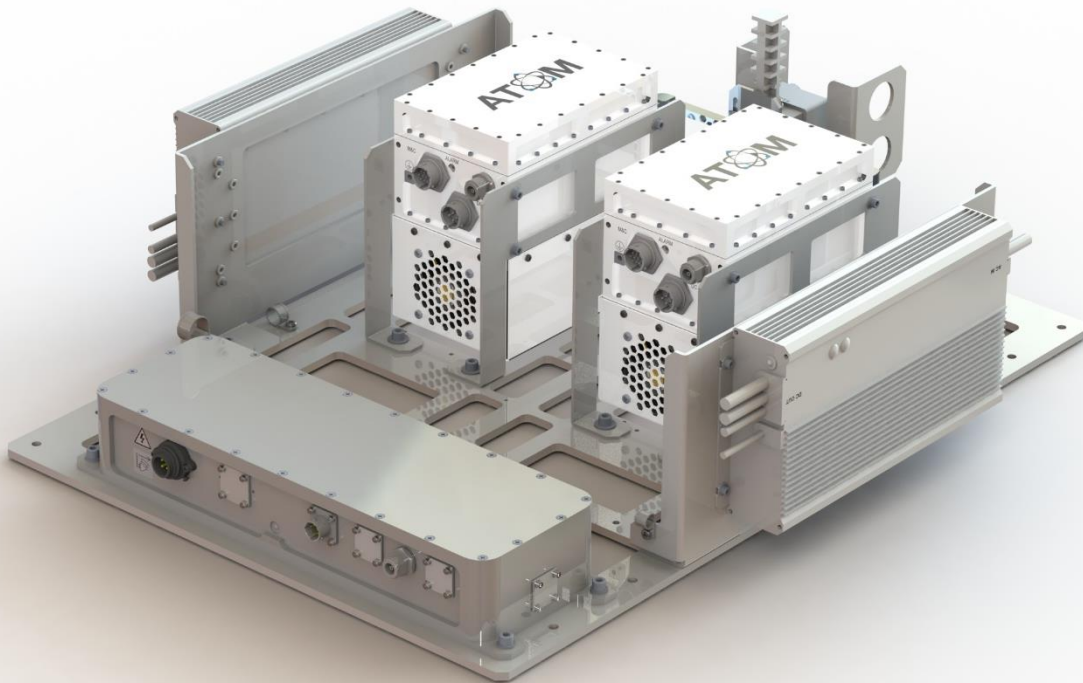# USER MANUAL

BUC Redundant Switch

TABLE OF CONTENTS

Acronyms

AC	Alternating Current
CI	Control Interface
ETH	Ethernet
IDU	Indoor Unit
IFL	Interfacility Link
BUC	Block Upconverter
ODU	Outdoor Unit
REF	For Reference Only
RF	Radio Frequency
RSW	Redundant Switch System
SNMP	Simple Network Management Protocol
WG	Waveguide

Safety

|	
Warning 	**Changes or Modifications to Equipment** Changes or modifications to this equipment, not expressly approved by the manufacturer, could void the user's authority to operate the equipment.
Warning 	**Accessories and Devices** Use of non-approved accessories or devices may lead to a degradation in performance, damage to equipment, or potential hazards.
Warning 	**AC Power** This device uses AC power. Proper grounding of equipment is necessary for safety purposes.

1. BUC Redundant Switch System Overview

1.1 Operation

The BUC Redundant Switch system (RSW) provides BUC redundancy by automatically switching to a backup BUC in the event of a BUC failure. During normal operation, there is one Active BUC and one Standby BUC which are both monitored continuously. BUC health monitoring is accomplished by watching the BUC active power consumption. If the active BUC falls outside of a specified window, the RSW automatically switches to the backup BUC.

1.2 System

1.2.1 Headless Operation (ODU Only)

The RSW is headless, meaning that it can be operated without the use of an Indoor Unit (IDU). All monitoring and control (M&C) can be performed over Ethernet using the Web Interface or via SNMP. The Outdoor Unit (ODU) contains all control circuitry and is connected to the user's system through the Interfacility Link (IFL).
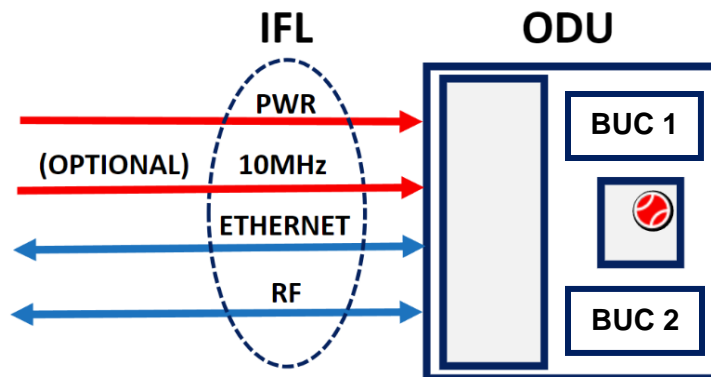
1.2.2 System with Optional IDU

The Indoor Unit (IDU) is an optional add-on which allows a user to interface with the ODU via its built in LCD panel and buttons. The IDU provides a 1U server rack with an M&C interface and has configurable alarms in the event of an ODU fault.

DOC-002374_rD - BUC RSW User Manual.docx
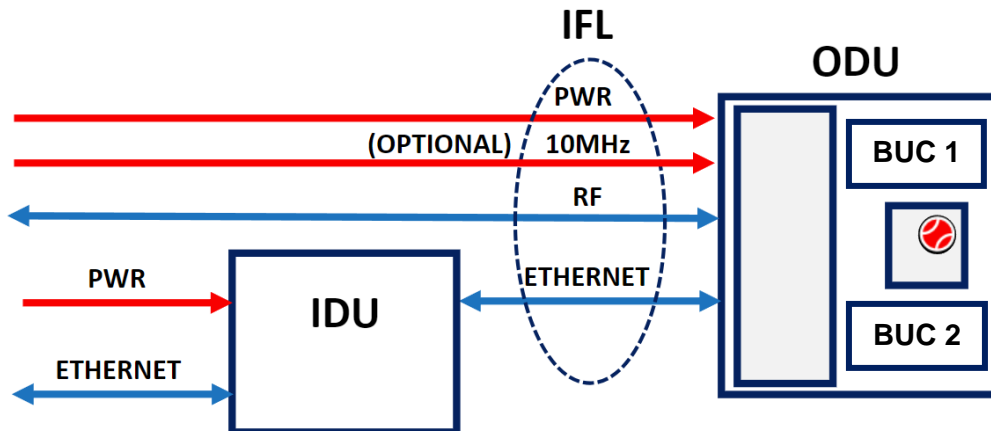
2. Getting Started

This section will outline the RSW installation and setup.

2.1 Warnings

⚠ If the RSW is configured for AC power, before powering on the unit, make sure that the system is properly grounded. This is required for safety purposes.

⚠ Do not open the ODU controller box lid while the system is powered on.

⚠ Inspect all cables for damage prior to connecting them to the system.

2.2 ODU Interface

The interface for ODU connectors is detailed in this section.

J1
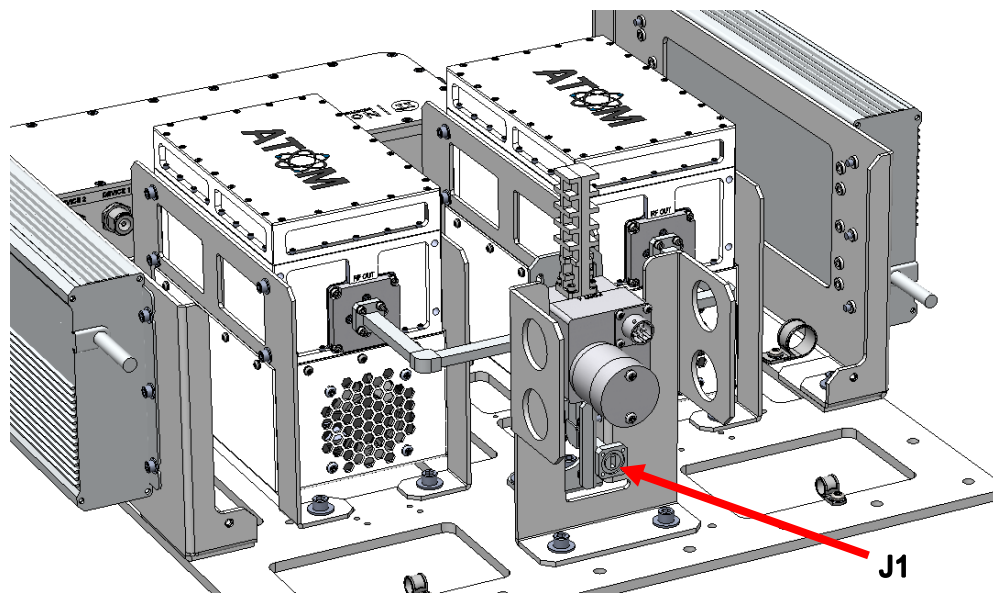
(Rear side of 50W Ka GaN shown for reference)
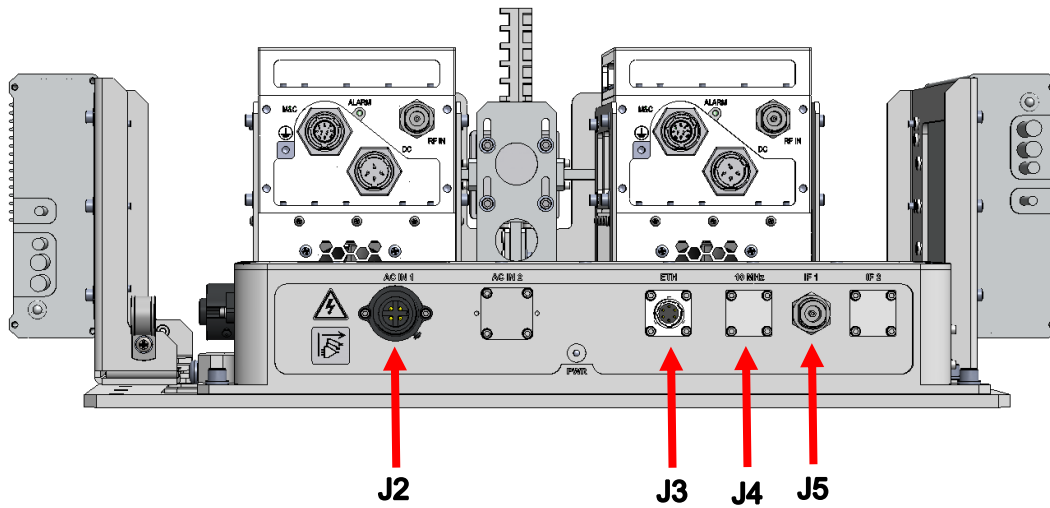
(Front Side of ODU)
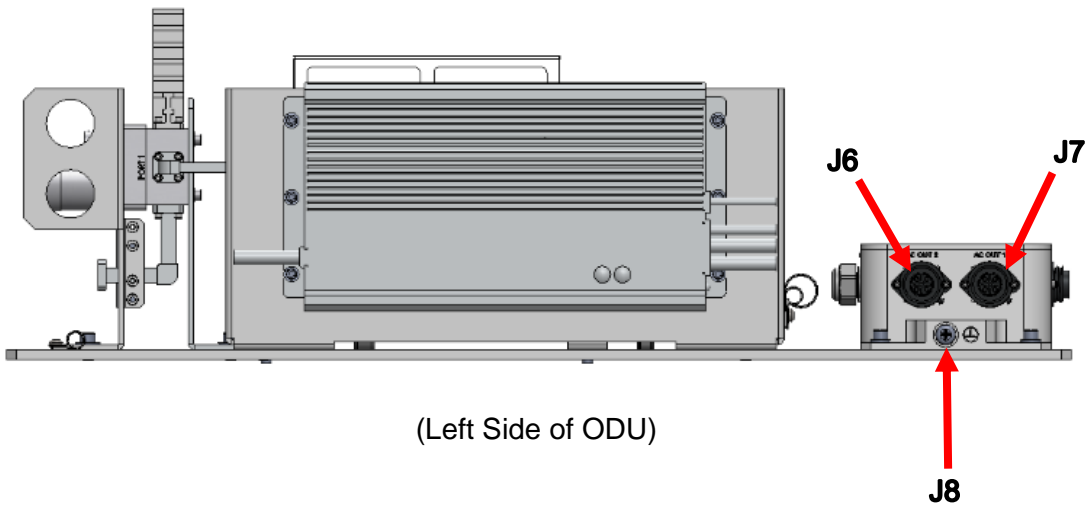
(Left Side of ODU)
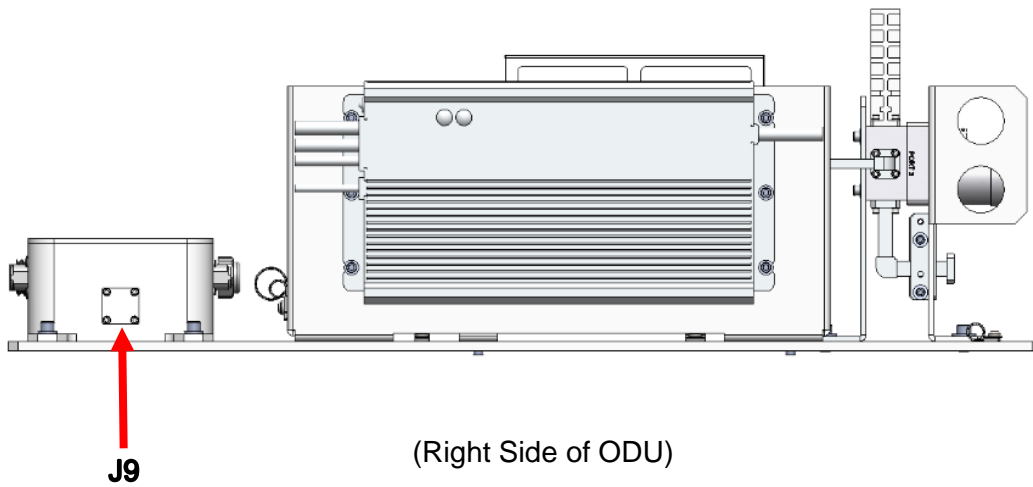
(Right Side of ODU)

- **J1**: Waveguide RF Input
  - Ku-Band option has WR75 grooved with 6-32 ⤓ 0.25" tapped holes.
  - Ka-Band option has WR42 grooved with 4-40 ⤓ 0.20" tapped holes.

- **J2**: "AC IN 1" Power Connector
  - Amphenol PN C016 20C003 200 12 (or equivalent).
  - Pin Out:
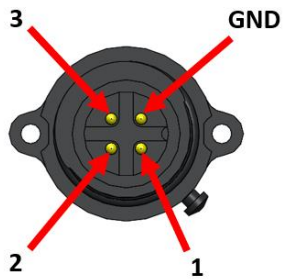
Connector Pin	Signals
1	AC HOT
2	-
3	AC NEU
4	GND

- **J3**: "ETH"
  - Amphenol PN PT02E-10-6P (023) (or equivalent).
  - Pin Out:
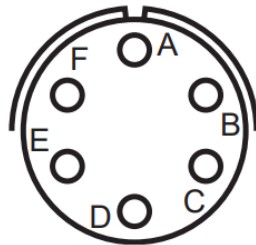
Connector Pin	Signals
A	ETH Tx-
B	ETH Tx+
C	Open
D	ETH Rx+
E	GND
F	ETH Rx-

- **J4:** "10MHz" Injection (Optional)
  - SMA Female Bulkhead.

- **J5**: "IF IN"
  - N-connector option has N-connector.

- **J6: "**AC OUT 2"
  - Amphenol PN C016 20C003 200 12 (or equivalent).
  - Pin Out:
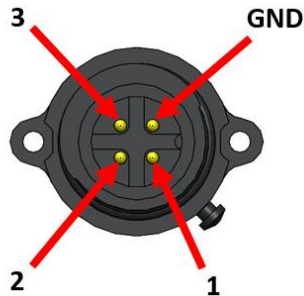
Connector Pin	Signals
1	AC HOT
2	-
3	AC NEU
4	GND

- **J7:** "AC OUT 1"
  - Same as "AC OUT 2"

- **J8**: Grounding Screw
  - 1x 1/4-20 x 1/2" long pan head screw and 2x external tooth lock washers provided with the ODU system.

- **J9**: Reset Button (covered)
  - Refer to Section 3.6 for more details.

2.3 Baseplate Installation

2.3.1 Baseplate installation

Refer to the diagram below for the location of all mounting holes on the redundant switch baseplate. Depending on the redundant switch configuration, some holes may be inaccessible.
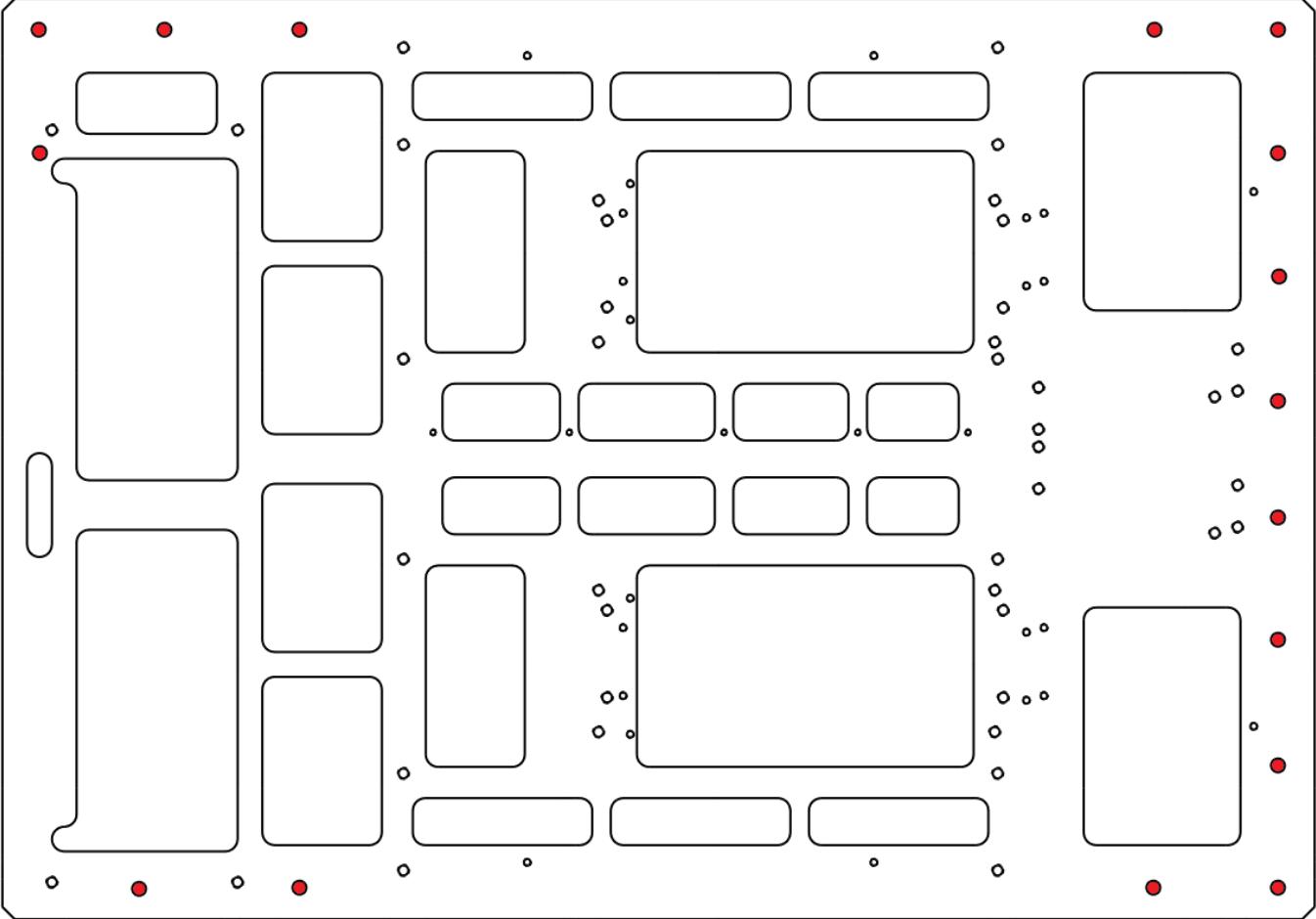
Purpose	Indicator	Quantity	Specification
Mounting baseplate	Highlighted in Red	16	Ø 0.281" Through Hole

NOTE: Use medium strength thread locker when installing the baseplate.

2.4 IFL Installation

This section covers the steps to install the IFL to the ODU.

The IFL consists of:

- 1 x Power cable
- 1 x Ethernet cable
- 1 x RF Cable
- 1 x 10 MHz Signal Cable (optional, for 10MHz Injection option only)

Each power cable requires a power plug corresponding with the region it will be installed in.

1. Attach the RF cable to the "IF IN" connector as shown below. Connect the other end of the RF cable to a modem transmitting port.

2. Attach the AC power cable (male) to the power plug adapter.

3. Attach the AC power cable (female) to the "AC IN" connector (male) on the ODU. Ensure that the cable is threaded onto the connector.

4. Attach the Ethernet cable (Amphenol circular connector end) to the "ETH" connector as shown below. Connect the other end to an RJ45 port OR the RJ45 port on the IDU (labeled "ODU").

5. Power on the system by connecting the power cable to an AC power source.
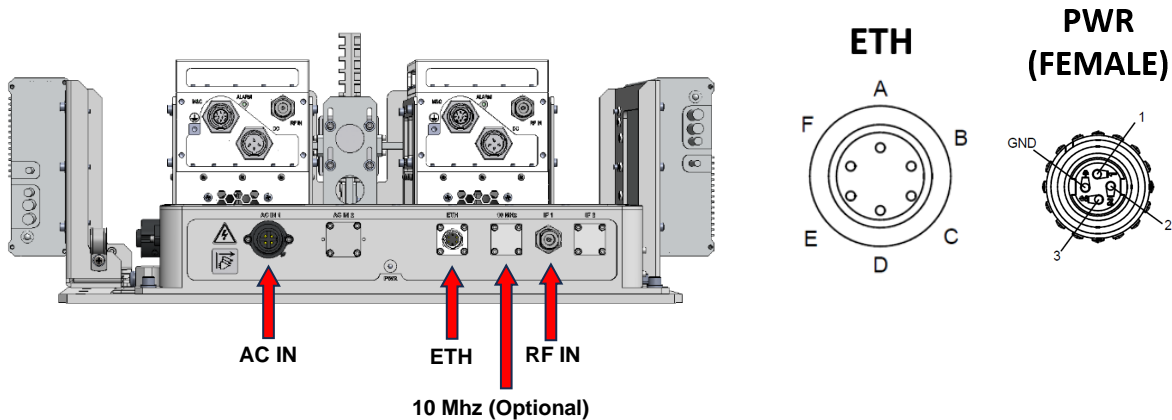
2.5 IDU Installation (Optional)

This section outlines the steps to install the IDU.

1. Use appropriate fasteners (not included with IDU) to mount the IDU to a 1RU rack.
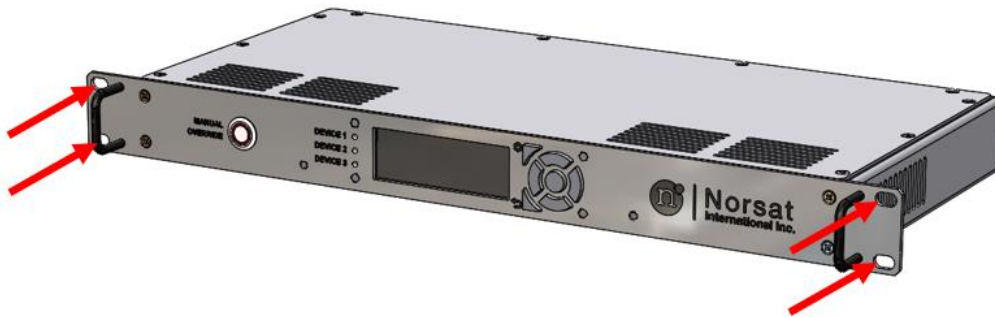
2. Connect the Ethernet RJ-45 connector from the IFL to the ETH "ODU" port.

ETH IDU
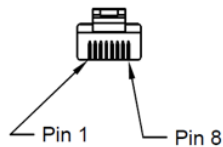
3. (Optional) Connect the Network port to any external network connection (cable not included).

4. Connect the AC IN port to the IDU power cable.

5. Power on the system.

2.6 Safety Ground

A safety ground connection point is provided on the ODU and IDU. If the AC power input has no earth ground, it is strongly recommended to connect one at the ODU grounding point and IDU grounding point (if applicable). The grounding point locations are shown below.
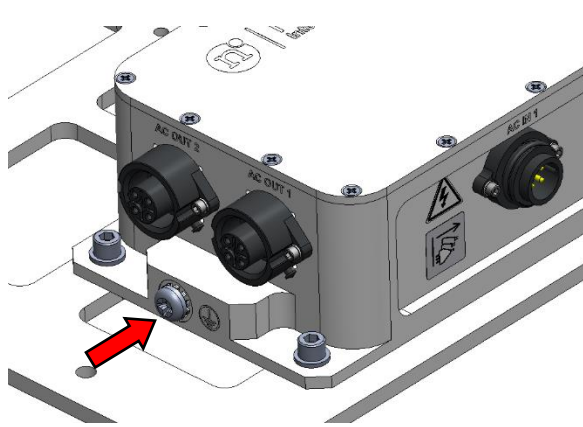
ODU Grounding Point
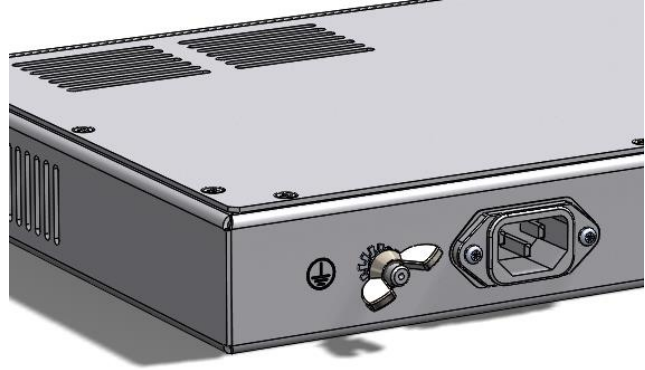
IDU Grounding Point
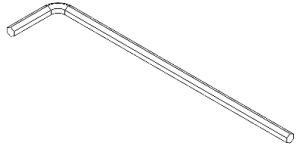
2.7 BUCs Replacement

The RSW ODU System is pre-assembled with BUCs. This section provides instructions for replacing a BUC within the RSW BUC system.

2.7.1 For 25/50W Ka GaN, 20/40W Ku GaAs, and 80W Ku GaN

BUC installation for Ku-Band and Ka-Band components are identical. Different sized fasteners are provided.

The following components are required (not included with the mounting kit):

Component 1 (Hex Key)		**Component 2** (Loctite)
25W Ka GaN	7/64", 9/64'' and 1/4''	
50W Ka GaN	7/64", 5/32'' and 1/4''	
80W Ku GaN	9/64" and 5/32''	

Note the interfaces shown below:
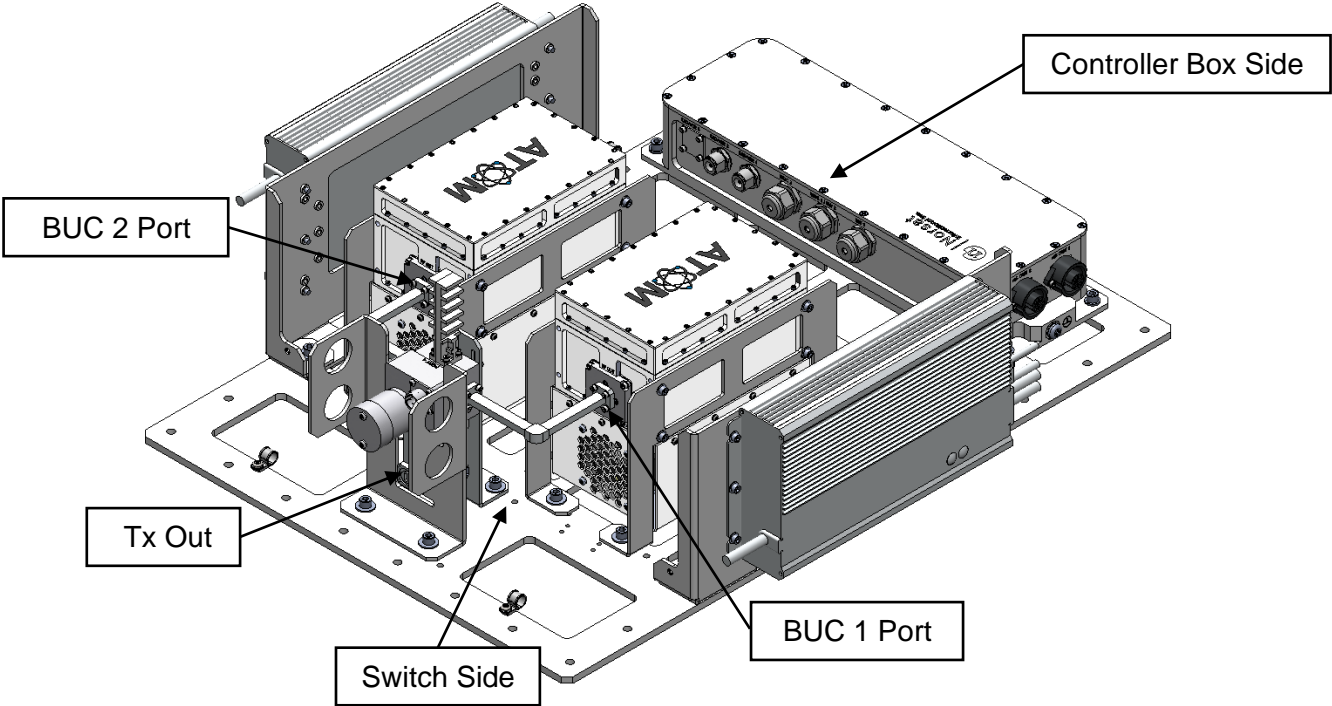
(50W Ka GaN BUC RSW ODU is shown here for reference)

Perform the following steps for BUC 1 and BUC 2 interfaces:

1. Disconnect DC Power Cable, M&C Cable, and RF Cable from the BUC side.
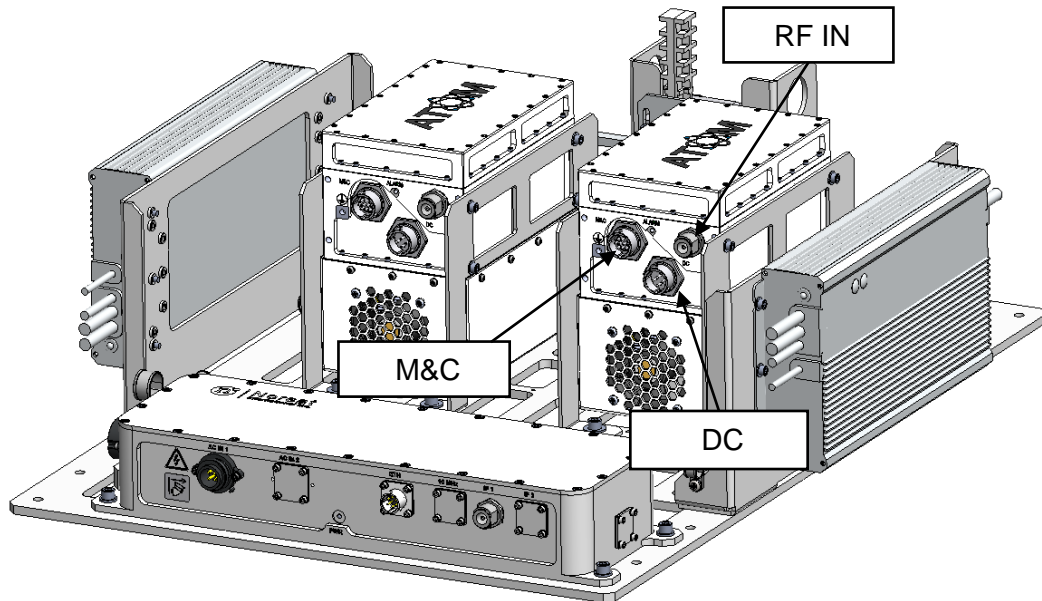
(50W Ka GaN BUC RSW ODU is shown here for reference)

2. Unscrew all screws on RF OUT Port from the BUC.
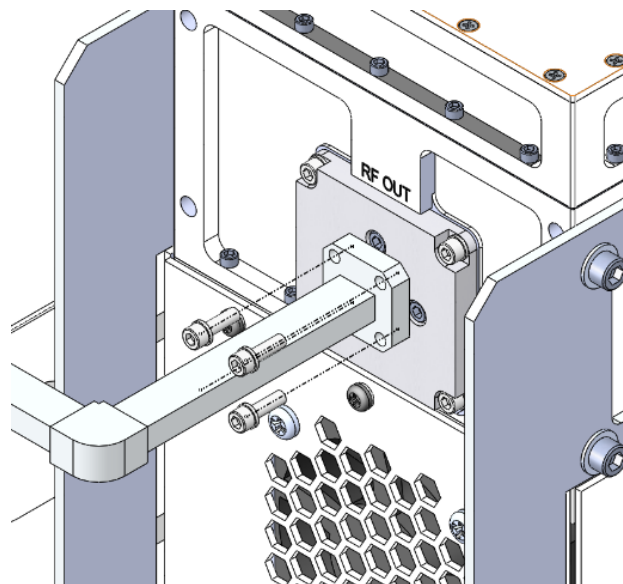
(50W Ka BUC is shown here for reference)

3. Unscrew all mounting screws from the baseplate and mark the location of the screw holes.
    NOTE: For both switch side and controller box side.
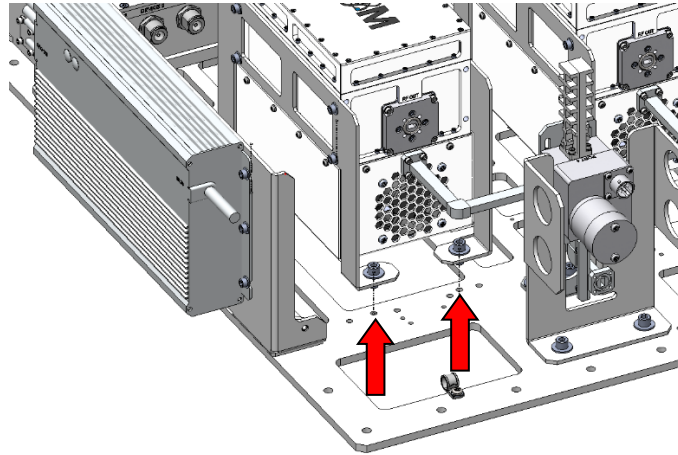
(Switch Side of view is shown here for reference)

4. Unscrew all screws on the BUC Bracket and take the original BUC out.
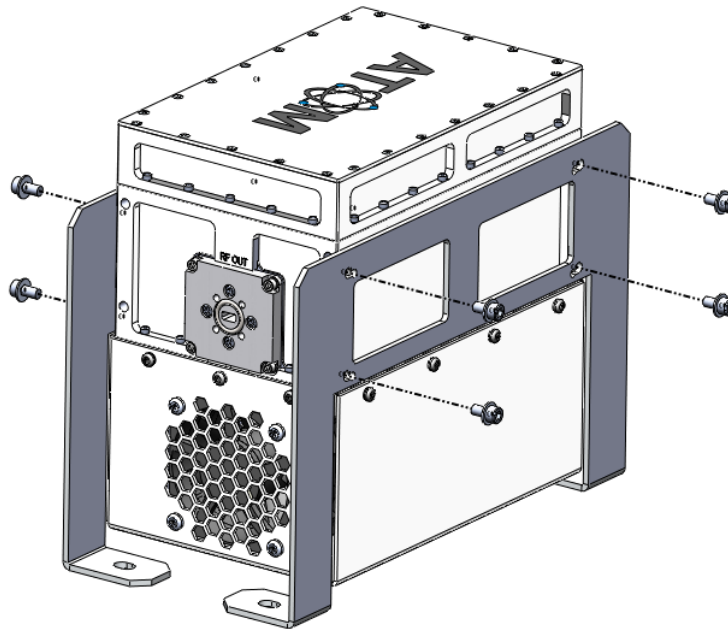
(50W Ka GaN BUC is shown here for reference)

5. On the thread of original screws, apply two to three drops of Component 2.

Component 2

(REF)

Original Screws

6. Install the new BUC into the BUC Bracket with the original fasteners.
NOTE: If the model of the new BUC is different with the original one, it may require different fasteners.
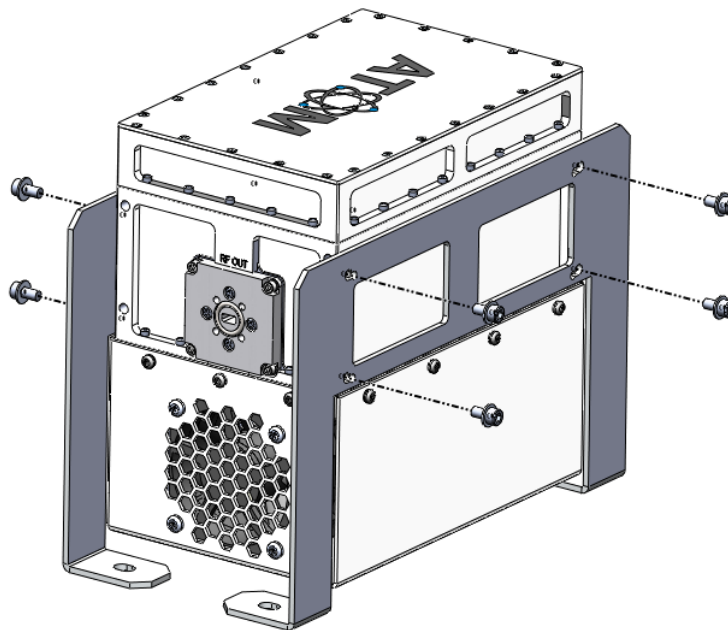
(50W Ku GaN BUC is shown here for reference)

7. Reattach all screws on the RF OUT Port to the BUC.
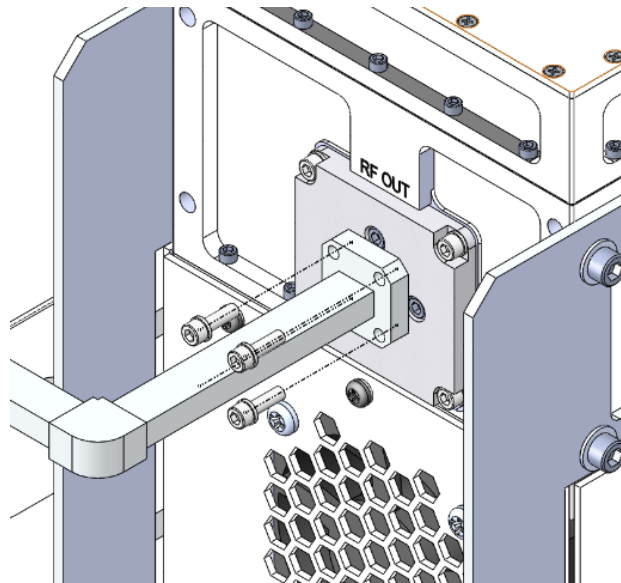
(50W Ka BUC is shown here for reference)

8. Secure the BUC Bracket on the baseplate with the original fasteners removed in step 3.
   NOTE: For both switch side and controller box side.
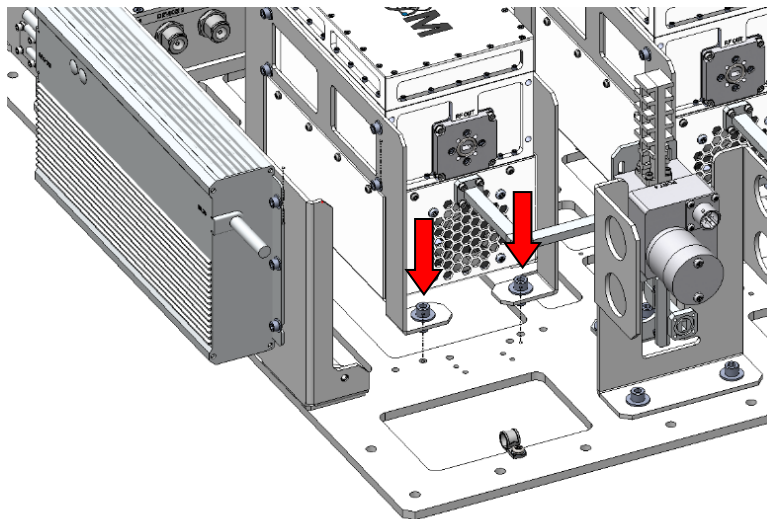
(Switch Side of view is shown here for reference)

9. Reconnect all cables disconnected in step 1 to the BUC side: DC Power Cable, M&C Cable, and RF Cable.

2.7.2 For 80W Ku GaAs

The following components are required (not included with the mounting kit):

Component 1 (Hex Key)	**Component 2** (Loctite)
9/64'' and 1/4''	

Note the interfaces shown below:


BUC 2 Port

Controller Box Side

Switch Side

Tx Out

BUC 1 Port
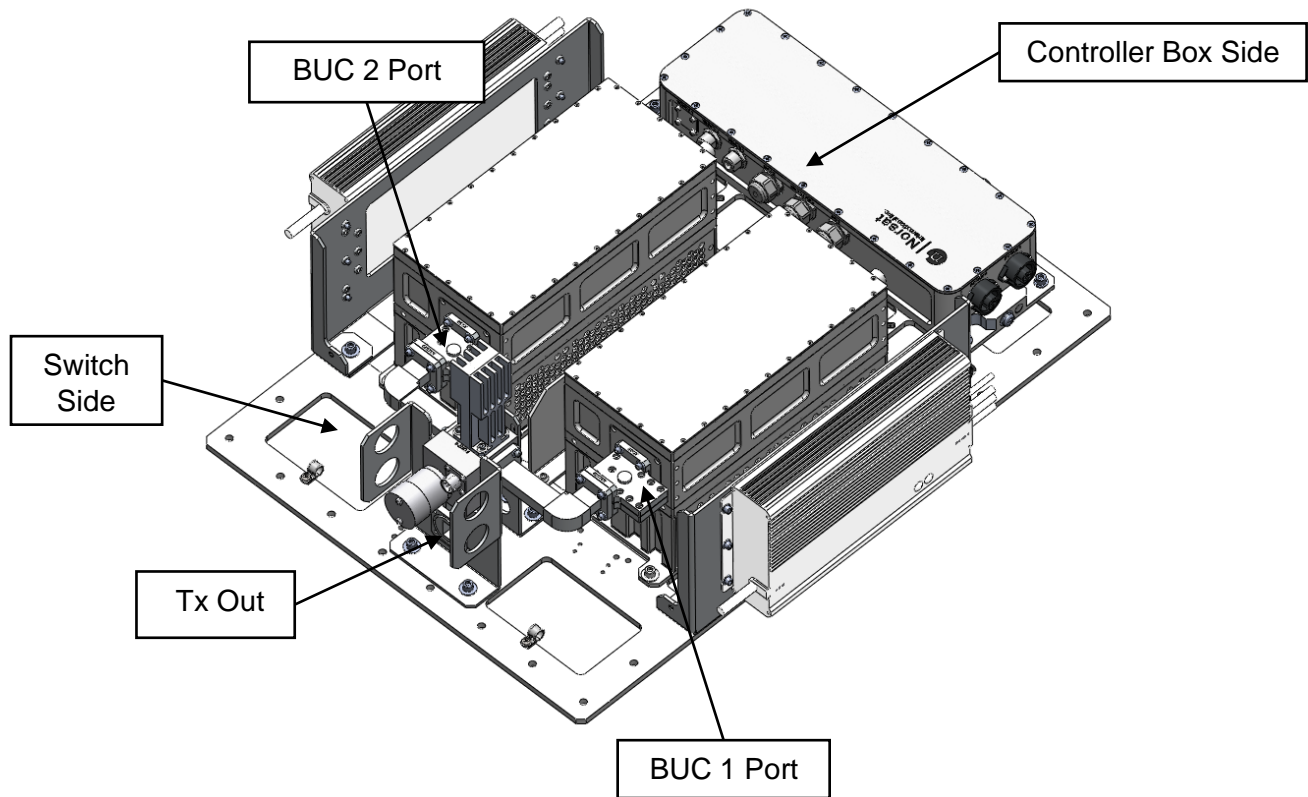
Repeat the following steps for BUC 1 and BUC 2 interfaces:

1. Disconnect DC Power Cable, M&C Cable, and RF Cable from BUC side.
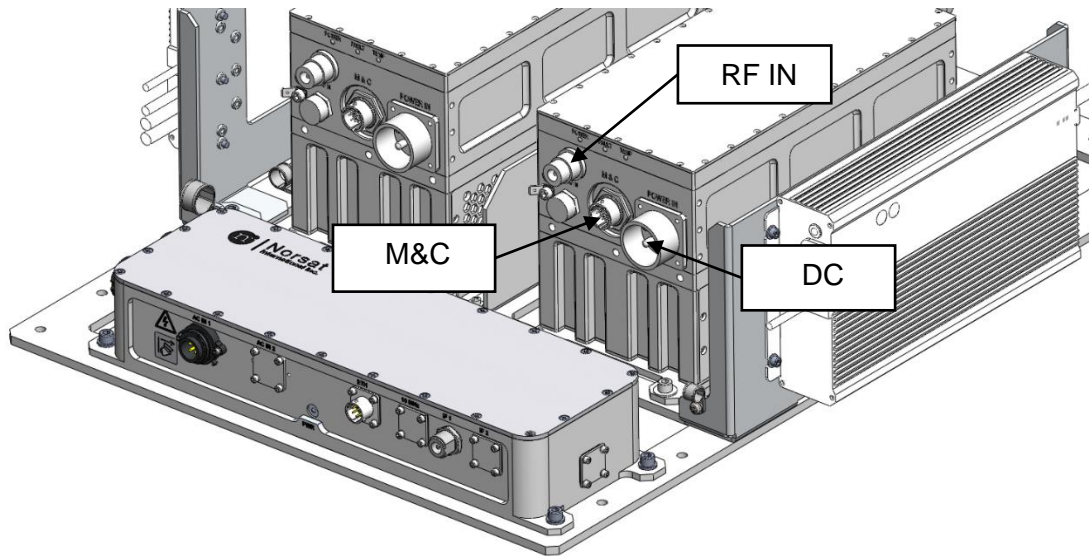
2. Unscrew all screws on RF OUT Port from the BUC.
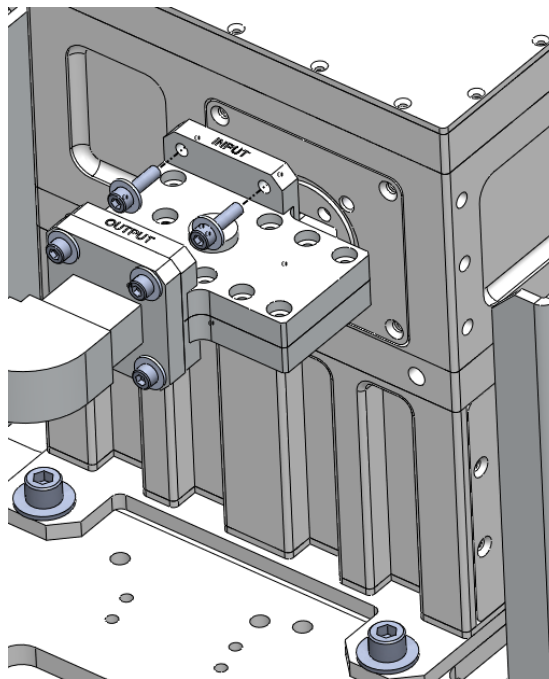
3. Unscrew all mounting screws from the Baseplate and mark the location of the screw holes.
    NOTE: For both switch side and controller box side
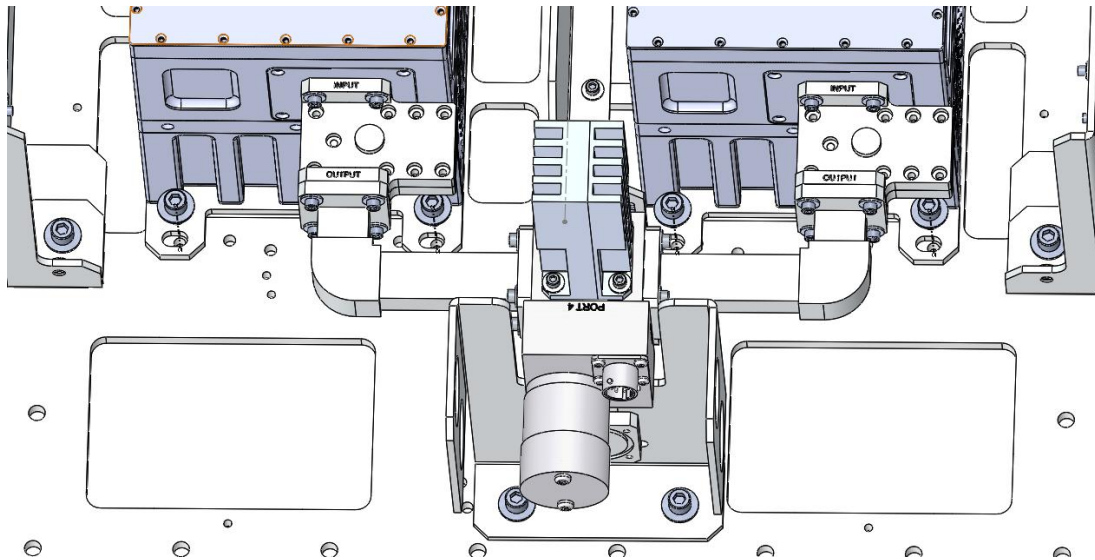
(Switch Side of view is shown here for reference)

4. Unscrew all screws from the BUC Mounting Plates.
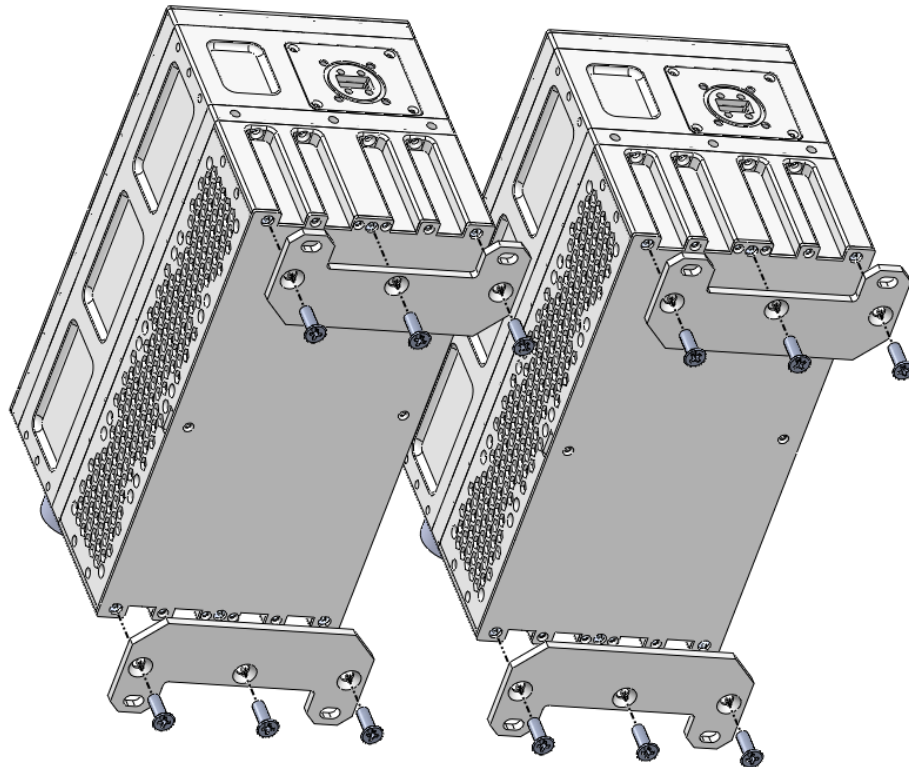
5. On the thread of original screws, apply two to three drops of Component 2.

Component 2

(REF)
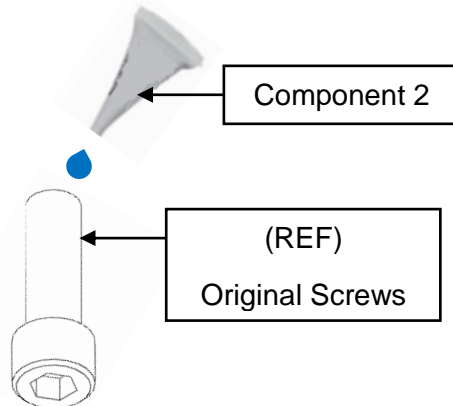
Original Screws

6. Install the new BUC on the BUC Mounting Plates with the original fasteners.
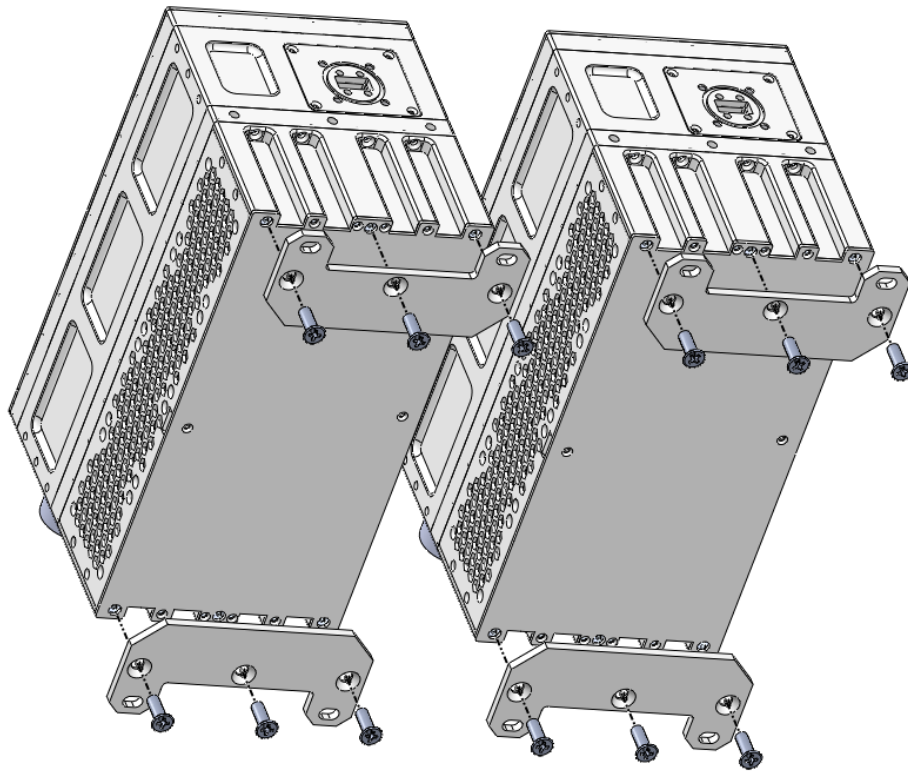
7. Reattach all screws on RF OUT Port to the BUC.
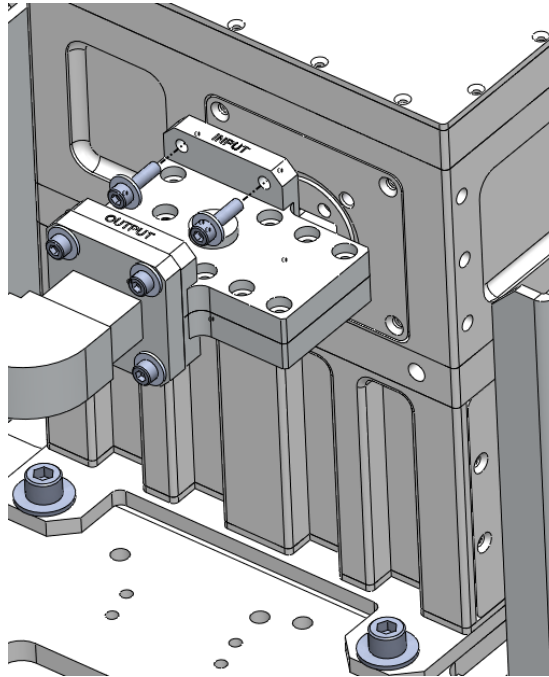
8. Secure the BUC Mounting Plates to the Baseplate with the original fasteners.
NOTE: For both switch side and controller box side.
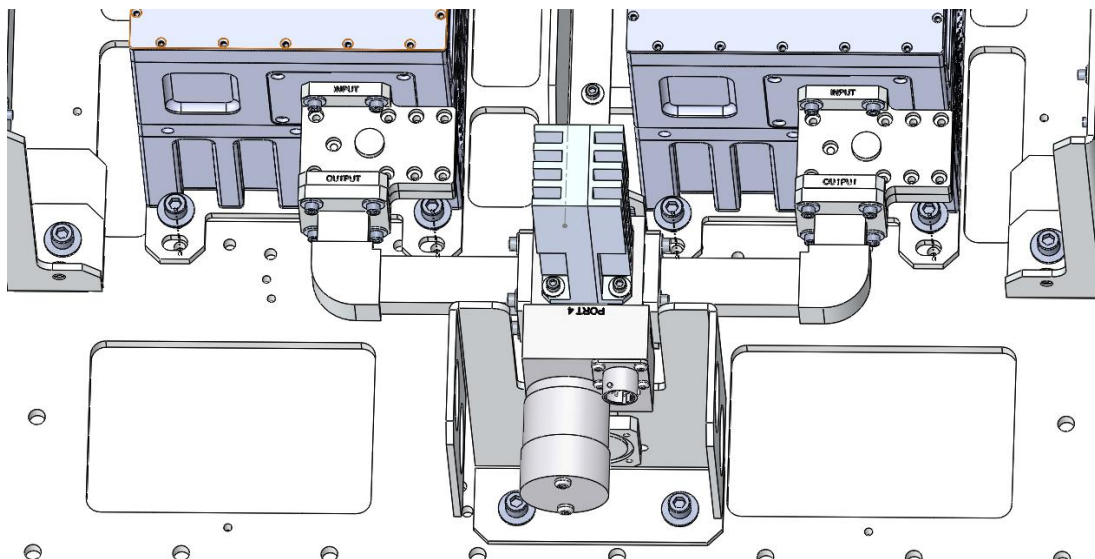
(Switch Side of view is shown here for reference)

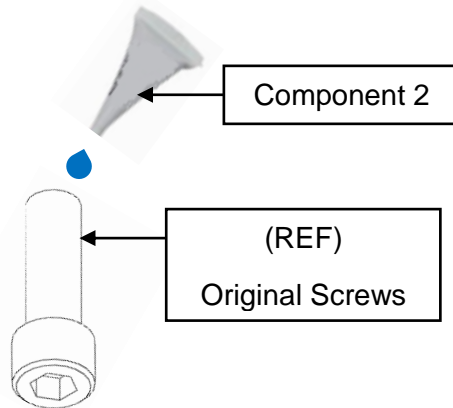10. Reconnect all cables disconnected in step 1 to the BUC side: DC Power Cable, M&C Cable, and RF Cable.

3. ODU Monitoring and Control

3.1 Fault Monitoring

The RSW monitors the status of all BUCs. The ODU communicates with the BUCs through the M&C cables and reports any faults to the ODU. **Not all Norsat BUCs have the same fault detection. Please refer to the user manual of the equipped BUCs to verify which faults the BUCs can detect.**

The RSW can detect a Gain Fault based on the gain thresholds listed below. These limits are user configurable through the Web Interface, SNMP, or the IDU. **It is the user's responsibility to optimize these thresholds based on the application.**

Upper Limit: If the gain rises above this value, an over gain fault will be triggered.

Upper Warning: If the current rises above this value, an over gain warning will be triggered.

Lower Warning: If the current falls below this value, an under gain warning will be triggered.

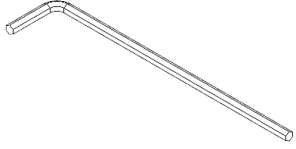**Lower Limit:** If the current falls below this value, an under gain fault will be triggered.
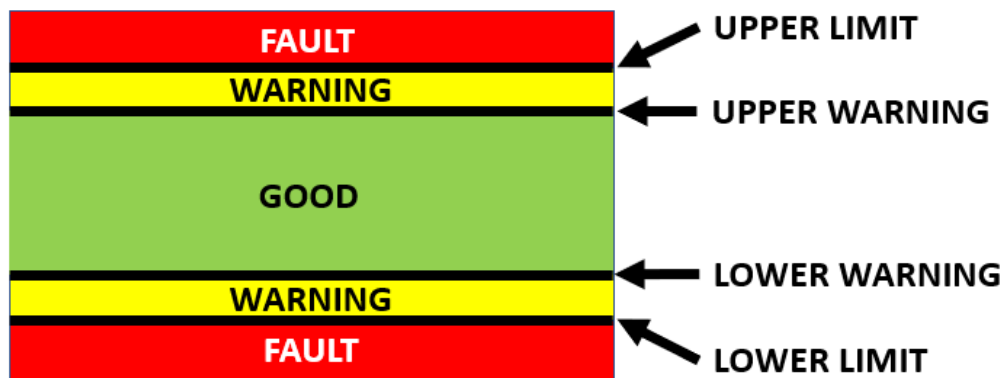
3.2 ODU Settings

3.2.1 Automatic Mode

While the Manual Override is disabled, the RSW will run in **Automatic Mode**. While in Automatic Mode, the RSW automatically switches from the Active BUC to the Standby BUC if there is a fault present on the Active BUC. The table below summarizes the RSW actions based on the fault status while in Automatic Mode.

STATE	ACTION
Fault on active device	RSW will automatically switch to standby BUC if there are no faults present on the standby device
Fault on standby device	No action taken
Fault on both devices	No action taken
Manual switch to standby device	RSW will switch to the standby BUC if there are no faults present on the standby device.

3.2.2 Manual Override Mode

While the Manual Override is enabled, the RSW will run in **Manual Override Mode.** In this mode, the RSW does not take any action based on the fault state of the BUCs. This mode allows the user to select what BUC is active without restrictions. The table below summarizes the RSW actions based on the fault status while in Manual Override Mode.

STATE	ACTION
Fault on active device	No action taken
Fault on standby device	No action taken
Fault on both devices	No action taken
Manual switch to standby device	RSW will switch to the standby device regardless of faults.

3.2.3 Gain Equalization

While Gain Equalization is enabled, the RSW will attempt to match the gain values of the BUCs by modifying the attenuation of the standby BUC. In the event of a switch from the active BUC to the standby BUC, the new active BUC will have a similar output power as the old active BUC. Note that gain equalization cannot be enabled while eco mode is enabled or if either of the BUCs are muted.

3.2.4 Eco Mode

While Eco Mode is enabled, the RSW will mute the standby BUC. This significantly lowers the power consumption of the ODU. If the RSW switches from the active BUC to the standby BUC, the new active BUC will be unmuted, and the new standby will be muted. Note that eco mode cannot be enabled while gain equalization is enabled.

3.2.5 Default Network Settings

The default network settings are listed below. The network settings can be configured using the Web Interface (see Section 3.3). To connect to either the Web Interface or over SNMP, an Ethernet capable computer is required. The RSW IP address is static and does not support DHCP.

Parameter	DESCRIPTION
IP Address	192.168.77.30
Net Mask	255.255.255.0
Gateway	192.168.77.1
SNMP Port	161
SNMP Trap Port	162
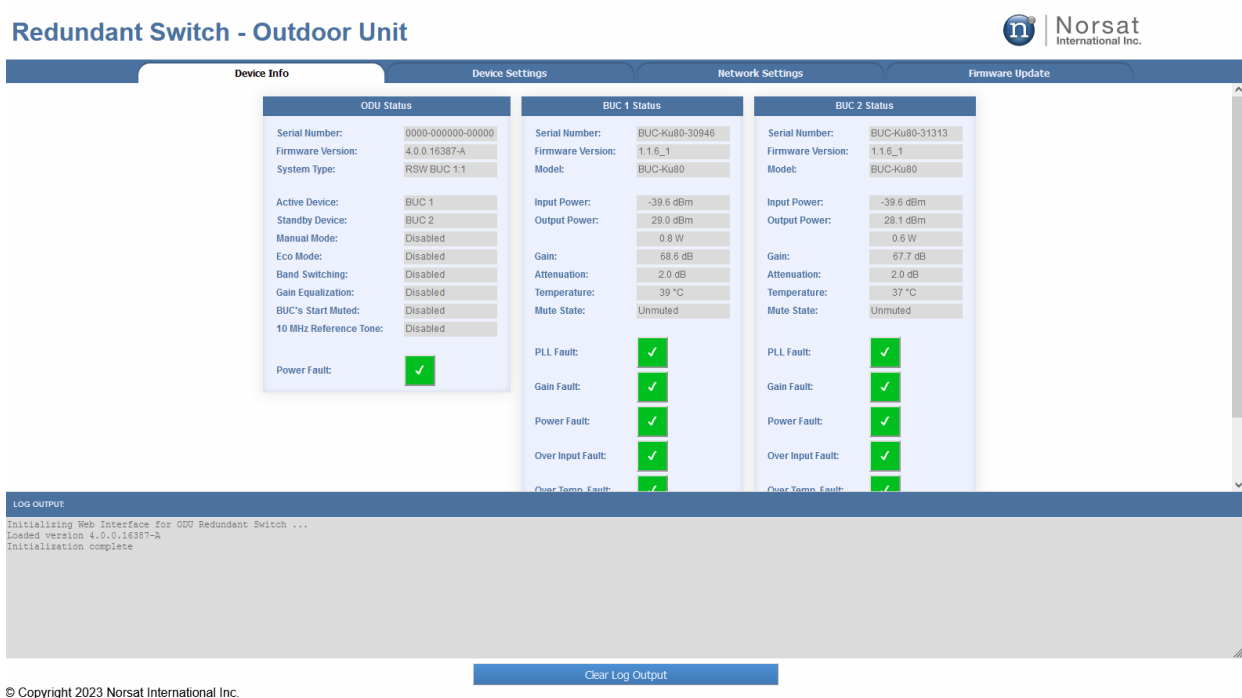
3.3 Web Interface

3.3.1 Accessing the Web Interface

To access the web interface using a browser, enter the IP address of the ODU in the address bar. The default IP address is 192.168.77.30.
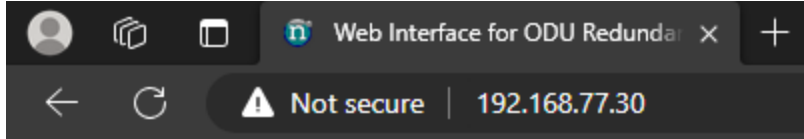
The Redundant Switch – Outdoor Unit Web Interface should now load in the web browser.

The **LOG OUTPUT** section at the bottom should display **Initialization complete** once all data has been received from the ODU.

3.3.2 Device Info Page

The **Device Info** page displays information from the ODU and each connected BUC.

ODU Status		BUC 1 Status		BUC 2 Status	
Serial Number:	0000-000000-00000	Serial Number:	BUC-Ku80-30946	Serial Number:	BUC-Ku80-31313
Firmware Version:	4.0.0.16387-A	Firmware Version:	1.1.6_1	Firmware Version:	1.1.6_1
System Type:	RSW BUC 1:1	Model:	BUC-Ku80	Model:	BUC-Ku80
Active Device:	BUC 1	Input Power:	-39.6 dBm	Input Power:	-39.6 dBm
Standby Device:	BUC 2	Output Power:	29.0 dBm	Output Power:	28.1 dBm
Manual Mode:	Disabled		0.8 W		0.6 W
Eco Mode:	Disabled	Gain:	68.6 dB	Gain:	67.7 dB
Band Switching:	Disabled	Attenuation:	2.0 dB	Attenuation:	2.0 dB
Gain Equalization:	Disabled	Temperature:	39 °C	Temperature:	37 °C
BUC's Start Muted:	Disabled	Mute State:	Unmuted	Mute State:	Unmuted
10 MHz Reference Tone:	Disabled				
		PLL Fault:	✓	PLL Fault:	✓
Power Fault:	✓	Gain Fault:	✓	Gain Fault:	✓
		Power Fault:	✓	Power Fault:	✓
		Over Input Fault:	✓	Over Input Fault:	✓
		Over Temp. Fault:	✓	Over Temp. Fault:	✓

3.3.3 ODU Status

In the **Device Info** tab of the web interface, the ODU Status section will show the information of ODU.

PARAMETER	DESCRIPTION
Serial Number	Unique serial number assigned to the Norsat RSW Outdoor Unit (ODU).
Firmware Version	Identifies the version of firmware that is currently installed and operational on the ODU.
System Type	Indicates the specific system model for the ODU. Either BUC 1:1, LNB 1:1 or LNB 1:2.
Active Device	Identifies which device, either BUC 1 or BUC 2, is actively in use and transmitting signals.
Standby Device	Identifies the backup device, either BUC 1 or BUC 2, that is on standby and ready to take over transmission if needed.
Manual Mode	Indicates whether the manual operating mode is enabled or disabled. See 3.2.2 for more details.
Eco Mode	Specifies whether the Eco Mode is enabled or disabled. Eco Mode automatically mutes the standby BUC to reduce energy consumption. See 3.2.4 for more details.
Band Switching	Indicates whether band switching is enabled or disabled. Band switching allows the user to select which frequency band the BUCs are operating in.
Gain Equalization	Indicates whether gain equalization is enabled or disabled. Gain equalization attempts to match the output power of the standby BUC to the active BUC. See 3.2.3 for more details.
BUCs Start Muted	Indicates whether the BUCs start in a muted state after ODU is turned on.
10 MHz Reference Tone	Indicates whether the 10 MHz reference tone is enabled or not
Power Fault Status	Status for power faults or irregularities in the system's power supply.

3.3.4 BUC Status

In the **Device Info** tab of the web interface, the BUCs Status will show the status of each BUC as well as the status for each fault. Please see the BUC manual for more information about the equipped BUCs.

PARAMETER	DESCRIPTION
Serial Number	Unique serial number assigned to the Norsat Block Upconverter (BUC).
Firmware Version	Identifies the version of firmware that is currently installed and operational on the BUC.
Model	Indicates the specific device model for the BUC.
Input Power	Indicates the strength of the signal received by the BUC in dBm.
Output Power	Indicates the strength of the signal being transmitted by the BUC in dBm
Gain	Indicates the gain applied to the signal by the BUC in dB.
Attenuation	Indicates the attenuation applied to the signal by the BUC in dB.
Temperature	Indicates the current internal temperature of the BUC.
Mute State	Indicates whether the BUC is muted.
PLL Fault	Indicates whether a fault related to the Phase-Locked Loop has been detected in the BUC.
Gain Fault	Indicates whether the BUC's gain has exceed the minimum or maximum gain limits.
Power Fault	Indicates whether a fault related to power supply or distribution has been detected in the BUC.
Over Input Fault	Indicates whether a fault related to exceeding the acceptable input signal level has been detected in the BUC.
Over Temperature Fault	Indicates whether a fault related to high operating temperature has been detected in the BUC.
Communication Fault	Indicates whether a fault related to communication has been detected in the BUC.

The table below outlines the symbols used for faults:

SYMBOL	DESCRIPTION
?	**Unknown**: fault status has not yet been initialized.
√	**No Faults**: The value is currently within the expected range.
!	**Warning**: The value has exceeded the warning threshold.
X	**Fault**: There is a fault present.

3.3.5 Device Settings Page

The **Device Settings** page is used to update the settings for the ODU and BUCs.

The **ODU Settings** section displays the current settings for Manual Override, the Active Device, Band Switching, Frequency Band, Eco Mode, Gain Equalization and Start BUCs Muted.

To Update the ODU Configuration settings:

1. Click the drop-down menu and choose the desired active device.
2. Click the check boxes to your desired value. Checked is enabled, unchecked is disabled.
3. Press the **Save Settings** button on the bottom to save your settings.

The system controls will be temporarily disabled as the system is updated.

The **BUC Settings** section displays the Mute State for each BUC, as well as the Upper Limit, Lower Limit, Upper Warning, and Lower Warning parameters. Pressing the **Mute** button will mute and unmute a BUC. Changes to a BUC's mute state take effect immediately.

To update the BUC Settings:

1. Use the provided controls to update the desired value(s) for the gain fault parameters.
2. Click the **Save Settings** button on the bottom to change the settings.

The system controls will be temporarily disabled as the system is updated.

3.3.6 Network Settings Page

The **Network Settings** page shows the current network settings and the SNMP configuration settings of the ODU. Use the SNMP Settings to modify the SNMPv3 username and/or password, or the SNMPv2 Community String.

Device Info	Device Configuration	Network Settings	Firmware Update

Network Configuration

IP Address:	192.168.77.30	192 . 168 . 77 . 30
Subnet:	255.255.255.0	255 . 255 . 255 . 0
Gateway:	192.168.77.1	192 . 168 . 77 . 1
Save Backup? ☐		

Update Network Settings

SNMP Configuration

SNMP Version:	2 ˅	Set SNMP Version
Community String:	Enter Value	
SNMP Port:	161	
SNMP Trap Port:	162	

Update

To update the Network Configuration:

1. Use the provided controls to change the IP address, Subnet, and Gateway to the desired values.

2. If you would like to save a text file backup of the Network settings, click the **Save Backup?** checkbox. The text file backup will be saved into the default downloads folder for the web browser used to load the ODU Web Interface.

3. Click the **Update Network Settings** button.

4. The system will be reinitialized with the updated network settings.

5. To access the webpage, update the Subnet and Gateway on your computer to match the new values and load the webpage at the new IP address.

To set the SNMP version number:

1. Set the desired version number from the dropdown menu.

2. Press the **Set SNMP Version** button to the right.

Note that the configuration parameters shown for SNMP authentication depend on the version of SNMP that is specified. For SNMP version 1 or version 2, a field for the Community String will be shown. For SNMP version 3, fields for the SNMP username and password will be shown.

To update the SNMP configuration settings:

1. If using SNMP version 2, change the Community String to the desired value in the text field. The SNMP Community String must match the Community String of the IDU for the ODU to communicate with the IDU.

2. If using SNMP version 3, change the SNMP username and/or SNMP password to the desired value. The SNMP username and password must match the username and password of the IDU for the ODU to communicate with the IDU.

3. Click the **Update** button.

4. The system will now update the SNMPv3 username and password, or SNMPV2 Community String.

Note: Keep all network settings saved in a secure location, as the RSW can only be controlled and configured over the Ethernet. If you have lost the IP address of the device and can no longer connect, a hardware factory reset must be performed at the ODU (see Section 3.6.2).

3.3.7 Firmware Update Page

The **Firmware Update** page allows the user to update the RSW ODU firmware.

To perform a firmware update on the RSW ODU:

1. Obtain a valid RSW ODU firmware update file from Norsat. All RSW ODU firmware update files are saved as .bin files.

2. Open the Web Interface and navigate to the **Firmware Update** tab.

3. Click the **Browse** button to open the file explorer on your machine.

4. Navigate to the file location of the firmware update file and open it.

5. Click the **Update Firmware** button.

6. The firmware update progress will be shown in the **LOG OUTPUT** section.

7. **Do not close the Web Interface or power off the RSW while the firmware update is in progress!**

8. Once the system update is complete, reload the Web Interface, and confirm that the new Firmware Version is shown on the **ODU Status** section.

3.4 SNMP

3.4.1 Default SNMP Configuration

The default SNMP settings are shown in the table below:

PARAMETER	DESCRIPTION	DEFAULT
SNMP Traps	Traps enabled or disabled	Enabled
Trap Cycles	Number of trap cycles	0
BUC 1 Trap on Fault	Sends trap if fault is present on BUC 1	Enabled
BUC 2 Trap on Fault	Sends trap if fault is present on BUC 2	Enabled
Power Trap on Fault	Sends trap if a system power fault is detected	Enabled
SNMP Version	Version of SNMP running on the RSW	V1/V2/V3
Read Community String	Read Community String	Public
Write Community String	Write Community String	Public
Username	Username for SNMP V3	rswuser
Default Password	Password for SNMP V3	norsatrsw

3.4.2 SNMP parameters

To access the RSW SNMP parameters, download the latest MIB file from Norsat. A summary of all accessible parameters is shown below:

Product Configuration

PARAMETER	DESCRIPTION	ACCESS
Product Configuration	Norsat RSW Product Configuration	Read-only
Serial Number	RSW Serial Number	Read-only
Firmware Version	Firmware Version	Read-only

Network Settings

PARAMETER	DESCRIPTION	ACCESS
Ip Addr	IP Address	Read-only
Net Mask	Network Mask	Read-only
Gateway	Gateway Address	Read-only
Snmp Port	SNMP Port	Read-only
Snmp Trap Port	SNMP Trap Port	Read-only

SNMP Settings

PARAMETER	DESCRIPTION	ACCESS	Range
Trap Activated	Set to 1 if traps should be generated when a condition occurs	Read-write	0 or 1
Trap Cycles	Approximate time between sending or repeating traps. Accepted values are either 0 or >=15. Value 0 means to send a trap only once per occurrence.	Read-write	0 or >=15
Trap On Device1 Fault	Set to 1 for the device to send SNMP trap due to a Device 1 fault	Read-write	0 or 1
Trap On Device2 Fault	Set to 1 for the device to send SNMP trap due to a Device 2 fault	Read-write	0 or 1
Trap On Power Fault	Set to 1 for the device to send SNMP trap due to BUC Power fault	Read-write	0 or 1

Device Settings

PARAMETER	DESCRIPTION	ACCESS	Range
Max Gain	Maximum BUC Gain(dB) before a Gain Fault is triggered	Read-write	0 to 100
Min Current	Minimum BUC Gain(dB) before a Gain Fault is triggered	Read-write	0 to 100
Upper Warning	Upper warning threshold for BUC gain before a gain warning is triggered.	Read-write	0 to 100
Lower Warning	Lower warning threshold for BUC gain before a gain warning is triggered.	Read-write	0 to 100
Device Model	The model of the BUC used. If this device is not a Norsat BUC, it will be set to "UNKNOWN".	Read-only	-
Device Type	The model of ODU RSW.	Read-only	-
Factory Reset	Factory Reset. Write 1 to trigger a factory reset of the Redundant Switch.	Read-write	0 or 1

Device Status

PARAMETER	DESCRIPTION	ACCESS	Range
Active Device	Gets/Sets the active device. Set to '1' for device 1 and '2' for device 2.	Read-write	1 or 2
Standby Device	Gets the standby device	Read-only	1 or 2
Override	Gets/Sets the manual override status. Set to '0' for disabled or '1' for enabled.	Read-write	0 or 1
Eco Mode	Gets/Sets Eco Mode status. Set to '0' for disabled or '1' for enabled.	Read-write	0 or 1
BUC 1 Serial	Gets serial Number of BUC 1	Read-only	-
BUC 1 Firmware	Gets firmware version of BUC 1	Read-only	-
BUC 1 Input Power	Gets input power of BUC 1 (dBm)	Read-only	-
BUC 1 Output Power	Gets output power of BUC 1 (dBm)	Read-only	-
BUC 1 Gain	Gets gain of BUC 1 (dB)	Read-only	-
BUC 1 Mute State	Gets/Sets the mute state of BUC 1. Set to '0' for unmuted and '1' for muted.	Read-write	0 or 1
BUC 1 Attenuation	Gets the attenuation of BUC 1. (dB)	Read-only	-
BUC 1 Temperature	Gets the temperature of BUC 1. (°C)	Read-only	-
BUC 2 Serial	Gets the serial number of BUC 2	Read-only	-
BUC 2 Firmware	Gets the firmware version of BUC 2	Read-only	-
BUC 2 Input Power	Gets the input power of BUC 2 (dBm)	Read-only	-
BUC 2 Output Power	Gets the output power of BUC 2 (dBm)	Read-only	-
BUC 2 Gain	Gain of BUC 2 (dB)	Read-only	-
BUC 2 Mute State	Mute state of BUC 2. Set to '0' for unmuted and '1' for muted.	Read-write	0 or 1
BUC 2 Attenuation	Attenuation of BUC 2. (dB)	Read-only	-
BUC 2 Temperature	Temperature of BUC 2. (°C)	Read-only	-
Band Selection	Get/Sets Band Switching. Set to '0' for disabled or '1' for enabled.	Read-write	0 or 1
Selected Band	The selected frequency band the BUCs are operating in.	Read-write	1 to 4
Reference Tone	Gets/Sets 10 MHz Reference Tone status. Set to '0' for disabled or '1' for enabled.	Read-write	0 or 1

Faults

List of faults that either BUC can detect. For all faults, '0' is no fault detected, '1' is fault detected.

PARAMETER	DESCRIPTION	ACCESS	Range
Power Fault	Enabled if ODU is not receiving enough power.	Read-only	0 or 1
BUC Mute Fault	Enabled if user manually mutes BUC.	Read-only	0 or 1
BUC Over Temperature Fault	Enabled if BUC's temperature exceeds its maximum value.	Read-only	0 or 1
BUC PLL Fault	Enabled if BUC is unable to get a PLL lock.	Read-only	0 or 1
BUC Power Fault	Enabled if BUC has insufficient power.	Read-only	0 or 1
BUC Communication Fault	Enabled if system is unable to communication with BUC.	Read-only	0 or 1
BUC Power In Fault	Enabled if BUC's input signal's power is too high or low	Read-only	0 or 1
BUC Over Gain Fault	Enabled if BUC's gain exceeds the maximum gain limit.	Read-only	0 or 1
BUC Under Gain Fault	Enabled if BUC's gain exceeds the minimum gain limit.	Read-only	0 or 1
BUC Over Gain Warning	Enabled if BUC's gain exceeds the maximum gain warning.	Read-only	0 or 1
BUC Under Gain Warning	Enabled if BUC's gain exceeds the minimum gain warning.	Read-only	0 or 1

Groups

PARAMETER	DESCRIPTION	ACCESS
Get Ident	Response format: sn <serial no.> fwver <firmware version> pn <operational mode>	Read-only
Get Config	Response format: MODEL <BUC model number> TYPE <BUC Type> LW <lower warning> UW <upper warning> LL <lower limit> UL <upper limit>	Read-only
Get Status	Response format: MO <manual override> A <active device> SB <standby device> D1_G <device 1 gain> D2_G <device 2 gain> D3_G <device 3 gain> PWR_F <power fault> SYS_F <system faults> D1_F <device 1 faults> D2_F <device 2 faults>	Read-only

3.5 ODU Manual Override Switch

If the RSW state needs to be manually changed in the field, the manual override switch on the ODU can be used.

1. If the device being switched to is in a fault state, enable Manual Override Mode.

2. Remove the cover on the manual override switch.
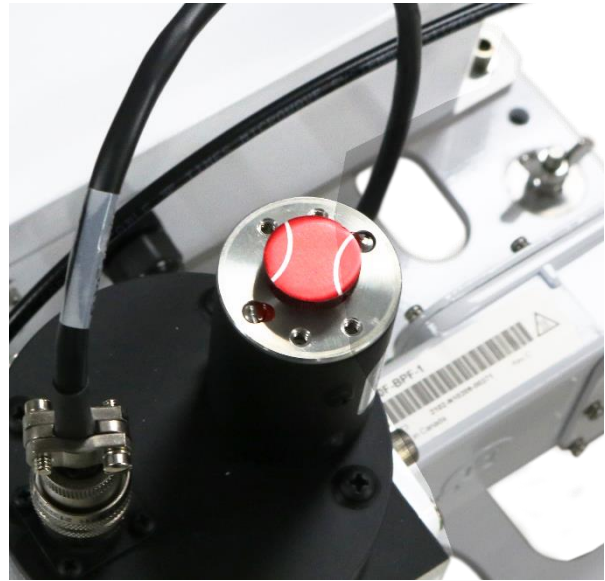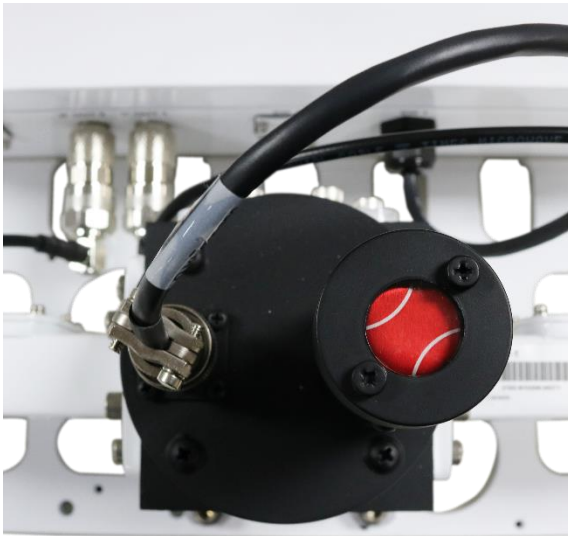
3. Turn the override switch to the desired position. The white lines on the switch indicate the current active path. **Do not hold the switch in the new position if the system is trying to switch back to the previous device. This may cause damage to the motor.**
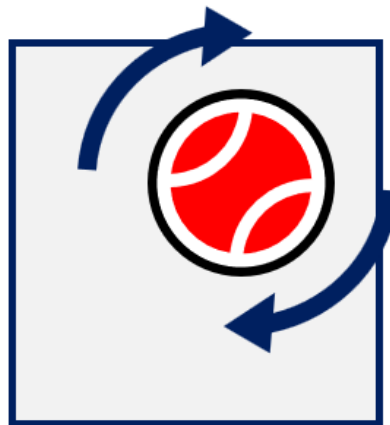
4. Replace the switch cover.

3.6 Factory Reset

Performing a factory reset on the ODU will reset all user configurable values including Network Settings, ODU settings, BUC settings, and SNMP settings.

PARAMETER	VALUE AFTER FACTORY RESET
IP Address	192.168.77.30
Gateway Address	192.168.77.1
Subnet Mask	255.255.255.0
SNMP Port	161
SNMP Trap Port	162
SNMP Community String	public
SNMPv3 Username	rswuser
SNMPv3 Password	norsatrsw
Manual Override	Disabled
Max BUC Gain	80.0 dB
Min BUC Gain	20.0 dB
Upper Warning Gain	75.0 dB
Lower Warning Gain	25.0 dB

3.6.1 SNMP Factory Reset

To perform a factory reset of the ODU over SNMP:

1. Open an SNMP client.
2. Write 1 to the factoryReset parameter.

3.6.2 Hardware Factory Reset

If it is not possible to connect to the ODU over Ethernet, it may be necessary to perform a hardware factory reset.

To perform a factory reset in hardware:

1. Power on the ODU

2. Remove the reset button cover on the right side of the ODU housing by unscrewing the four screws.
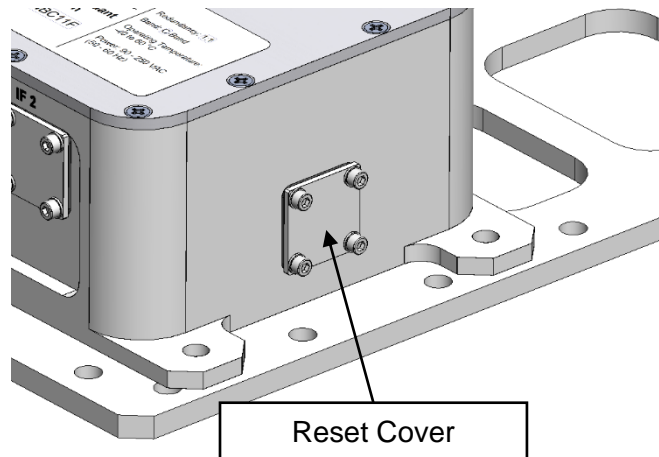
Reset Cover

3. Locate the factory reset button and use an appropriate tool to press it for 5 seconds.

Reset Button
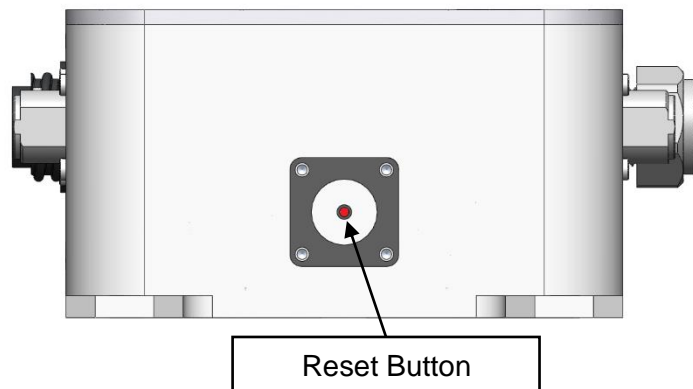
4. The factory reset will now occur.

5. Reload the ODU web interface.

6. Replace the reset cover by fastening 4x screws from step 1. Make sure the flat gasket is placed between the cover and the housing.

4. IDU Operation

This section goes through how to use and configure the Optional IDU. The IDU is not required for RSW operation but allows for an additional M&C interface to the ODU.

4.1 Front Panel

All IDU functionality can be accessed through the front panel. The front panel contains:

1. Screen
2. Control Buttons
3. Device status LEDs
4. Manual override switch

4.1.1 Button Functions
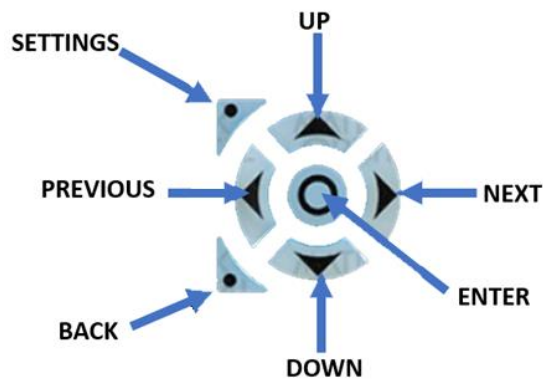
Parameter	DESCRIPTION
Settings	Takes the user to the main settings page
Up	Moves the indicator up if possible, or increases any digit by one if changing a setting
Next	Moves the indicator to the right if possible
Down	Moves the indicator down if possible, or decreases any digit by one if changing a setting
Back	Takes the user to the previous page
Previous	Moves the indicator to the left if possible
Enter	If selecting a subpage, displays that subpage. If changing a setting, saves the setting and moves to the previous page.

4.1.2 Status LEDs

The Status LEDs provide the status of each device at a quick glance. In the 1:1 RSW configuration, the DEVICE 3 LED will not be used.

LED STATUS	DESCRIPTION
Solid Geen	Status is **GOOD**
Yellow Solid	Device is in **STANDBY**
Red Solid	Device is in a **WARNING** state
Red Flashing Slow	Device is in an **ALARM** state
Red Flashing Fast	Device **ERROR**
Off	Device is **NOT PRESENT**

4.1.3 Manual Override

The manual override switch on the IDU front panel allows the user to toggle the manual override status on the ODU (See Section 3.2 for details on operating mode). The LED ring on the manual override switch will be illuminated while the Manual Override is enabled.

**MANUAL OVERRIDE
DISABLED**

**MANUAL OVERRIDE
ENABLED**

When manual override is pressed, the user is taken to the Device Selection page (See section 4.2.6.1). The Manual Override button will only have an effect if the IDU and ODU are connected. If there is a connection error, pressing the Manual Override button has no effect.

Note: It may take a few moments for the LED to illuminate after the button is pressed as the command is sent to the ODU.

4.2 LCD Screen

4.2.1 Menu Navigation

There are two main menus that are accessible through the IDU LCD display: the **Status Page**, and the **Settings Page**. The status page allows for monitoring of the RSW and device statuses. The Settings Page allows for the configuration of ODU and IDU settings. Pressing **Up** and **Down** moves the indicator, allowing the user to select the desired setting. Pressing **Enter** takes the user to that specific settings page. Pressing **Back** takes the user to the previous page.

4.2.2 Status Page

```
-> BUC 1 STATUS : OK
   BUC 2 STATUS : STANDBY
Manual Override : DISABLED
```

The **Status Page** is the default page that the LCD displays during normal operation. This page shows the fault status of all connected devices. It also displays the status of the manual override (ENABLED or DISABLED).

Note: This page is updated every few seconds, so some updates may take a few moments to change. After 20 seconds of inactivity on any other page, this page will automatically be shown. It can also be accessed by pressing the **Back** button.

Press **Enter** on the indicated device to go to the **Device Status page**.

If the IDU is unable to communicate with the ODU, the following error message will be displayed

```
ERROR: THERE IS NO CONNECTION
WITH THE ODU.
```

4.2.3 Device Status Page

```
Device Num       : 1
BUC Model        : BUC-Ku80
Device Usage     : ACTIVE
Comm Fault       : ABSENT
OverGain Fault   : ABSENT
UnderGain Fault  : ABSENT
                 ▼

                 ▲
OverTempFault    : ABSENT
PLL fault        : ABSENT
Power Fault      : ABSENT
Actual Gain      : 40.80 dB
Lower Warning    : 40.00 dB
Upper Warning    : 70.00 dB
                 ▼

                 ▲
Lower Limit      : 30.00 dB
Upper Limit      : 80.00 dB
```

The **Device Status Page** lists information about the specified device. Information about other devices can be seen by pressing the **Next** or **Previous** buttons.

PARAMETER	DESCRIPTION
Device Num	The number of the device whose information is being displayed.
BUC Model	The model type reported by the BUC.
Device Usage	Indicates how the BUC is being used. Valid values are Active, Standby, or Absent.
Comm Fault	Indicates whether a Communication Fault is Present or Absent.
Over Gain	Indicates whether an Over Gain Fault is Present or Absent.
Under Gain	Indicates whether an Under Gain Fault is Present or Absent.
Over Temp Fault	Indicates whether an Over Temperature Fault is Present or Absent.
PLL Fault	Indicates whether a PLL Fault is Present or Absent.
Power Fault	Indicates whether a Power Fault is Present or Absent.
Actual Gain	What the current gain is for the selected BUC.
Lower Warning	What the lower gain warning is
Upper Warning	What the upper gain warning is
Lower Limit	What the lower gain limit is
Upper Limit	What the upper gain limit is

4.2.4 IDU Setting Page

```
-> Network Settings
   Device Settings
   Sound Settings
   Extra Modes
   ODU Factory Reset
   IDU Factory Reset
   Band Switching
   About
```

The **Settings Page** can be accessed by pressing the **Settings** button on the keypad. This page allows the user to access pages for configuring ODU and IDU settings. A summary of the pages is listed below:

OPTION	DESCRIPTION
Network Settings	Go to the Network Settings Page (See Section 4.2.5)
Device Settings	Go to the Device Settings Page (See Section 4.2.6)
Sound Settings	Go to the Sound Settings Page (See Section 4.2.7)
Extra Modes	Go to the Extra Modes Page (See Section 4.2.8)
ODU Factory Reset	Go to the ODU Factory Reset Page (See Section 0)
IDU Factory Reset	Go to the IDU Factory Reset Page (See Section 4.2.10)
About	Go to the About Page (See Section 4.2.12)
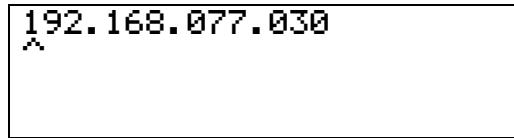
4.2.5 Network Settings Page

```
-> ODU IP : 192.168.077.030
   IDU IP : 192.168.077.031
   SUBNET : 255.255.255.255
   GATEWAY: 192.168.077.001
```

The **Network Settings Page** allows the user to view or change the current ODU and IDU network settings. Pressing **Enter** takes the user to the request reboot page where these settings can be modified. If any of the IP Addresses are updated, the IDU may need to be power cycled.

Note: For communication between the ODU and IDU, the ODU IP on this page must be configured to match the ODU IP address on the unit. If the user wants to change the ODU's IP address, this must be performed through the ODU's Web Interface (see Section 3.3).

4.2.5.1 ODU IP Address Page

```
192.168.077.030
^
```

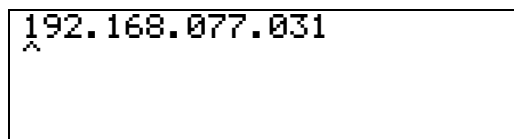The **ODU IP Address Page** allows the user to configure the ODU's IP address to match the IP address on the ODU. The **Next** and **Previous** buttons select which digit to change. The **Up** and **Down** buttons change the value of the selected digit by one. The maximum value for each section is 255.

Pressing **Enter** takes the user to the Confirm Network Settings page (see section 4.2.5.5). Pressing **Back** takes the user to the Network Settings page without saving any values.
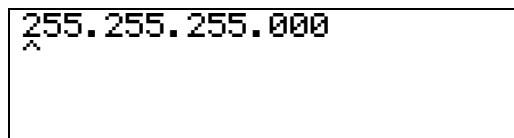
4.2.5.2 IDU IP Address Page

```
192.168.077.031
^
```

The **IDU IP Address Page** allows the user to change the IDU's IP address. The **Next** and **Previous** buttons select which digit to change. The **Up** and **Down** buttons change the value of the selected digit by 1. The maximum value for each section is 255.

Pressing **Enter** takes the user to the Confirm Network Settings page (see section 4.2.5.5). Pressing **Back** takes the user to the Network Settings page without saving any values.

4.2.5.3 Subnet Page

```
255.255.255.000
^
```

The **Subnet Page** allows the user to change the subnet that the IDU-ODU network operates on. The **Next** and **Previous** buttons select which digit to change. The **Up** and **Down** buttons change the value of the selected digit by 1. The maximum value for each section is 255.

Pressing **Enter** takes the user to the Confirm Network Settings page (see section 4.2.5.5). Pressing **Back** takes the user to the Network Settings page without saving any values.

4.2.5.4   Gateway Page

```
192.168.077.001
^
```

The **Gateway Page** allows the user to change the gateway that the IDU uses. The **Next** and **Previous** buttons select which digit to change. The **Up** and **Down** buttons change the value of the selected digit by 1. The maximum value for each section is 255.

Pressing **Enter** takes the user to the Confirm Network Settings page (see section 4.2.5.5). Pressing **Back** takes the user to the Network Settings page without saving any values.

4.2.5.5   Confirm Network Settings

```
THIS SETTINGS CHANGE
REQUIRES A REBOOT TO TAKE
EFFECT. REBOOT NOW?
-> NO
   YES
```

Pressing Enter after changing the ODU IP address, IDU IP address, Subnet Mask or Gateway will show the Confirm Network Settings page. If your new settings are correct, move cursor to **YES** and press enter to reboot the IDU and save the new value.

4.2.6 Device Settings Page

```
-> ACTIVE BUC    : BUC 1
   Lower Limit   : 30.00 dB
   Lower Warning : 40.00 dB
   Upper Warning : 70.00 dB
   Upper Limit   : 80.00 dB
```

The **Device Settings Page** allows the user to choose which device is active, as well as change the threshold values for the Gain Fault detection. The following sections will outline the subpages.

4.2.6.1   Select Active Device Page

```
   SELECT ACTIVE DEVICE
-> BUC 1
   BUC 2

```

The **Select Active Device Page** allows the user to change which device is active. Pressing **Enter** updates the Active Device if allowed.

Note: Pressing the Manual Override button brings the user to this screen, allowing them to change the Active Device.

4.2.6.2   Lower Limit Threshold Page

```
BUC GAIN
LOWER LIMIT
30.00 dB
^

```

The **Lower Limit Threshold Page** allows the user to change the lower limit of the allowable gain (measured in dB). Pressing **Previous** and **Next** allows the user to select which digit to change. Pressing **Up** and **Down** changes the value of the digit by 1. Pressing **Enter** saves the value and returns the user to the **Device Settings Page**.

4.2.6.3   Lower Warning Threshold Page

```
BUC GAIN
LOWER WARNING
40.00 dB
^

```

The **Lower Warning Threshold Page** allows the user to change the lower warning threshold (measured in dB). Pressing **Previous** and **Next** allows the user to select which digit to change. Pressing **Up** and **Down** changes the value of the digit by 1. Pressing **Enter** saves the value and returns the user to the **Device Settings Page**.

4.2.6.4   Upper Warning Threshold Page

```
BUC GAIN
UPPER WARNING
70.00 dB
^
```

The **Upper Warning Threshold Page** allows the user to change the upper warning threshold (measured in dB). Pressing **Previous** and **Next** allows the user to select which digit to change. Pressing **Up** and **Down** changes the value of the digit by 1. Pressing **Enter** saves the value and returns the user to the **Device Settings Page**.

4.2.6.5   Upper Limit Threshold Page

```
BUC GAIN
UPPER LIMIT
80.00 dB
^
```

The **Upper Limit Threshold Page** allows the user to change the upper limit threshold (measured in dB). Pressing **Previous** and **Next** allows the user to select which digit to change. Pressing **Up** and **Down** changes the value of the digit by 1. Pressing **Enter** saves the value and returns the user to the **Device Settings Page**.

4.2.7   Sound Settings

```
-> ALARM SOUND  : DISABLED
   BUTTON SOUND : DISABLED
```

The **Sound Settings Page** allows the user to change the alarm and button sound settings. Pressing **Previous** disables, the setting and pressing **Next** enables the setting. Pressing **Enter** saves the sound setting and returns the user to the **Settings Page**.

PARAMETER	DESCRIPTION
ALARM SOUND	If ENABLED, the Alarm Sound plays if the Active Device is in an alarm state. If the Standby Device is in an alarm state, the Alarm does not sound
BUTTON SOUND	If ENABLED, the Button Sound plays on any keypad button press

4.2.8 Extra Modes Page

```
-> NONE
   ECO MODE
   GAIN EQUALIZATION
```

In the Extra Modes page, the user can configure the ODU to operate in Eco Mode, Gain Equalization, or normal mode. Pressing **Enter** saves the selection and returns the user to the **Settings Page**. Pressing **Back** takes the user to the **Settings Page** without saving.

4.2.9 ODU Factory Reset Page

```
RESET ODU SETTINGS TO
FACTORY DEFAULTS?
-> NO
   YES
```

The **ODU Factory Reset Page** allows users to reset the ODU to factory settings. This factory reset is limited to the ODU and does not change any settings on the IDU.

Pressing **Enter** when NO is selected takes the user to the Settings Page. Pressing **Enter** when YES is selected takes the user to a confirmation page. If the factory reset is confirmed, it is recommended to power cycle the IDU.

4.2.10 IDU Factory Reset Page

```
RESET IDU SETTINGS TO
FACTORY DEFAULTS?
-> NO
   YES
```

The **IDU Factory Reset Page** allows users to reset the IDU to factory defaults. This includes the IP addresses in the IDU's memory, and the sound settings. This is only for the IDU and will not include the IP addresses in the ODU's memory. It will also not include the threshold values (limits and warnings), Active Device, or active band.

Pressing **Enter** when NO is selected takes the user to the **Settings Page**. Pressing **Enter** when the YES is selected takes the user to a confirmation page. If the factory reset is confirmed, it is recommended to power cycle the IDU.

4.2.11 Band Switching Page

```
-> Band Switching: Enabled
   Selected Band : 4
```

The **Band Switching Page** allows users to enable or disable band switching and change the selected band of the equipped BUCs. To enable Band Switching, move the cursor to Band Switching and press **Next.** To disable, press **Previous**. To set the Selected Band, move the cursor to Selected Band and press **Next** to increase the band and **Previous** to decrease the band.

Please check the user manual for the equipped BUCs to determine if Band Switching is supported.

4.2.12 About Page
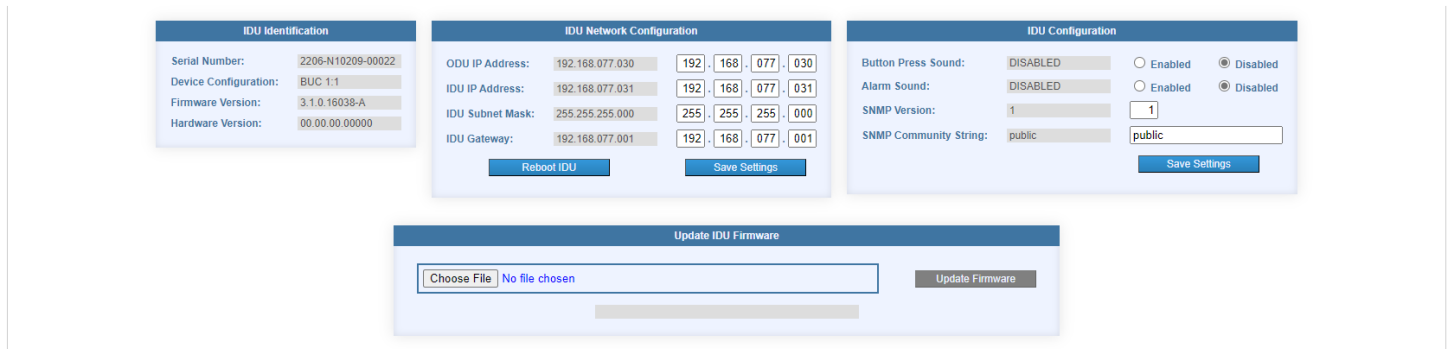
```
IDU SN: 2111-N00000-00000
IDU Ver: 3.1.0.16038-A
HW Ver: PCBVC-HWVB

ODU SN: 2111-N00001-00000
ODU Ver: 3.1.0.16054-A
```

The **About Page** displays the Serial Number (SN) and software version (Ver) of the IDU and the ODU.

The "A" after the IDU Software Version indicates that the software is running the normal application software. If any errors are detected in the software, it runs the Gold application software instead, indicated by a "G" after the Software Version.
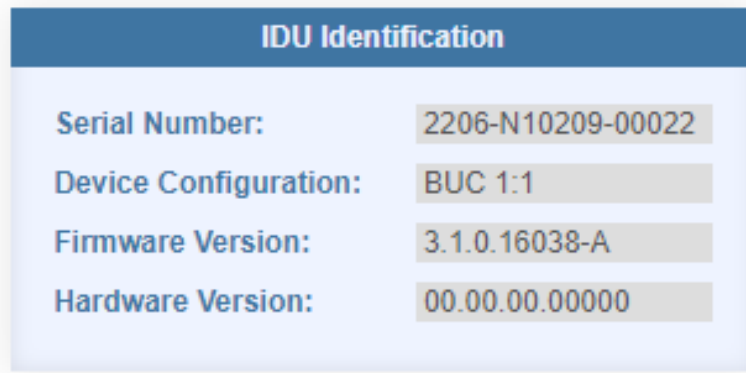
4.3 IDU Web Interface

4.3.1 Accessing the Web Interface

The RSW IDU web interface can be accessed through a web browser.

1. Locate the device's IP address (192.168.77.31 by default).
2. Go to the IP address using a web browser.
3. The Log Output at the bottom of the page will display any system messages after loading the page.

4.3.2 IDU Identification

The **IDU Identification** section displays the IDU Serial Number, ODU Device Configuration, IDU Firmware Version and IDU Hardware version. These values are not user configurable.

4.3.3 IDU Network Configuration

The **IDU Network Configuration** section displays the Network Settings for the IDU. The current values are on the left.

To change the network settings:

1. Input the updated network values in the inputs on the right.
2. Press the "Save Settings" button to implement the changes.
3. Power cycle the IDU after updating the network settings for the change to take effect. The web page will now be accessible through the updated IP address.

4.3.4 IDU Configuration

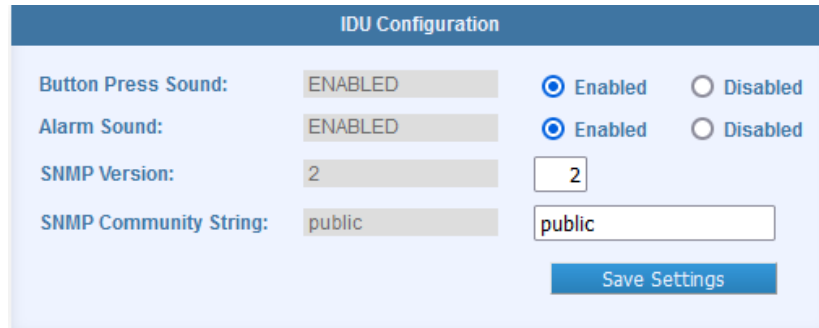The **IDU Configuration** section displays the sound settings for the IDU, with the current values on the left.
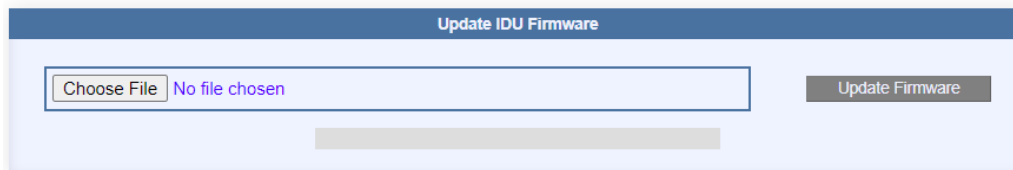

To update the sounds settings:

1. Select the desired sound settings using the radio buttons on the right.
2. Press **Save Settings** to implement the changes.

To update the SNMP settings:

1. Enter 1, 2, or 3 for the SNMP version.
2. Set the text (community string for v1 or v2, username and password for v3) to match what was set on the ODU.
3. Press **Save Settings** to implement the changes.

4.3.5 Update IDU Firmware

The **Update IDU Firmware** section allows the user to update the firmware on the IDU.

To perform a firmware update on the RSW IDU:

1. Obtain a valid RSW IDU firmware update file from Norsat. All RSW IDU firmware update files are saved as .bin files.

2. Open the Web Interface and navigate to the **Firmware Update** section.

3. Click the **Choose File** button to open the file explorer on your machine.

4. Navigate to the file location of the firmware update file and open it.

5. Click the **Update Firmware** button.

6. The firmware update progress will be shown in the **LOG OUTPUT** section.

7. **Do not close the Web Interface or power off the IDU while the firmware update is in progress!**

8. Once the system update is complete, reload the Web Interface, and confirm that the new Firmware Version is shown on the **IDU Identification** section.

4.3.6 Log Output

LOG OUTPUT:
```
2022-07-06, 12:26:00 p.m. - Starting Web Interface for Redundant Switch IDU v2.0.1
2022-07-06, 12:26:00 p.m. - IDU 2111-N00000-00000 is running in LNB 1:1 mode with firmware version 1.0.0.15125-A and hardware version PCBVC-HWVB
2022-07-06, 12:26:01 p.m. - ODU Network Settings: 192.168.77.30
2022-07-06, 12:26:01 p.m. - IDU Network Settings: 192.168.77.31 -- 255.255.255.0 -- 192.168.77.1
2022-07-06, 12:26:01 p.m. - IDU has the Button Press Sound ENABLED and the Alarm Sound ENABLED
2022-07-06, 12:26:01 p.m. - IDU uses SNMP version 2 with Community String public
```

Clear Log Output

The **Log Output** section displays information about any changes that the user may have made from the Web Interface. Press **Clear Log Output** to erase all the messages.

5. System Troubleshooting

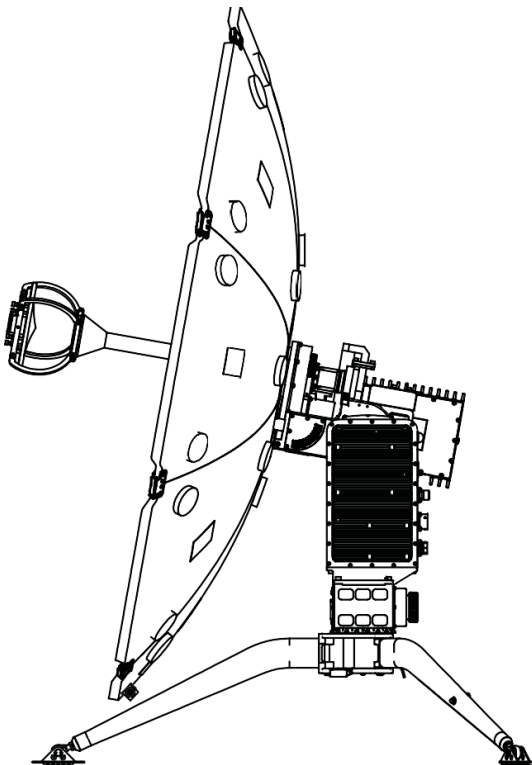| PROBLEM	TROUBLESHOTING STEPS
Can't connect to the ODU web interface	1. Verify that the ODU power connector is properly seated and threaded. 2. Verify that the Ethernet connector is connected and locked at both ends. 3. Connect a computer to the RSW via the Ethernet port. On windows, search for Command Prompt, then type "ping <RSW IP> (default is 192.168.77.30). a. if the IP address is reachable, try loading the web page using Firefox. 4. If the system includes the optional IDU, check the ODU IP settings in the network settings page and confirm that you are accessing the correct address. 5. Disconnect and reconnect the Ethernet connection on the client side. 6. Power cycle the ODU. 7. Use an IP Scanner to search the network for the devices MAC address. 8. If the IP address has been lost, a hardware factory reset may be required (see Section 3.6). 9. If the problem persists, contact Norsat customer support.
System Power Fault is present	1. If the LNBs are being powered by the on-board ULC, open the ODU Web Interface and confirm that the ULC is enabled. 2. If the LNBs are being powered by an external source, ensure that power is being applied to the system. 3. If the ULC is enabled, disable the ULC and then enable the ULC. 4. Power cycle the ODU. 5. If the problem persists, contact Norsat customer support.
One of the BUCs is not receiving power	1. Verify that the ODU power connector is properly seated and threaded. 2. Check that the BUC connectors are properly threaded at the ODU. 3. If the BUCs are being powered by the on-board ULC, open the ODU Web Interface and confirm that the ULC is enabled. 4. If the BUCs are being powered by an external source, ensure that power is being applied to the system.

6. System Maintenance

NO.	DESCRIPTION	FREQUENCY
1	Inspect all cables for damage	Once per month
2	Toggle the active BUC to standby to test that the system is working as expected	Once per month

DOC-002374_rD - BUC RSW User Manual.docx

ABOUT NORSAT

Norsat International Inc., founded in 1977, is a leading provider of innovative communication solutions that enable the transmission of data, audio, and video for remote and challenging applications. Norsat's products and services include customizable satellite components, portable satellite terminals, maritime solutions, and satellite networks. The company's products and services are used extensively by telecommunications services providers, emergency services and homeland security agencies, military organizations, health care providers and Fortune 1000 companies.