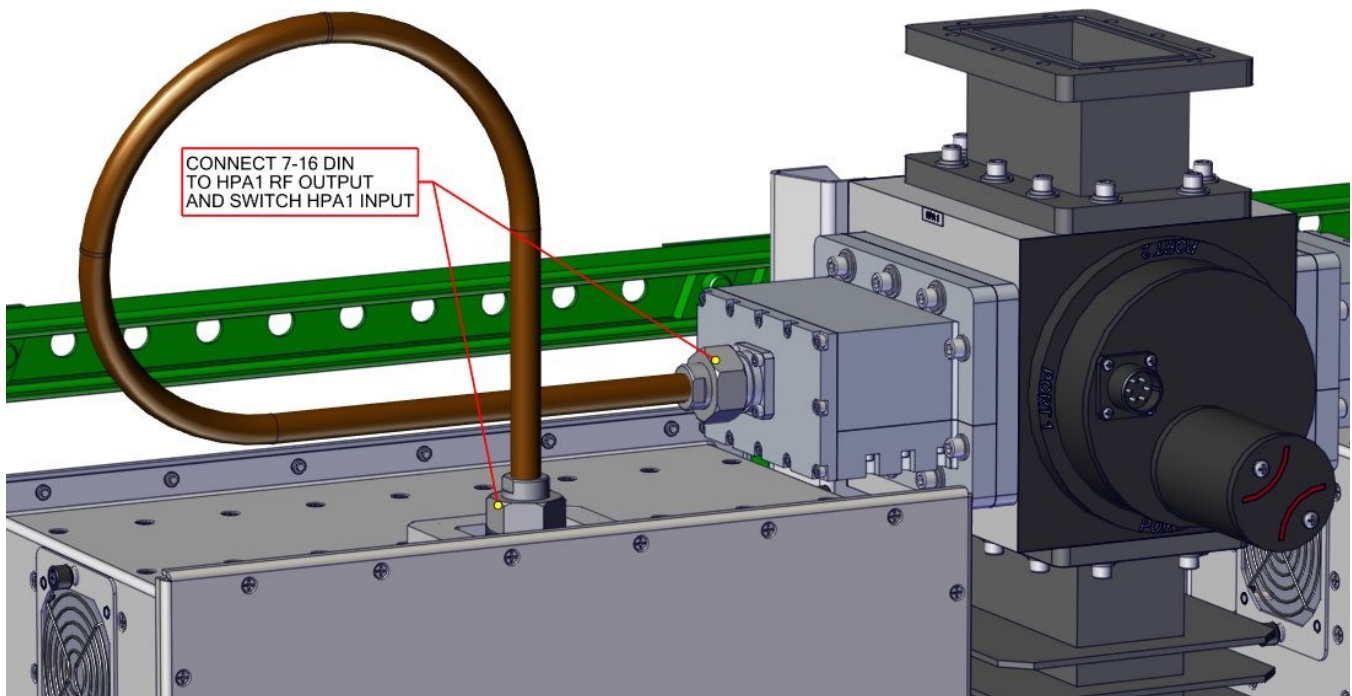


Figure 1-18: Connect RF Coaxial Cables Between HPA and Switch, S-Band

1.4 Installation, Input Plate and RF/IF Connections

A redundant system is available with input switching or input splitting. In both cases, an Input Plate Assembly will be installed between the amplifiers.

1.4.1 Input Splitting

An outline drawing of a typical Input Splitting Plate Assembly is shown in **Figure 1-19**.

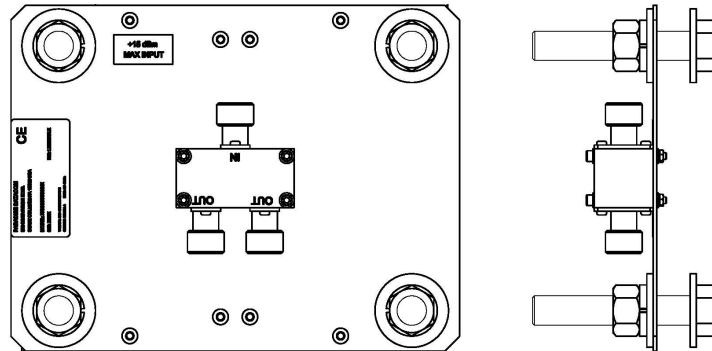


Figure 1-19: Input Splitting Plate Assembly, Typical

1.4.1.1 Input Splitter on C-Band and Ku-Band Systems

Figure 1-20 shows a typical installation for an Input Plate Assembly for C- or Ku-Band systems with an input splitter installed. Mounting hardware was shipped with the assembly.

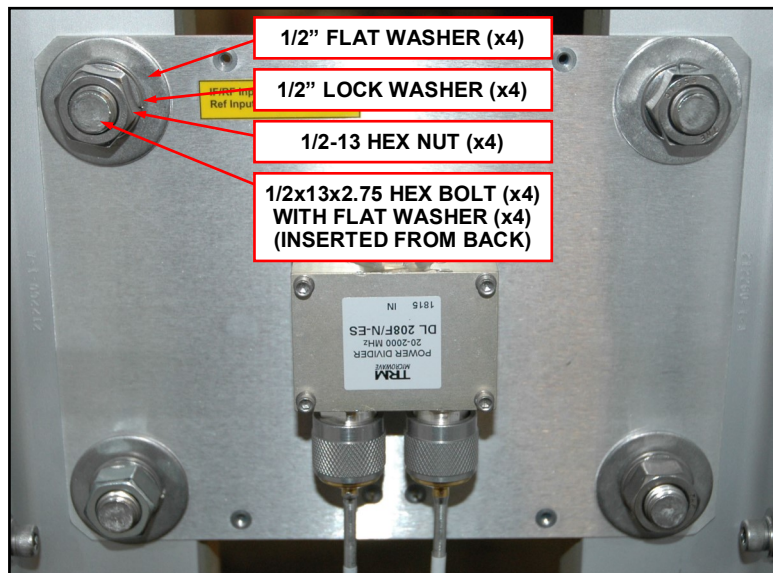


Figure 1-20: Mount Input Plate Assembly to Frame (C-, Ku-Band)

Pre-formed semi-rigid coaxial cables are run between the N-type (F) OUT connectors of the splitter to the N-type (F) RF Input (J1) connectors of each HPA. Refer to the label on each cable and your system's schematic to verify the cable connection location. Do not bend or otherwise attempt to change the shape of these cables. Repeat for each HPA.

Note: Self-amalgamating tape should be used to cover all connector junctions (N-type; SMA) so that no water can creep into the thread between the plug and socket.

1.4.1.2 Input Splitter on S-Band Systems

Figure 1-21 shows a typical installation for an Input Plate Assembly for S-Band systems with an input splitter installed. Mounting hardware was shipped with the assembly.

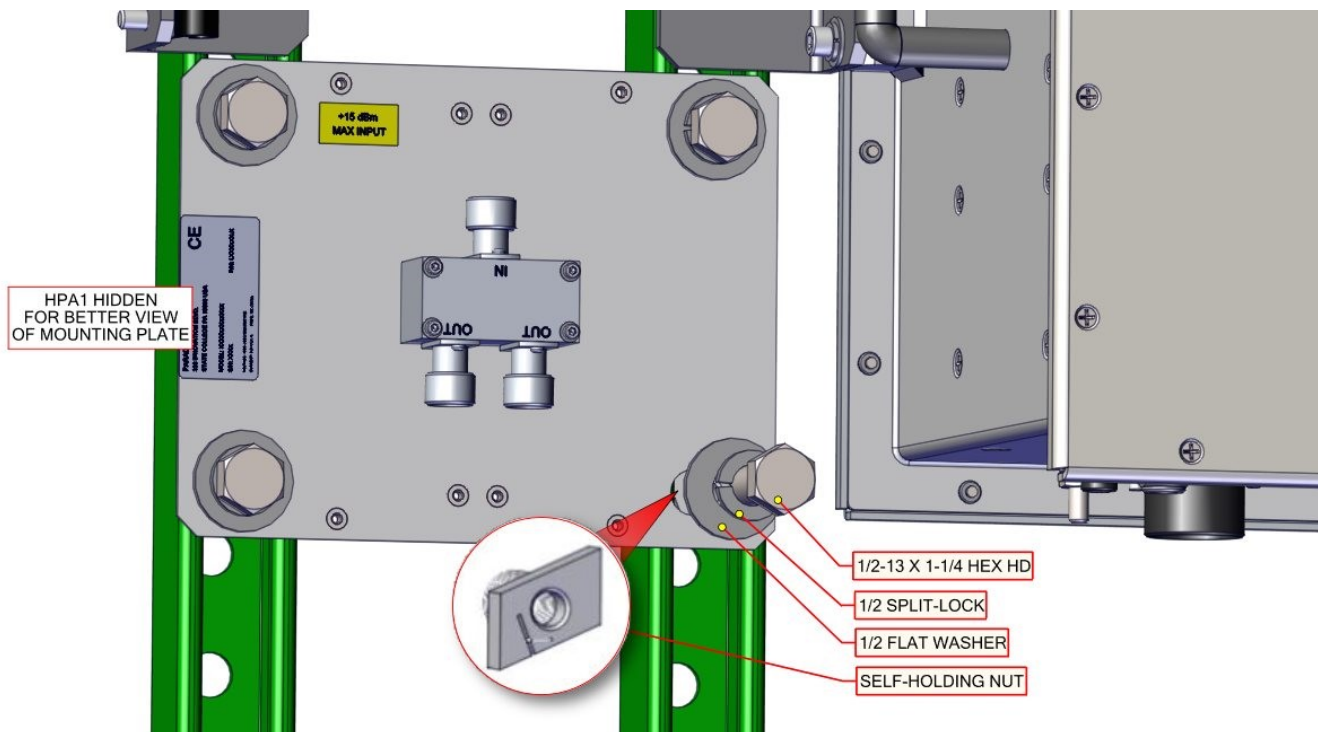


Figure 1-21: Mount Input Plate Assembly to Frame (S-Band)

Pre-formed semi-rigid coaxial cables are run between the N-type (F) OUT connectors of the splitter to the N-type (F) RF Input (J1) connectors of each HPA. See **Figure 1-22**. Refer to the label on each cable and your system's schematic to verify the cable connection location. Do not bend or otherwise attempt to change the shape of these cables. Repeat for each HPA.

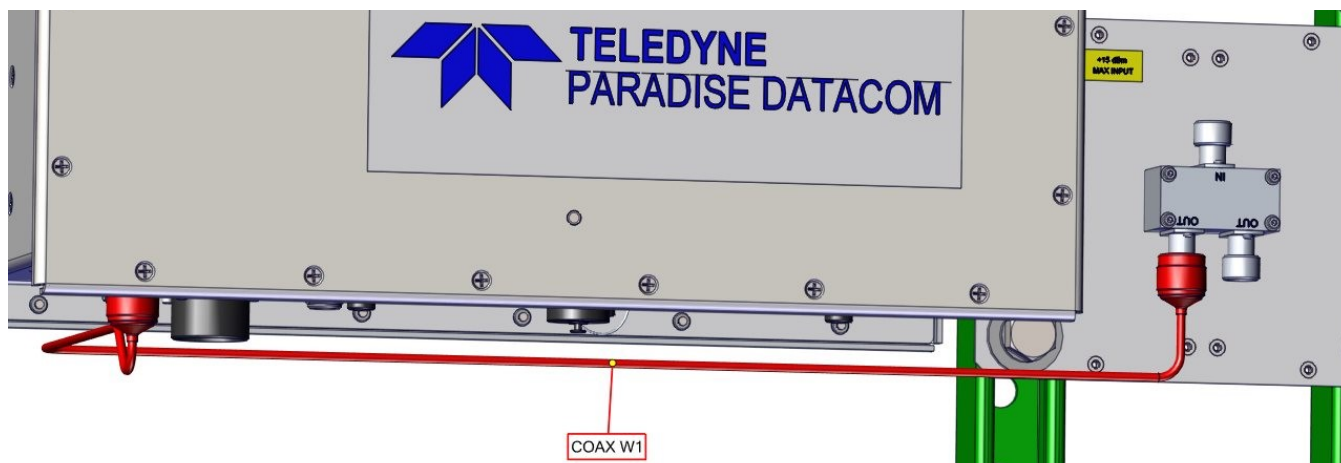


Figure 1-22: Connect Coaxial Cable Between Splitter and HPA RF Input (J1) Connector

Note: Self-amalgamating tape should be used to cover all connector junctions (N-type; SMA) so that no water can creep into the thread between the plug and socket.

1.4.2 Input Switching

An outline drawing of a typical Input Switching Plate Assembly is shown in **Figure 1-23**.

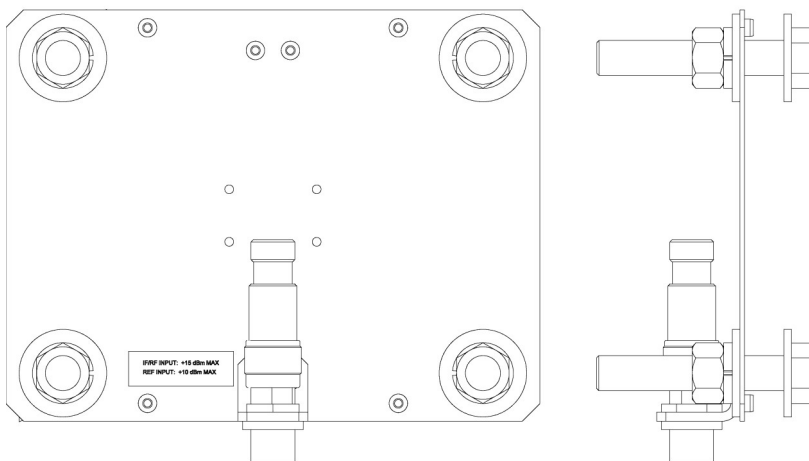


Figure 1-23: Input Switching Plate Assembly

Figure 1-24 shows a typical installation for an Input Plate Assembly with systems using input switching. Mounting hardware was shipped with the assembly.

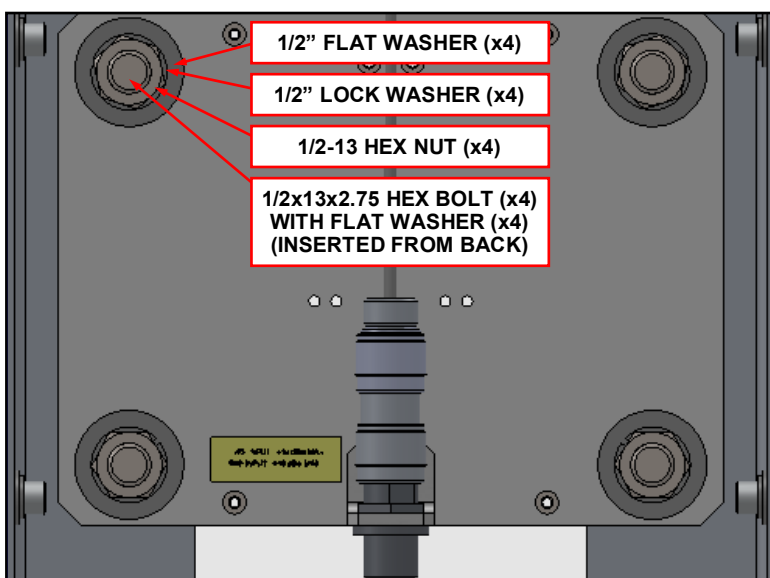


Figure 1-24: Installation, Input Switching Plate Assembly

Important! Do not bend or otherwise alter the shape of the semi-rigid co-axial cables.

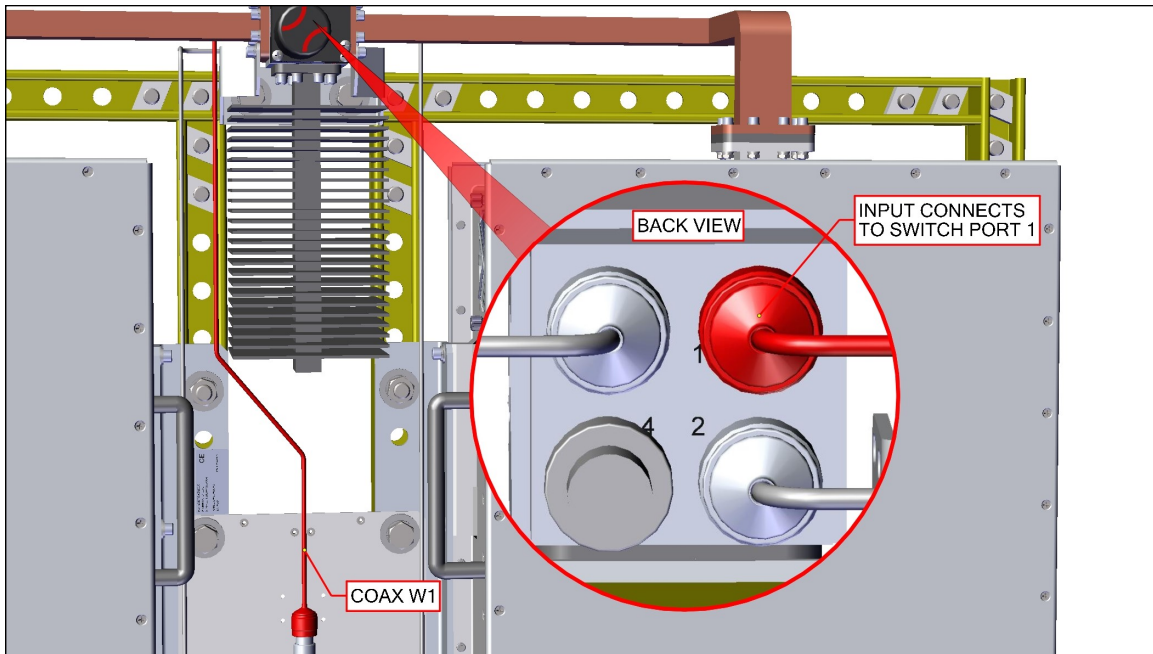


Figure 1-25: Connect Coax W1 to Input and Switch Port 1 (typical, C-Band)

Connect the pre-formed semi-rigid coaxial cable labeled W1 between the N-type (F) connector at the input plate assembly and the N-type (F) connector at Switch Port 1. See **Figure 1-25** for a typical C-Band example, and **Figure 1-26** for a typical Ku-Band example.

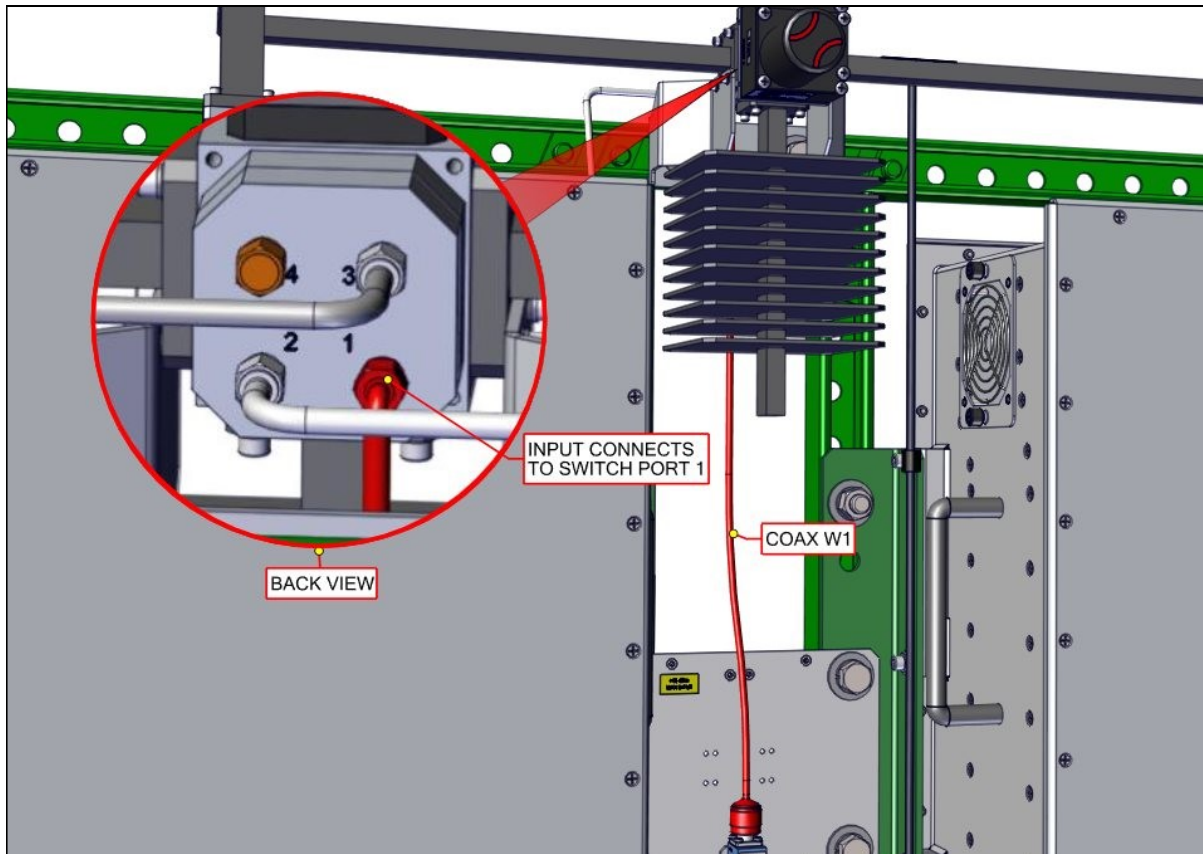


Figure 1-26: Connect Coax W1 to Input and Switch Port 1 (typical, Ku-Band)

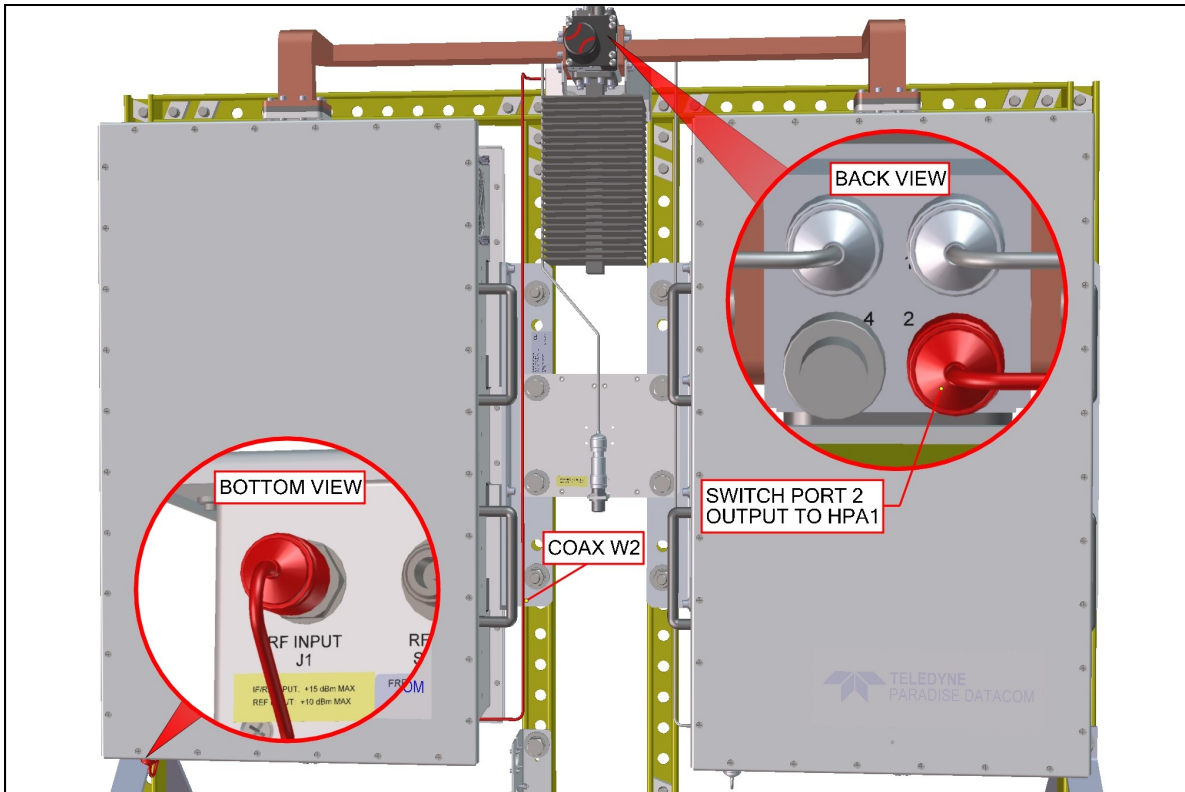


Figure 1-27: Connect Coax W2 to Switch Port 2 and HPA1 Port J1 (typical, C-Band)

Connect the pre-formed semi-rigid coaxial cable labeled W2 between Switch Port 2 and the RF Input port (J1) of HPA1. See **Figure 1-27** for a typical C-Band example, and **Figure 1-28** for a typical Ku-Band example.

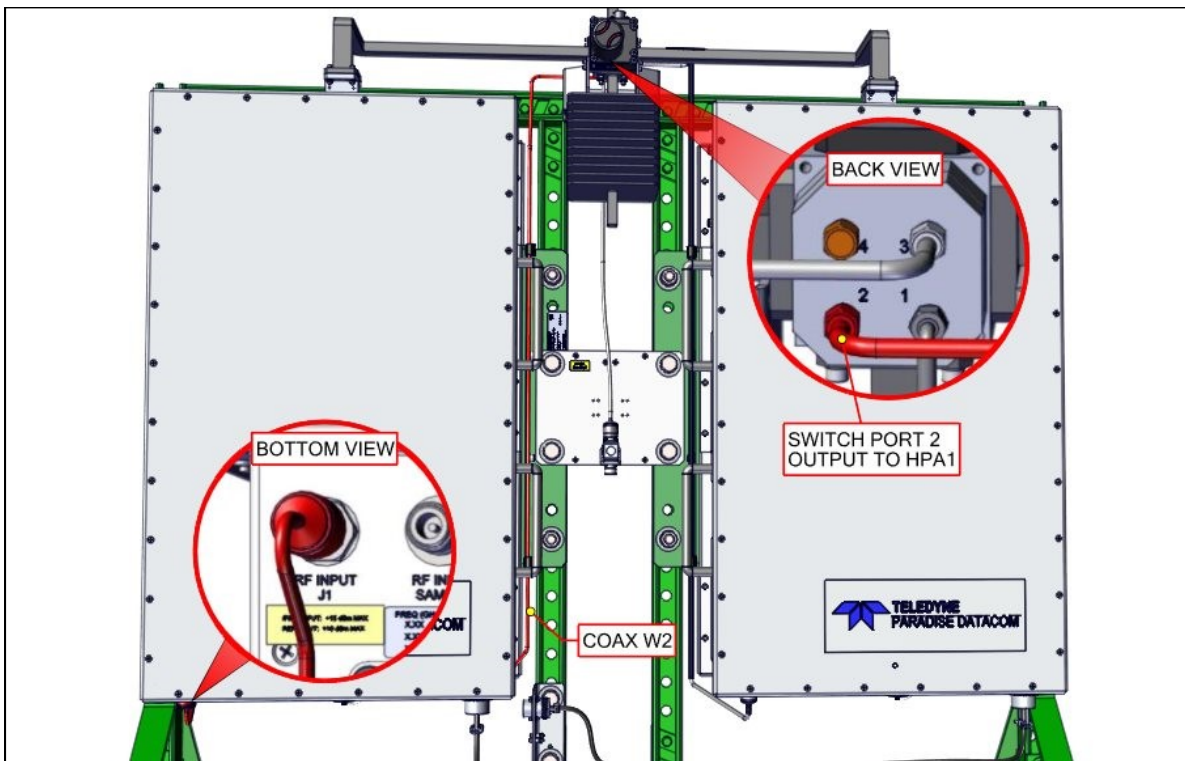


Figure 1-28: Connect Coax W2 to Switch Port 2 and HPA1 Port J1 (typical, Ku-Band)

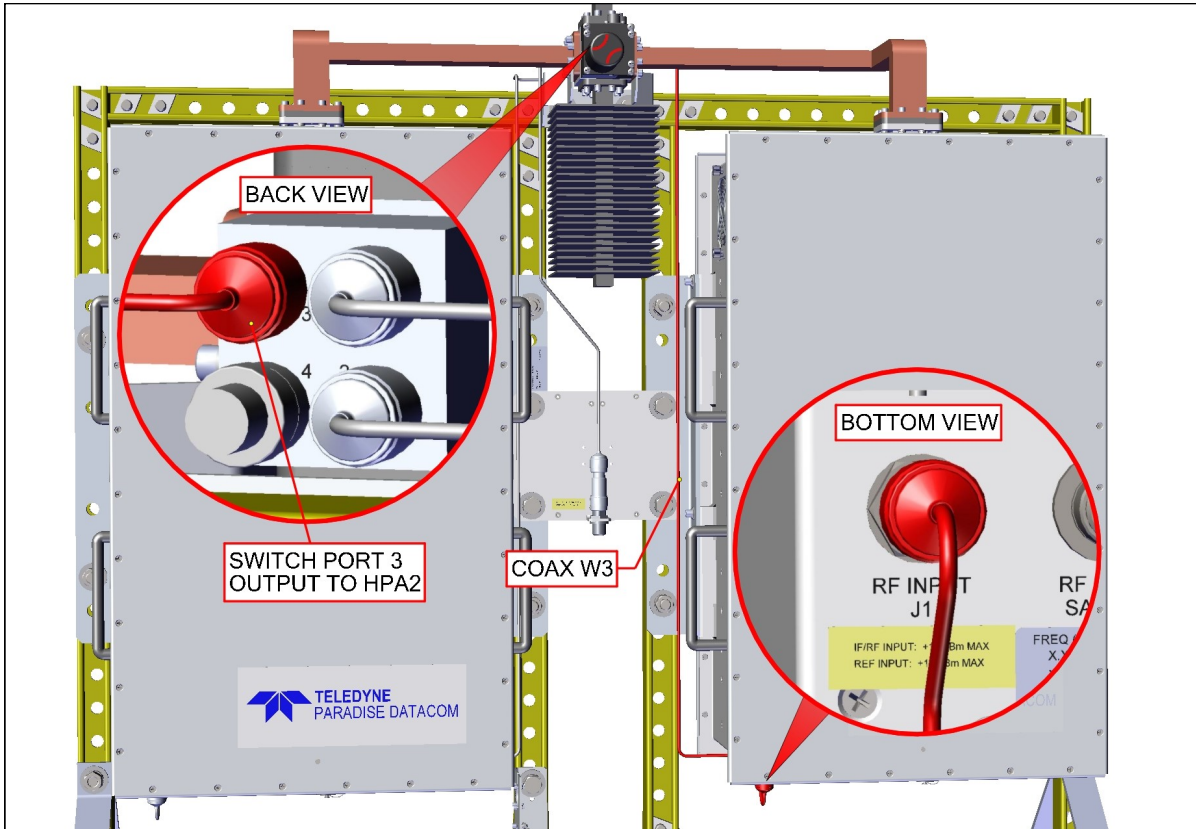


Figure 1-29: Connect Coax W3 to Switch Port 3 and HPA2 Port J1 (typical, C-Band)

Connect the pre-formed semi-rigid coaxial cable labeled W3 between Switch Port 3 and the RF Input port (J1) of HPA2. See **Figure 1-29** for a typical C-Band example, and **Figure 1-30** for a typical Ku-Band example.

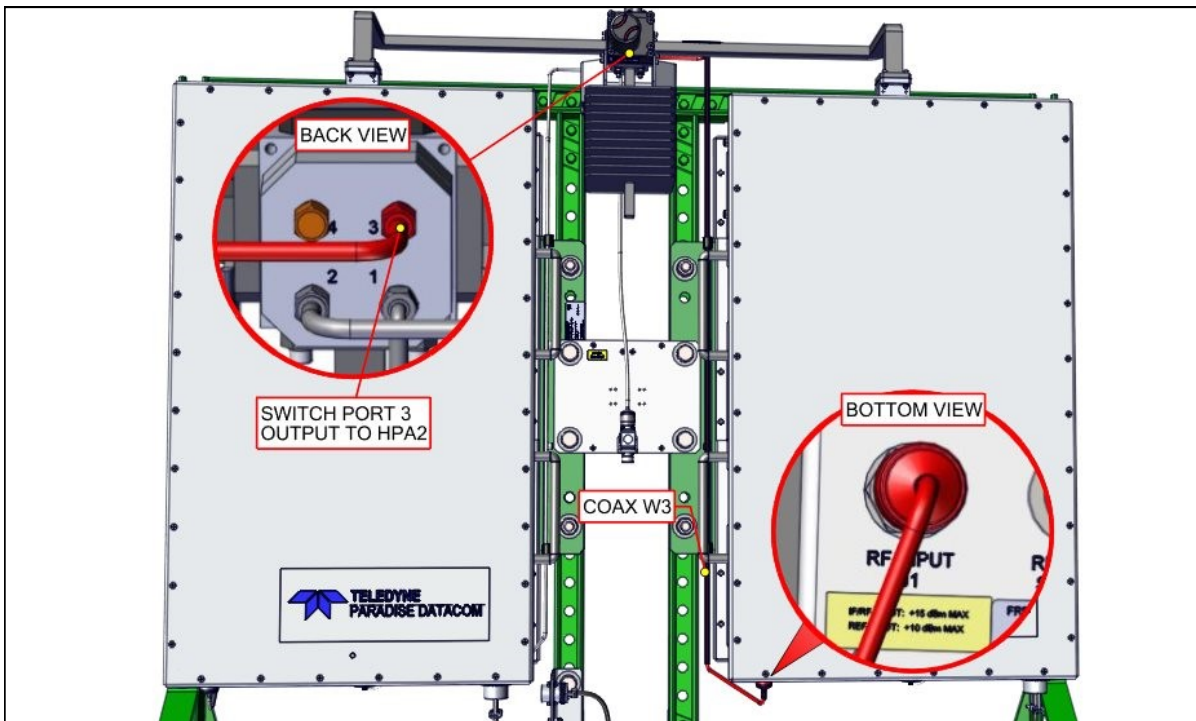


Figure 1-30: Connect Coax W3 to Switch Port 3 and HPA2 Port J1 (typical, Ku-Band)

1.5 Installation, Switch and Link Cables

A typical redundant system includes a Switch Cable (L200514-X) and Link Cable (L200534-X) which need to be connected to complete the installation. The cables include labels near each connector that identify to which port the connector should be plugged. See **Figure 1-31**.

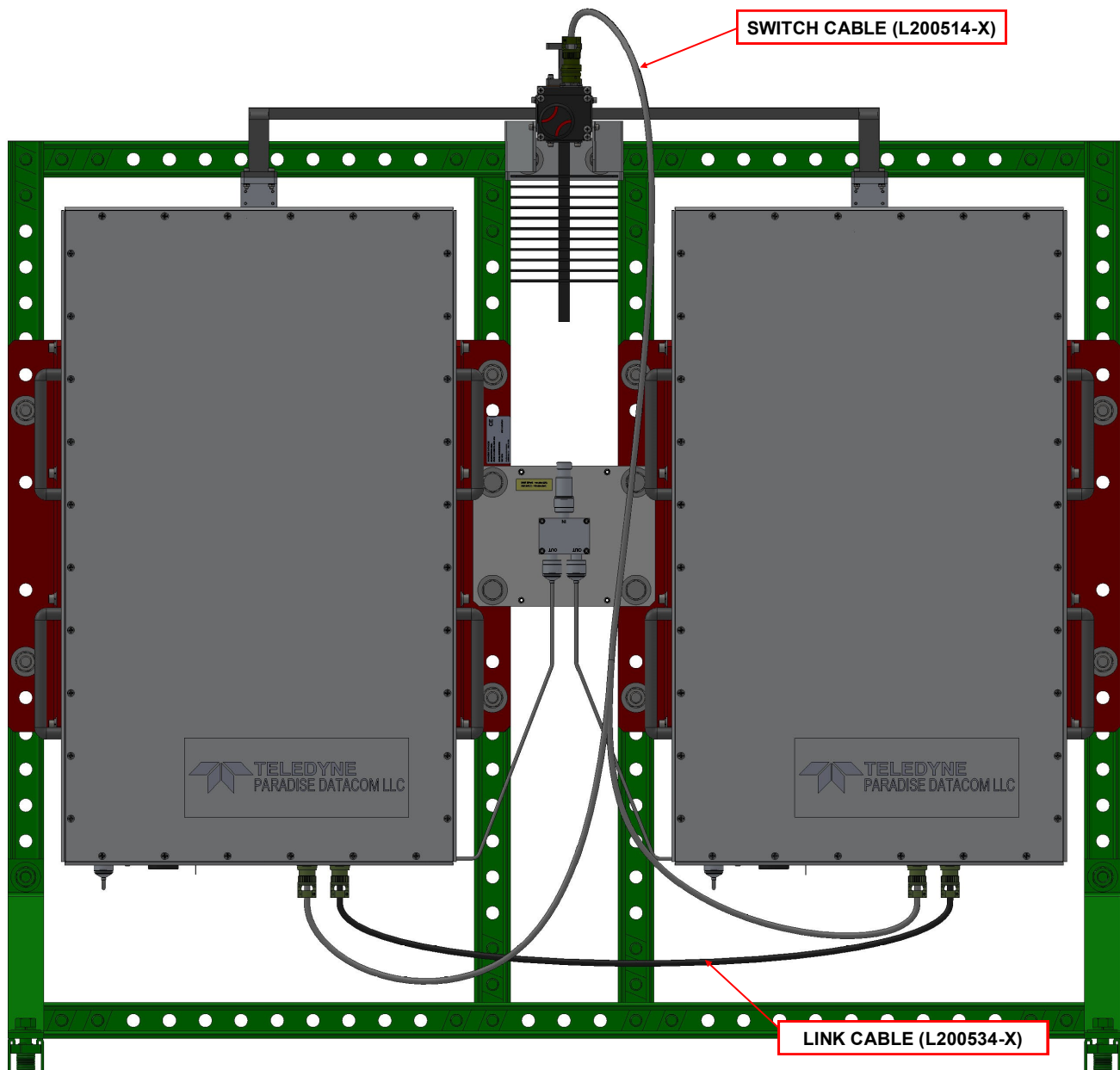


Figure 1-31: Connect Switch and Link Cables

Check your system schematic to verify proper connections.

Note: Self-amalgamating tape or putty should be used to cover all connector junctions (circular MIL, MS-type) from the plug/socket connection to as close as possible to the cable sheath so that no water can creep into the thread between the plug and socket.

1.6 Installation, Switch and M&C Cables with Optional RCP

All Teledyne Paradise Datacom 1:1 High Power Outdoor Systems do not require an external controller for normal system operation. An optional RCP2-1100 controller is available, and requires a different set of cable configurations than described in **Section 1.5**.

The system interface panel should be installed to the uni-strut frame below HPA 1, as shown in **Figure 1-32**.

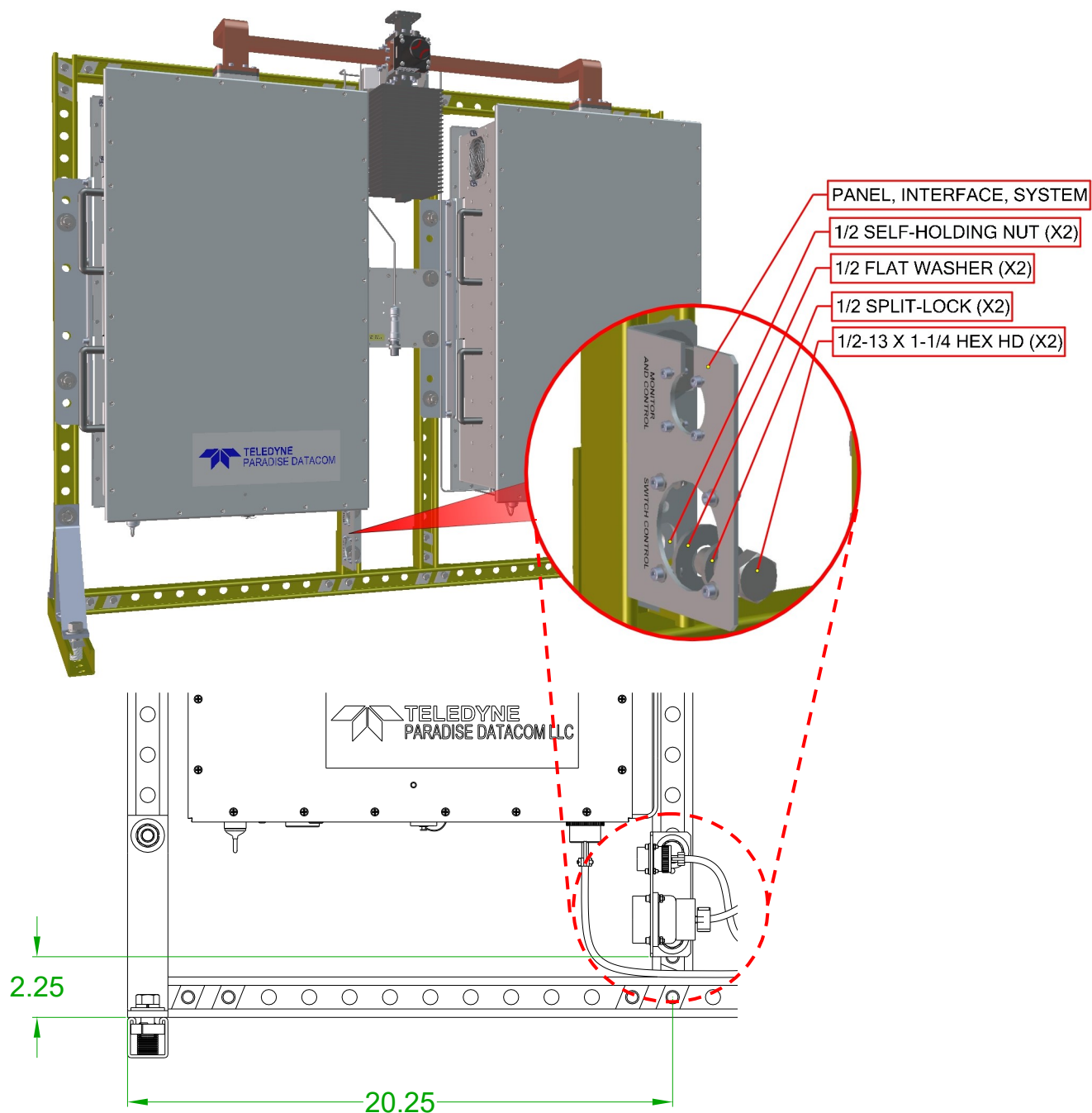


Figure 1-32: Install System Interface Panel

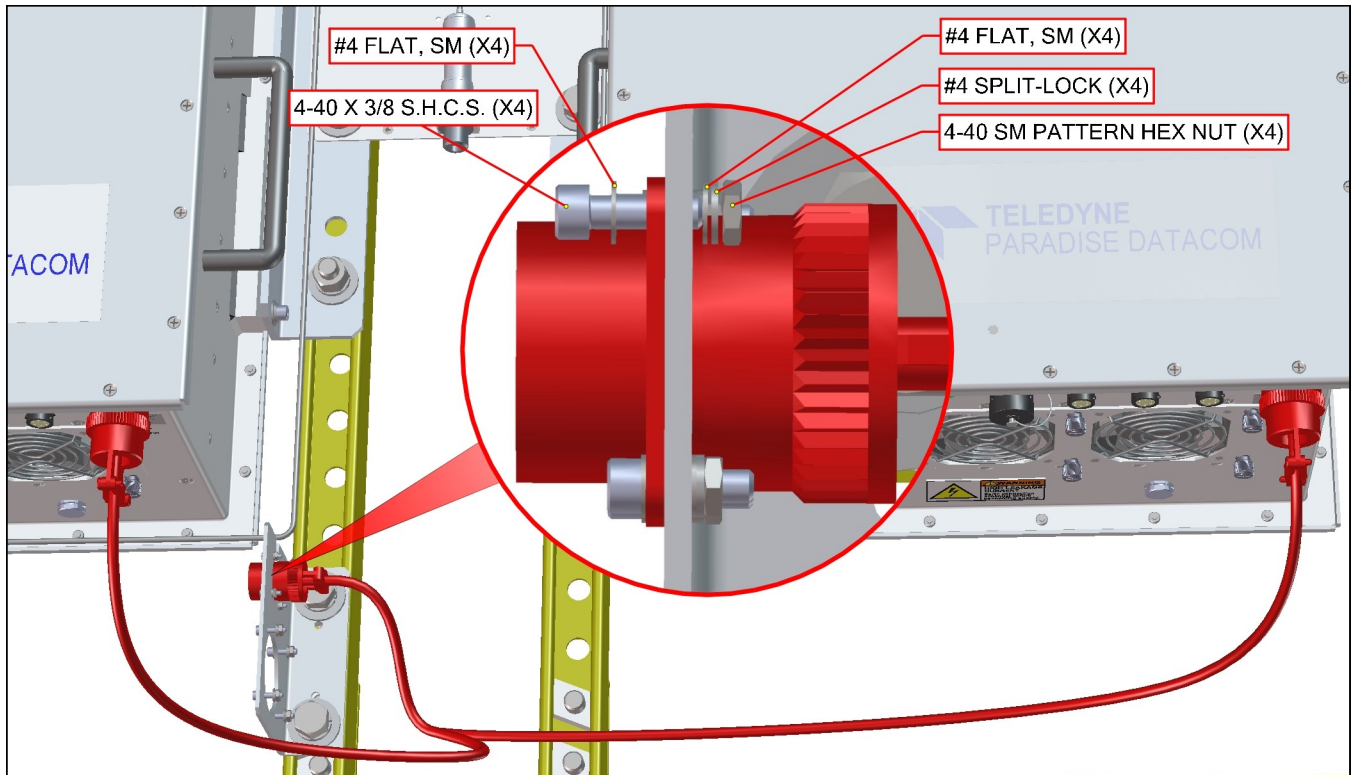


Figure 1-33: Connect M&C Cable (L203092-X)

1.6.1 Install M&C Cable

The M&C Cable (part number L203092-X) includes labels near each connector that identify to which port the connector should be plugged.

Install the M&C Cable to the system interface panel as shown in **Figure 1-33**. Note that the mounting flange on the connector should be slid into the interface panel slot so that the flange is on the printed side of the panel. Secure the connector flange to the panel using the hardware provided.

Plug the circular MIL connector labeled J4 HPA1 to port J4 of HPA1. Plug the circular MIL connector labeled J4 HPA2 to port J4 of HPA2.

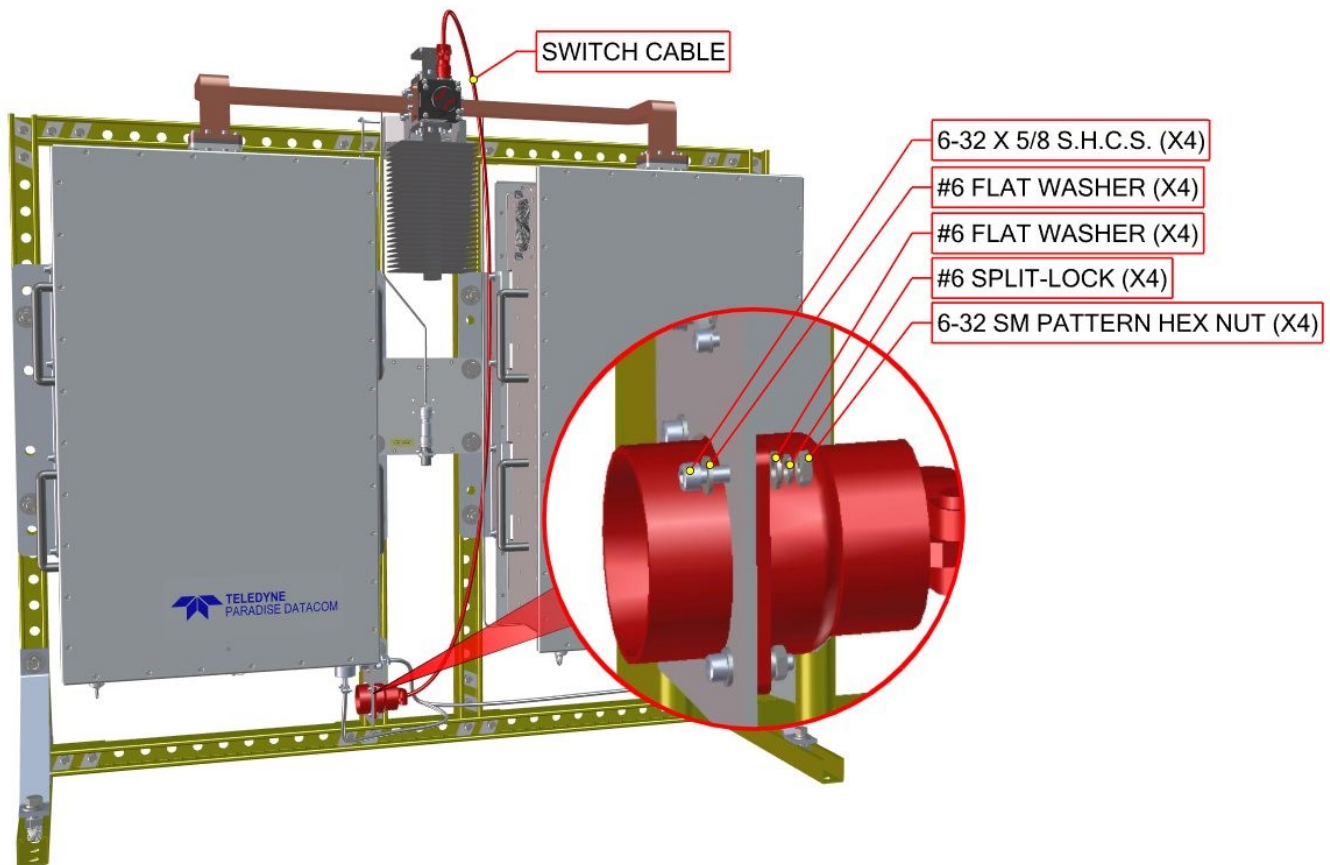


Figure 1-34: Connect Switch Cable (L203093-X)

1.6.2 Install Switch Cable

The Switch Cable (part number L203093-X) includes labels near each connector that identify to which port the connector should be plugged.

Install the Switch Cable to the system interface panel as shown in **Figure 1-34**. Note that the circular MIL connector should be slid into the interface panel hole so that the mounting flange is opposite the printed side of the panel. Secure the connector flange to the panel using the hardware provided.

Plug the circular MIL connector labeled SWITCH to the waveguide switch.

1.6.3 Connect Cables to RCP2-1100 Controller

The Teledyne Paradise Datacom Redundant 32 Controller is designed to be mounted in a standard EIA 19 inch equipment rack. **Figure 1-35** shows the connectors at the controller rear panel.

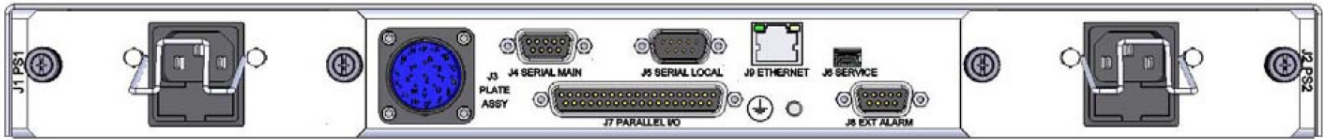


Figure 1-35: RCP2-1100 Redundant System Controller, Rear Panel

Two cables connect between the RCP2-1100 Controller and the system interface panel: the Switch Cable (part number L201061-X) and the Serial Coms Cable (part number L203091-X). The cables include labels near each connector that identify to which port the connector should be plugged.

Plug the DB9 (M) connector of the Serial Coms Cable (L203091-X) labeled J8 RCP2 to port J8 of the controller rear panel. Plug the DB9 (F) connector labeled J5 RCP2 to port J5 of the controller rear panel. Plug the circular MIL connector labeled MONITOR AND CONT to its mating connector on the system interface panel.

Plug the circular MIL connector of the Switch Cable (L201061-X) labeled P1 to port J3 of the controller rear panel. Plug the circular MIL connector labeled P2 to the system interface panel.

Refer to the operations manual for the Redundant System Controller (part number 209351) for operating instructions.

1.7 Installation, Optional Maintenance Switch

An optional maintenance switch with controller is available for all systems. The maintenance waveguide switch assembly is located at the system output, and includes a dummy load. See **Figure 1-36** for an example.

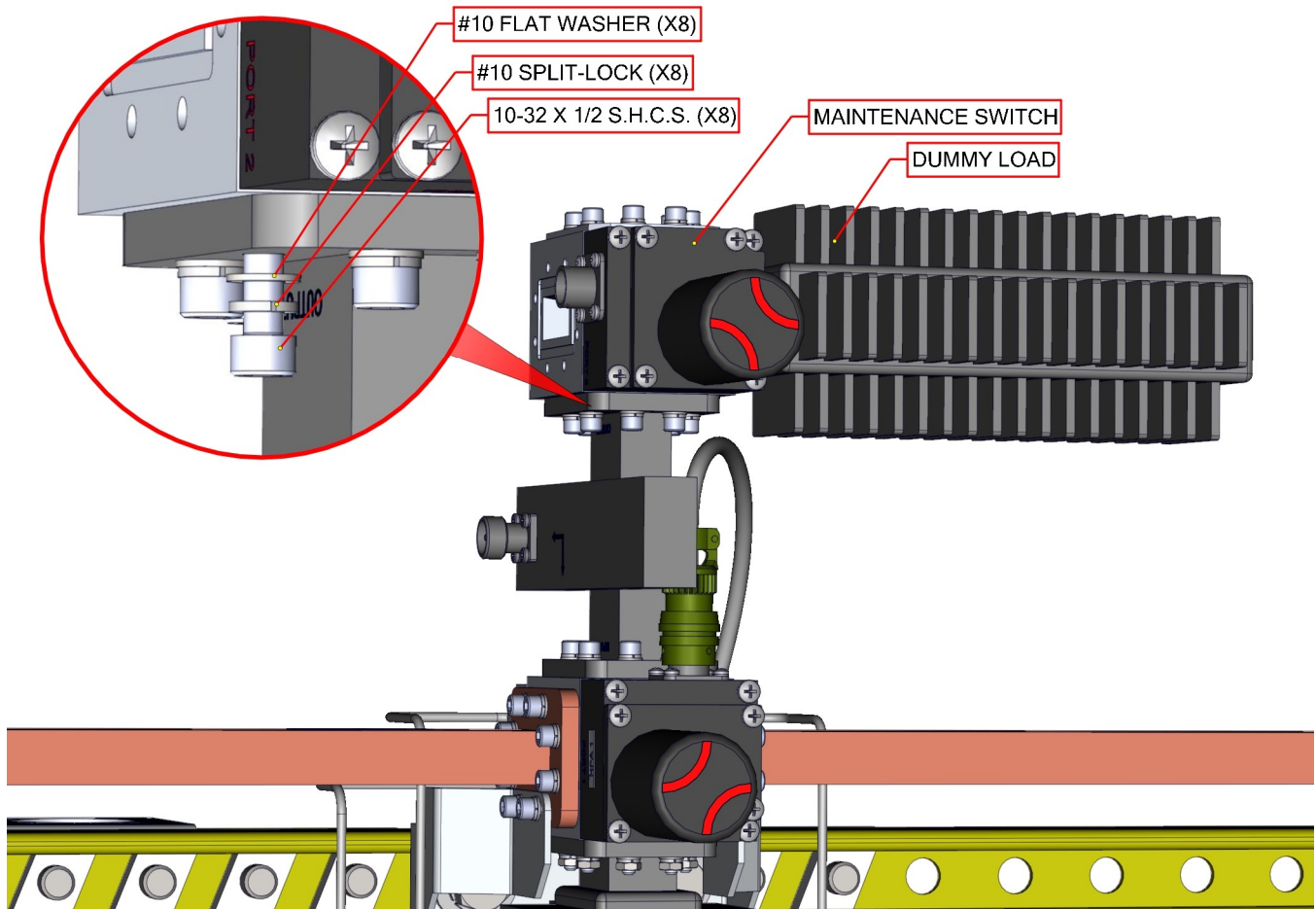


Figure 1-36: Install Maintenance Switch and Dummy Load Assembly (C-Band shown)

Depending on the size and weight of the dummy load, a support bracket may be required to help bear the weight of the load. Such a support bracket would be secured to the uni-strut frame. Check the outline drawing for your system.

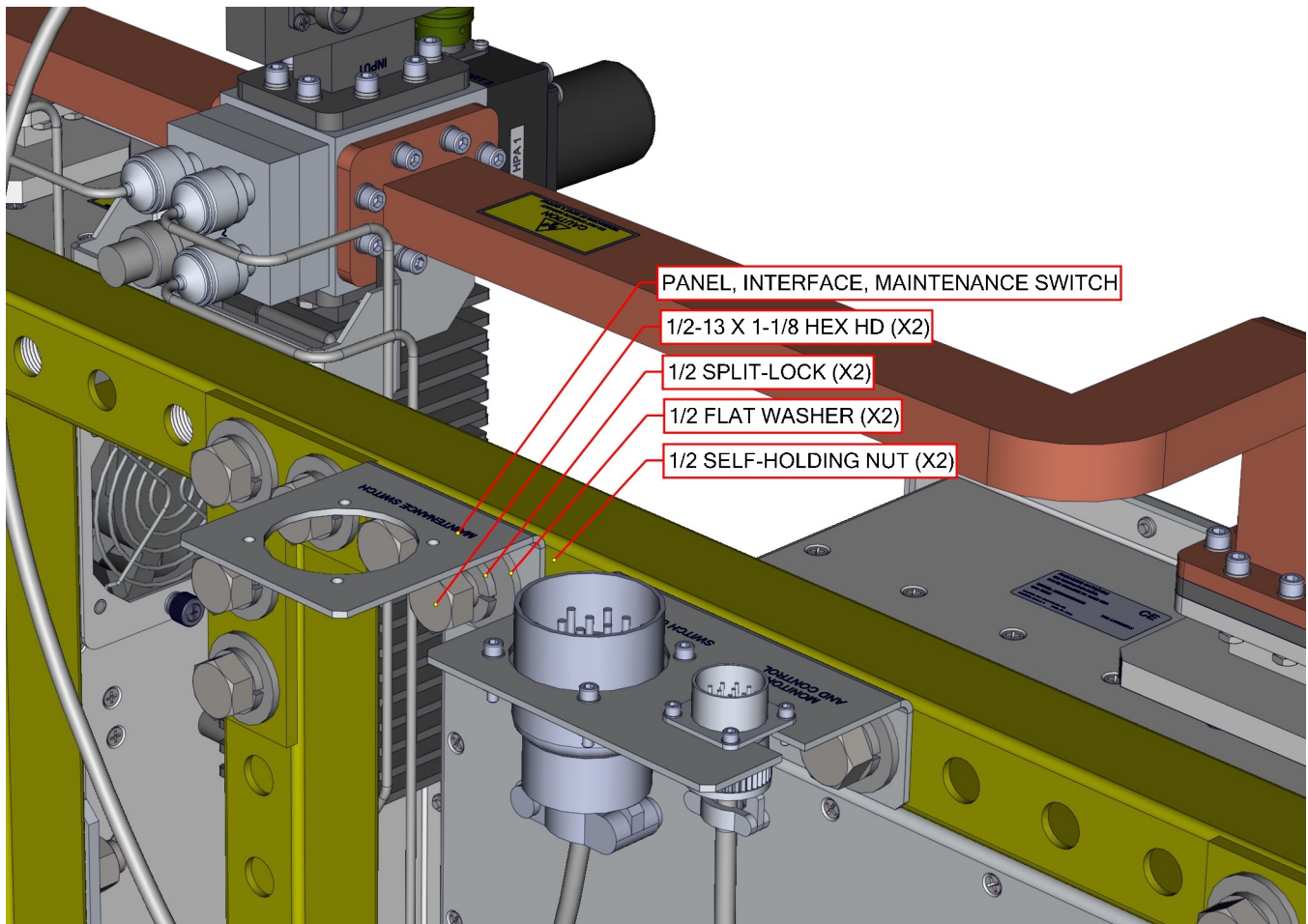


Figure 1-37: Install Maintenance Switch Interface Panel

1.7.1 Install Maintenance Switch Interface Panel

Install the maintenance switch interface panel to the uni-strut frame as shown in **Figure 1-37**. Note that for systems using a redundant system controller, the location of the system interface panel may be moved to the top, rear of the uni-strut frame.

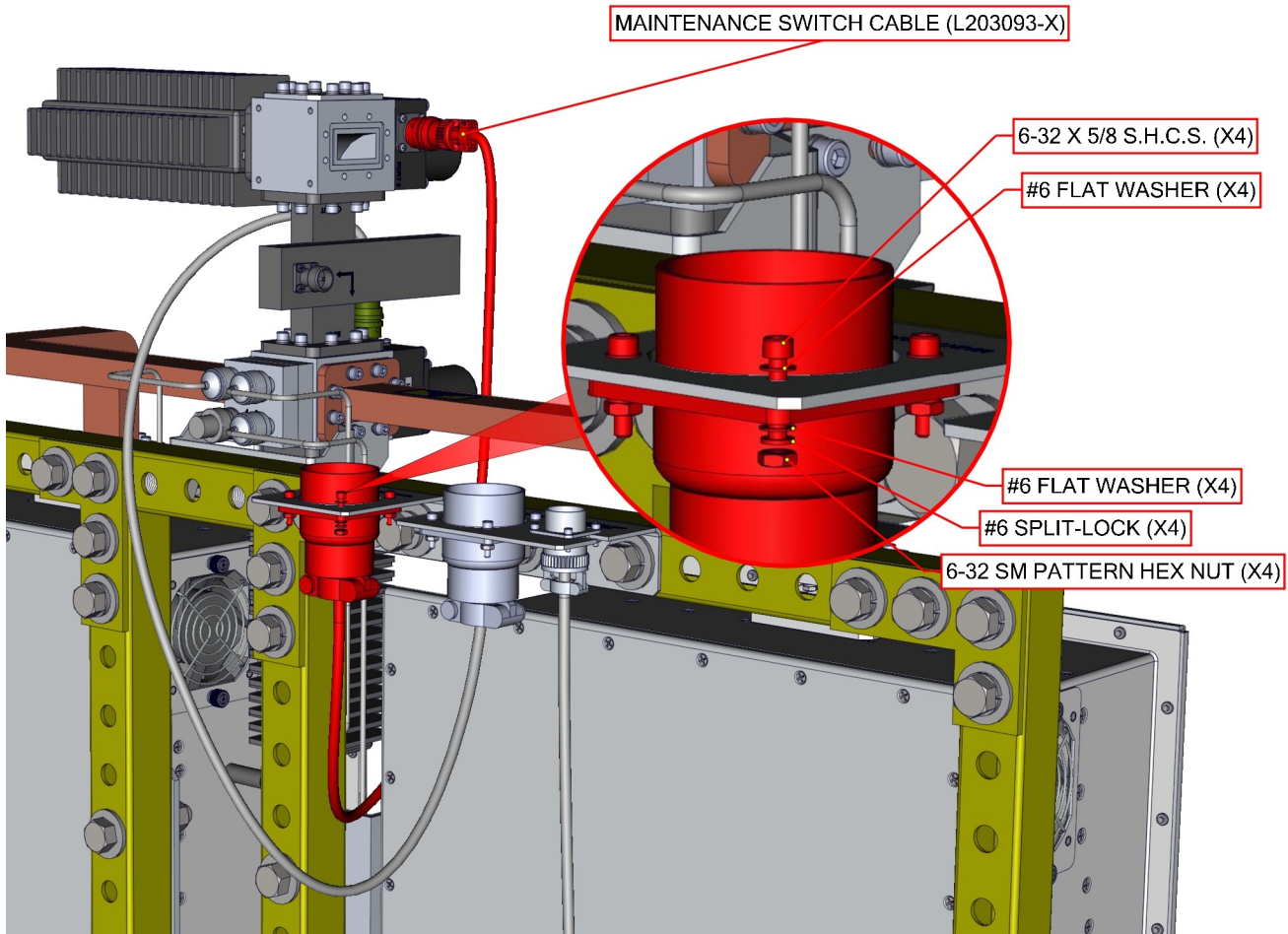


Figure 1-38: Connect Maintenance Switch Cable (L203093-X)

1.7.2 Connect Maintenance Switch Cable

Attach the larger circular MIL connector of the Maintenance Switch Cable to the interface panel as shown in **Figure 1-38**.

1.7.3 Connect Control Cable to Maintenance Switch Controller

The Teledyne Paradise Datacom Maintenance Switch Controller is designed to be mounted in a standard EIA 19 inch equipment rack.

The maintenance switch control cable includes labels near each connector that identify to which port the connector should be plugged. Plug the circular MIL connector of the maintenance switch control cable (L201061-X) labeled P1 to port J3 of the controller rear panel. Plug the circular MIL connector labeled P2 to the maintenance switch interface panel.

Refer to the operations manual for the Redundant System Controller (part number 209351) for operating instructions.

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2.0 Introduction

This section outlines the assembly and mounting procedure for a 1:2 Redundant High Power Outdoor SSPA System.

Before beginning the assembly of the uni-strut mounting kit, verify that the kit includes all of the items in **Table 2-1**. If any items are missing, contact Teledyne Paradise Datacom with the part number and quantity of the shortage.

The following instructions describe the assembly of the uni-strut mounting kit, and the installation of the High Power Outdoor SSPAs and associated switch, signal box and waveguide assembly. The system is intended to be free standing and entirely self-supported once properly mounted.

It is important to give consideration to the following:

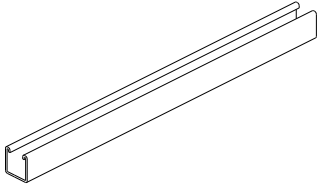
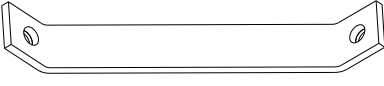
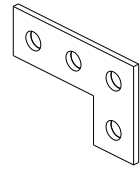
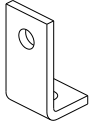







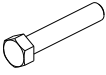
1. Structural integrity of the mounting deck.
2. Accessibility to all local user interfaces. (Ensure SSPA enclosure doors are free to open to the latched position.)
3. Adequate cooling air, 8.00" minimum clearance must be maintained between air intake and any surface that will inhibit air flow.
4. The High Power Outdoor SSPA should never be enclosed in such a manner that airflow is restricted. Normal operating range is -40 to +60°C.
5. Proper weatherized sealing of all connectors.

Warning! The High Power Outdoor SSPAs should not be positioned in such a way that allows falling precipitation to enter the fans at the bottom of the amplifier. Doing so will void your warranty.

2.1 Installation, Uni-Strut Assembly

Reference the parts list in **Table 2-1** and **Figure 2-1**, **Figure 2-2**, and **Figure 2-3** throughout the assembly of the mounting frame.

Table 2-1: Parts List, Mounting Kit Assembly (L214792-2)

Item	Qty.	Description	Image
1	4	UNI-STRUT, 34.5"	
2	2	UNI-STRUT, 37.5"	
3	2	UNI-STRUT, 69"	
4	4	UNI-STRUT, 20"	
11	8	CORNER BRACE, 7.5"	
12	12	BRACKET, L, 4-HOLE	
13	4	ANGLE, CONNECTOR, 2-HOLE	
21	58	BOLT, HEX, 1/2-13 X 1.25, SS	
22	66	WASHER, LOCK, 1/2	
23	69	WASHER, FLAT, 1/2, STD	
24	44	NUT, SELF-HOLD, 1/2, SPRINGLESS	
25	12	NUT, SELF-HOLD, 1/2	
26	8	NUT, HEX, 1/2-13, GRADE 5 ZINC	
27	4	WASHER, FLAT, 9/16, D-SHAPE	
28	8	BOLT, HEX, 1/2-13 X 2.75, SS	

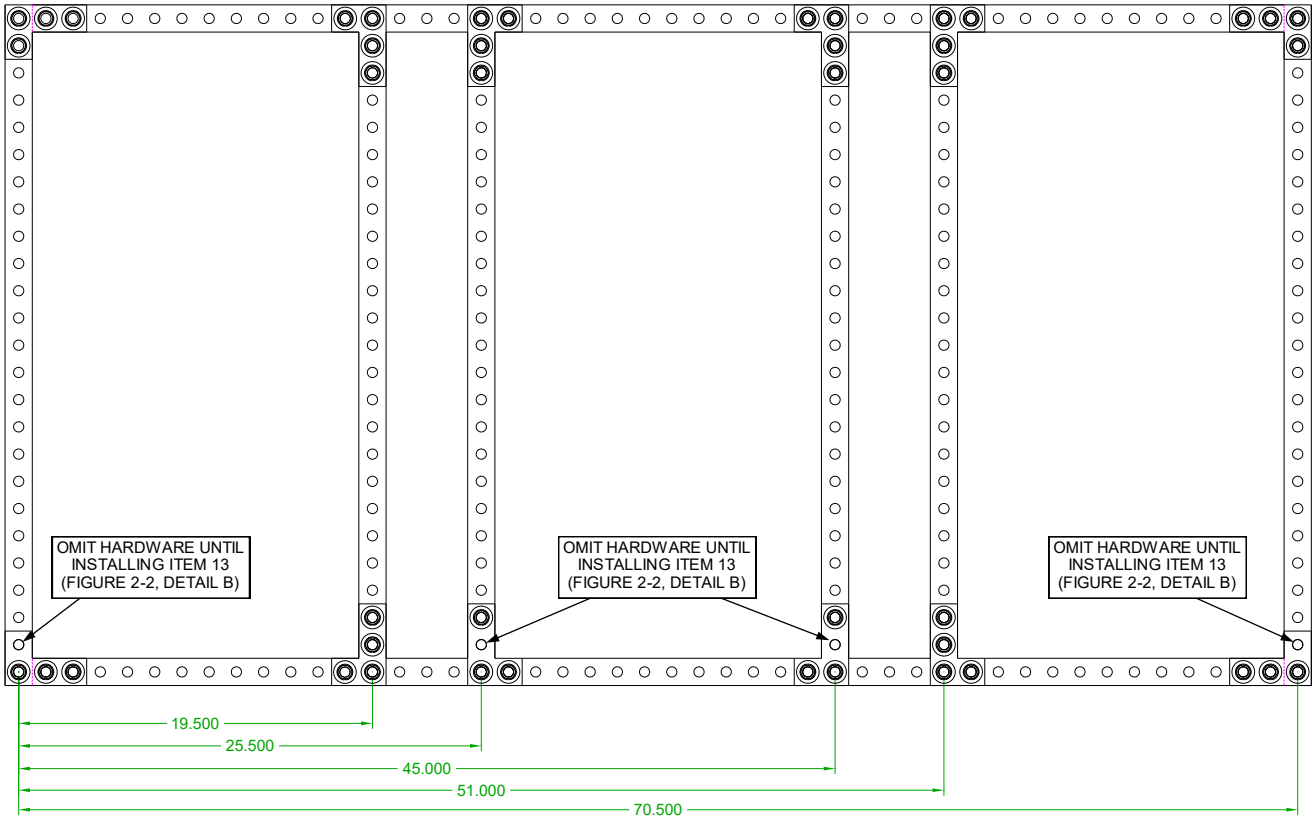


Figure 2-1: Uni-Strut Assembly

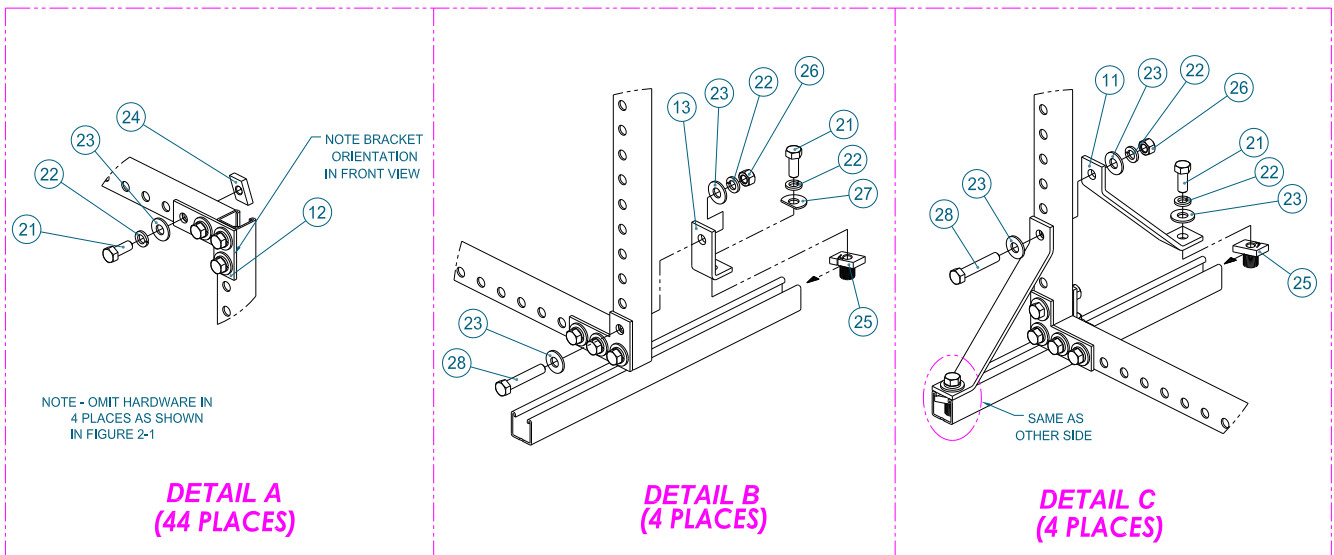


Figure 2-2: Uni-Strut Assembly, Hardware Placement

1. Arrange the uni-strut sections (Items 1, 2 and 3) as shown in **Figure 2-1**. Secure the 4-hole L-brackets (Item 12) on the flat side of the uni-strut as shown in **Figure 2-1**, and refer to **Figure 2-2, Detail A** for hardware placement.

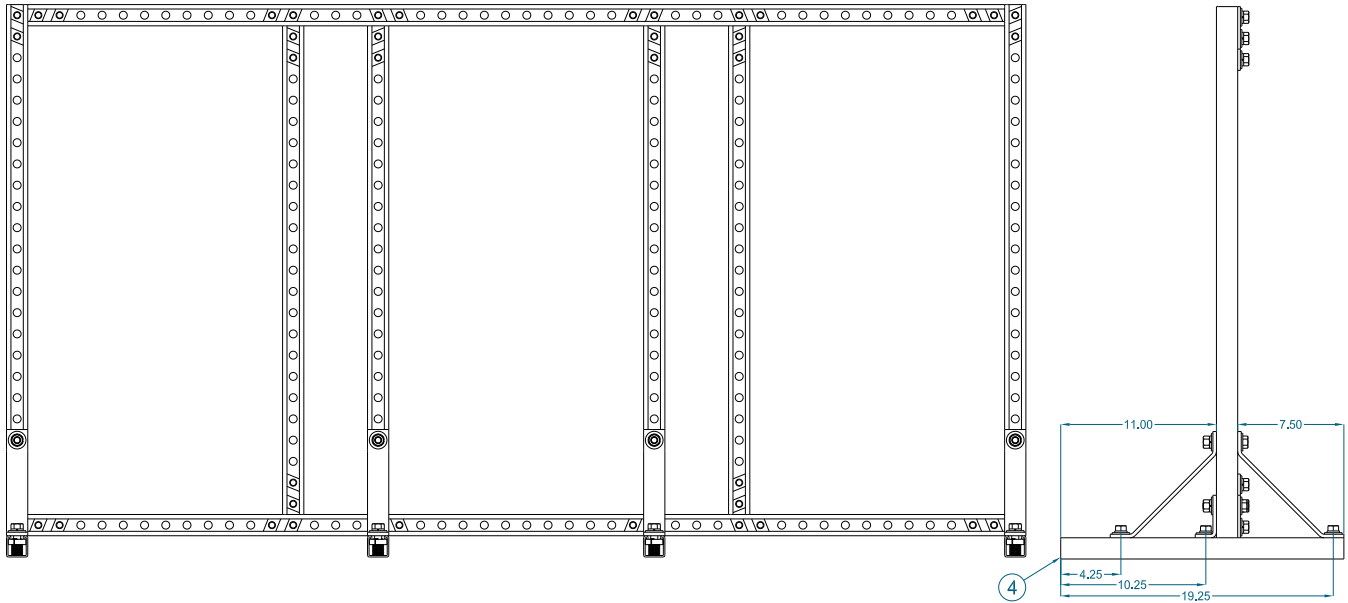


Figure 2-3: Uni-Strut Assembly, Base Struts

2. Arrange the 20" sections of uni-strut (Item 4) as shown in **Figure 2-3**,
3. Secure the 2-hole angle connectors (Item 13) to the uni-strut base and frame as shown in **Figure 2-3**, and refer to **Figure 2-2, Detail B** for hardware placement.
4. Attach the corner braces (Item 11) to the uni-strut base and frame as shown in **Figure 2-3**, and refer to **Figure 2-2, Detail C** for hardware placement.
5. Secure all hardware tightly.

2.2 Installation, HPAs to Frame

Warning: The base struts (Item 4) included in the mounting kit should be bolted securely to the location decking prior to mounting the HPAs to the mounting frame. This is to ensure that the mounted SSPA assembly does not tip over during or after system installation.

The HPAs will be mounted to the open channel side of the uni-strut frame. Mounting hardware is provided with the amplifiers. See **Figure 2-4**.

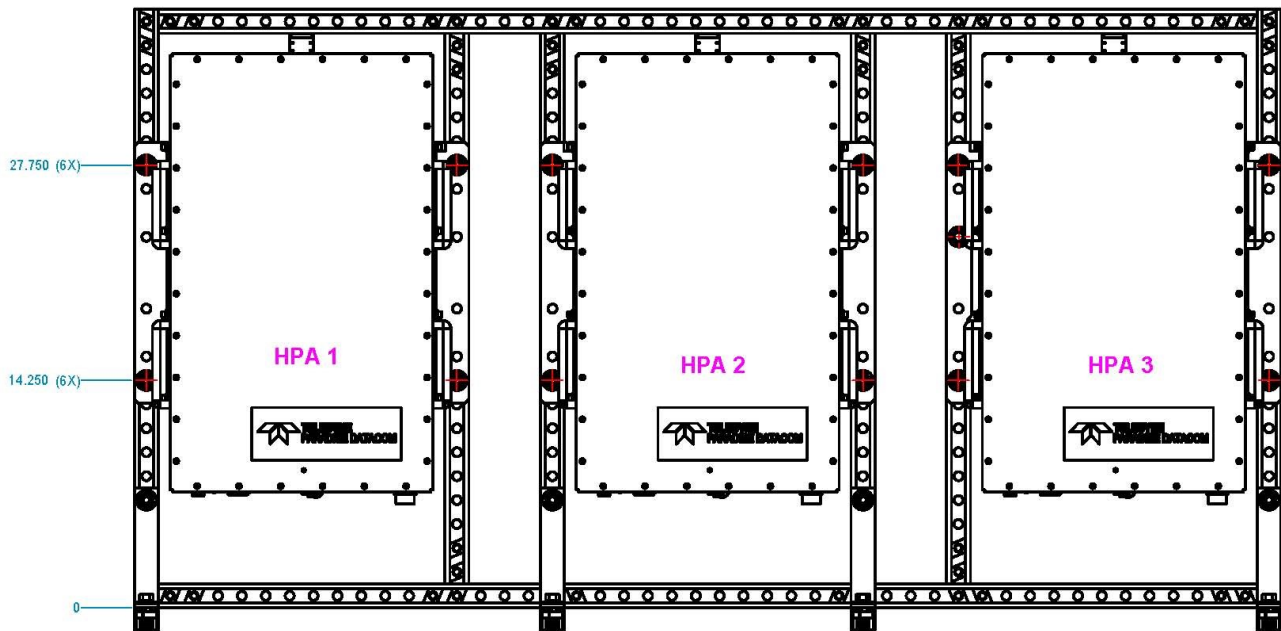


Figure 2-4: Mount HPAs to Frame

Warning: The HPAs each weigh in excess of 100 pounds (45.5 kg). A mechanical lift or at least two persons are required to mount the HPAs to the frame, while a third person installs the hardware.

1. Insert a 1/2-13x2.75 hex bolt with 1/2" flat washer through the flat side of the uni-strut frame at the positions shown in **Figure 2-4** and through the mounting bracket of the HPAs.
2. Secure each bolt with a 1/2" flat washer, 1/2" lock washer and 1/2-13 hex nut.
3. Tighten hardware securely.

2.3 Installation, Waveguide Switch Array

2.3.1 Ku-Band Systems

The redundant system was shipped with the following components that comprise the waveguide switch array: a switch 1 assembly, a switch 2 assembly with termination, two (2) switch support brackets, an interface bracket, two (2) RF/IF input assemblies, and waveguide segments that connect between the output of the HPAs and the switches. See **Figure 2-5**.

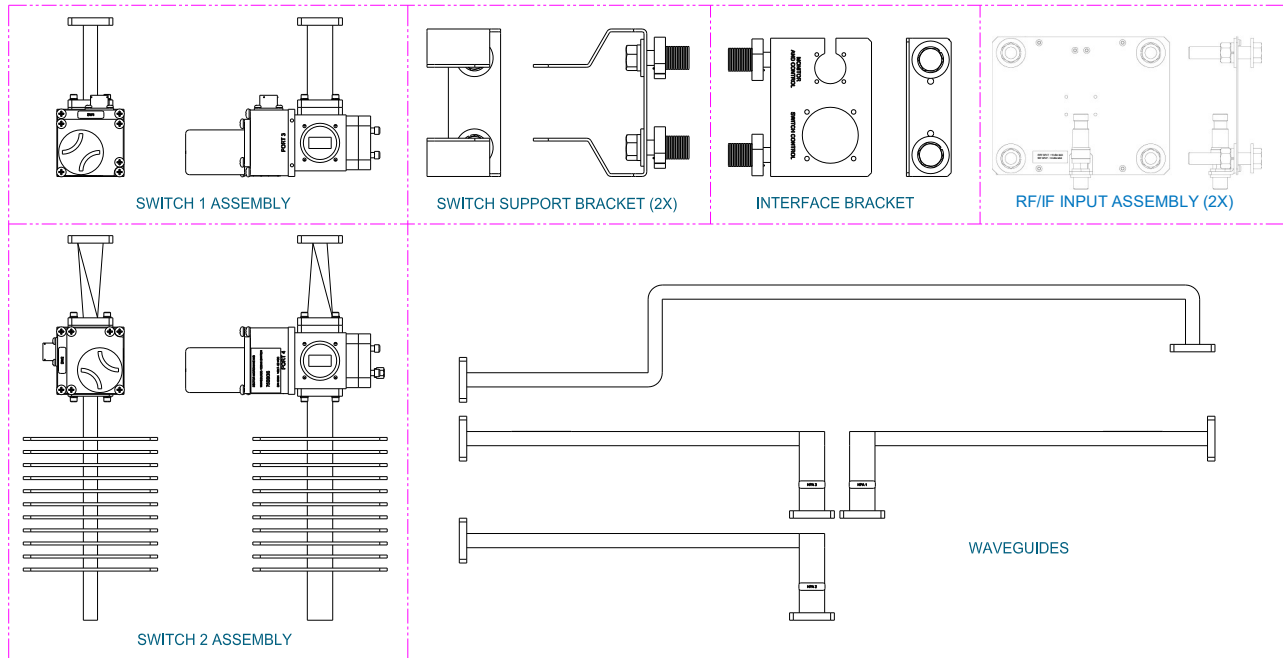


Figure 2-5: Ku-Band Components, Switches, Support Brackets, and Waveguide

The switch support brackets are mounted to the top rail, one bracket centered between HPA1 and HPA2, and the other between HPA2 and HPA3. Mounting hardware was shipped attached to the bracket. See the break-away in **Figure 2-6** for the hardware configuration for mounting the switch support brackets to the frame.

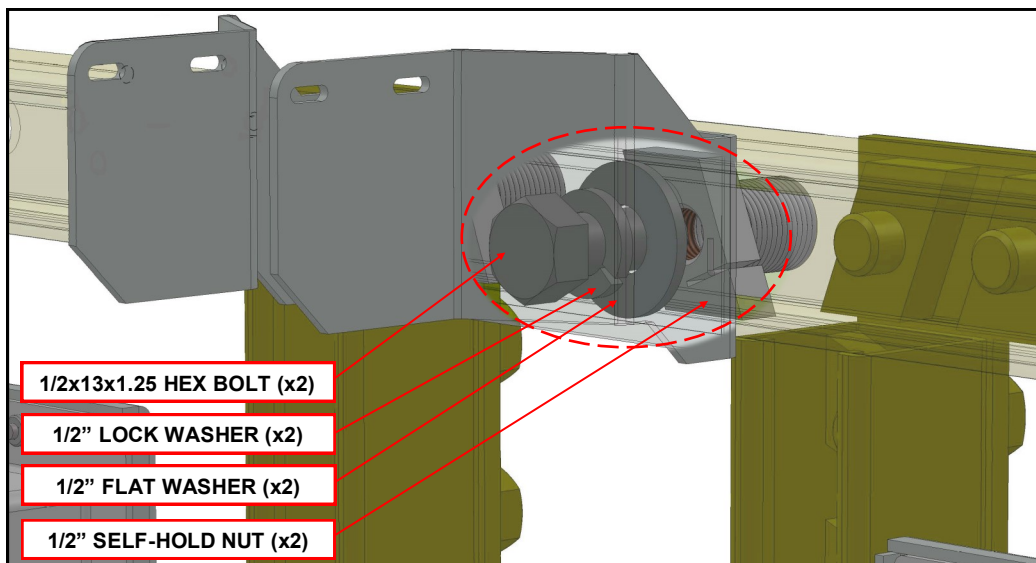


Figure 2-6: Mounting Switch Supports to Frame

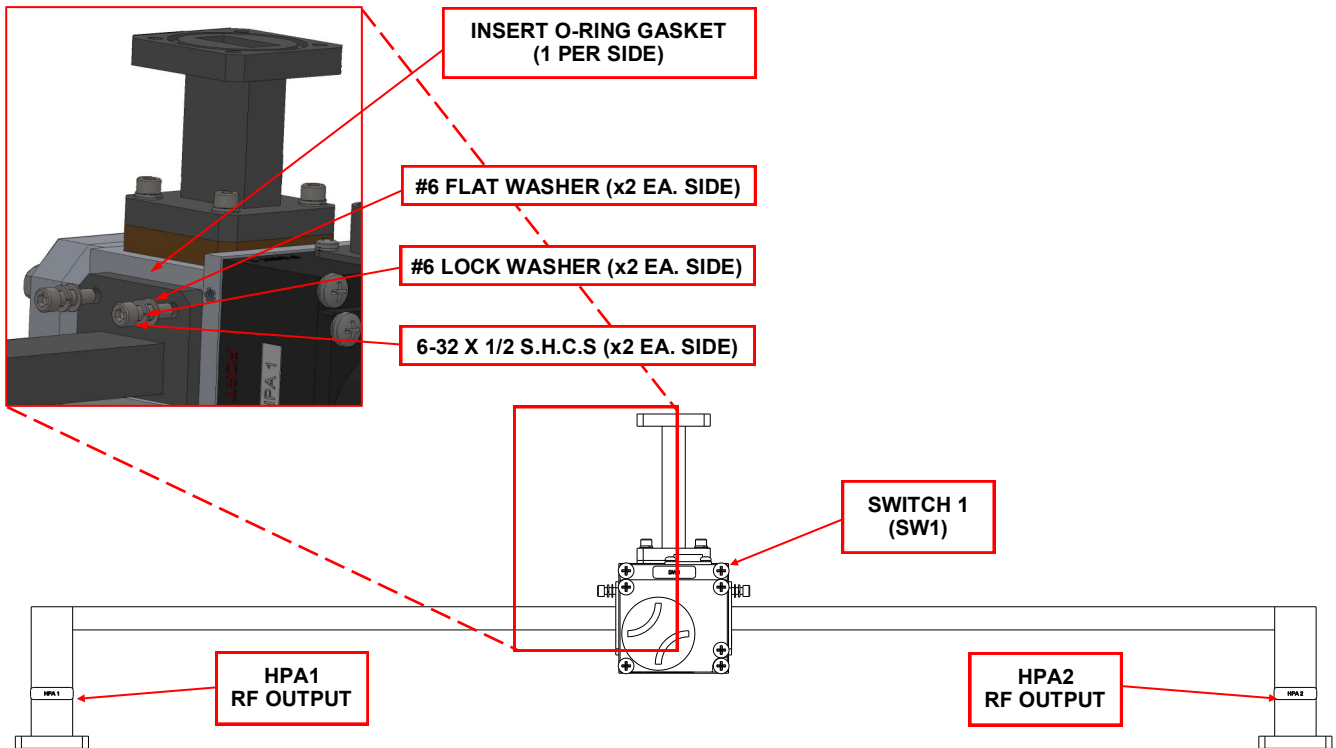


Figure 2-7: Connect Waveguide to Switch 1 (SW1), Ku-Band (typical)

Connect the waveguide segments labeled HPA1 and HPA2 to the SW1 switch assembly as shown in **Figure 2-7**. Insert an O-ring gasket (supplied) between each waveguide flange and the switch port to which it attaches. Use the supplied hardware to secure the waveguide segments to the switch assembly as shown in **Figure 2-7**.

Connect the waveguide segment labeled HPA3 and the 3-bend waveguide segment to the SW2 switch assembly as shown in **Figure 2-8**. Insert an O-ring gasket (supplied) between each waveguide flange and the switch port to which it attaches. Use the supplied hardware to secure the waveguide segments to the switch assembly as shown in **Figure 2-8**.

Leave out the hardware on the bottom side of the waveguide flanges until later. The mounting holes on the bottom side of the waveguide flanges will be used to mount the assembly to the switch support.

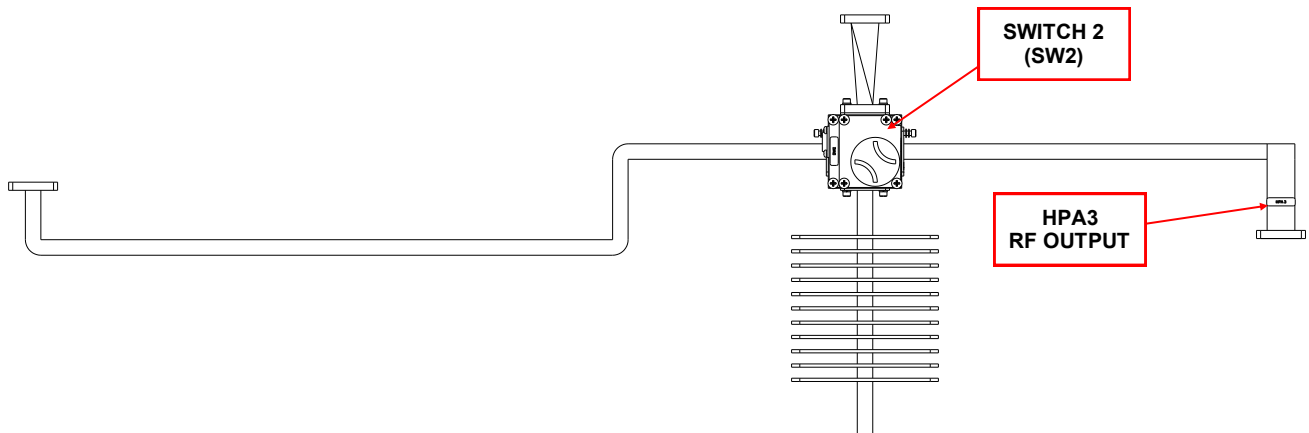


Figure 2-8: Connect Waveguide to Switch 2 (SW2) Ku-Band (typical)

Slide the switch assembly into the switch support bracket, making sure the baseball switch faces away from the uni-strut frame. Use the supplied hardware to secure the switch assembly to the support bracket as shown in **Figure 2-9**.

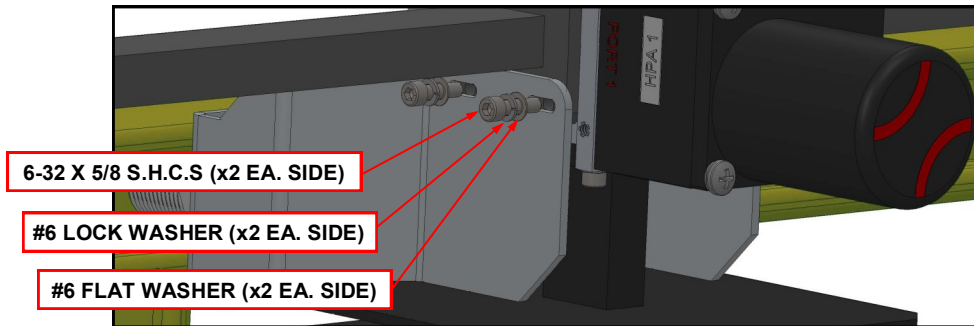


Figure 2-9: Switch Assembly Installation, Ku-Band (typical)

Insert an O-ring gasket (supplied) between the RF Output waveguide of the HPA and the waveguide segment. Secure the waveguide to the RF Output flange of the HPA with the supplied hardware. **Figure 2-10** shows a typical installation for a Ku-Band HPA. Repeat for each HPA in the system.

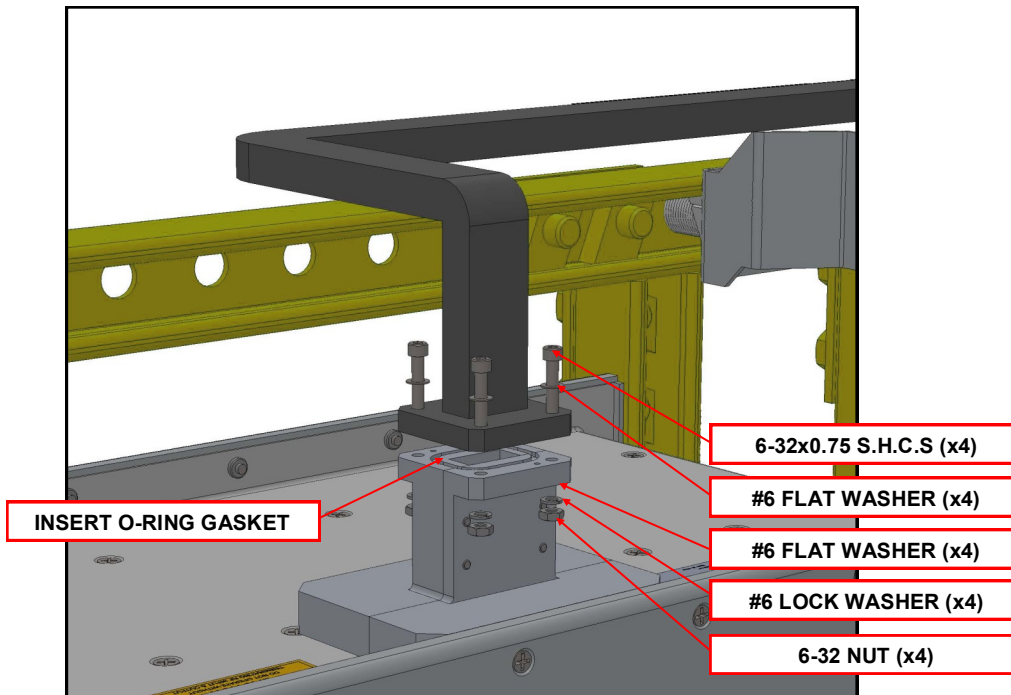


Figure 2-10: Waveguide Installation, Ku-Band (typical)

2.3.2 C-Band Systems

The redundant system was shipped with the following components that comprise the waveguide switch array: a switch 1 assembly, a switch 2 assembly with termination, two (2) switch support brackets, an interface bracket, two (2) RF/IF input assemblies, and waveguide segments that connect between the output of the HPAs and the switches. See **Figure 2-11**.

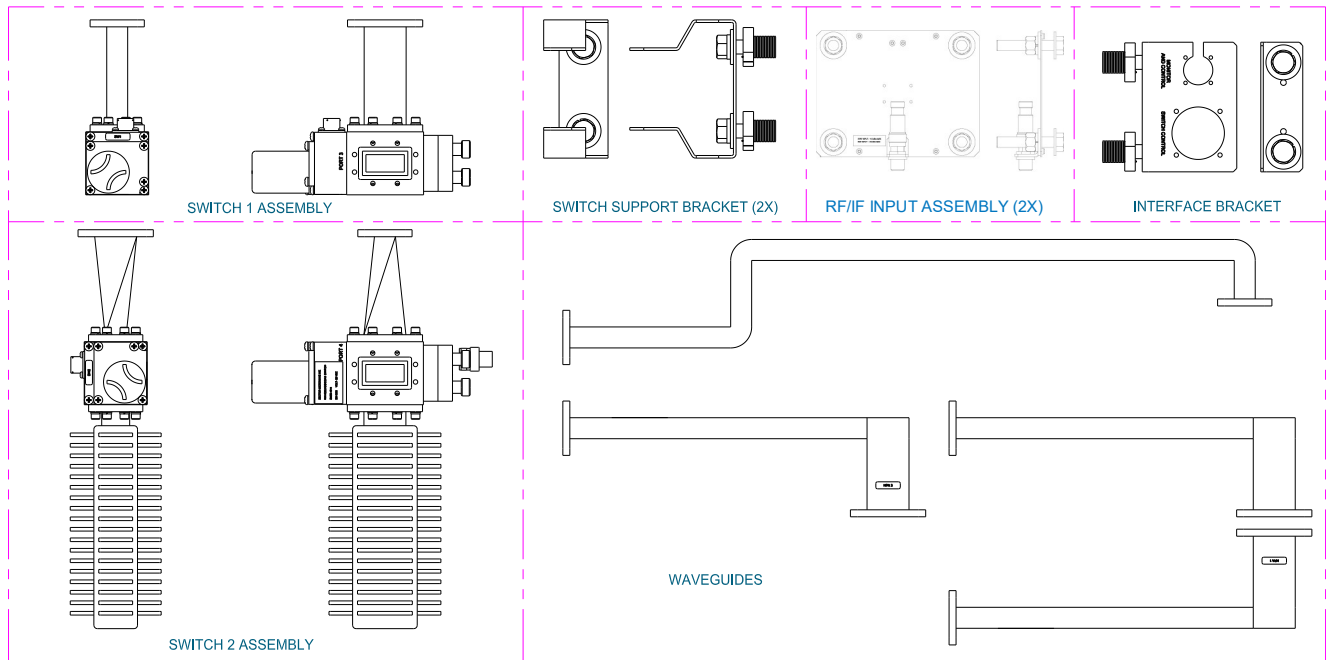


Figure 2-11: C-Band Components, Switches, Support Brackets, and Waveguide

The switch support brackets are mounted to the top rail, one bracket centered between HPA1 and HPA2, and the other between HPA2 and HPA3. Mounting hardware was shipped attached to the bracket. See the break-away in **Figure 2-12** for the hardware configuration for mounting the switch support brackets to the frame.

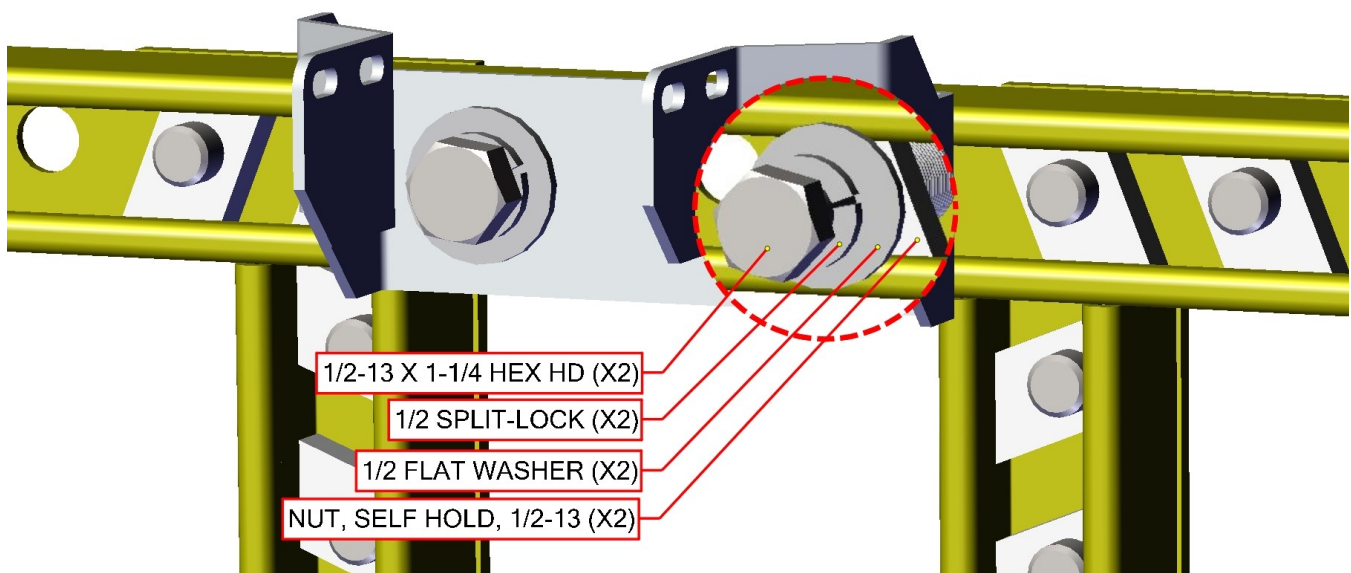


Figure 2-12: Install Switch Supports to Frame

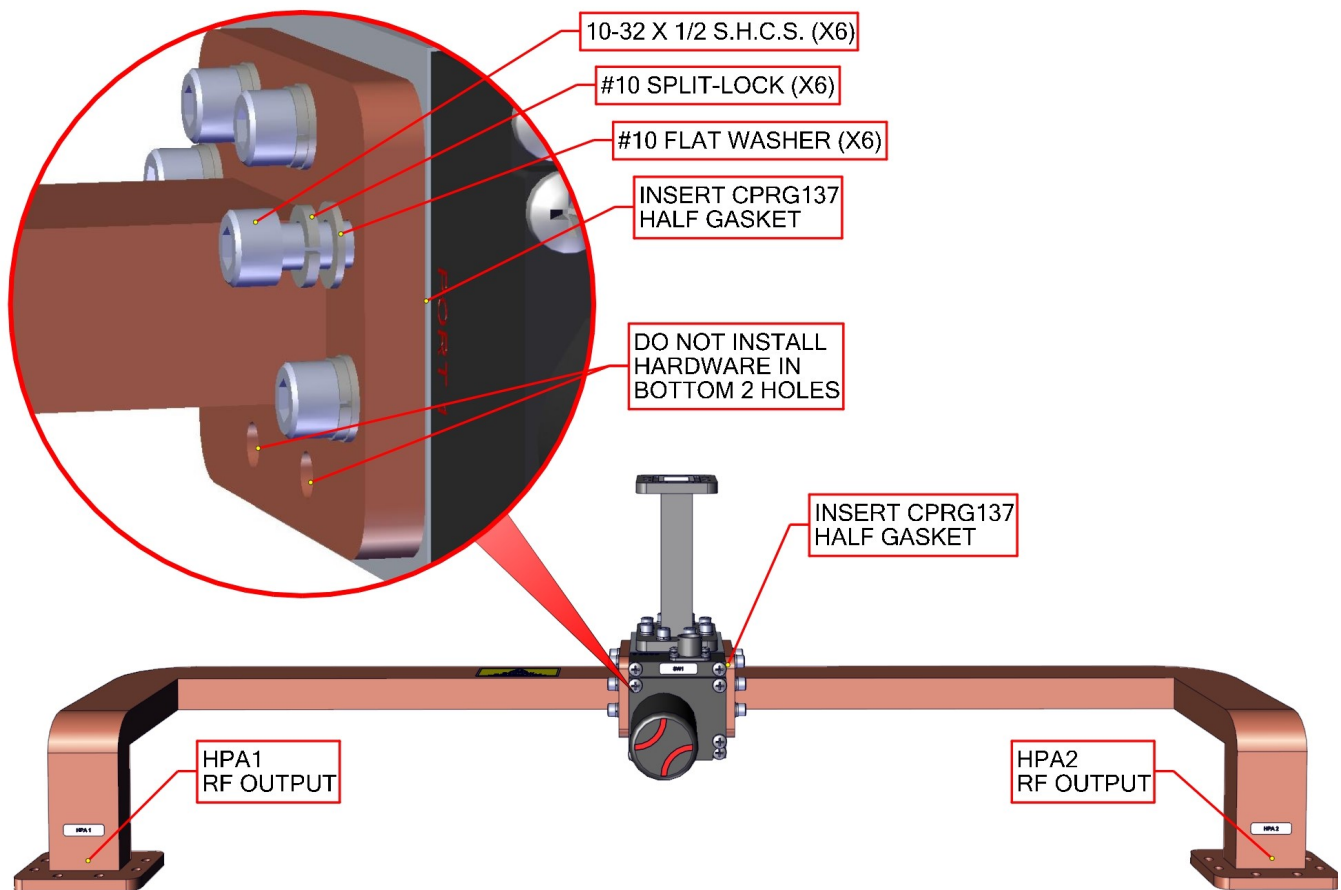


Figure 2-13: Connect Waveguide to Switch 1 (SW1), C-Band (typical)

Connect the waveguide segments labeled HPA1 and HPA2 to the SW1 switch assembly as shown in **Figure 2-13**. Insert a gasket (supplied) between each waveguide flange and the switch port to which it attaches. Use the supplied hardware to secure the waveguide segments to the switch assembly as shown in **Figure 2-13**.

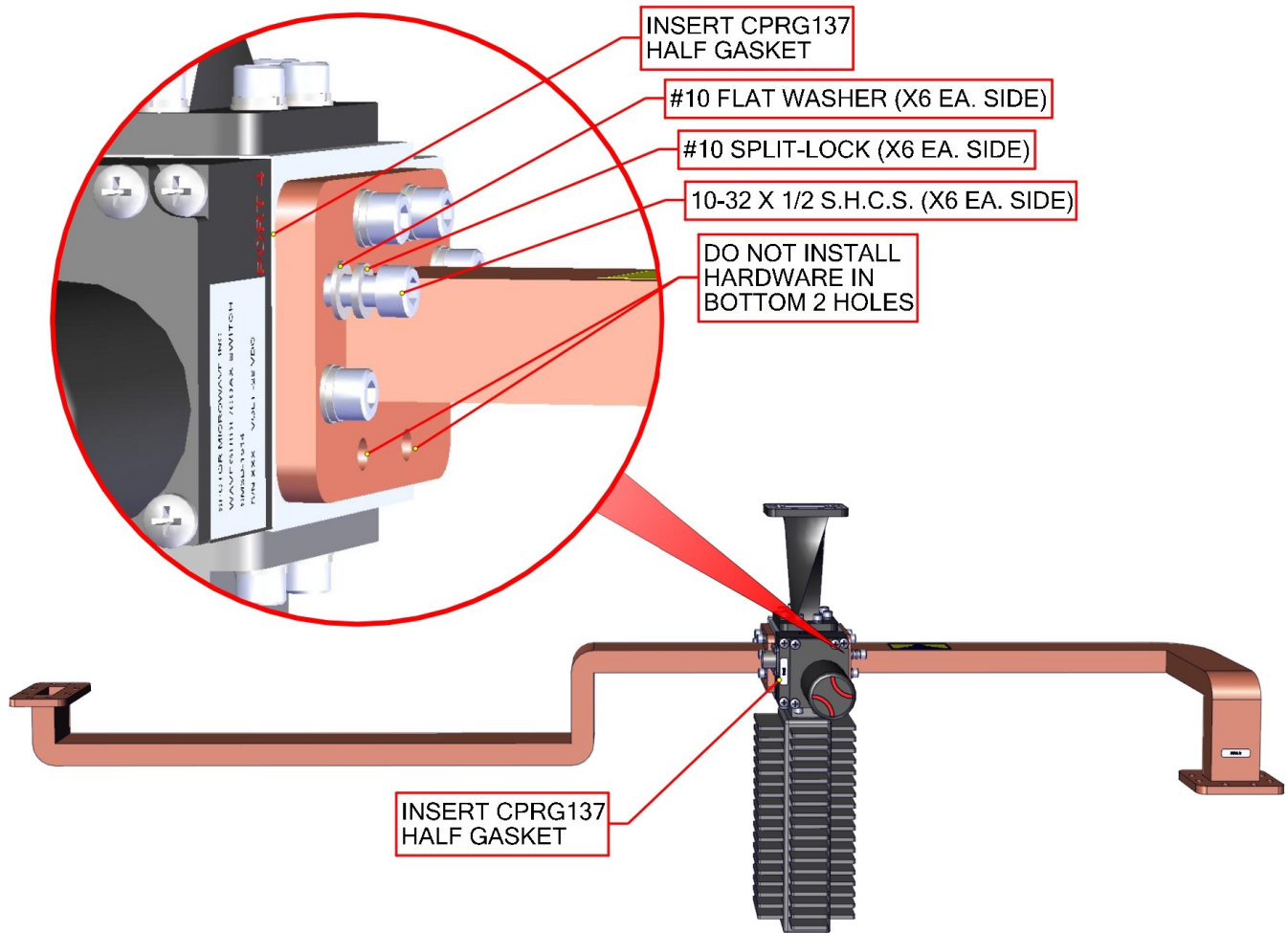


Figure 2-14: Connect Waveguide to Switch 2 (SW2), C-Band (typical)

Connect the waveguide segment labeled HPA3 and the 3-bend waveguide segment to the SW2 switch assembly as shown in **Figure 2-14**. Insert a gasket (supplied) between each waveguide flange and the switch port to which it attaches. Use the supplied hardware to secure the waveguide segments to the switch assembly as shown in **Figure 2-14**.

Leave out the hardware on the bottom side of the waveguide flanges until later. The mounting holes on the bottom side of the waveguide flanges will be used to mount the assembly to the switch support.

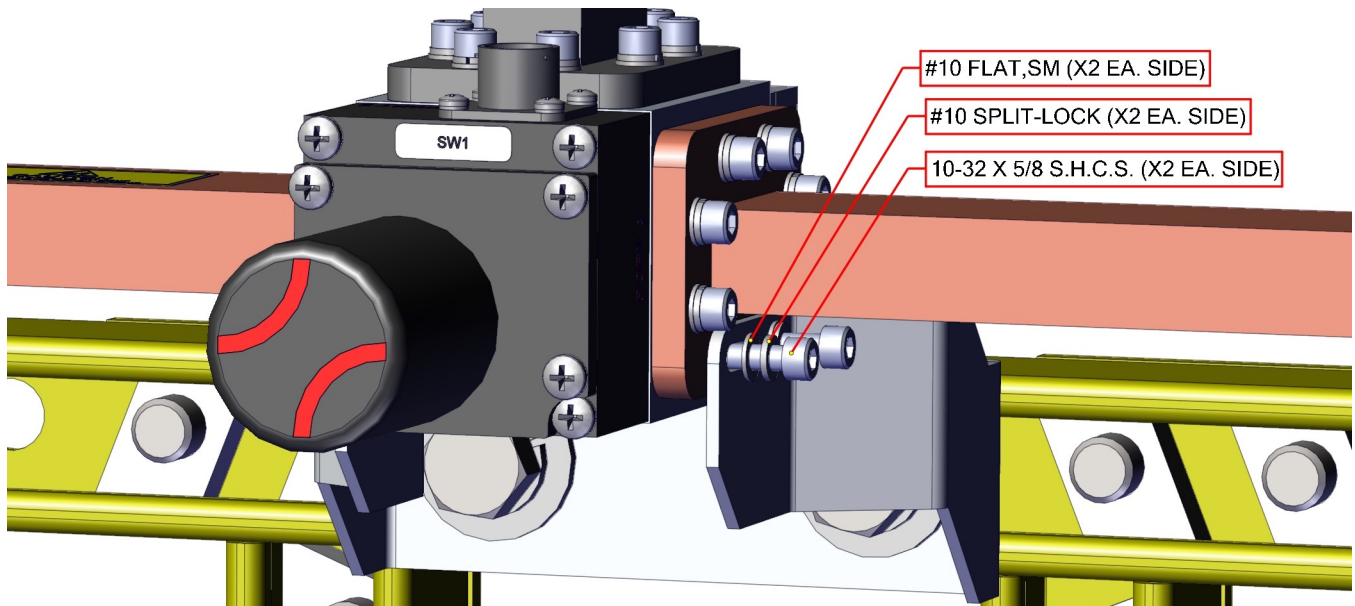


Figure 2-15: Connect Switches to Support Brackets, C-Band (typical)

Slide the switch assembly SW1 into the switch support bracket, making sure the baseball switch faces away from the uni-strut frame. Use the supplied hardware to secure the switch assembly to the support bracket as shown in **Figure 2-15**.

Repeat the above with switch assembly SW2. Secure the waveguide flange to SW1, Port 4 with the hardware provided, as shown in **Figure 2-16**.

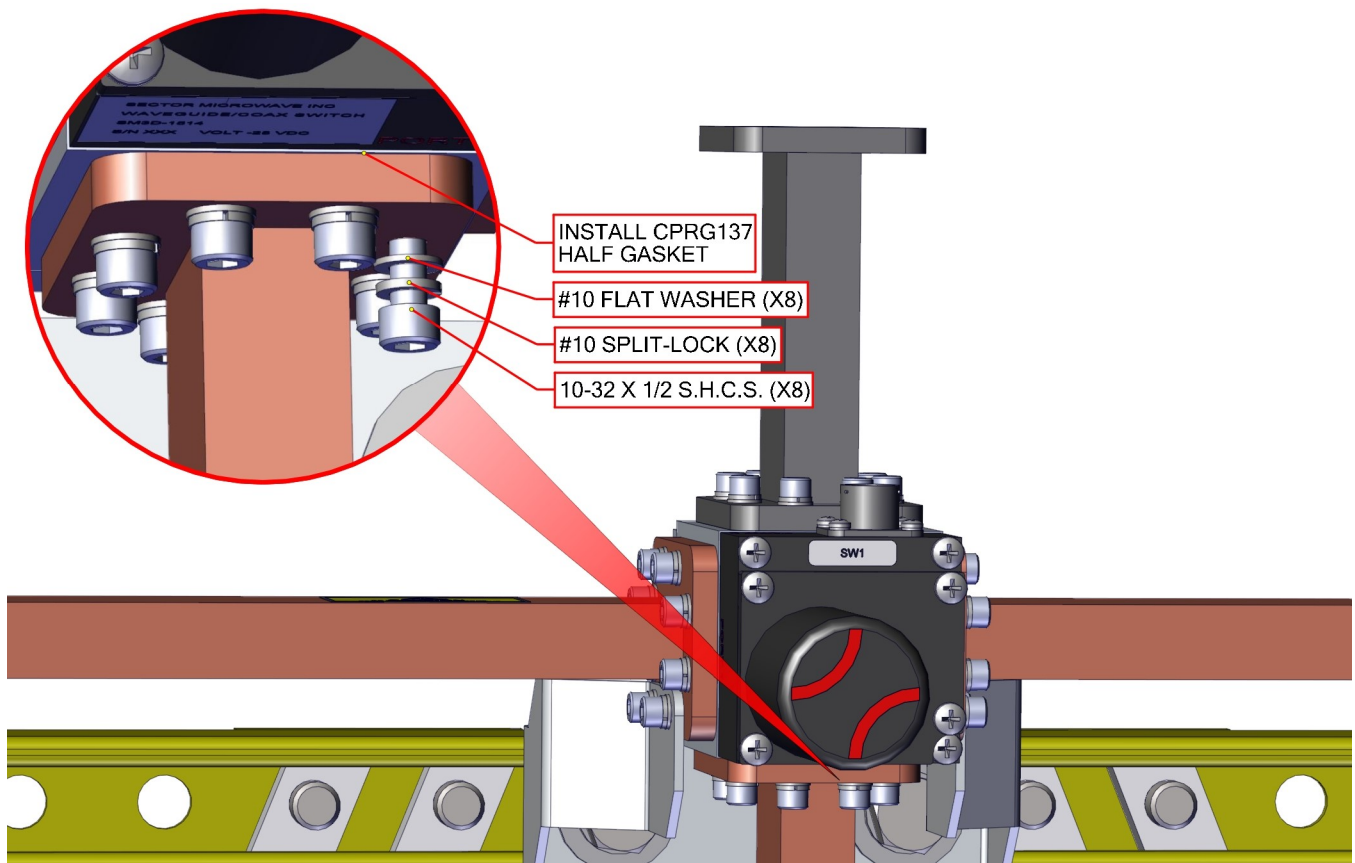


Figure 2-16: Connect Waveguide to Switch 1, Port 4, C-Band (typical)

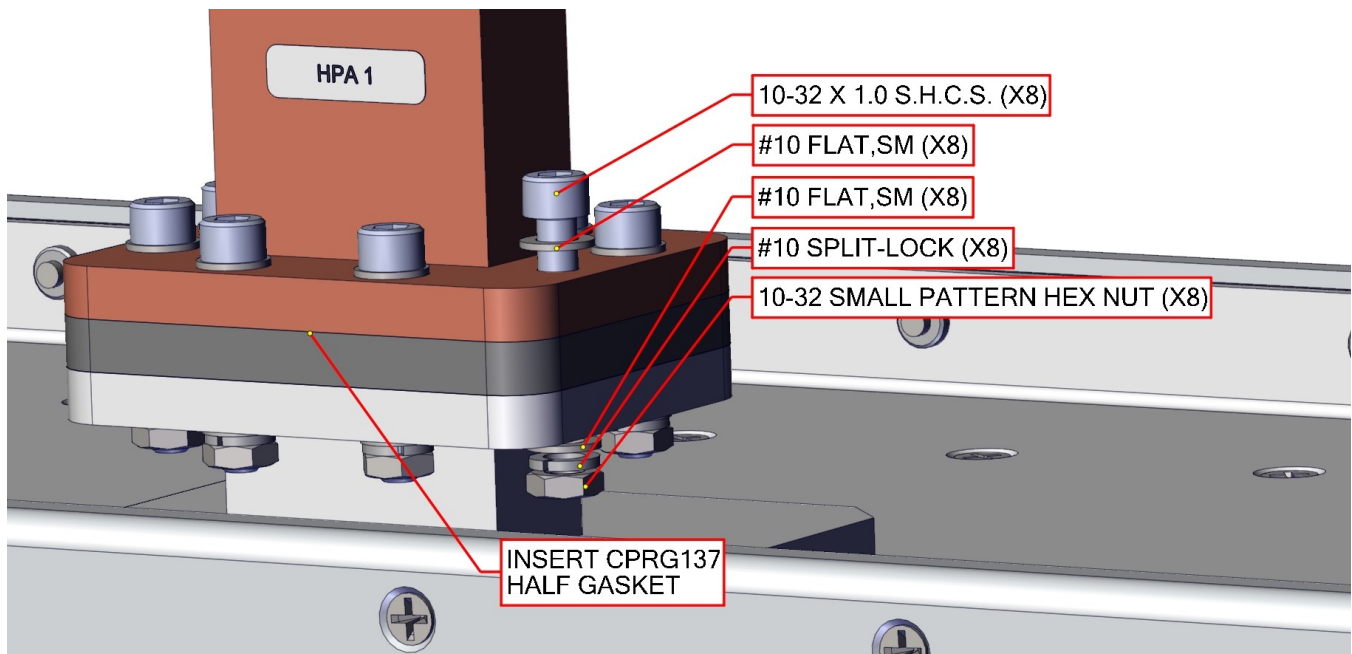


Figure 2-17: Connect Waveguide to HPA RF Output, C-Band (typical)

Insert a gasket (supplied) between the RF Output waveguide of the HPA and the waveguide segment. Secure the waveguide to the RF Output flange of the HPA with the supplied hardware. **Figure 2-17** shows a typical installation for a C-Band HPA. Repeat for each HPA in the system.

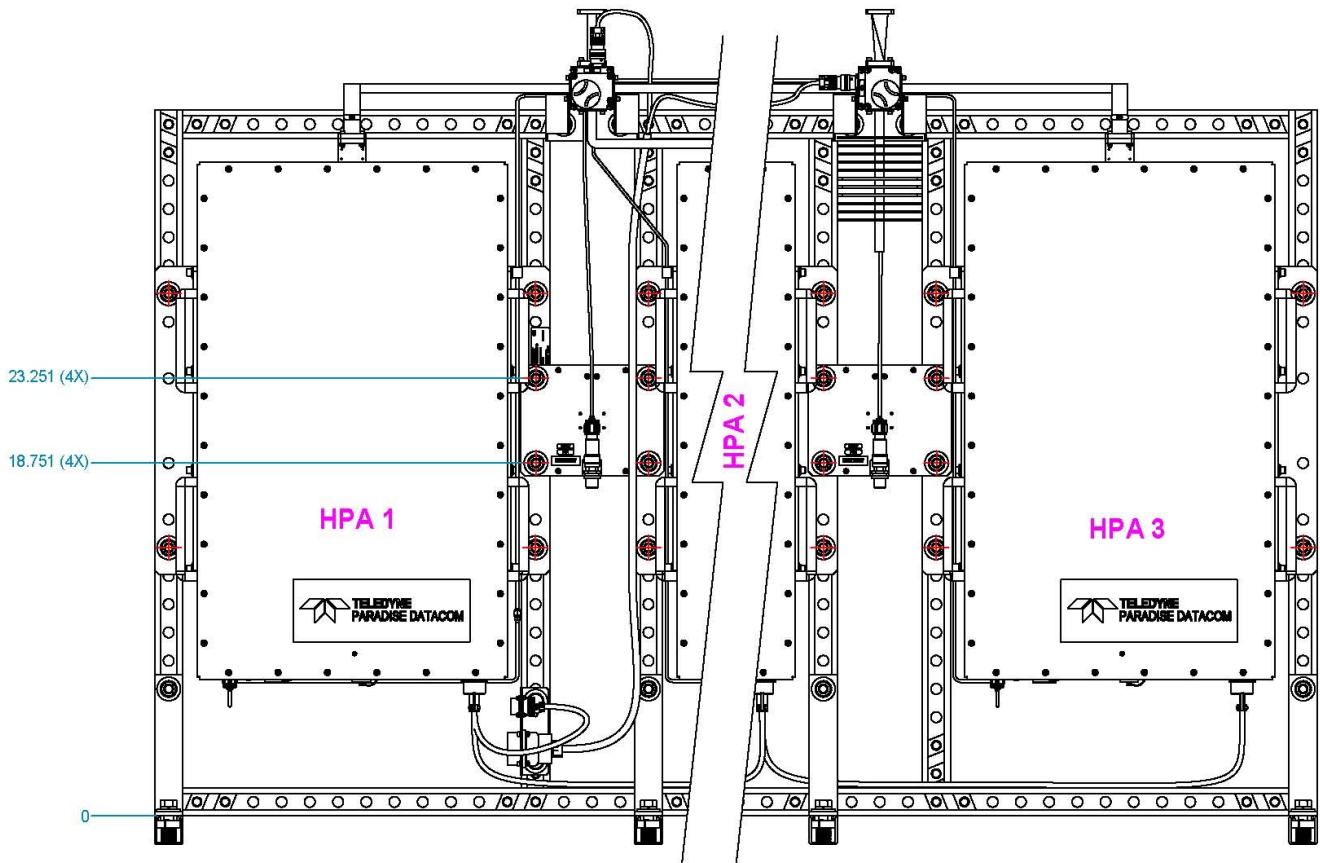


Figure 2-18: Installation, RF Input Plate Assemblies (Ku-Band shown)

2.4 Installation, Input Plate and RF/IF Connections

A 1:2 redundant system is available with input switching. Two (2) Input Plate Assemblies will be installed between the amplifiers. One plate is installed between HPA1 and HPA2; the second plate is installed between HPA2 and HPA3.

2.4.1 Input Switching

An outline drawing of a typical Input Switching Plate Assembly is shown in **Figure 2-18**.

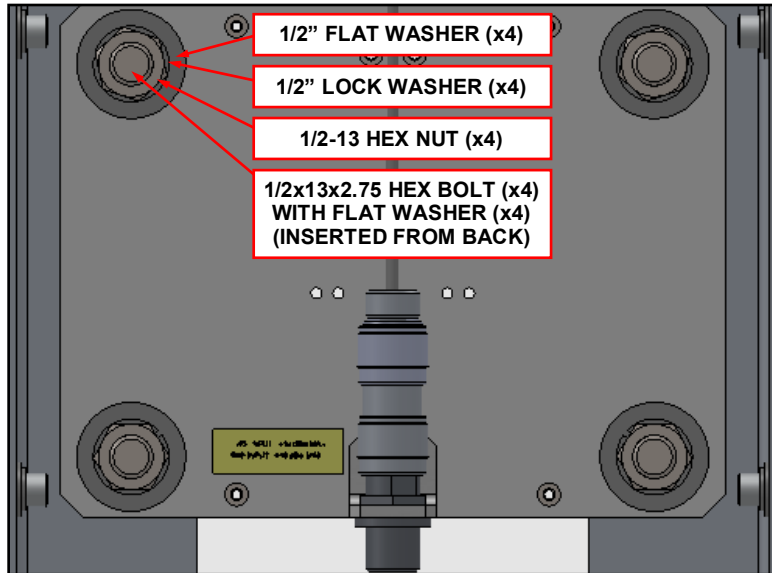


Figure 2-19: Installation, Input Switching Plate Assembly

Figure 2-19 shows a typical installation for an Input Plate Assembly with systems using input switching. Mounting hardware was shipped with the assembly.

The figures on the following pages show the pre-formed semi-rigid coaxial cables that lead from the N-type (F) OUT connectors of the system RF Input connectors to the SMA (F) connectors at the back side of each switch.

Figure 2-20 on the next page shows the coaxial cables for a typical Ku-Band system.

Figure 2-21 on the page following the next page shows the coaxial cables for a typical C-Band system.

Note: Self-amalgamating tape should be used to cover all connector junctions (N-type; SMA) so that no water can creep into the thread between the plug and socket.

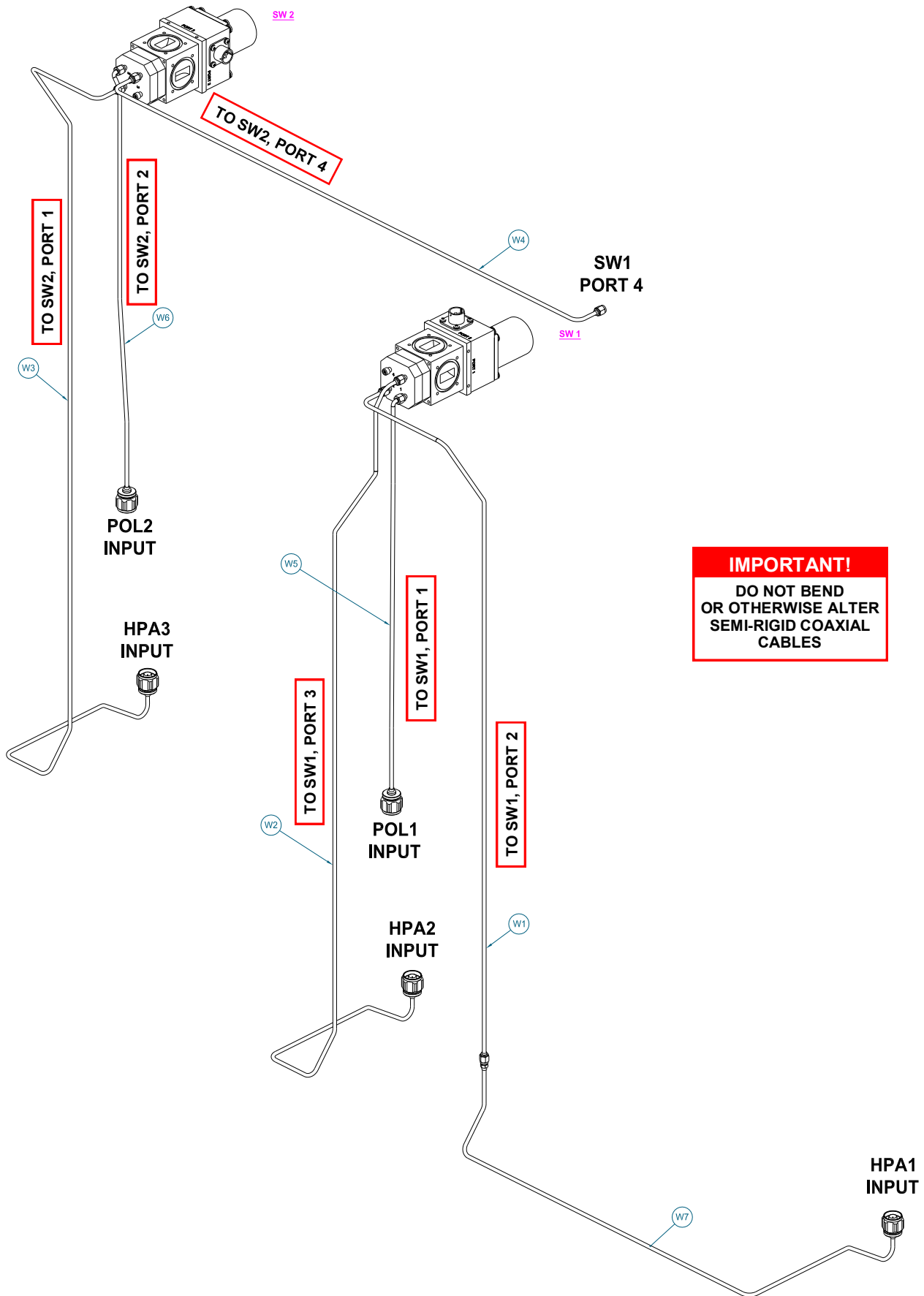


Figure 2-20: Installation, Coaxial Cables for Ku-Band Systems (typical)

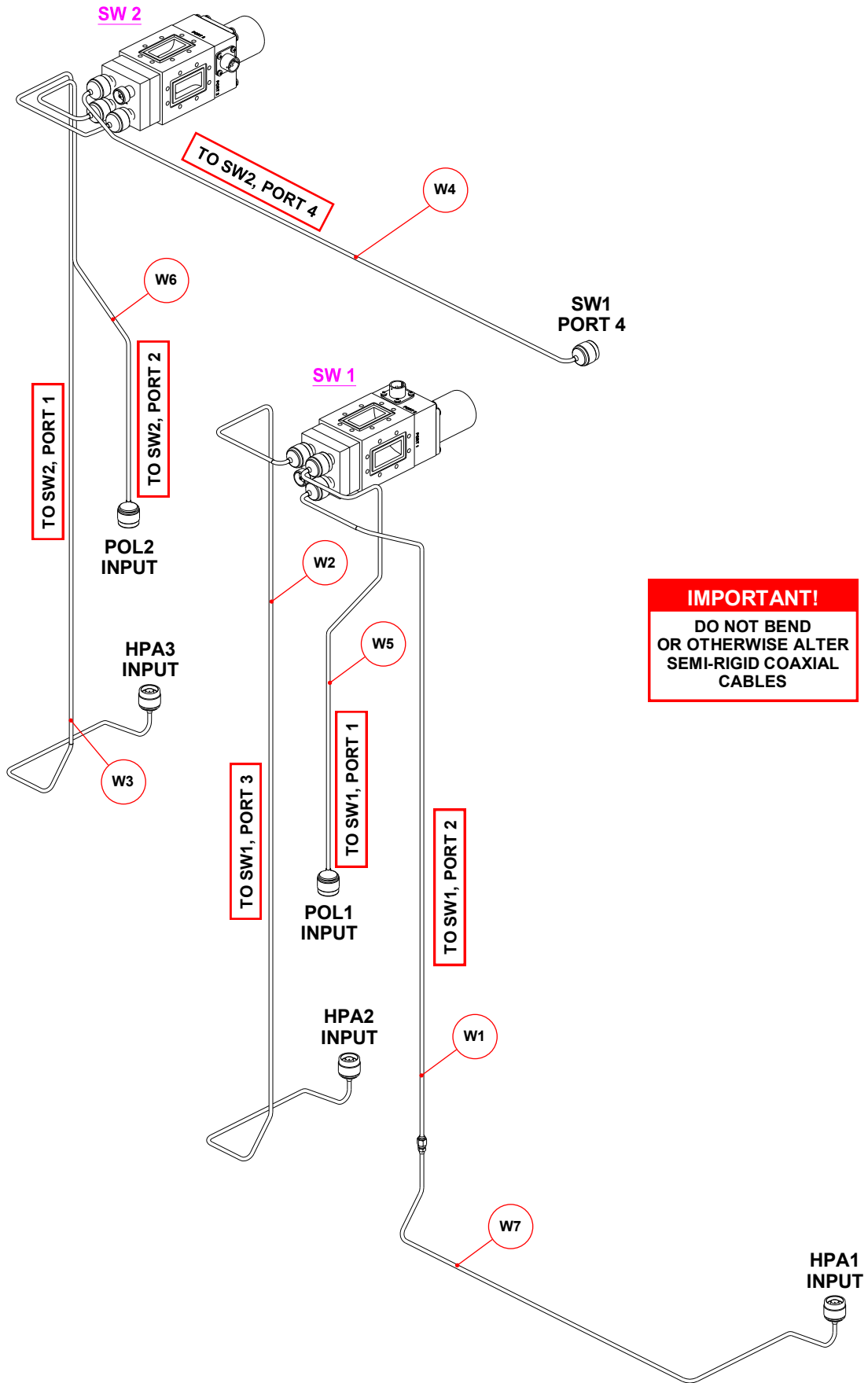


Figure 2-21: Installation, Coaxial Cables for C-Band Systems (typical)

2.5 Installation, Switch and Link Cables

The redundant system includes a Switch Cable and Link Cable which need to be connected to complete the installation. These cables connect to an I/O Panel. Mating cables connect between the I/O Panel and an indoor RCP2-1200 Redundant System Controller.

2.5.1 Install I/O Plate

Insert two self-holding nuts in the channel of the vertical uni-strut between HPA1 and HPA2, closest to HPA1. Align the I/O Panel as shown in **Figure 2-22**, and secure to the uni-strut using two (2) sets of hex bolts, lock washers and flat washers.

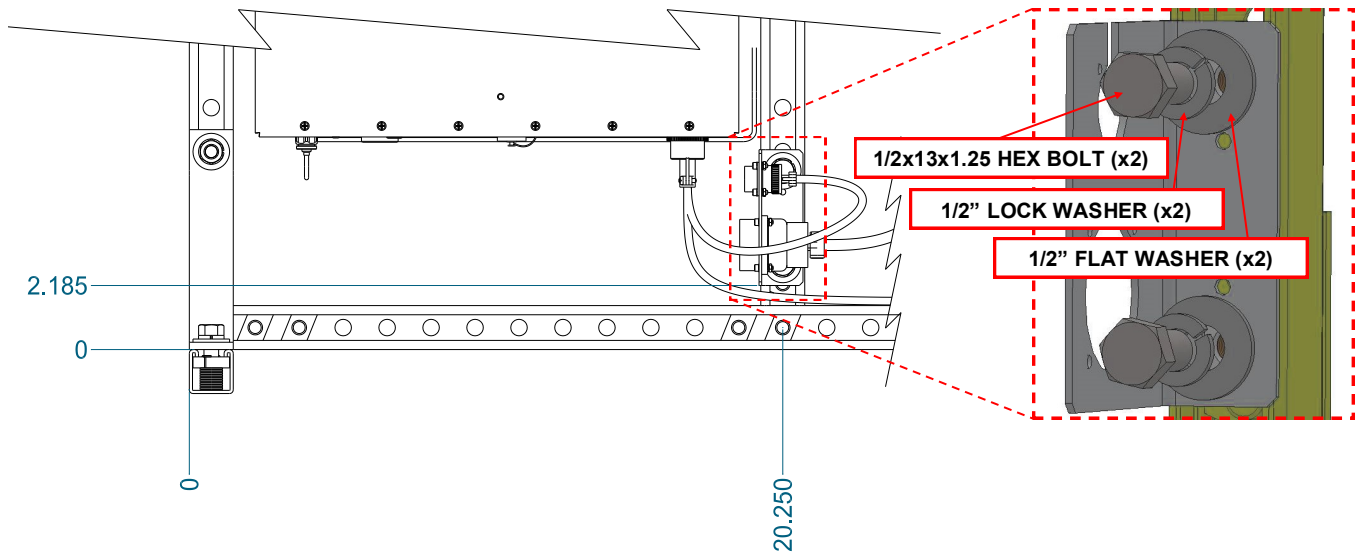


Figure 2-22: Installation, I/O Panel

2.5.2 Switch Control Cable, L201650

An outline drawing of this cable is shown in **Figure 2-23**. Labels are affixed to the cable near each connector that identify to which port the connector should be plugged.

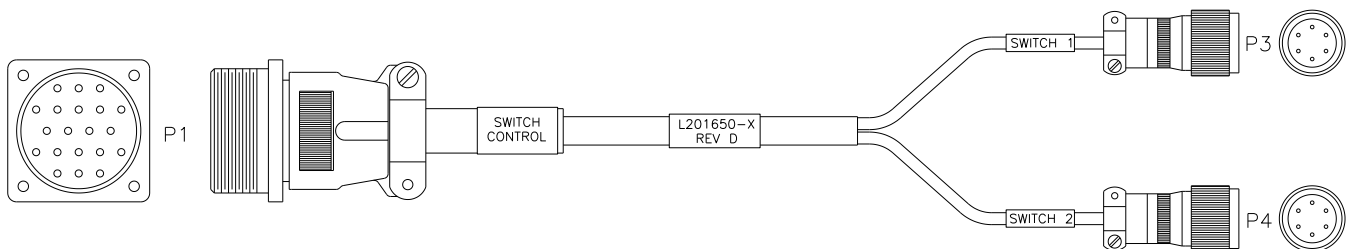


Figure 2-23: Switch Control Cable, L201650

Connect the 6-socket circular MIL connectors (P3 and P4) to the 6-pin connectors on each switch (SW1 and SW2). Insert the 16-pin circular MIL connector (P1) into the I/O Panel, as shown in **Figure 2-25**. Secure with four sets of socket head cap screws, flat washers and nuts.

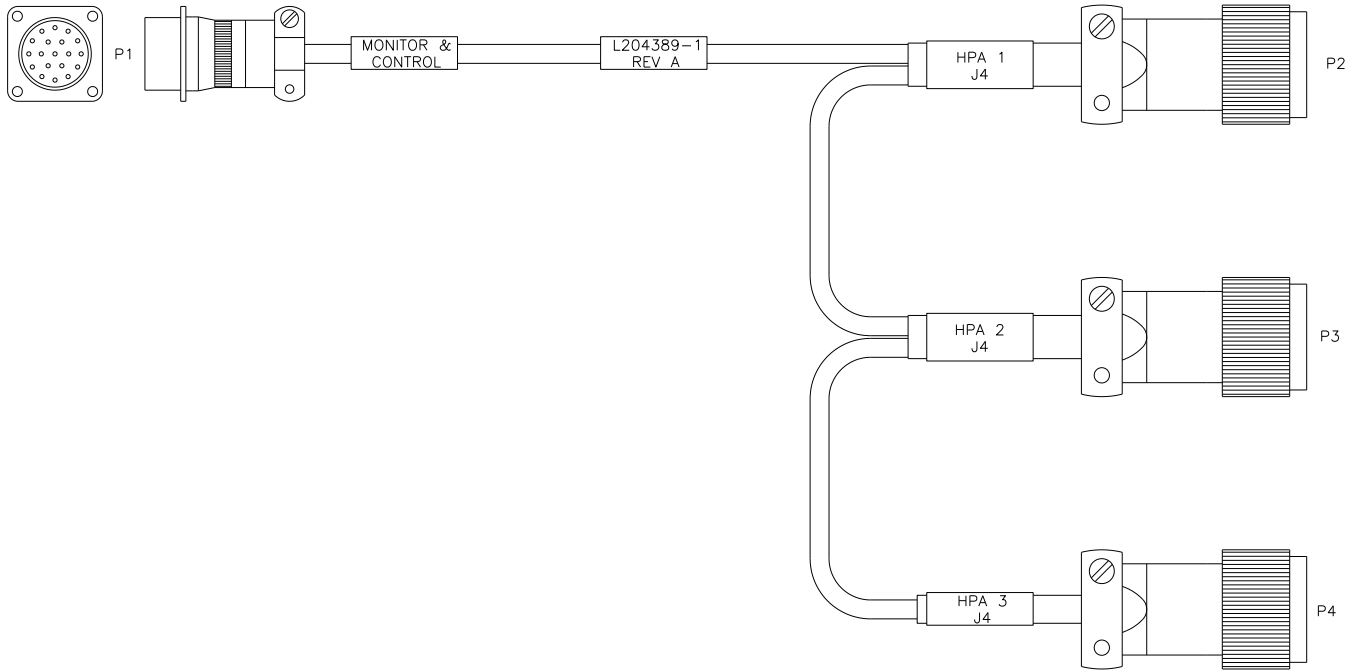


Figure 2-24: Monitor & Control Cable, L204389

2.5.3 Monitor & Control Cable, L204389

An outline drawing of the Monitor & Control Cable (L204389) is shown in **Figure 2-24**. Labels are affixed to the cable near each connector that identify to which port the connector should be plugged.

Connect the 32-pin circular MIL connectors (P2, P3 and P4) to each HPA Port J4. Slide the 19-pin circular MIL connector (P1) into the slot in the I/O Panel, as shown in **Figure 2-25**. Secure with four sets of socket head cap screws, flat washers and nuts.

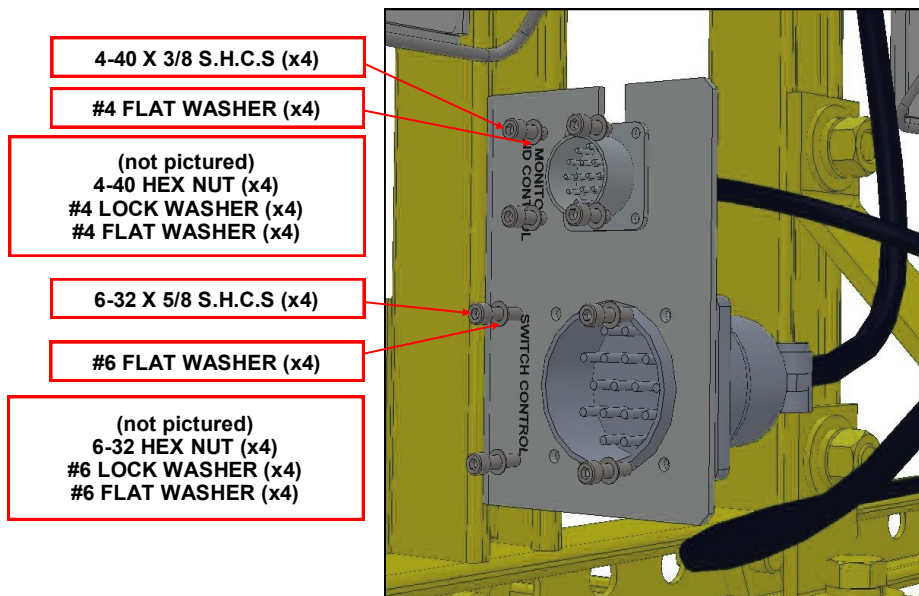


Figure 2-25: Install Cables to I/O Panel

2.5.4 Connect Cables Between Controller and I/O Panel

Two cable assemblies connect between the indoor RCP2-1200 Redundant System Controller and the System I/O Panel.

The Switch Cable (L201061) is used to provide power to the system transfer switches, and to communicate the switch position to the controller. **Figure 2-26** shows an outline drawing of the Switch Cable. Connect the circular MIL connector (P2) to Switch Control mate at the System I/O Panel. Connect the circular MIL connector (P1) to Port J3 of the RCP2-1200 controller.

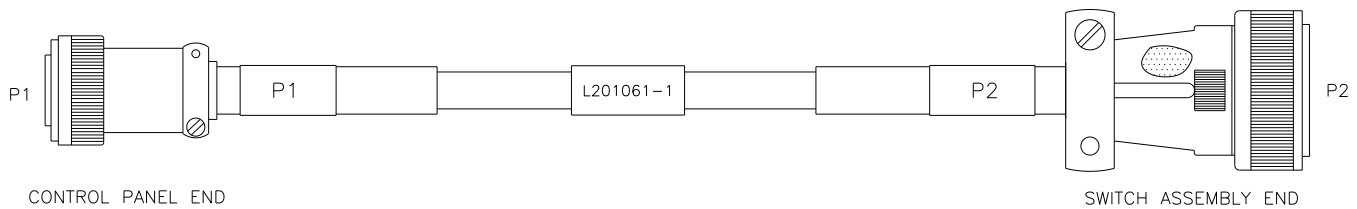


Figure 2-26: Switch Cable, L201061

The Monitor and Control Cable (L203091) is used to communicate between the system controller and the connected HPAs. **Figure 2-27** shows an outline drawing of the Monitor and Control Cable. Connect the circular MIL connector (P1) to the Monitor and Control mate at the System I/O Panel. Connect the DB9 connector (P2) to Port J8 of the RCP2-1200 controller and the DB9 connector (P3) to Port 5 of the RCP2-1200 controller.

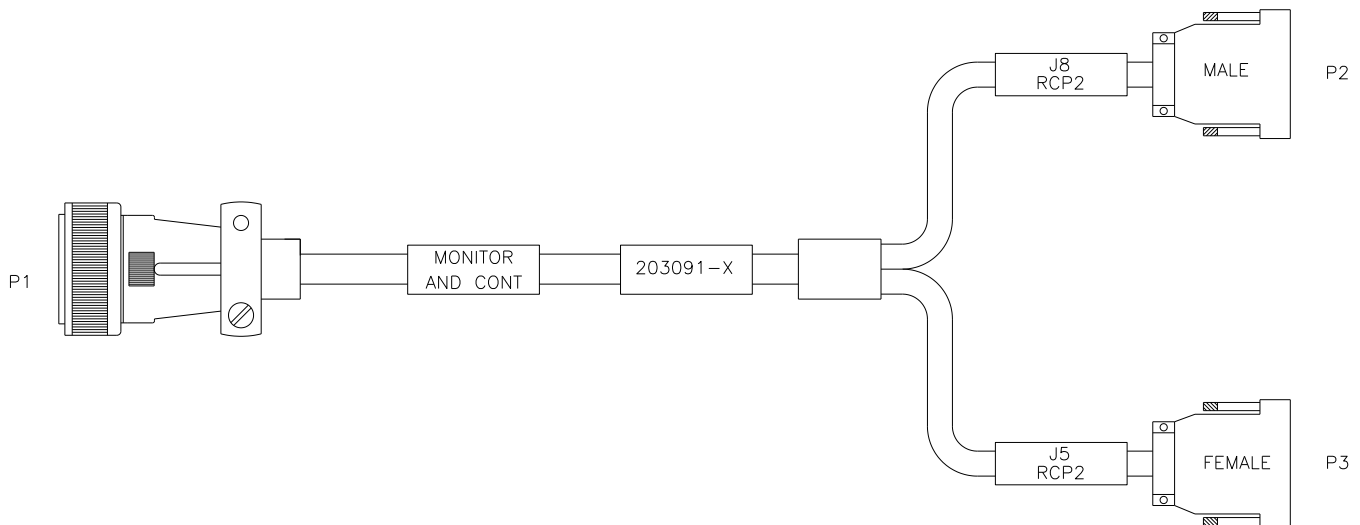


Figure 2-27: Monitor & Control Cable, L203091

Check the system schematic to verify proper connections.

Note: Self-amalgamating tape or putty should be used to cover all connector junctions (circular MIL, MS-type) from the plug/socket connection to as close as possible to the cable sheath so that no water can creep into the thread between the plug and socket.

3.0 Introduction

This section outlines the assembly and mounting procedure for a 1:1 Phase Combined High Power Outdoor SSPA System.

Before beginning the assembly of the uni-strut mounting kit, verify that the kit includes all of the items in **Table 3-1**. If any items are missing, contact Teledyne Paradise Datacom with the part number and quantity of the shortage.

The following instructions describe the assembly of the uni-strut mounting kit, and the installation of the High Power Outdoor SSPAs and associated switch, signal box and waveguide assembly. The system is intended to be free standing and entirely self-supported once properly mounted.

It is important to give consideration to the following:

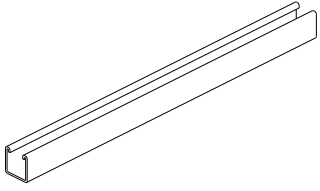
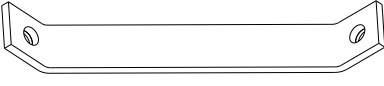
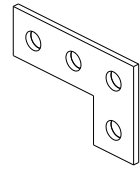
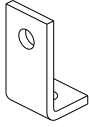







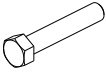
1. Structural integrity of the mounting deck.
2. Accessibility to all local user interfaces. (Ensure SSPA enclosure doors are free to open to the latched position.)
3. Adequate cooling air, 8.00" minimum clearance must be maintained between air intake and any surface that will inhibit air flow.
4. The High Power Outdoor SSPA should never be enclosed in such a manner that airflow is restricted. Normal operating range is -40 to +60°C.
5. Proper weatherized sealing of all connectors.

Warning! The High Power Outdoor SSPAs should not be positioned in such a way that allows falling precipitation to enter the fans at the bottom of the amplifier. Doing so will void your warranty.

3.1 Installation, Uni-Strut Assembly

Reference the parts list in **Table 3-1** and **Figure 3-1**, **Figure 3-2**, and **Figure 3-3** throughout the assembly of the mounting frame.

Table 3-1: Parts List, Mounting Kit Assembly (L213302-1)

Item	Qty.	Description	Image
1	2	UNI-STRUT, 34.5"	
2	2	UNI-STRUT, 37.5"	
3	2	UNI-STRUT, 43.5"	
4	2	UNI-STRUT, 20"	
11	4	CORNER BRACE, 7.5"	
12	8	BRACKET, L, 4-HOLE	
13	2	ANGLE, CONNECTOR, 2-HOLE	
21	36	BOLT, HEX, 1/2-13 X 1.25, SS	
22	40	WASHER, LOCK, 1/2	
23	42	WASHER, FLAT, 1/2, STD	
24	30	NUT, SELF-HOLD, 1/2, SPRINGLESS	
25	6	NUT, SELF-HOLD, 1/2	
26	4	NUT, HEX, 1/2-13, GRADE 5 ZINC	
27	2	WASHER, FLAT, 9/16, D-SHAPE	
28	4	BOLT, HEX, 1/2-13 X 2.75, SS	

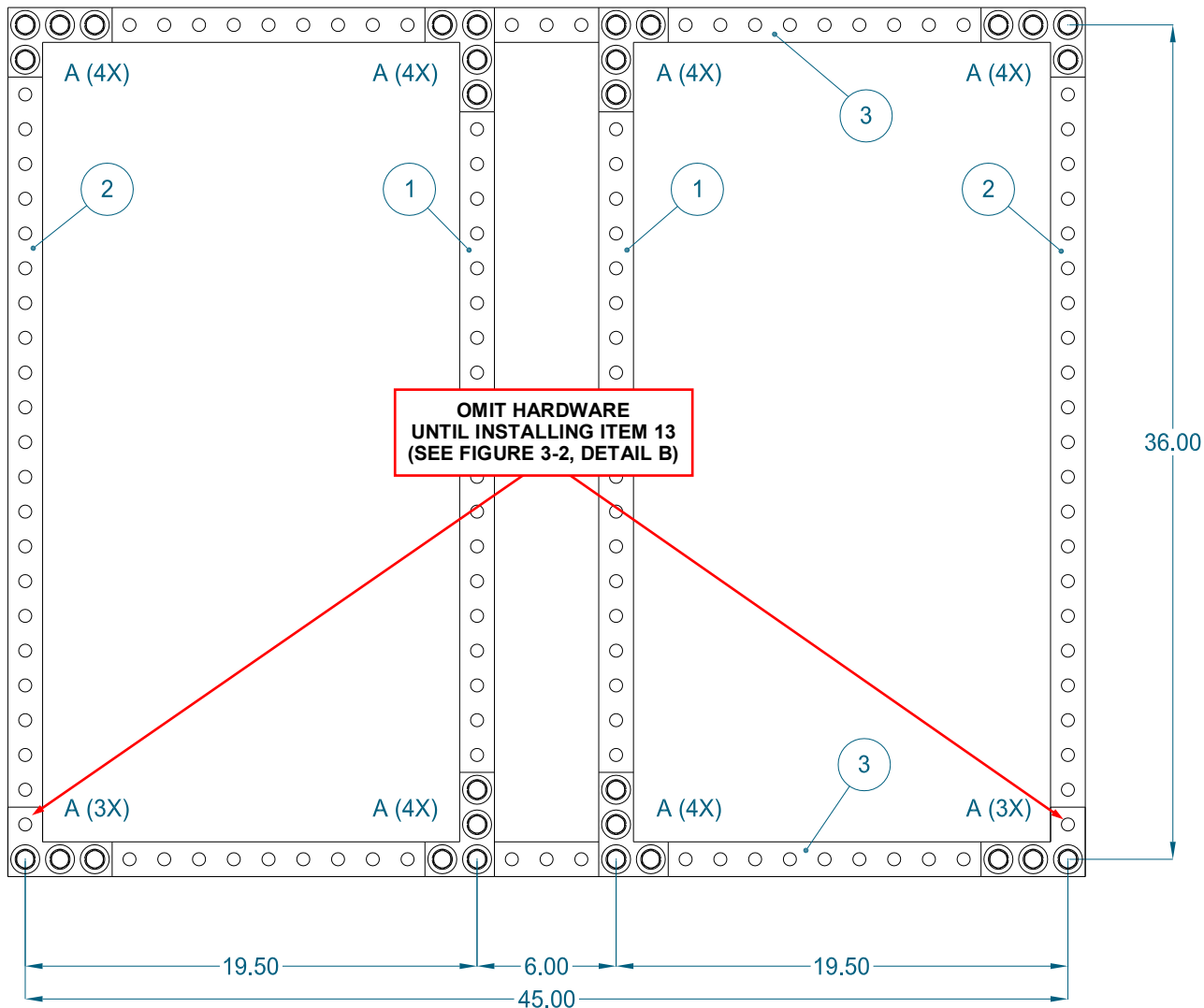


Figure 3-1: Uni-Strut Assembly

1. Arrange the uni-strut sections (Items 1, 2 and 3) as shown in **Figure 3-1**. Secure the 4-hole L-brackets (Item 12) on the flat side of the uni-strut as shown in **Figure 3-1**, and refer to **Figure 3-2, Detail A** for hardware placement.
2. Arrange the 20" sections of uni-strut (Item 4) as shown in **Figure 3-3**,
3. Secure the 2-hole angle connectors (Item 13) to the uni-strut base and frame as shown in **Figure 3-3**, and refer to **Figure 3-2, Detail B** for hardware placement.
4. Attach the corner braces (Item 11) to the uni-strut base and frame as shown in **Figure 3-3**, and refer to **Figure 3-2, Detail C** for hardware placement.
5. Secure all hardware tightly.

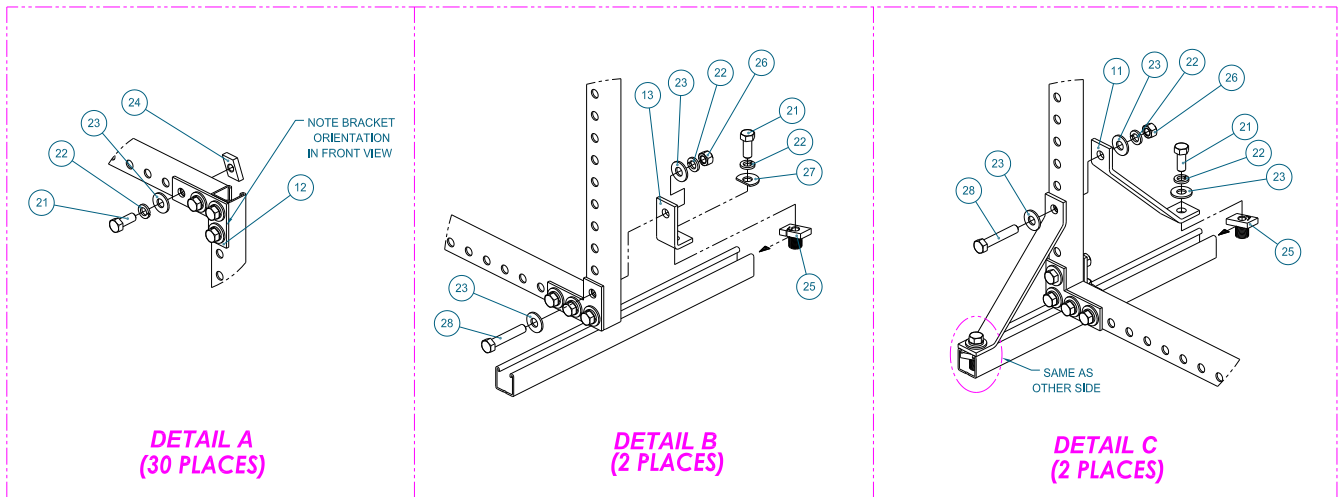
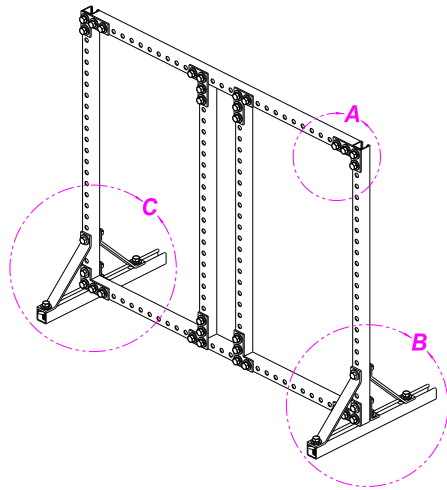


Figure 3-2: Uni-Strut Assembly, Hardware Placement

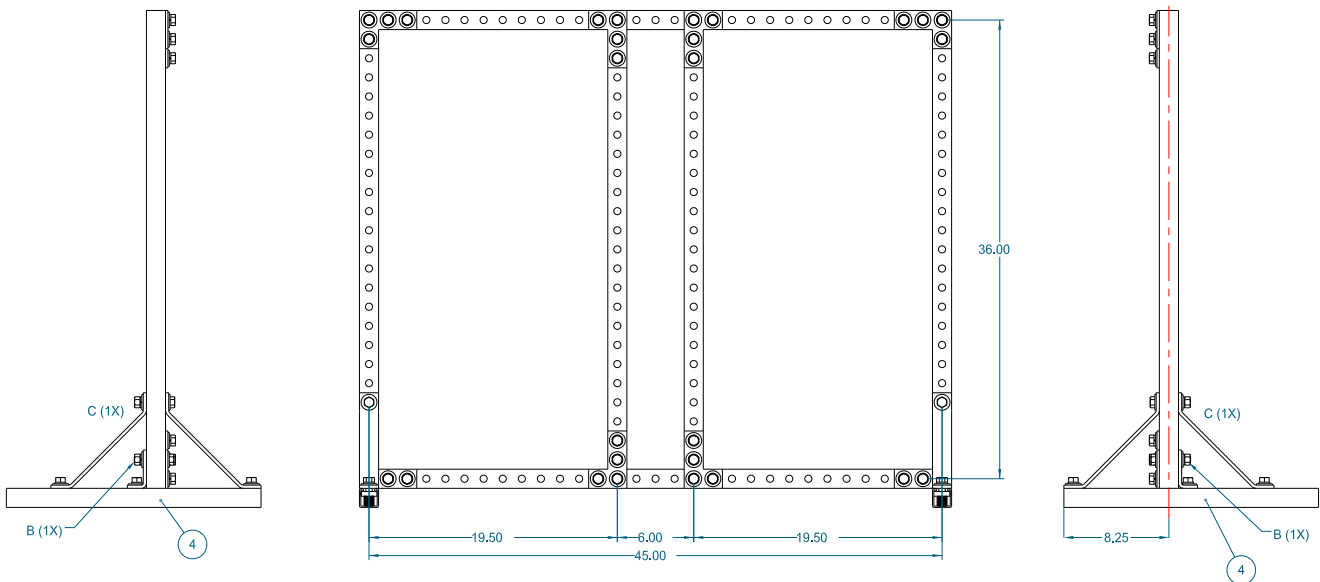


Figure 3-3: Uni-Strut Assembly, Base Strut

3.2 Installation, HPAs to Frame

Warning: The base struts (Item 1) included in the mounting kit should be bolted securely to the location decking prior to mounting the HPAs to the mounting frame. This is to ensure that the mounted SSPA assembly does not tip over during or after system installation.

The HPAs will be mounted to the open channel side of the uni-strut frame. Mounting hardware is provided with the amplifiers. See **Figure 3-4**.

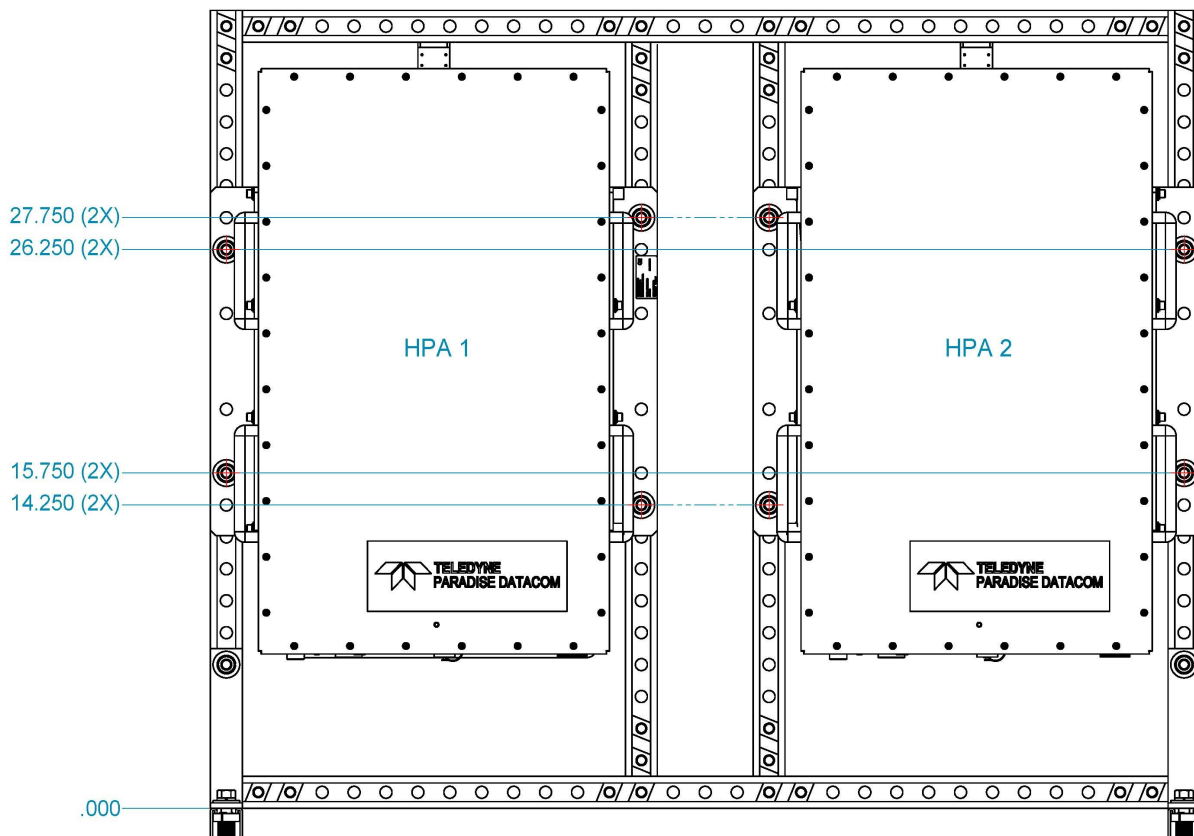


Figure 3-4: Mount HPAs to Frame

Warning: The HPAs each weigh in excess of 100 pounds (45.5 kg). A mechanical lift or at least two persons are required to mount the HPAs to the frame, while a third person installs the hardware.

1. Insert a 1/2-13x2.75 hex bolt with 1/2" flat washer through the flat side of the uni-strut frame at the positions shown in **Figure 3-4** and through the mounting bracket of the HPAs.
2. Secure each bolt with a 1/2" flat washer, 1/2" lock washer and 1/2-13 hex nut.
3. Tighten hardware securely.

3.3 Installation, Output Waveguide and Switch Array

3.3.1 C-Band Systems

The system was shipped with the following components that comprise the output waveguide and switch array:

- Switch/Termination Assembly, which includes the Magic Tee, Switches, Crossguide Couplers, and Termination
- Waveguide segment (216398-1) which connects between HPA1 and SW1, Port 2
- Waveguide segment (216399-1) which connects between HPA2 and SW2, Port 3

See **Figure 3-5**.

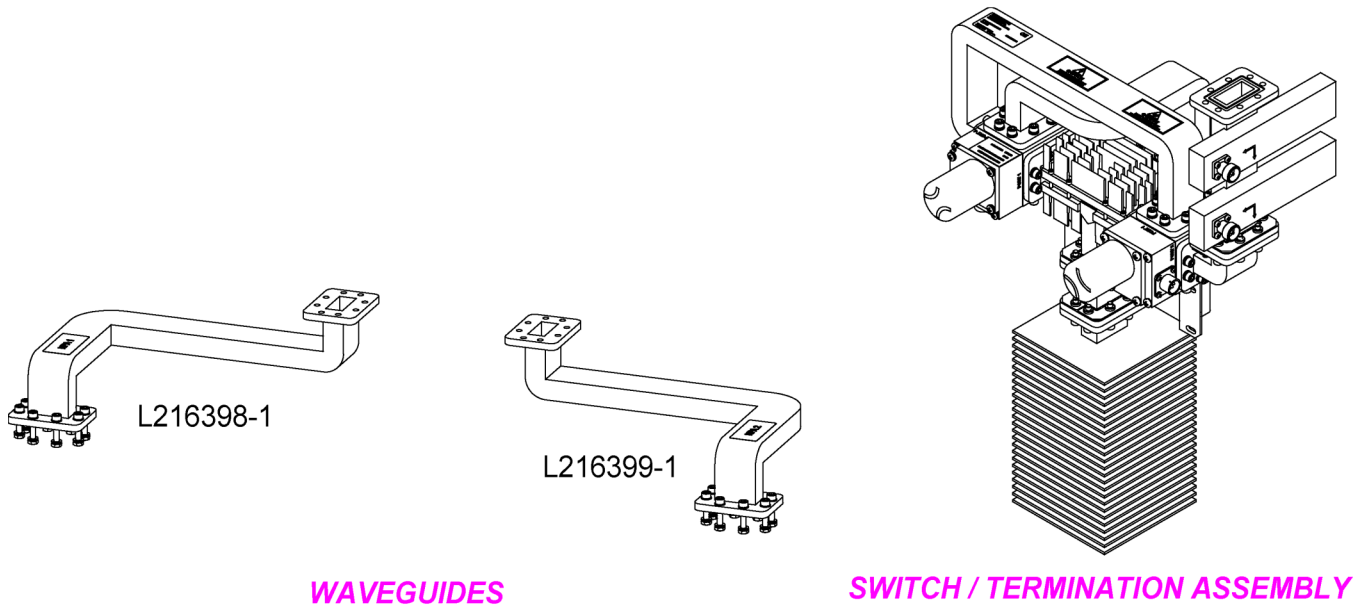


Figure 3-5: Waveguide and Switch Array Components, C-Band Systems

These components were disassembled for shipment as shown and need to be installed. See **Figure 3-6** through **Figure 3-10** for instructions for installing the output waveguide and switch array. All hardware required for this installation was included.

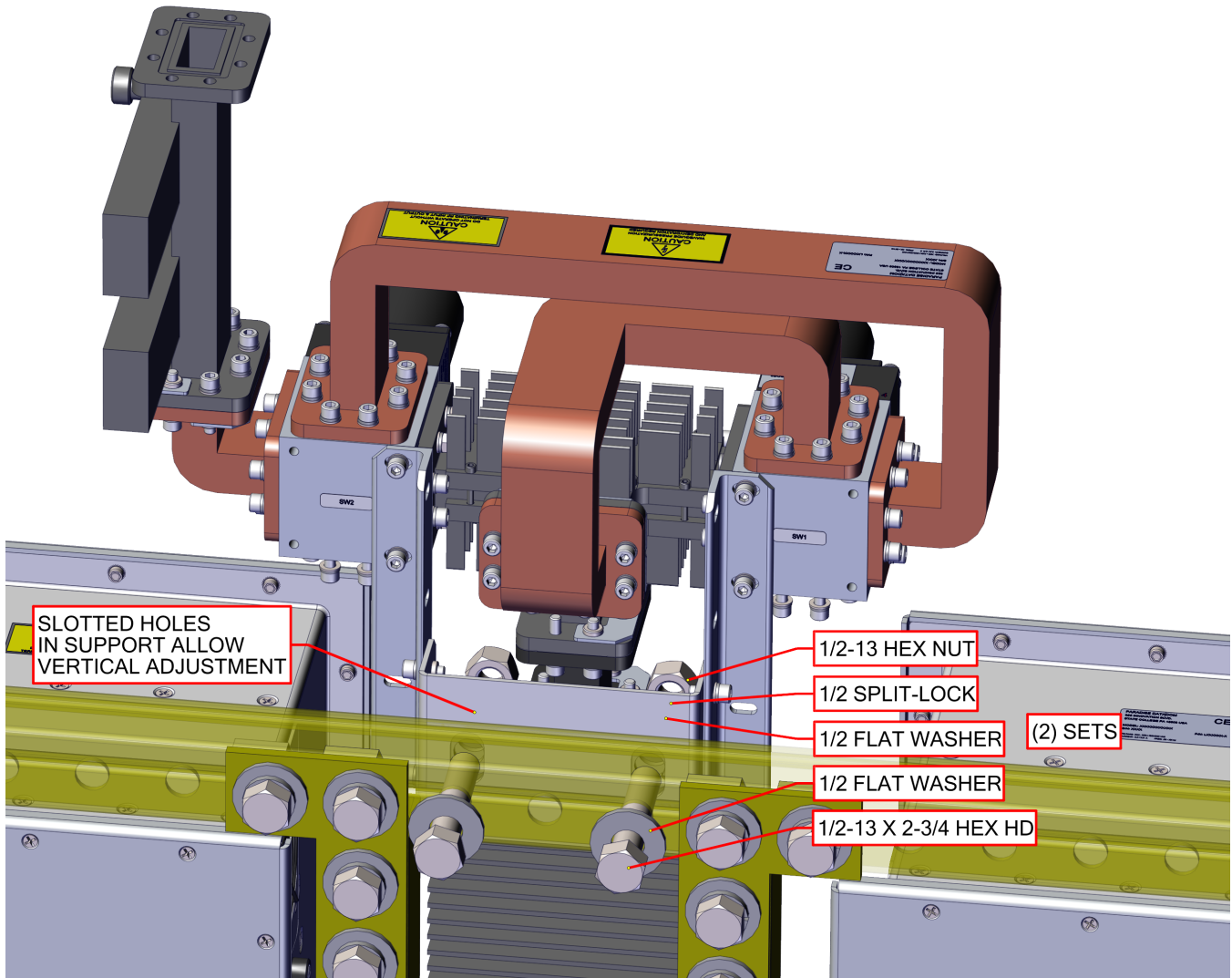


Figure 3-6: Mount Waveguide/Switch Assembly to Frame, C-Band Systems

3.3.1.1 Mount Waveguide/Switch Assembly

Insert two 1/2-13 x 2-3/4 hex bolts with flat washers into the top horizontal section of the uni-strut frame as shown in **Figure 3-6**.

Slide the switch assembly support onto these bolts and secure with 1/2 flat washers, 1/2 split washers and 1/2-13 hex nuts. Do not fully tighten the hardware to allow some vertical adjustment of the switch assembly.

3.3.1.2 Attach RF Output Waveguide (HPA1 and HPA2)

Insert supplied half gaskets between the RF Output flange of each HPA and the connecting waveguide. See **Figure 3-7** and **Figure 3-9**.

Warning: Do not try to force the waveguide to fit to the position of the HPA RF Output flange. Doing so may damage the waveguide. Minor adjustment in the position of the Waveguide/Switch Assembly may be necessary.

Secure the waveguide to the HPA RF Output flanges using (8x) 10-32 x 1" socket head cap screws, lock and flat washers, and 10-32 hex nuts. See **Figure 3-7** and **Figure 3-9**.

Insert supplied half gaskets between the waveguide flange and the switch. See **Figure 3-8** and **Figure 3-10**.

Attach the waveguide flange to the switch assembly using (8x) 10-32 x 9/16" socket head cap screws, lock and flat washers. See **Figure 3-8** and **Figure 3-10**.

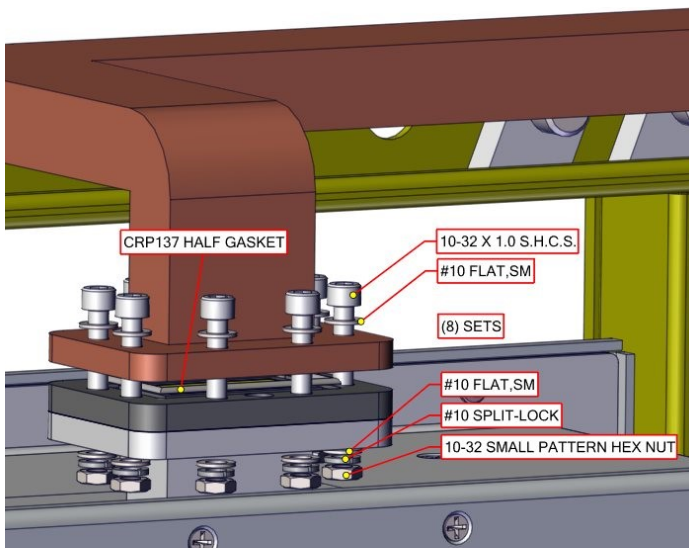


Figure 3-7: Attach Waveguide to HPA1

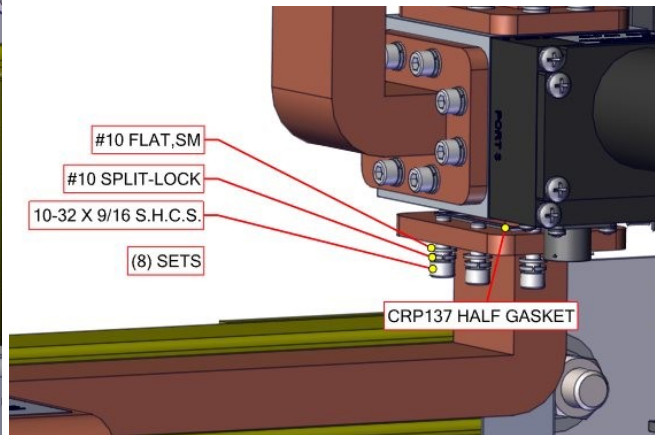


Figure 3-8: Attach HPA1 W/G to Switch

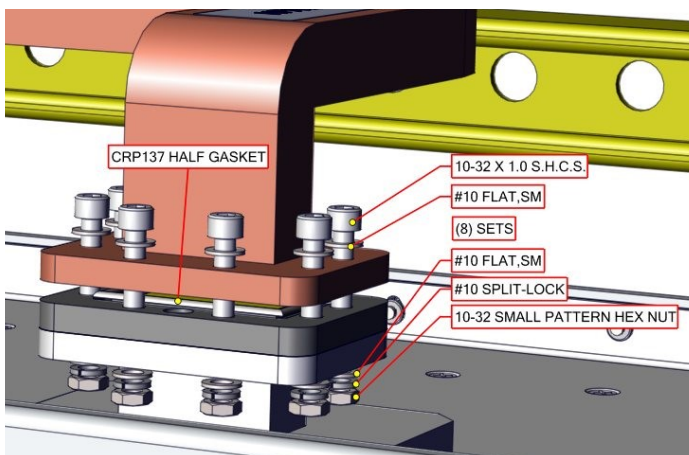


Figure 3-9: Attach Waveguide to HPA2

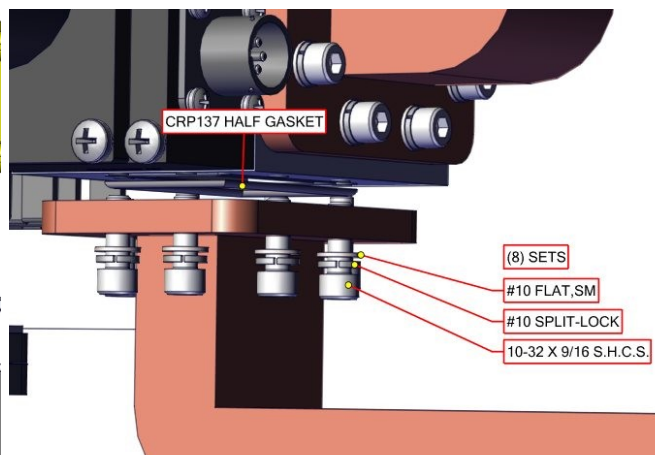


Figure 3-10: Attach HPA2 W/G to Switch

3.3.2 Ku-Band Systems

The system was shipped with the following components that comprise the output waveguide and switch array:

- Switch/Termination Assembly, which includes the Magic Tee, Switches, Crossguide Couplers, and Termination
- Waveguide segment (216963-1) which connects between HPA1 and SW1, Port 2
- Waveguide segment (216964-1) which connects between HPA2 and SW2, Port 3

See **Figure 3-11**.

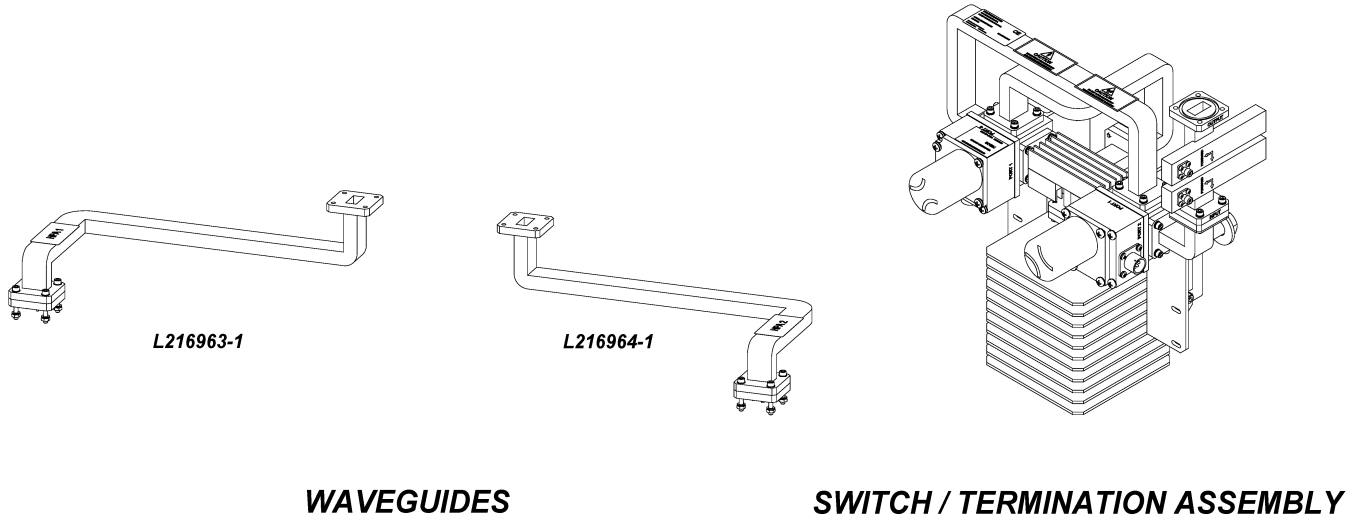


Figure 3-11: Waveguide and Switch Array Components, Ku-Band Systems

These components were disassembled for shipment as shown and need to be installed. See **Figure 3-12** through **Figure 3-16** for instructions for installing the output waveguide and switch array. All hardware required for this installation was included.

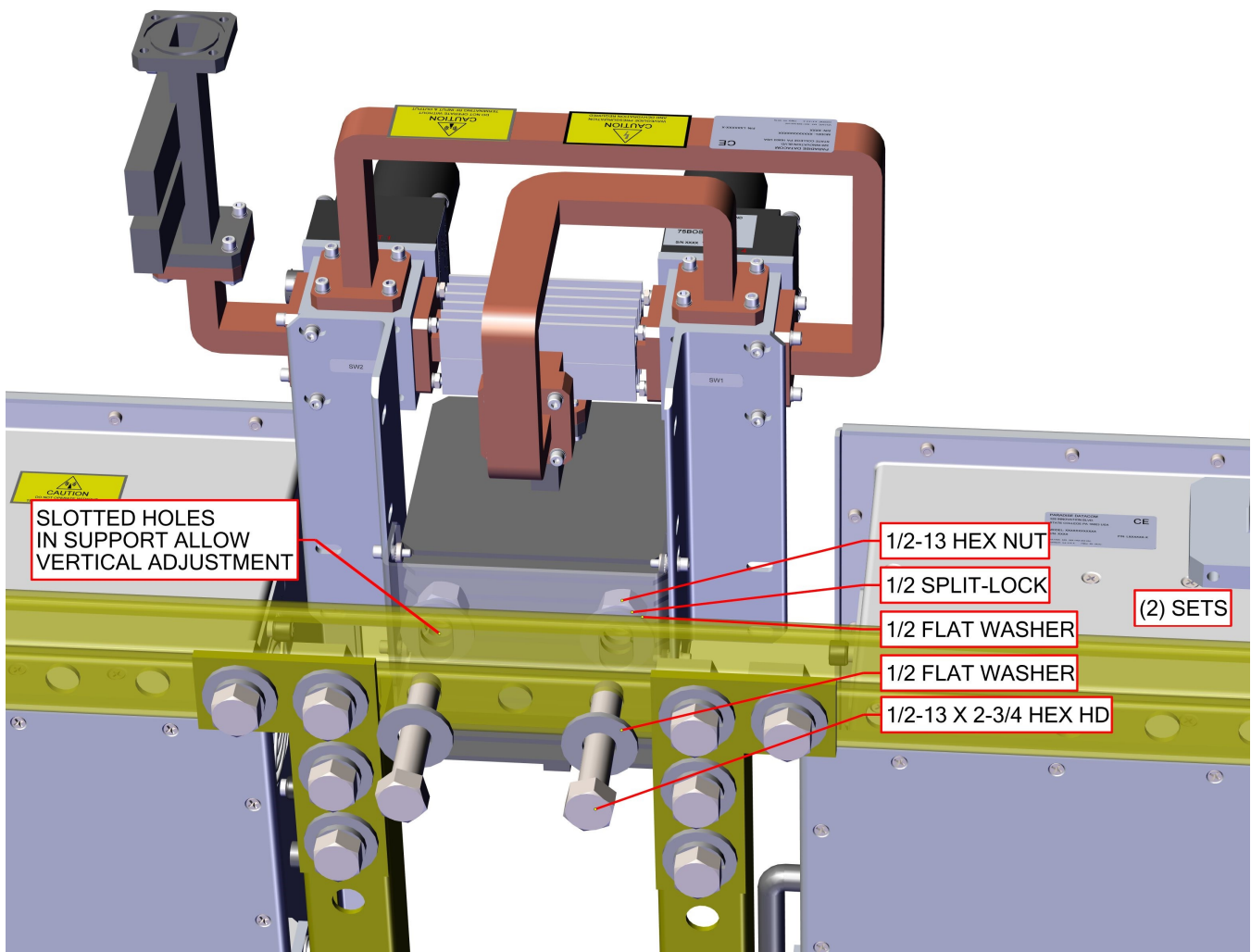


Figure 3-12: Mount Waveguide/Switch Assembly to Frame, Ku-Band Systems

3.3.2.1 Mount Waveguide/Switch Assembly

Insert two 1/2-13 x 2-3/4 hex bolts with flat washers into the top horizontal section of the uni-strut frame as shown in **Figure 3-12**.

Slide the switch assembly support onto these bolts and secure with 1/2 flat washers, 1/2 split washers and 1/2-13 hex nuts. Do not fully tighten the hardware to allow some vertical adjustment of the switch assembly.

3.3.2.2 Attach RF Output Waveguide (HPA1 and HPA2)

Insert supplied o-rings between the RF Output flange of each HPA and the connecting waveguide. See **Figure 3-13** and **Figure 3-15**.

Warning: Do not try to force the waveguide to fit to the position of the HPA RF Output flange. Doing so may damage the waveguide. Minor adjustment in the position of the Waveguide/Switch Assembly may be necessary.

Secure the waveguide to the HPA RF Output flanges using (8x) 6-32 x 1" socket head cap screws, lock and flat washers, and 6-32 hex nuts. See **Figure 3-13** and **Figure 3-15**.

Insert supplied o-rings between the waveguide flange and the switch. See **Figure 3-14** and **Figure 3-16**.

Attach the waveguide flange to the switch assembly using (8x) 6-32 x 9/16" socket head cap screws, lock and flat washers. See **Figure 3-14** and **Figure 3-16**.

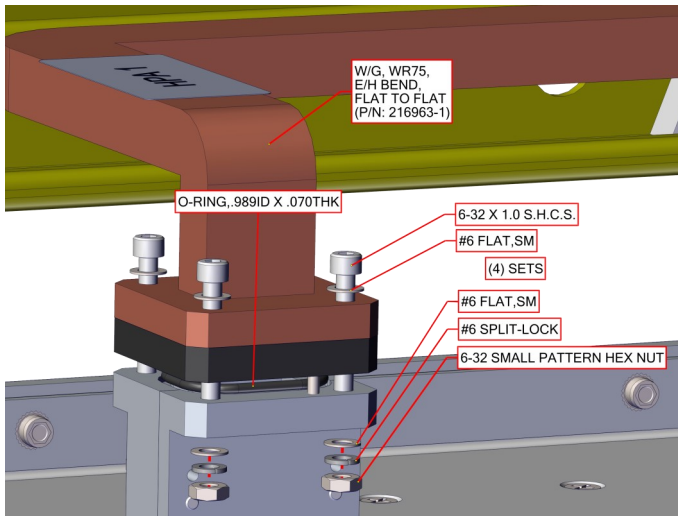


Figure 3-13: Attach Waveguide to HPA1

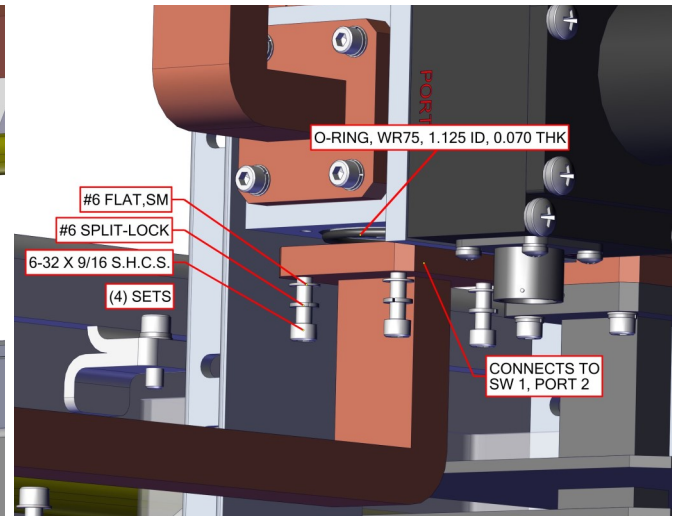


Figure 3-14: Attach HPA1 W/G to Switch

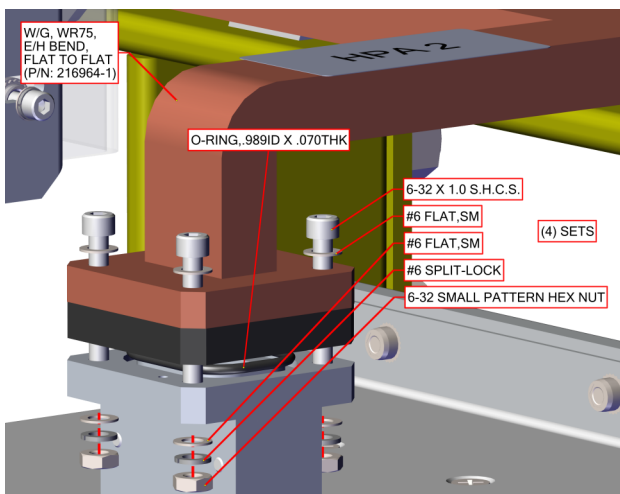


Figure 3-15: Attach Waveguide to HPA2

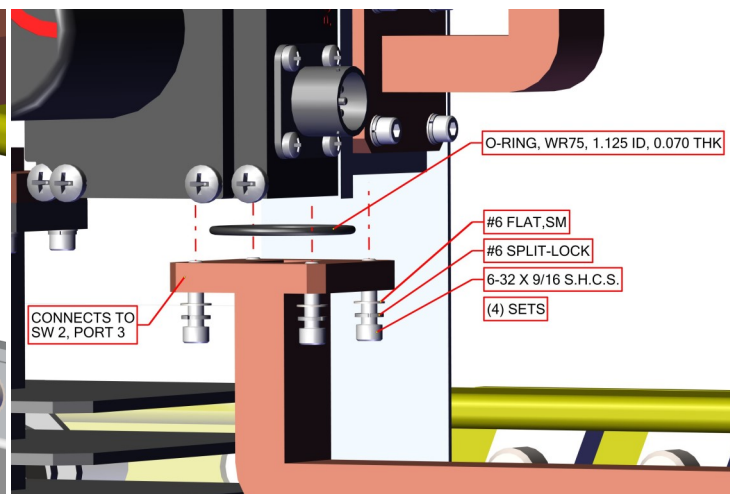


Figure 3-16: Attach HPA2 W/G to Switch

3.4 Installation, Signal Box

The signal box is a weatherized enclosure which houses the optional block up converters and provides a single point of connection for system I/O. Mounting hardware is provided with the unit.

The mounting plate for the signal box includes mounting supports for the system waveguide and termination, which will be referenced later.

Remove the mounting hardware from the signal box mounting plate. The hardware should include two (2) each 1/2-13 x 1-1/4" hex bolts, lock washers, flat washers and 1/2"-13 springless self-holding nuts.

Insert the springless self-holding nuts into the open-channel side of the uni-strut frame, at the location shown in **Figure 3-17**. Secure the signal box to the flat side of the uni-strut frame using the hex bolts, lock washers and flat washers.

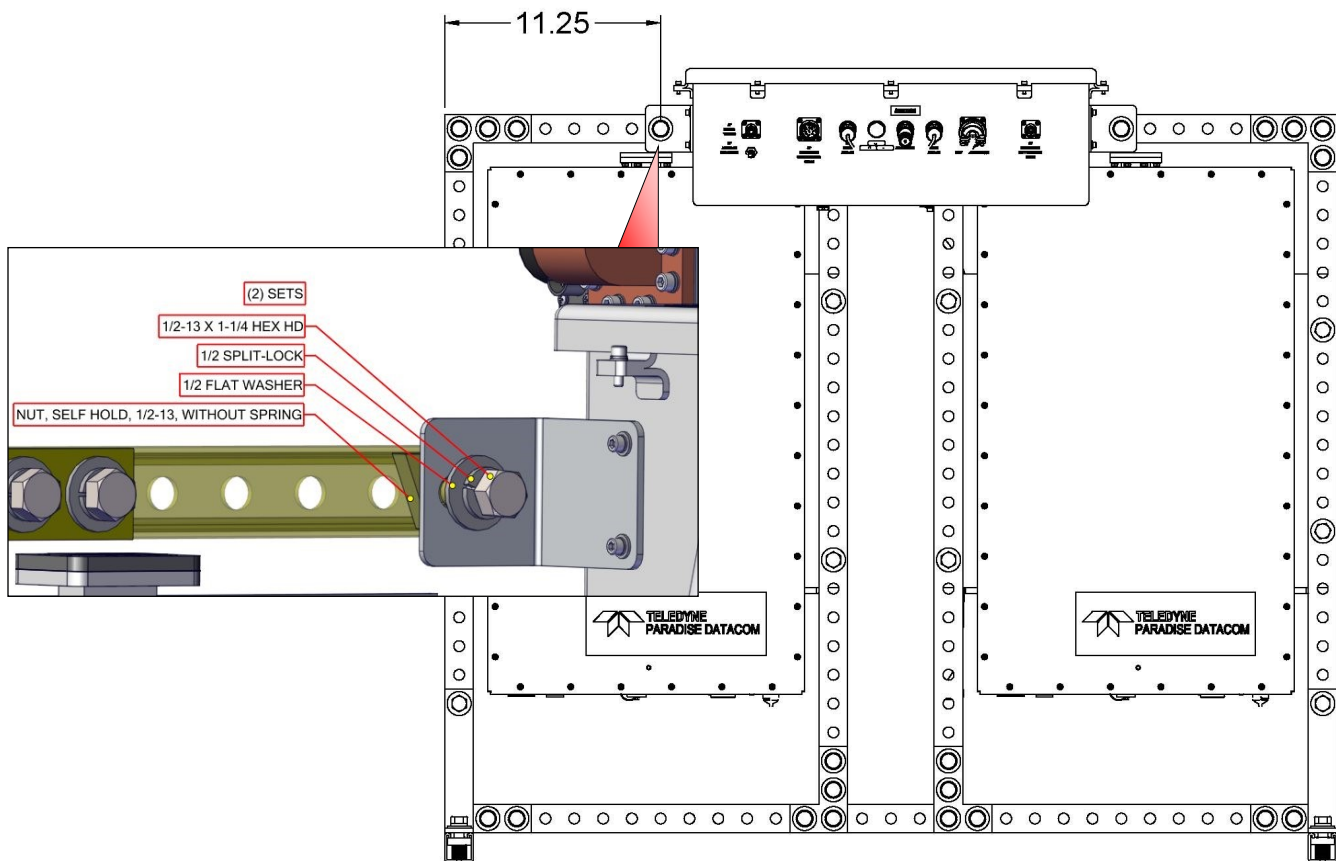


Figure 3-17: Mount Signal Box to Frame

3.5 Installation, Semi-Rigid Coaxial Cables

A series of pre-formed semi-rigid coaxial cables were shipped with the system. Each cable is labeled (W1 through W5) for easy identification. These cables are used to transmit the RF signal to each HPA, and the forward power signal from the crossguide coupler to the signal box. See **Figure 3-18** for identification of C-Band coaxial cables.

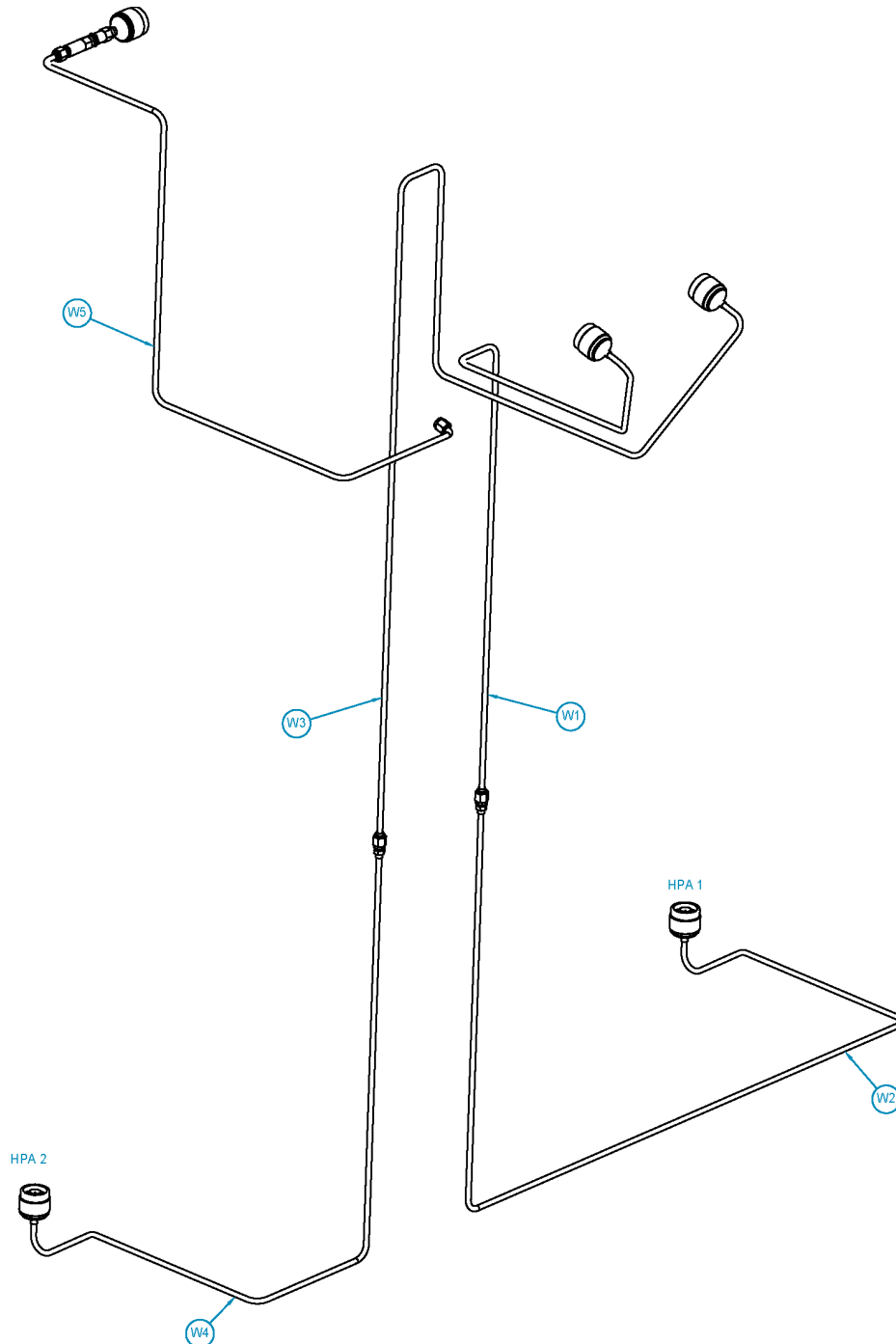


Figure 3-18: Semi-Rigid Coaxial Cables, C-Band Systems

Caution! Do not bend or otherwise alter the shape of the pre-formed semi-rigid coaxial cables. Doing so may damage the cable.

See **Figure 3-19** for identification of Ku-Band coaxial cables.

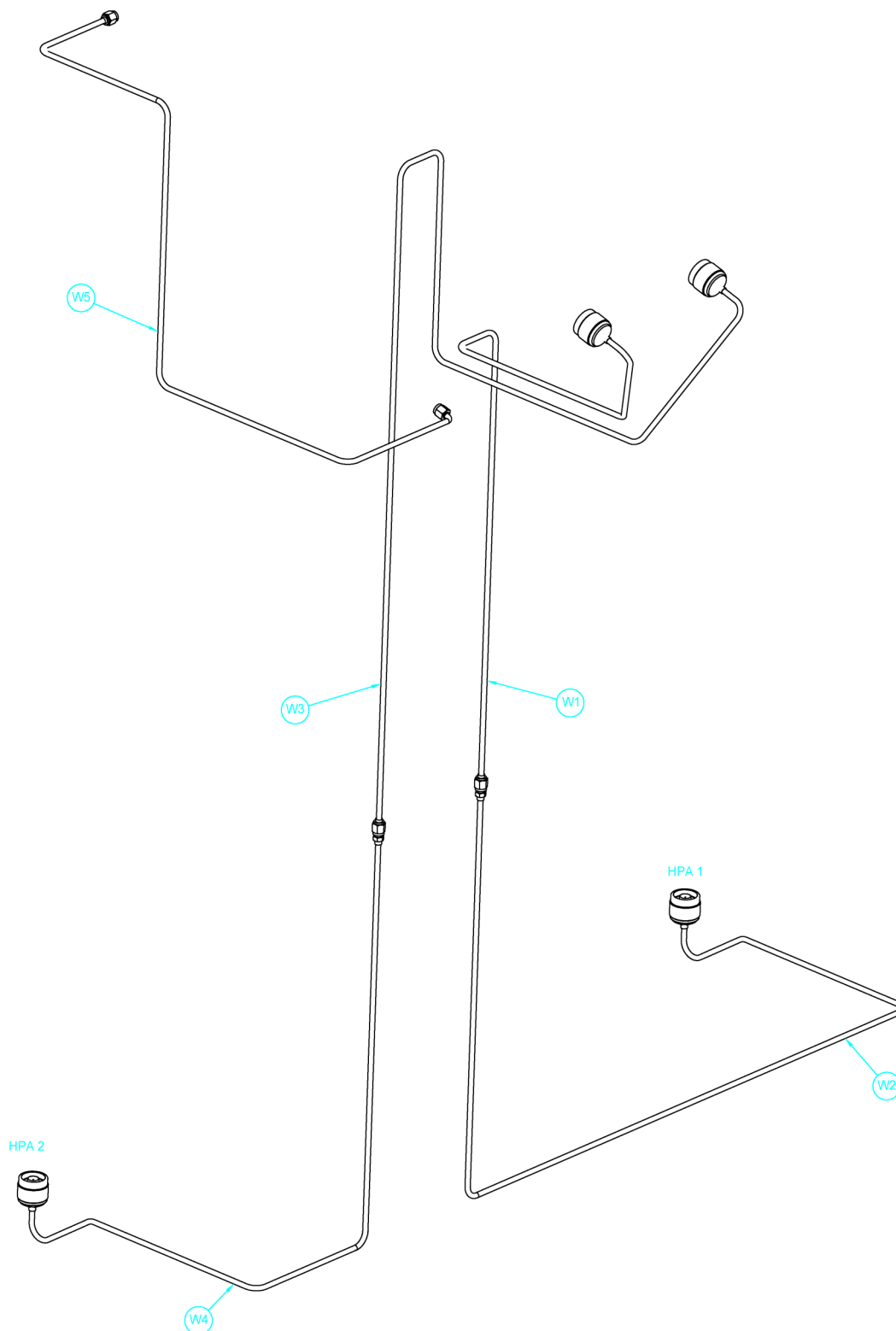


Figure 3-19: Semi-Rigid Coaxial Cables, Ku-Band Systems

Caution! Do not bend or otherwise alter the shape of the pre-formed semi-rigid coaxial cables. Doing so may damage the cable.

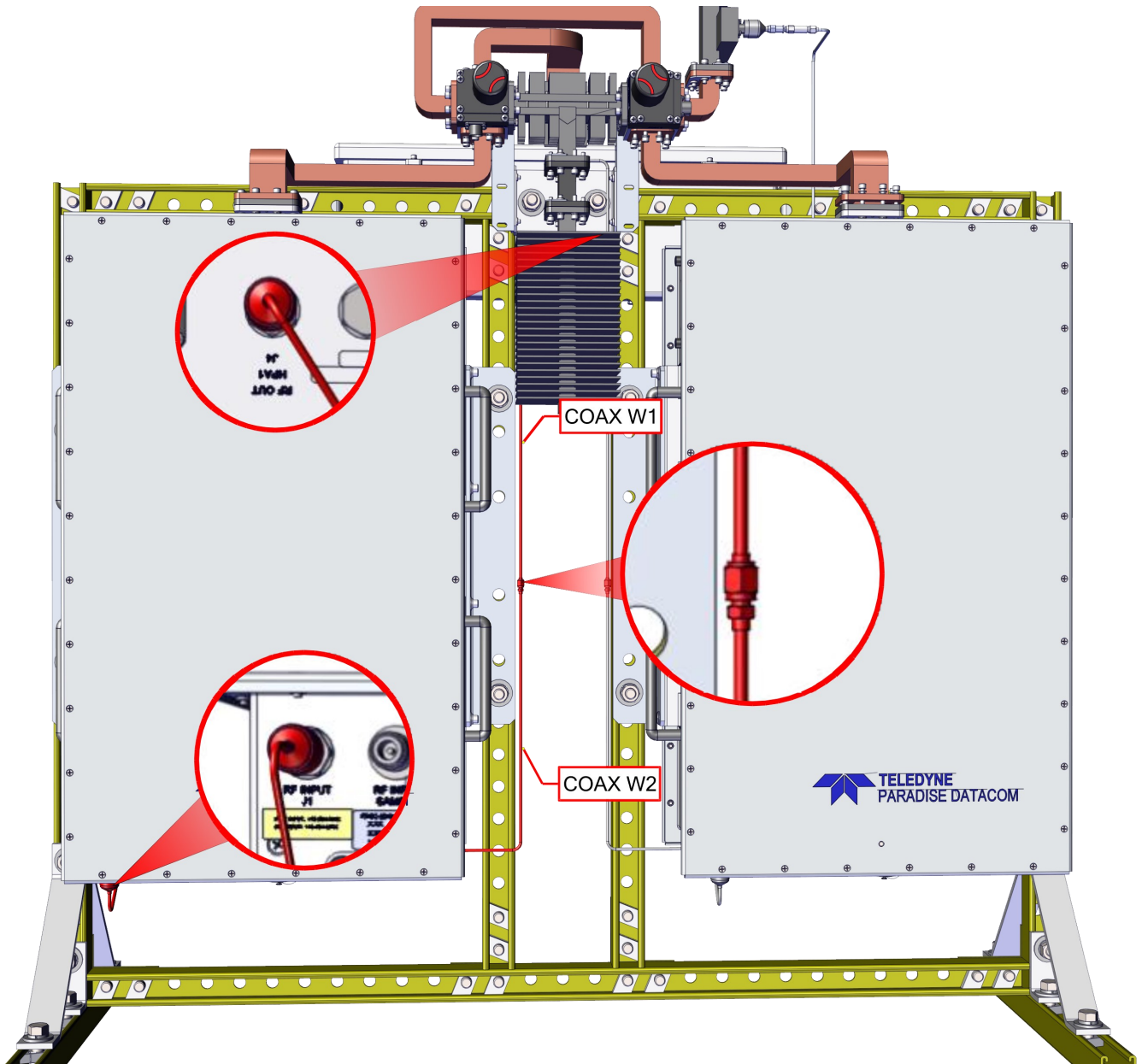


Figure 3-20: Coaxial Cables (Signal Box to HPA1)

3.5.1 Signal Box to HPA1

Refer to **Figure 3-20** and follow the steps below.

1. Connect the N-Type connector of coaxial cable W1 to port J4 (HPA1 RF OUT) of the Signal Box.
2. Connect the SMA connector of coaxial cable W1 to the SMA connector of coaxial cable W2.
3. Connect the N-Type connector of coaxial cable W2 to port J1 (RF INPUT) of HPA1.

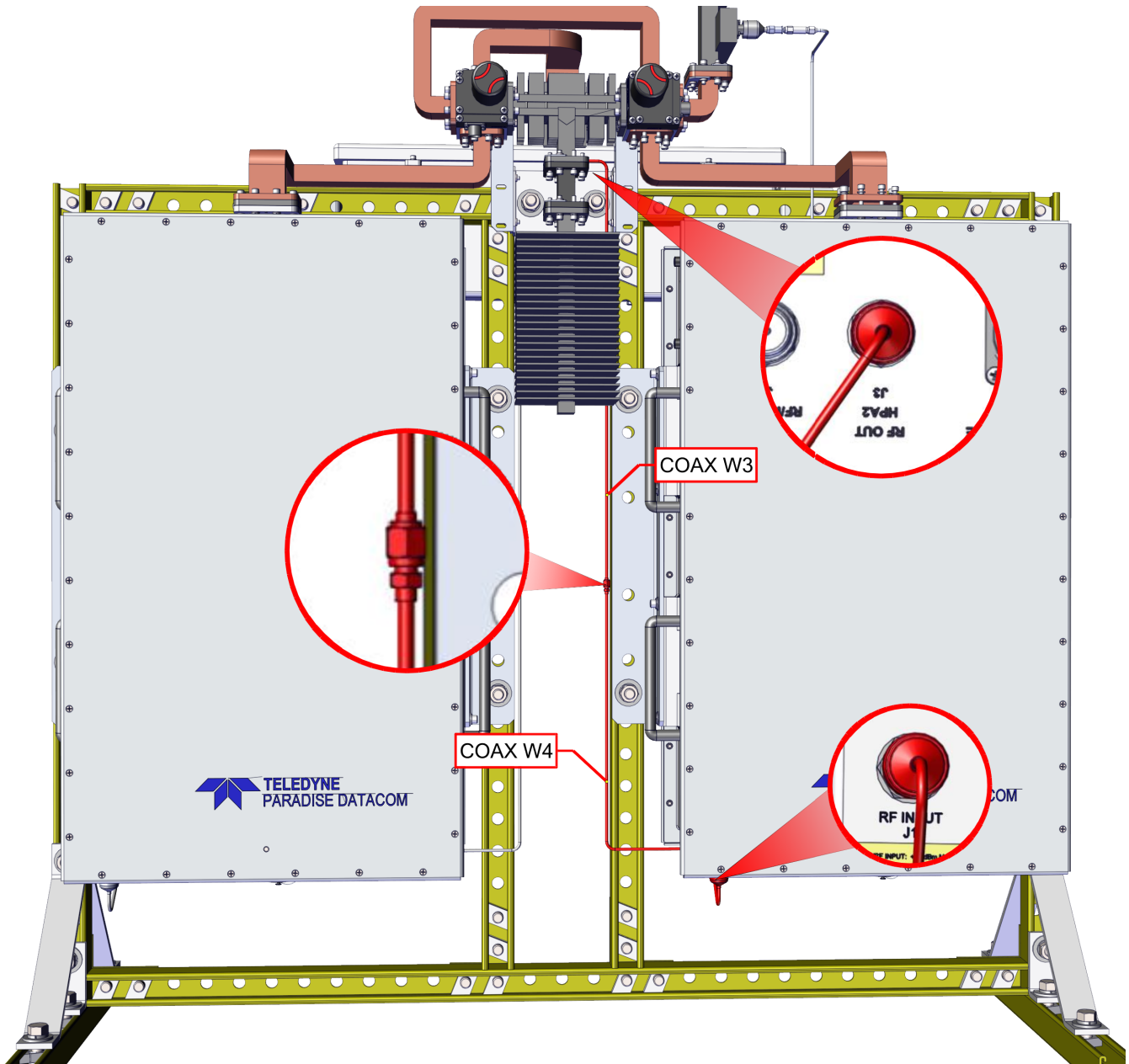


Figure 3-21: Coaxial Cables (Signal Box to HPA2)

3.5.2 Signal Box to HPA2

Refer to **Figure 3-21** and follow the steps below.

1. Connect the N-Type connector of coaxial cable W3 to port J3 (HPA2 RF OUT) of the Signal Box.
2. Connect the SMA connector of coaxial cable W3 to the SMA connector of coaxial cable W4.
3. Connect the N-Type connector of coaxial cable W4 to port J1 (RF INPUT) of HPA2.

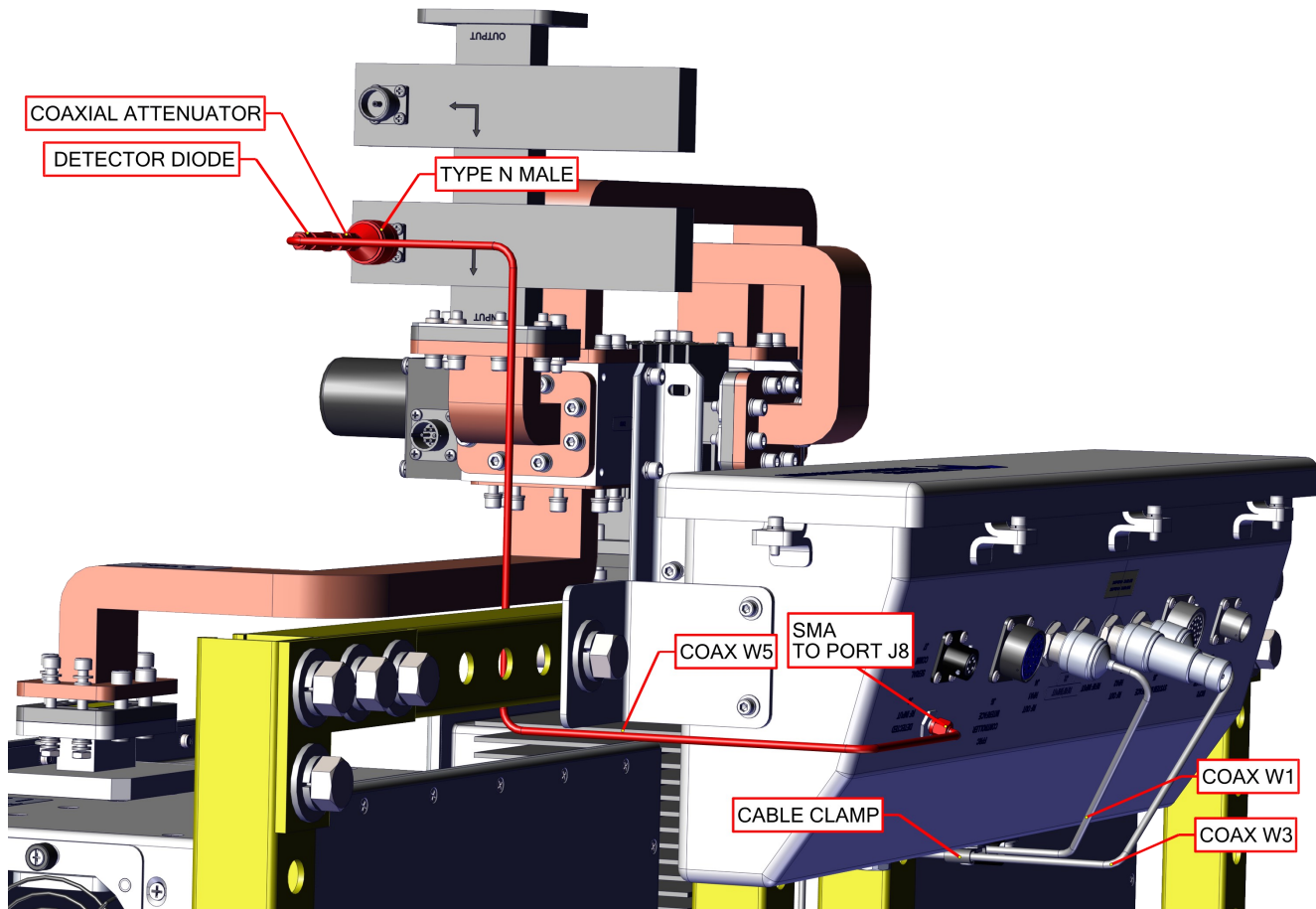


Figure 3-22: Coaxial Cables, C-Band Systems (Signal Box to Crossguide Coupler)

3.5.3 Signal Box to Crossguide Coupler (Output Sample)

3.5.3.1 C-Band Systems

For C-Band systems, refer to **Figure 3-22** and follow the steps below.

1. Locate the coaxial cable labeled W5. Connect the Type-N (M) connector to the crossguide coupler.
2. Ensure the coaxial attenuator and detector diode are connected to cable W5.
3. Connect the SMA connector to Port J8 of the signal box.

Note: Cables W1 and W3 should be secured into the cable clamps located at the bottom of the signal box. One at a time, remove the socket head cap screw to slide the cable through the grommet clamp. Reinsert the socket head cap screw and tighten securely before moving to the next grommet clamp.

Note: Self-amalgamating tape should be used to cover all connector junctions (N-type; SMA) so that no water can creep into the thread between the plug and socket.

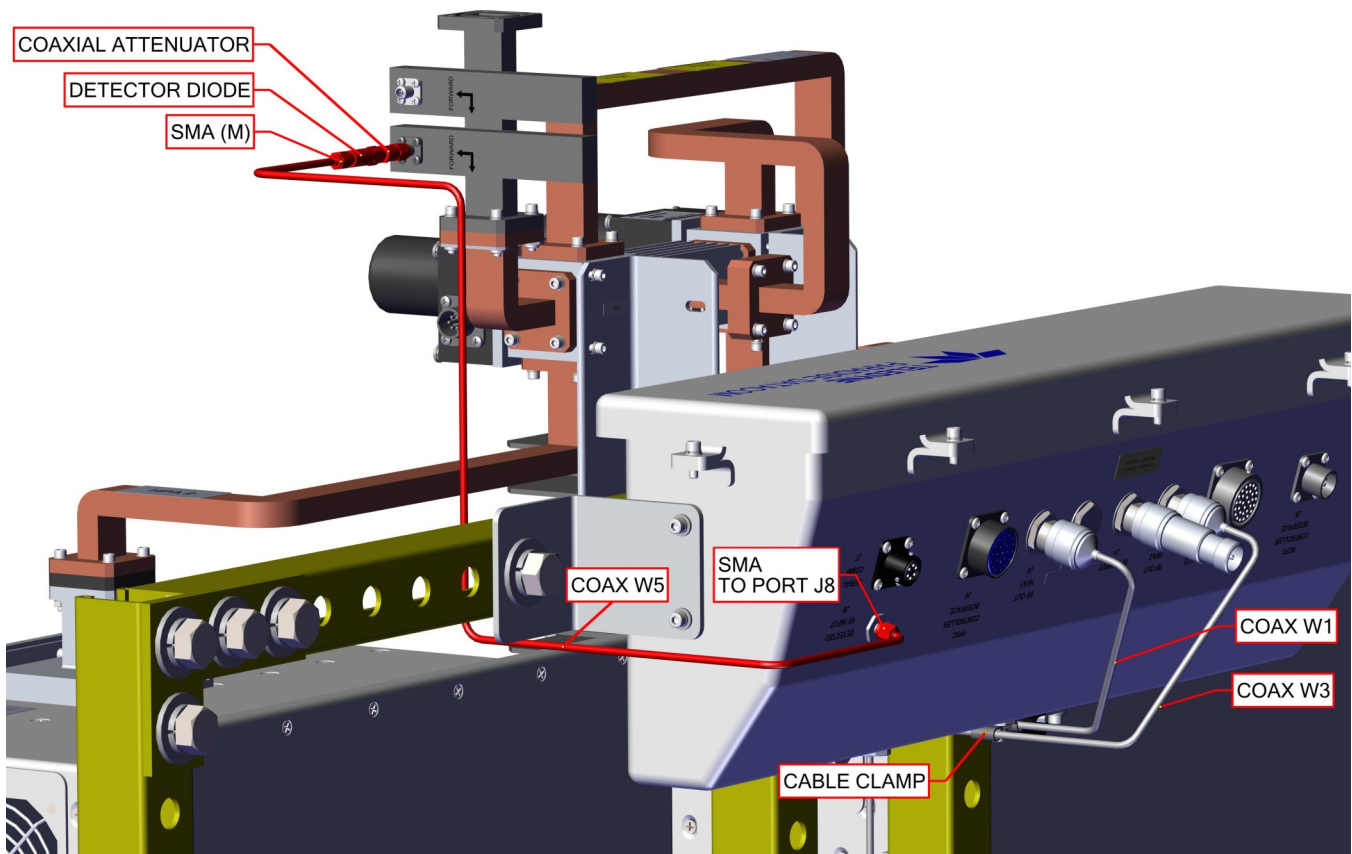


Figure 3-23: Coaxial Cables, Ku-Band Systems (Signal Box to Crossguide Coupler)

3.5.3.2 Ku-Band Systems

For Ku-Band systems, refer to **Figure 3-23** and follow the steps below.

1. Locate the coaxial cable labeled W5. Connect the SMA (M) connector, detector diode and coaxial attenuator to the crossguide coupler.
2. Connect the SMA connector to Port J8 of the signal box.

Note: Cables W1 and W3 should be secured into the cable clamps located at the bottom of the signal box. One at a time, remove the socket head cap screw to slide the cable through the grommet clamp. Reinsert the socket head cap screw and tighten securely before moving to the next grommet clamp.

Note: Self-amalgamating tape should be used to cover all connector junctions (N-type; SMA) so that no water can creep into the thread between the plug and socket.

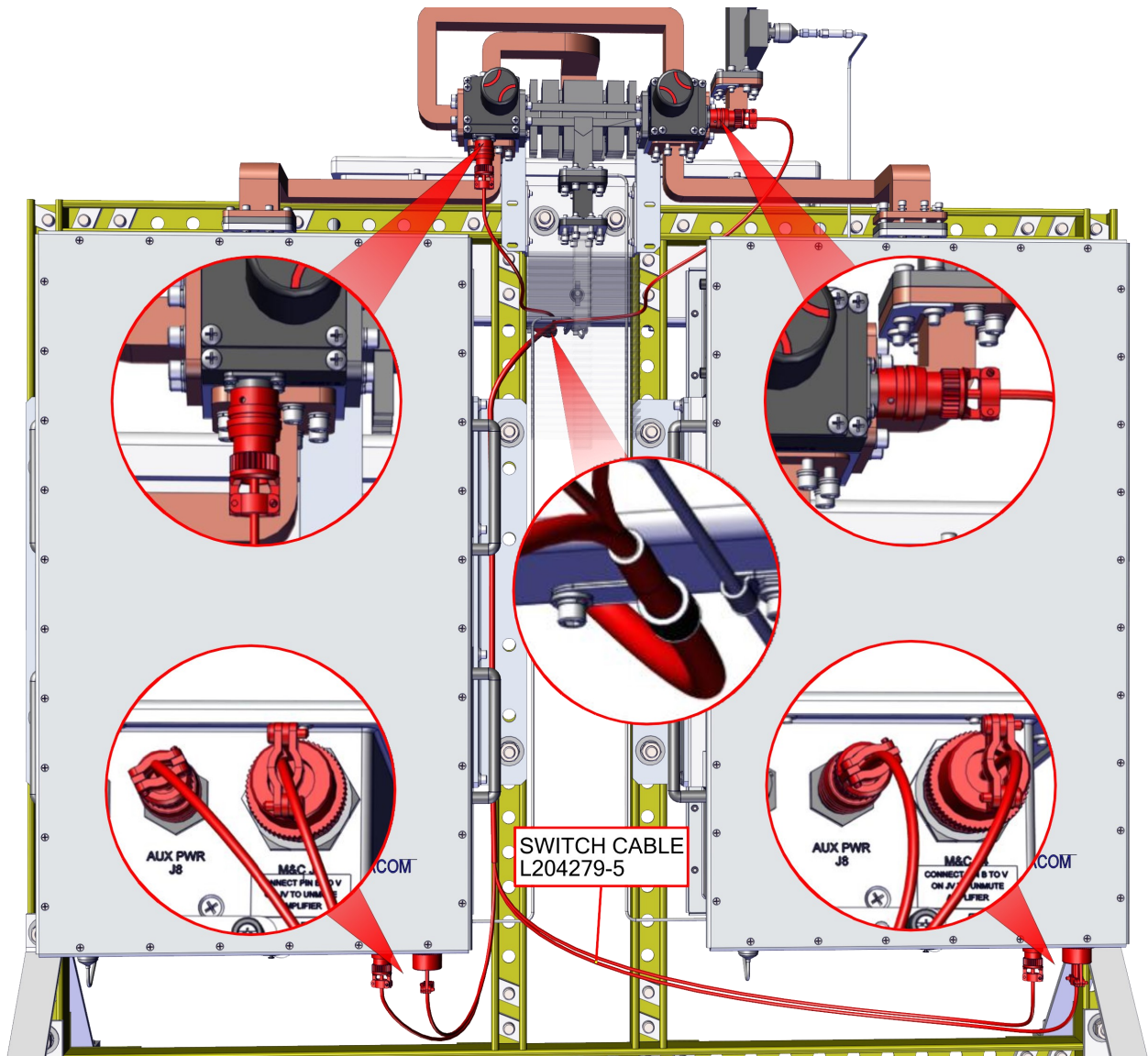


Figure 3-24: System Control Cable (C-Band System pictured)

3.6 Installation, System Control Cable

The redundant system includes a System Control Cable which needs to be connected to complete the installation. The cable includes labels near each connector that identify to which port the connector should be plugged.

Check the system schematic to verify proper connections.

Note: The Switch Cable should be secured into the cable clamp located at the bottom of the signal box.

Note: Self-amalgamating tape or putty should be used to cover all connector junctions (circular MIL, MS-type) from the plug/socket connection to as close as possible to the cable sheath so that no water can creep into the thread between the plug and socket.

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4.1 Introduction

This section outlines the assembly and mounting procedure for a 1:2 Phase Combined High Power Outdoor SSPA System.

Before beginning the assembly of the uni-strut mounting kit, verify that the kit includes all of the items in **Table 4-1**. If any items are missing, contact Teledyne Paradise Datacom with the part number and quantity of the shortage.

The following instructions describe the assembly of the uni-strut mounting kit, and the installation of the High Power Outdoor SSPAs and associated switch, signal box and waveguide assembly. The system is intended to be free standing and entirely self-supported once properly mounted.

It is important to give consideration to the following:

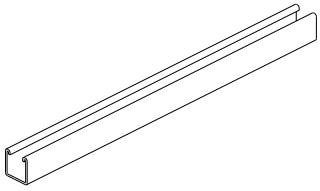
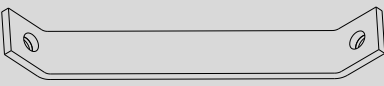
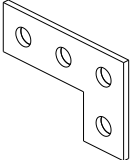
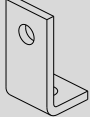







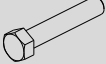
1. Structural integrity of the mounting deck.
2. Accessibility to all local user interfaces. (Ensure SSPA enclosure doors are free to open to the latched position.)
3. Adequate cooling air, 8.00" minimum clearance must be maintained between air intake and any surface that will inhibit air flow.
4. The High Power Outdoor SSPA should never be enclosed in such a manner that airflow is restricted. Normal operating range is -40 to +60°C.
5. Proper weatherized sealing of all connectors.

Warning! The High Power Outdoor SSPAs should not be positioned in such a way that allows falling precipitation to enter the fans at the bottom of the amplifier. Doing so will void your warranty.

4.2 Installation, Uni-Strut Assembly

Reference the parts list in **Table 4-1** and **Figure 4-1**, **Figure 4-2**, and **Figure 4-3** throughout the assembly of the mounting frame.

Table 4-1: Parts List, Mounting Kit Assembly (L214792-1)

Item	Qty.	Description	Image
1	4	UNI-STRUT, 34.5"	
2	2	UNI-STRUT, 37.5"	
3	2	UNI-STRUT, 69"	
4	4	UNI-STRUT, 20"	
5	2	UNI-STRUT, 7.5"	
11	8	CORNER BRACE, 7.5"	
12	14	BRACKET, L, 4-HOLE	
13	4	ANGLE, CONNECTOR, 2-HOLE	
21	65	BOLT, HEX, 1/2-13 X 1.25, SS	
22	73	WASHER, LOCK, 1/2	
23	76	WASHER, FLAT, 1/2, STD	
24	51	NUT, SELF-HOLD, 1/2, SPRINGLESS	
25	12	NUT, SELF-HOLD, 1/2	
26	8	NUT, HEX, 1/2-13, GRADE 5 ZINC	
27	4	WASHER, FLAT, 9/16, D-SHAPE	
28	8	BOLT, HEX, 1/2-13 X 2.75, SS	

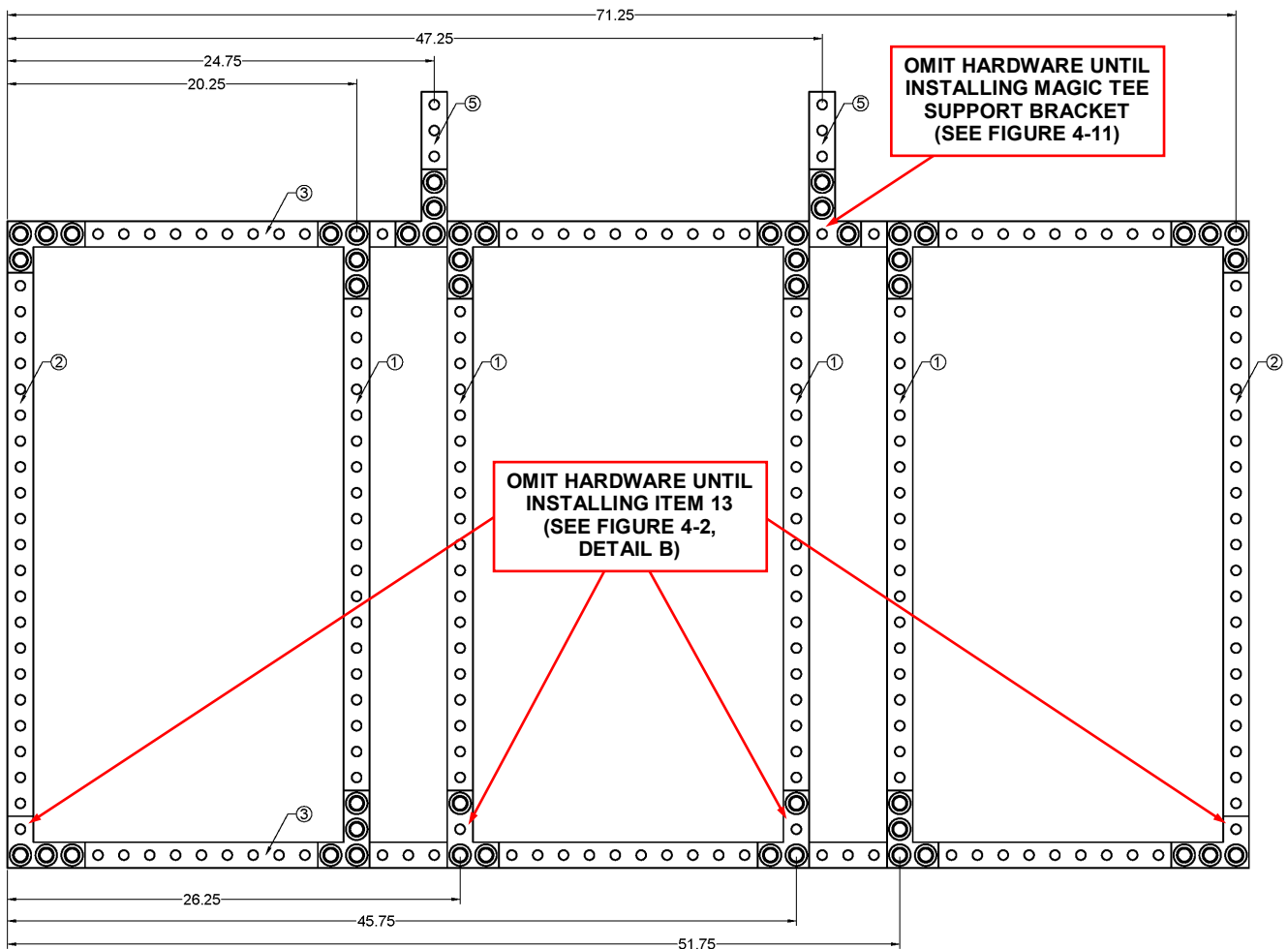


Figure 4-1: Uni-Strut Assembly

1. Arrange the uni-strut sections (Items 1, 2, 3 and 5) as shown in **Figure 4-1**. Secure the 4-hole L-brackets (Item 12) on the flat side of the uni-strut as shown in **Figure 4-1**, and refer to **Figure 4-2, Detail A** for hardware placement. Note that there are five (5) instances where hardware should not be installed through the L-brackets.
2. Arrange the 20" sections of uni-strut (Item 4) as footers, shown in **Figure 4-3**,
3. Secure the 2-hole angle connectors (Item 13) to the uni-strut base and frame as shown in **Figure 4-3**, and refer to **Figure 4-2, Detail B** for hardware placement.
4. Attach the corner braces (Item 11) to the uni-strut base and frame as shown in **Figure 4-3**, and refer to **Figure 4-2, Detail C** for hardware placement.
5. Secure all hardware tightly.

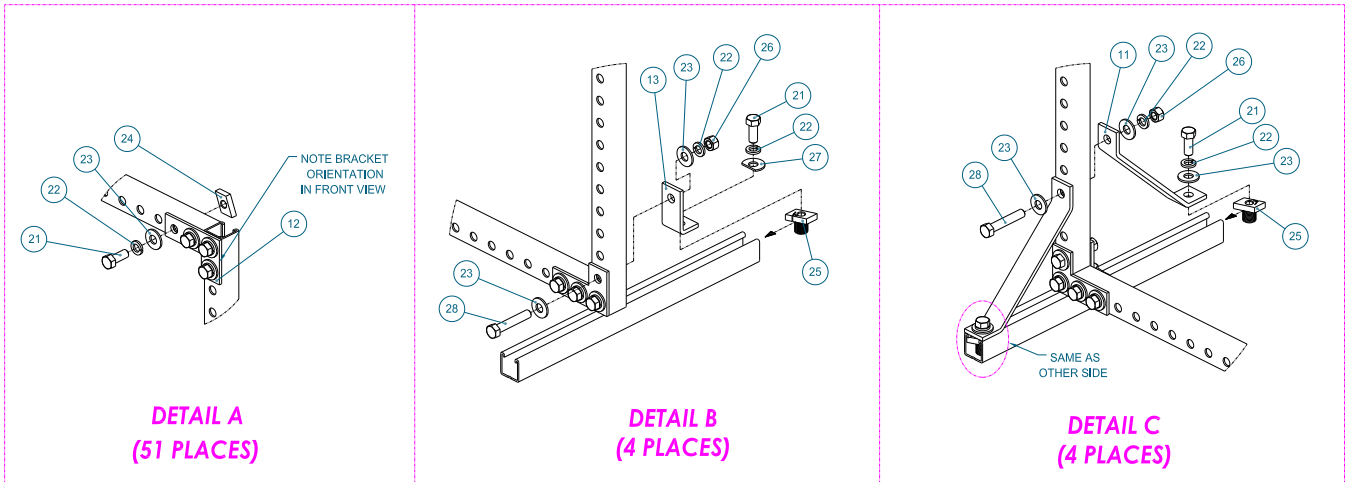


Figure 4-2: Uni-Strut Assembly, Hardware Placement

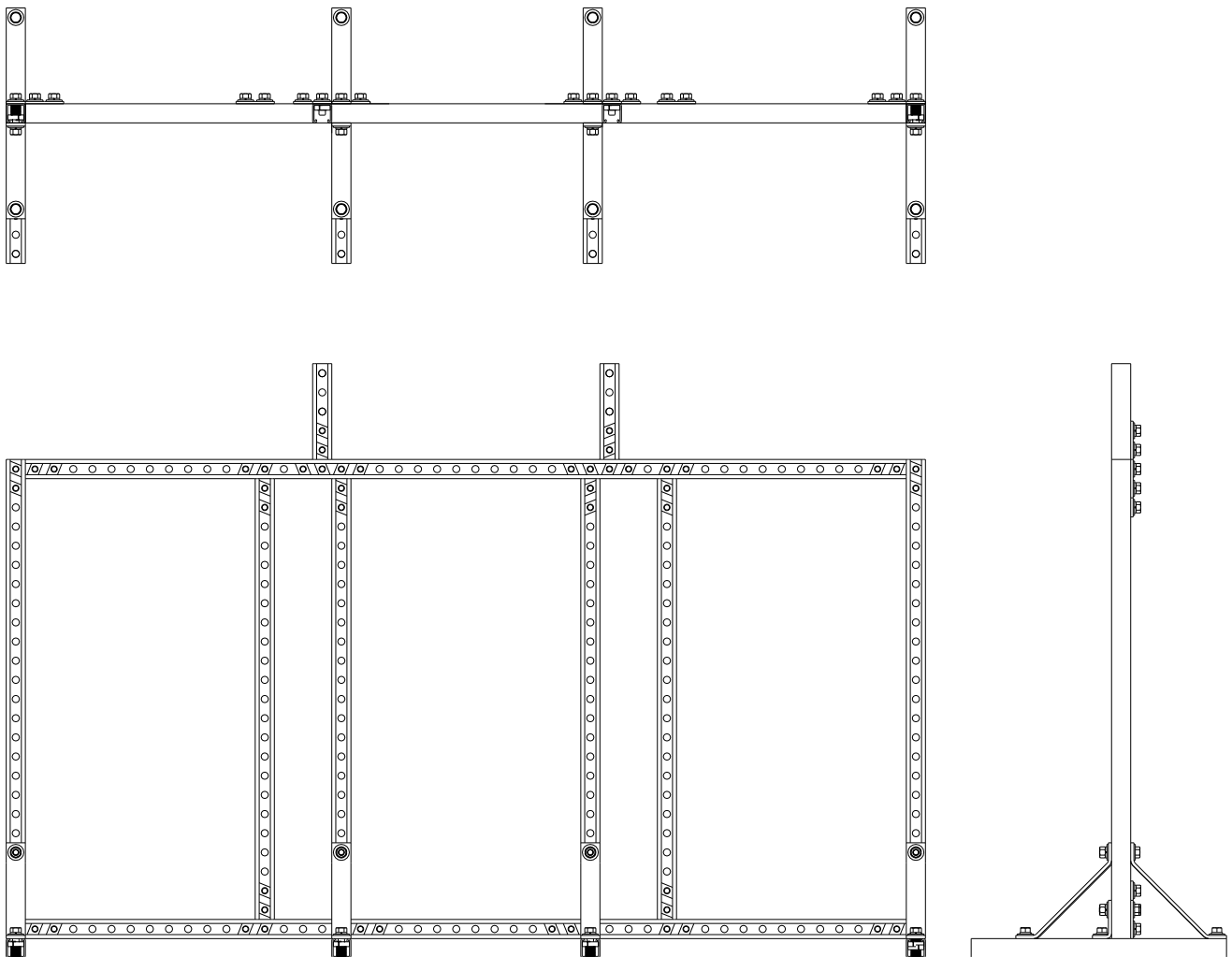


Figure 4-3: Uni-Strut Assembly, Attach Footers

4.3 Installation, HPAs to Frame

Warning: The base struts (Item 1) included in the mounting kit should be bolted securely to the location decking prior to mounting the HPAs to the mounting frame. This is to ensure that the mounted SSPA assembly does not tip over during or after system installation.

The HPAs will be mounted to the open channel side of the uni-strut frame. Mounting hardware is provided with the amplifiers. See **Figure 4-4**.

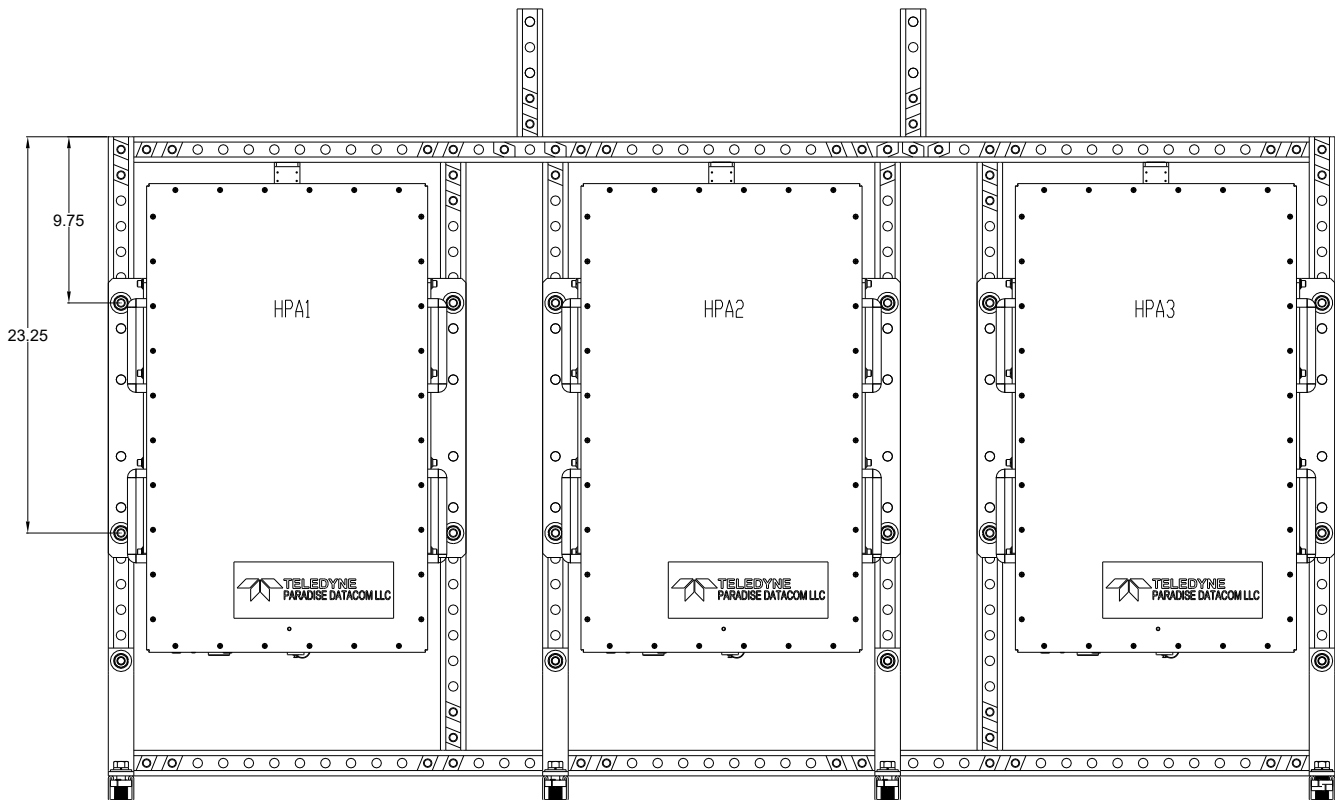


Figure 4-4: Install Amplifiers

Warning: The HPAs each weigh in excess of 100 pounds (45.5 kg). A mechanical lift or at least two persons are required to mount the HPAs to the frame, while a third person installs the hardware.

1. Insert a 1/2-13x2.75 hex bolt with 1/2" flat washer through the flat side of the uni-strut frame at the positions shown in **Figure 4-4** and through the mounting bracket of the HPAs.
2. Secure each bolt with a 1/2" flat washer, 1/2" lock washer and 1/2-13 hex nut.
3. Tighten hardware securely.

4.4 Installation, Signal Box

The signal box is a weatherized enclosure which houses the block up converters and provides a single point of connection for system I/O. Mounting hardware is provided with the unit.

The mounting plate for the signal box includes mounting supports for the system waveguide and termination, which will be referenced later.

Remove the mounting hardware from the signal box mounting plate. The hardware should include four (4) each 1/2-13 x 1.25" hex bolts, lock washers, flat washers and 1/2" springless self-holding nuts.

Figure 4-5 shows the mounting installation for the signal box.

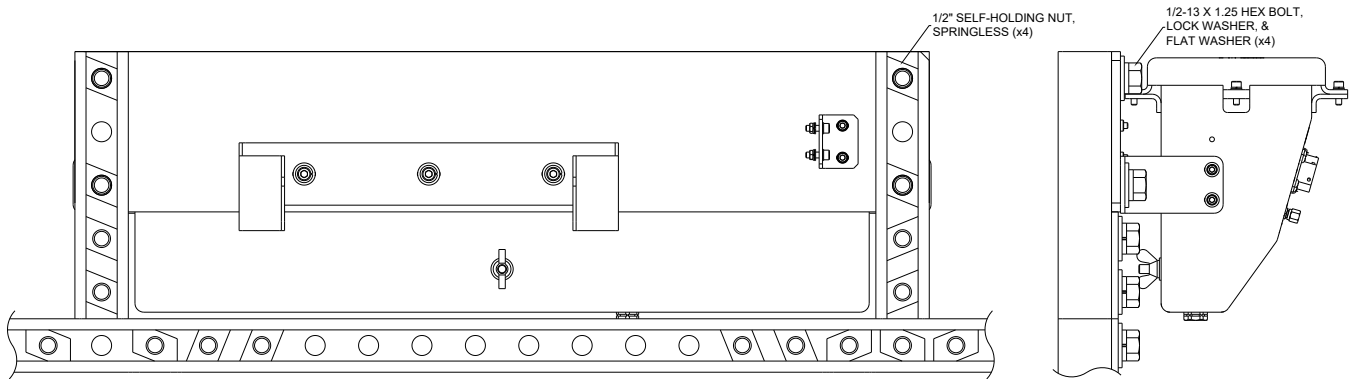


Figure 4-5: Install Signal Box

4.5 Installation, Output Waveguide and Switch Array

4.5.1 Ku-Band Systems

The system was shipped with the following components that comprise the output waveguide and switch array:

- RF Output Assembly, which includes the Magic Tee, Crossguide Couplers, and Termination
- Switch 1 (SW1)
- Switch 2 (SW2) and Termination (connected to SW2, Port 2)
- Waveguide segment (214782-1) which connects between HPA1 and SW1, Port 2
- Waveguide segment (214783-1) which connects between HPA2 and SW1, Port 4
- Waveguide segment (214784-1) which connects between HPA3 and SW2, Port 3
- Waveguide segment (214785-1) which connects between SW1, Port 1 and the Magic Tee
- Waveguide segment (214786-1) which connects between SW2, Port 4 and the Magic Tee
- Waveguide segment (214787-1) which connects between SW1, Port 3 and SW2, Port 1

See **Figure 4-6**.

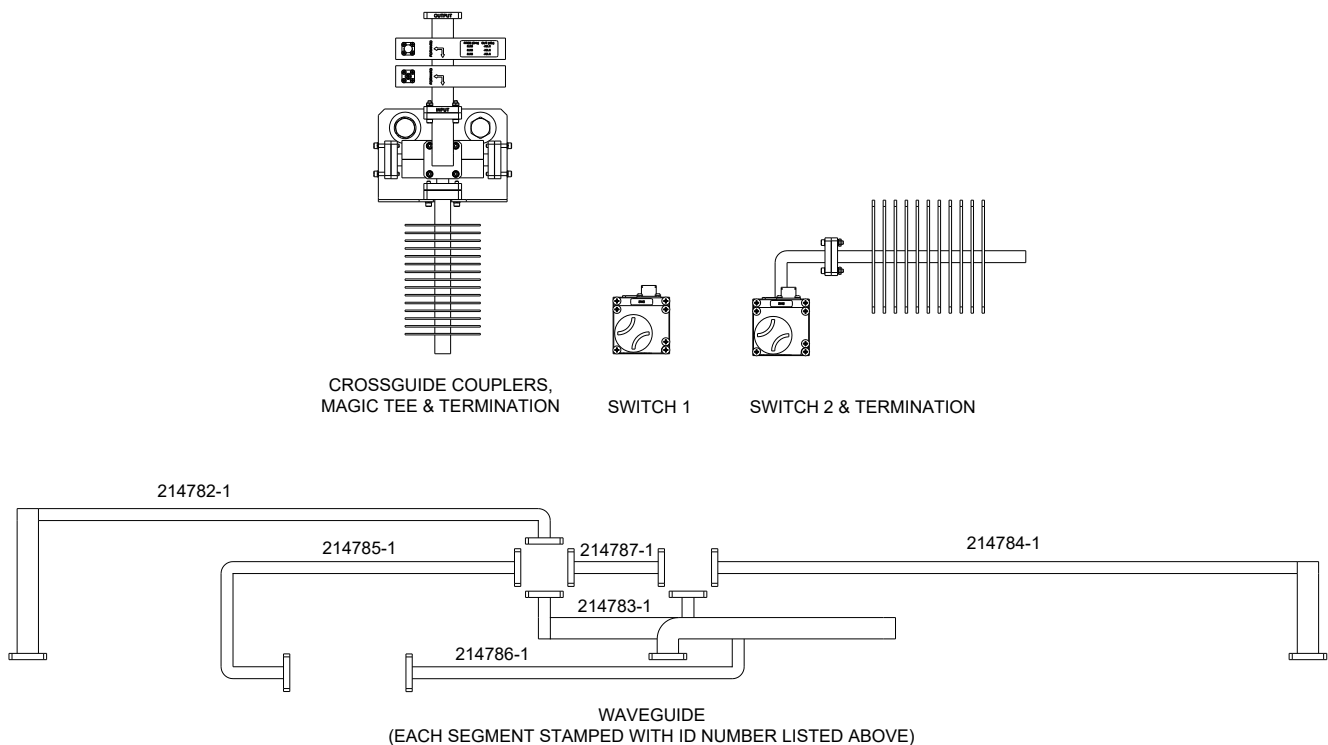


Figure 4-6: Components, Output Waveguide and Switch Array, Ku-Band (typical)

These components were disassembled for shipment and need to be installed. See **Figure 4-7** through **Figure 4-12** for instructions for installing the output waveguide and switch array. All hardware required for this installation was included.

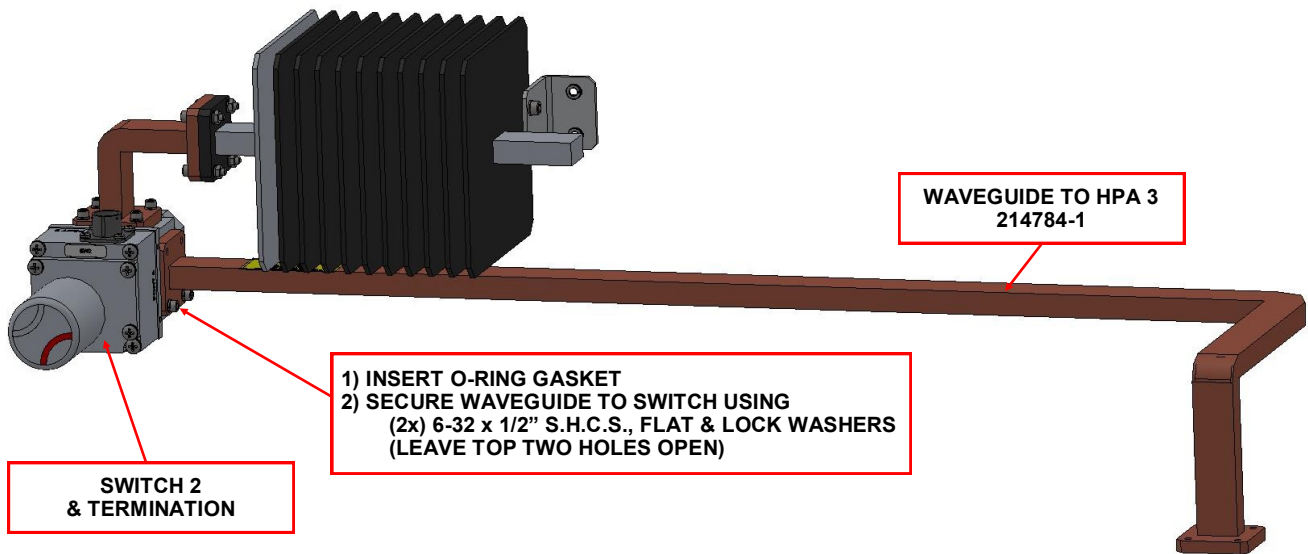


Figure 4-7: Attach W/G Segment 214784-1 to SW2

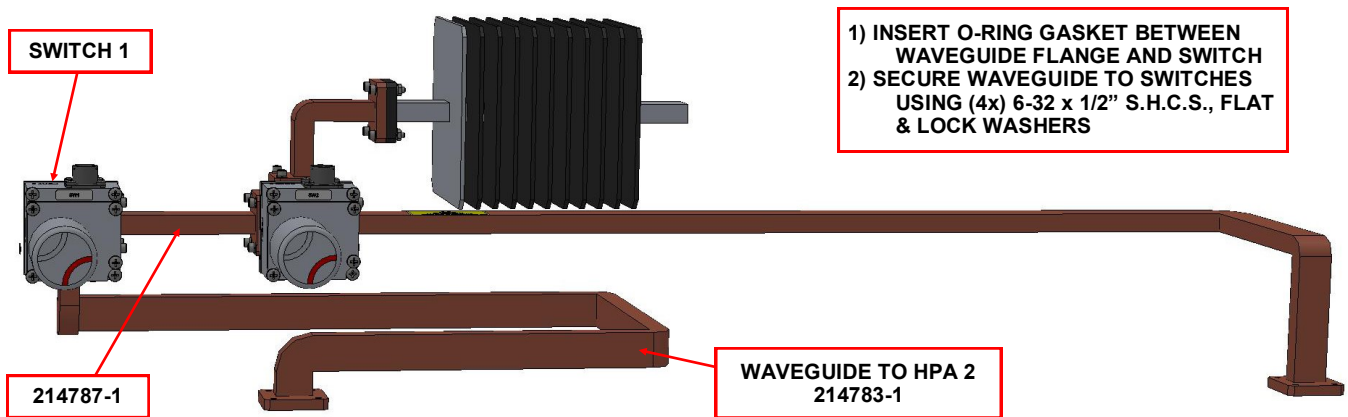


Figure 4-8: Attach W/G Segment 214787-1, SW1 and W/G Segment 214783-1

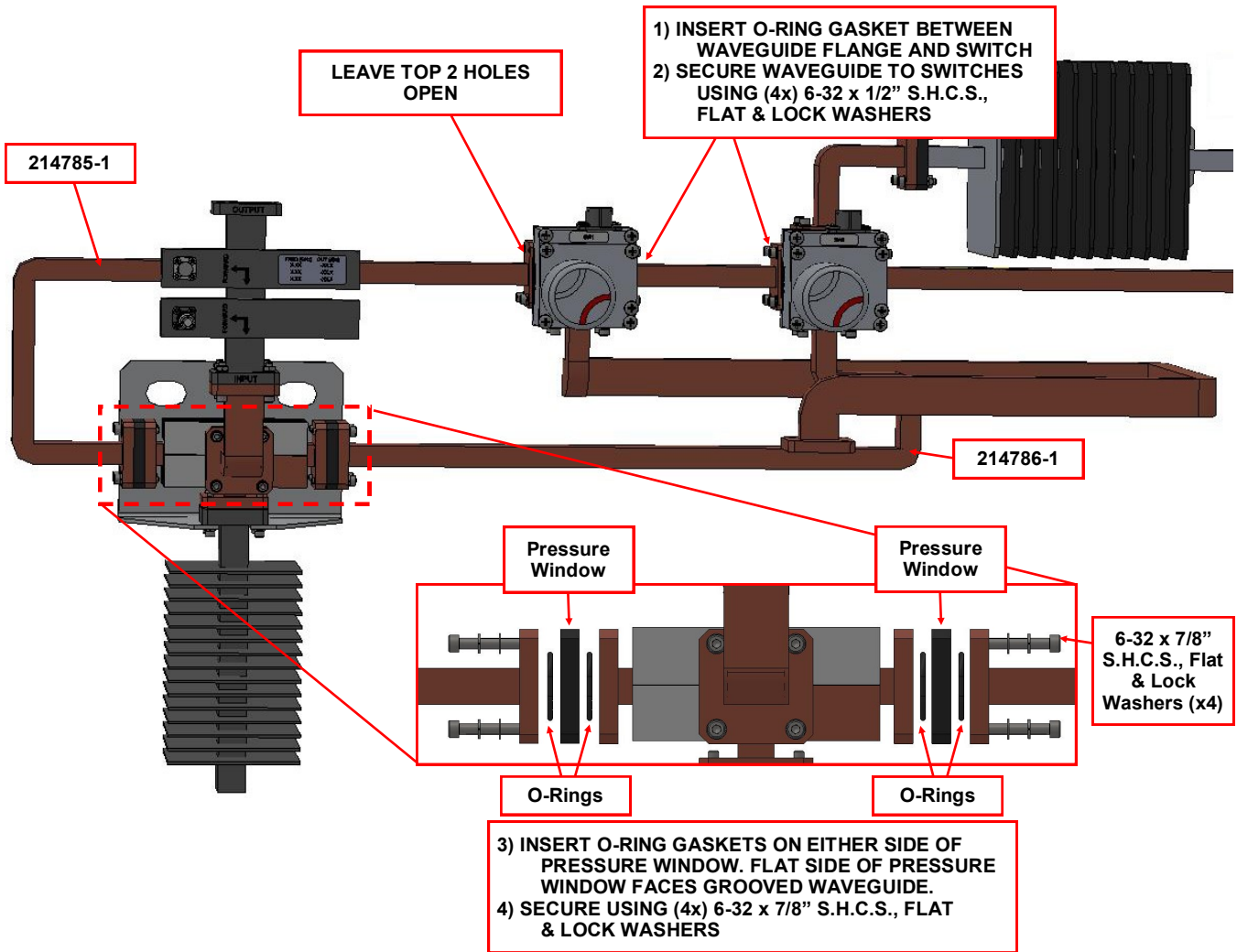


Figure 4-9: Attach W/G Segment 214785-1, Magic Tee and W/G Segment 214786-1

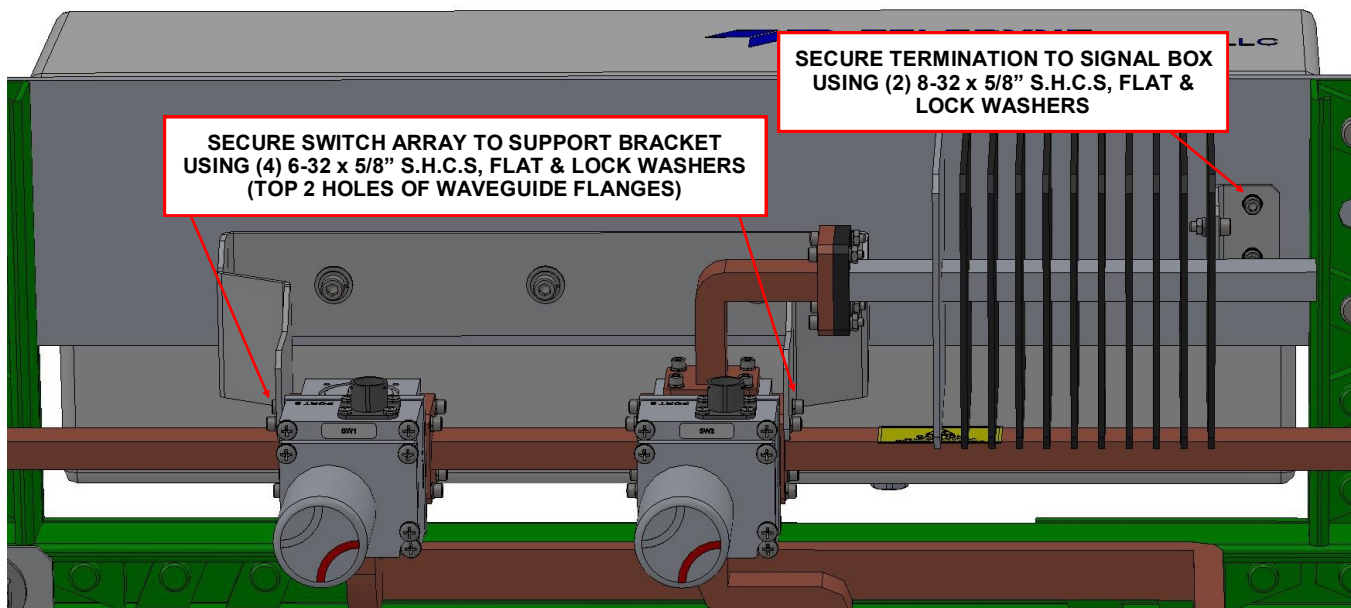


Figure 4-10: Attach W/G Assembly to Signal Box Support Brackets

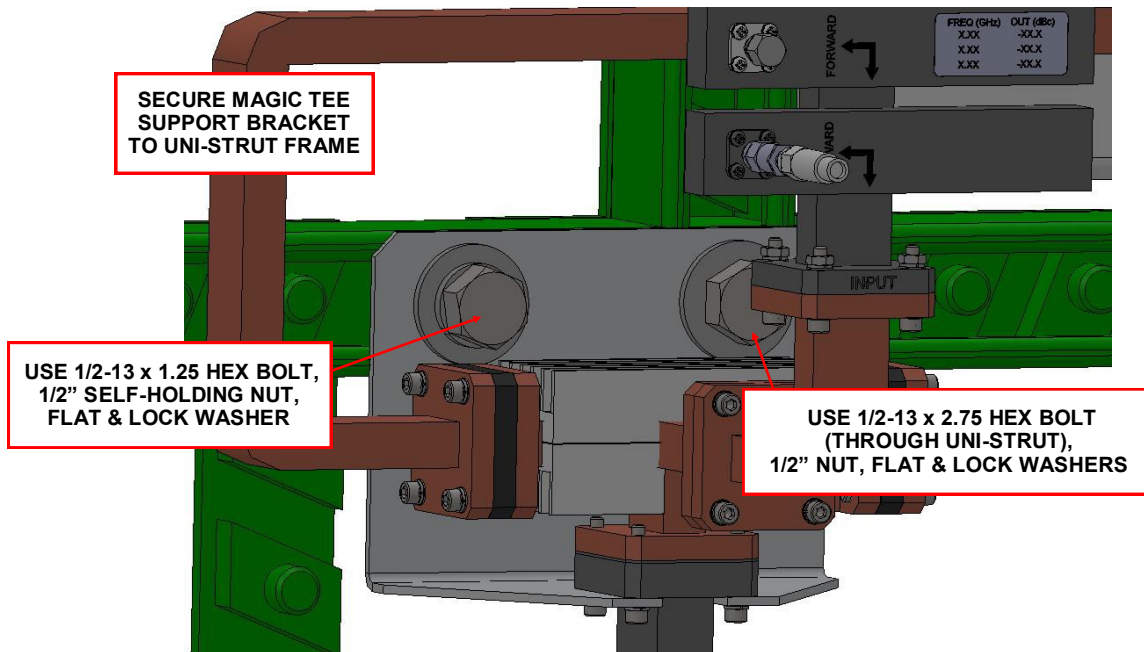


Figure 4-11: Attach Magic Tee Support Bracket to Uni-Strut Frame

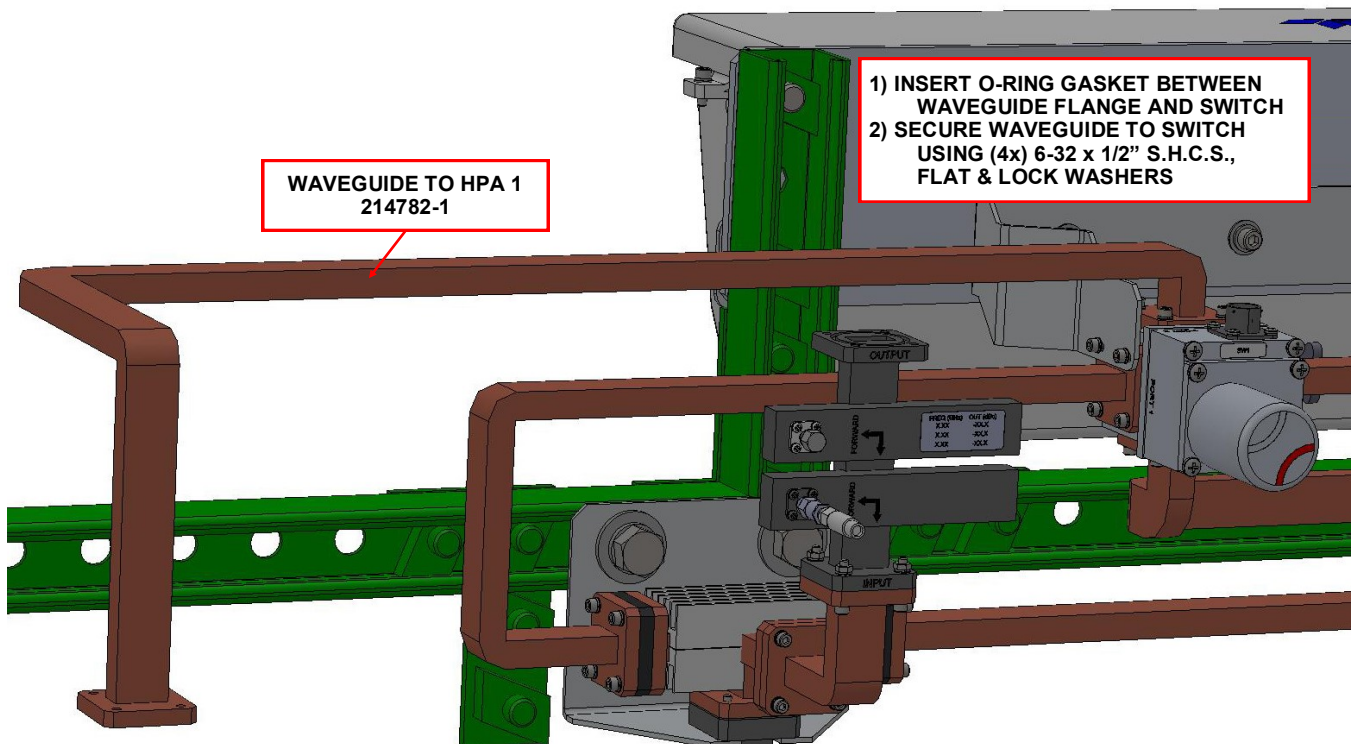


Figure 4-12: Attach W/G Segment 214782-1 to SW1

Insert supplied O-ring gaskets between the RF Output flange of each HPA and the connecting waveguide. See **Figure 4-13**.

Warning: Do not try to force the waveguide to fit to the position of the HPA RF Output flange. Doing so may damage the waveguide. Minor adjustment in the position of the HPAs may be necessary.

Secure the waveguide to the HPA RF Output flanges using (4x) 6-32 x 3/4" socket head cap screws, lock and flat washers, and 6-32 nuts. See **Figure 4-13**.

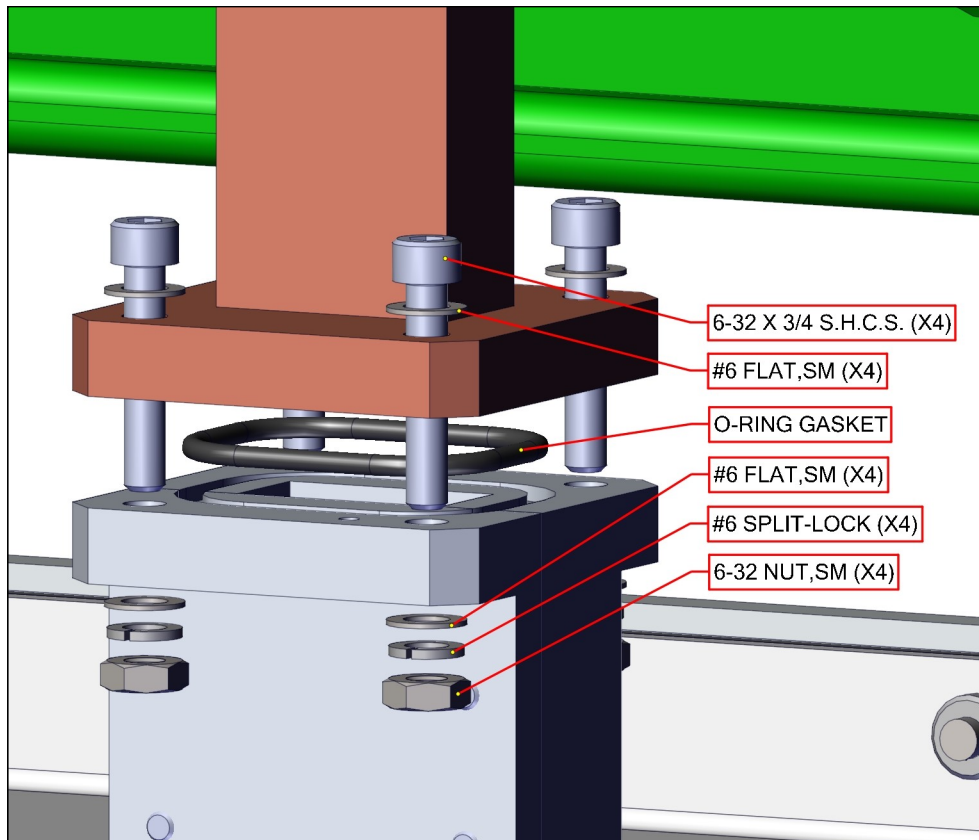


Figure 4-13: Insert O-Ring Gasket at HPA RF Output and Secure Waveguide to Flange

4.6 Installation, Semi-Rigid Coaxial Cables

A series of pre-formed semi-rigid coaxial cables were shipped with the system. Each cable is labeled (W1 through W9) for easy identification. These cables are used to transmit the RF signal to each HPA, and the forward power signal from the crossguide coupler to the signal box. See **Figure 4-14**.

Caution! Do not bend or otherwise alter the shape of the pre-formed semi-rigid coaxial cables. Doing so may damage the cable.

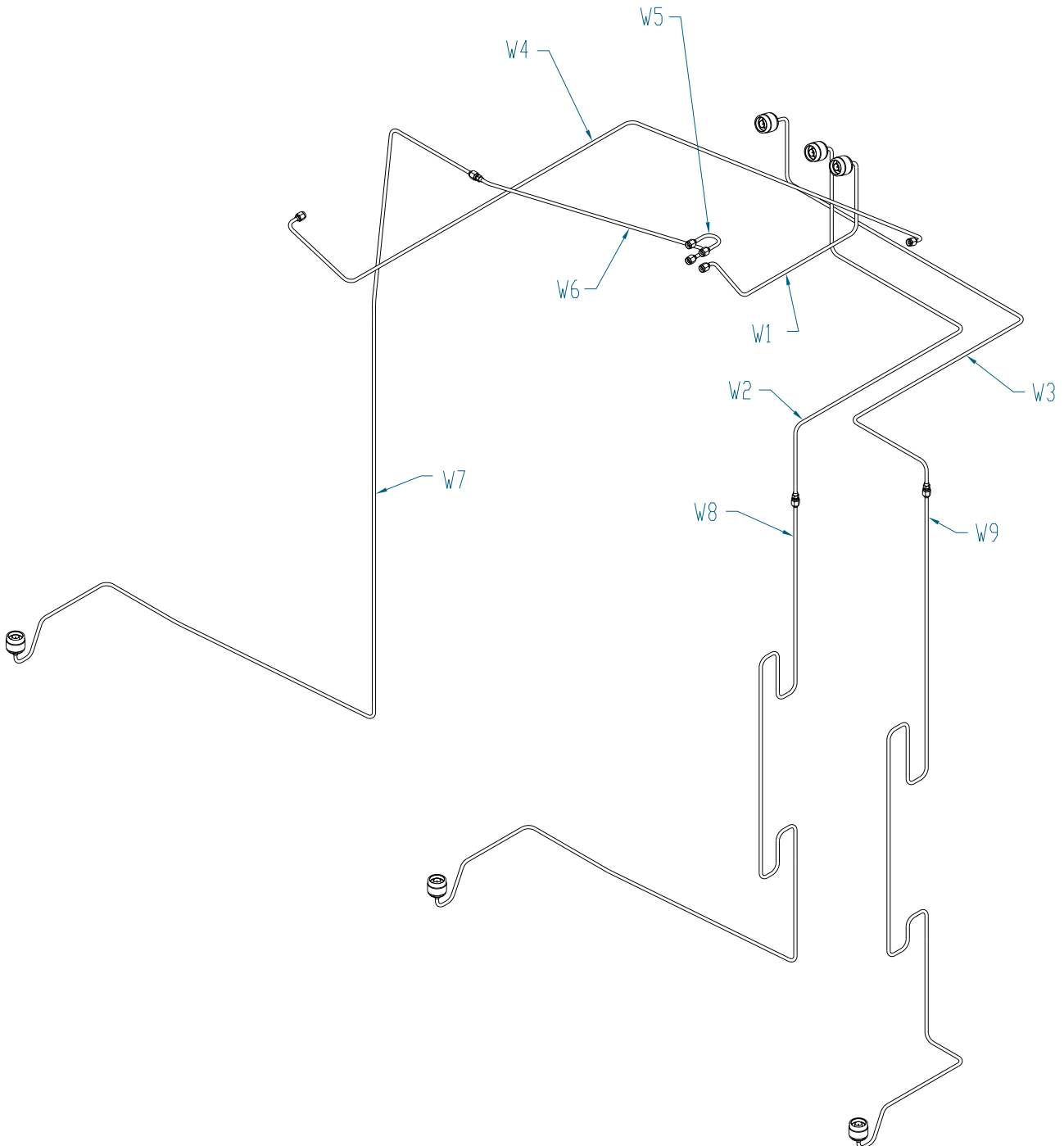


Figure 4-14: Semi-Rigid Coaxial Cables, Ku-Band (typical)

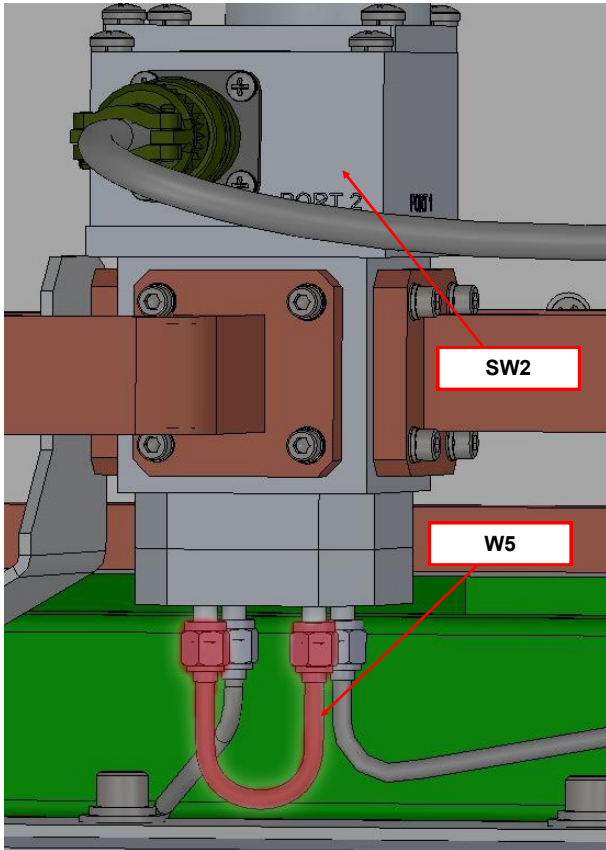


Figure 4-15: Connect W5 to SW2 (shown from top of switch)

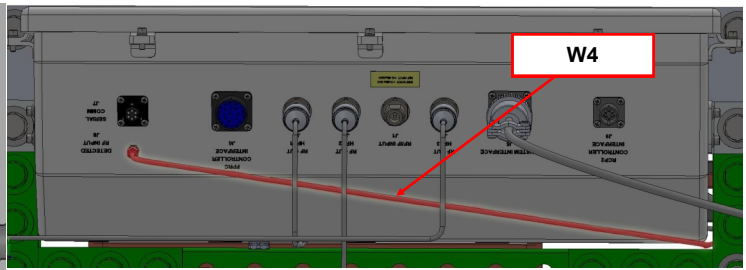


Figure 4-16: Connect W4 to Port J8

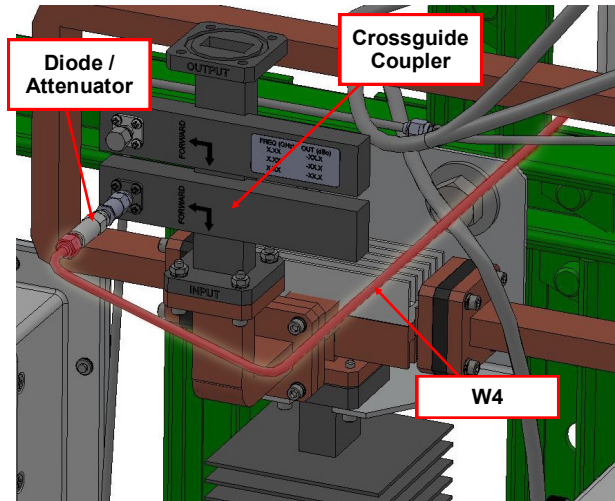


Figure 4-17: Connect W4 to Diode/Attenuator at Crossguide Coupler

1. Locate the short coax cable labeled W5. Connect this cable to the SMA connectors on Switch 2 (SW2) at Port 3 and Port 4. See **Figure 4-15**.
2. Locate the coaxial cable labeled W4. The cable will run across the length of the signal box as shown in **Figure 4-16**. Connect the SMA connector to Port J8 of the signal box. Connect the SMA connector at the opposite end to the detector diode and attenuator at the crossguide coupler at the system output. See **Figure 4-17**.
3. Locate the coaxial cable labeled W1. This cable will run beneath the signal box as shown in **Figure 4-18**. Connect the N-type connector to Port J4 of the signal box. Connect the SMA connector to Port 2 of SW2.
4. Locate the coaxial cables labeled W2 and W8. Connect the N-type connector of W2 to Port J2 (HPA2) of the signal box. This cable will run between the uni-strut frame and the top of HPA2. See **Figure 4-19**, Connect the SMA connector of W2 to the SMA connector of W8. Connect the N-type connector of W8 to the RF Input Port J1 of HPA2.
5. Locate the coaxial cables labeled W3 and W9. Connect the N-type connector of W3 to Port J3 (HPA3) of the signal box. This cable will run across the bottom of the signal box, and bend down between HPA2 and HPA3. See **Figure 4-20**. Connect the SMA connector of W3 to the SMA connector of W9. Connect the N-type connector of W9 to the RF Input Port J1 of HPA3.
6. Locate the coaxial cables labeled W6 and W7. Connect the SMA connector of W6 to Port 1 of Switch 2 (SW2). Connect the SMA connector of W6 to the SMA connector of W7. Connect the N-type connector of W7 to the RF Input Port J1 of HPA1.

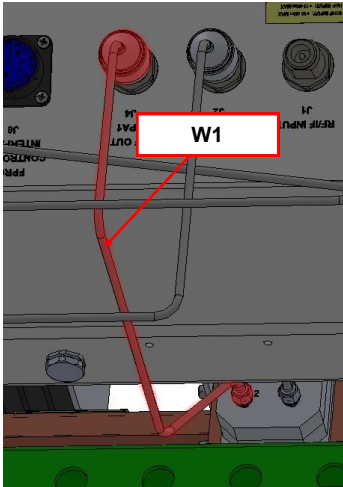


Figure 4-18: Connect W1 to Signal Box J4 (HPA1) and SW2-2

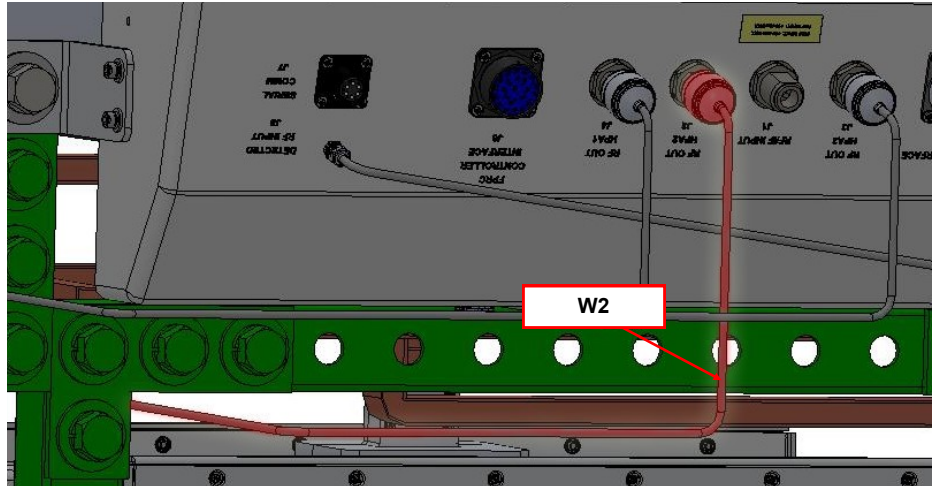


Figure 4-19: Connect W2 to Signal Box Port J2 (HPA2)

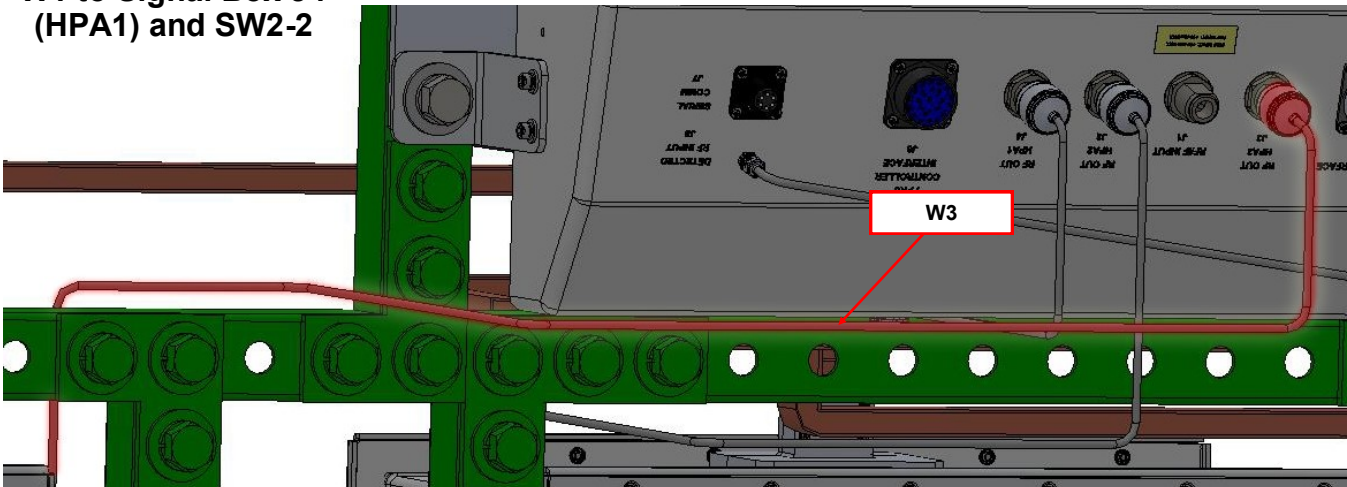


Figure 4-20: Connect W3 to Signal Box Port J3 (HPA3)

Note: Cables W7, W8 and W9 should be secured into the cable grommets connected to the HPA support brackets. One at a time, remove the socket head cap screw to slide the cable through the grommet clamp. Reinsert the socket head cap screw and tighten securely before moving to the next grommet clamp.

Note: Self-amalgamating tape should be used to cover all connector junctions (N-type; SMA) so that no water can creep into the thread between the plug and socket.

4.7 Installation, System Control Cable

The redundant system includes a System Control Cable which needs to be connected to complete the installation. The cable includes labels near each connector that identify to which port the connector should be plugged.

Check the system schematic to verify proper connections.

Note: Self-amalgamating tape or putty should be used to cover all connector junctions (circular MIL, MS-type) from the plug/socket connection to as close as possible to the cable sheath so that no water can creep into the thread between the plug and socket.

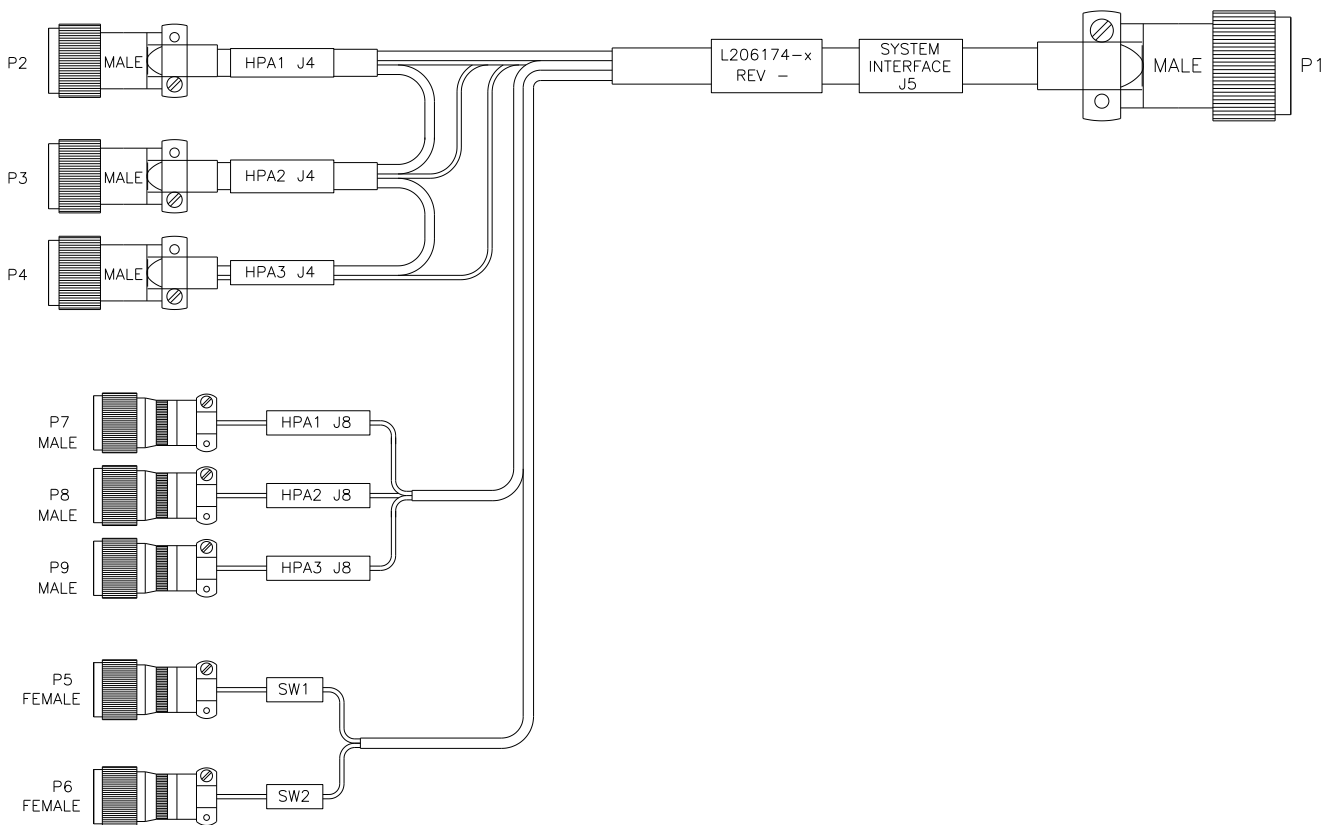


Figure 4-21: System Control Cable

4.8 Installation, 1:2 Phase Combined System Control Cables

The HPA phase combined system is controlled from a separate rack-mountable controller (FPRC-1200).

A control cable (L209372-X) connects between port J7 of the signal box and port J5 of the controller. A separate control cable (L206172-X) connects between port J6 of the signal box and ports J3 and J8 of the controller. See **Figure 4-22**.

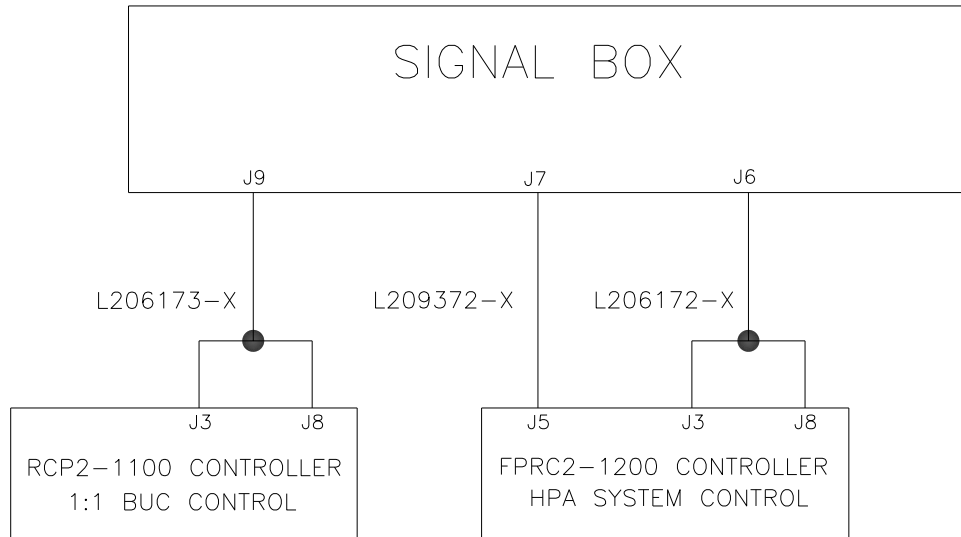


Figure 4-22: Block Diagram, Connections for 1:1 BUC Control Cable and 1:2 HPA System Control Cable

Control of the 1:2 Phase Combined System is described in the Redundant System Controller manual, document number **209351**.

Note: Self-amalgamating tape or putty should be used to cover all outdoor connector junctions (circular MIL, MS-type) from the plug/socket connection to as close as possible to the cable sheath so that no water can creep into the thread between the plug and socket.

4.9 Installation, 1:1 BUC Control Cable (Optional)

For systems with L-Band input, the signal box houses a 1:1 redundant block up converter system which is controlled from a separate rack-mountable controller (RCP2-1100).

A control cable (L206173-X) is supplied which connects between port J9 of the signal box and ports J3 and J8 of the controller. See **Figure 4-22**.

Control of the 1:1 BUC System is described in the Redundant System Controller manual, document number **209351**.