D2WARN System Manual

For: Public Television Stations
Project: D2WARN

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Contents

1 Getting Started

1.1 Introduction

The second generation WARN system builds on the foundation of the first generation WARN equipment and adds significant improvements. The second generation system is contained in a single 2RU openGear frame, with complete failover protection, and ensures current and future FCC compliance.

The WARN system includes primary and backup hardware and operates transparently with no impact to your station's video and audio programs. Out of the box, it supports ASI, and optionally SMPTE 310.

1.2 Features

- Proven and reliable technology: The system is built around the D2Flex, a fourth generation digital video multiplexer with technology used in hundreds of broadcast stations worldwide
- The 2RU, rack mount openGear oGx frame can be customized as needed by stations to accommodate up to 10 cards
- The system design features a fully redundant satellite receiver and groomer pair that enables continuous monitoring and automatic failover from main to backup
- Failsafe ASI bypass protection ensures that the station programming is not interrupted or disrupted in any way discernable to viewers
- Fail to wire bypass in the event of power failure or groomer card failure
- Upgradable to support multiple transport streams, future enhancements, and ATSC 3.0
- Supports ASI, and can be optioned with SMPTE 310
- Browser interface for M&C, and SNMP status and traps for monitoring and alerting.
- Dual Hot Swappable 600W redundant power supplies and cooling for reliable 24/7 operation.
- User Manual stored on each Groomer which is updated with each firmware release so it is always current and available

1.3 Manual

After logging in, the current User's Manual stored on each Groomer may be accessed on the Main Page of the GUI (the D2WARN Status page) by clicking on **Support** on the left margin. See below. This will allow the user to download the manual on to the user's PC or view the manual on a separate tab of the GUI. The manual is updated with each new version of firmware. When new firmware is released, it contains the latest version of the User's Manual.

Instructions on how to log in to each groomer are provided in an upcoming section.

The latest version of the manual may always be found on D2D's web site: www.d2dtechnologies.com/d2warn
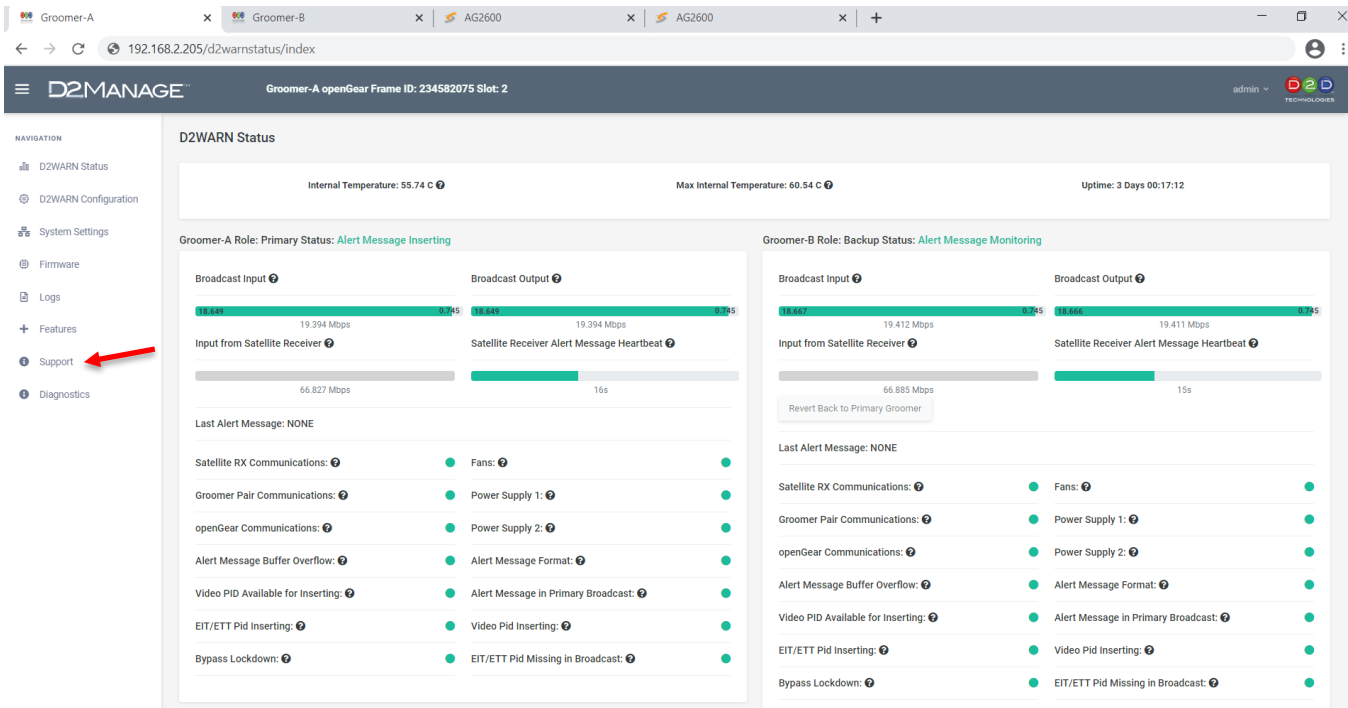
Figure 1-1. Accessing the current User Manual

1.4 Requirements

- 2 rack spaces, at least 16" deep with redundant power to install the openGear Frame.
- 5 static IP addresses on the facility's LAN that the openGear Frame will run on.
- 2 RF feeds from Galaxy-16, KU Vertical (a user supplied splitter can be used to feed both)
- A PC or MAC with Chrome, Firefox or Edge.
- ASI of the facility's broadcast stream immediately after the encoder and any PSIP generation, prior to any other data inserting devices (Datacasting, Water-markers, Nielson boxes, etc.).
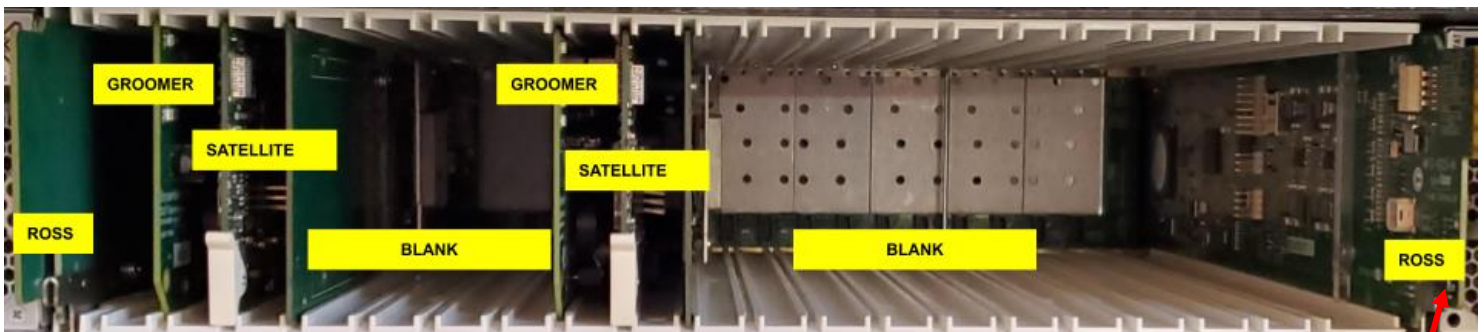
Figure 1-2. openGear Frame, Front Facing with the Front Door Open.

1.5 WARN card layout

Slot 1: Empty – D2D Groomer A IO Card does use Slot 1 backplane.
Slot 2: D2D Groomer A card.
Slot 3 and 4: Sencore AG 2600 Satellite Receiver card A.
Slot 5 and 6: Empty.
Slot 7: Empty – D2D Groomer B IO Card does use Slot 7 backplane.
Slot 8: D2D Groomer B card.
Slot 9 and 10: Sencore AG2600 Satellite Receiver card B.
Slots 11 through 20: Empty.

Note: The Groomer cards should remain in their assigned slots. Do not attempt to swap the groomer cards without contacting D2D Customer Support.

There are two RF to BNC adapters supplied. These will go on the RF A input of the Satellite Receiver cards.

Also supplied are three BNC female to BNC female jumpers. These jumpers connect the Satellite Receivers to the groomers, and Groomer A ASI-1 OUT to Groomer B ASI-1 IN (internal failover only). The system is shipped with all adapters and cables pre-installed.

1.6 Additional installation requirements

The ROSS openGear oGx uses redundant power supplies and takes up two rack spaces. It is 16" deep.

You will need 5 IP addresses and 1 Ethernet cable from your LAN.

The two satellite receiver cards will also require an RF feed from Galaxy-16 Ku Band, Vertical. A user supplied L-Band splitter is required to feed both satellite receivers.

It is recommended that the D2WARN system is installed immediately after the encoder and any PSIP generation, prior to any other data inserting devices (Datacasting, Water-markers, Nielson boxes, etc.).

1.7 Powering up

You MUST have both power supplies connected! Once you hook up the two power supplies, turn on the openGear Frame with the small, black switches located at either side, (PS 1 and PS 2). After you close the door, you'll hear the fans power up and settle.   If there is a power supply *not* hooked up, bad power to one side, or the fan door is left open, a loud alarm will sound until you connect clean power to both sides and close the door.

1.8 Installation

Note: The D2WARN system as received will pass the ASI transport stream directly and transparently, with no WARN messages inserted. When powered down, the ASI fail safe relay in both groomers pass ASI directly to the output. When powered up in its initial state (bypass), the groomers will continue to pass ASI directly until manually moved to a normal operating state.

The Primary and Backup Groomers have been pre-configured for ASI Flow – Internal Failover, but in Bypass Mode.

The installation steps, below, assume the station is using internal failover (as opposed to external, such as with chain redundancy). If the station would like to operate external or chain redundancy, the steps below should be completed first. Configuring the D2WARN system for external or chain redundancy will be covered later.

Refer to the ASI internal failover system block diagram shown in the Section: **Configurations**.

1. Mount the openGear Frame with WARN system in a 19-inch equipment rack, being sure to provide adequate ventilation above, below, and on both sides.
2. Connect both AC power supplies to a power source.
3. Connect the output of the station's encoder to Groomer A, ASI 1 IN.
4. Connect the output of Groomer B, ASI 1 OUT to the station's equipment downstream of the WARN system.
5. Connect the L-Band feed from the satellite antenna via a user provided 2-way divider to Satellite Receiver A RF-A IN, and Satellite Receiver B RF-A IN using the supplied F to BNC adaptors. The adapters connect to the first BNC from the top of the Satellite Receiver cards.
6. You will notice two ASI jumpers going from the ASI OUT connector on the satellite receiver cards to ASI 2 IN on the D2WARN Groomer cards. There is a third jumper connecting the output of Groomer A to the input of Groomer B. Leave them there.

1.9 Backplane and Connectors
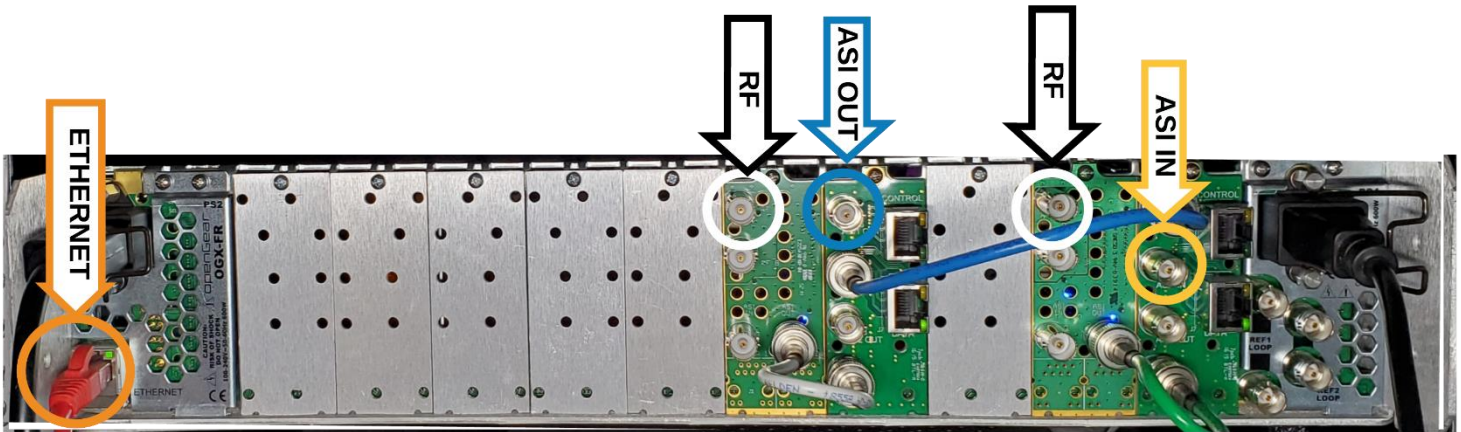
Figure 1-3. openGear Backplane

Groomer Card I/O

ASI 1 OUT

ETH 1

ASI 1 IN

RESERVED

RESERVED

ASI 2 IN
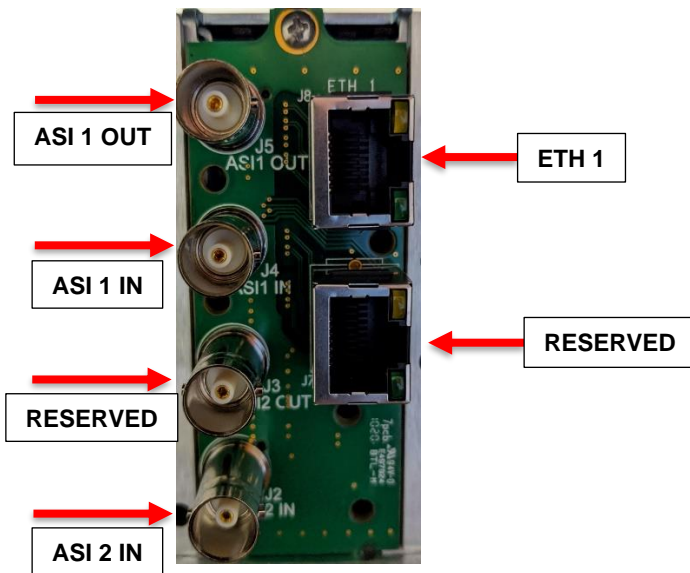
Figure 1-4. Groomer Backplane

Receiver Card I/O

RF A Input

RF B Input

ASI In

ASI Out
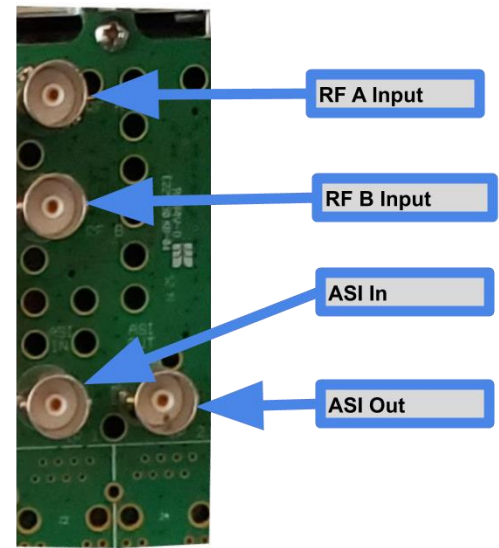
Figure 1-5. Satellite Receiver Backplane

1.10 D2WARN TCP/IP – Control Port Setup

As received from the factory the system is configured with default, static IP addresses. To access the system's GUI and configure the IP addresses you will need a standalone PC (not on your LAN) connected to the Ethernet port of the openGear frame. The Ethernet cable is plugged in to the port on the back of the frame, lower left side. See the picture shown above.

You will need:

1. One Ethernet cable (CAT 5 or CAT 6).
2. A PC that has a wired Ethernet port and has either Chrome, Firefox or Microsoft Edge installed. These are the browsers supported by the D2WARN system.
3. One dedicated port and 5 dedicated static IP addresses from your IT or Network Facilities Administrator. All addresses must be on the same subnet. The Administrator should also supply the subnet mask.

1.11 IP addresses and Login Info

The openGear Frame contains an internal network hub. All the openGear cards in the D2WARN system connect directly to the internal network hub. This allows all the cards to be accessed through the openGear Ethernet port.

Set your PC to the following parameters: IP address: 192.168.2.150,
Subnet Mask: 255.255.255.0, Gateway: 192.168.2.1.

Note: The PC settings above are intended for a <u>locally</u> connected PC during the initial setup process.

Note: A Windows PC or Mac may be used, however a Mac will quarantine the downloaded file and create a new file in addition to the downloaded file. Care must be taken so that the downloaded file is uploaded, not the newly created file. This issue was fixed with firmware released in June 2021.

The D2WARN System's Default IP addresses, and username/passwords are:

1. *The D2WARN Groomer "A" card in slot 2: 192.168.2.205 admin/admin*
2. *The Satellite Receiver A card in Slots 3 and 4: 192.168.2.207 admin/ [password blank*]*
3. *The D2WARN Groomer "B" card in slot 8: 192.168.2.206 admin/admin*
4. *The Satellite Receiver B card in Slots 9 and 10: 192.168.2.208. admin/ [password blank*]*
5. *openGear Frame in slot 21 (all the way on the left side when viewed from the rear): 192.168.2.209*
6. *The external IP address of the Groomer A card (**This Groomer's "Eth 1" port**) is 192.168.1.205*
7. *The external IP address of the Groomer B card (**This Groomer's "Eth 1" port**) is 192.168.1.206*

*Some Sencore Receivers with newer firmware have a default Password set. The password on those receivers is: mpeg101.

Note: Changing the Groomer and Satellite Receiver Passwords is recommended. Complete instructions are provided in the Section: Cyber Security.

Note: If the user wants to change the IP settings, the addresses must be changed in the order they appear in this document:

1. **Satellite Receiver cards**
2. **openGear Frame. This step MUST be completed before changing the IP addresses of the Groomer cards.**
3. **D2WARN Groomer cards**
4. **Set the IP addresses of the cards the groomers communicate with**

Connect an Ethernet cable from the PC to the Ethernet port on the openGear backplane. The Ethernet cable is plugged in to the port on the back of the frame, lower left side.

1.12 Setting up the Satellite Receiver Cards

The Groomer and Satellite Receiver cards are configured through the openGear Frame Ethernet port.
Open a browser and type 192.168.2.207, it will open on the login screen. Select **admin**. Leave Password blank (some Sencore receivers with newer firmware have a default password set, in which case enter **mpeg101**). Click **Login.**
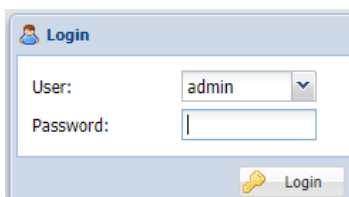
Figure 1-6. Satellite Receiver Login

Once on the main page, click on the **Admin** tab. Then click on the settings icon by **Static**.
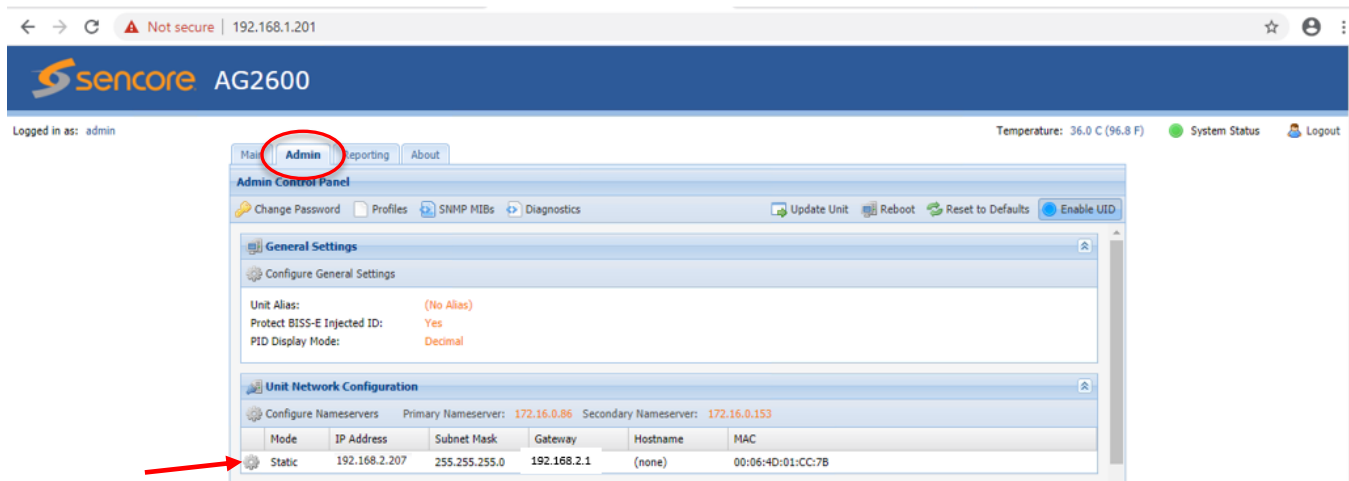
Figure 1-7. Satellite Receiver Admin Screen
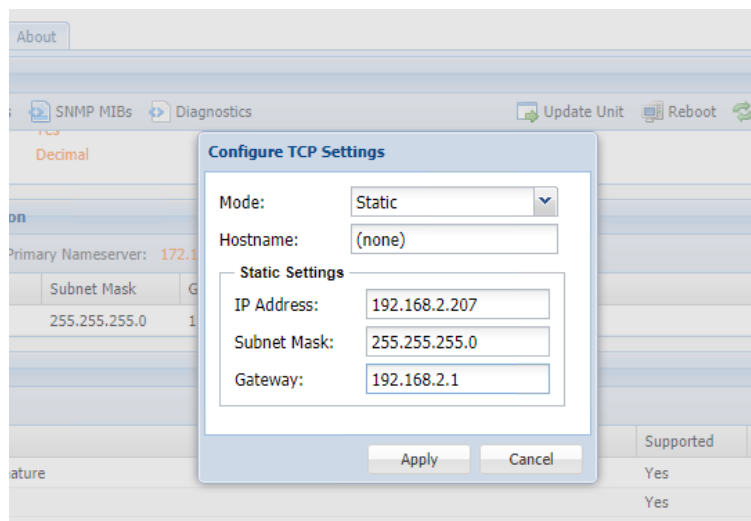
Figure 1-8. Satellite Receiver Static IP Address

From there you can configure the TCP settings to your facility's LAN. Click **Apply.**
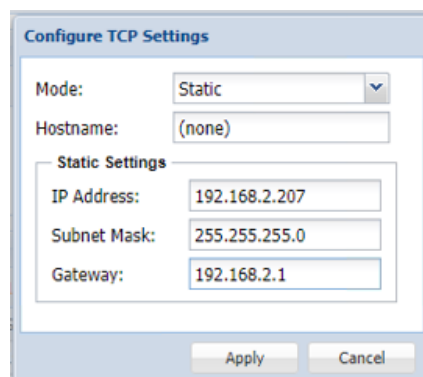
Figure 1-9. Changing the Satellite Receiver Card's IP Address

Perform the same process to set the IP address for the other Satellite Receiver card at 192.168.2.208.

1.13 Assigning the IP address for the openGear Frame

Open a browser and type 192.168.2.205, it will open on the login screen. Enter admin for the **Username**, and admin for the **Password**. Click **Log In**:

Figure 1-10. Groomer Log In page

Note: With the exception of the External IP Address (this Groomer's Eth 1 Port, described below), all of the IP addresses must be on the same subnet. That is, the Frame, the Internal IP Address, and the System Gateway must all be on the same subnet.

Note: If the openGear Frame's IP address is changed to a subnet different than the groomer cards you will be able to connect to the groomer cards, but the groomer cards will not be able to communicate with the openGear Frame until the groomer card's IP addresses are changed and on the same subnet as the Frame.

Note: If you attempt to enter an invalid IP Address a warning flag will appear in the upper right corner. The user must click the "X" to close the window and correct the error:
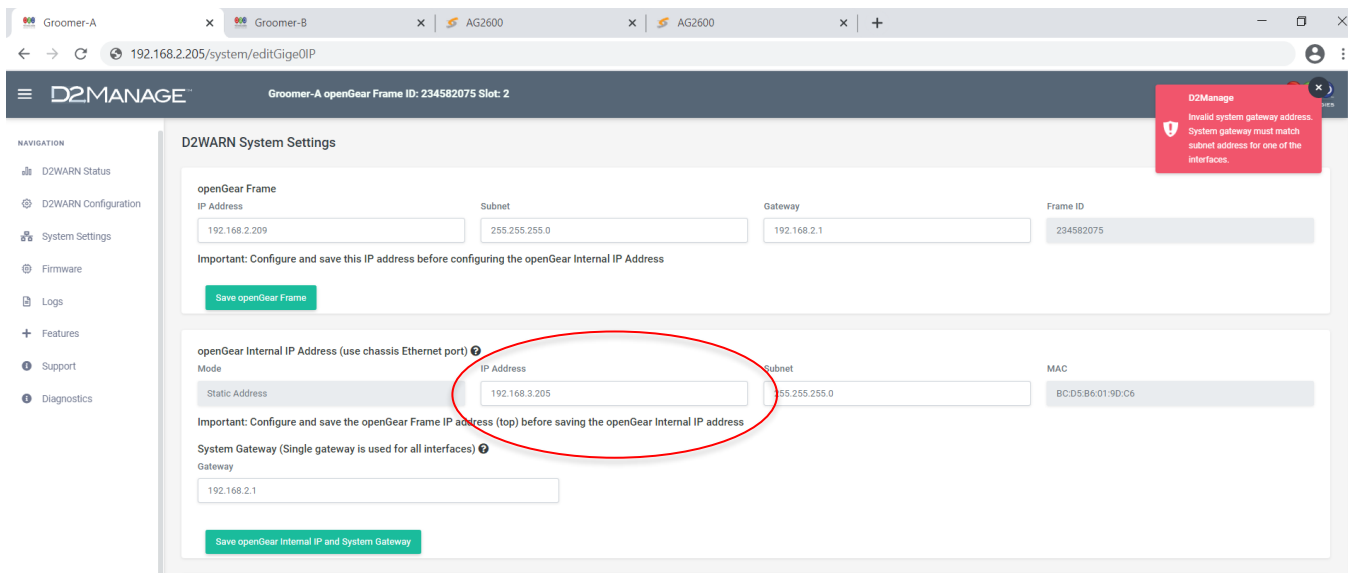
Figure 1-11. Attempting to Enter an Invalid IP Address

The procedure to assign an IP address to the openGear Frame is shown below:

1. Log in to 192.168.2.205 and go to the **Systems Settings** page.
2. Enter the desired IP Address, Subnet, and Gateway under **openGear Frame**. Make certain you enter all IP settings including IP address, Subnet Mask and Gateway before saving.
3. Click **Save openGear Frame**.
4. The openGear Frame will reset, and after a few minutes the LCD on the front of the frame should display the updated IP address.
5. Log in to 192.168.2.206 and go to the **System Setting** page. The IP Address, Subnet, and Gateway of the openGear Frame may already display the correct information. If the addresses are not yet updated, it's OK to enter them now. Make certain you enter all IP settings including IP address, Subnet Mask and Gateway before clicking **Save openGear Frame**.
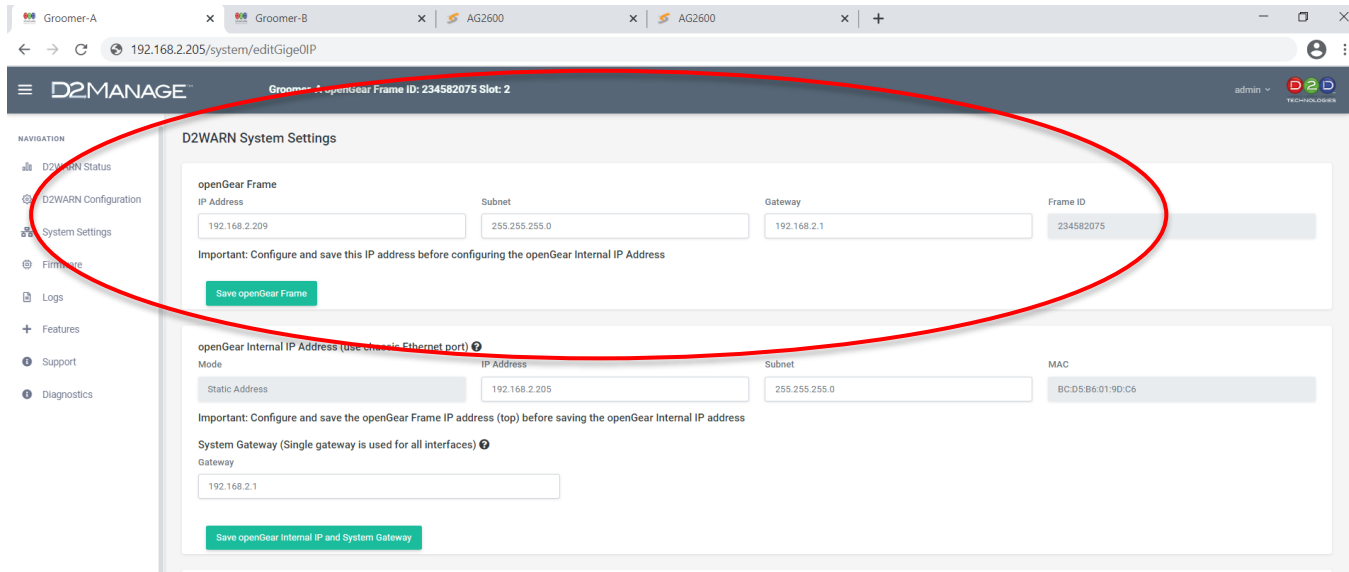
Figure 1-12. Assigning the IP Address of the openGear Frame

Figure 1-13. LCD Display on the openGear Frame's Front Panel

1.14 Setting up the openGear Internal IP Address and System Gateway

The groomer cards connect to the internal openGear network hub, so they are accessed through the openGear Frame Ethernet port. The procedure to set the internal IP address is shown below:

1. Log in to 192.168.2.205 and navigate to the **System Settings** page.
2. The groomer card user interface uses the **openGear Internal IP Address** settings.
3. Set the IP address and Subnet of the **openGear Internal IP Address** for Groomer A.
4. Click **Save openGear Internal IP Address and System Gateway**.
5. Enter the System Gateway.
6. Click **Save openGear Internal IP Address and System Gateway**.
7. Log in to 192.168.2.206 and repeat for Groomer B.
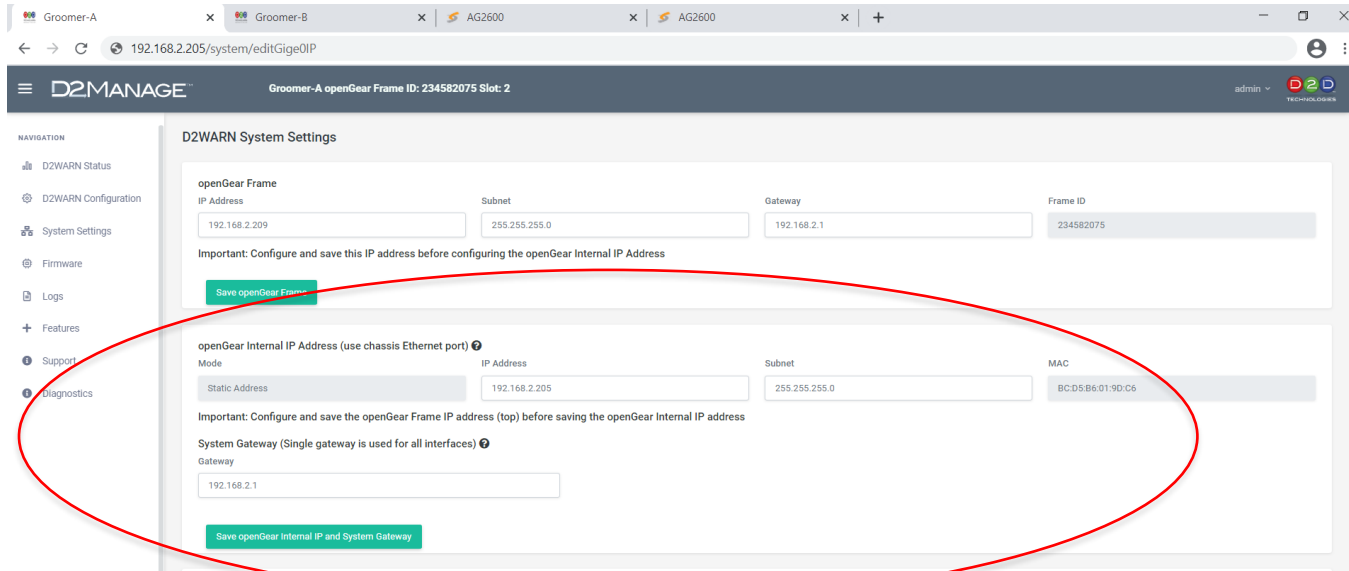
Figure 1-14. Setting the Internal IP Address of the Groomer

Note: When you change the Internal IP address you will lose communications with the groomer. You must change the settings on your locally connected PC to the same subnet as the new Internal IP Address. Then you will be able to reconnect to the groomer with the new IP address.

1.15 IP Address of This Groomer's "Eth 1" Port (Rear Panel)

This IP address is also known as the external IP address. If you lose communication with the frame and groomer cards, this IP address may be used to connect and communicate directly with each groomer card. This is covered later in the Section: **Troubleshooting**.

Note: If you change this address from its default setting, be sure to write it down in case you need it later!

It is important that this address is not on the same subnet as the **openGear Frame** and the **openGear Internal IP Address**. For example, for subnet mask 255.255.255.0, if the **openGear Internal IP Address** is 192.168.2.205, the IP Address of **This Groomer's "Eth 1" Port (Rear Panel)** cannot be on the "2" subnet. It must be on something other than this subnet, such as 192.168.1.205. Configure as required for Groomer A and Groomer B.
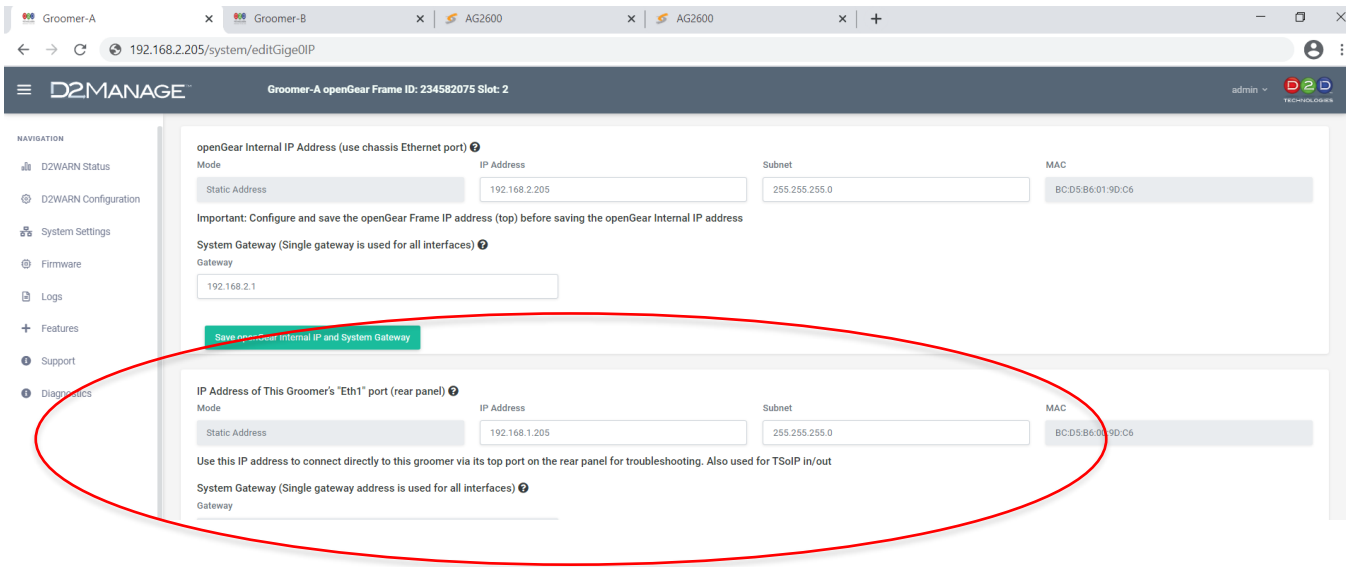
Figure 1-15. Setting the External IP Address of the Groomer

1.16 General Settings

A unique Hostname may be assigned to this Groomer if desired (optional). This is a future feature which will allow the user to access the Groomer simply by entering its Hostname, or identifying the groomer in multisystem installations.

Enter a unique Hostname and click **Save General Settings**.
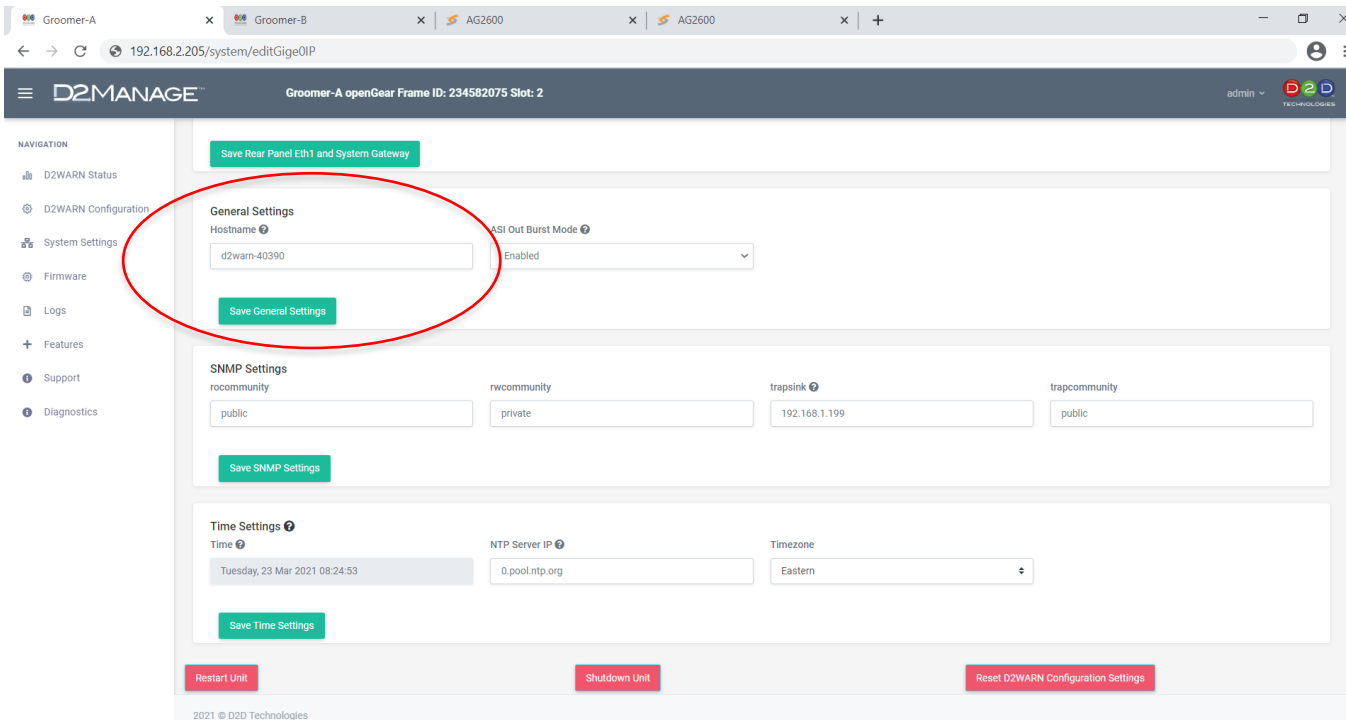
Figure 1-16. Setting the Hostname of the Groomer

Note: The Hostname has restrictions. Only a-z, A-Z, 0-9, dot (.), and hyphen(-) are allowed. The Hostname cannot start or end with a hyphen.

The ASI output of the Groomer may be configured for **Burst Mode** or **Byte Mode**. When **Enabled** the Groomer's ASI output operates at full band width (~213 Mbps). **Enabled** is the default setting. **Disabled** configures the Groomer's ASI Output to **Byte Mode**. When **Disabled** the ASI outputs are constrained to ~53 Mbps. This option provides a compatibility mode for older ASI systems which cannot accept a data byte on every ASI clock.

Note: When enabling or disabling Burst Mode it is important that <u>both</u> groomers are configured the same. This is because the Backup Groomer is still monitoring and processing the signal it passes. It is not in bypass mode and will process the output according to how it is configured.
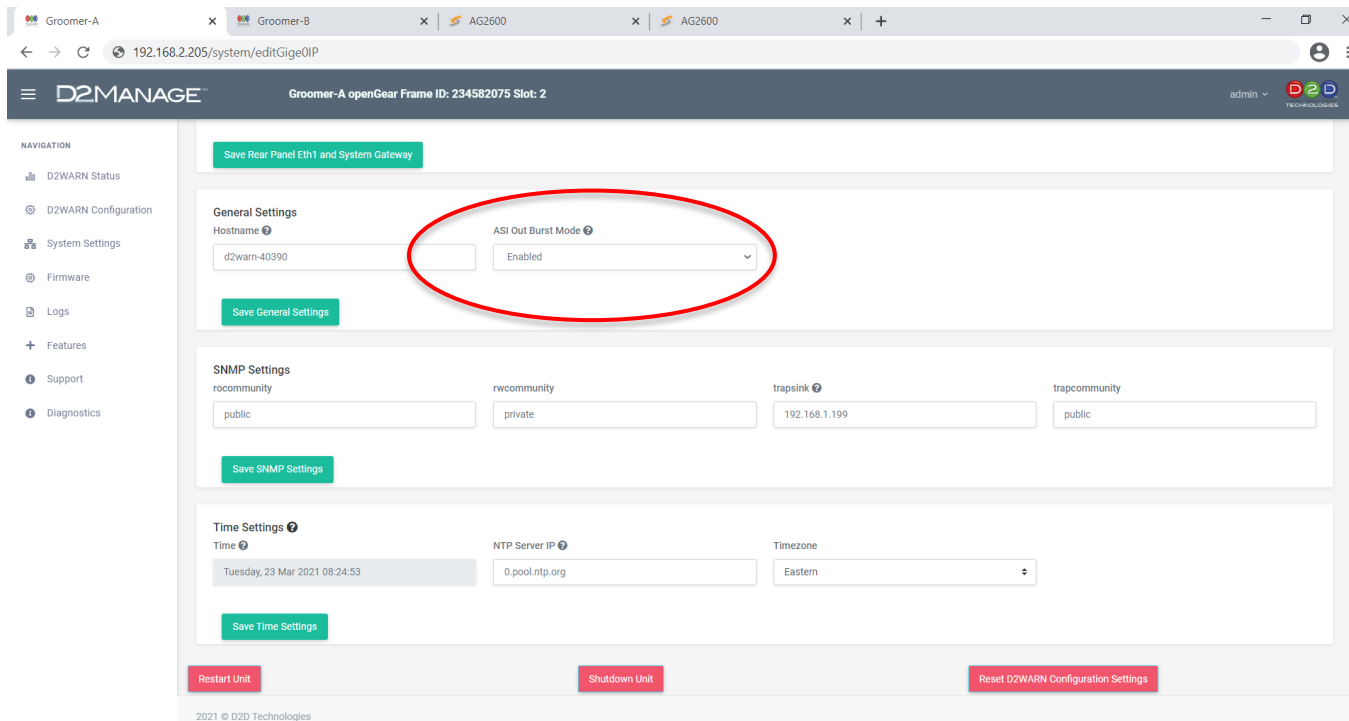
Figure 1-17. Configuring the ASI output of the Groomer for Burst Mode or Byte Mode

1.17 SNMP Settings

The Groomer's alarms may be monitored using SNMP traps. The MIBs may be obtained from D2D, or downloaded from the Groomer. Instructions for downloading the MIBs from the Groomer are provided in the Section: **Monitoring.**

Enter the trapsink IP address, and click **Save SNMP Settings**. The trapsink IP address is the IP address of the SNMP monitoring system. If a MIB browser is used to monitor the traps, the trapsink is the IP address of the PC being used with MIB browsing software.

The SNMP Community settings for each groomer may also be changed if required by the station's monitoring configuration. More information about changing the SNMP Community settings is provided in the Section: **Cyber Security.**

Note: If you change the rocommunity it will affect communication between the Primary and Backup Groomers. If you change the rocommunity name for Groomer A, you must also change the corresponding rocommunity name on Groomer B's GUI for "Cards this Groomer Communicates With." This is covered in an upcoming Section.
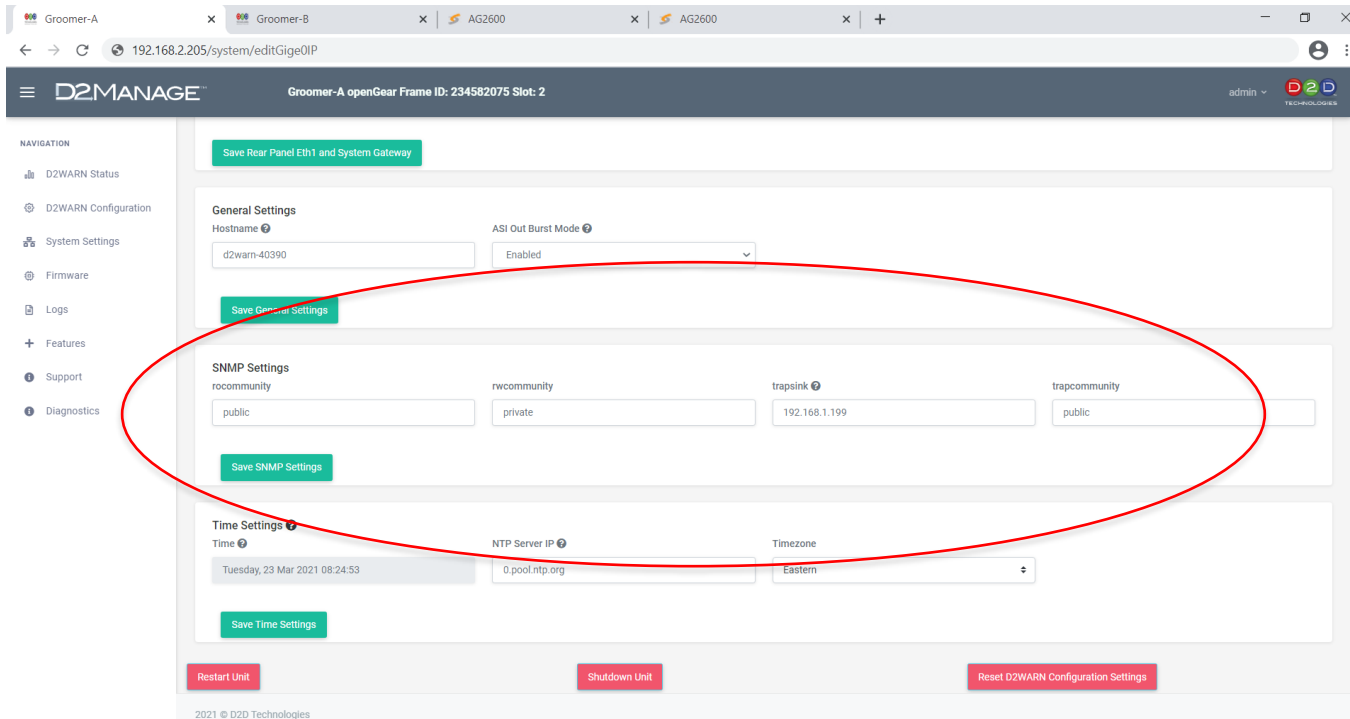
Figure 1-18.   Setting the SNMP trapskink

1.18 Setting the NTP Server IP Address (if applicable) or Manually Setting the Time.

Setting the Time and selecting the Time Zone is accomplished on the **Systems Settings** page.

1. Log in to 192.168.2.205 and navigate to the **Systems Settings** page. To enter the IP address of the NTP server, scroll to the bottom of the **Systems Settings** page. Enter the address of the NTP server and click **Save Time Settings**.
2. To enter the time manually, enter 0.0.0.0 for the NTP Server IP address and click **Save Time Settings**. Then click on the Date and Time in the **Time** box and change as necessary. Click **Save Time Settings**.
3. To select the Time Zone, use the **Timezone** drop down box. Scroll down to the desired Time Zone and click **Save Time Settings**.
4. Log in to 192.168.2.206 and repeat for Groomer B.
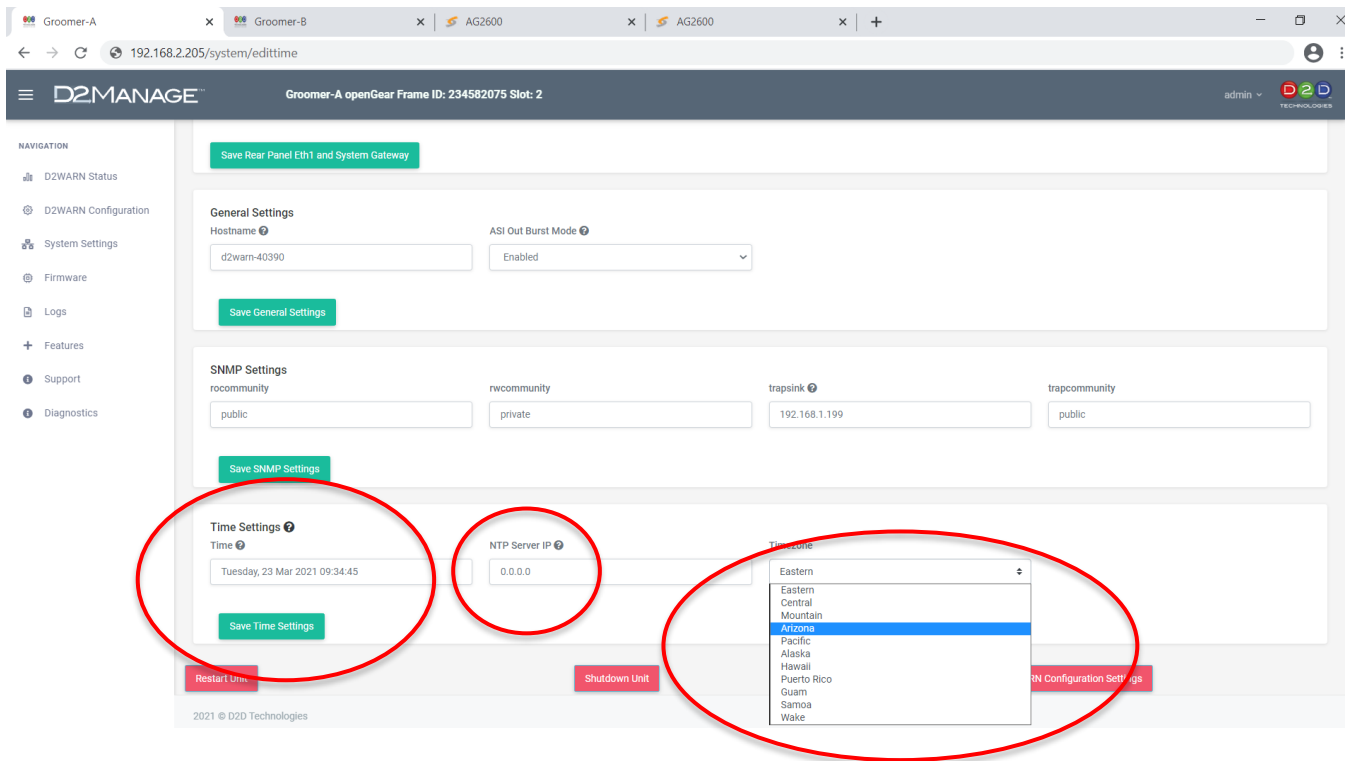
*Figure 1-19. Setting the Time and Date on the **Systems Settings** Page*

1.19 Restarting, Shutting Down, and Resetting the Groomer

The Groomer may be restarted remotely by clicking on the **Restart Unit** button on the bottom of the **Systems Settings** page. This is a soft reset. The Groomer will restart, and you may log back in after a minute or two.

It is recommended that the Groomer be shut down before removing the Groomer card from the openGear frame. This may be accomplished by clicking on the **Shutdown Unit** button. This is a hardware shutdown, and you will not be able to reboot the groomer remotely.

Note: Do not shut the unit down unless someone is on site to reseat the groomer card or power cycle the system!

The user may reset the groomer to its factory default configuration by clicking on the **Reset D2WARN Configuration Settings** button. Resetting the groomer will not change any of the entries on the **Systems Settings** page. The IP addresses of the associated groomer and receiver will not be changed. The **Broadcast Stream Flow and Failover Settings for this Groomer** on the **D2WARN Configuration** page will be reset to **ASI Flow – Failover Role Bypass.**
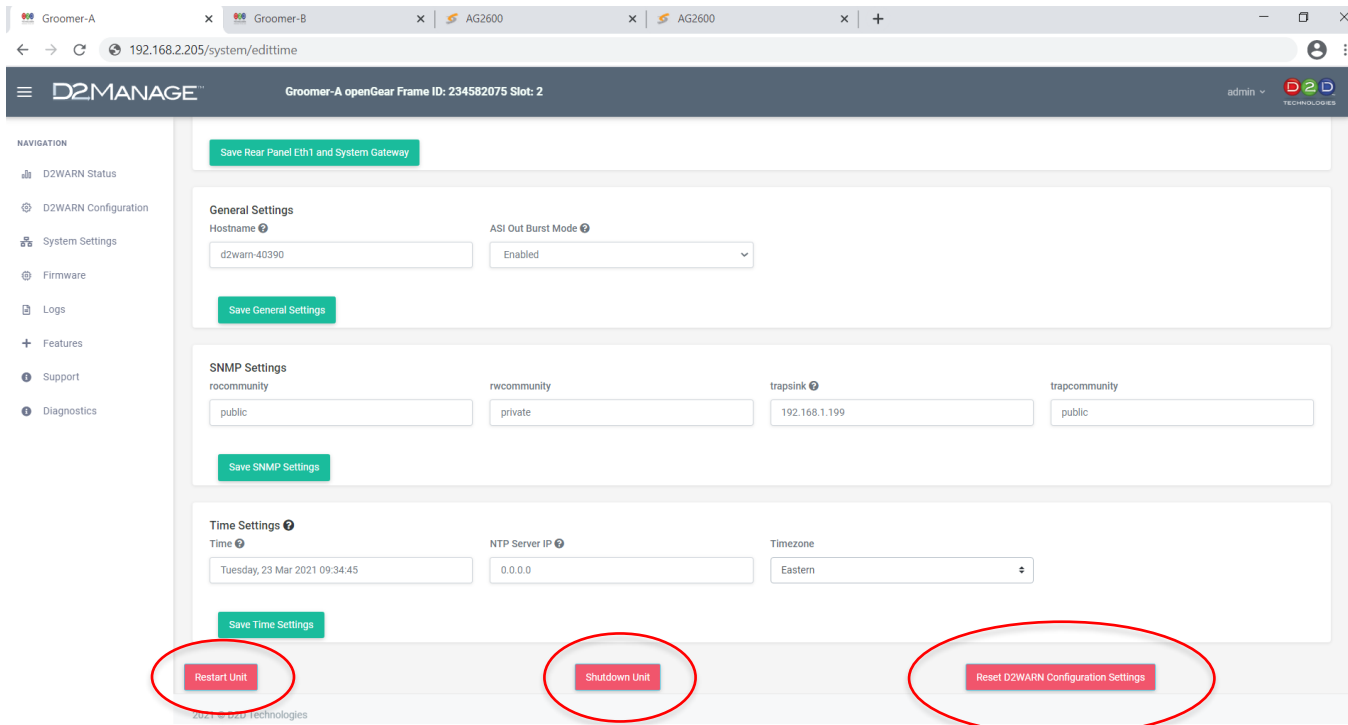
Figure 1-20. Restarting, Shutting Down, or Resetting the Groomer Remotely

1.20 Set the IP Addresses and SNMP Community Names of the Cards the Groomer Needs to Communicate With

The purpose of this section is to tell Groomer A to monitor the status of Satellite Receiver A, and to tell Groomer A to monitor the status of Groomer B.
Likewise, to tell Groomer B to monitor the status of Satellite Receiver B, and to tell Groomer B to monitor the status of Groomer A.

The IP addresses are entered on the **D2WARN Configuration** page, under **Cards this Groomer Communicates With.** The procedure to set the IP address of the cards this groomer communicates with is shown below:

Procedure:

1. Set up Groomer A first. Log in to 192.168.2.205 and go to the **D2WARN Configuration** page of Groomer A. Enter what will be the new IP address for Satellite Receiver A (if Receiver A's address will not change, there is no need to change its default IP address). Also enter the new IP address for Groomer B (if Groomer B's address will not change, there is no need to change its default IP address).
2. Scroll to the bottom of the page and click **Save** or simply hit **Enter** on your PC to apply settings.
3. Now set up Groomer B. Log in to 192.168.2.206 and go to the **D2WARN Configuration** page of Groomer B. Enter what will be the new IP address for Satellite Receiver B (if Receiver B's address will not change, there is no need to change its default IP address). Also enter the new IP address for Groomer A (if Groomer A's address will not change, there is no need to change its default IP address).
4. Scroll to the bottom of the page and click **Save** or simply hit **Enter** on your PC to apply settings.
5. You can now use the connection test buttons for satellite and groomer entries on both systems to ensure that the IP addresses are correct.
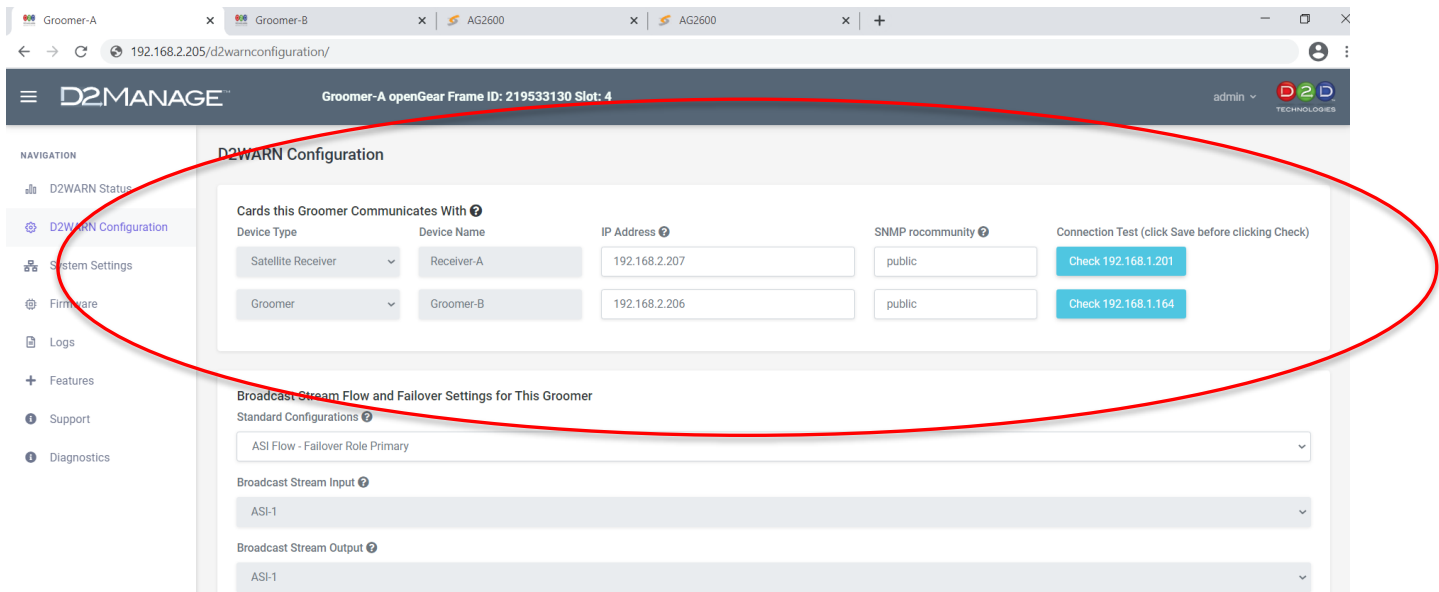
Figure 1-21. **D2WARN Configuration** Page

The **SNMP rocommunity** name for the corresponding Satellite Receiver and Groomer may also be changed. This is required if the **SNMP rocommunity** name for the corresponding Groomer was changed on that groomer's **Systems Settings** page, or if the corresponding Satellite Receiver's **Read-Only Community** name was changed. The Read Only Community names must match on the groomer and its corresponding groomer or satellite receiver. More information can be found in the Section: **Cyber Security.**

The Sencore receiver's SNMP Community Names are set on the receiver GUI's Admin page. The Read-Only Community is used to communicate with its associated Groomer. The Read-Write Community is used for external monitoring of the receiver, if desired. More information can be found in the Section: **AG2600 Satellite Receiver**.

Figure 1-22. **SNMP Communities** on the Receiver's Admin Page

1.21 Taking the System out of Bypass - Activating the System and Putting it into Operation

As received from the factory, the Groomers are configured in Bypass mode. ***The D2WARN status and front light bar will show red until it is taken out of bypass and the groomer sees a valid incoming transport stream. This is normal.***
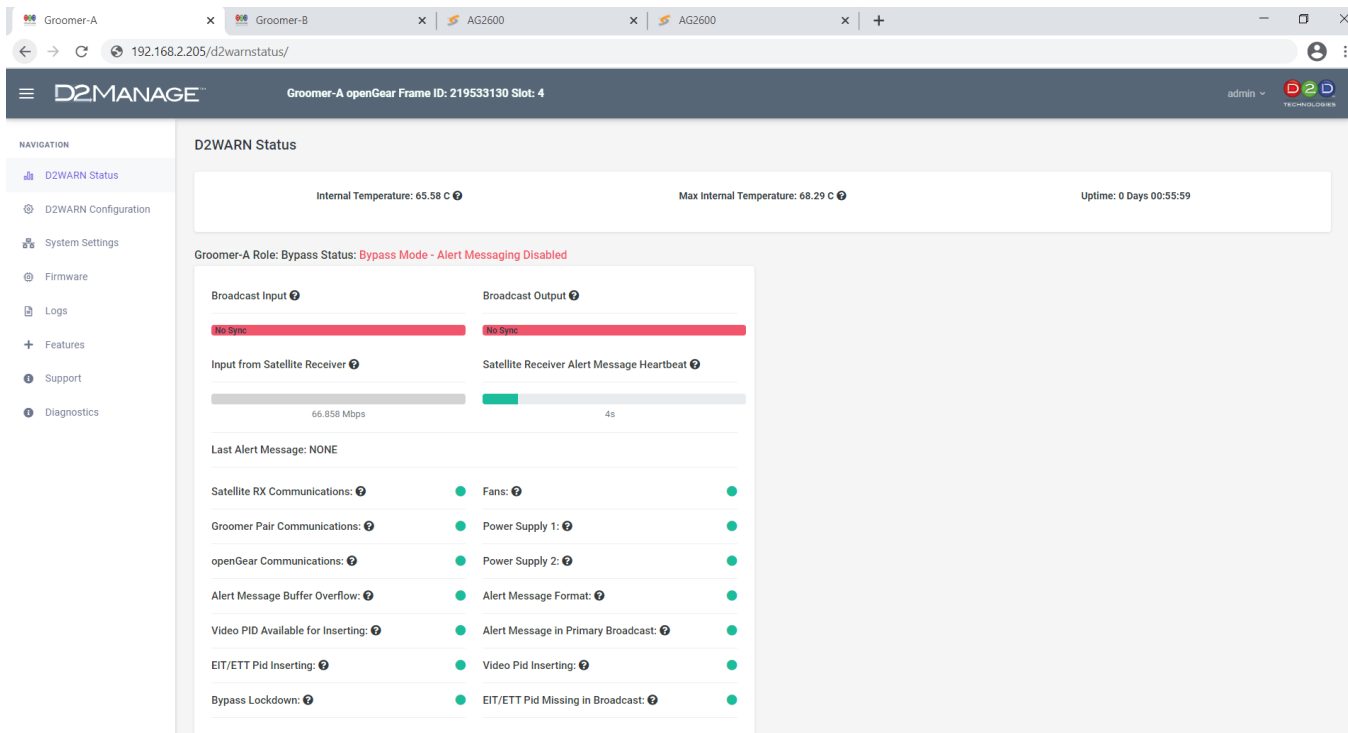
Figure 1-23. **D2WARN Status** *Page in* **Bypass** *Mode*

The D2WARN system as received from the factory will pass the ASI transport stream directly and transparently, with no WARN messages inserted. The Primary and Backup Groomers have been pre-configured for **ASI Flow – Failover Role Bypass**. Once the IP addresses are configured the system is ready to be taken out of bypass and put into operational mode. These steps will describe putting the system into ASI Flow with Internal Redundancy.

In this mode the Broadcast Stream Flow will be ASI in to ASI out, and the cards will operate in a Primary/Backup configuration. This is the most common configuration. Please see the Configurations section for other options.

1. Connect to Groomer A and go to the **D2WARN Configuration** page.
2. From the **Standard Configurations** drop down menu select **ASI Flow-Failover Role Primary** to set Groomer A as the Primary.
3. Scroll to the bottom of the page and click **Save.**
4. Connect to Groomer B and go to the **D2WARN Configuration** page.
5. From the **Standard Configurations** drop down menu select **ASI Flow-Failover Role Backup** to set Groomer B as the Backup.
6. Scroll to the bottom of the page and click **Save.**

Figure 1-24. Taking the Units Out of Bypass

The user may now configure the system to meet the station's requirements. Configuring the system is covered in the following section.

2 Configurations

2.1 D2WARN ASI System Configuration

The ASI based D2WARN system is designed to reliably insert the designated emergency message PID(s) into the broadcast transport stream with full ASI failsafe and automatic failover capabilities for a fully resilient solution in case of power or component failure. In the unexpected case where the groomer processor fails or power is lost, a failsafe ASI bypass ensures that the broadcast stream is maintained.

2.2 Initial Default Configuration:

The D2WARN system as received from the factory will be preconfigured as follows:

1. The two Satellite Receivers will be pre-tuned and configured to receive the PBS Ku-band satellite feed (Galaxy-16) that contains the WARN message data in designated PIDs. Details for the configurations may be found in the Section: **Uploading a Configuration File to the Satellite Receiver Card**.
2. The D2WARN Groomer cards will be in bypass mode and will remain in bypass mode until configured otherwise by the station engineer(s).
    1. The **Alert Message Source** will be pre-configured to **ASI-2**.
    2. Default IP addresses will be configured in all modules (Satellite Receivers, Groomers, and the openGear frame) as per the Section: **Getting Started**.
    3. All D2D provided BNC-F coax jumpers will be in place.

In the Section **Getting Started**, the system was taken out of bypass and configured for internal failover as follows:
  ASI Flow – Failover Role Primary (for the Primary Groomer)
  ASI Flow - Failover Role Backup (for the Backup Groomer).

Internal failover is described below.

2.3 Theory of Operation

In the preferred configuration where the WARN system is installed after the station's encoder, the groomer "looks" for null packets to use for inserting Alert Messages. The alert messages are inserted into the station's broadcast transport stream, and fed to the station's transmitter for over the air broadcast.

The Alert Messages are typically received from the satellite, and fed into the groomer for insertion.

This section describes the theory of operation for internal failover redundancy when used with the station's ASI or SMPTE-310 broadcast stream.

Refer to the ASI Internal Failover System Block Diagram, below. ASI failover redundancy is accomplished in the D2WARN system by way of a cascaded signal flow from the Primary Groomer to the Backup Groomer. The Primary Groomer inserts the WARN messages, and the Backup Groomer simply passes the station's program transport stream, with messages inserted, out to the station's broadcast chain. If the Primary Groomer fails it will pass the transport stream unaltered, without inserting Alert Messages, on to the Backup Groomer. In this event, the Backup Groomer takes over, and inserts the Alert Messages.

When the Primary Groomer is inserting, the Backup Groomer is not in bypass mode. It is still monitoring the health of the Primary Groomer, and processing the transport stream.

Satellite Receiver redundancy is handled by failing over to the other receiver / groomer pair. If the Primary Satellite Receiver fails, the system will switch to the Backup Satellite Receiver and Backup Groomer.
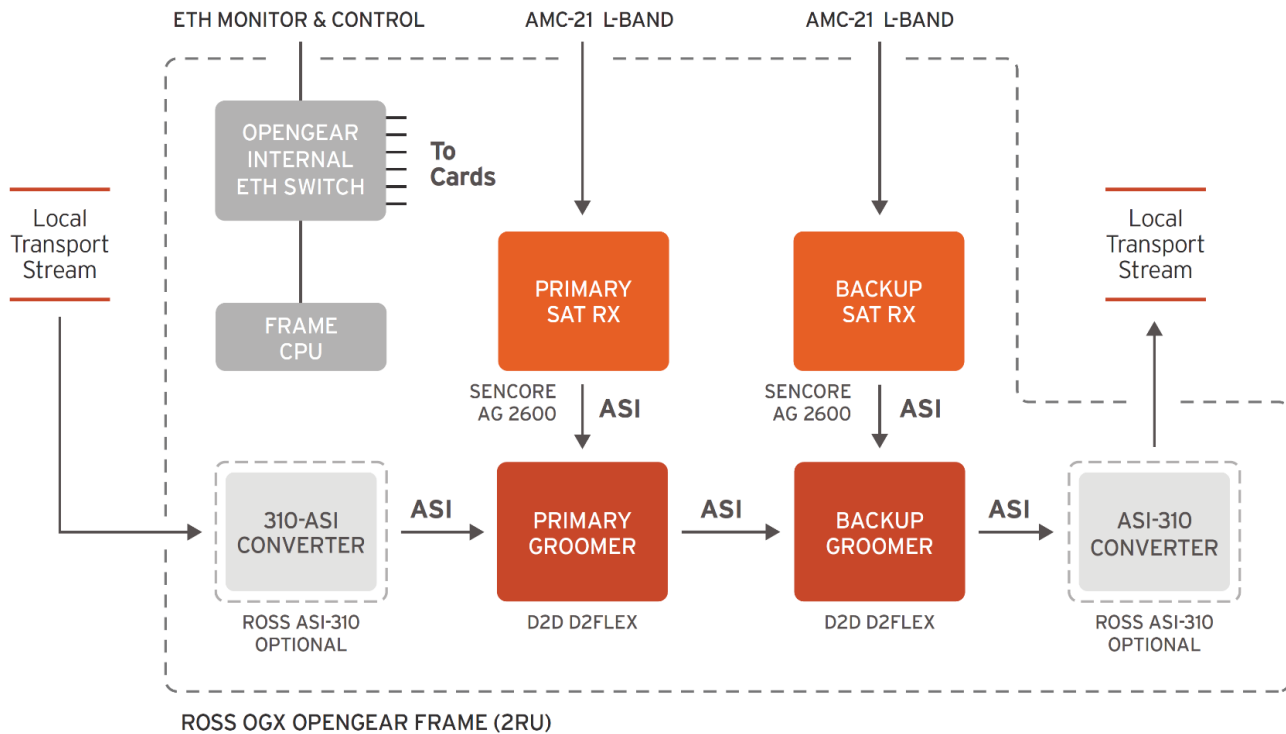
Figure 2-1. Broadcast Signal Flow, Internal Redundancy Scenario

In its standard equipment configuration, the D2WARN System is shipped with one Primary Groomer in slot 2, and one Backup Groomer in slot 8. Due to the cabling on the backplane, the Groomer card plugged in to slot 2 can only be configured as the Primary Groomer (that is, it cannot be configured as the backup). Likewise, the Groomer card plugged in to slot 8 can only be configured as the Backup Groomer. With non-standard equipment configurations, these slot numbers may change.

Failure of a satellite receiver or groomer is detected via SNMP. The health of the satellite receivers and groomers is monitored by continuously polling. If the Primary Groomer does not receive a status update from the Primary Satellite Receiver and no heartbeat is received by the Primary Groomer from the Primary Satellite Receiver, the system will failover to the Backup Receiver / Groomer pair. If the Primary Groomer is still receiving heartbeats from the Primary Satellite Receiver, it will assume that the Primary Satellite Receiver is actually OK and not failover.

In the case of the groomers, each groomer will unicast its status to the other. If the Primary Groomer stops receiving the status from the backup it will be considered a warning. If the Backup Groomer stops receiving the status from the Primary Groomer and no heartbeat is received by the Primary Groomer from the Primary Satellite Receiver, the system will failover to the Backup Receiver / Groomer pair. If heartbeats are being received by the Primary Groomer, it will assume that Groomer A is actually OK and not failover.

In addition to monitoring its health via SNMP, there is an additional failover trigger for the satellite receivers. Since it is not possible to tell if the loss of satellite PBS heartbeat messages is due to rain fade or some other issue, missing PBS heartbeats will not immediately cause a failover to the backup receiver and groomer. In order to account for both short term rain fade conditions and long-term failure conditions, there will be two time out settings. The first timeout will be measured in seconds. Its default value is 40 seconds. When the seconds timeout is reached it will only issue a warning since it may be an indication of rain fade.

The second timeout will be measured in minutes and should be set for a longer period than a typical rain fade. Its default value is 60 minutes. When the minutes timeout is reached it will be considered a failure and will trigger the backup groomer (if present) to take over. Both the short term and long-term time out values are configurable on the **D2WARN Configuration** page.
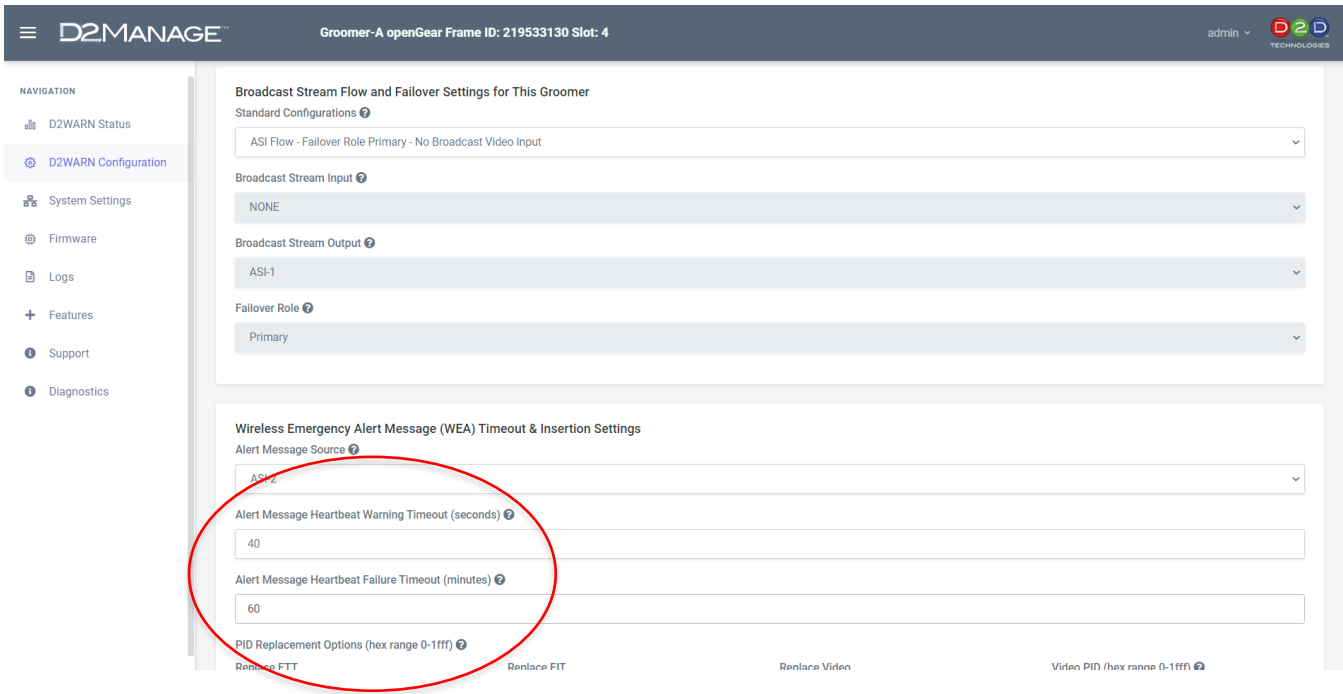
Figure 2-2. Configuring the Short (Seconds) and Long (Minutes) Alert Message Heartbeat Timeout

In order to prevent the system from thrashing between groomers, it requires the user to manually switch Alert Message insertion back to the Primary Groomer once it has returned to a healthy state. A "**Revert Back to Primary Groomer**" button on the Backup Groomer's **D2WARN Status** page is used to manually switch Alert Message insertion back to the Primary Groomer. Also shown is the configuration and status of each groomer.
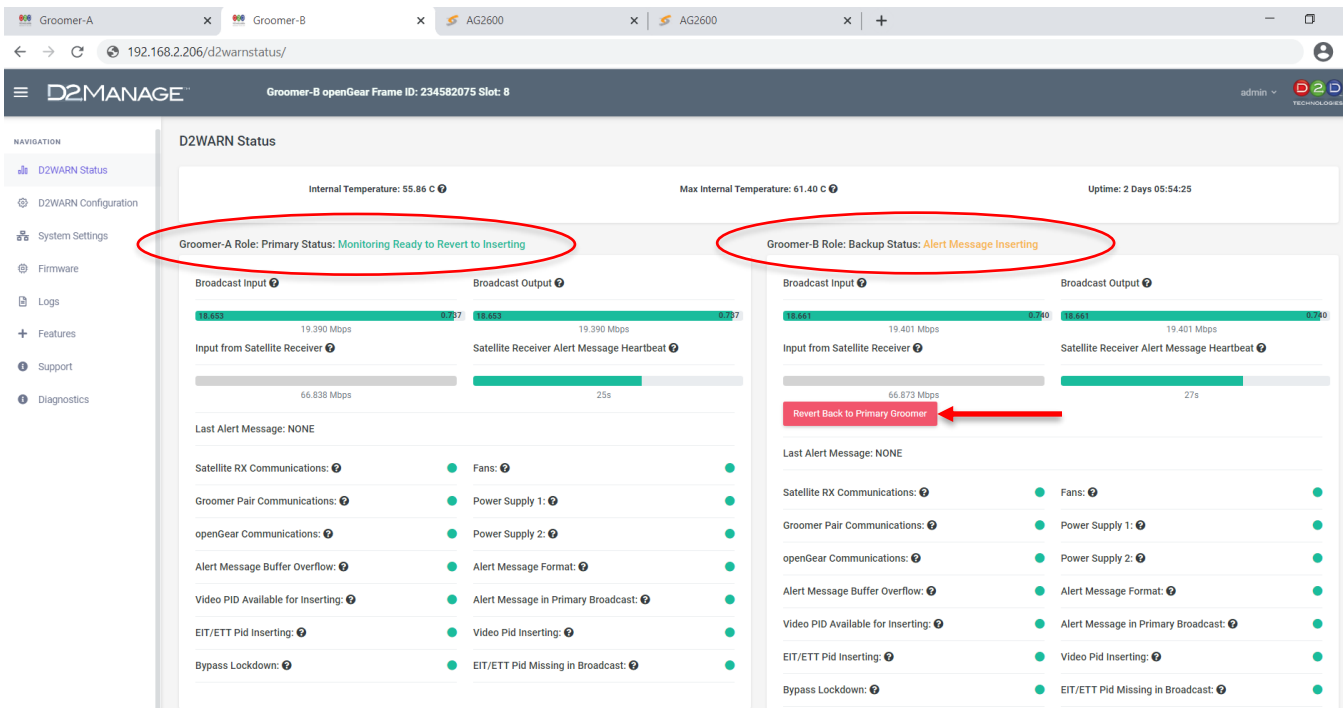
*Figure 2-3. **Revert Back to Primary Groomer** Button*

2.4 ASI Failover Configurations

Each of the two D2WARN Groomers can be configured in any of the standard failover configurations, plus one non-standard configuration. The configurations are chosen on the D2WARN Configuration page for each Groomer.

2.4.1 ASI Flow – Failover Role Primary

Groomer A is typically configured as the Primary Groomer. When selected, the system's input is set to the ASI-1 IN port of Groomer A in slot 2. The system's output is set to the ASI-1 OUT port of Groomer B in slot 8. The Groomer being configured is designated as Primary (see below).

In normal operation the Primary Groomer will insert Alert Messages into the stations program transport stream and feed the complete transport stream to the Backup Groomer. The Backup Groomer will pass the transport stream unaltered out to the station's broadcast chain.
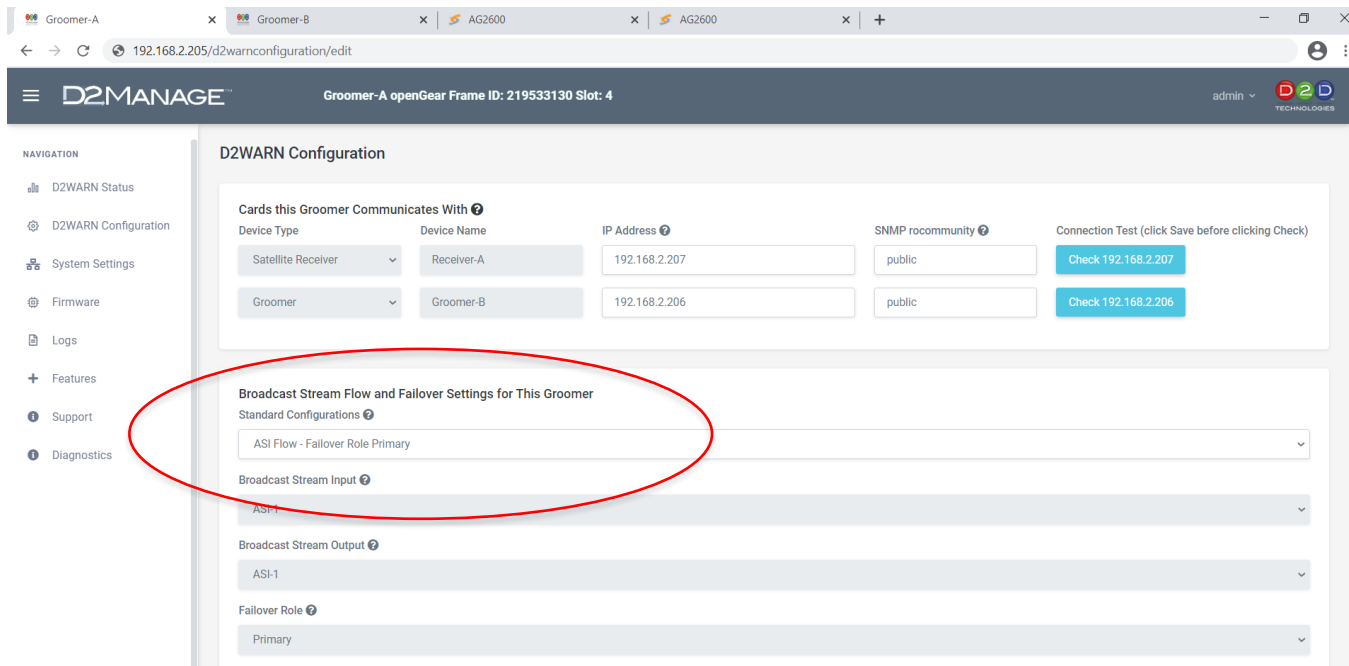
Figure 2-4. Primary Groomer Configuration

In the event of failure or extended periods of missing heartbeats from PBS, the Primary Groomer will failover, and pass the transport stream without Alert Messages to the Backup Groomer. In this event, the Backup Groomer will assume the role of inserting Alert Messages.

Note: Due to the cabling on the backplane, the Groomer card plugged in to slot 2 can only be configured as the Primary Groomer (that is, it cannot be configured as the Backup).

2.4.2 ASI Flow – Failover Role Backup

Groomer B is typically configured as the Backup Groomer. When selected, the system's input is set to the ASI-1 IN port of Groomer A in slot 2. The system's output is set to the ASI-1 OUT port of Groomer B in slot 8. The Groomer being configured is designated as the Backup (see below).

In normal operation, the Backup Groomer will simply pass the transport stream from the Primary Groomer unaltered out to the station's broadcast chain.
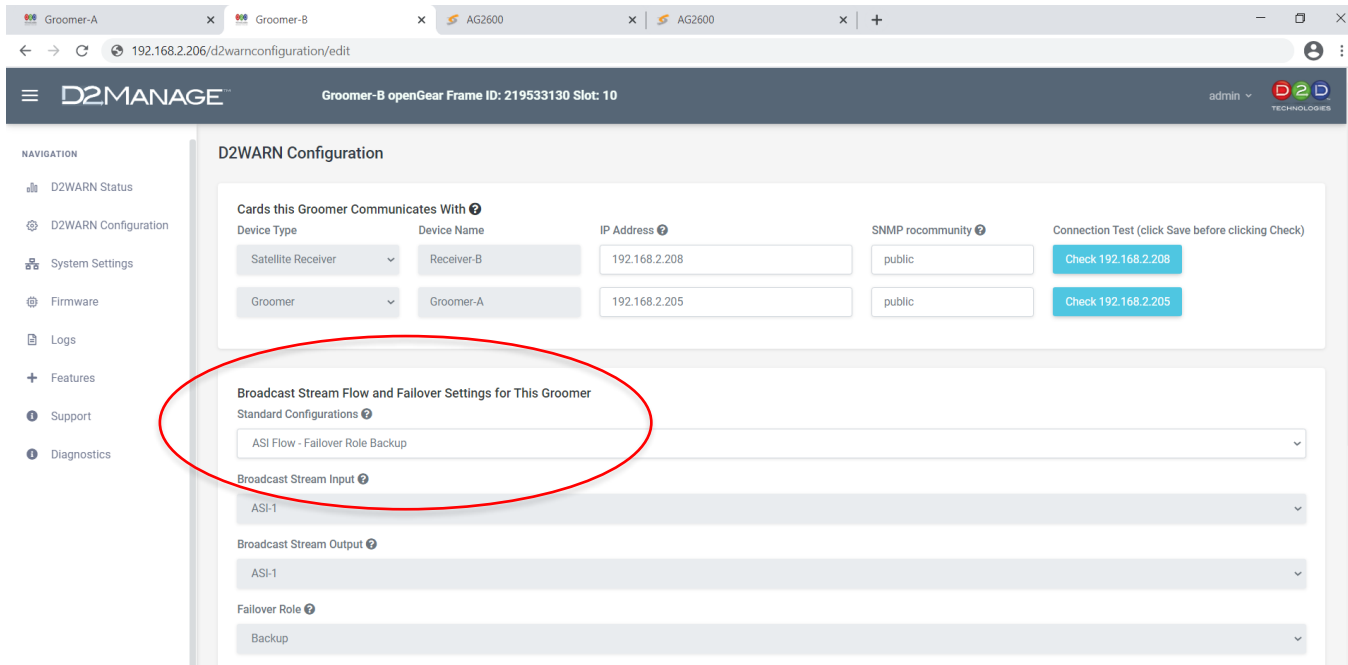
Figure 2-5. Backup Groomer Configuration

In the event of Primary Groomer failure, the Backup Groomer will assume the role of inserting Alert Messages. If the Backup Groomer fails, it will simply pass the transport stream as received from the Primary Groomer out to the station's broadcast chain.

The Backup Groomer is not capable of failing over to the Primary Groomer. The Groomer card plugged in to slot 8 can only be configured as the Backup Groomer.

2.4.3 ASI Flow – Failover Role None (External Failover)

The D2WARN system can be configured with the two Receiver-Groomer pairs independent of each other to allow member stations to run the systems in parallel. This configuration is used for both groomers when no internal failover is desired. A typical example is a station running "chain redundancy," with two broadcast chains (and in some cases, two STLs). An external ASI redundancy switch is used.

In this configuration the following conditions apply:

1. PBS member stations are responsible for switching the output stream in case of a component or system failure. No automatic failover is provided by the D2WARN system.

2. Any of the supported configurations can be configured as External Failover. See the Section: **Failsafe and Failover.**

For this configuration, Groomer A is configured as **ASI Flow – Failover Role None**. Groomer B is also configured as **ASI Flow – Failover Role None** (see below).
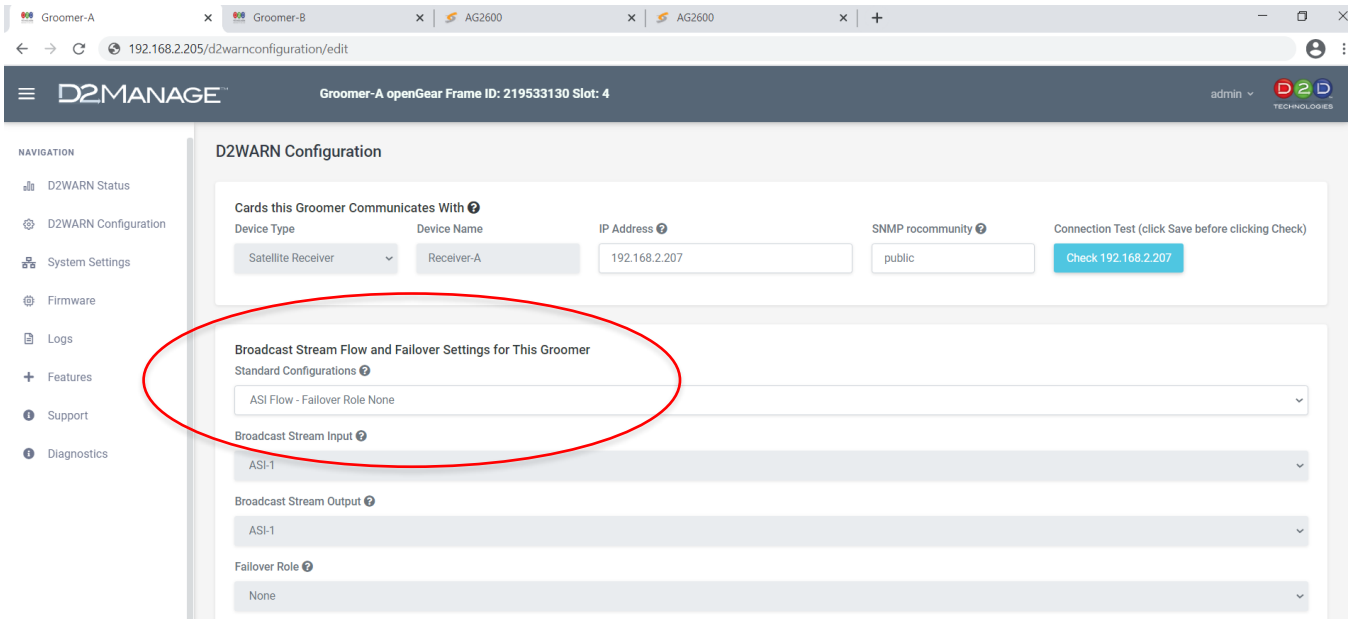
Figure 2-6. Failover Role None

Note that in this configuration, each groomer will only communicate with its associated satellite receiver. It will not "listen" to the status of the other groomer (as it is not required with no internal failover). Only the satellite receiver associated with each groomer will be configured and displayed on the **D2WARN Configuration** page, under **Cards This Groomer Communicates With** (see below).
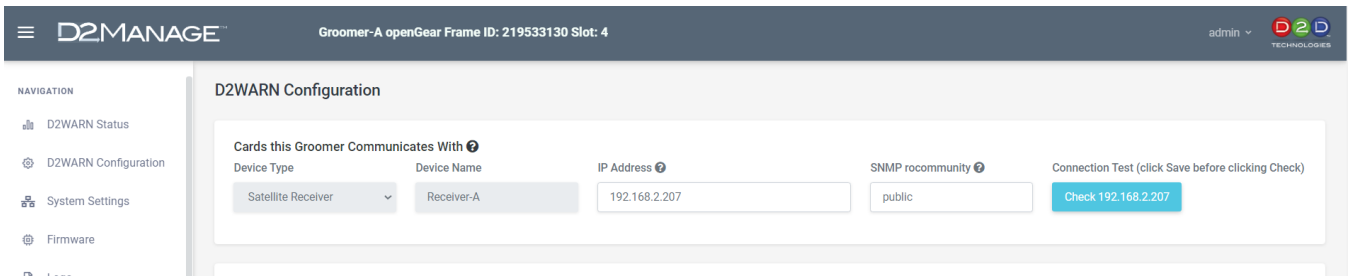
Figure 2-7. ***Cards This Groomer Communicates With*** *when in **Failover Role None** (External Failover)*

The system's input port for the station's A broadcast chain is set to the ASI-1 IN port of Groomer A in slot 2. The output is set to ASI-1 OUT port of Groomer A.

The system's input port for the station's B broadcast chain is set to the ASI-1 IN port of Groomer B in slot 8. The output is set to ASI-1 OUT port of Groomer B.

Satellite Receiver A and Groomer A will add Alert Messages to the station's A transport stream, which is then sent out to the station's primary or A broadcast stream. Satellite Receiver B and Groomer B will add Alert Messages to the station's B transport stream, which is then sent out to the station's backup or B broadcast stream. Refer to the ASI External Failover System Diagram (see below).
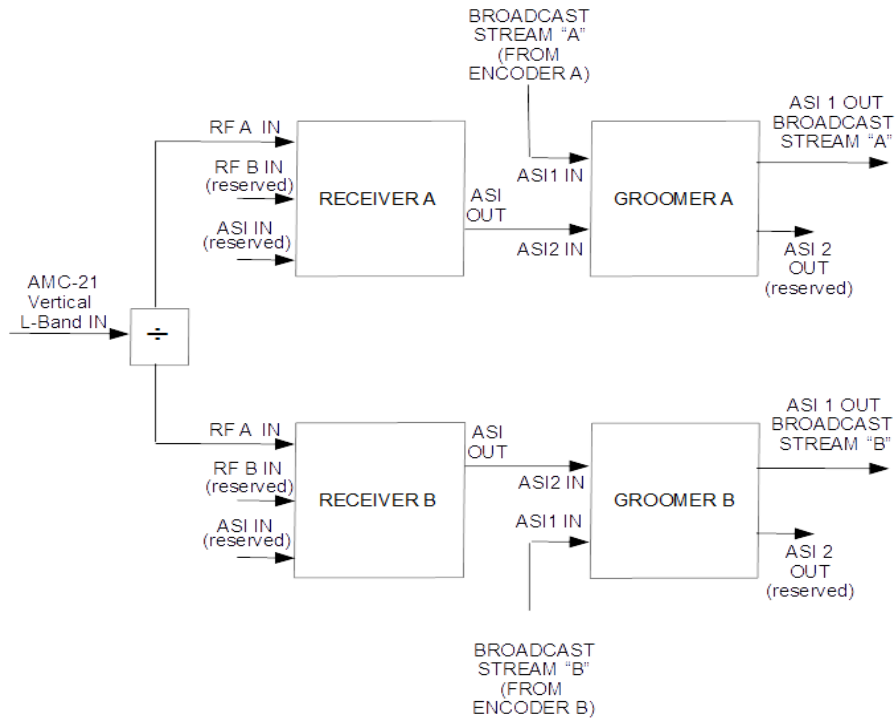
Figure 2-8. External Failover

2.4.4 ASI Flow – Failover Role Bypass

This configuration is used for both groomers when it is desired to put the D2WARN system in bypass mode. Both groomers are configured as **ASI Flow – Failover Role Bypass**. In this configuration the bypass relay in each groomer is de-energized. The station's program transport stream is passed directly from the input to the output of the D2WARN System with no message insertion.

In some cases, it may be desired to put only one of the groomers in bypass mode. This can be accomplished by configuring only that groomer.

Note: If a groomer is in bypass mode, it will not insert Alert Messages in the event of the other groomer's failure.

Note: In the event of a power failure, the bypass relay will de-energize and put the system in bypass mode.

Note: Removing a groomer card will interrupt the station's broadcast. The system will <u>not</u> go into bypass or failover to the backup groomer. The WARN system must be patched around.
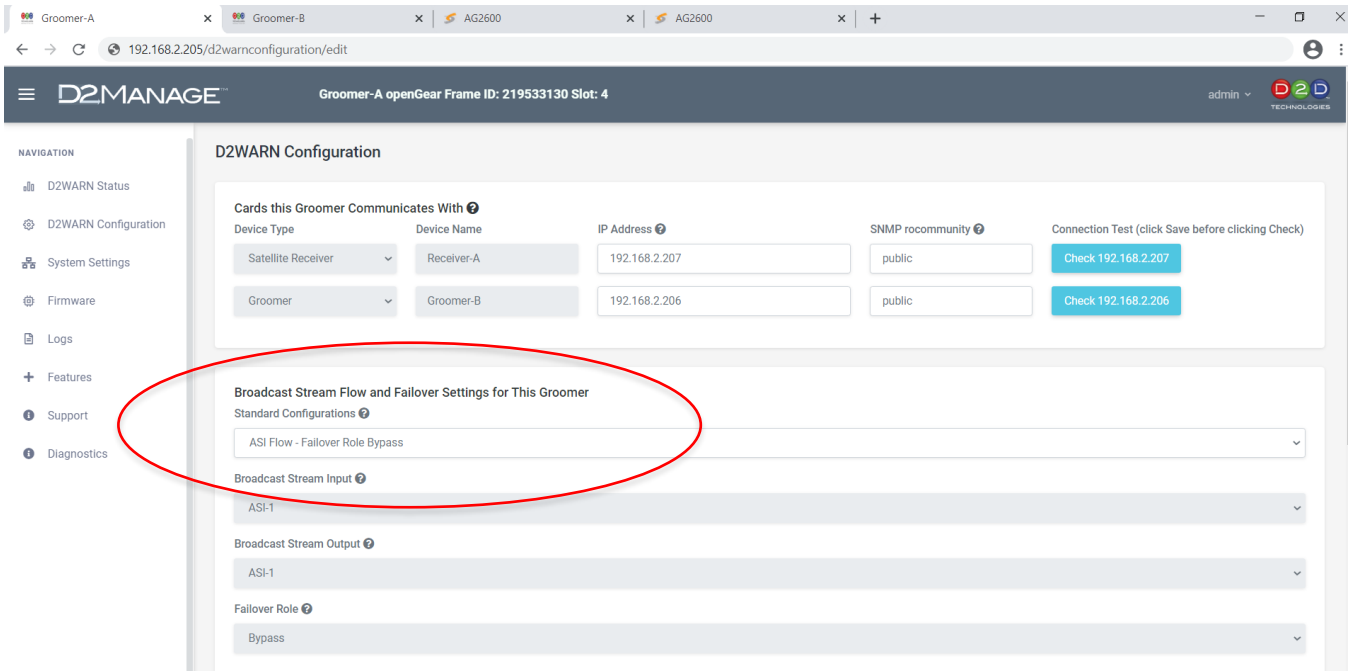
Figure 2-9. Bypass Mode

2.4.5 ASI Flow - Failover Role None - No Broadcast Video Input

This configuration is used for both groomers when it is desired to operate in "No Input Mode." In this mode WARN messages are inserted at a rate that will not exceed 150 kbps. The output of the groomer will also be capped at approximately 150 kbps. This mode is typically used when the output of the system is fed into a multiplexer along with the station's broadcast feed.

Note: In this configuration there is no internal failover redundancy. If internal failover redundancy is desired, the configurations described next should be used.
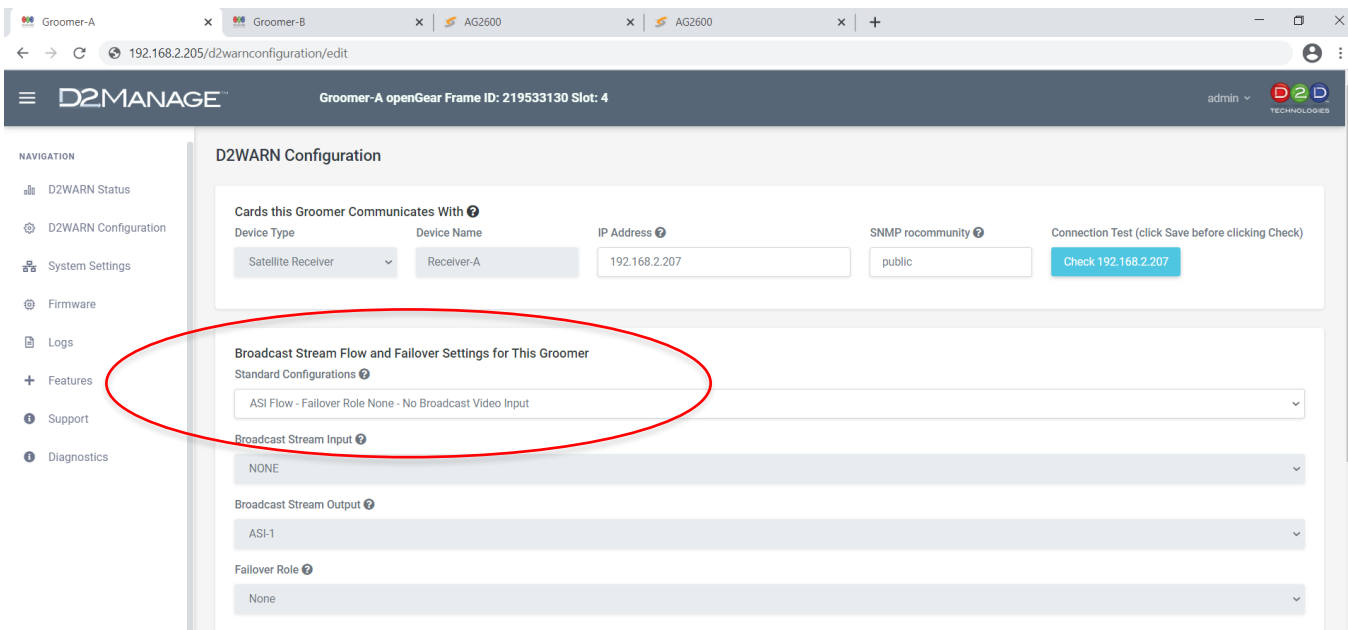
Figure 2-10. Failover Role None - No Broadcast Video Input. Primary and Backup Configuration

No input mode is typically used when the station's broadcast stream is not passed through the D2WARN system. The output of the D2WARN system, with a message data rate limited to 150 kbps, is multiplexed along with the station's broadcast stream to produce a total output of program and Alert Messages.

2.4.6 ASI Flow - Failover Role Primary - No Broadcast Video Input

This configuration is similar to the configuration described above, however it is used when internal redundancy is desired. The primary groomer is configured for **ASI Flow – Failover Role Primary – No Broadcast Video Input**.

In this mode WARN messages are inserted at a rate that will not exceed 150 kbps. The output of the groomer will also be capped at approximately 150 kbps. This mode is typically used when the output of the system is fed into a multiplexer along with the station's broadcast feed.

Figure 2-11. ASI Flow - Failover Role Primary - No Broadcast Video Input

No input mode is typically used when the station's broadcast stream is not passed through the D2WARN system. The output of the D2WARN system, with a message data rate limited to 150 kbps, is multiplexed along with the station's broadcast stream to produce a total output of program and Alert Messages.

2.4.7 ASI Flow - Failover Role Backup - No Broadcast Video Input

This configuration is similar to the configuration described above for the primary groomer, however it is used for the backup groomer when internal redundancy is desired. The backup groomer is configured for **ASI Flow – Failover Role Backup – No Broadcast Video Input**.

For internal redundancy with no video input, the primary groomer is configured for **ASI Flow – Failover Role Primary – No Broadcast Video Input**. The backup groomer is configured for **ASI Flow – Failover Role Backup – No Broadcast Video Input.**
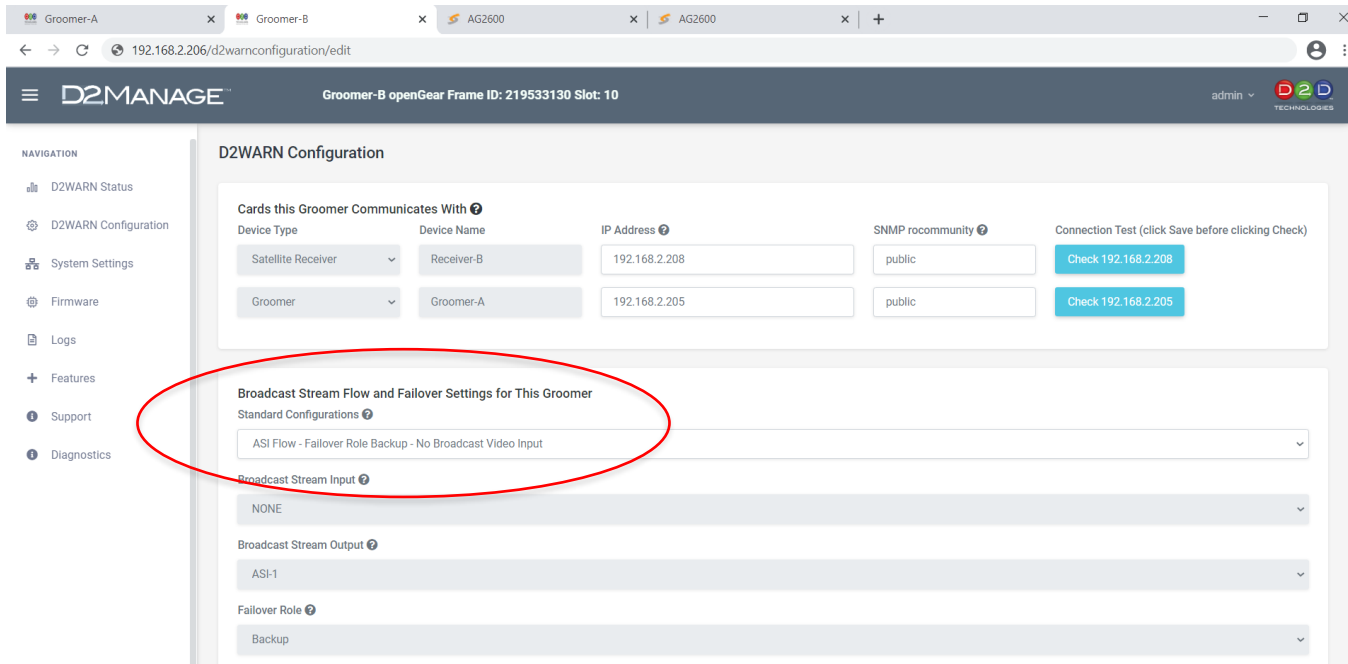
Figure 2-12. ASI Flow - Failover Role Backup - No Broadcast Video Input

2.4.8 Manual Configuration

The preceding failover configurations (above) are standard configurations. When one of these standard configurations is selected, the Broadcast Stream Input, Output, and Failover Roles are automatically set for the Groomer being configured. They appear in the drop down menu as "read only."

For configurations which do not fit one of the standard configurations, **Manual Configuration** may be selected. Manual Configuration allows the user to select each parameter individually. This allows setting the input and output however you want including **ASI 1**, **IP** or **None** for **Broadcast Stream Input**, and **ASI** or **IP** for **Broadcast Stream Output**. You must first select **Manual Configuration**, then scroll to the bottom of the page and click **Save**. Then go back to set the Input, Output, and Failover Roles and click **Save** again.

2.4.8.1 Broadcast Stream Input set to None

This configuration is the same as no input mode. In this mode WARN messages are inserted at a rate that will not exceed 150 kbps. The ASI or TSoIP output of the groomer is capped at approximately 150 kbps. This mode is typically used when the output of the system is fed into a multiplexer al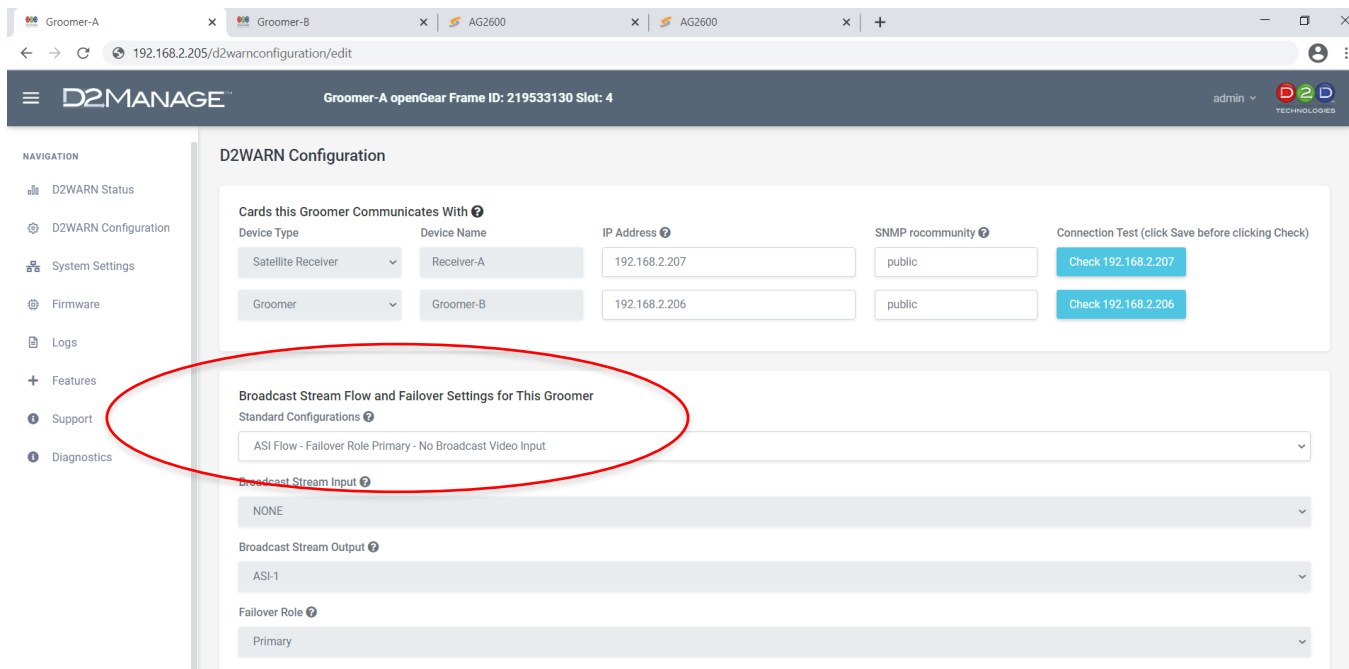ong with the station's broadcast feed. The output of the D2WARN system is multiplexed along with the station's broadcast stream to produce a total output of program and Alert Messages.

Note: When configured for Input None the output of the groomer is an unrefenced PID at a very low data rate. The stations mux may need to be specially configured to accept this. Check with your equipment manufacturer's Technical Support.

2.4.8.2 Broadcast Stream Input set to ASI-1

In this configuration the station's broadcast stream is fed into Groomer A's **ASI-1 IN** port. This is similar to the standard ASI configurations described above, however the output may now be set to **ASI-1** or **IP**.

2.4.8.3 Broadcast Stream Input set to IP

Note: Internal Failover is not supported for TSoIP configurations. If the input and/or output are set for IP, only one groomer is used. The other groomer is not used. It may remain in the frame if desired and kept as "warm" spare. The station must provide for redundancy externally. There is no built in redundancy.

This configuration allows the system to be set up for ASI in / TSoIP out, TSoIP in / TSoIP out, or Input None / TSoIP out. To configure the **Broadcast Stream Input,** enter the port and IP address. Choose **Failover Role**: **None** from the drop down menu. Click **Save**.

The IP address may be a Unicast or Multicast address. If a Unicast address is entered, it *must* be on the same subnet as the **Eth1** port.

The physical input port for TSoIP is the groomer's **Eth 1** port on the back of the groomer. The TSoIP input and output share the same physical port.

The D2WARN system supports multicast UDP, 7 packets per frame, with no error correction.

Eth 1

RESERVED

Note: the Eth1 port is on the external subnet. Most stations want to keep their TSoIP traffic on a different subnet from the command and control interface. The groomers support two subnets, used for the internal and external interfaces.

Note: The Eth2 port is reserved for future use.

Note: Internal Failover is not supported for IP at this time.

Figure 2-13

Examples of several configurations are shown below:

Figure 2-14. TSoIP Input Configuration. Groomer B is Configured for TSoIP in Multicast, ASI out. Failover Role: None. External IP Address Eth1 set to 192.168.1.206.

Figure 2-15. TSoIP Input Configuration. Groomer B is Configured for TSoIP in Multicast, TSoIP out Unicast. Failover Role: None. External IP Address Eth1 set to 192.168.1.206.

Figure 2-16. TSoIP Input Configuration. Groomer B is Configured for TSoIP in, TSoIP out. Unicast. Failover Role: None. External IP Address Eth1 set to 192.168.1.206.

2.4.8.4 Broadcast Stream Output set to ASI-1

In this configuration the broadcast stream output from the groomer is configured to the **ASI-1 OUT** port. This is similar to the standard ASI configurations described above, however the input may now be set to **ASI-1** or **IP**.

2.4.8.5 Broadcast Stream Output set to IP

Note: Internal Failover is not supported for TSoIP configurations. If the input and/or output are set for IP, only one groomer is used. The other groomer is not used. It may remain in the frame if desired and kept as "warm" spare. The station must provide for redundancy externally. There is no built in redundancy.

Note: When configured for Input None the output of the groomer is an unrefenced PID at a very low data rate. The stations mux may need to be specially configured to accept this. Check with your equipment manufacturer's Technical Support.

This configuration allows the system to be set up for ASI in / TSoIP out, TSoIP in / TSoIP out, or Input None / TSoIP out. To configure the **Broadcast Stream Output,** enter the port and IP address of the IP equipment downstream from the WARN system. Choose **Failover Role**: **None** from the drop down menu. Click **Save**.

The IP address may be a Unicast or Multicast address. If a Unicast address is entered, it *must* be on the same subnet as the **Eth1** port.

The physical input port for TSoIP is the groomer's **Eth 1** port on the back of the groomer. The TSoIP input and output share the same physical port. The **Eth1** IP address is the groomer's Source Address.

The D2WARN system supports multicast UDP, 7 packets per frame, with no error correction.

Examples of several configurations are shown below:

Figure 2-17. TSoIP Output Configuration. Groomer B is Configured for ASI in, TSoIP out Multicast. Failover Role: None.

Figure 2-18. TSoIP Output Configuration. Groomer B is Configured for ASI in, TSoIP out Unicast. Failover Role: None. External IP Address Eth1 set to 192.168.1.206.
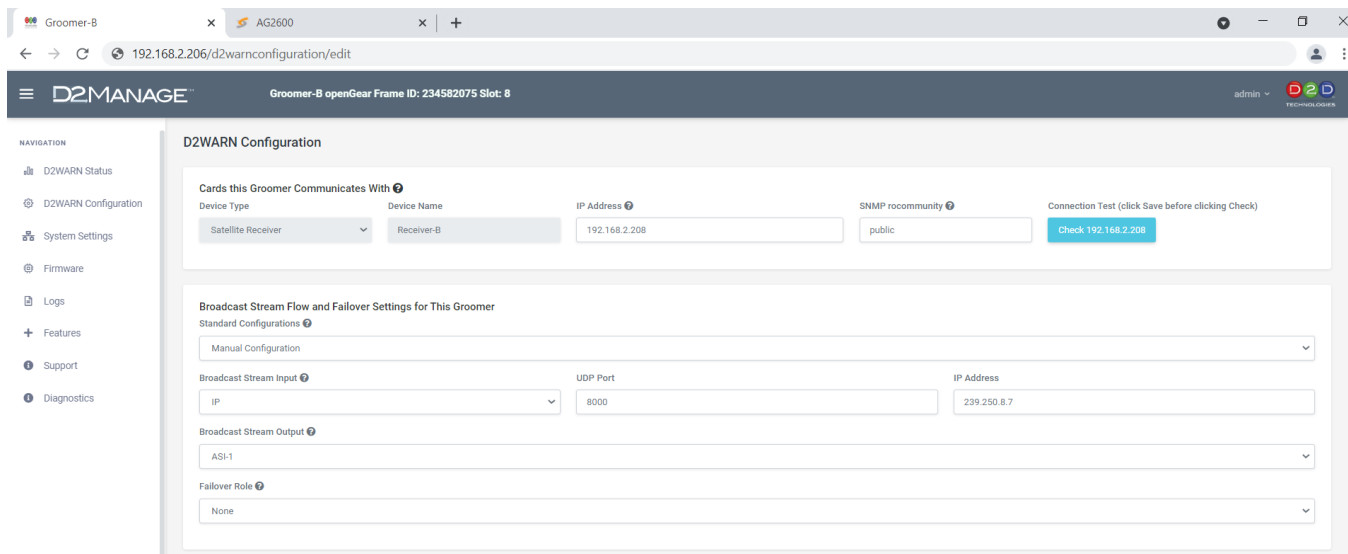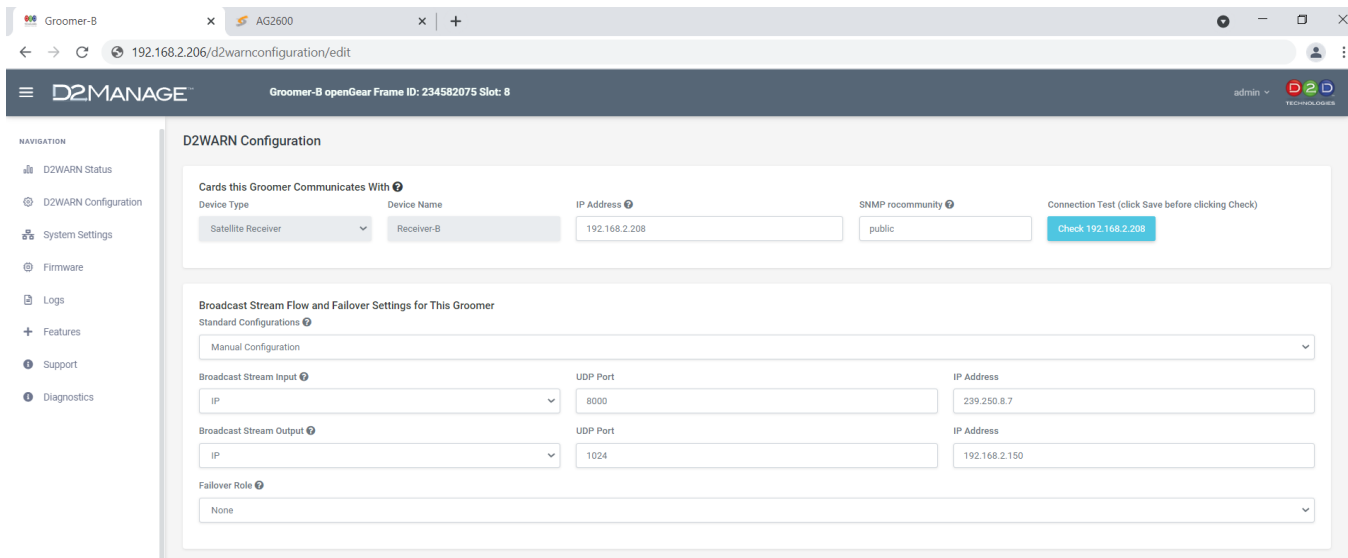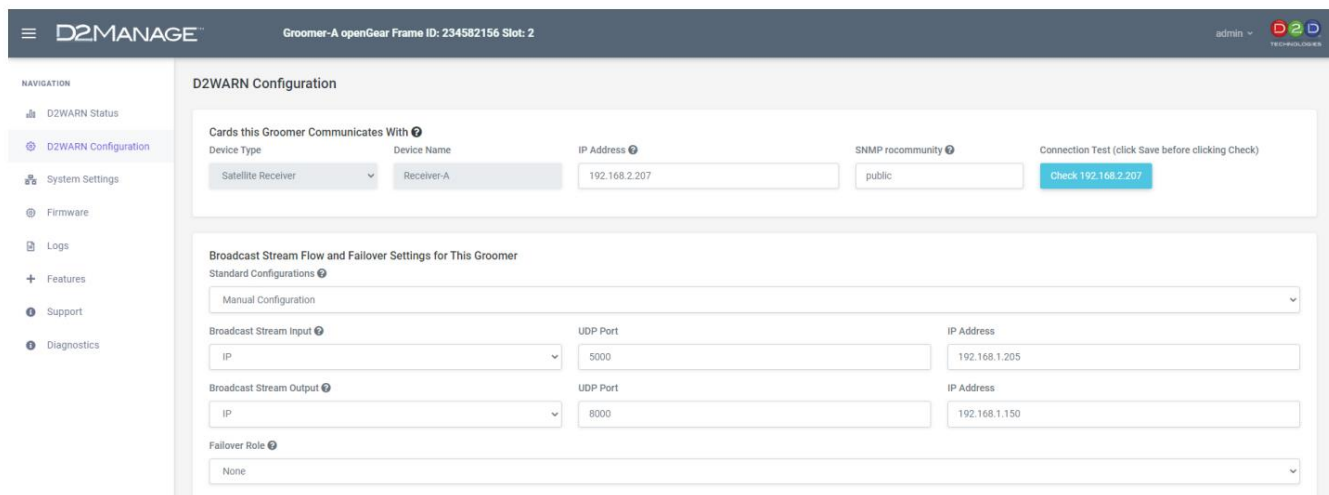
Figure 2-19. TSoIP Output Configuration. Groomer B is Configured for TSoIP in, TSoIP out. Multicast. Failover Role: None. External IP Address Eth1 set to 192.168.1.206.
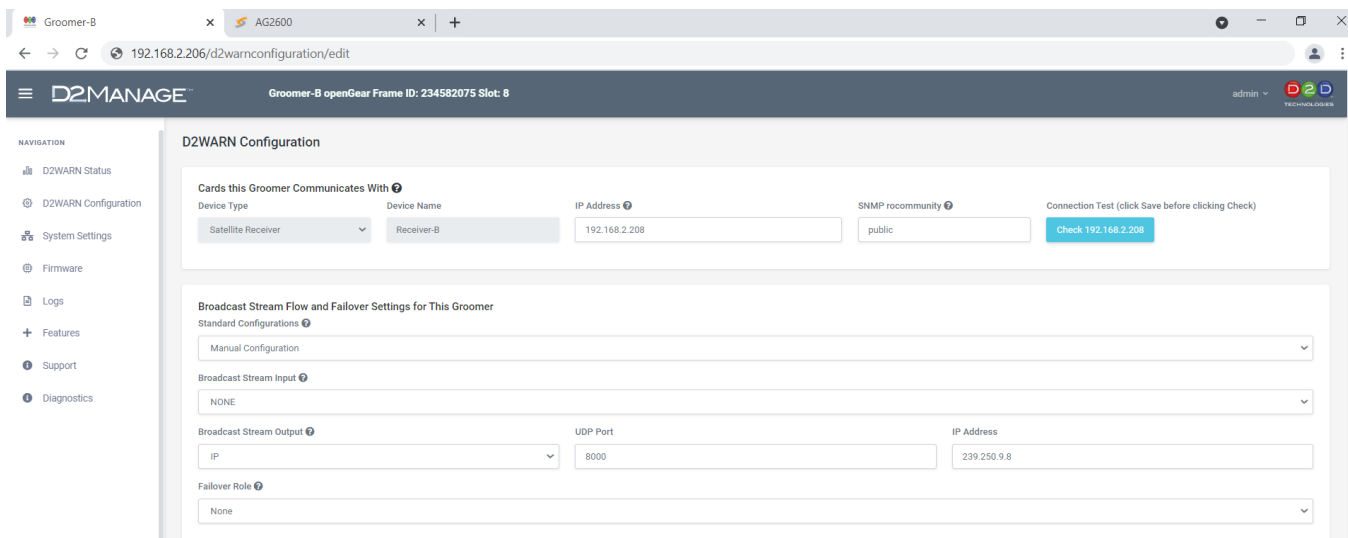
Figure 2-20. TSoIP Output Configuration. Groomer B is Configured for Input None, TSoIP out Multicast. Failover Role: None. External IP Address Eth1 set to 192.168.1.206.

2.4.9 SMPTE-310 IN and/or OUT

The D2WARN system will support SMPTE-310 for the Input, the Output, or both. SMPTE-310 support is provided by an optional Ross SMPTE-310 converter module installed in slot 11. Jumpers must be installed to connect the ASI IN and/or ASI OUT between the groomers and the converter card. The Ross SMPTE-310 converter card may be monitored using DashBoard.
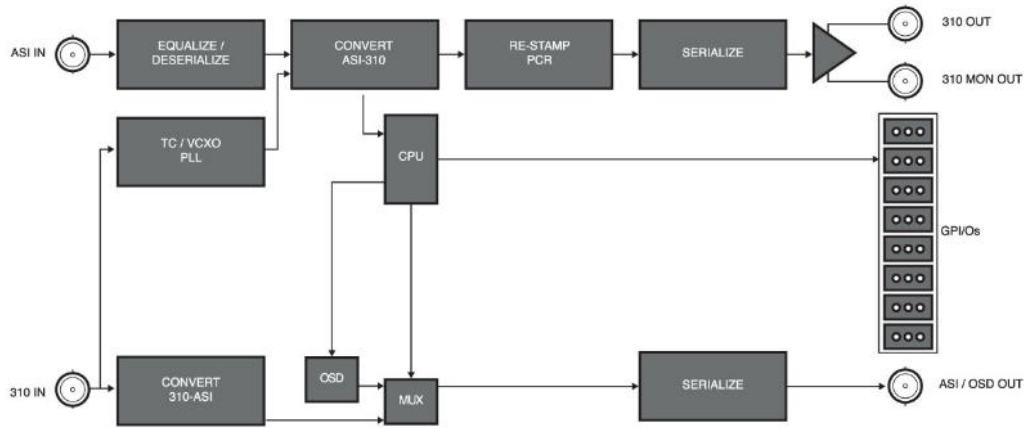
Figure 2-21. Ross ASI-310 Converter Block Diagram

If DashBoard is used, DashBoard may be used to configure the Ross Converter card:
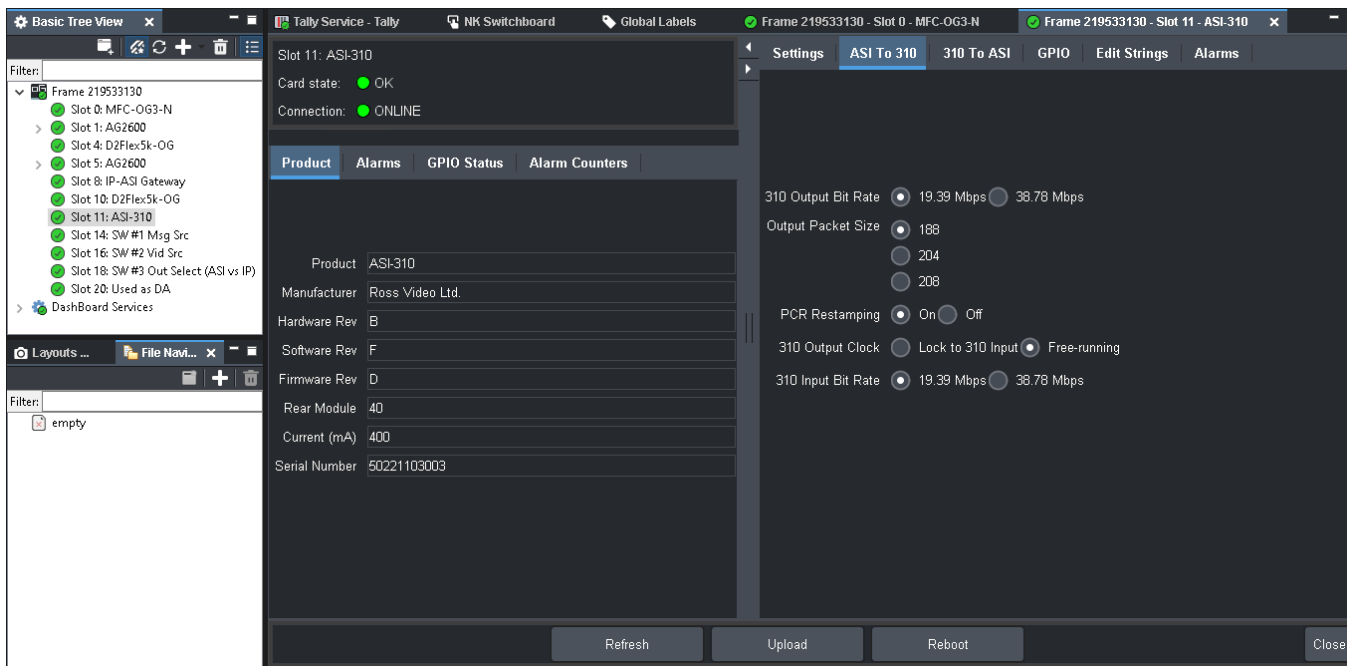
Figure 2-22. Configuring the Ross Converter Card using DashBoard

2.5 Wireless Emergency Alert (WEA) Settings

The WARN Alert Messages are sent to each station via Galaxy 16, transponder 22 vertical, and carried on PID 0x911 (decimal 2321). The downlinked signal is split and fed into the WARN system. Supported input formats for feeding the Alert Messages into the WARN system are:

- L-Band from the LNB or over a fiber link
- ASI
- TSoIP

Descriptions and configuration instructions for each format are provided below.

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2.5.1 Satellite Dish and WARN System in Separate Locations

For stations with the satellite dish and WARN system at different locations, Ethernet or fiber links may be used to feed the downlink signal into the WARN system. In all cases where the satellite dish and WARN system are at different locations it is important that the Sencore AG2600 Satellite Receivers remain in their openGear frame slots. If the satellite receivers are removed, the groomers will not be able to communicate with them using SNMP. The system will alarm, and the frame's light bar will flash. Configuring DashBoard to prevent the light bar from flashing on a card fault is not recommended. Doing so will prevent the light bar from flashing for <u>any</u> card faults, including the groomers.

2.5.2 L-Band from the LNB or L-Band over Fiber Link

In most installations the L-Band signal from the satellite receive LNB is spilt and fed into each Sencore AG2600 Satellite Receiver. The ASI output of each Sencore receiver is then fed into the **ASI2** input of its associated groomer. In these installations **ASI-2** is selected under **Alert Message Source** on the **D2WARN Configuration** page:
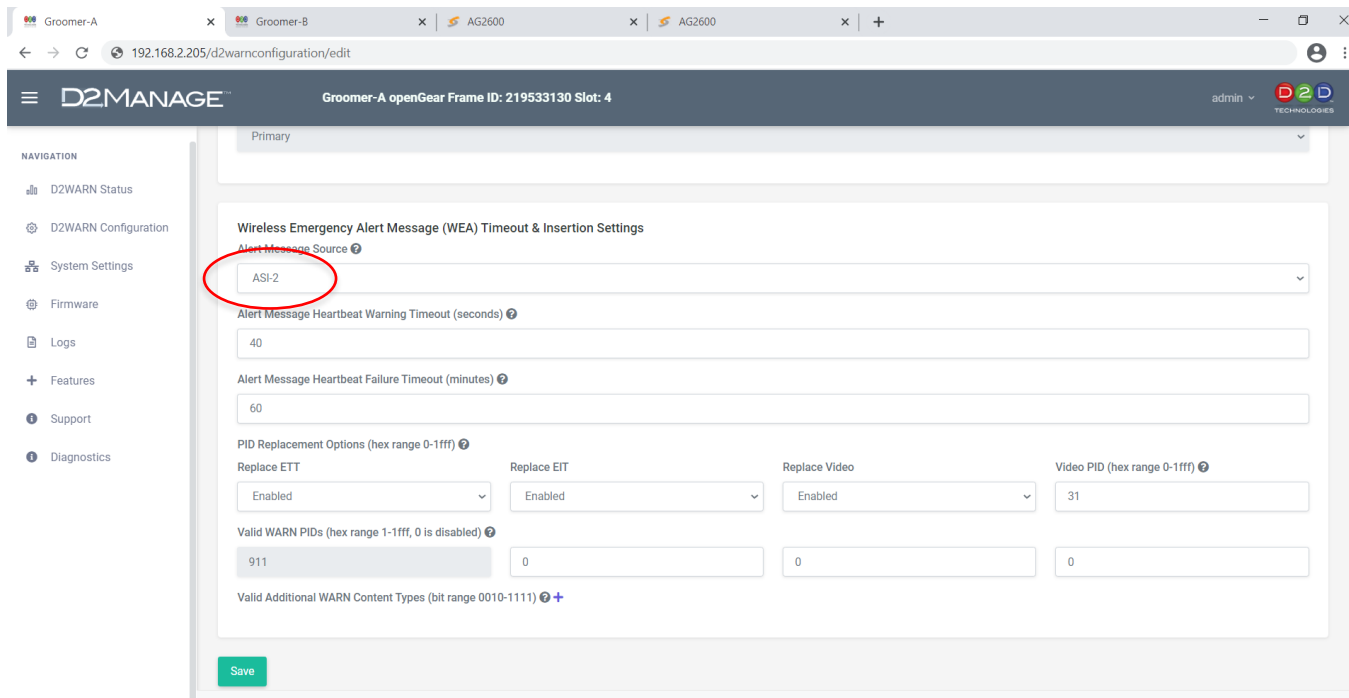
Figure 2-23. Alert Messages Source Configuration, ASI input

Stations with the satellite receive dish and WARN system at separate locations, and connected using an L-Band over fiber link would configure the Alert Message Source the same. In these installations the L-Band output from the fiber link would be split and fed into each Sencore receiver.

2.5.3 ASI

With the satellite receive dish located separately from the WARN system, a satellite receiver with an ASI output may be used. At the other end of the link, ASI from the downlink can be fed either into the Sencore receivers (recommended) or directly into the groomers. To configure the Sencore receivers to accept ASI, click on the settings icon next to **Input Selection** on the receiver's GUI. A window will open. Select **ASI** and click on **Apply**:
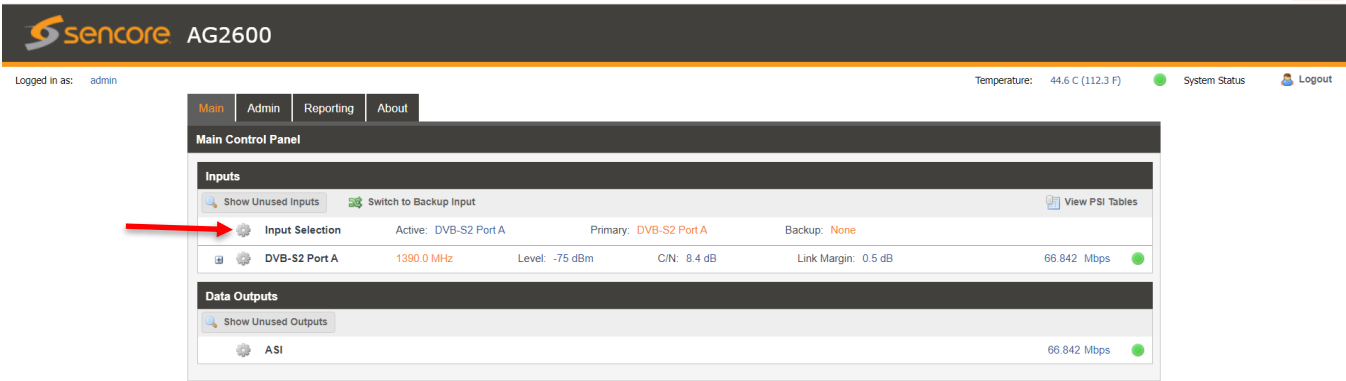
Figure 2-24. Configuring the Sencore AG2600 Satellite Receiver for ASI Input
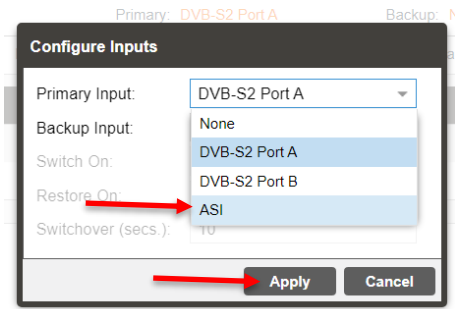
Figure 2-25. Selecting ASI
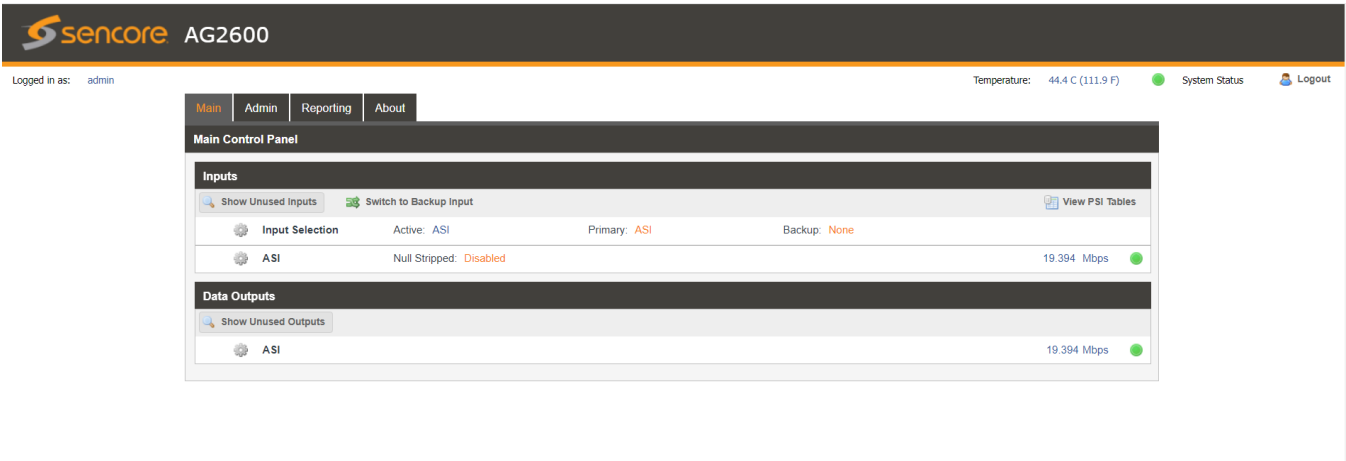
Figure 2-26. The Sencore AG2600 Satellite Receiver Configured for ASI Input

If desired, ASI may be fed directly into **ASI2 IN** on the back of each groomer. This is acceptable, however the Sencore receiver cards should remain installed in their openGear slots to avoid the groomers from alarming, and the openGear frame's light bar flashing.

2.5.4 TSoIP

With the satellite receive dish located separately from the WARN system, a satellite receiver with TSoIP output may be used. At the other end of the link, TSoIP from the downlink can be fed into the groomers. To configure the groomers to accept TSoIP, select **IP** under **Alert Message Source** on the **D2WARN Configuration** page. Enter the **UDP Port** and **IP Address**. Click **Save:**

Figure 2-27. Alert Messages Source Configuration, TSoIP input

When the alert message source is configured for TSoIP, internal failover is not supported. This is true even with the WARN system configured for ASI In/ASI Out.

2.5.5 ASI and TSoIP

A combination of ASI and TSoIP may also be used. For example, ASI out of a remote receiver may be converted to TsoIP for transmission over a fiber link. And then converted back to ASI for feeding into the WARN system, as discussed above.

Note: Alternatively, TSoIP out of the link may also be used to feed the WARN system. However, when the alert message source is configured for TSoIP, internal failover is not supported.

2.5.6 Alert Message Heartbeat Warning Timeout (seconds)

This is also referred to as the "short" timeout, and is measured in seconds. It is set to detect the short term disappearance of Alert Message heartbeats most likely caused by rain fade. This value should be set to a number greater than the 30 second period of the Alert Message heartbeats. The default is 40 seconds. When the seconds timeout is reached it will only issue a warning since it may be an indication of rain fade. To set the short term timeout, enter a number and click **Save.**

Note: The value for the "short" timeout should be the same for both Groomer A and Groomer B.

2.5.7 Alert Message Heartbeat Failure Timeout (minutes)

This is also referred to as the "long" timeout, and is measured in minutes. It is set to detect the long term disappearance of Alert Message heartbeats caused by a card or other hardware failure (such as a cable or splitter). This value should be set to greater than the length of a typical rain fade. The default is 60 minutes. When the Primary Groomer's minutes timeout is reached it will be considered a failure and failover to the Backup Groomer. To set the long term timeout, enter a number and click **Save.**

Note: The value for the "long" timeout should be the same for both Groomer A and Groomer B.

2.5.8 PID Replacement Options

PID Replacement Options settings are found on the D2WARN Configuration page, toward the bottom of the page.
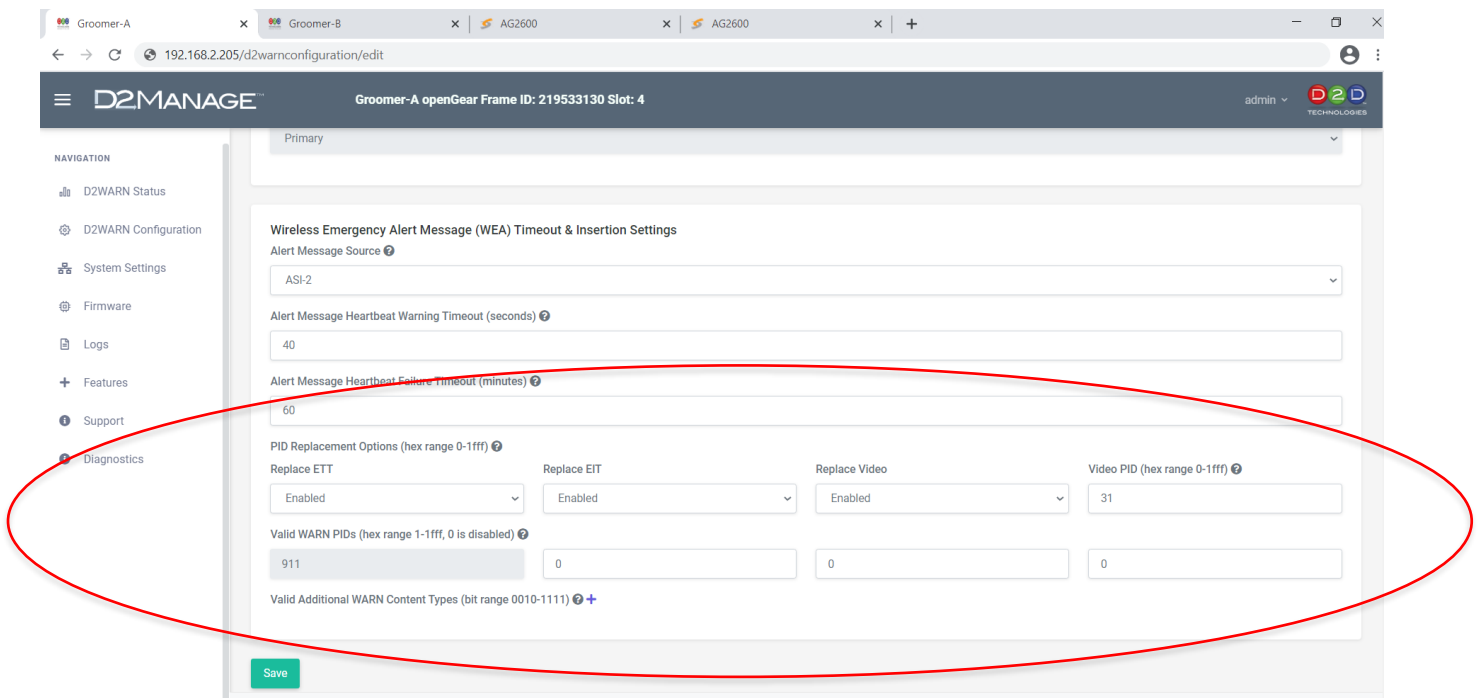
*Figure 2-25. PID Replacement Options, **D2WARN Configuration** page*

Select which PIDs are used for Alert Message insertion in the event there are not enough "null" packets in the station's broadcast stream for injecting the Alert Messages. PID replacement allows for message insertion by replacing PSIP PIDs or, in a worst case scenario, a video PID.

PID replacement will occur in the following order:

Note: All PIDS are listed in Hexadecimal

1. **Replace ETT:** Allows for injecting Alert Messages by the replacing Extended Text Table (Dynamic PSIP) packets. The timeout for ETT replacement is 100 ms for pre-emptive messages, and 5 minutes for normal messages. The configuration choices enabled or disabled.

2. **Replace EIT:** Allows for injecting Alert Messages by the replacing Event Information Table (Dynamic PSIP) packets. The timeout for EIT replacement is 100 ms for pre-emptive messages, and 5 minutes for normal messages. The configuration choices enabled or disabled.

3. **Replace Video:** If enabled allows for injecting Alert Messages by the replacing packets of a video PID. The timeout for Video PID replacement is 200 ms for pre-emptive messages, and 10 minutes for normal messages. The configuration choices enabled or disabled. Entering **0** in the Video PID box will also disable **Replace Video**.

4. **Video PID:** Specifies the Video PID to be used for Video PID replacement. The value entered here sets which video PID to replace when **Replace Video** is enabled. Entering **0** will disable **Replace Video**.

5. **Valid WARN PIDS:** Configures which PIDs the system will look for to find Alert Messages. The system will always look for PID 911. This entry is read only and cannot be changed. Additional PIDs to use for messages may be entered here (to allow for future functionality).

6. **Valid Additional WARN Content Types**: Clicking on the **+** will open a new window:
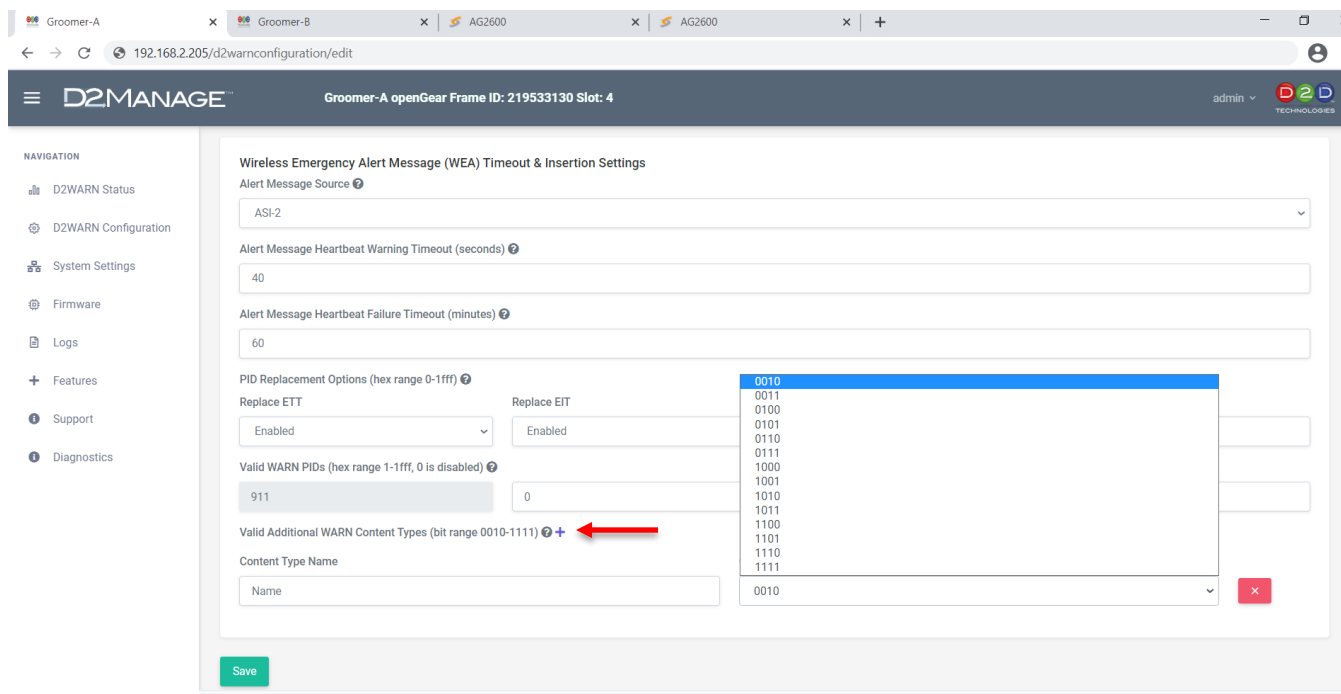
Figure 2-26. Currently Undefined Additional WARN Content Types (Future Expansion)

7. **Valid WARN Content Types:** Configures which Content types the system will look for in Alert Messages. The system currently supports CMAC and CAP message types. The **Content Type Name** may be entered. The drop down selection shows 14 other binary combinations possible with a 4 bit field. These are currently undefined for future expansion.

3 Operation

Once the D2WARN system has been installed and configured for the desired signal flow and failover scenario, operation is straightforward. In normal use, the user logs in to Groomer A and observes the system status on the **D2WARN Status** page. Four browser windows can be opened so that Groomer A, Groomer B, Satellite Receiver A and Satellite Receiver B are available.
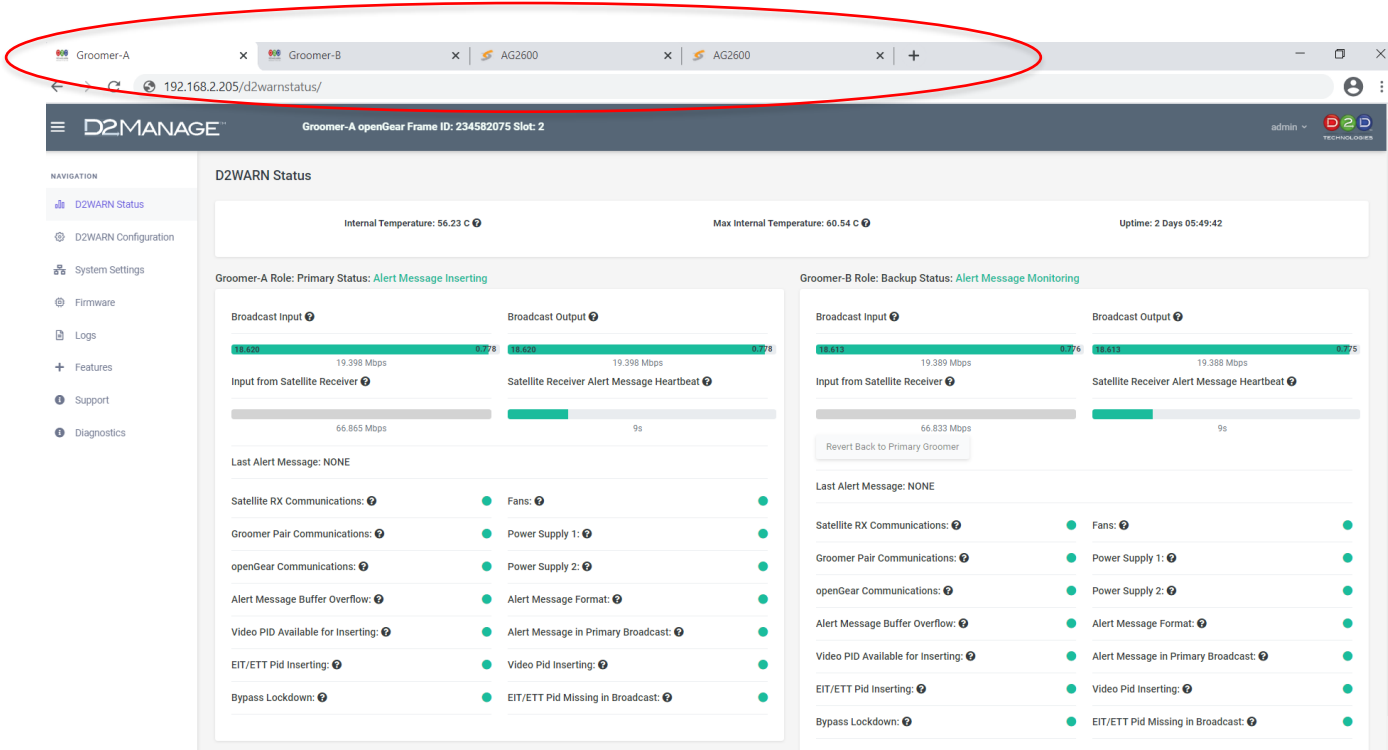
Figure 3-1. Groomer A Status page with both Groomers and both Satellite Receivers Available

Optionally, a fifth browser window may be opened for the Frame, although this is usually not necessary.

The status of each groomer is shown at the top of the **D2WARN Status** page. Also shown is the Role of each Groomer (for example, Primary or Backup).
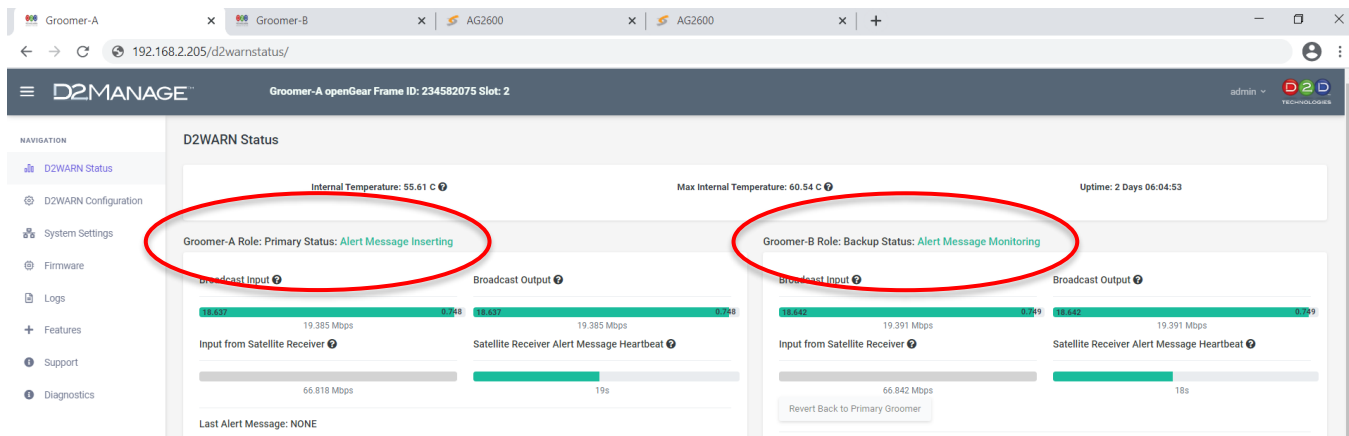
Figure 3-2. D2WARN Status

Groomer A's status page will display the status of both Groomer A and B when the system is configured for internal failover:
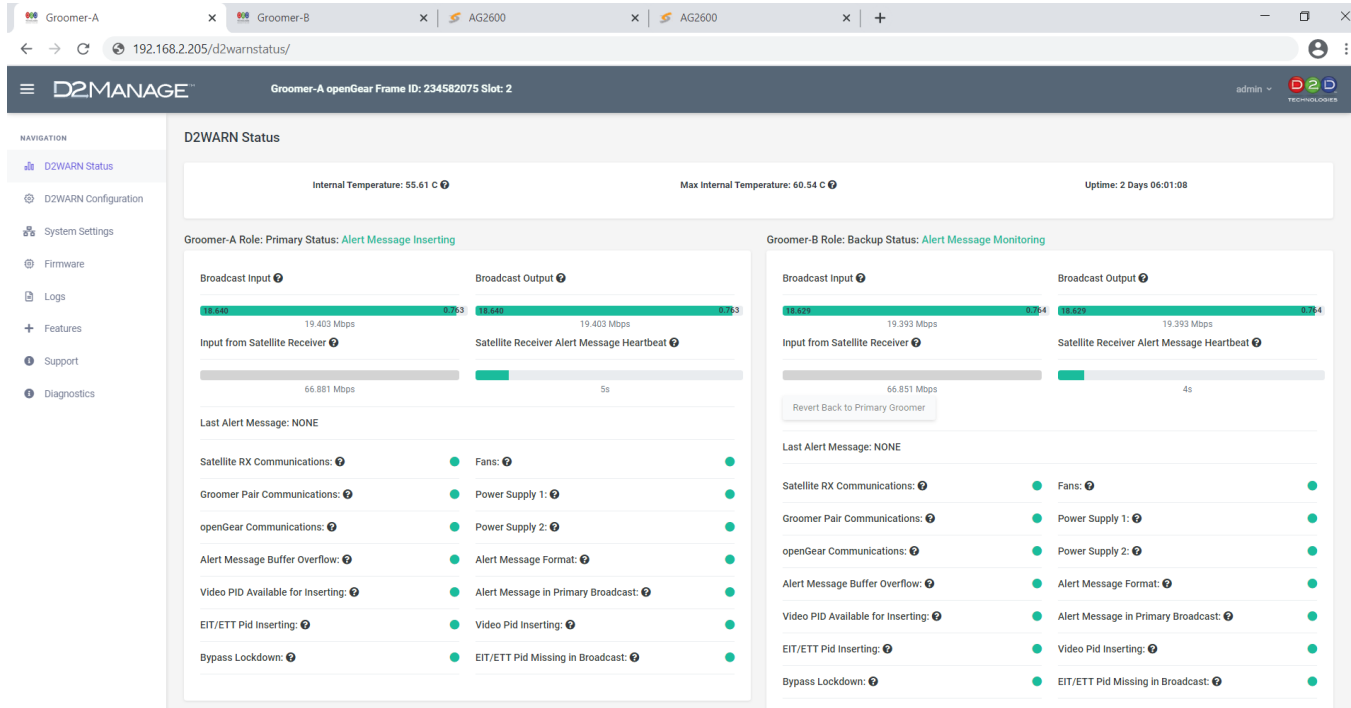
Figure 3-3. D2WARN System Configured for Internal Failover

Groomer A's status page will only display the status of Groomer A when the system is not configured for internal failover. In these cases, the status of Groomer B must be observed on its D2WARN Status page by opening its GUI (window).
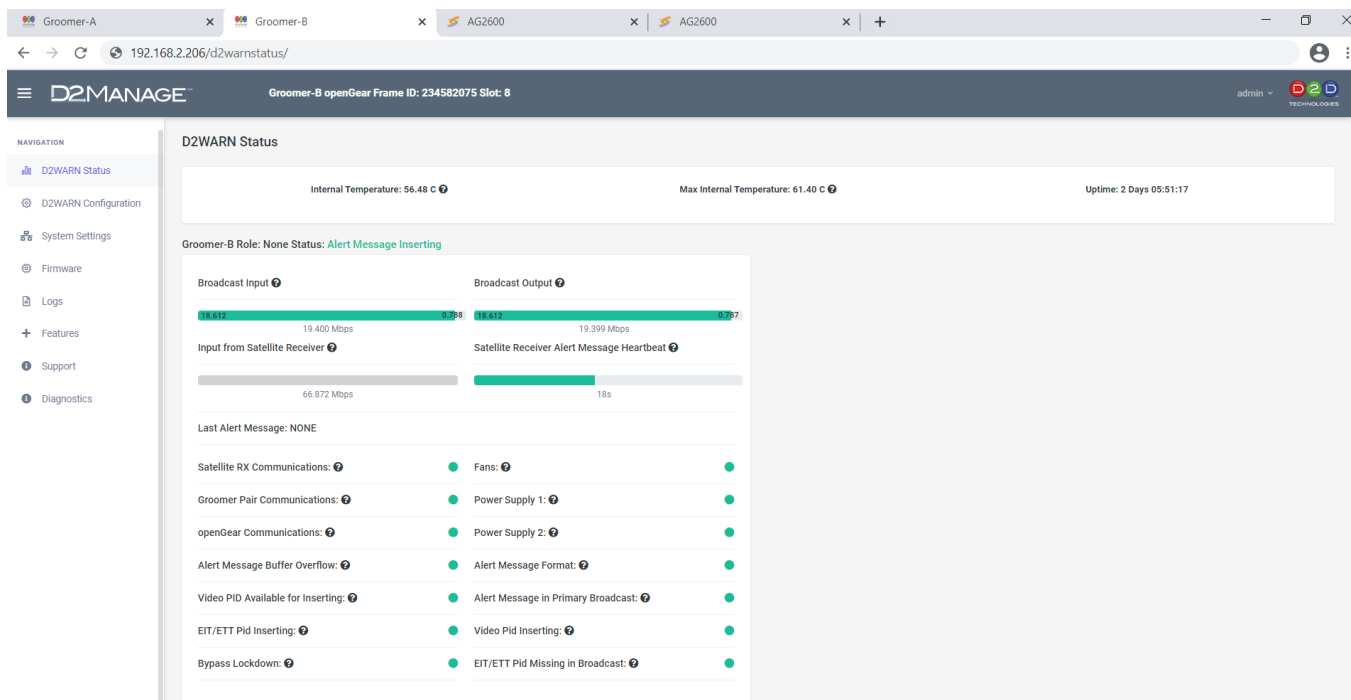
Figure 3-4. D2WARN System Configured for Failover Role None

The configurations where both groomers will be displayed on the **D2WARN Status** page are below:

ASI Flow – Failover Role Primary
ASI Flow – Failover Role Backup
ASI Flow – Failover Role Primary – No Video Input
ASI Flow – Failover Role Backup – No Video Input
Manual Configuration – Failover Role Primary
Manual Configuration – Failover Role Backup

The configurations where only one groomer will be displayed on the **D2WARN Status** page are shown below:

ASI Flow – Failover Role None
ASI Flow – Failover Role Bypass
ASI Flow – Failover Role None – No Video Input
Manual Configuration – Failover None
Manual Configuration – Failover Bypass

When configured for internal failover, Groomer A's status page can be used for all monitoring of both groomers. In the event of a failover, the **Revert Back to Primary Groomer** button on Groomer B's status page is used once the event has cleared.
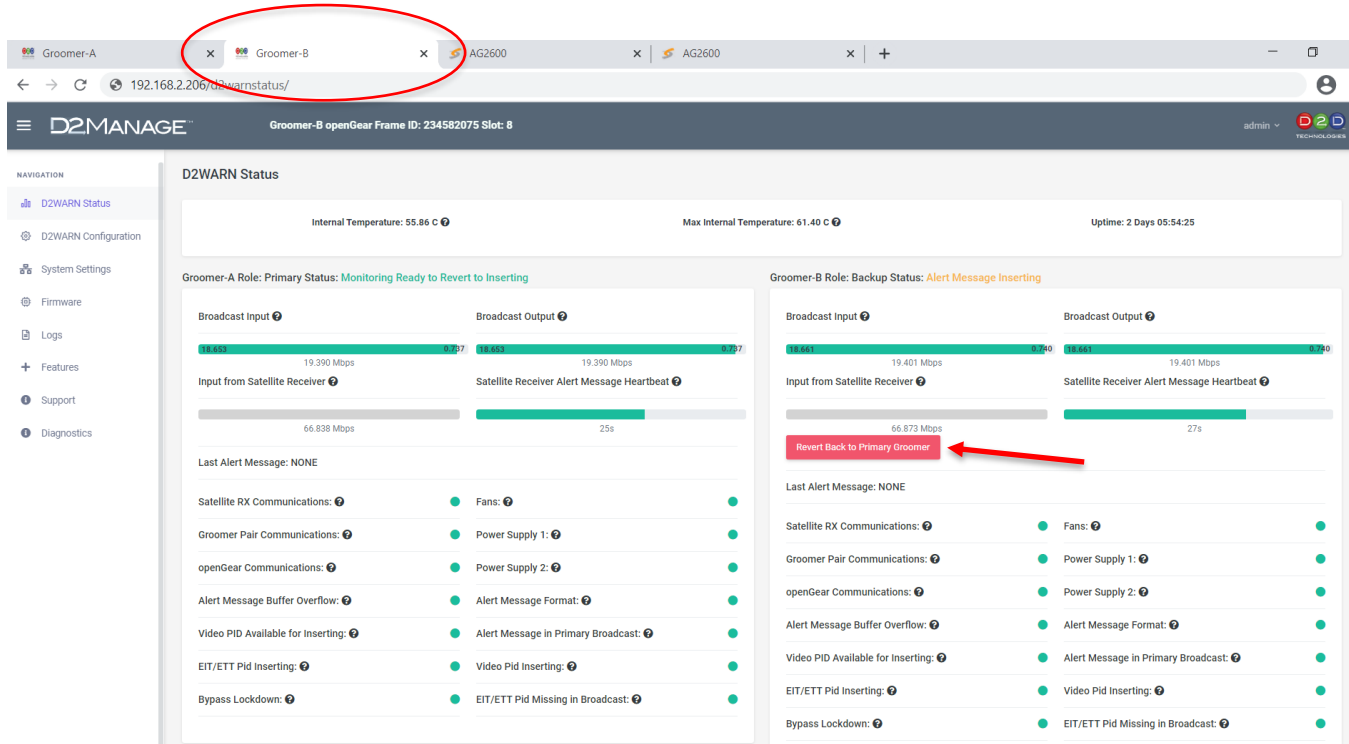
*Figure 3-5. The **Revert Back to Primary Groomer** Button on the Backup Groomer's Web Page*

Once an event which caused a failover has been cleared, the **Revert Back to Primary Groomer** button will turn red. The user must click on this button on Groomer B's **D2WARN Status** page to restore normal operation.

If the Groomers cannot communicate with each other, the status pane for one of groomers will be "greyed out." This only applies to groomers that are in Primary or Backup role. The groomer which does not receive an update from its associated groomer will "grey out" the associated groomer's status pane.
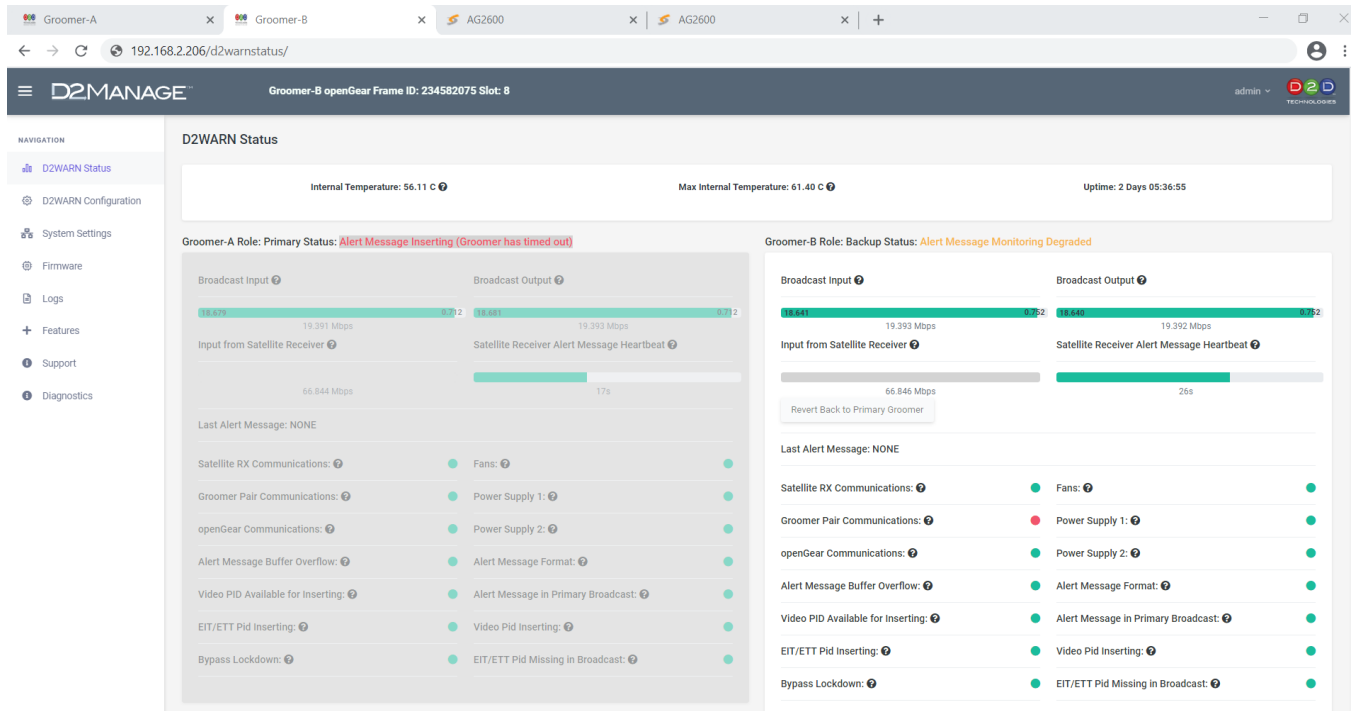
Figure 3-6. Groomer B is not Receiving Updates from Groomer A

Various alarm indicators are displayed on the **D2WARN Status** page. The meaning of each alarm can be found by placing the cursor over that alarm's Tool Tip:

For example, the Tool Tip for **Groomer Pair Communications** is: **If alarmed, Groomer B cannot communicate with Groomer A.**

A complete description of all status indications, alarms, and indicators is provided in the Section: **Monitoring**.

4 Failsafe and Internal Failover

The D2WARN system has the ability to detect hardware failures and faults, and failover to the backup or place itself in bypass mode if it meets certain requirements. The details are provided in this section.

4.1 ASI Failsafe

The system is built around the D2Flex digital video multiplexer (groomer) that handles the PID insertion, grooming, monitoring and alerting of the broadcast stream. In the unexpected case where the D2Flex processor fails or power is lost, a failsafe ASI bypass ensures that the broadcast stream is maintained.

ASI Failsafe Conditions:

1. Power Failure: If the groomer loses power, the ASI bypass relay de-energizes and directly connects the ASI-1 Input to the ASI-1 Output.
2. Processor Watchdog: In the unusual circumstance where the embedded Linux operating system becomes unresponsive, the ASI bypass relay de-energizes and directly connects the ASI-1 Input to the ASI-1 Output.

If one of the groomers goes into ASI Failsafe mode, the D2WARN Automatic Failover system design still ensures insertion of the designated message PID(s).

4.2 Internal ASI Failover

The D2WARN system can be configured for internal redundancy switching. Its operation is described in Section: **Configurations.**

4.3 Failover Specifications

Startup Mode

At startup, Groomer A and Groomer B will attempt to communicate with each other. Startup does not check for any error conditions other than Groomer Pair communications. As soon as Groomer Pair Communications are established, Monitor Mode is started.

Monitor Mode

Monitoring checks for failover error events and initiates a failover if necessary. This section describes the error causes for a failover event, conditions required to activate the failover, and the requirements for ending the failover event and reverting insert operations to Groomer A.

Failover Error Causes:

- Groomer-A Receiver Input Error – Satellite Receiver Failure (Heartbeat Failure "long" Timeout)
- Groomer-A Receiver Input Error – Satellite Receiver Warning (Heartbeat Warning "short" Timeout) and no status update received from its associated receiver
- Groomer-A Alert Message Source Input Error (Alert Messages) – Input from Satellite Receiver Failure (Heartbeat "long" Failure Timeout)
- Groomer-A Alert Message Source Input Error (Alert Messages) – Input from Satellite Receiver Warning (Heartbeat Warning "short" Timeout) and no status update received from its associated receiver
- Groomer A Failure

Note: Failover will occur only if there are no Groomer B Receiver Input Errors.

Revert Back to Primary Groomer Button Enable:
- Groomer A has no Satellite Receiver input errors
- Groomer A has valid Satellite Receiver Pair communications

Revert Back to Primary Groomer Activation:
- Revert Button is clicked on Groomer B's D2WARN Status page

4.4   Configurations with Failover Support

At this time internal failover is only supported with ASI signal flow configurations, or SMPTE-310 with the converter. There is no redundancy for the SMPTE-310 converter. Internal failover for TSoIP configurations is not supported.

4.5   Configurations with Failover and Failsafe Support

The following configuration are supported with failover and failsafe protection as noted below.

Video In	Video Out	WARN Source	Notes
ASI	ASI	Sat RX, ASI	
ASI	310	Sat RX, ASI	D2WARN-310M card required
310	ASI	Sat RX, ASI	D2WARN-310M card required
310	310	Sat RX, ASI	D2WARN-310M card required
None	ASI	Sat RX, ASI	
None	310	Sat RX, ASI	D2WARN-310M card required

4.6   External Failover Configuration

The D2WARN system can be configured with the two Receiver-Groomer pairs independent of each other to allow member stations to run the systems in parallel.

PBS member stations are responsible for switching the ASI, SMPTE-310 or TSoIP output stream in case of a component or system failure. No automatic failover is provided by the D2WARN system.

5 Monitoring

The D2WARN system provides multiple methods for monitoring the health of the system, including front panel light bar, browser-based status page, and SNMP traps.

5.1 Front Panel LED Color Indicators

The D2WARN system controls the front panel light bar of the openGear frame. The light bar provides a visual indication of the overall health of the system. If DashBoard is installed, the user has the option to configure the color as desired. For instructions on how to configure the light bar colors using DashBoard, see the Section: **Updating the openGear Frame Firmware and Configuring the Frame Light Bar**.

Note: If the Frame cannot communicate with the Groomers, the light bar will not function correctly.

As received from the factory the default colors are:

Blue = All Good. Everything is working.

Figure 5-1. Blue Indicates the System is Fully Functional with no Alarms

Yellow = Warning. System still functional but degraded. Check SNMP or GUI.

Figure 5-2. Yellow Indicates You Should Check the Groomer for Alarms

Red = Failure. One or both of the Groomers is configured in Bypass, or the system is non-functional and requires Immediate attention. Check SNMP or GUI.

Figure 5-3. Red Indicates Immediate Attention is Required

5.2 D2WARN Status via the GUI

The D2WARN Status page shows the overall health of the system, including **Internal Temperature**, **Max Internal Temperature** reached since the last time the groomer was restarted, and **Uptime**. Groomer status, signal presence and data rate, and alarms can also be seen at a glance.
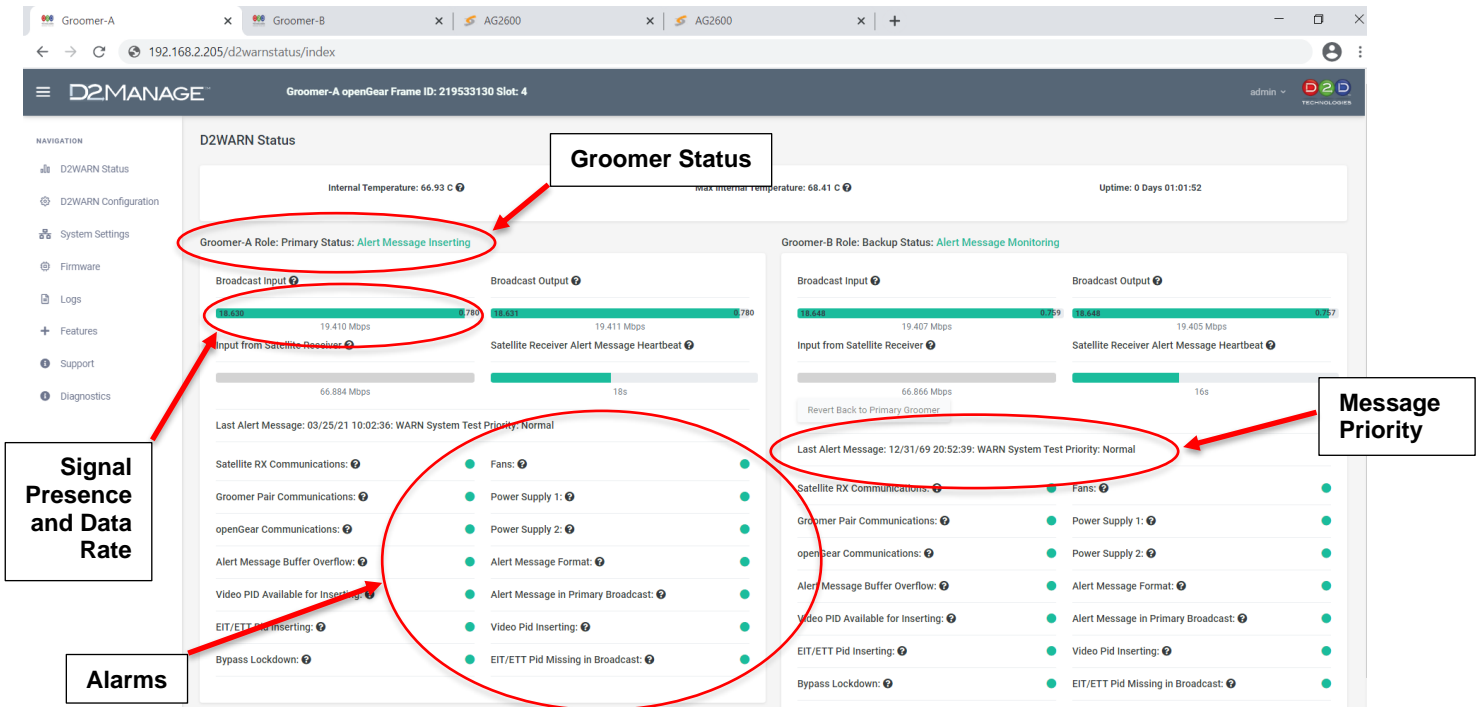
Figure 5-4. D2WARN Status GUI Page

Note: The gray portion of the data rate bar indicates the null packets.

All status indicators will display **GREEN** if they are receiving proper signals, and **RED** if there is an issue.

The Groomer cards are linked together and will display both the Primary and Backup status in real time when configured for internal redundancy (see the Section: **Operation**).

Below is an explanation of the possible **Groomer Status** indications:

1) **Alert Message Inserting** (Green for primary/yellow for backup): normal operating mode for primary, warning mode if backup is inserting.

2) **Alert Message Monitoring** (Green color): normal operating mode for back up card with no alarms present.

3) **Alert Message Inserting Degraded** (Yellow color): Still inserting but has issues such as failed power supply/fan.

4) **Alert Message Monitoring Degraded** (Yellow color): Still monitoring but has issues such as failed power supply/fan.

5) **Alert Message Failure** (Red color): Not inserting messages which occurs when no heartbeat being received.

6) **No Broadcast Signal Detected** (Red color): This is the worst failure which occurs when no signal is detected on broadcast input. System most likely off air.

7) **Alert Message Detected in Broadcast Input** (Red color): This indicates that the broadcast stream coming into the system already contains PID 911. This will happen if two systems are both inserting, and one feeds the other. Once the issue has been corrected, it will take 11 minutes for the alarm to clear and turn green.

The most likely cause is another WARN system is inserting messages upstream from this system.

8) **Groomer Locked intoBypass mode. System Reset Required** (Red color): This indicates that the system has gone into Bypass mode due to an instability. The groomers must be restarted, or in some cases power cycled, to clear the event.

If the system is configured for internal failover, and Groomer A goes into **Bypass Lockdown**, the system will fail over to Groomer B. This will require the user to **Revert Back to Primary Groomer** following restart.

9) **Groomer Has Timed Out:** No update has been received from this groomer.

Below is an explanation for the Signal Presence and Data Rate indicators:

1) **Broadcast Input:** Displays the Sync status and overall bitrate of incoming broadcast transport stream whether it be ASI or IP.
   a) Red when input is not detected. In this state system is most likely off air and requires immediate attention. Check cabling and verify input source.
   b) When input sync is achieved the total bitrate is displayed under the status bar with Green representing the bitrate of data packets (Non-Null) and Gray representing bitrate of Null packets.

2) **Broadcast Output:** Displays the Sync status and overall bitrate of the outgoing broadcast transport stream whether it be ASI or IP.
   a) Red when input is not detected. In this state system is most likely off air and requires immediate attention. Check cabling and verify input source.
   b) When output sync is achieved the total bitrate is displayed under the status bar with Green representing the bitrate of data packets (Non-Null) and Gray representing bitrate of Null packets.

3) **Input from Satellite Receiver:** Displays the Sync status and overall bitrate of the satellite receiver transport stream whether it be ASI or IP.
   a) Red when input is not detected. In this state the groomer is not receiving a signal from its associated receiver. Check satellite receiver settings. This alarm is a failure on a primary groomer and a warning on a backup groomer.
   b) When output sync is achieved the total bitrate is displayed under the status bar with Green representing the bitrate of data packets (Non-Null) and Gray representing bitrate of Null packets.

4) **Satellite Receiver Alert Message Heartbeat:** Displays the heartbeat time in seconds since the last Alert Message heartbeat was received. The bar will remain Green as long as Alert Message heartbeats are being received. It will turn Red once the heartbeat seconds counter has been reached. In this state the groomer is not receiving alert message heartbeats.

The seconds will continue to count below the status bar. Once the seconds timeout has been reached it will be considered a rain fade event and will be classified as a warning. If weather indicates a rain fade this warning should be temporary and resolve on its own once weather clears.

Once the minutes timeout has been reached an equipment failure is assumed, and will be classified as a failure on a primary groomer and a warning on a backup groomer. Check for obstructions to the satellite dish, the splitter, cables, and verify Satellite Receiver settings.

5) **Last Alert Message:** Displays timestamp and message type of the last Alert Message received. This is an indication of an actual alert message received. Heartbeat messages do not display in this status indicator.

Below is an explanation of the **Alarms**:

6) **Satellite Receiver Communications:** Indicates if the groomer can communicate with its Satellite Receiver pair. If alarmed, verify Satellite Receiver IP address on the **D2WARN Configuration** page.

7) **Fans:** Displays the status of the openGear frame fans. If alarmed, verify front door of openGear frame is closed. This is a warning on both primary and backup groomers.

8) **Groomer Pair Communications:** Indicates if groomer can communicate with its groomer pair. If alarmed, verify groomer pair IP address on the **D2WARN Configuration** page and check status of groomer pair.

9) **openGear Communications:** Indicates if the groomer card can communicate with the openGear frame. If alarmed, verify IP setting of openGear frame on the **D2WARN Systems Settings** page.

   Note: If the Frame cannot communicate with the Groomers, the light bar will not function correctly.

10) **Power Supplies 1 and 2:** Displays the status of the openGear frame power supplies. If alarmed, replace openGear power supply. This is a warning on both primary and backup groomers.

11) **Alert Message Buffer Overflow:** Indicates an Alert Message Buffer Overflow has occurred. If alarmed, verify there is enough bandwidth to inject Alert messages. Consider enabling PID replacement options if not already enabled. This is a warning on both primary and backup groomers.

12) **Alert Message Format:** Indicates an Alert Message Format error has occurred such as a CRC error or invalid message type. If alarmed, verify signal strength of Satellite Receiver. This is a warning on both Primary and Backup Groomers.

13) **Video PID Available for Inserting:** Indicates if transport stream packets of the Video PID configured for PID replacement has not been seen for at least 30 seconds. If alarmed, verify the Video PID replacement setting on the **D2WARN Configuration** page. This is a warning on both primary and backup groomers.

14) **Alert Message in Primary Broadcast:** This indicates that the broadcast stream coming into the system already contains PID 911. This will happen if two systems are both inserting, and one feeds the other. Once the issue has been corrected, it will take 11 minutes for the alarm to clear and turn green.

   The most likely cause is another WARN system is inserting messages upstream from this system.

15) **EIT/ETT PID Inserting:** This alarm indicates that the ETT and, if necessary, the EIT PIDs are being replaced by Alert Message PIDs. This occurs if there are not enough Null packets available for normal insertion.

16) **Video PID Inserting:** This alarm indicates that the video PID is being replaced by Alert Message PIDs. This is a worst case scenario and occurs if there are not enough Null, ETT, and EIT packets available for normal insertion.

17) **Bypass Lockdown:** This alarm indicates that the system has gone into bypass mode due to an instability. The groomers must be restarted, or in some cases power cycled, to clear the event.

18) **EIT/ETT PID Missing in Broadcast:** This alarm indicates that there are no EIT or ETT PIDs found in the broadcast stream input. This alarm is activated if EIT/ETT PIDs are not detected for 10 minutes.

5.3 SNMP System Monitoring and Alerts

The health of the D2WARN system can be continuously monitored with SNMP status for remote monitoring and traps for alarm conditions. All failsafe and failover scenarios are detected and alerted by the groomers in the system.

The Groomer's alarms may be monitored using SNMP traps. The MIBs may be obtained from D2D, or downloaded from the Groomer.

To download the MIBs currently loaded onto the groomer, click on **Support** on the left margin of the GUI:

Figure 5-5. Downloading the MIBs from the Groomer

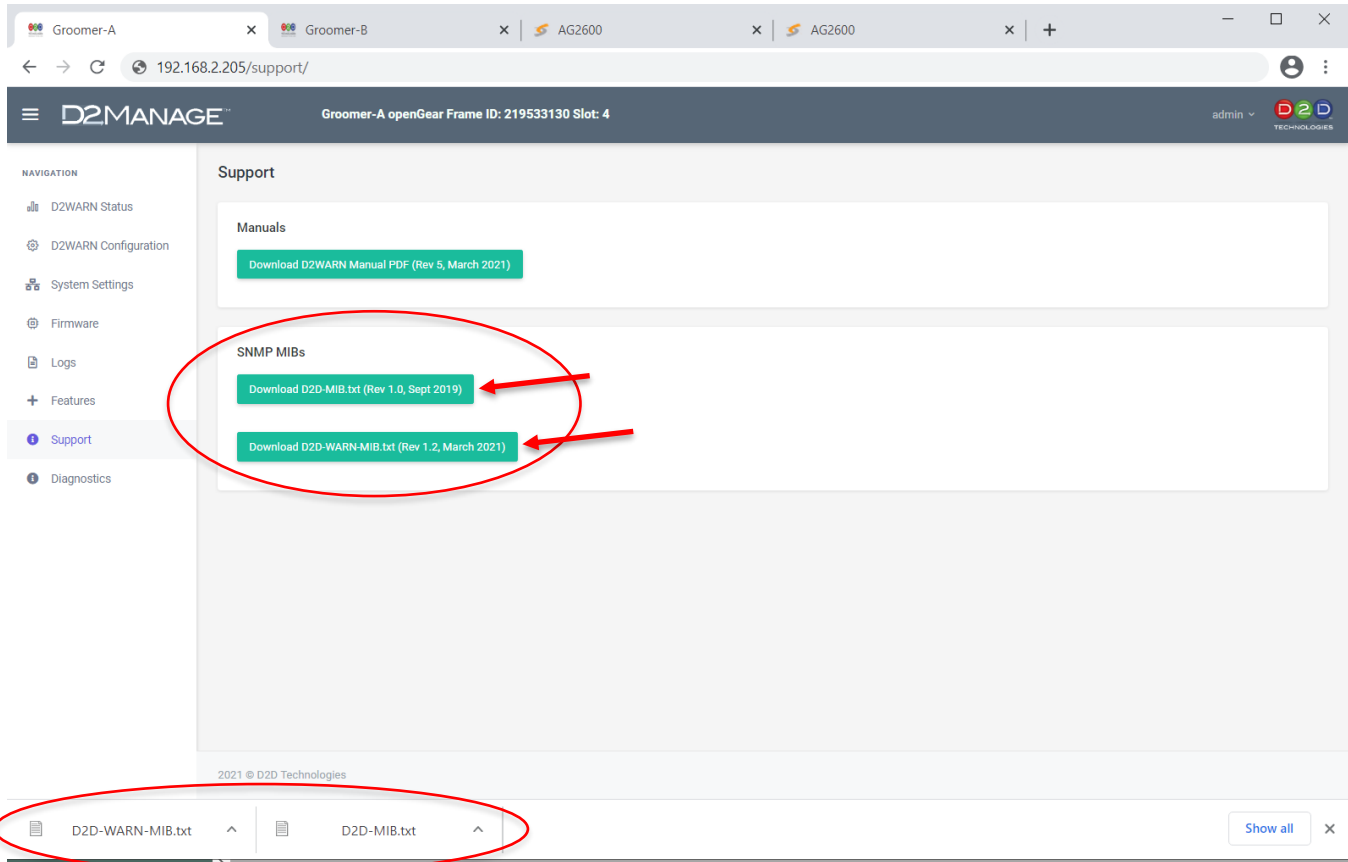The D2D-MIB.txt and the D2D-WARN-MIB.text file may be downloaded to the user PC:

Figure 5-6. Downloading the MIBs from the Groomer

The manual may also be downloaded from the **Support** page. This manual was current at the time of the firmware release.

Note: A revised manual may be released before new firmware is released. The most current manual may always be found and downloaded here: http://www.d2dtechnologies.com/d2warn/

5.4 SNMP Status

The D2WARN system includes SNMP and GUI status of the following:

Status	SNMP	GUI	Comments
Most Recent Alert Heartbeat message received.	Walk	Status	Progress bar shows this, will turn red if problems
Most Recent Alert message received.	Walk	Status	Most recent Date/Time and Type displayed
Status for both Groomer A and Groomer B	Trap	Status	SNMP traps on any status changes
Total non-null packet bit rate of both Broadcast Stream and Satellite Stream.	Walk	Status	Progress bar shows this, will turn red if problems.
Total non-null packet bit rate of output stream for both Groomer A and Groomer B.	Walk	Status	Progress bar shows this, will turn red if problems.
Broadcast Sync: Loss of sync on Broadcast stream input to the Groomer A	Trap	Status	Progress bar shows this, will turn red if problems
Broadcast Sync: Loss of sync on Broadcast stream input to the Groomer B	Trap	Status	Progress bar shows this, will turn red if problems
Receiver Sync: Loss of sync on Satellite stream from receiver to Groomer A	Trap	Status	Progress bar shows this, will turn red if problems
Receiver Sync: Loss of sync on Satellite stream from receiver to Groomer B	Trap	Status	Progress bar shows this, will turn red if problems
Receiver Heartbeat: No Alert Heartbeat (PID 0x911) within the Alert Heartbeat Timeout from the satellite receiver stream to the Groomer A	Trap	Status	Progress bar shows this, will turn red if problems
Receiver Heartbeat: No Alert Heartbeat (PID 0x911) within the Alert Heartbeat Timeout from the satellite receiver stream to the Groomer B	Trap	Status	Progress bar shows this, will turn red if problems
Input Heartbeat: No Alert Heartbeat (PID 0x911) within the Alert Heartbeat Timeout on the Broadcast input of the Groomer B.	Trap	Alarm	
Alert Buffer Overflow: If the 32MB Alert Message buffer fills up and overflows.	Trap	Alarm	
Alert Message Format: An error is detected in the Alert Message Format for the following conditions: 1. Protocol Version: Any value except 0x2h will set the alarm state. 2. CRC32 Error: If the CRC32 is not correct, the message is not inserted and the alarm is set. 3. Length Error: If the message length is not correct, the message is not inserted and the alarm is set. 4. The Alarm state is cleared on the next valid message.	Trap	Alarm	
Missing Video PID: The replacement video PID has been missing for more than 30 seconds on the input of Groomer A	Trap	Alarm	
Missing Video PID: The replacement video PID has been missing for more than 30 seconds on the input of Groomer B	Trap	Alarm	
Power Supply 1 Failure	Trap	Alarm	There are separate alarms for each power supply
Power Supply 2 Failure	Trap	Alarm	
Fan Failure: One or more of the frame fans has failed.	Trap	Alarm	
Groomer Pair Communications failed	Trap	Alarm	
Alert Message found in Primary Broadcast. An Alert Message packet was found in the primary broadcast feed	Trap		
Satellite RX communication failure. Groomer cannot communicate with the satellite receiver	Trap	Alarm	
Groomer Pair Communications. Groomers cannot communicate with each other	Trap	Alarm	

6 Upgrading the Groomer Cards

Note: This could cause a minor on air hit. It is recommended that you upgrade one groomer at a time, starting with Groomer B.   It may be prudent, although not necessary, to patch around the system depending on your broadcast chain.

Note: Both groomers must be running the same firmware version. It is not recommended or supported to run diferent versions of firmware on each groomer.

Note: A Windows PC or Mac may be used, however a Mac will quarantine the downloaded file and create a new file in addition to the downloaded file. Care must be taken so that the downloaded file is uploaded, not the newly created file. This issue was fixed in June 2021.

6.1 Procedure (for ASI Internal Failover Configuration)

1. Download the firmware version received and place it on the hard drive (or other storage device) of the PC used to log in to the D2WARN system.
2. Log in to Groomer B and go to the **Firmware** page.
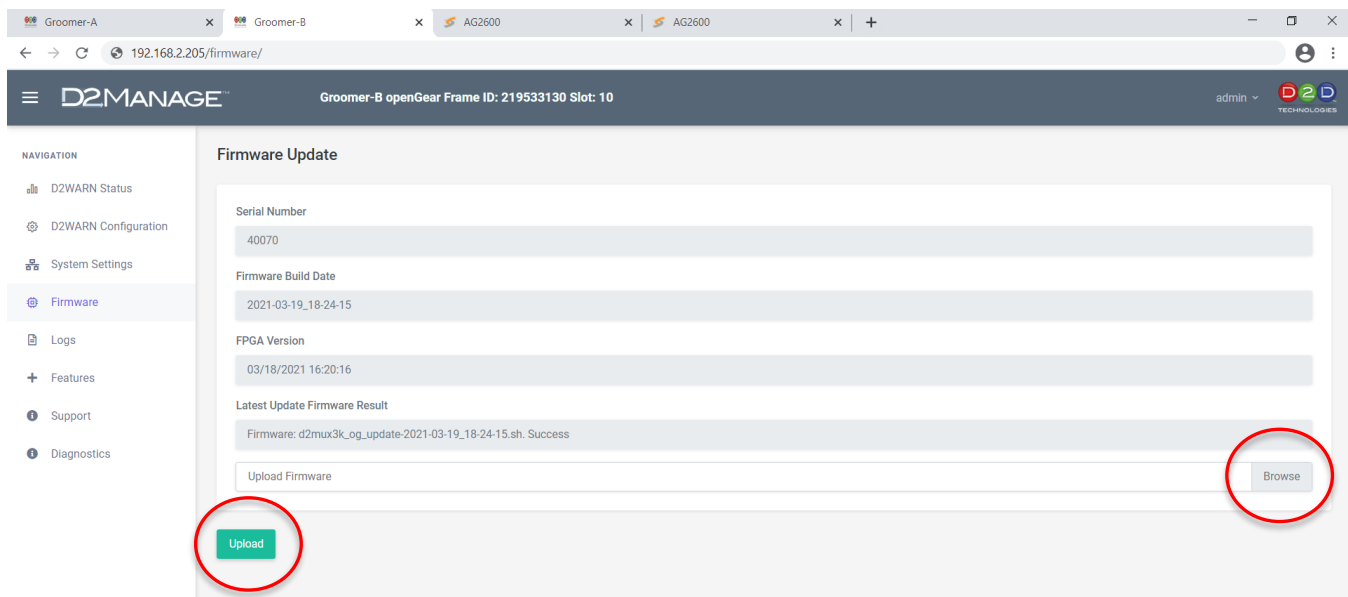
*Figure 6-1. **Firmware** Page*

3. Browse to the firmware file received (d2mux3k_og_update-xxxx-xx-xx_xx-xx-xx).
4. Click **Upload**
5. When the upload is finished, click **Yes** to restart the unit.
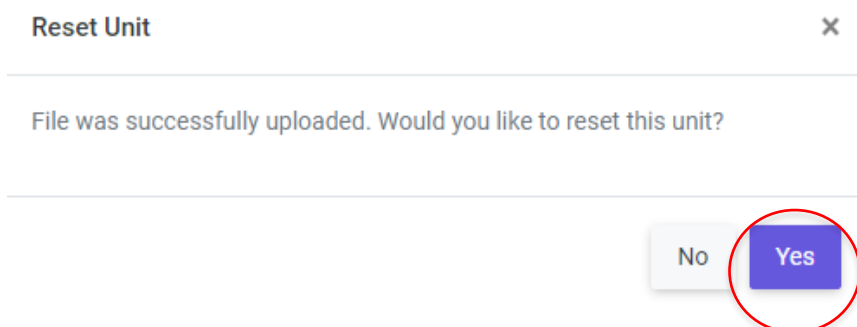
6. Log back into Groomer B and check that there are no alarms.
7. Log in to Groomer A and place groomer A in bypass mode. This will force failover to groomer B after a delay of about 30 seconds.
8. Check that Groomer B is inserting by viewing Groomer B's GUI, **D2WARN Status** page. Groomer B's status will indicate: **Alert Message Inserting Degraded** in yellow.
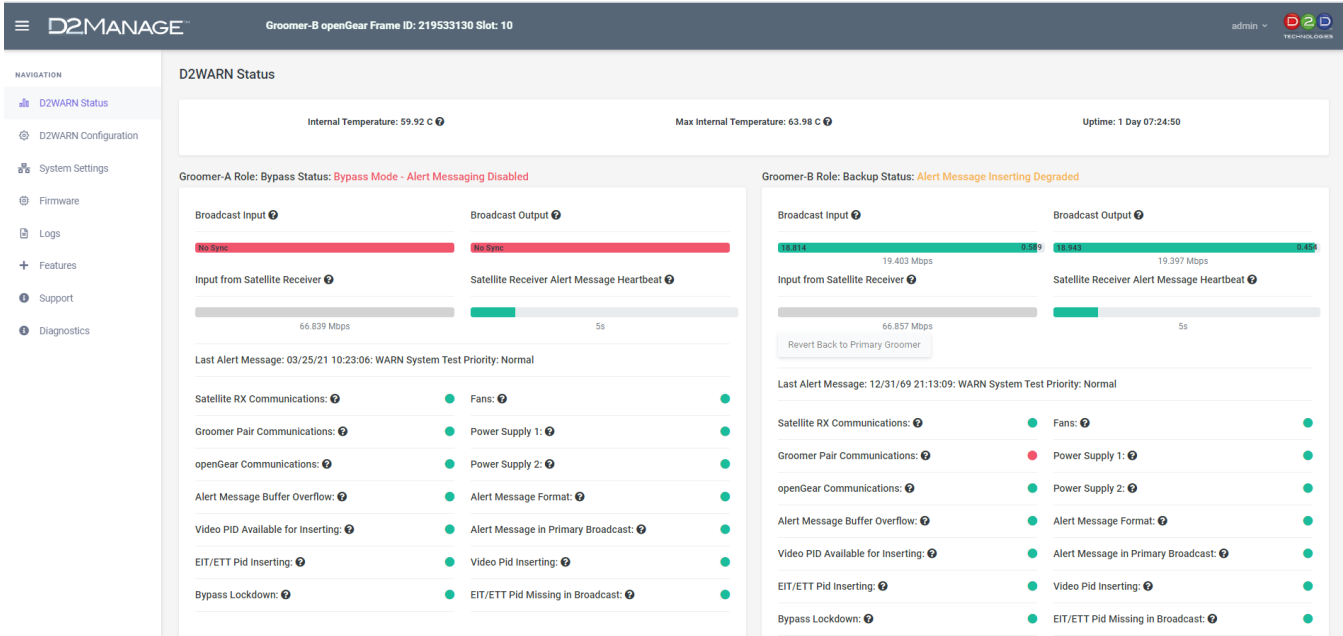
*Figure 6-2. Groomer B's GUI, **D2WARN Status** Page*

Note: Because Groomer A is in bypass mode, you must log in to Groomer B's GUI to see the status of both groomers. Also, there will be a Groomer Pair Communications alarm.

9. Upgrade groomer A (using steps 3 through 5, above). Allow groomer A to reset.
10. Log in and take Groomer A out of bypass. Check that there are no alarms.
11. Click **Revert back to Primary Groomer** using groomer B's GUI.

7 Adding Frames to DashBoard, Updating the Frame Firmware, and Configuring the Frame Light Bar

Many member stations already use DashBoard to control other equipment, and DashBoard will provide some functionality when connected to the D2WARN system. This functionality is limited to showing and changing system IP addresses, upgrading the openGear frame software and firmware, and configuring the frame's Light Bar. Full monitoring and control of the D2WARN system using DashBoard is not supported.

7.1 Installing DashBoard

DashBoard and its User Manual may be downloaded at:
https://www.rossvideo.com/support/software-downloads/dashboard/
https://www.rossvideo.com/support/product-documentation/dashboard/

Please refer to the User Manual for complete setup instructions.

7.2 Adding an openGear Frame Using the Automatic Detection Feature

Note: The PC running DashBoard must be on the same subnet as the openGear frame. If the PC is not on the same subnet, it must first be configured to be on the same subnet as the frame to be added.

When the frame to be detected is on the same subnet as the computer running DashBoard, it will be automatically discovered when DashBoard is launched. By default, the DashBoard queries the network for new frames every 10 seconds.

Confirm the Automatic Discovery feature settings by selecting **Window** > **Preferences**. If Automatic Discovery is not enabled, enable it in the window which opened. Make sure **All Network Interfaces** is enabled. Click **Refresh**, and then **OK**. See below:
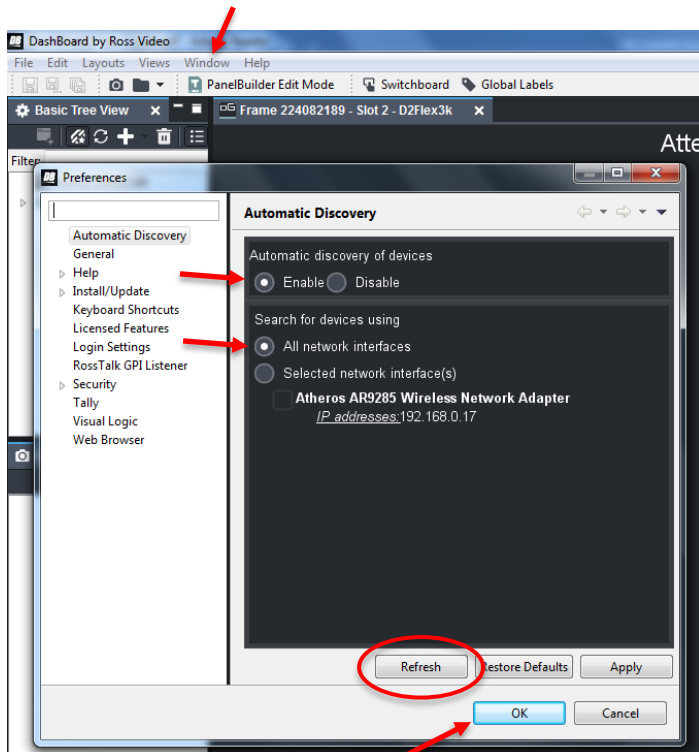
Figure 7-1. Confirm Automatic Discovery is Enabled

7.3 Manually Adding openGear Frames to DashBoard

As with Automatic Detection, the PC running DashBoard must be on the same subnet as the frame to be added. Below are the steps to manually add an openGear frame to DashBoard :

Click ✚ on the Tree View toolbar to open the **Select Equipment or Service Type to Add** dialog box:
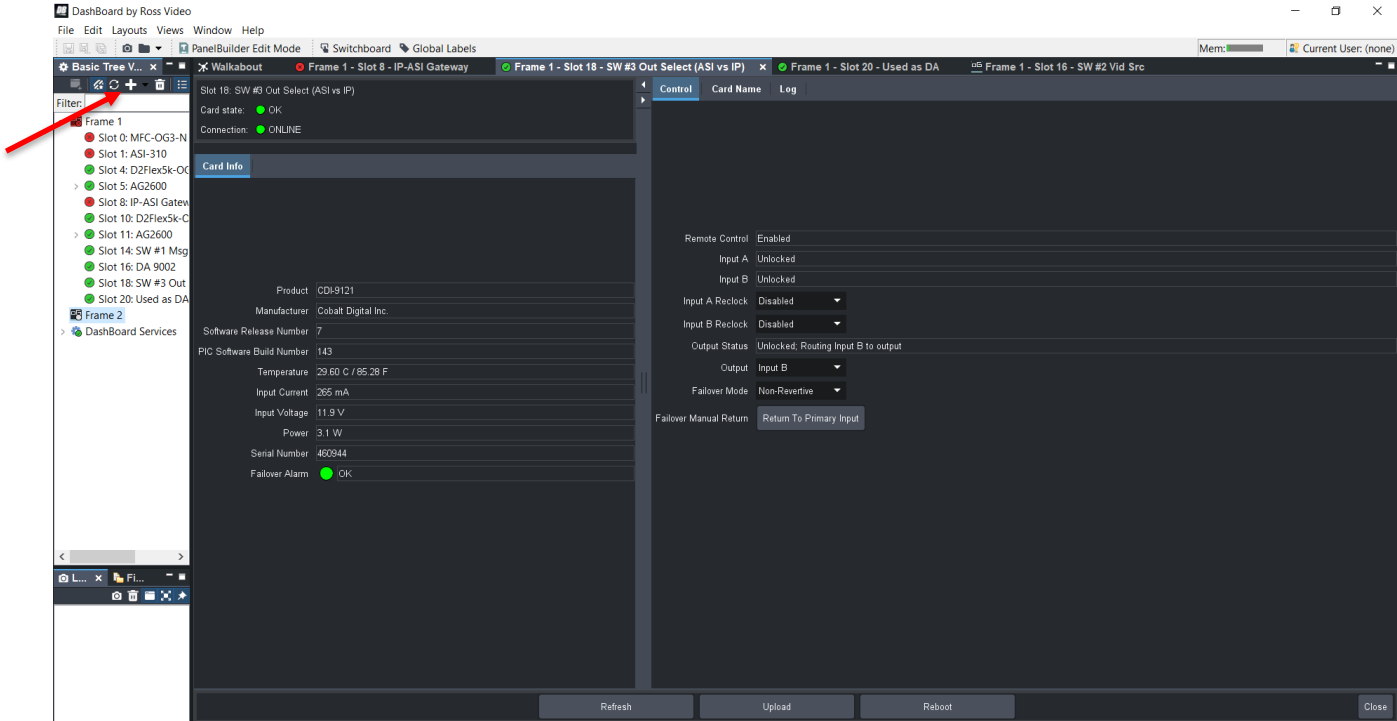
Figure 7-2. Adding a Frame Manually
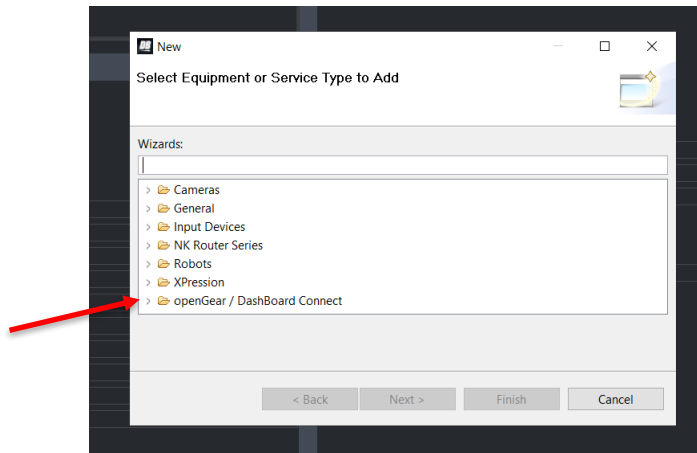
Figure 7-3. Selecting an openGear Frame to Add

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Expand the **openGear / DashBoard Connect** node, select **TCP/IP DashBoard Connect or openGear Device**, and then click **Next**:
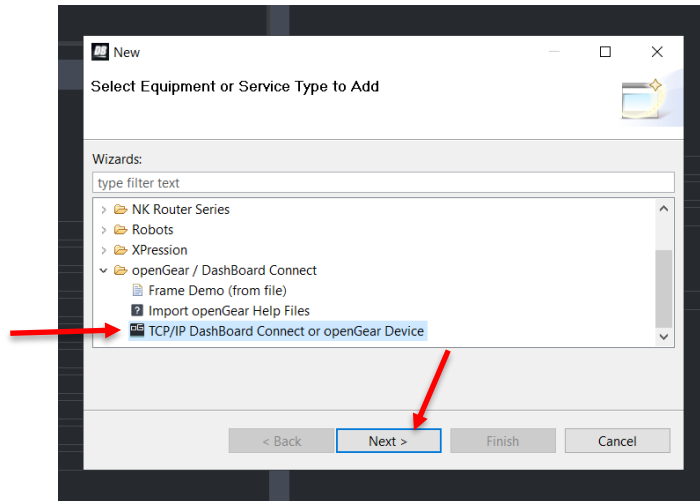
Figure 7-4. Adding an openGear Frame

The **New TCP/IP DashBoard Connect/openGear Frame** dialog box appears. Type the IP address of the frame in the **IP Address** box. The **Detect Frame Information** button becomes available. Click on **Detect Frame Information**. The frame attributes will be detected. Click **Finish**:
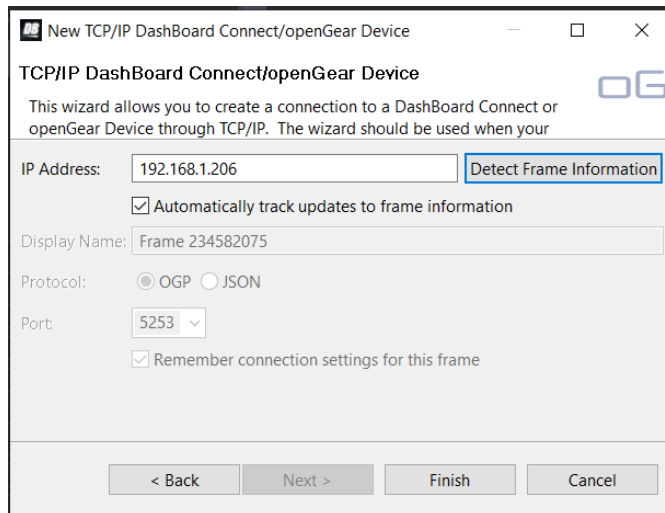
Figure 7-5. Detecting the Frame Information

7.4 Determining the Software and Firmware Version

After launching DashBoard and the Frame has been automatically discovered, click on **> Frame** which will display its installed devices.
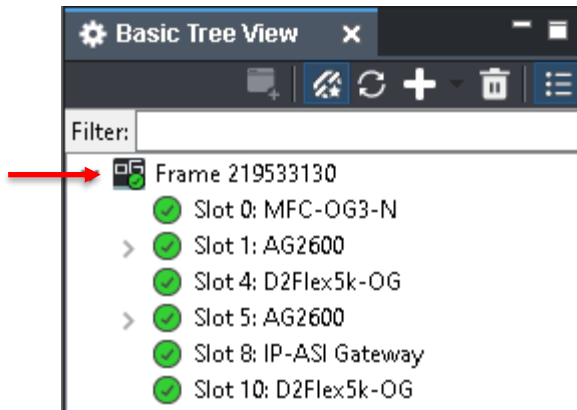
Figure 7-6. Click on > Frame

Click on **Slot 0**. The software and firmware versions will be displayed.
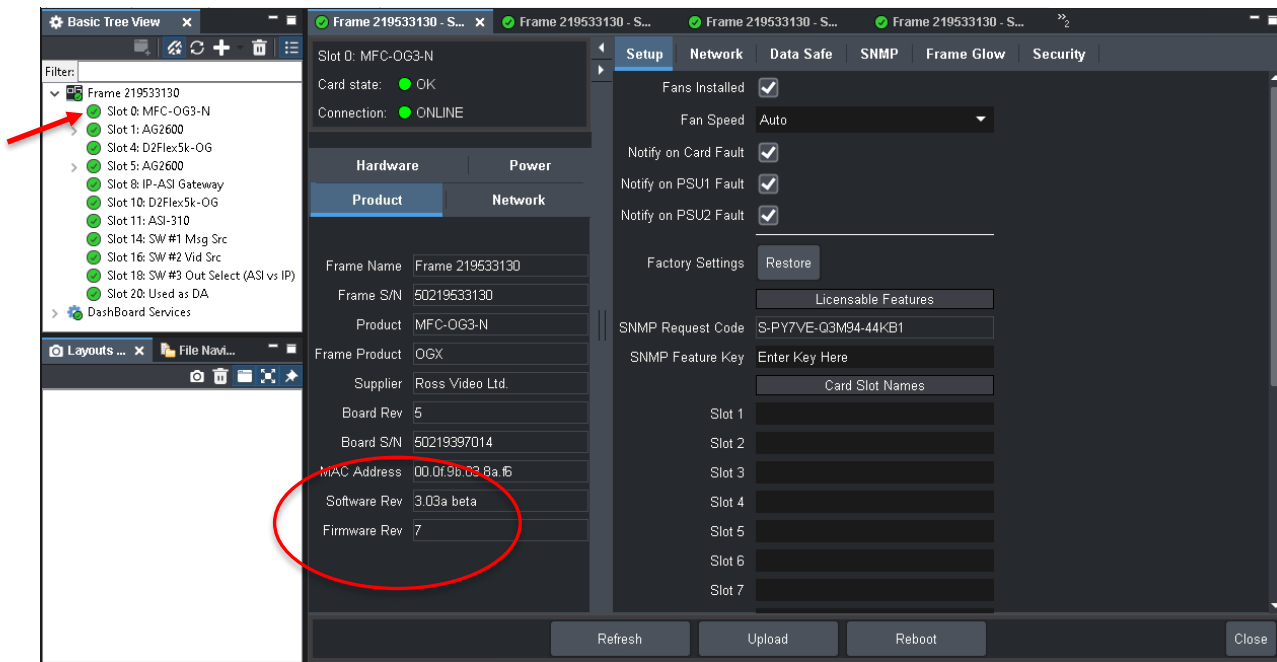
Figure 7-7. openGear Frame Software and Firmware Versions

7.5 Updating the Software and Firmware

You will need to contact Ross Technical Support to download the latest software and firmware versions. Download the file to your PC or other storage device. Select **Slot 0** and click on the **Upload** button.
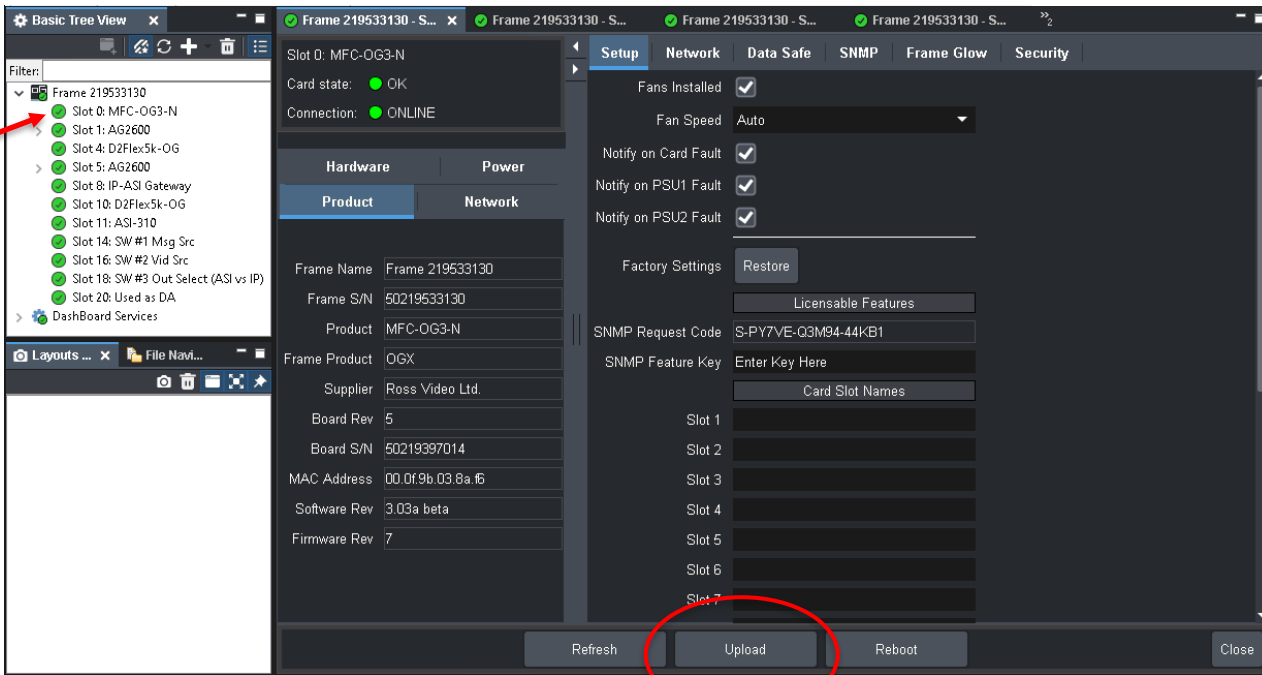
Figure 7-8. Uploading Firmware

Browse to the file which you previously downloaded to your PC hard drive or other storage device. It should be in the format of MFC-OG3-N-v3_03a.
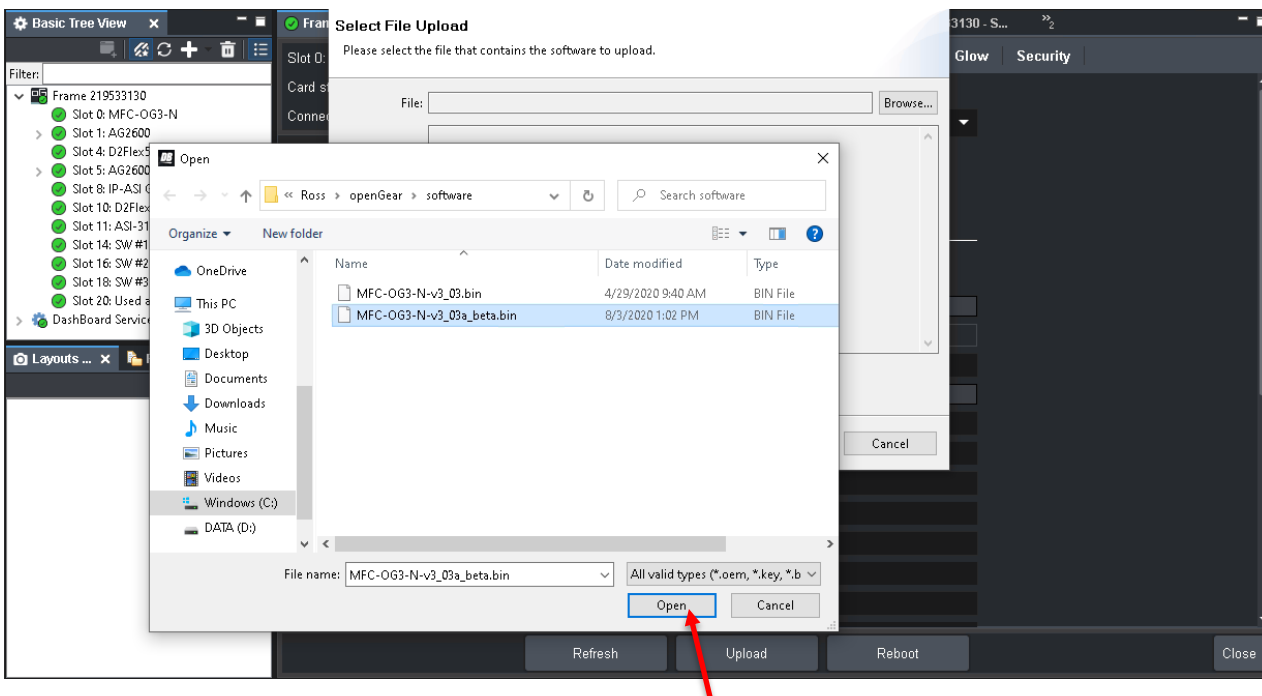
Figure 7-9. Browsing to Firmware File

Click on the file to highlight it, and click **Open**. Click on **Finish:**
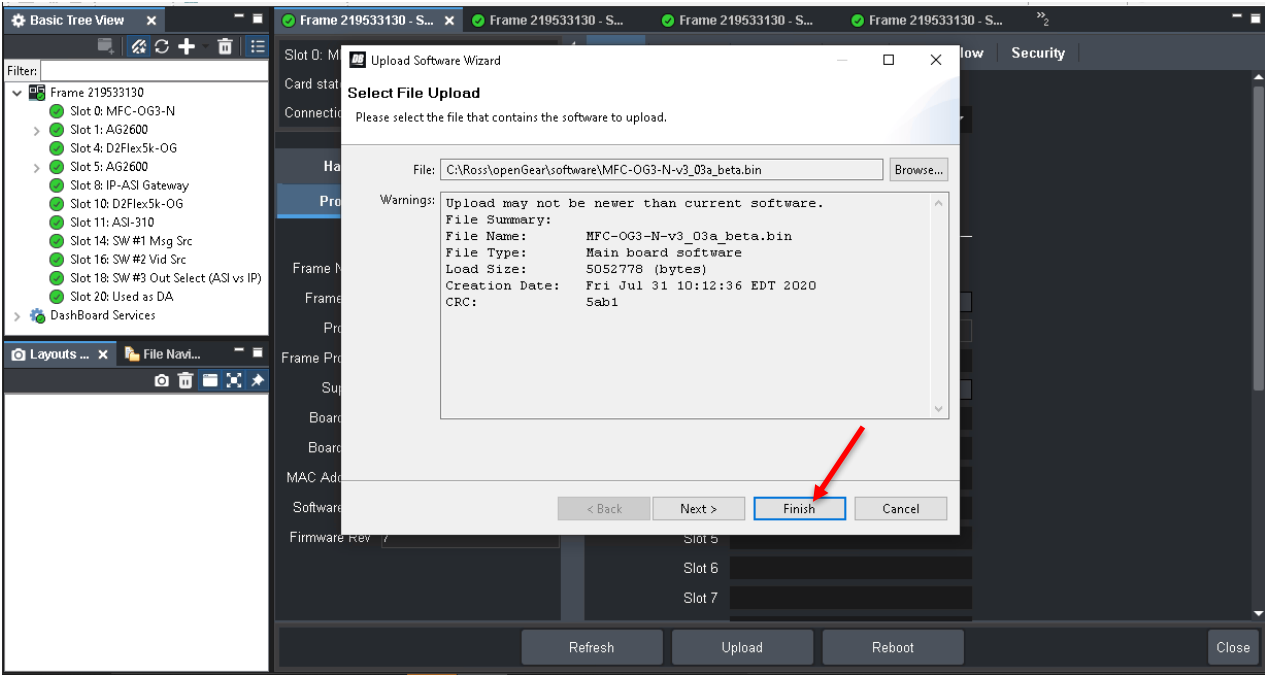
Figure 7-10. Updating Firmware

A window will open, click on **OK.** A new window will open. Click on **Yes** to reboot now:
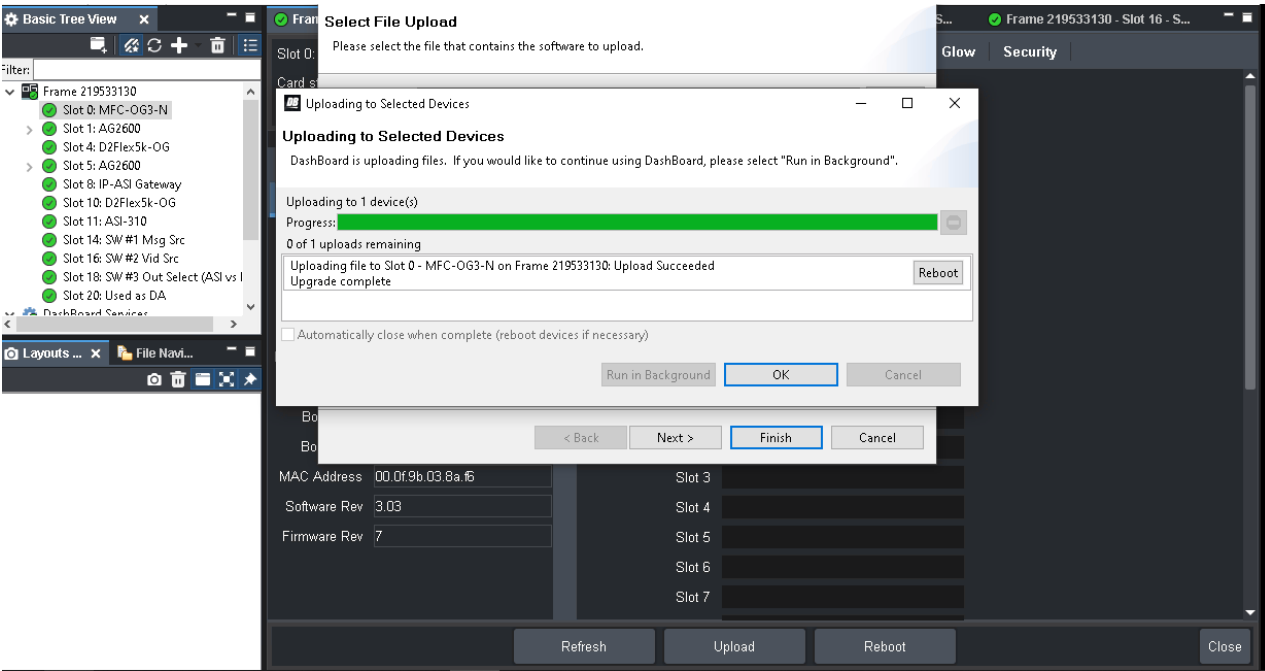
Figure 7-11. Updating Firmware

7.6 Using DashBoard to Configure the Frame's Light Bar

The Frame's light bar may be configured to show the status of the WARN system. Configuration is accomplished using DashBoard. Click on **Slot 0**. If not already selected, click on **Setup**. See below:
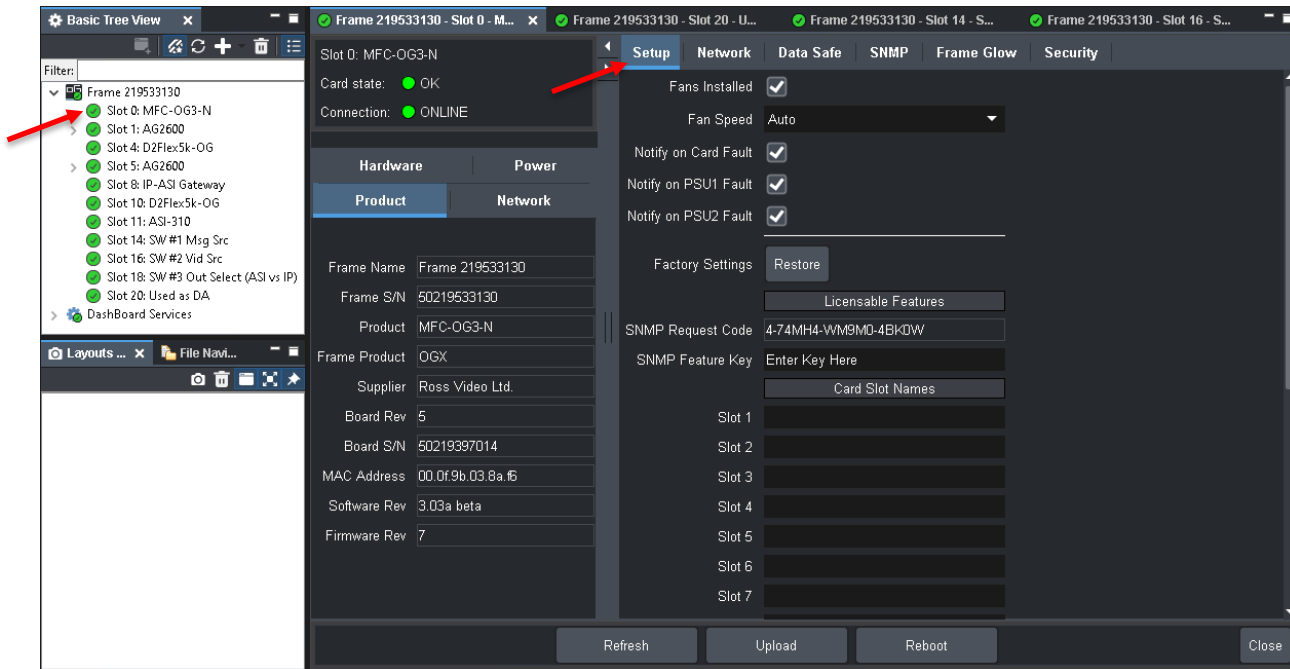
Figure 7-12. Frame Setup Tab

Under the Setup tab, ensure that the following boxes are checked. With this configuration a fault or alarm from any card will trigger the light bar:

Notify on Card Fault
Notify on PSU1 Fault
Notify on PSU2 Fault

Under the **Frame Glow** tab, ensure that the **Frame Status** box is checked. The Frame Glow options may be selected as desired.
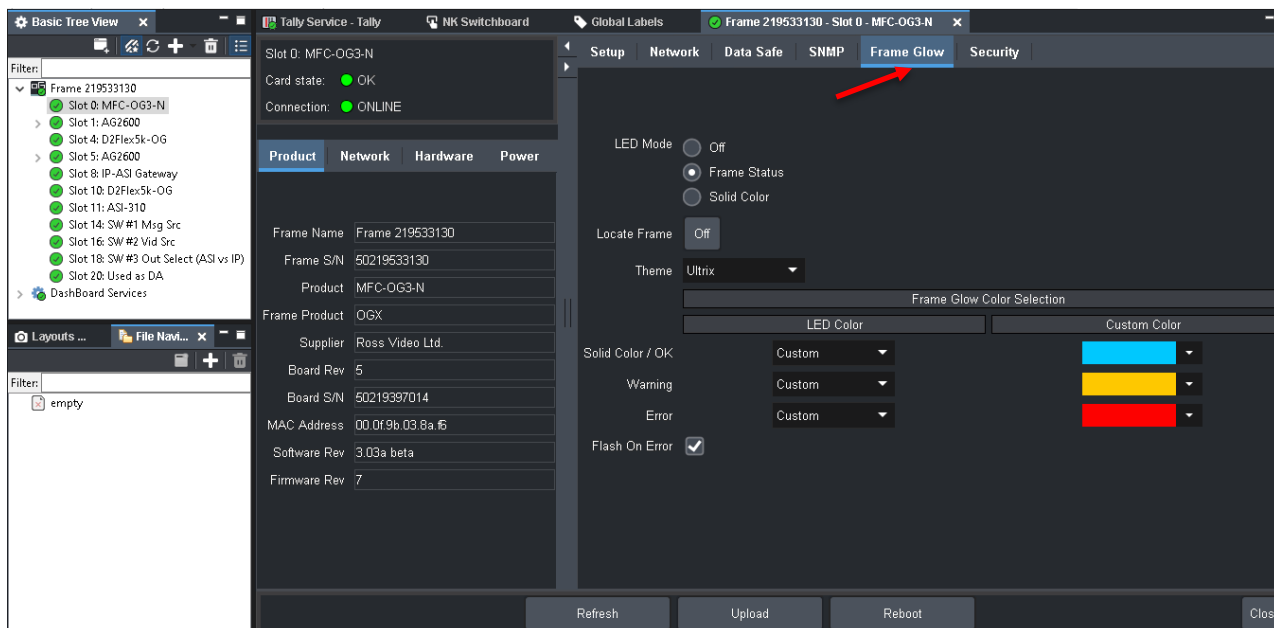
Figure 7-13. Frame Glow Tab

If an alarm is reported, for example by Groomer A, the status button next to **Slot 0** (the Frame) will turn yellow or red. The status button next to **Slot 4** (Groomer A) will also turn yellow or red. This does not indicate a Frame fault. It is merely Groomer A reporting its fault to the Frame.
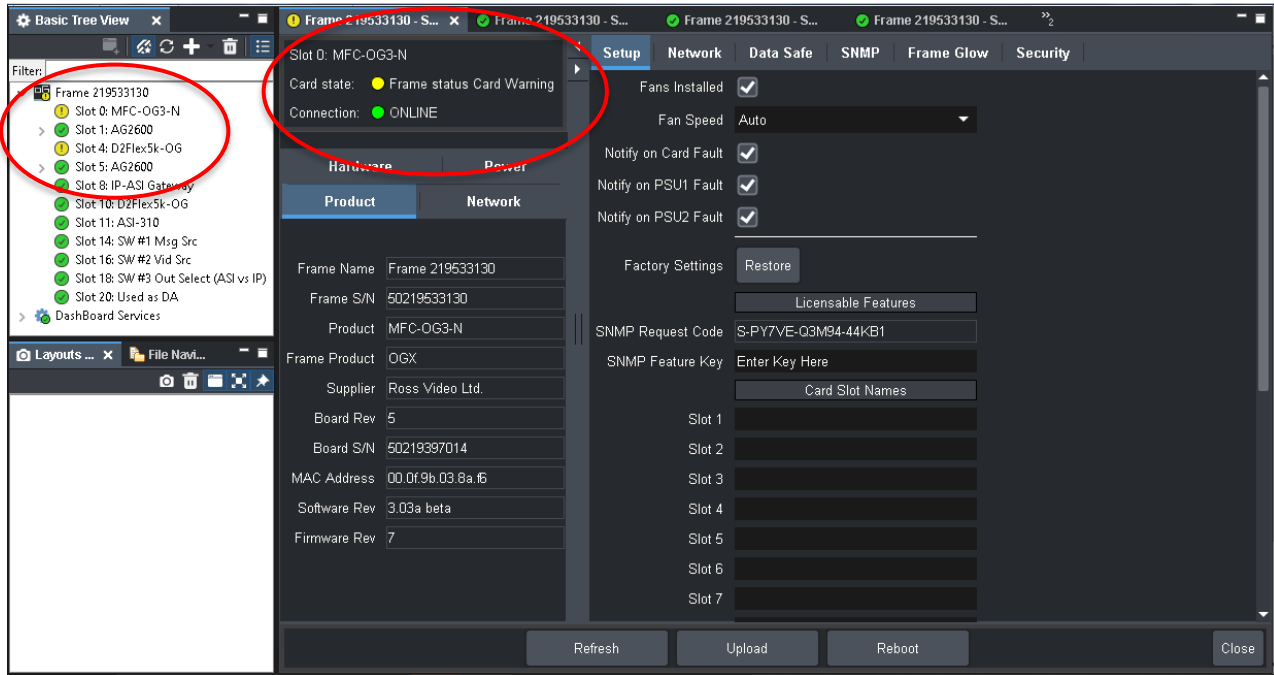
Figure 7-14. Groomer A Reporting a Warning Alarm to the Frame

8 AG2600 Satellite Receiver

8.1 Setting the Date and Time

The Date and Time settings are found on the **Admin** page of the Sencore Satellite Receiver's GUI. It is important that the receiver's date and time settings are accurate. The diagnostics and log files show the date and time, and these must be accurate if needed for troubleshooting.

To check the setting for the date and time, log in to the receiver's GUI, and click on the **Admin** tab:
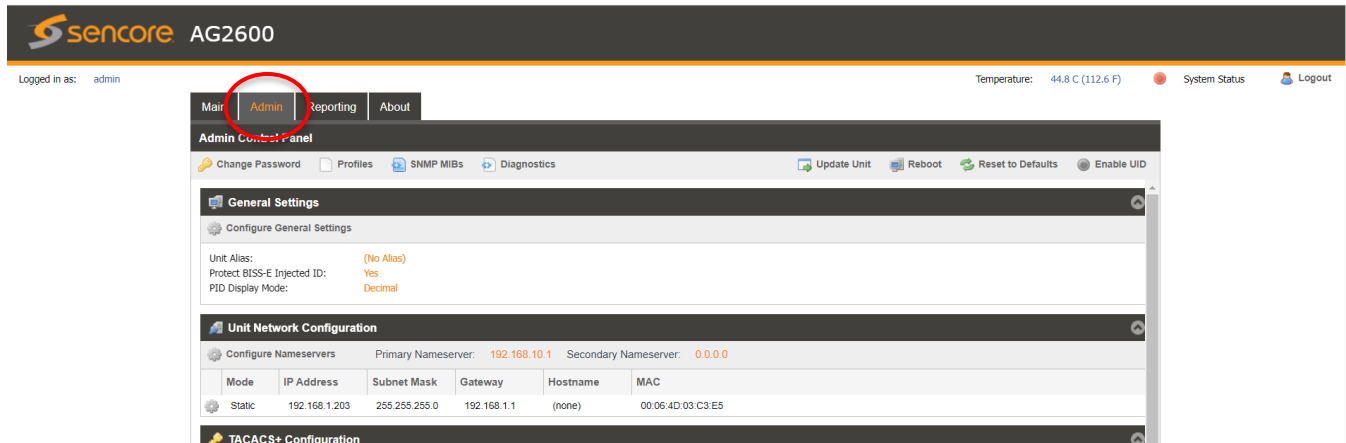
*Figure 8-1. Satellite Receiver Card **Admin** Tab*

On the Admin page, scroll down to Date/Time:
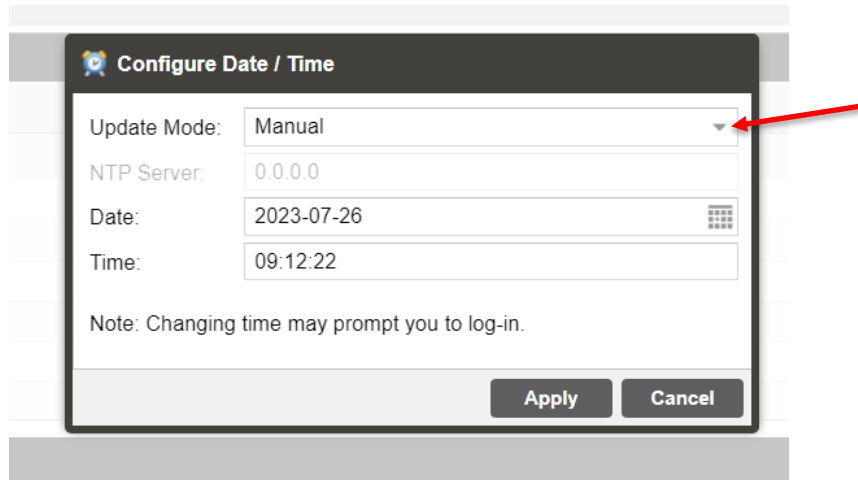
Figure 8-2. Date/Time Settings

The receiver's date and time are either entered manually, or synced to an NTP source. To change, click on the Settings icon for **Configure Date/Time**:
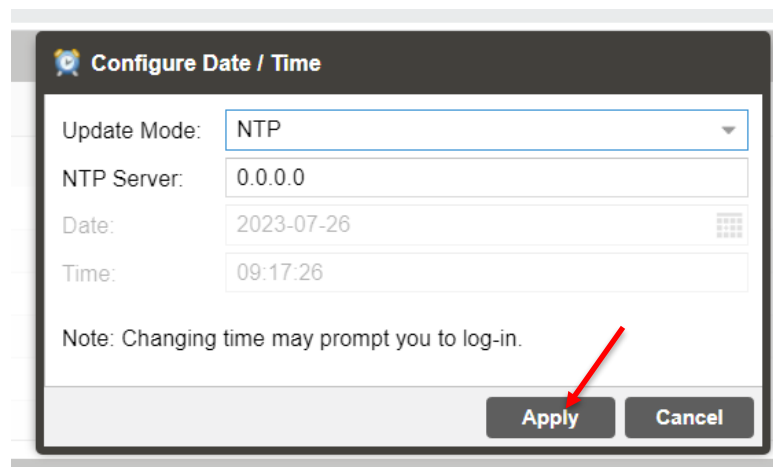
Figure 8-3. Configure Date/Time Settings

A box will open. Using the drop down menu you can choose to enter the date and time manually, or use NTP:

Figure 8-4. Enter Date and Time Manually

Figure 8-5. Configure NTP

For manual settings, enter the current date and time and click on **Apply**. For NTP enter the address of the NTP server and click on **Apply**.

8.2 Uploading the Configuration File

The Satellite Receiver cards come preconfigured for the correct Input Selection and the PBS Galaxy-16 Ku Band/Vertical satellite parameters. These steps can be used if you ever need to reload the settings. You must first obtain the profile from D2D Customer Support and download it to your PC.

Log into the Satellite Receiver card. Click on the **Admin** tab:
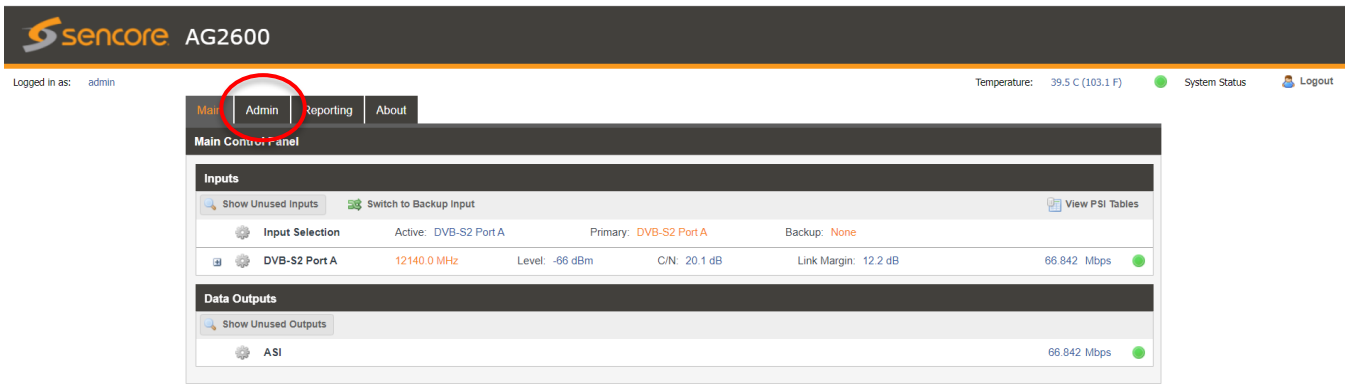
*Figure 8-6. Satellite Receiver Card **Admin** Tab*

On the Admin page click on the **Profiles**:
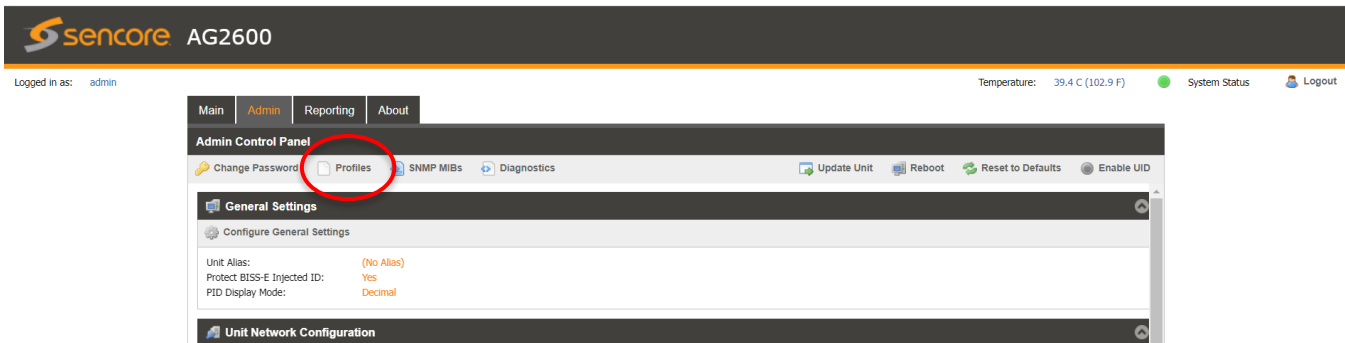
*Figure 8-7. Satellite Receiver Card **Admin** Page*

That will bring up the **Profile Manager** box. Click on Upload:
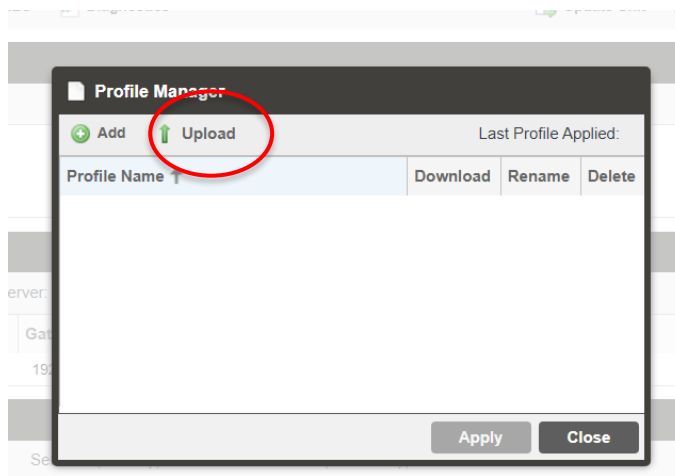
*Figure 8-8. Satellite Receiver Card **Profile Manager***

The File manager box will appear. Navigate to the file named **"PBS_AG2660_Profile.pfl"** which you previously downloaded to your PC hard drive or other storage device. Highlight the file and click **Open**.
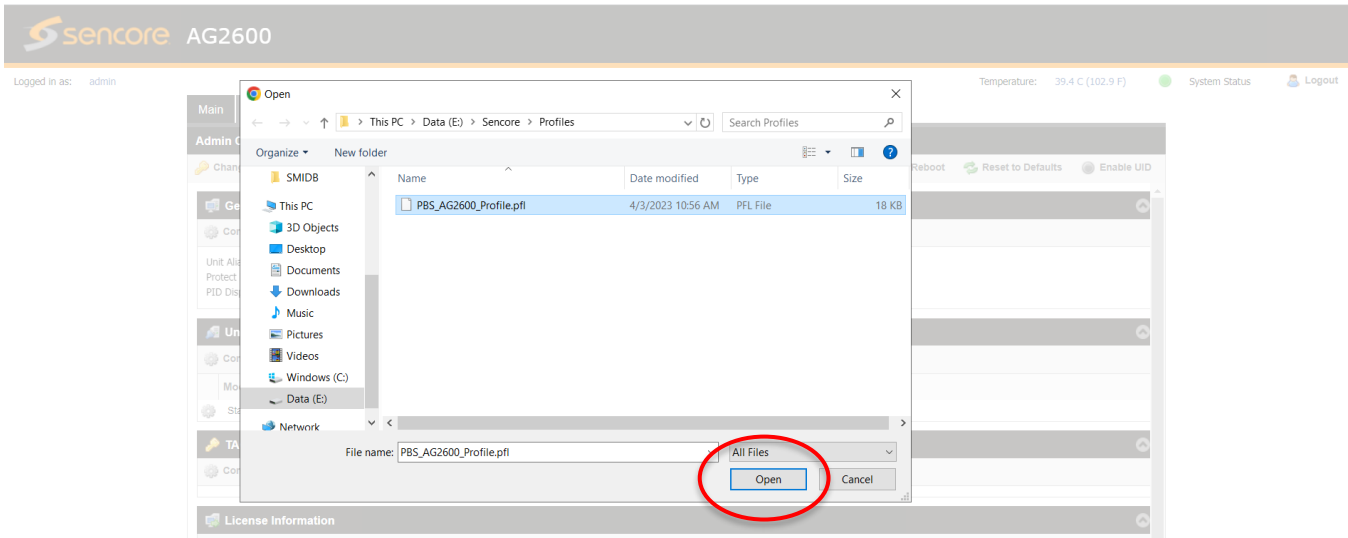
Figure 8-9. File Manager
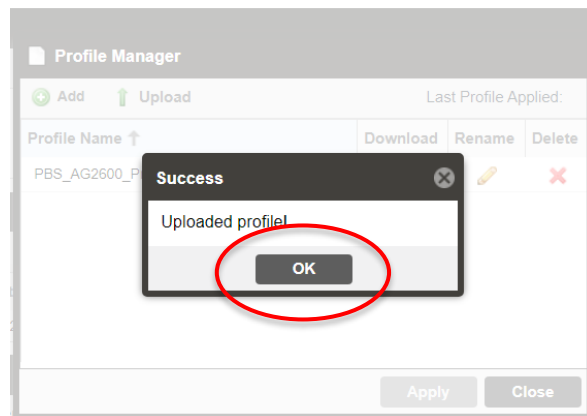
Figure 8-10. Profile Uploaded Successfully

Click **OK**. Once the file is uploaded, highlight it and click **Apply**:
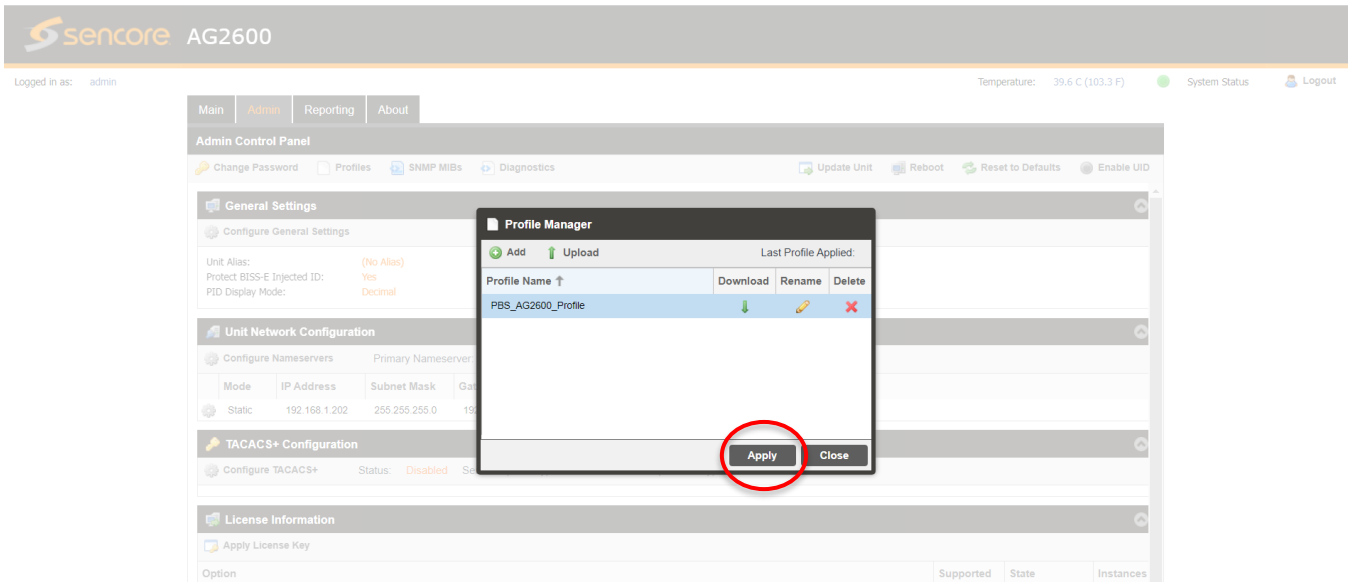
*Figure 8-11. Click **Apply** to Complete Upload Process*

8.3 Entering the PBS Satellite Parameters

If preferred, the user can enter the satellite parameters manually by clicking on the **Main** tab.
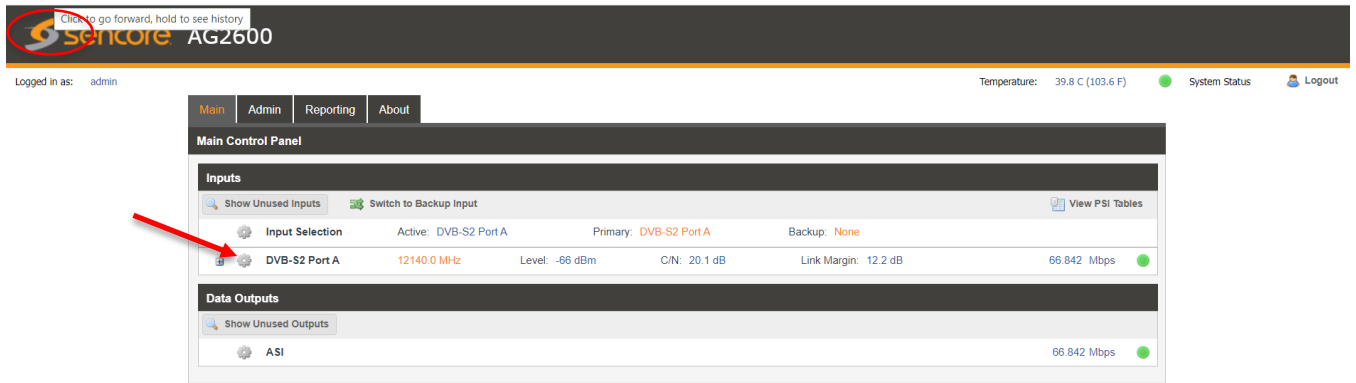
*Figure 8-12. Satellite Receiver **Main** Control Panel*

Next click on the settings icon next to **DVB-S2 Port A**. A configuration window will open where the satellite parameters may be entered manually. Enter the parameters and click **Apply**.
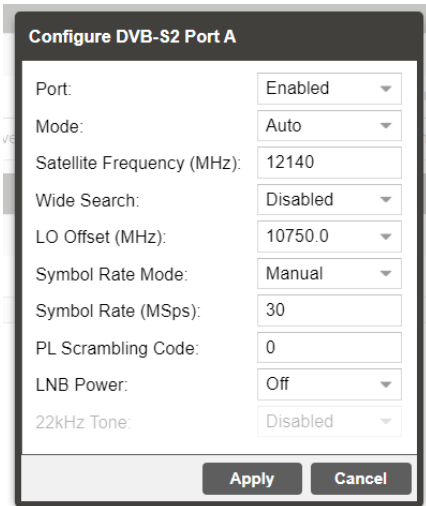
Figure 8-13. Entering Satellite RF Parameters Manually
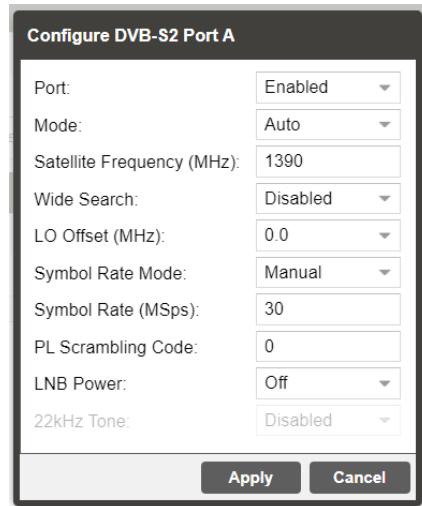
Figure 8-14. Entering Satellite L-Band Parameters

Note: Either the satellite's downlink RF frequency, or the LNB's output L-Band frequency may be entered. To enter the RF frequency, select your LNB's LO frequency in the LO Offset (MHZ) drop down menu. To enter the LNB's output L-Band frequency, select zero for the LO Offset (MHz).

The parameters for the PBS satellite are shown below:

PBS Satellite Parameters

Note: These are accurate as of April 2023. Subject to change.

Satellite – Galaxy 16
Polarization – Vertical Receive
Orbital Location - 99° W
Ku-Band
Transponder - 22
Bandwidth - 36 MHz
Downlink Frequency - 12140 MHz
L-Band - 1390 MHz
DVB-S2, 8-PSK, 3/4, 188 Byte data packets
Symbol Rate - 30 MHz

8.4 DVB-S2 Input Specifications

Frequency Range: 950 MHz – 2150 MHz in 100 kHz steps
Impedance: 75Ω
RF Input Level   -65 dBm to -25 dBm

8.5 SNMP

The Sencore AG2600 Satellite Receiver uses SNMP to communicate its status to its associated Groomer. For this purpose the Read-Only Community is used. This is covered in Section 1: **Getting Started**.

If desired, SNMP may also be used by the station to monitor the Sencore Receiver. If the station wishes to monitor the receiver the Read-Write Community would be used. For more information please contact D2D Technical Support.

To rename a SNMP Community click on settings icon under **SNMP Communities** on the receiver's Admin page:

*Figure 8-15. SNMP Communities on **Admin** page*

A window will open where the new community name(s) may be entered, and applied:
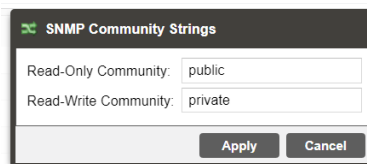
Figure 8-16. Changing the SNMP Community Names

8.6 PID Filter

The "raw" output of the AG2600 Satellite Receiver is approximately 66 Mbps. For those cases where the satellite receiver(s) and groomer(s) are installed at separate locations, it may be necessary to reduce the data rate from the AG2600 Satellite Receivers. For example, the satellite dish and receivers are located at the main studio and the WARN system is located at the transmitter some distance away. If the STL or fiber link cannot accommodate the full 66 Mbps receiver output, PID filtering may be used to reduce the data rate out of the satellite receiver(s).

The AG2600 Satellite Receiver is capable of filtering PIDs with the addition of the AG 26928 PID Filtering License. Contact D2D or Sencore Technical Support for information on purchasing and installation.

Below is an example of the PID filter configuration used to reduce the AG2600 output data rate from 66 Mbps to 3 Mbps. A PCR must be present in order for the Groomer's Satellite Receiver Input to stay in sync. In this example PCR PID 241 from service 15 was included because that Service had the lowest bandwidth.

Also shown below is a screen shot of the Groomer's GUI showing the Input From the Satellite Receiver data rate.

Finally, a screen shot of the Transport Stream Analyzer is below, which shows the PID filtered output of the AG2600 Satellite Receiver in this example.
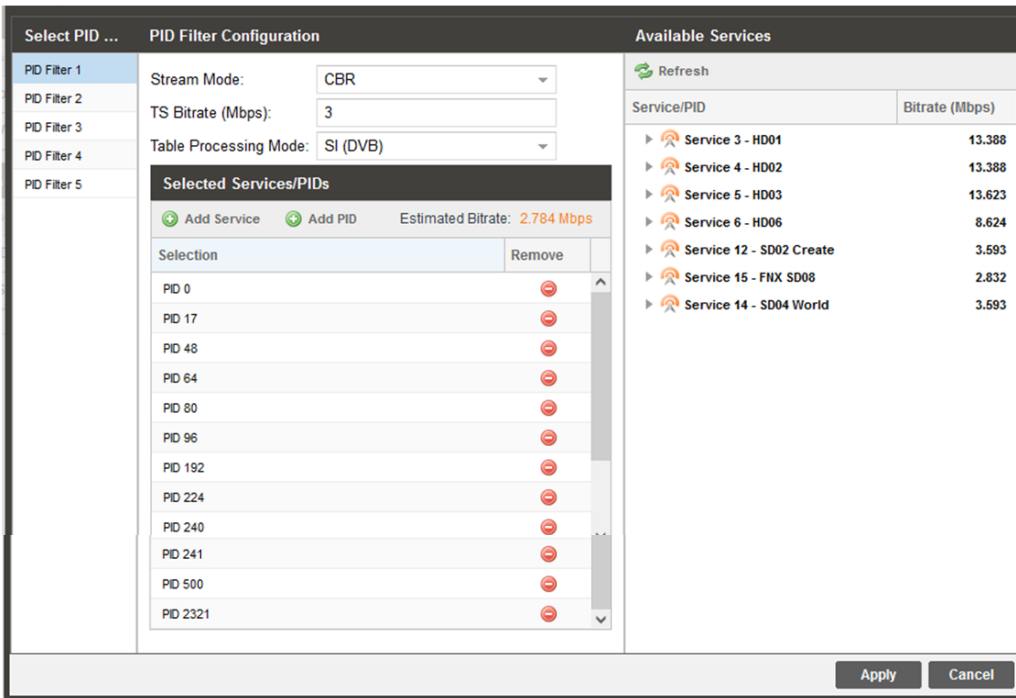
Figure 8-17. AG2600 PID Filter Configuration
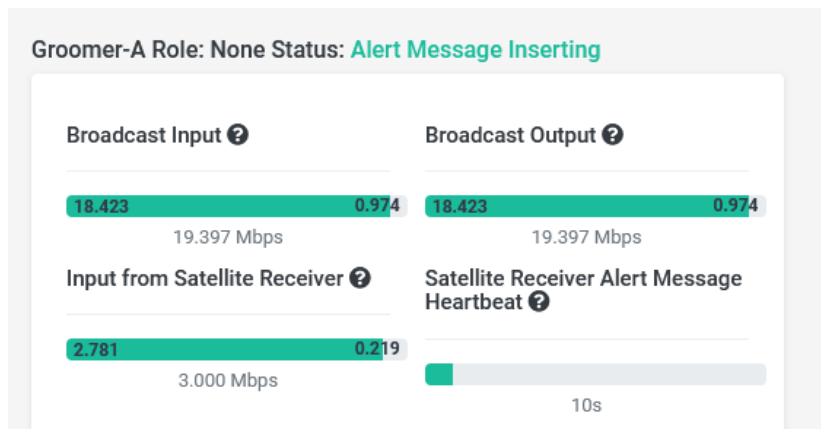
Figure 8-18. Groomer A GUI Showing Data Rate from AG2600

PID info (39)

- **0 PAT** (96 kbps / 0.5%)
- **?! 17 Unknown** (14.1 kbps / 0.07%)
- **48 PMT** (98 kbps / 0.5%)
- **49 AVC/H.264 Video** (0 bps / 0.00%)
- **52 AC-3 Audio** (0 bps / 0.00%)
- **53 AC-3 Audio** (0 bps / 0.00%)
- **54 AC-3 Audio** (0 bps / 0.00%)
- **64 PMT** (96 kbps / 0.5%)
- **65 AVC/H.264 Video** (0 bps / 0.00%)
- **68 AC-3 Audio** (0 bps / 0.00%)
- **69 AC-3 Audio** (0 bps / 0.00%)
- **70 AC-3 Audio** (0 bps / 0.00%)
- **80 PMT** (196 kbps / 1.0%)
- **81 AVC/H.264 Video** (0 bps / 0.00%)
- **84 AC-3 Audio** (0 bps / 0.00%)
- **85 AC-3 Audio** (0 bps / 0.00%)
- **86 AC-3 Audio** (0 bps / 0.00%)
- **87 AC-3 Audio** (0 bps / 0.00%)
- **96 PMT** (96 kbps / 0.5%)
- **97 AVC/H.264 Video** (0 bps / 0.00%)
- **100 AC-3 Audio** (0 bps / 0.00%)
- **101 AC-3 Audio** (0 bps / 0.00%)
- **102 AC-3 Audio** (0 bps / 0.00%)
- **192 PMT** (96 kbps / 0.5%)
- **193 AVC/H.264 Video** (0 bps / 0.00%)
- **196 AC-3 Audio** (0 bps / 0.00%)
- **197 AC-3 Audio** (0 bps / 0.00%)
- **198 AC-3 Audio** (0 bps / 0.00%)
- **224 PMT** (96 kbps / 0.5%)
- **225 AVC/H.264 Video** (0 bps / 0.00%)
- **228 AC-3 Audio** (0 bps / 0.00%)
- **229 AC-3 Audio** (0 bps / 0.00%)
- **230 AC-3 Audio** (0 bps / 0.00%)
- **240 PMT** (96 kbps / 0.5%)
- **241 AVC/H.264 Video** (16.9 Mbps / 87.4%)
- **244 MPEG-1 Audio** (0 bps / 0.00%)
- **?! 500 Unknown** (84 kbps / 0.4%)
- **?! 2321 Unknown** (0 bps / 0.00%)
- **Ø 8191 Null packets** (1.47 Mbps / 7.6%)

PID | TS | Grid

Ready

Figure 8-19. PID Filtered Output from AG2600

9 Resetting the Satellite Receiver to Factory Defaults

If a satellite receiver appears to not be functioning resetting it to its factory defaults may fix the issue. All settings will be returned to the factory defaults except the network management port's TCP/IP settings. All event logs will be cleared. To reset all settings to default click the **Reset to Defaults** button. The AG 2600 will prompt the user to confirm the reset. The unit will reboot once the reset is confirmed.

1. Log into the receiver and click on the **Admin** tab.
2. Click **Reset to Defaults** on the right side of the page.
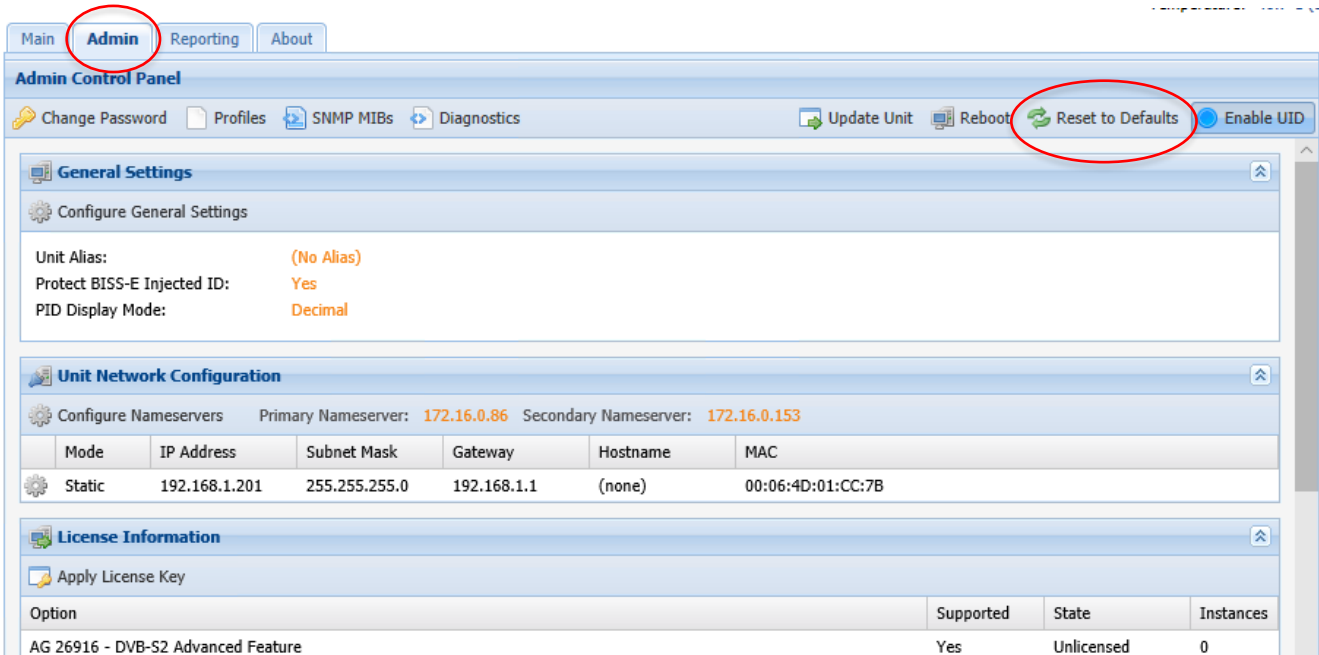
*Figure 9-1. Satellite Receiver **Admin** Page*

3. Confirm that you want to reset everything to defaults:
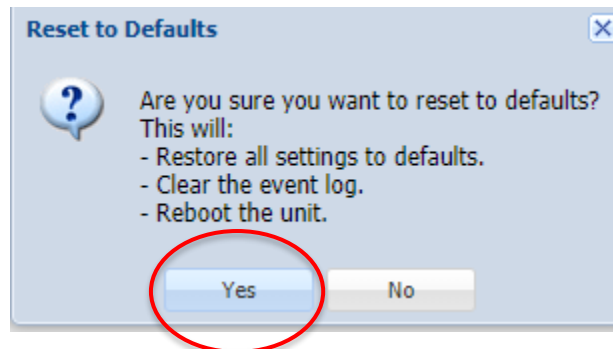
Figure 9-2. Resetting the Satellite Receiver to Factory Defaults

Once the satellite receiver has been reset to its Factory Defaults, the **Input Selection** and **DVB-S2 Port A** must be configured (see **Manually Setting the Satellite Receiver Input** and **Entering the PBS Satellite Receiver Parameters** in the preceding section).

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10 Interconnect Ports

The following table provides a list of the external interconnect ports available to configure the D2WARN system for ASI or IP applications

| Component	Port	Description	Physical
OG Frame	ETHERNET	The openGear Ethernet port is used as the single control port for the D2WARN system (cable supplied by user)	RJ45
AG-2600 Rec A	RF A	The RF input for the satellite receiver (cable supplied by user)	BNC-F
AG-2600 Rec A	RF B	Unsupported	BNC-F
AG-2600 Rec A	ASI In	Unsupported	BNC-F
AG-2600 Rec A	ASI-OUT	The ASI output from the satellite receiver A connected to the Groomer (cable supplied by D2D)	BNC-F
AG-2600 Rec B	RF A	The RF input for the satellite receiver (cable supplied by user)	BNC-F
AG-2600 Rec B	RF B	Unsupported	BNC-F
AG-2600 Rec B	ASI In	Unsupported	BNC-F
AG-2600 Rec B	ASI-OUT	The ASI output from the satellite receiver B connected to the Groomer B Groomer (cable supplied by D2D)	BNC-F
Groomer A	ASI-IN1	The ASI Input of the broadcast stream	BNC-F
Groomer A	ASI-IN2	The ASI Input of the WARN data from Satellite Receiver A	BNC-F
Groomer A	ASI-OUT1	The ASI Output of the broadcast stream cascade to Groomer B ASI-IN1 on ASI systems, internal failover systems (cable supplied by D2D).	BNC-F
Groomer A	ASI-OUT2	Reserved	BNC-F
Groomer A	GIGE-Eth 1	Optional dedicated control port for the Groomer, and TSoIP	RJ45
Groomer A	GIGE-Eth2	Reserved	RJ45
Groomer B	ASI-IN1	The ASI Input of the broadcast stream from Groomer A	BNC-F
Groomer B	ASI-IN2	The ASI Input of the WARN data from Satellite Receiver B	BNC-F
Groomer B	ASI-OUT1	The ASI Output of the broadcast stream	BNC-F
Groomer B	ASI-OUT2	Reserved	BNC-F
Groomer B	GIGE-Eth 1	Optional dedicated control port for the Groomer, and TSoIP	RJ45
Groomer B	GIGE-Eth2	Reserved	RJ45
ASI-310 Card	ASI-IN	The ASI input that is converted to SMPTE-310 on the 310-OUT port	BNC-F
ASI-310 Card	310-OUT	The SMPTE-310 converted output from the ASI-IN port	BNC-F
ASI-310 Card	310-IN	The SMPTE-310 input that is converted to ASI on the ASI-OUT port	BNC-F
ASI-310 Card	ASI-OUT	The ASI converted output from the 310-IN port	BNC-F

11 Replacing a Battery in the Groomer Card

The Groomer cards have a CR 2032 battery that keeps the real time clock active if the NTP is not selected and the unit shuts down or reboots. If your groomer card does not remember the time after a power cycle, the battery needs to be replaced.

1. Determine which cards need the battery and take note of which slot it is in the frame
2. Open the door and remove the groomer card by firmly pressing on the top of the white retaining tab
3. The card will pop out enough to grab hold of it
4. Remove the card and set it on a static resistant surface
5. CAREFULLY use a small flathead screwdriver to pry the battery up while holding the black retaining clip back
6. Remove the battery. Be very careful not to lift up or break the tab under the battery.
7. Slide the new battery in its place
8. Make certain that it is seated correctly
9. Reinsert the card in the same slot
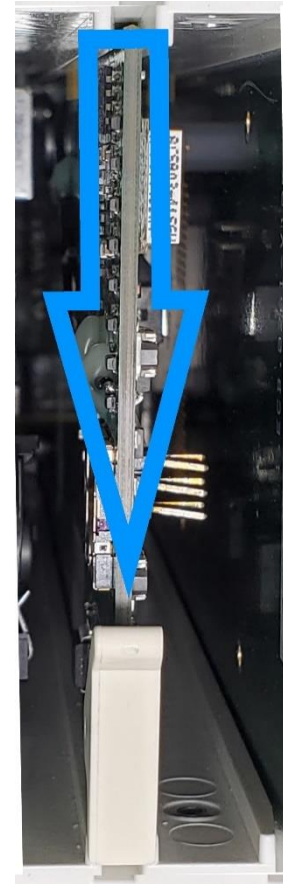
Figure 11-1. Retaining Tab.
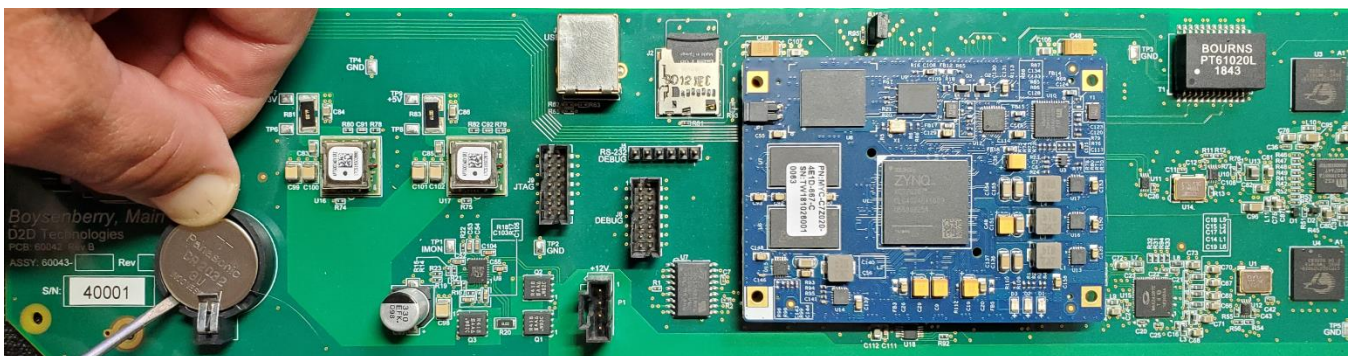
Figure 11-2. Groomer Card Battery Removal

12 Features Page

The Features Page is only used to add future capabilities to the WARN system. From here a license may be loaded into each groomer. If a new license is available it may be obtained from D2D and downloaded onto the user's PC. The license may then be uploaded to the groomer by browsing to the file, and clicking on the **Upload** button.
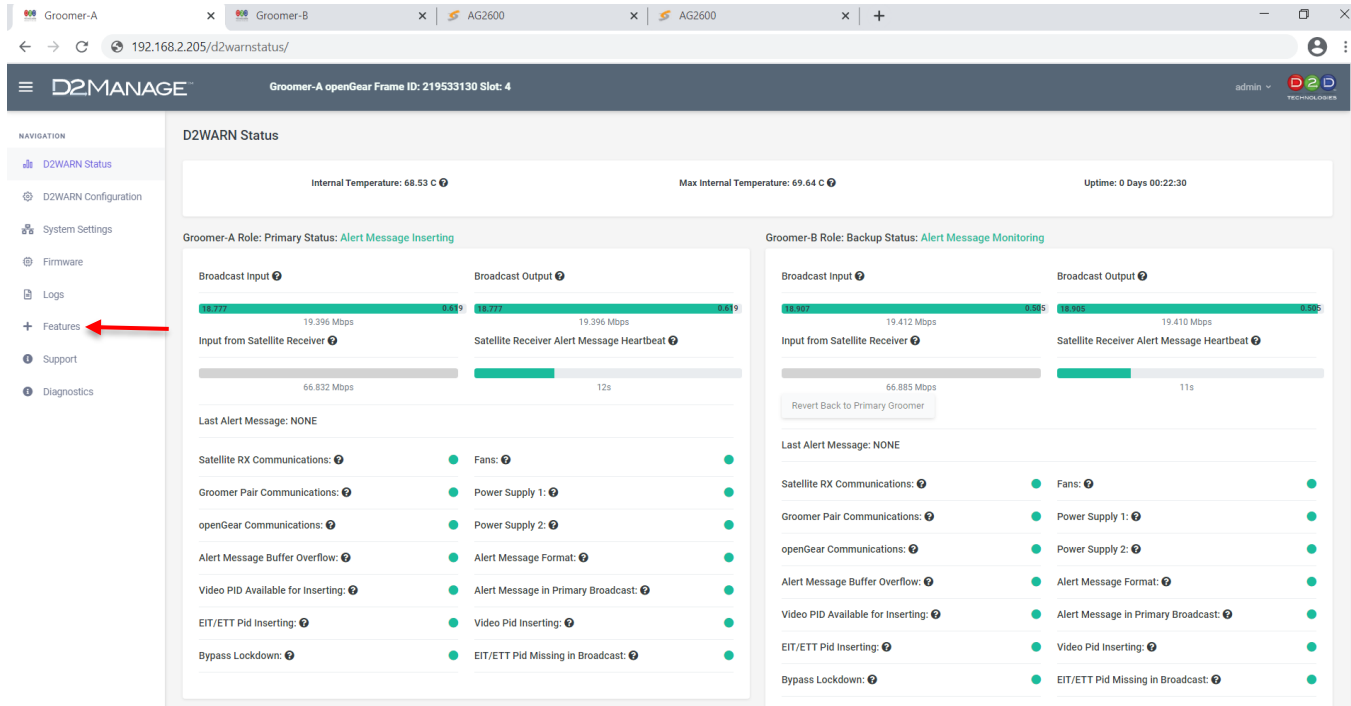
*Figure 12-1. **Features** Page for Uploading New Licenses*
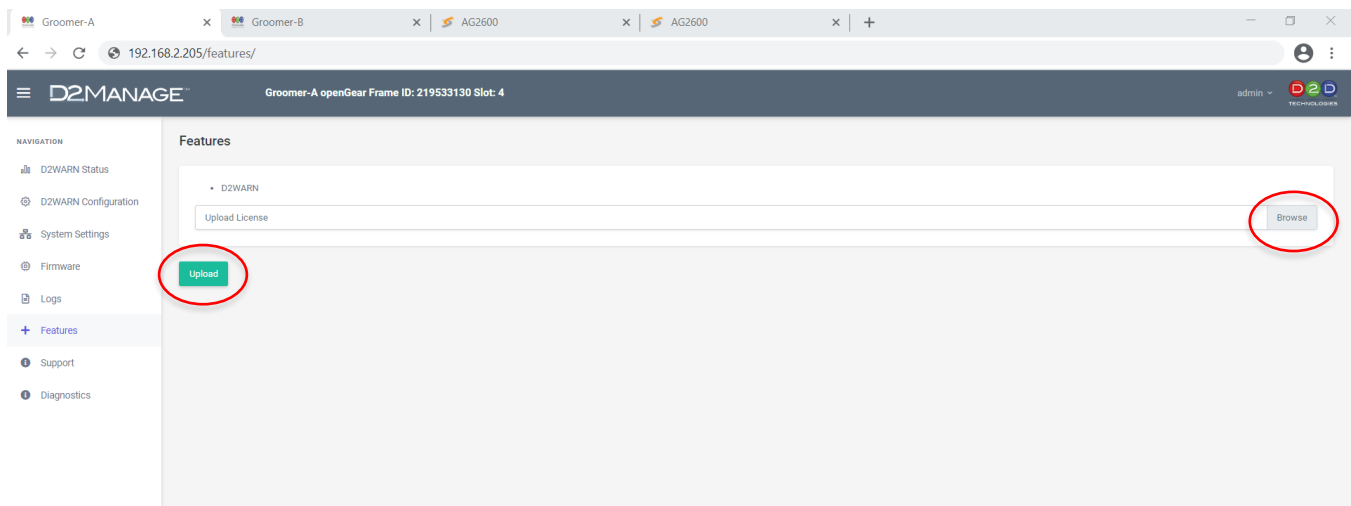
*Figure 12-2. Uploading a License on the **Features** Page*

13 Defect Management and Bugs

13.1 Reporting Bugs, Defects, Issues and Problems

Defects, Bugs and problems should be reported via the D2CARE JIRA portal at:
https://d2dtech.atlassian.net/servicedesk/customer/portal/1

All users and testing personnel will be added to this portal, also known as JIRA. The web portal will gather data and assign the appropriate D2D Engineer for resolution.

13.2 D2D Technologies Contact

9140 Golfside Drive 1S
Jacksonville, FL 32256 USA
Main: 904-607-4177 • Fax.904-363-0967
D2DTechnologies.com
Sales@D2DTechnologies.com

14 Troubleshooting

14.1 System is Unresponsive and the Light Bar is Flashing Red

In the unlikely event that an instability is detected in one or both groomers, the system will automatically go into bypass to ensure the station's on air programming is not interrupted. In this case an alarm on the groomer's GUI will turn red, and the status will indicate that the groomer has locked itself into bypass mode. The user will have to restart the affected groomer(s) or power cycle the system.

If the system is configured for internal failover, and Groomer A went into bypass mode, the system will fail over to Groomer B. This will require the user to Revert Back to the Primary Groomer following restart. See the Section: **Monitoring** for more information.

14.2 Wrong IP Address Entered, or You Can No Longer Communicate with the Groomer Cards

If you entered a wrong address or the openGear frame is no longer communicating with a groomer card, you may be able to connect to the groomer directly.

1. When shipped from the factory the **IP Address of This Groomer's "Eth 1" port (rear panel)** on the **System Settings** page for Groomer A is 192.168.1.205. For Groomer B it is 192.168.1.206. If these addresses have not been changed you can connect to the groomer directly with your PC.

    Note: If you change this address from its default setting, be sure to write it down in case you need it later!

2. Plug an Ethernet cable into the **Eth 1** port of the groomer card. It is the top port.
3. Connect to your PC and set the subnet mask to 255.255.255.0. Set the PC to an address in the same subnet (e.g., 192.168.1.150).
4. Open a browser and enter the **IP Address of This Groomer's "Eth 1" port (rear panel)** on the **System Settings** page. From the factory, Groomer A is 192.168.1.205. Groomer B is 192.168.1.206.
5. From there you can set the other IP addresses manually.
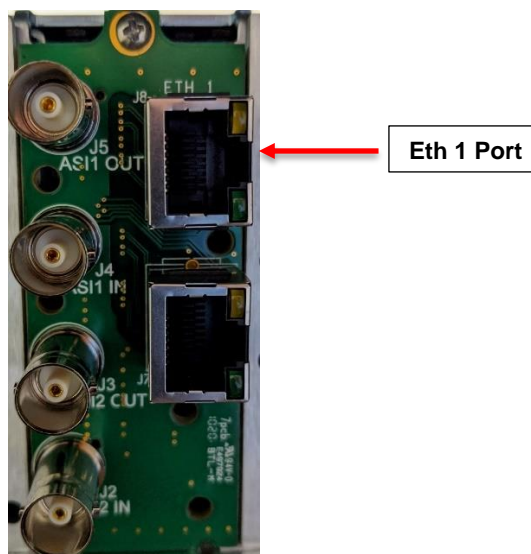
Figure 14-1. Eth 1 Port Located on the Back of the Groomer Cards
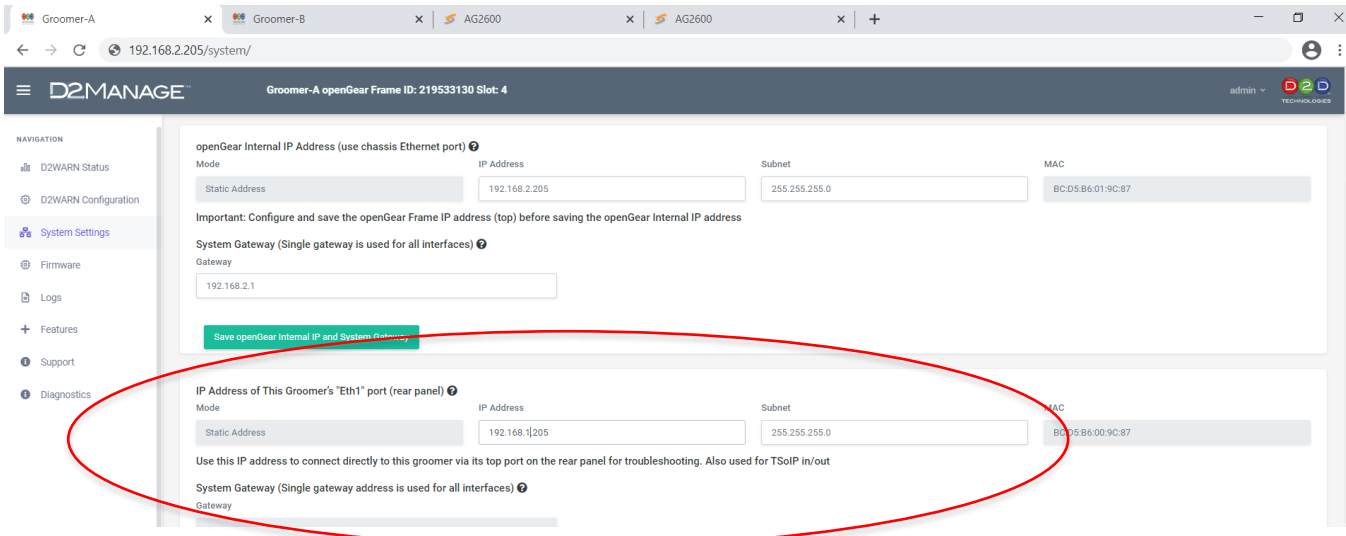
Figure 14-2. IP Address of This Groomer's "Eth 1" port (rear panel)

14.3 IP Address of the Groomer is Unknown

If you cannot connect to the Groomer directly, it may be necessary to discover the Groomer's IP address. In some cases DashBoard can be used to display and set the Groomer's IP address. Contact D2D Customer Support for assistance.

14.4 PSU Error

If you are getting Power Supply (PSU) errors:

1. Check your software on the openGear Frame and make certain that it is version 3.02a or higher. See the Section: **Upgrading the openGear Frame and Configuring the Light Bar.**
2. Contact D2 Care at 904-607-4177

14.5 Loud Alarm Emanating From the Front Panel

1. Make certain both power supplies are plugged in and turned on. Look for a green light on each one at each end.
2. Double check that the door is closed properly, and it has snapped into place.

14.6 Enabling and Disabling the Audio Alarm

You may disable the audio alarm if desired. An **Alarm Mute** button is identified as ① in the picture of the Network Controller card, shown below. The Network Controller card is located all the way on the right when viewing the WARN system from the front. The **Alarm Mute** button mutes the audio alarm for two minutes. If a fault condition is still present when the mute time-out ends, the card re-activates the audio alarm.
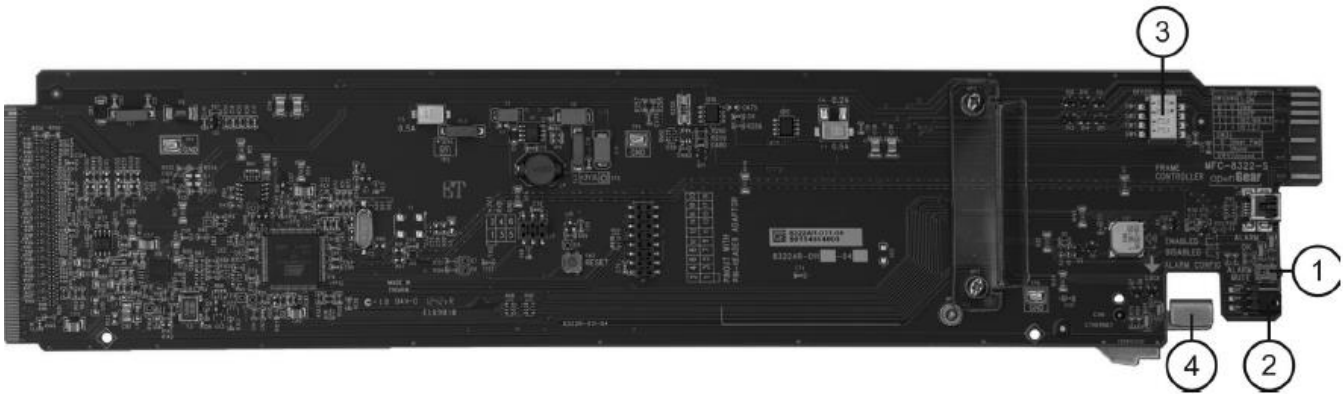
Figure 14-3. openGear Frame Network Controller Card

To permanently disable the audio alarm, the jumpers identified as (2) may be set to 2 + 3:
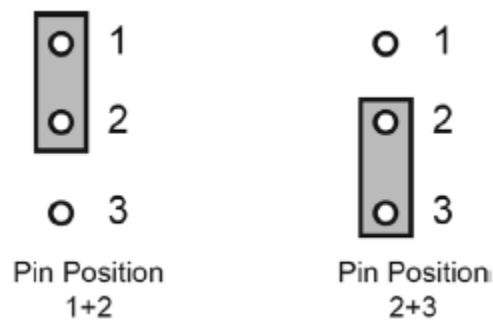
Figure 14-4. Setting the Jumper PINs on the Frame's Network Controller Card

14.7 The Frame's IP Address is wrong, or the Groomer Cannot Communicate with the openGear Frame

If there is an **openGear Communications** alarm on one or both of the groomers, it is most likely due to a wrong IP address for the Frame. The frame's IP address may have been incorrectly entered on the groomer's **System Setting** page, or the frame's IP address was change somehow. The frame's IP address may be on a different subnet than the groomer. In all cases the frame's correct IP address is shown on the frame's front panel LCD display.

DashBoard may be used to set the frame's TCP/IP settings. More information on downloading, configuring and using DashBoard are in the Section: **Updating the openGear Frame Firmware and Configuring the Frame Light Bar.**

Note: This issue can only be corrected locally. The PC running DashBoard must be on the same subnet as the openGear frame. If the PC is not on the same subnet, it must first be configured to be on the same subnet as the frame to be added. The PC must be connected directly to the main Ethernet port on the back of the openGear frame.

To change the Frame's IP address back to its correct subnet and address perform the following procedure:

1. Connect a local PC to the main Ethernet jack on the rear of the WARN system.

2. Change the PC's Network Connections so that the IP settings are on the same subnet as the frame's IP address as shown on its front panel LCD display. This will allow you to connect to the frame using DashBoard.

Note: If the PC is on a different subnet than the groomers and receivers, you will temporarily lose communications with the Groomers and Receivers.

3. The DIP switches SW1 and SW2 identified as (3) on the Network Controller card must both be set to the OFF (User Settings) position:
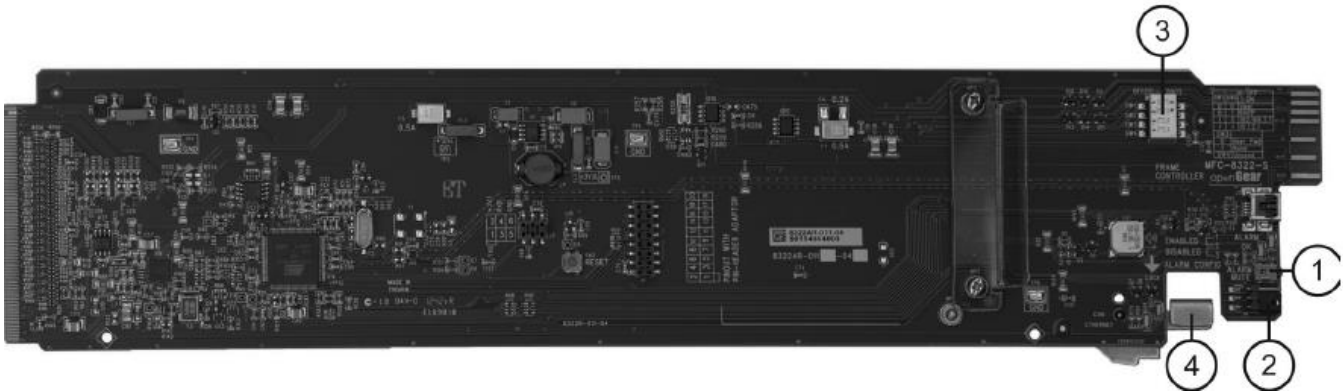
Figure 14-5. openGear Frame Network Controller Card

SW1 Position	SW2 Position	Controlled via DashBoard	Descriptions
OFF	OFF	YES	The card network settings can be set by the user from the DashBoard Network tab. (default). DHCP Mode is assumed until the user changes the settings in DashBoard.

Figure 14-6. Setting the DIP Switches on the Network Controller Card

4. Close DashBoard, and reopen it. DashBoard will detect the frame.

5. Double click on the Network Controller card in slot 0:
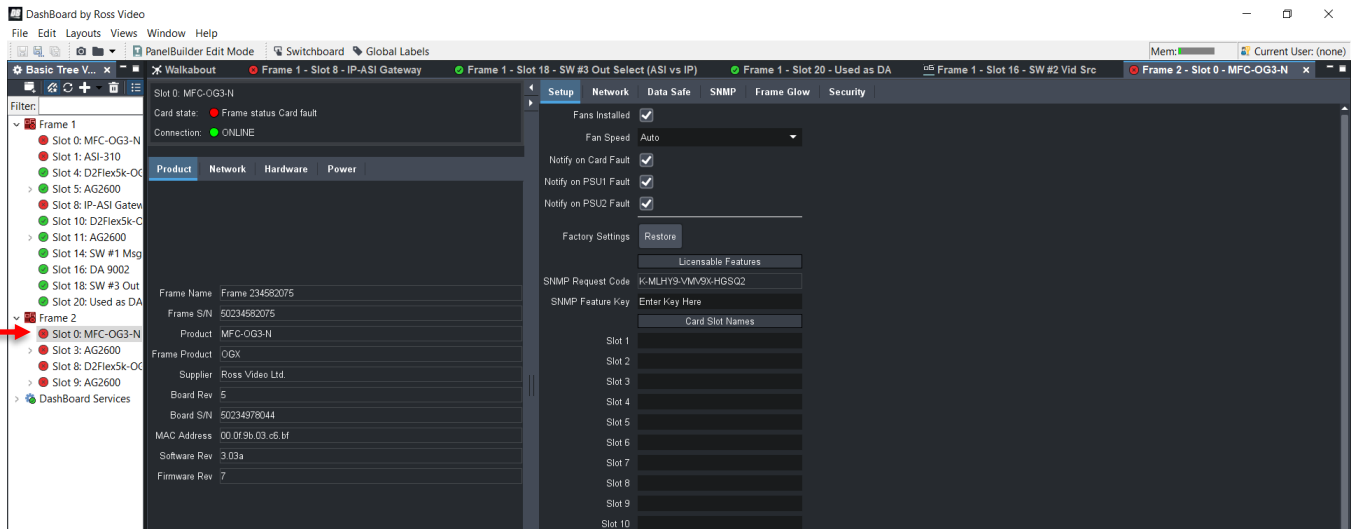
Figure 14-7. Selecting the Network Controller Card on DashBoard

6. Click on **Network** in the top tool bar:
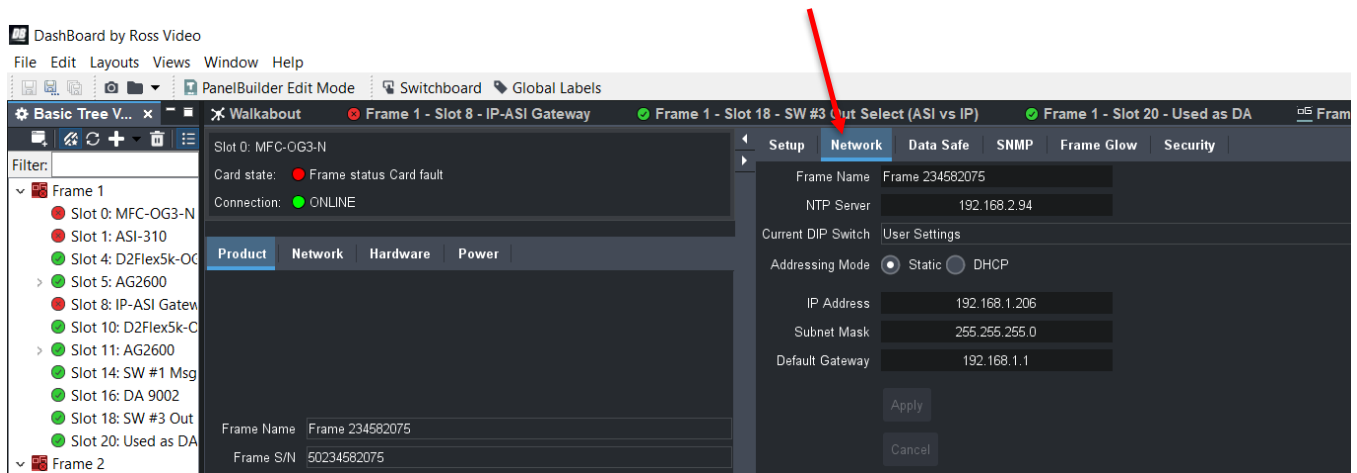
Figure 14-8. Configuring the Network Settings using DashBoard

7. Enter the frame's desired **IP address**, **Subnet Mask**, and **Default Gateway**, and click on **Apply**:
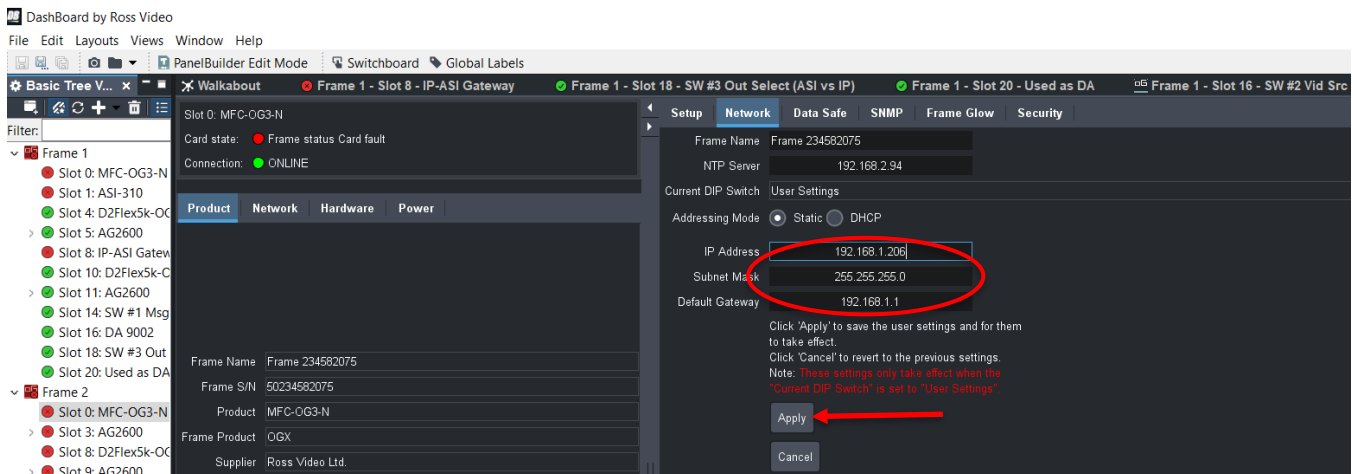
Figure 14-9. Entering the Network Settings using DashBoard

You may now change the PC's IP settings back to their original settings, and communicate with the groomer on its original, correct IP Internal IP address.

14.8 Wrong IP address Entered, or the Satellite Receiver Card is Corrupted

If the Satellite Receiver's IP Address, Subnet, and/or Gateway are unknown, DashBoard may be used to set the receiver's TCP/IP settings. More information on downloading, configuring and using DashBoard are in the Section: **Updating the openGear Frame Firmware and Configuring the Frame Light Bar.**

To set the satellite receiver's TCP/IP settings using DashBoard, click on **AG2600** for that receiver in the left margin. Enter the desired **IP Address, Subnet Mask,** and **Default Gateway**, and then click on **Apply Network Settings**.

Note: It may be necessary in some cases to repeat this procedure before the changes will take effect.
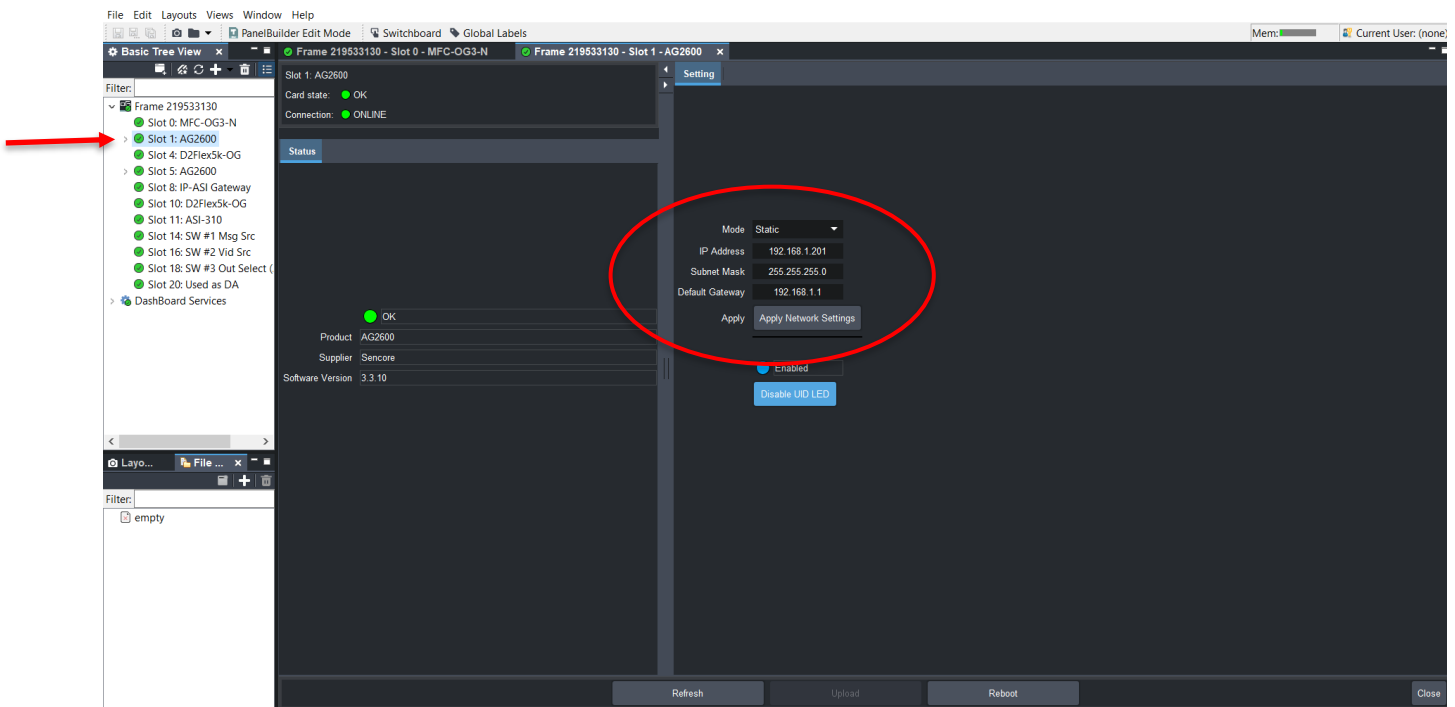
Figure 14-10. Using DashBoard to configure the Satellite Receiver's Network Management Port's TCP/IP Settings

If the satellite receiver card becomes corrupted you can reboot to the recovery image. Remove the card from its slot, and then reinsert the card while pressing and holding down the **Boot to Recovery Image** button shown below. The user must hold the button down until the blue LED (UID) light stops flashing (about 10 seconds).

Boot to Recovery Image

Unit Identification (UID) LED (blue)

Input Presence LED (green)

Active Error LED (red)
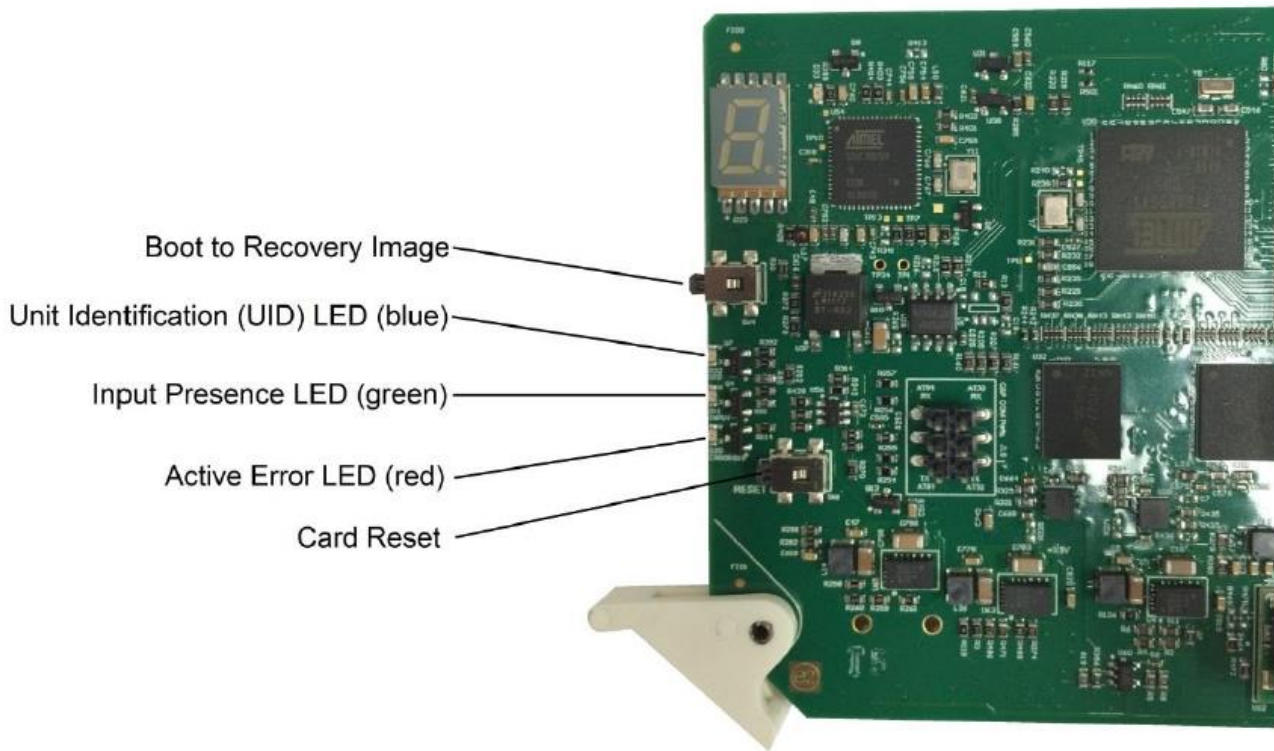
Card Reset

Figure 14-11. Boot to the Recovery Image

The user can also reset the card. Press the **Card Reset** button shown above.

14.9 Satellite Receiver not Working Properly

If a satellite receiver appears to not be functioning resetting it to its factory defaults may fix the issue. Refer to the Section **Resetting the Satellite Receiver to Factory Defaults.** All settings will be returned to the factory defaults except the network management port's TCP/IP settings. All event logs will be cleared.

Once the satellite receiver has been reset to its Factory Defaults, the **Input Selection** and **DVB-S2 Port A** must be configured. Refer to the Sections **Manually Setting the Satellite Receiver Inputs** and **Entering the PBS Satellite Parameters.**

Receivers running later versions of software may occasionally not function properly. Symptoms include inability to sign in to the User Interface (GUI), or the User Interface not displaying correctly. Clearing the browser's cache will solve this issue. With Windows 10 and higher this may be accomplished by typing Ctrl + Shift + R, or Ctrl + F5. Either will clear the cache. If that does not work, then the cache may be cleared by using the browser's settings.

14.10 Downloading the Sencore Satellite Receiver's Diagnostics and Logs

Note: The receiver's date and time must be accurate in order for the log's time and date stamp to be accurate. The receiver's date and time can be viewed on its Admin page. Complete instructions for setting the date and time can be found in the Section: AG2600 Satellite Receiver, under Setting the Date and Time.

On the Sencore AG2600 Satellite Receiver's GUI, click on the **Admin** tab, and then click on **Diagnostics**:
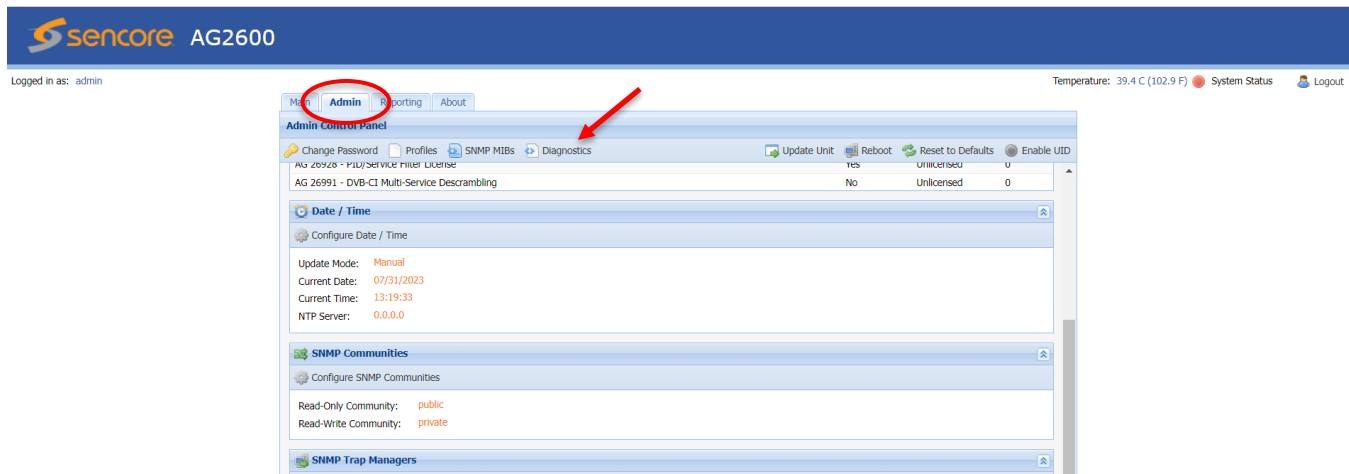
Figure 14-12. Downloading the AG2600 Receiver's Diagnostics and Log File

The diagnostics file will download, and a window will confirm when completed. Click on **OK**:
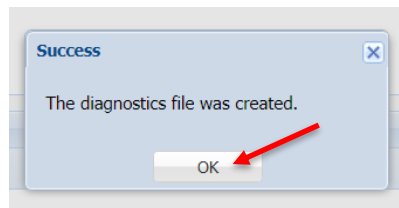
Figure 14-13. Diagnostics Download Completed

The diagnostic file will download to your PC, and you can send it to D2D for analysis.:
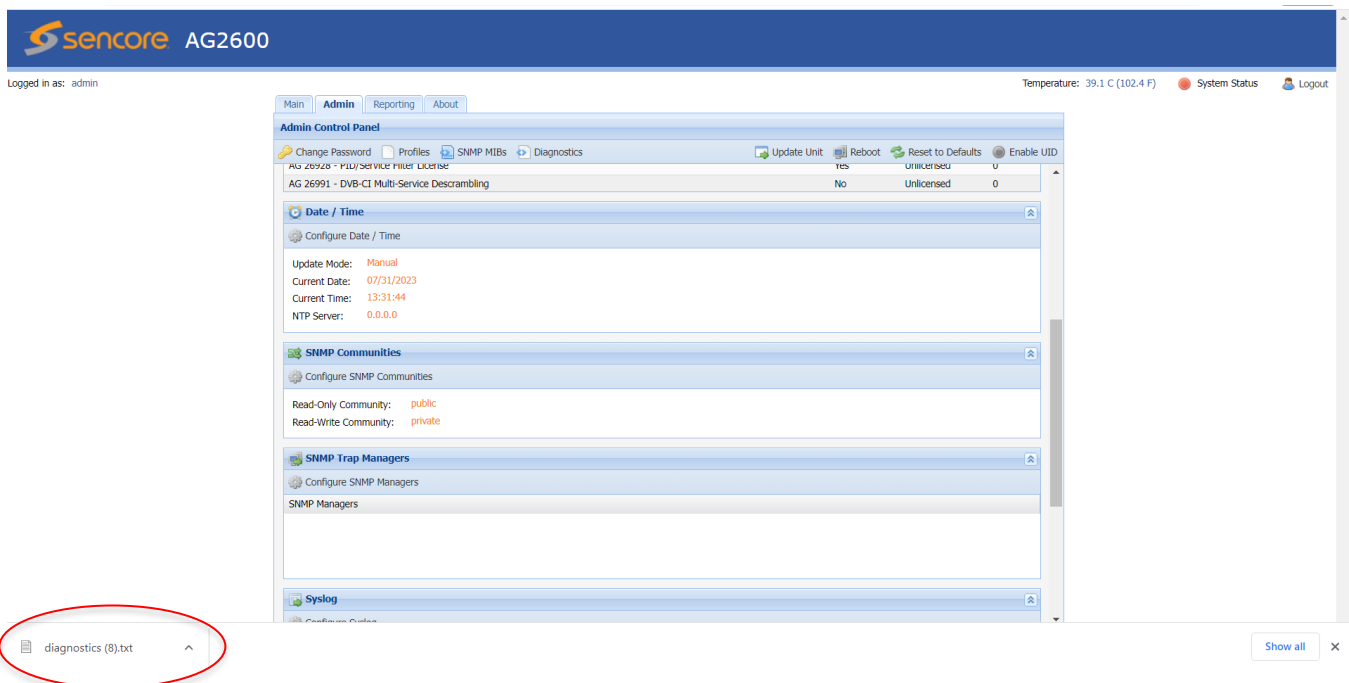
Figure 14-14. Diagnostics File Downloaded to PC

The user can also download and view the receiver's log using Notepad or similar application. On the Sencore AG2600 Satellite Receiver's GUI, click on the **Reporting** tab, then click on **Logs,** and then click on **Download**:
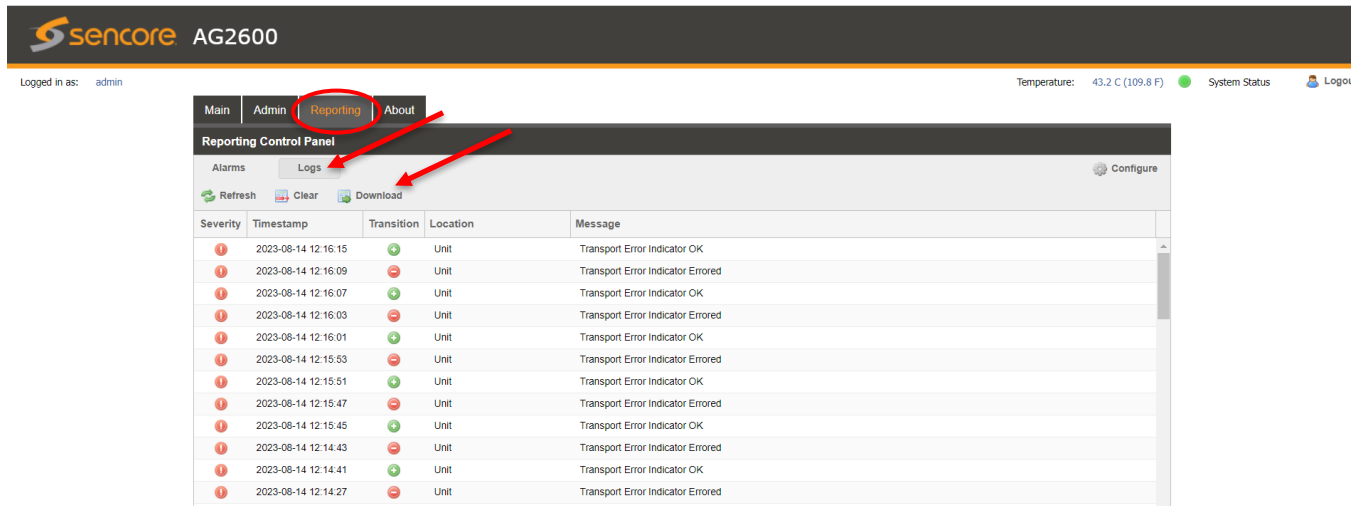
Figure 14-15. Downloading the Logs to your PC

Once downloaded, the logs may be viewed using Notepad, or similar application:
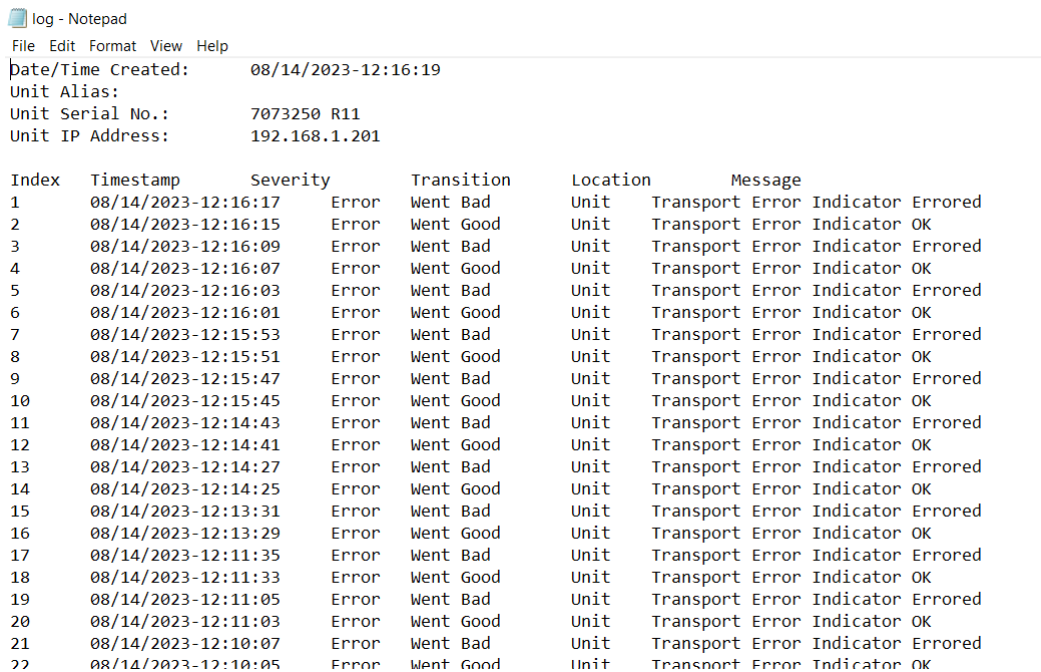
Figure 14-16. Viewing the Logs Using Notepad

14.11 Swapping the Groomer Cards

As received from the factory Groomer A is installed in slot 2, and Groomer B is installed in slot 8 (although the user may change these assignments if desired to customize the openGear frame). Whether these groomer slot assignments are changed or kept as received, each groomer card should remain in its assigned slot. The cards should not be swapped. If the cards are removed, the user should take care to reinstall the groomers in their correct slots.

Although it may be helpful to swap the groomer cards when troubleshooting an issue, care must be exercised. It is not as simple as just reconfiguring their IP addresses and groomer pair communication assignments. Swapping the groomer cards is not recommended without contacting D2D Customer Support.

14.12 Viewing and Downloading the Groomer's Logs

Note: The system date and time must be accurate for the log's time and date stamp to be accurate. Check the Date and Time configuration on the Systems Settings page.

Each Groomer's logs may be viewed on its **Logs** page. Ticking the box next to **Filter Enable** will open a window where the logged events may be filtered for display. Logged events may be filtered by selecting **Status Changes**, **Alarm Events**, etc., at the top of the Logs page. For example, ticking the box **Filter Enable**, and **Alert Inserted**, and then clicking on **Apply Filter and Refresh Log** will display each time a WEA message was inserted into the station's broadcast stream:
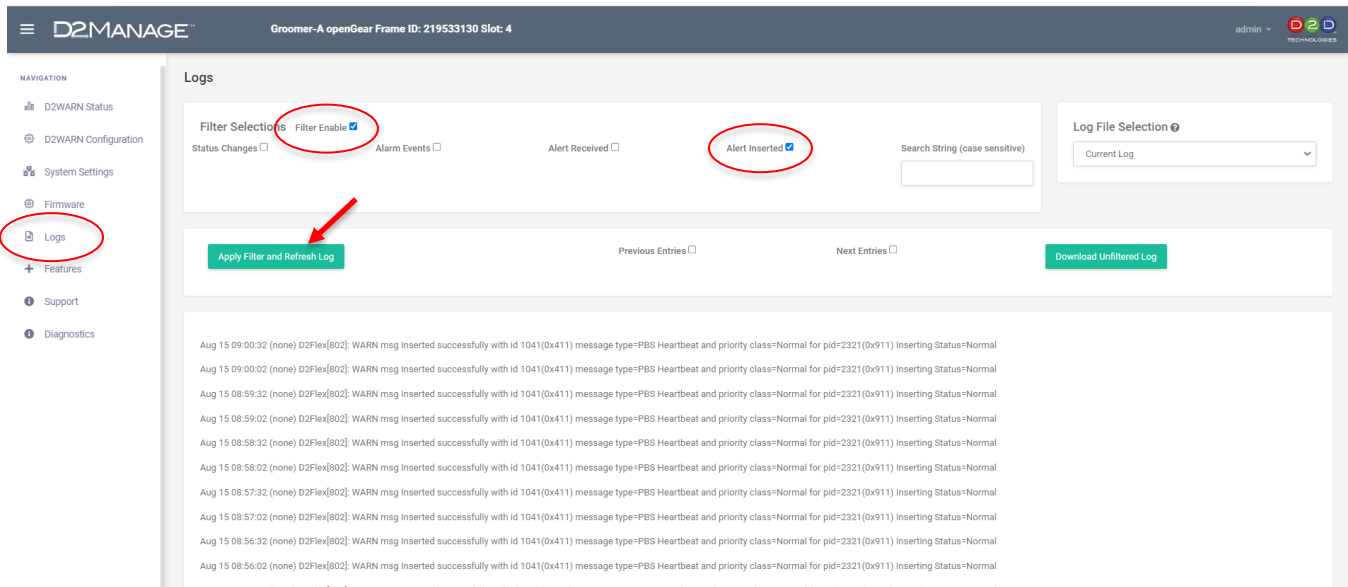
Figure 14-17. Displayed Log Filtered to Show Only Those Times an Alert Message was Inserted

The **Previous Entries** box may be checked, followed by clicking on **Apply Filter and Refresh Log**, to show the previous one thousand entries. This is useful when there are many log entries, such as when heartbeats are logged. Ticking the **Next Entries** box will bring the list back up by one thousand entries.
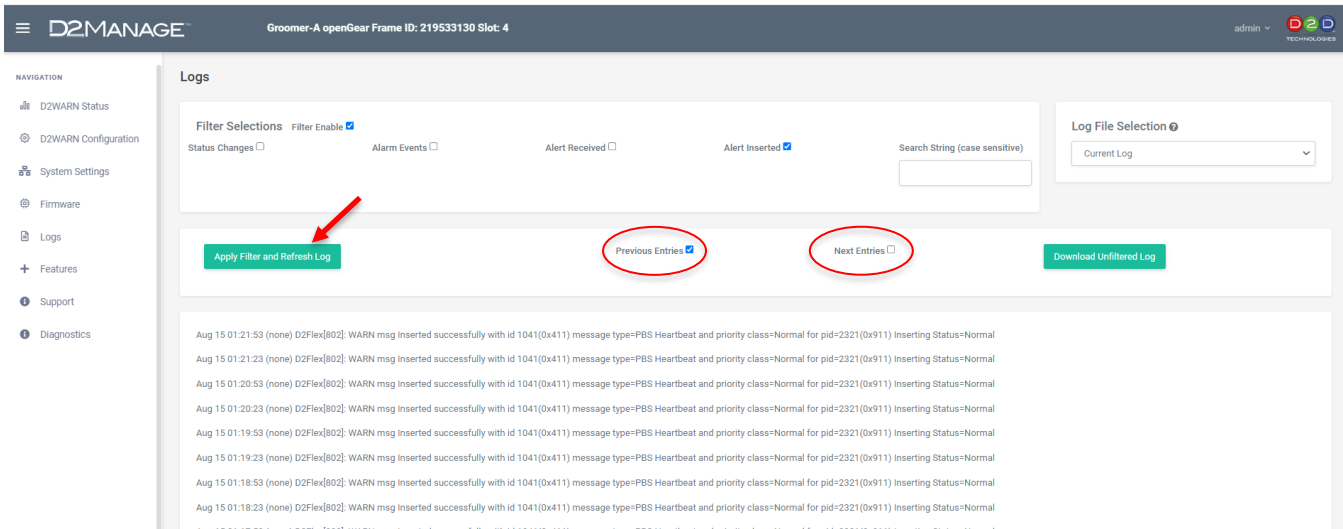
Figure 14-18. Previous One Thousand Entries Displayed

It may be necessary to download the log and send it to D2D for troubleshooting. This can be accomplished as follows:

- Click the **Logs** button on the left side of the GUI. This will open the log page. Select which log you wish to download from the drop down menu under **Log File Selection**. Either the current log, or a log up to 30 days old may be chosen:
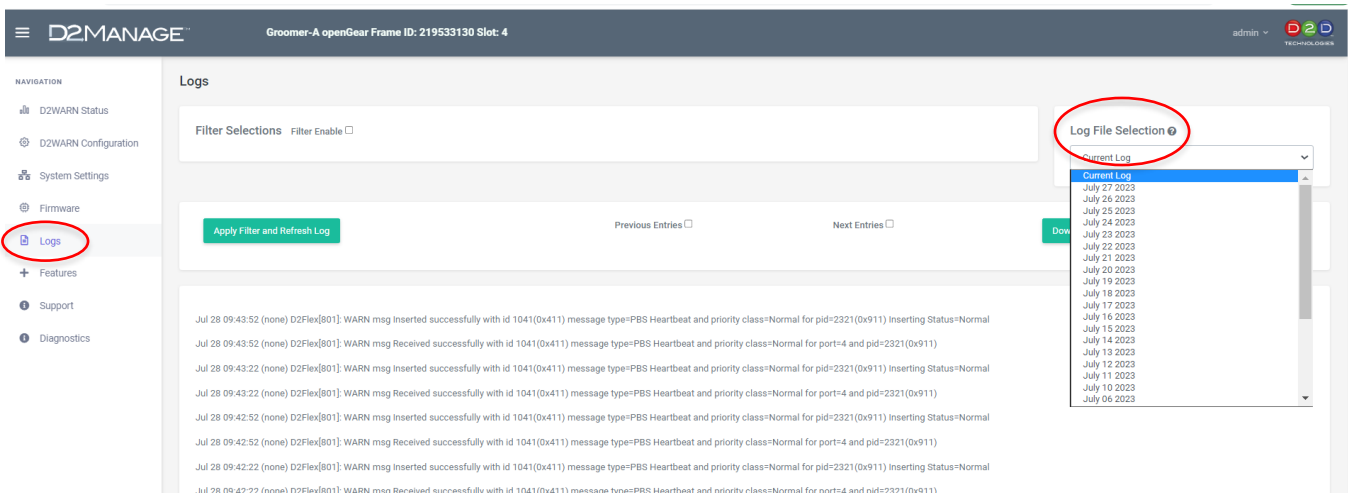
Figure 14-19. Select Which Log to Download

- Scroll to the bottom and click the **Download** button.
- Clicking on the **Download** button will download the unfiltered logs to your PC. From there you can send the file to D2D.

Note: The downloaded log will be unfiltered. Clicking on a filter will have no effect.
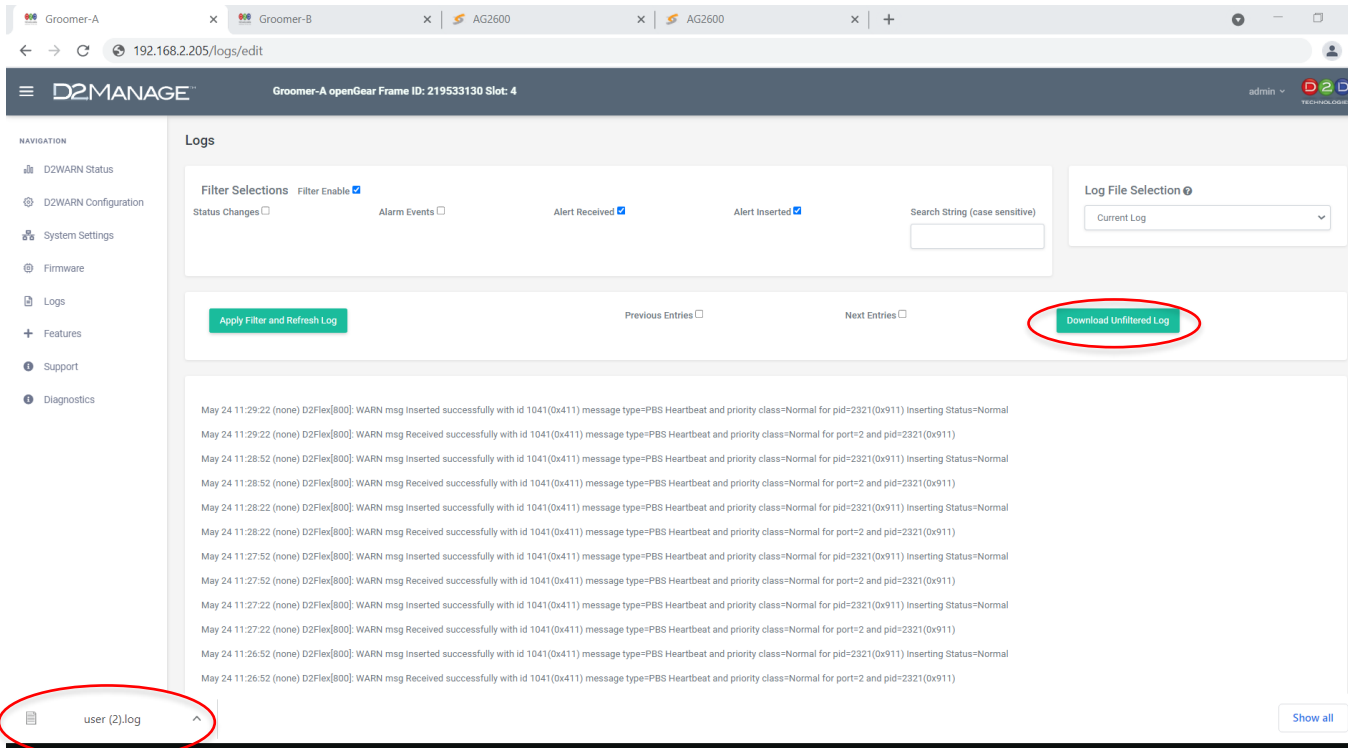
Figure 14-20. Downloading the Log to your PC

14.13 Groomer Log Alarm Messages and SNMP Trap Descriptions

Alarm Event: Broadcast Input not detected [SNMP Trap warnBroadcastInputSyncLoss 1010]
Alarm Event: Broadcast Input detected [SNMP Trap warnBroadcastInputSyncLossClear 1011]

Alarm Event: Satellite Receiver Input not detected. Check receiver signal, alarms and logs [SNMP Trap warnSatelliteRcvrSyncLoss 1020]
Alarm Event: Satellite Receiver Input detected [SNMP Trap warnSatelliteRcvrSyncLossClear 1021]

Alarm Event: Broadcast Input not detected [SNMP Trap warnBroadcastInputSyncLoss 1010]
Alarm Event: Broadcast Input detected [SNMP Trap warnBroadcastInputSyncLossClear 1011]

Alarm Event: Satellite Receiver Input not detected. Check receiver signal, alarms and logs [SNMP Trap warnSatelliteRcvrSyncLoss 1020]
Alarm Event: Satellite Receiver Input detected [SNMP Trap warnSatelliteRcvrSyncLossClear 1021]

Alarm Event: Alert message buffer overflow alarm cleared at startup or after configuration change [SNMP Trap warnWeaBufferOverflowClear 1061]
Alarm Event: Alert message corruption alarm cleared at startup or after configuration change [SNMP Trap warnWeaMessageFormatErrorClear 1071]

Alarm Event: Video PID for inserting alarm cleared at startup or after configuration change [SNMP Trap warnNoVideoPidForInsertClear 1081]
Alarm Event: Satellite communications alarm cleared at startup or after configuration change [SNMP Trap warnSatelliteCommClear 1111]
Alarm Event: Groomer communication alarm cleared at startup or after configuration change [SNMP Trap warnGroomerPairCommClear 1121]

Alarm Event: Alert message buffer overflow alarm cleared [SNMP Trap warnWeaBufferOverflowClear 1061]
Alarm Event: Alert message buffer overflow, possible insufficient NULL packets[SNMP Trap warnWeaBufferOverflow 1060]

Alarm Event: Alert message corruption alarm cleared [SNMP Trap warnWeaMessageFormatErrorClear 1071]
Alarm Event: Alert message corrupted. Check satellite receiver signal, alarms and logs [SNMP Trap warnWeaMessageFormatError 1070]

Alarm Event: Alert messsage reception has failed. Check satellite receiver signal, alarms and logs [SNMP Trap warnSatelliteRcvrWeaMinTimeout 1040]
Alarm Event: Alert message failure alarm cleared [SNMP Trap warnSatelliteRcvrWeaMinClear 1041]

Alarm Event: Alert messages not detected, timeout warning alarm activated. Check satellite receiver signal, alarms and logs [SNMP Trap warnSatelliteRcvrWeaSecTimeout 1030]
Alarm Event: Alert messages detected. Timeout warning alarm cleared [SNMP Trap warnSatelliteRcvrWeaSecClear 1031]

Alarm Event: Groomer communication alarm cleared [SNMP Trap warnGroomerPairCommClear 1121]
Alarm Event: Cannot communicate with Groomer pair. Check IP addresses for both groomers [SNMP Trap warnGroomerPairCommFailure 1120]

Alarm Event: Satellite communications alarm cleared [SNMP Trap warnSatelliteCommClear 1111]
Alarm Event: Cannot communicate with satellite receiver card. Check receiver IP address, alarms and logs. [SNMP Trap warnSatelliteCommFailure 1110]

Alarm Event: Video PID for inserting alarm cleared [SNMP Trap warnNoVideoPidForInsertClear 1081]
Alarm Event: Video PID for inserting not detected, Check PID replacement configuration [SNMP Trap warnNoVideoPidForInsertTimeout 1080]

 Alarm Event: Alert message detected in Primary broadcast input alarm cleared [SNMP Trap warnWeaMsgInBroadcastClear 1131]
 Alarm Event: Alert message detected in Primary broadcast input [SNMP Trap warnWeaMsgInBroadcast 1130]

Alarm Event: Bypass relay lock alarm is cleared [SNMP Trap warnBypassLockdownClear 1151]
Alarm Event: System is locked into Bypass Relay Mode. Power reset of this Groomer is required. [SNMP Trap warnBypassLockdown 1150]

Alarm Event: EIT/ETT missing alarm cleared [SNMP Trap warnMissingEitEttPidClear 1161]
Alarm Event: EIT and/or ETT PIDs for inserting not detected. Check PID replacement configuration [SNMP Trap warnMissingEitEttPid 1160]

Alarm Event: EIT/ETT PID insert alarm cleared [SNMP Trap warnEitEttPidInsertingClear 1171]
Alarm Event: EIT/ETT PID inserting activated. Broadcast input may have insufficient NULL packets. [SNMP Trap warnEitEttPidInserting 1170]

Alarm Event: Video PID inserting alarm cleared. [SNMP Trap warnVideoPidInsertingClear 1181]
Alarm Event: Video PID inserting activated. Broadcast input may have insufficient NULL packets. [SNMP Trap warnVideoPidInserting 1180]

Alarm Event: Fans OK and openGear Door closed [SNMP Trap warnOpenGearFanClear 1101]
Alarm Event: openGear Fans status set to OK at startup [SNMP Trap warnOpenGearFanClear 1101]
Alarm Event: Fan alarmed or openGear door open [SNMP Trap warnOpenGearFanFailure 1100]

Alarm Event: openGear Power Supply 1 OK [SNMP Trap warnOpenGearPowerSupply1Clear 1091]
Alarm Event: openGear Power Supply 1 Alarm [SNMP Trap warnOpenGearPowerSupply1Failure 1090]

```
Alarm Event: openGear Power Supply 2 OK [SNMP Trap warnOpenGearPowerSupply2Clear
1095]
Alarm Event: openGear Power Supply 2 Alarm [SNMP Trap
warnOpenGearPowerSupply2Failure 1094]

Alarm Event: Cannot communicate with openGear chassis, check IP address [SNMP Trap
warnopenGearCommAlarm 1000]
Alarm Event: openGear chassis communication OK [SNMP Trap
warnopenGearCommAlarmClear 1001]
```

14.14 System Fails Over to Backup Groomer

The Primary Groomer may occasionally fail over to the Backup Groomer for seemingly no reason. This can occur during a rain fade if Receiver A loses carrier lock for an extended length of time. Each receiver's logs can be viewed to determine if Receiver A has lost carrier lock. Instructions on how to view and download each receiver's log can be found previously in this Section under: **Downloading the Sencore Satellite Receiver's Diagnostics and Logs.**

Reversing the L-Band cables into the receivers, so that the C/N and margin shown on Receiver A is higher than on Receiver B, may alleviate this issue.

14.15 Groomer Diagnostics

In the event of a problem each groomer has the ability to generate and download a diagnostic package. The diagnostic package may be downloaded and sent to D2D for analysis. Click on the **Diagnostics** button on the left side of the GUI. This will open up the **Diagnostic** page. From there you can click on the button **Build and Download the Diagnostic Package.** The diagnostic package will download to your PC, and you can send this to D2D for analysis.
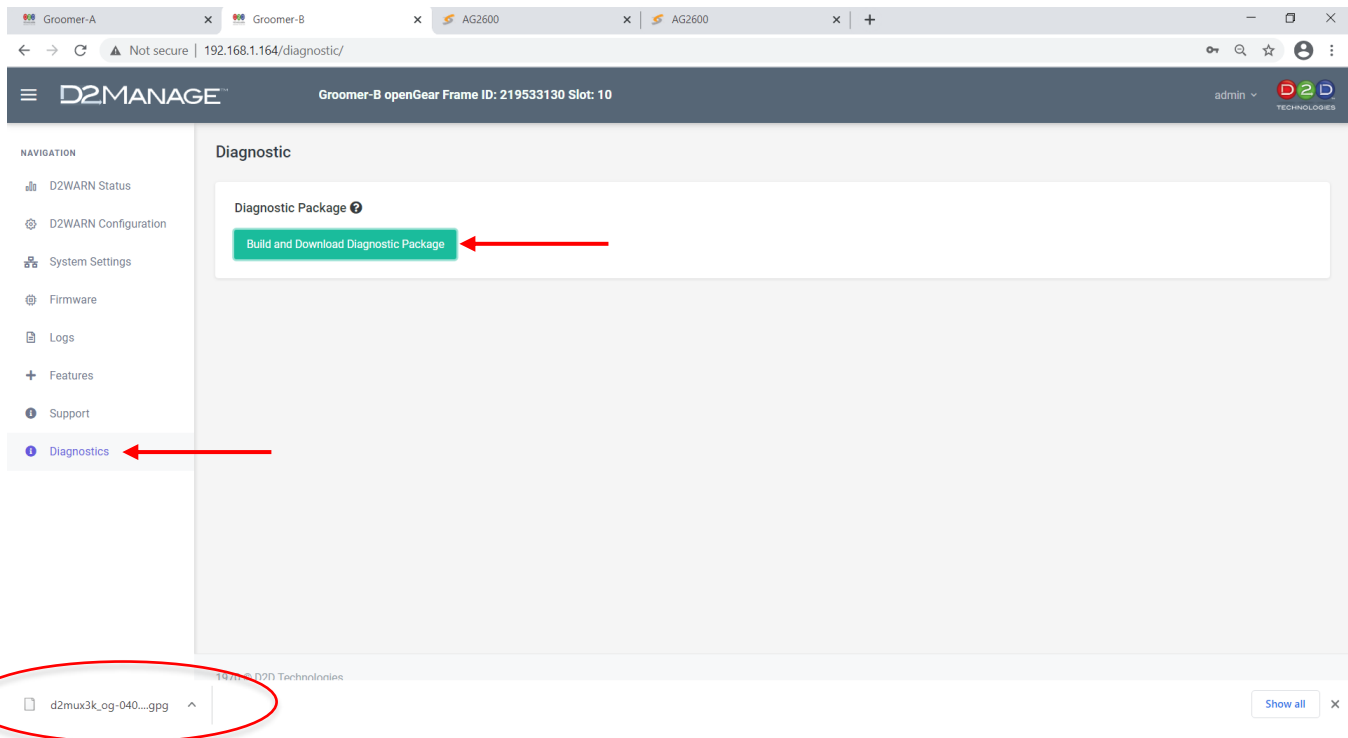

Figure 14-21. Downloading the Diagnostic Package of Groomer A

15 Fan Filter Maintenance

15.1 Cleaning the Air Filter

Routine maintenance of the fan filter installed in the OG3-FR series frame is highly recommended to ensure proper airflow through the chassis. The OG3-FR series frame has a single air filter that is used to prevent dust and airborne particulates from contaminating the frame. This filter should be cleaned at least once a year; but may need to be cleaned more frequently in some environments.

To Clean the Air Filter follow the procedure, below:

1. Remove the Air Filter from the Frame as follows. Locate the four 3/16"screws (#850-091R) on the frame door faceplate. Refer to the figure, shown below, for screw locations.

Figure 15-1. Location of Faceplate Screws

2. Remove the four screws that secure the faceplate.
3. Ensure that the side door tabs are disengaged from the door.
4. Remove the faceplate by gently pulling it towards you while avoiding the Diagnostic LED Display, the toggle buttons, and the monitoring LED
5. Gently remove the air filter off the metal protective screen that separates the filter from the fans.
6. Brush any loose dust off of the filter.
7. Place the filter under warm running water to remove any remaining dust. On one side of the filter is a foam filter material. When rinsing, water should flow out of this side
8. Remove the filter from the water and thoroughly pat dry with a towel to remove any moisture.
9. Replace the clean, dry filter into the frame door as follows. Place the clean air filter across the metal protective screen, orienting it in the same position you found it in during step 1.
10. Install the faceplate by gently fitting it back onto the frame door, ensuring the faceplate does not interfere with the Diagnostic LED Display, the toggle button, and the monitoring LED.
11. Verify that the side door tabs are seated properly in the cutouts on the frame door bracket.
12. Using a Phillips screwdriver, secure the faceplate using the four screws removed during step 1.

16 Cyber Security

16.1 Overview

Both the Groomers and Sencore Satellite Receivers in the WARN system can be protected from unauthorized access by requiring passwords to access their GUI's. As received from the factory the Groomers have a default password, and the Sencore receivers have no password (unprotected). In addition to the GUI, SSH access is possible. It is therefore recommended that stations keep their WARN system(s) disconnected from the internet.

It is also recommended that stations change the default passwords, or set passwords, for additional security. In the case of the Sencore receivers, it is further recommended to turn off SSH access. Instructions for changing and setting passwords, and turning off SSH access are provided in this section. Also covered are changing SNMP communities.

16.2 Changing the Groomer's GUI Password

Although the security risk is low, it is recommended that the GUI password for each Groomer be changed from the default as received from the factory. This is accomplished by logging into each Groomer, clicking on the **admin** drop down menu found on the GUI's banner, and selecting **Account Settings**:
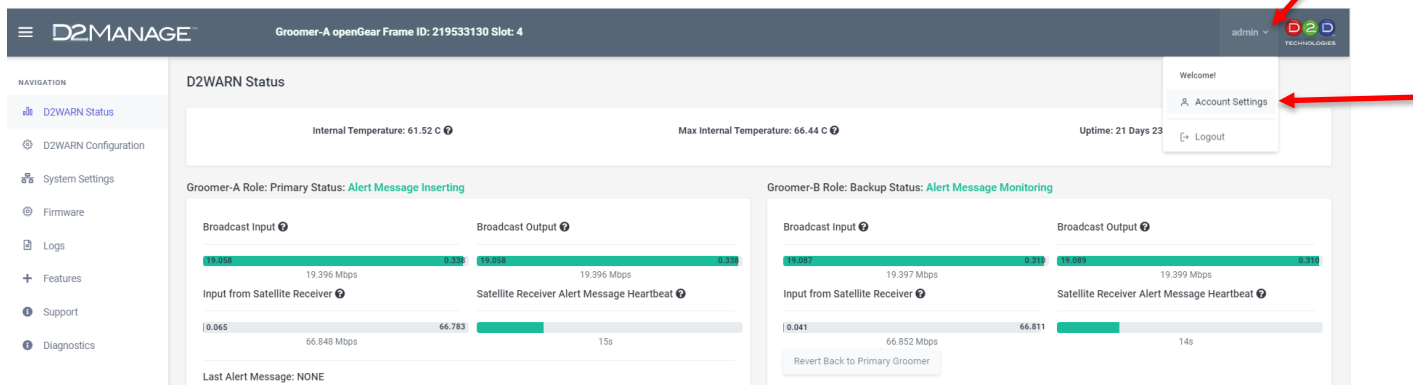

Figure 16-1. Changing the Groomer's Password

A window will open where you can assign a new Username and Password to that Groomer:
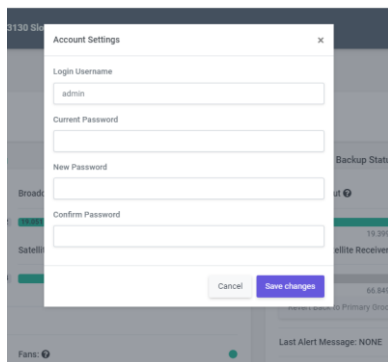

Figure 16-2. Entering a new Password for the Groomer

This procedure should be repeated for the other Groomer.

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16.3   Setting or Changing the Sencore Satellite Receiver's GUI Password

As received from the factory a password is not required to log into the Sencore AG2600 Satellite Receivers. it is recommended as a best practice to set a strong password for the AG2600 GUI.

Note: Some Sencore Receivers with newer firmware have a default Password set. The password on those receivers is: mpeg101.

Setting a GUI password can be accomplished by logging into the GUI and setting a password on the **Admin** page. Open a browser and enter the IP address of Receiver A. The main page will open. Click the **Admin** tab, and then click **Change Password**. A new box will open where you can enter a new password. Click on **Apply** to finish:
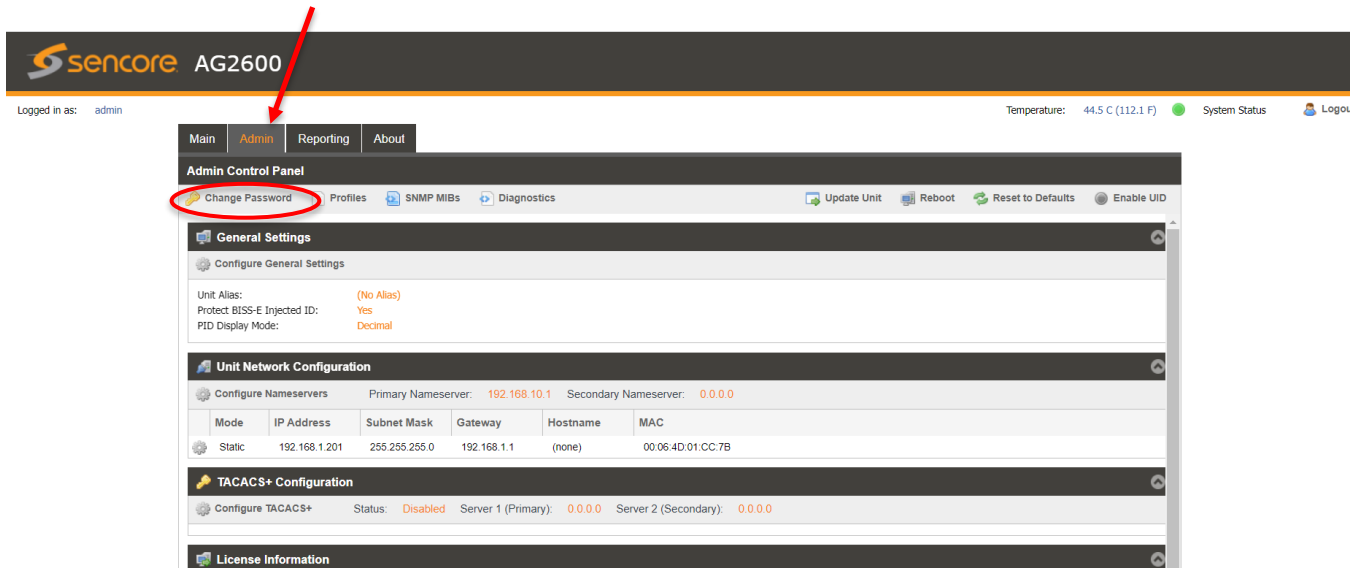

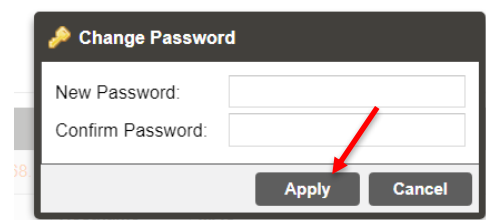*Figure 16-3. Changing the Password of the Sencore Receiver*

Figure 16-4. Entering a new Password for the Sencore Receiver

This procedure should be repeated for the other receiver.

16.4   Turning Off the Sencore Receiver's SSH Access

Nearly all Sencore AG2600 Satellite Receivers shipped in station WARN systems were delivered with a software version that does not require a password to access the root account (also known as Secure Shell or SSH), meaning it is possible to access the Linux system without using any password. While it is best practice to keep your WARN system disconnected from the internet (which mitigates the risk of this vulnerability), this SSH vulnerability should be remediated to ensure your WARN system and wider network remain secure. The most direct path to secure the root account is to turn off SSH access.

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To turn off SSH access connect a PC running Windows 10 or later (see connection instructions in Section 1) and open the command line. Alternatively, you may opt to use Putty or some other command line application.

It is recommended to perform these steps on Receiver B (Backup) first.
In the command line enter:

ssh root@ipaddress

where **ipaddress** is the IP address of the receiver for which you wish to turn off SSH. For example, to turn off SSH for receivers using the factory default IP address, use the following commands:

For Receiver B: ssh root@192.168.2.208
For Receiver A: ssh root@192.168.2.207

Note: These IP address are the default IP addresses for receivers A and B as received from the factory. If you have changed an IP address, the new IP address must be used. Also, the PC must be configured to be on the same subnet.

If this is the first time accessing SSH, a warning may appear. Type yes, and then hit **Enter**. To log in simply hit **Enter** again, as there is no password:
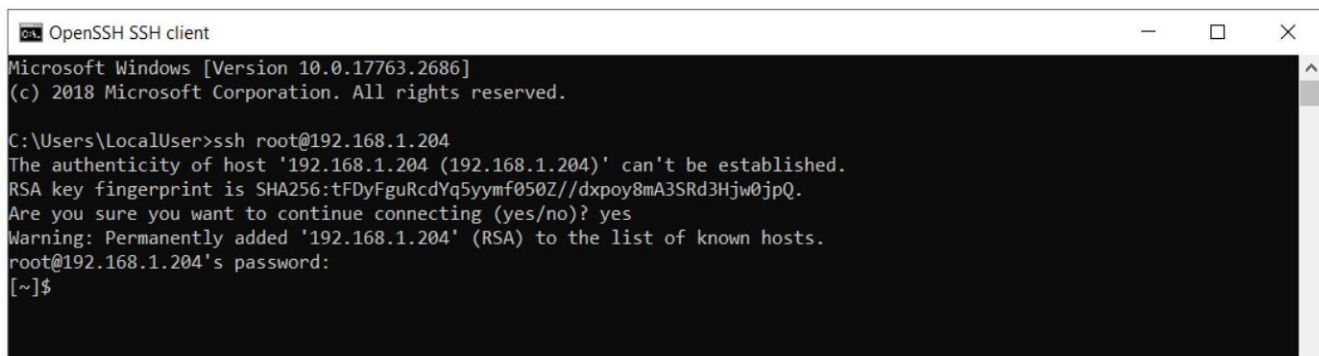

Figure 16-5. Accessing SSH for the First Time

If a warning does not appear, simply hit Enter to log in:
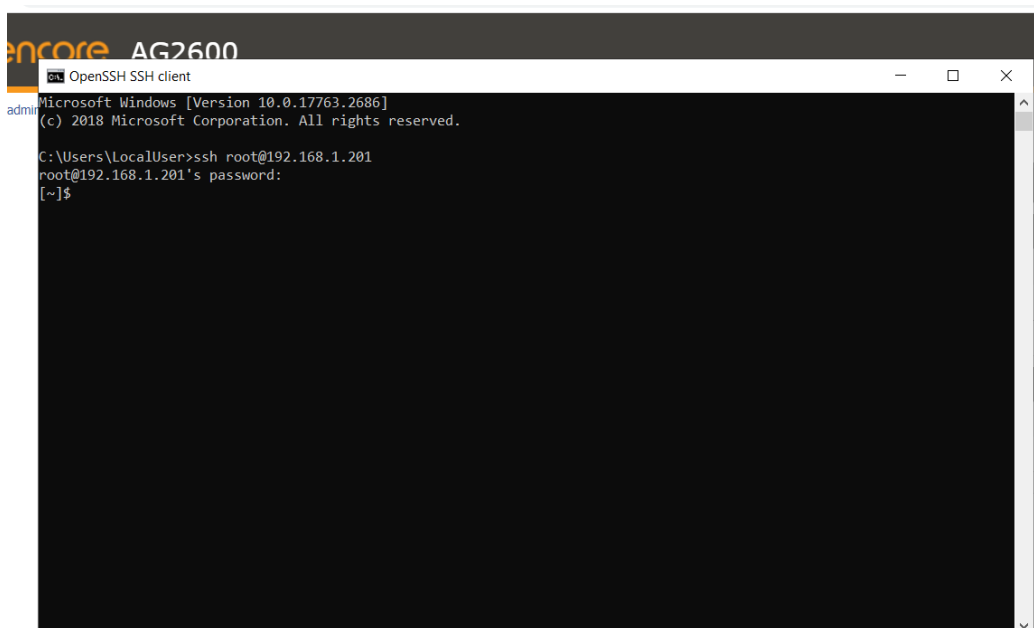
Figure 16-6. Logging Into the Root Account with No Password

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Note: If you discover that a password is indeed in place, you may skip this entire procedure, as your root account is secure.

Next, to turn off SSH type `rm /etc/rc.d/B65ssh` and hit **Enter**:

Figure 16-7. Turning off SSH

The receiver must now be rebooted for the change to take effect. Log into the receiver's GUI (enter the receiver's IP address in a browser window) and click the **Admin** tab. Next, click **Reboot**. A window will appear asking if you are sure you want to reboot the unit. Click **Yes**.

Figure 16-8. Rebooting the Sencore Receiver

Figure 16-9. Confirm Rebooting the Sencore Receiver
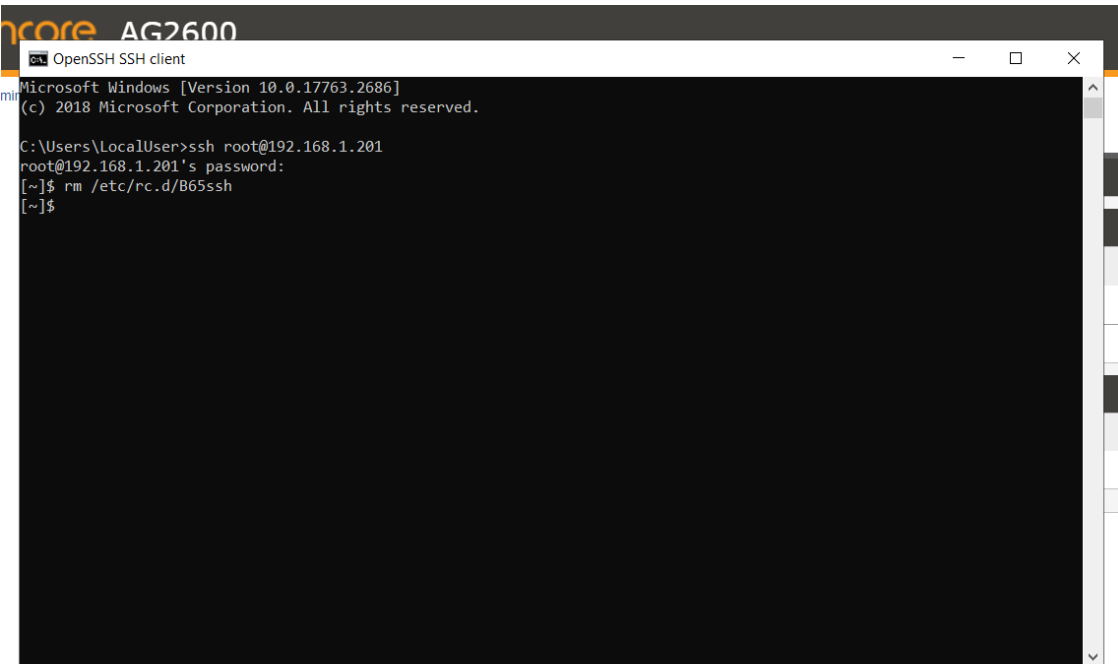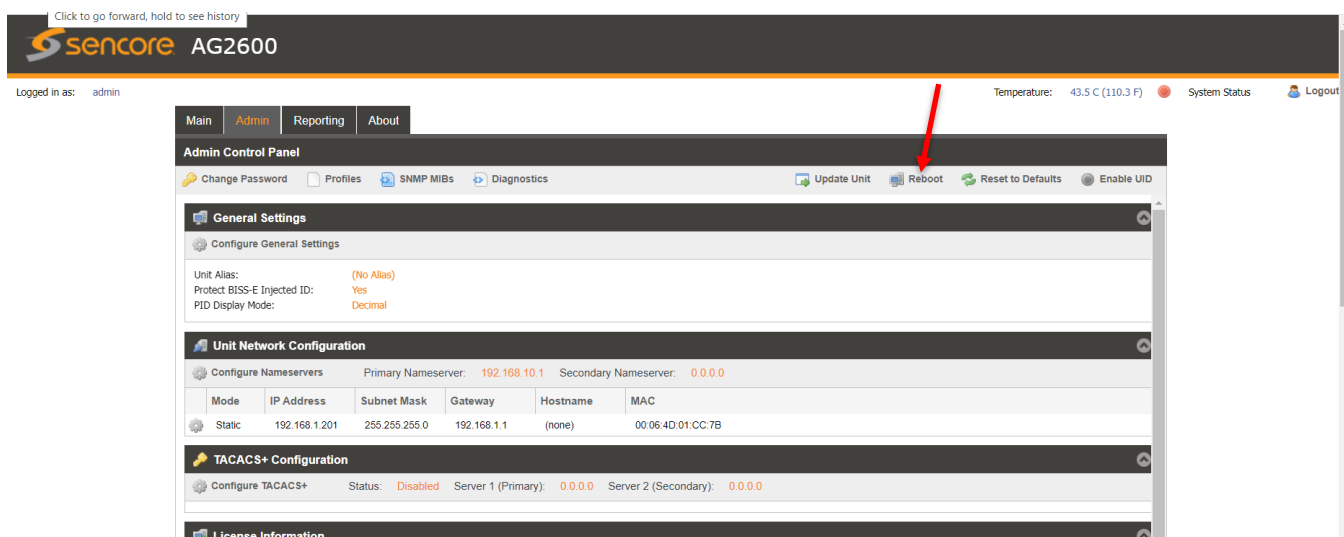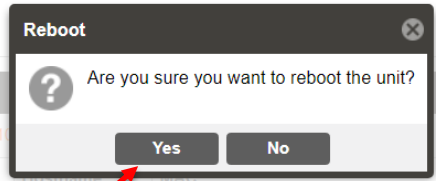
The receiver will reboot, and you can log into its GUI again. If the GUI is unresponsive, clear your browser cache. With Windows 10 and higher this may be accomplished by typing Ctrl + Shift + R, or Ctrl + F5. Either will clear the cache. If that does not work, then the cache may be cleared by using the browser's settings.

You can now confirm that SSH has been turned off by attempting to log into the root account. This can be done as shown above, either by using the command line and entering:

For Receiver B: ssh root@192.168.2.208
For Receiver A: ssh root@192.168.2.207

Alternatively, you may use Putty to attempt to log into the root account.

With SSH turned off, if you try to access the root menu using the command line you should not receive the error below:
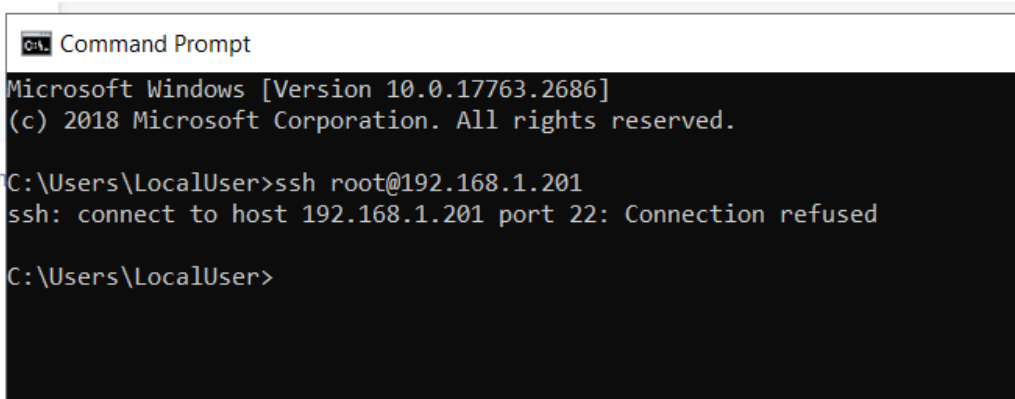

Figure 16-10. Using the Command Line to Log Into the Root Account with SSH Turned Off

If using Putty to log into the root account with SSH turned off you should see the error message, below:
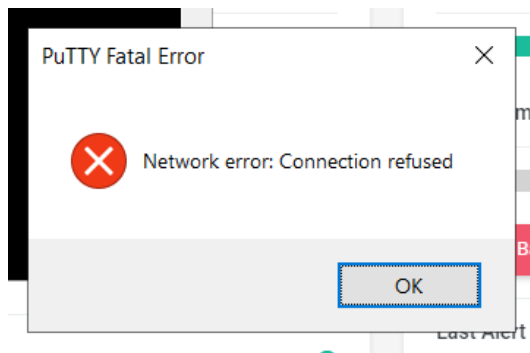

Figure 16-11. Using Putty when Attempting to Log Into the Root Account with SSH Turned Off

This procedure should be repeated for Receiver A (Primary).

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Once you have confirmed that SSH has been turned off for both receivers, log into either Groomer A or Groomer B. Depending on the timing when rebooting the primary receiver (Receiver A), it is possible the groomers in your WARN system will have failed over from primary to backup. This will be indicated by the OpenGear frame lightbar flashing yellow. Normal operation can be restored by logging into either groomer and clicking "**Revert Back to Primary Groomer**."
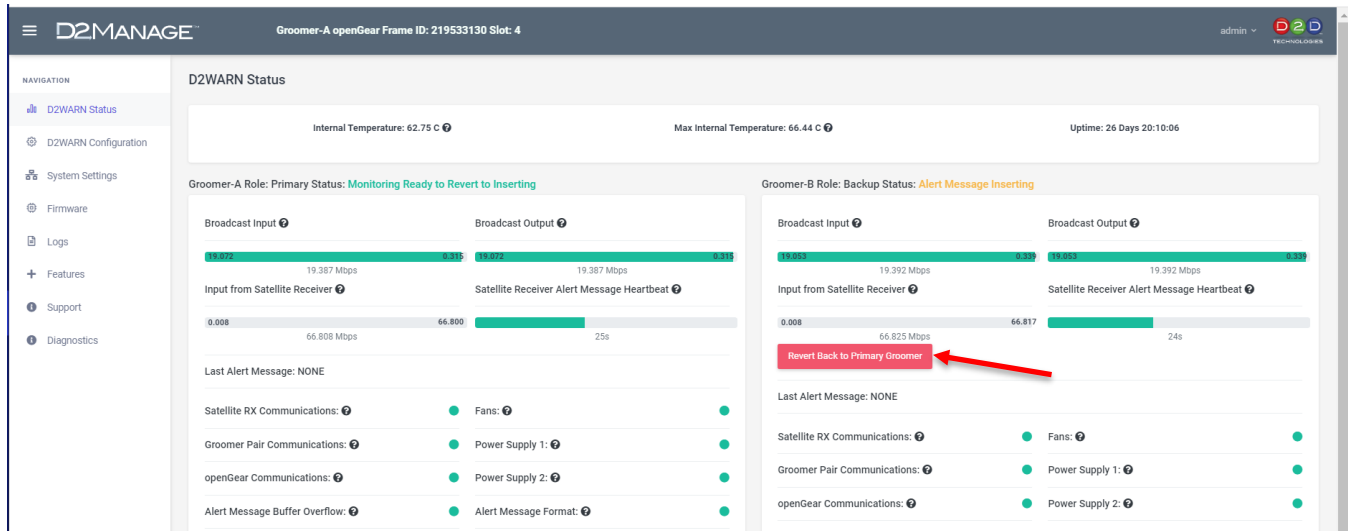
Figure 16-12. Reverting Back to the Primary Groomer (If Necessary)

Note: The WARN system will only fail over when the groomers are configured for ASI – Failover Role Primary, and ASI – Failover Role Backup.

16.5   Changing the SNMP Settings

In addition to communicating with an external alarm and monitoring system, the two groomers also use SNMP to communicate with each other as well as their corresponding Sencore Satellite Receiver. Although the security risk is very low, the user may wish to change the community names.

To change the groomer's SNMP community names, log into the groomer's GUI and go to the **Systems Settings** page. The rocommunity named and rwcommunity names may be entered, and saved:

Figure 16-13. Changing the Groomer's SNMP Name

Each Sencore satellite receiver uses SNMP to communicate its status to its associated groomer. For this purpose, the Read-Only Community (rocommunity) is used. The rocommunity name may be changed if desired. To change the Read Only Community name on the Sencore receiver, open its GUI and click on the Admin tab:

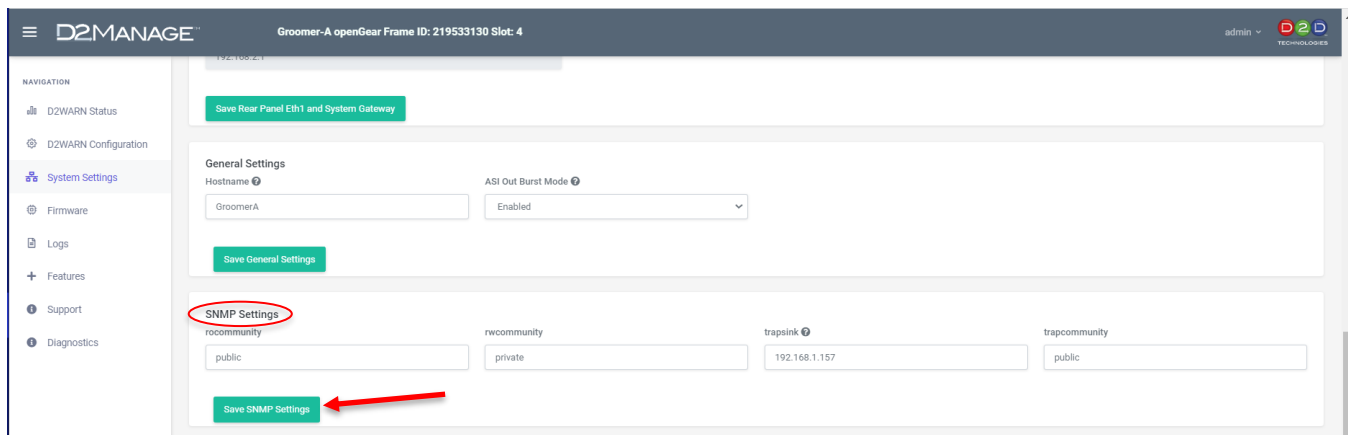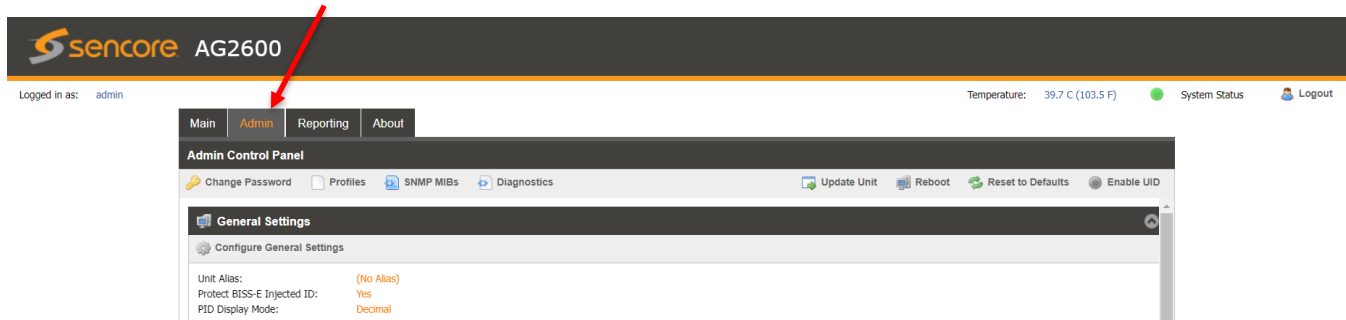*Figure 16-14. Opening the Admin Page*

Click the Settings icon, and a new window will open:

Figure 16-15. Configuring the SNMP Communities

Enter the new **Read-Only Community** name and click **Apply:**
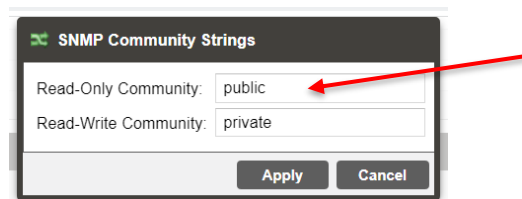
Figure 16-16. Changing the Read-Only Community Name

Note: The Sencore receiver's SNMP Read-Write community is not used by the WARN system. This would only be used by the station's external monitoring and control system.

If the Sencore receiver's Read-Only SNMP community name is changed, it must also be changed on the corresponding groomer. To change the SNMP community name to match the community name configured on the receiver, log into the groomer's GUI and open the **D2WARN Configuration** page. The community name may be changed under: **Cards this Groomer Communicates With**. Enter the same community name that was entered for the Sencore receiver in the previous step:
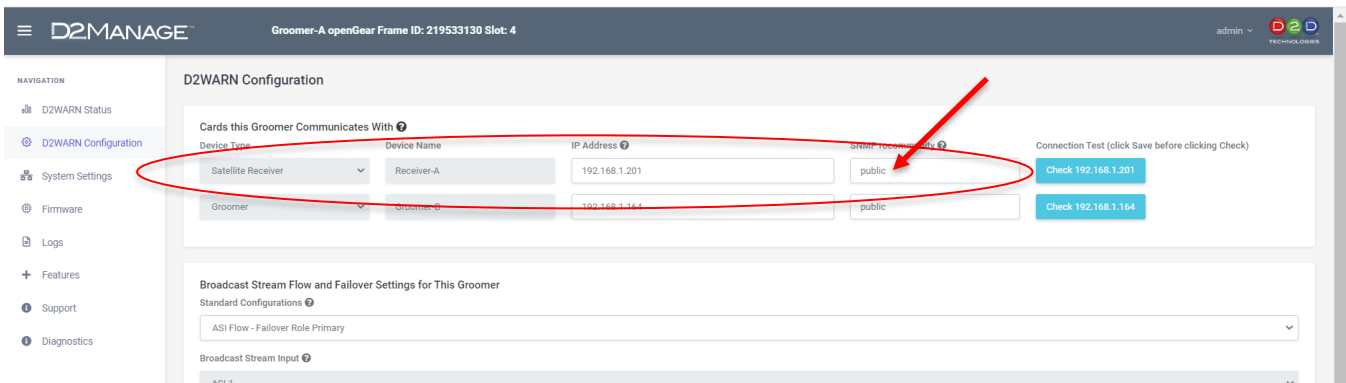
Figure 16-17. Changing the Read-Only Community Name for the Sencore Receiver

Scroll to the bottom of the page and click **Save**, or simply hit **Enter** on the PC.

With WARN systems configured to operate with a Primary and Backup Groomer (ASI – Failover Role Primary, and ASI – Failover Role Backup), SNMP is used to communicate the status of one groomer to its corresponding groomer. Note that his only applies to systems running ASI with internal failover.

Each groomer in a WARN system has a SNMP rocommunity name which is entered on its **Systems Settings** page:
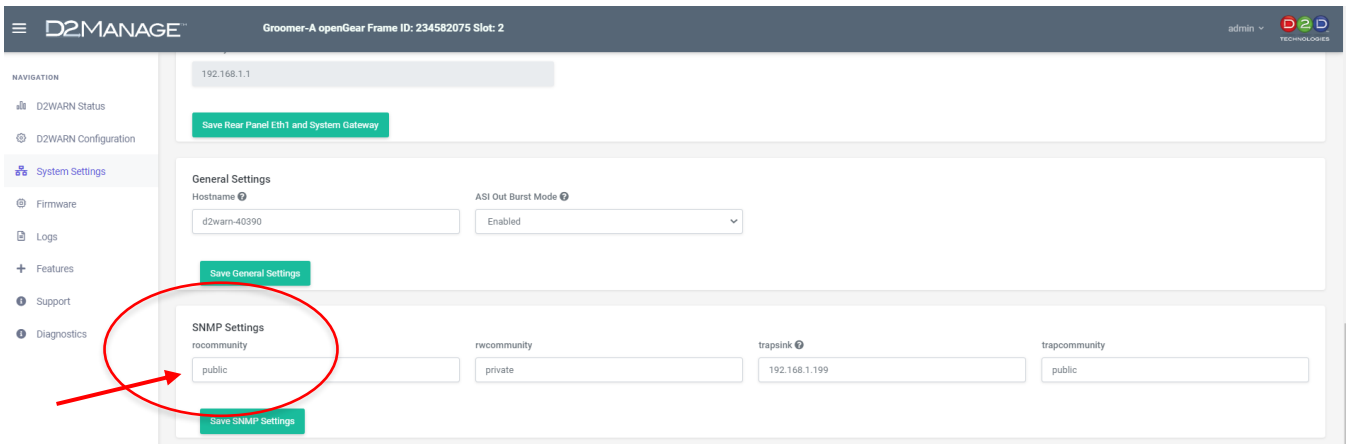
Figure 16-18. In this Example the rocommunity Name for Groomer A is Set on its Systems Settings Page

For WARN systems with internal failover, that same rocommunity name must be entered on the <u>other</u> groomer's **D2WARN Configuration** page, under **Cards This Groomer Communicates With**:
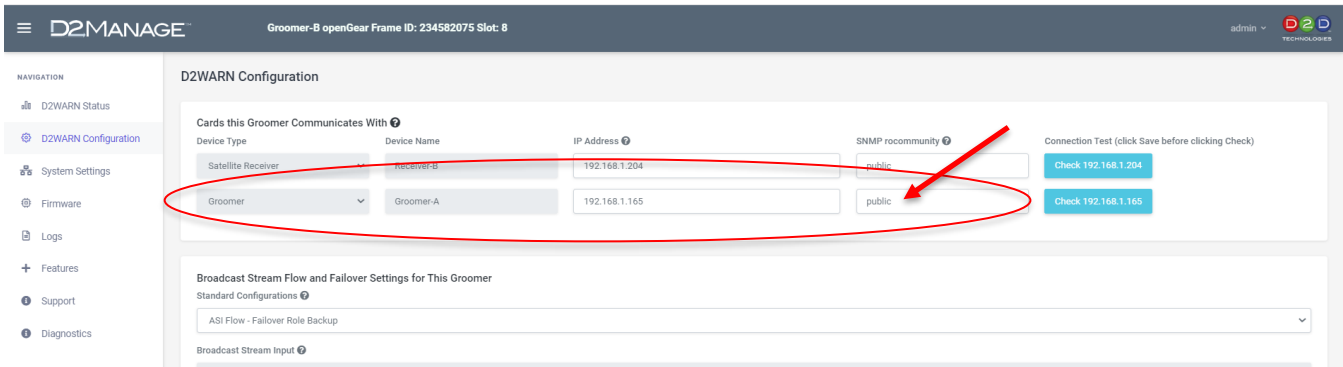
Figure 16-19. The Read-Only Community Name must also be Entered on Groomer B

If a groomer's SNMP rocommunity name is changed on its **Systems Settings** page, it must also be changed on its associated groomer's **D2WARN Configuration** page under **Cards this Groomer Communicates With**.

Note that a groomer's rocommunity name may also used by a station's monitoring system. The rocommunity name on a groomer's **Systems Settings** page, and on its associated groomer's **D2WARN Configuration** page under **Cards this Groomer Communicates With**, and the stations monitoring system (if used) must all match.

17 FAQs

Why are there two User Interfaces (GUIs): one for Groomer A and one for Groomer B? Are they the same?

Each groomer has its own GUI because that GUI may be configured as the Primary or Backup. Each GUI shows the status of both groomers when configured for internal failover (Primary and Backup), however any **Configuration** or **System Settings** changes to a groomer must be made via that groomer's GUI.

Is it possible to reboot the system remotely?

You can reset the groomers by pressing the **Restart Unit** button on the **System Settings** page.

Can I use the empty openGear slots for other (non-WARN) modules?

Yes, the frame's power supplies can support a fully loaded frame. Make sure there is adequate space for cooling.

Can the WARN system be operated in bypass mode?

Yes. Bypass mode can be configured using the D2WARN Configuration page, or by simply powering down the unit.

How does Bypass mode work?

When configured for Bypass, the groomer's bypass relay will deenergize connecting the ASI input directly to the ASI output. This also happens if the WARN system is unplugged or powered down. Note that Bypass does not work in any of the IP configurations.

On the ASI version, does the ASI signal pass if the groomer card is removed?

No, if one of the groomer cards is removed it will not pass the ASI signal. The bypass relay is located on each groomer card. The system would need to be "jumpered around."

Should I use a Windows PC or Mac to access the system's GUIs?

You may use either, however an issue existed with early firmware releases which may cause the groomer to not upload firmware when using a Mac. Firmware released in June 2021 corrected this issue.

Why is it recommended that the D2WARN system be installed immediately after the encoder and any PSIP generation, prior to any other data inserting devices (Datacasting, Water-markers, Nielson boxes, etc.)?"

The WARN system is designed so that the station can meet their FCC requirements with minimal impact on its broadcast stream. This recommended equipment order was chosen to prioritize what is important to the station. Video and guide information is the highest priority.

If the WARN system is not first in line, it is not installed as designed. The WARN system is designed to have as little impact as possible on the station's broadcast stream. It opportunistically replaces null packets when they are available. WARN equipment is designed to be first in line after the encoder and guide information. If it is installed downstream it can't work in the least impactful way.

If the WARN system is installed downstream, after Datacasting services, Water-markers, Nielsen, etc., there may not be sufficient null packets available to insert alert messages as required by the FCC. In this case the WARN system will start dropping ETT, EIT, and video information (in that order).

Why does my system fail over to the backup groomer?

The Primary Groomer may occasionally fail over to the Backup Groomer for seemingly no reason. This can occur during an extended rain fade if the signal level feeding Receiver A is slightly lower than that feeding Receiver B. Reversing the L-Band cables into the receivers, so that the C/N and margin shown on Receiver A is higher than on Receiver B, will alleviate this issue.

Where and when would we look for PID 0x911?

A transport stream analyzer at the output of the WARN system may show PID 0x911. However, many analyzers cannot capture PID 911 because it is not constant and is a very low data rate burst. The absence of PID 911 on a transport analyzer is not necessarily an indication that the WARN system is not inserting. Contact D2D Support for assistance if you would like verification that your WARN system is inserting PID 911.

Our system is on line and everything looks good with green lights on both groomers, both satellite receivers locked, and a blue light bar on the openGear frame. However, our Transport Stream Analyzer doesn't see a 0x911 PID inserted into our table.

Depending on your TS analyzer, the PID may show up as "Private Data," "unknown," or a ghost PID.   It is also possible that it could show up as decimal 2321. There is also the likelihood that it may not show up at all, and if it does show up it may be for less than a second due to its bursty nature and low data rate.

Where and when should we look for alert messages?

The D2WARN Status page will display the priority level of alert messages being inserted.

As far as timing, there are two different kinds of "heartbeats" as follows:

(1) Every 30 seconds the WARN system in the PBS NOC broadcasts a single 188-byte MPEG packet with a header flag indicating that the packet is a heartbeat. The 30 second heartbeats do contain a payload. The payload is simply ASCII text that says "Heartbeat Message." If this heartbeat packet is not received at a member station every 40 seconds, the local member station equipment will throw an alarm.

(2) Every 60 seconds, FEMA (usually) transmits something they call a "Link Test". This is a multi-packet XML message of around 3kBytes with a payload that basically says "I'm a Link Test, Your Connection to FEMA is alive". Unfortunately, FEMA doesn't guarantee Link Tests will always be every 60 seconds. Sometimes it is once every 120 seconds.

Will the system accept an external reference?

No, and external reference is not required.

Can the video processor add the ATSC PSIP descriptor to properly ID PID data? Currently WARN PID 0x911, when monitoring a TS analyzer, will display a 'ghost,' or "unknown" PID.

That feature is not currently envisioned, but we can add that to the list of possible future features

Can the WARN system be controlled by the DashBoard?

No. The main user interface will be each Groomer's or Satellite Receiver's web GUI. DashBoard may only be used to set or change IP addresses. The Dash Board system requires Java, and we are attempting to deliver a solution that does not require member stations to install Java.

If someday PBS decides to drop satellite delivery, does this end the WARN program?

No, it does not. WARN will be supported on any new distribution platform used by PBS. From a hardware standpoint, the new system can also accept data from any IP or ASI source in place of satellite.

Can the new system feed the WARN message into multiplexer (mux), without passing the station's program?

Yes. This is called No Input Mode and can be configured from the groomer's **D2WARN Configuration** page. In this mode WARN messages are inserted at a rate that will not exceed 150 kbps. The output of the groomer will also be capped at approximately 150 kbps. This mode is typically used when the output of the system is fed into a multiplexer along with the station's broadcast feed. The groomer's output is a low data rate, unreferenced PID. Consult your equipment manufacturer's Technical Support for assistance configuring your station's mux.

What is the data rate of the WARN messages as transmitted with our program stream?

WARN messages are seldom transmitted. When a message is transmitted it is of very short duration, resulting in an average data rate of less than 1 kbps.

Can the groomer cards be swapped? That is, put Groomer A in Groomer B's slot and vice versa?

Yes, although care must be exercised. It is not as simple as just reconfiguring their IP addresses and groomer pair communication assignments. Do not attempt to swap the groomer cards without contacting D2D Customer Support.