S400/S401 PRO Receiver
User Manual

Revision 1.5

CAUTION: Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

Important- Please read this entire manual before installing or operating this product.

Disclaimer

While reasonable effort has been made in the preparation of this document to assure its accuracy, Novra Technologies Inc. assumes no responsibility for errors or omissions that may appear in this manual. Novra reserves the right to change the contents of this manual at any time without notice.

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1 Conventions

1.1 Text Conventions

NOTE: Information in this box will be Informative.

CAUTION: This information will be quite important and should not be ignored.

- Text appearing in `Courier` font indicates characters to be typed in; e.g. type `Shell` indicates that the word "Shell" must be entered exactly as it appears, with the first letter capitalized.
- Text appearing in Bookman Old Style font indicates a directory path or filename; e.g. c:\Program Files.
- Text appearing in SMALL CAPS and CopperPlateGothic32bc font in an instruction indicates a button that must be clicked, or a key that must be pressed, or a field that must be entered or a particular screen; e.g. BUTTON indicates a button that must be clicked.

1.2 Applicable Models

This manual is applicable to the following Novra Receiver models:

- Novra S400/S401 PRO – DVB-S/DVB-S2 satellite data receiver capable of receiving and forwarding IP data and DVB MPEG streams
- Novra S400/S401-GRB – Satellite data receiver for use in GOES Re-Broadcast (GRB) applications.
- Novra S400/S401 PROCA – Same functionality as the S400/S401 PRO, but with a conditional access Common Interface (CI) slot, making it compatible with many commercially available conditional access encryption systems

1.3 Model Naming Convention

This manual uses the S400/S401 PRO naming convention when referring to any one of the applicable S400/S401 PRO models (see Section 1.2 above).

2 Introduction

2.1 Principles of Operation

The S400/S401 PRO is a satellite receiver that enables the reception of IP data carried on a DVB-S2 or DVB-S compliant satellite signal. The unit is also capable of receiving an IP unicast stream for distribution.

Please refer to Figure 1 below for a better understanding of the S400/S401 PRO operation. The desired DVB-S or DVB-S2 satellite signal is received using an appropriately sized satellite dish (not covered in this manual). A Low Noise Block (LNB) downconverter (not covered in this manual) is used to translate the incoming Radio Frequency (RF) signal to an Intermediate Frequency (IF) signal. The S400/S401 PRO receives this I/F signal and extracts the IP content, which is then passed on to the S400/S401 PRO LAN for distribution or viewing via computers connected to the LAN.

An S400/S401 PRO is managed using a device with a browser connected to the S400/S401 PRO via an Ethernet crossover cable or through an Ethernet switch. The user can use their browser to perform the following functions:

- Configure IP network parameters,
- Specify satellite tuning parameters,
- Select DVB information streams by component Program IDentification number (PID),
- Select MPE/ULE Streams by PID, and
- Map Programs and PIDs to multicast address(es).

Once configured, the S400/S401 PRO will retain its settings and continue to forward data streams even after restarting the S400/S401 PRO.

The S400/S401 PRO Receiver does not require a computer to continue operation. Once the configuration has been set, you should normally have no need to make further changes.

3 Getting Started

3.1 Typical S400/S401 PRO Installation

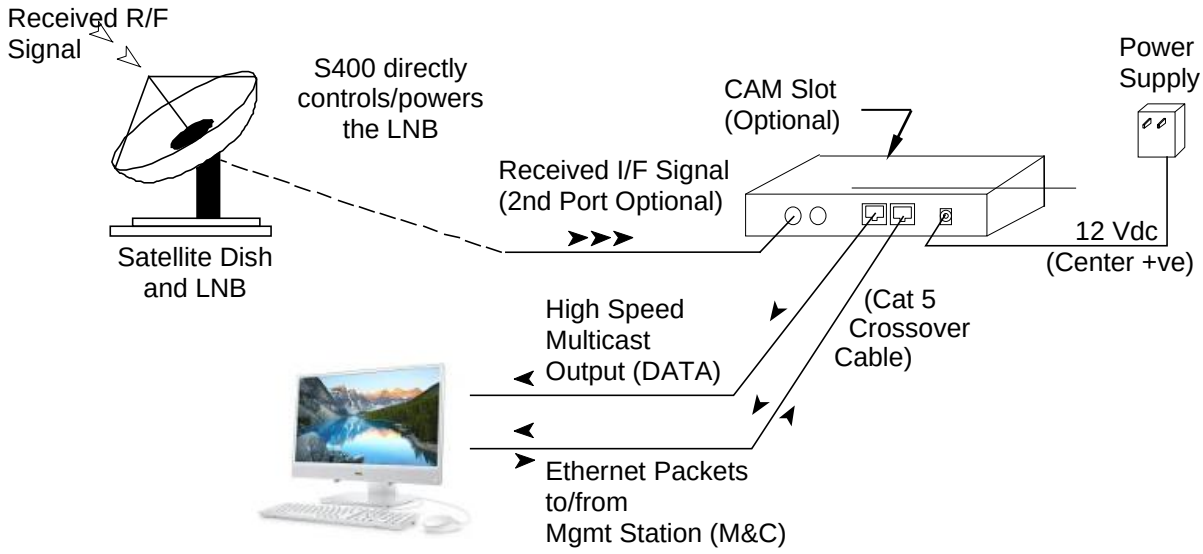


Figure 1 – Typical S400 Configuration

NOTE: - This information is needed in order for the receiver to function. It is recommended that all the information be collected before attempting to install the service. Novra Technologies Inc. expects that end users, who wish to control the LNB with the receiver, already have good understanding of satellite technology.

CAUTION: Nothing should be inserted between the S400 PRO and the satellite dish except for a surge suppressor. Cable TV Splitters, TVs, VCRs, and FM receivers are not designed for connection to this portion of the network. It is very likely they will be damaged by the LNB DC voltage generated by the S400 PRO

3.2 What Information do I Need – Basic Configuration?

Before using the S400/S401 PRO configuration GUI to configure your receiver, you need to gather the following information:

1) The LO Frequency _____ in MHz of the stream you wish to receive.

NOTE: Local Oscillator Frequency is specific to the LNB Model and is usually stamped on the Unit or can be found in the LNB Manual. Typical Ku Band values include: 9.75, 10.60, 10.75, 11.00, and 11.25 GHz. For the C Band satellite frequencies a typical value is 5.15 GHz.

2) The RF Band Frequency _____ in MHz of the stream you wish to receive. Your satellite service provider should be able to provide this information for you.

3) Polarization: Horizontal / Left ____ (+18 Volts DC) **OR** Vertical / Right ____ (+13 Volts DC). Your satellite service provider should be able to provide this information for you.

NOTE: If the LNB does not have the ability to switch polarizations, choose a value that will provide the most suitable power supply voltage. In most cases this will be Horizontal / Left (+18 Volts).

4) Will the receiver be controlling a Single Band LNB (Most Common) or a Universal Band / Dual LNB?

NOTE: The 22 KHz tone is used to switch between the 2 bands of the LNB. The receiver should be configured so that the proper tone is used and the proper band is selected.

5) The Symbol Rate in MBaud _____

Examples: 21.096, 5.12600, 1.50, …etc.

6) The IP Address to be assigned to your S400/S401 PRO Receiver's DATA interface (LAN1)

Default value is: 192.168.1.2

7) The IP Address to be assigned to your S400/S401 PRO Receiver's M&C interface (LAN2), if DHCP is not available

Default is to set value via DHCP

NOTE: If your network's DHCP server is set to assign addresses in the 192.168.1.xxx range, then the DATA interface (LAN1) IP will need to be changed to avoid conflict. An invalid configuration will result if both Ethernet interfaces are on the same subnet.

8) The IP address of the Default Gateway for the receiver.

9) Is the receiver supposed to filter multicast traffic using IGMP?

NOTE: IGMP is an Internet standard that is used to control multicast traffic on the LAN based on the client's interest in the stream. For proper operation, all components of your network should support IGMP

3.3 S400/S401 PRO Startup

1- Plug in the RF and network cables and then the power. When the S400/S401 PRO has completed its startup (approximately 45 seconds) you should be able to read its IP address from the LCD panel. Press the button multiple times to scroll through the display information. Note: The LCD does not display any information until at least 30 seconds after plugging in the power cable.

2- Use this IP address and type it into a browser address bar on a device that can communicate with the IP address assigned to the S400/S401 PRO (i.e. PC on same LAN). If the network connectivity is correct you will be presented with the status dashboard of the S400/S401 PRO in your browser.

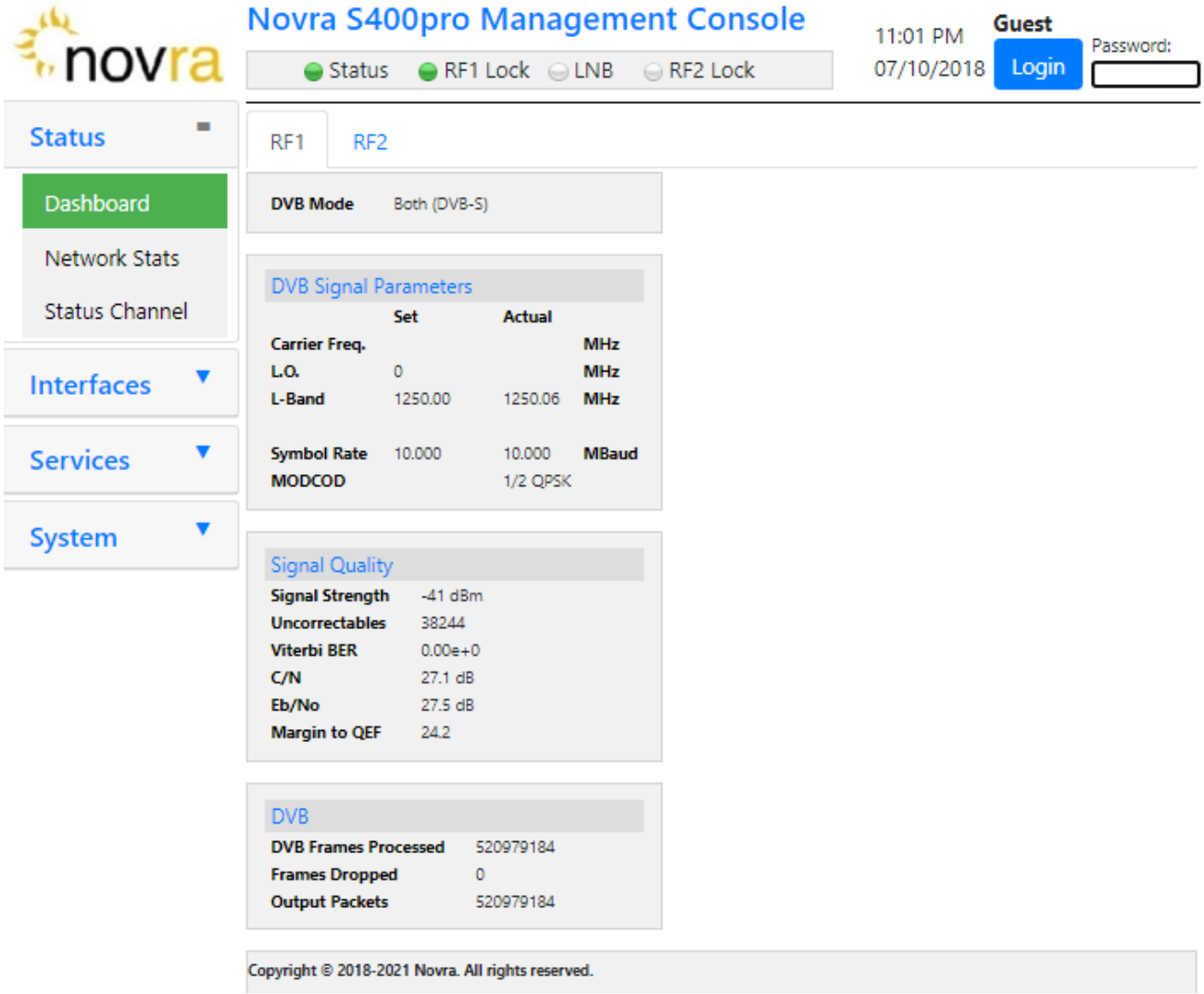


Figure 2 – S400/S401 PRO Dashboard

You can now proceed with configuring your S400/S401 PRO. In order to make any changes to the configuration of your S400/S401 PRO, you must login in the top right hand corner of the GUI display. The default password is “password”.

After successfully entering the password, you will be allowed to save changes to any aspect of the S400/S401 PRO configuration.

NOTE: - Default Password is `password`

3.4 Dashboard

Congratulations, you have connected to your S400/S401 PRO receiver and made it to the default status page (Figure 2). On this page, you can see basic connectivity of your device and its satellite RF tuners.

3.4.1 Status Bar

Near the top of the screen is a status bar that indicates the device status, tuner 1 status (RF1 Lock), LNB status and tuner 2 status (RF2 Lock).

If a tuner is locked its status indicator will be green. They should always match the tuner status indicators on the front panel of the S400/S401 PRO.

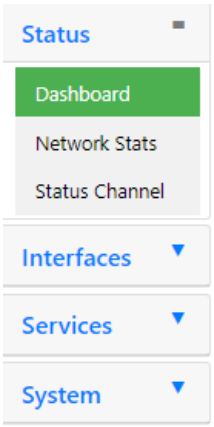
If the LNB is active its status will also be green.

To the right of the status bar will be the date and time of your S400/S401 PRO in UTC.

On the far upper right of the status screen is a login button where you must login to make changes to the configuration of your S400/S401 PRO.

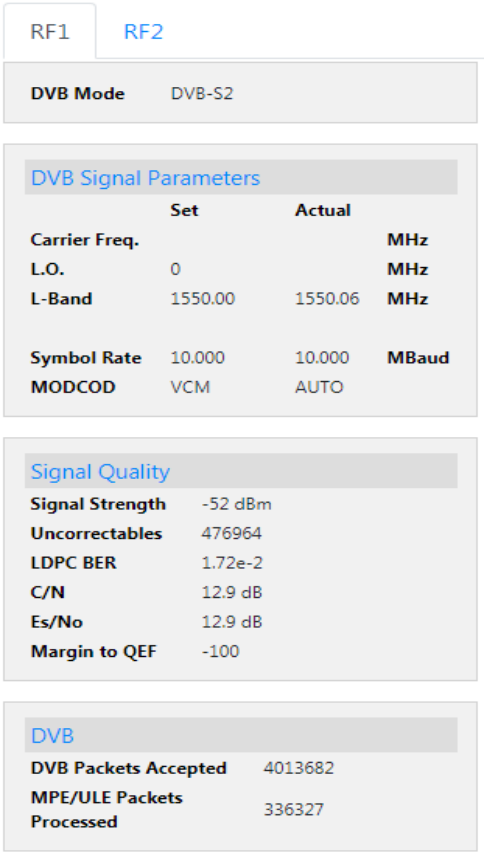
3.4.2 Navigation Menu

On the left side of the page is the navigation menu that allows you to select the various pages to view and configure all aspects of your S400/S401 PRO. The selected menu item is always highlighted.



3.4.3 Tuner Status Summary

The main section of the dashboard status page shows the status of either tuner 1 (RF1) or tuner 2 (RF2). Each tuner has the following details



- DVB Mode : DVB-S or DVB-S2

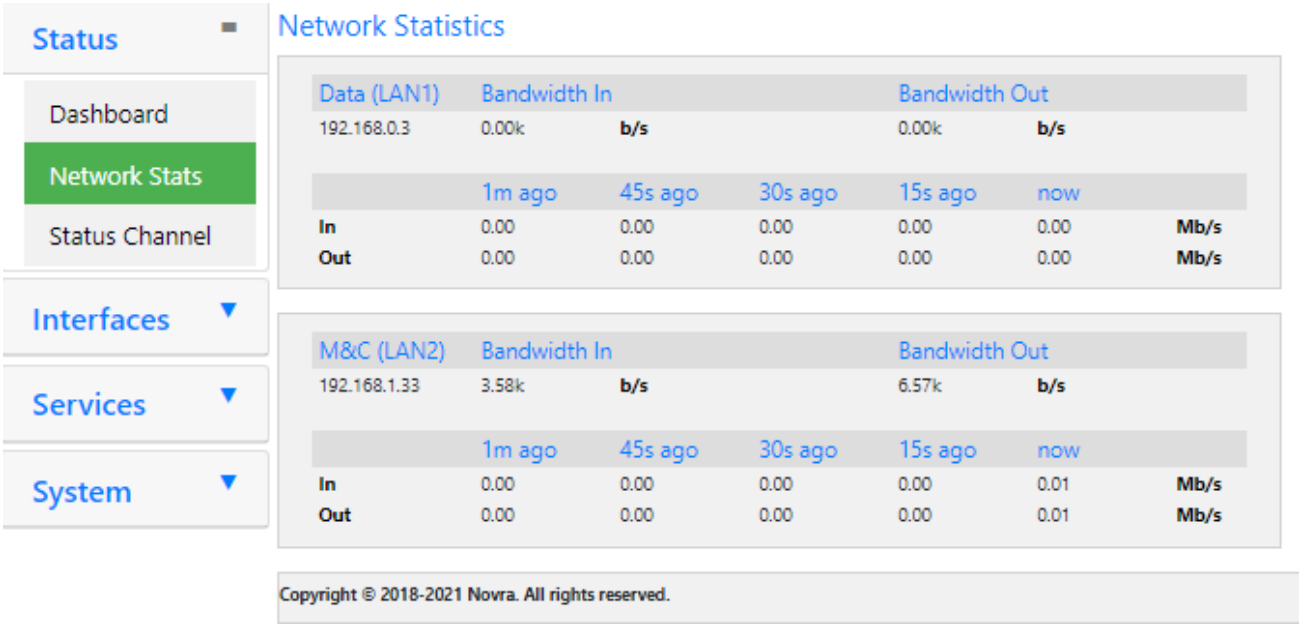
- Carrier Freq.
- L.O. – Local Oscillator
- L-Band
- Symbol Rate
- MODCOD

- Signal Strength
- Uncorrectables: Error Count
- (LDPC) BER: Bit Error Rate
- Carrier to Noise: in dB
- Es/No: in dB
- Margin to QEF

- DVB Packets Accepted: Counter
- MPE/ULE Packets Processed: Counter

3.5 Network Stats

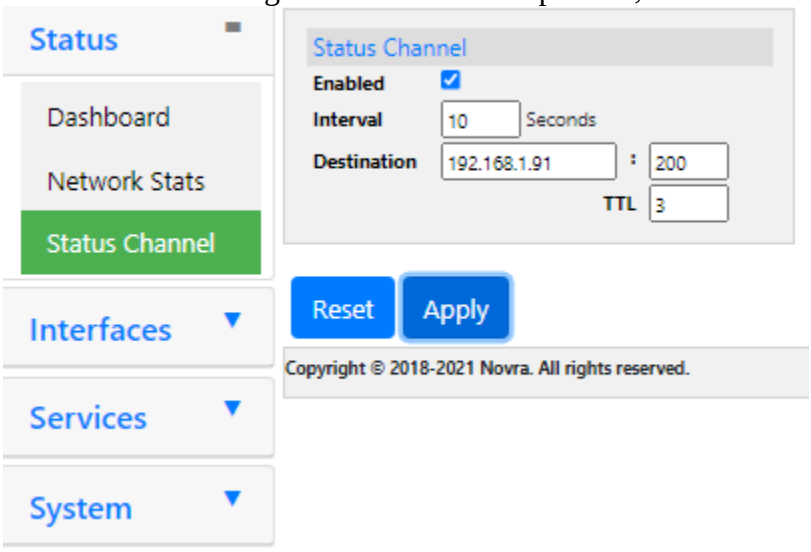
Under the Network Stats tab you can find LAN1 and LAN2 connectivity details including :
IP address
Bandwidth In – inbound data rate bits/sec
Bandwidth Out – outbound data rate bits/sec



3.6 Status XML Broadcast Channel

License is required to enable Broadcast of Status XML, see 4.3.5 License (System->license).

To enable forwarding of Status XML file packets, check the Status Channel -> Enabled button.



3.7 Content of Status XML Packet

```
<S400/S401>
    <Timestamp val="2021/03/11 23:24:53.816" />
    <Serialno val="111111111" />
    <Rev val="1.9.7" />
    <Temp val="43.21C" />
    <Fan val="OFF" />
    <SignalParams>
        <CHANNEL1>
            <Set>
                <LBand val="1155.00" />
                <LO val="0" />
                <SymbolRate val="AUTO" />
                <MODCOD val="Unknown" />
            </Set>
            <Actual>
                <LBand val="1155.062012" />
                <LO val="0" />
                <SymbolRate val="10000268" />
                <MODCOD val="1/4 QPSK" />
            </Actual>
        </CHANNEL1>
        <CHANNEL2>
            <Set>
```

```
            <LBand val="1155.00" />
            <LO val="0" />
            <SymbolRate val="AUTO" />
            <MODCOD val="Unknown" />
        </Set>
        <Actual>
            <LBand val="1155.062988" />
            <LO val="0" />
            <SymbolRate val="10000271" />
            <MODCOD val="1/4 QPSK" />
        </Actual>
    </CHANNEL2>
</SignalParams>
<SignalQuality>
    <CHANNEL1>
        <SigStrength val="-38.000000" />
        <LDPCBER val="0.000000" />
        <EsNo val="&gt;50 dB" />
        <MarginToQEF val="101.099998" />
    </CHANNEL1>
    <CHANNEL2>
        <SigStrength val="-47.000000" />
        <LDPCBER val="0.000000" />
        <EsNo val="42.099998" />
        <MarginToQEF val="43.199997" />
    </CHANNEL2>
</SignalQuality>
<Stats>
    <CHANNEL1>
        <FramesDropped val="0" />
        <FramesProcessed val="348435" />
        <OutputPackets val="0" />
    </CHANNEL1>
    <CHANNEL2>
        <FramesDropped val="0" />
        <FramesProcessed val="0" />
        <OutputPackets val="0" />
    </CHANNEL2>
</Stats>
<RF>
    <CHANNEL1>
        <LOlock val="Locked" />
        <SigLock val="Locked" />
        <RSSI val="-38.000000" />
```

```
        </CHANNEL1>
        <CHANNEL2>
            <LOlock val="Locked" />
            <SigLock val="Locked" />
            <RSSI val="-47.000000" />
        </CHANNEL2>
    </RF>
    <DEMOD>
        <CHANNEL1>
            <PLsync val="Locked" />
            <DataLock val="Locked" />
            <EsNo val="&gt;50 dB" />
            <Mode val="QPSK" />
            <Spectrum val="Normal" />
            <BCHUC val="0.000000000" />
        </CHANNEL1>
        <CHANNEL2>
            <PLsync val="Locked" />
            <DataLock val="Locked" />
            <EsNo val="42.099998" />
            <Mode val="QPSK" />
            <Spectrum val="Normal" />
            <BCHUC val="0.000000000" />
        </CHANNEL2>
    </DEMOD>
</S400/S401>
```

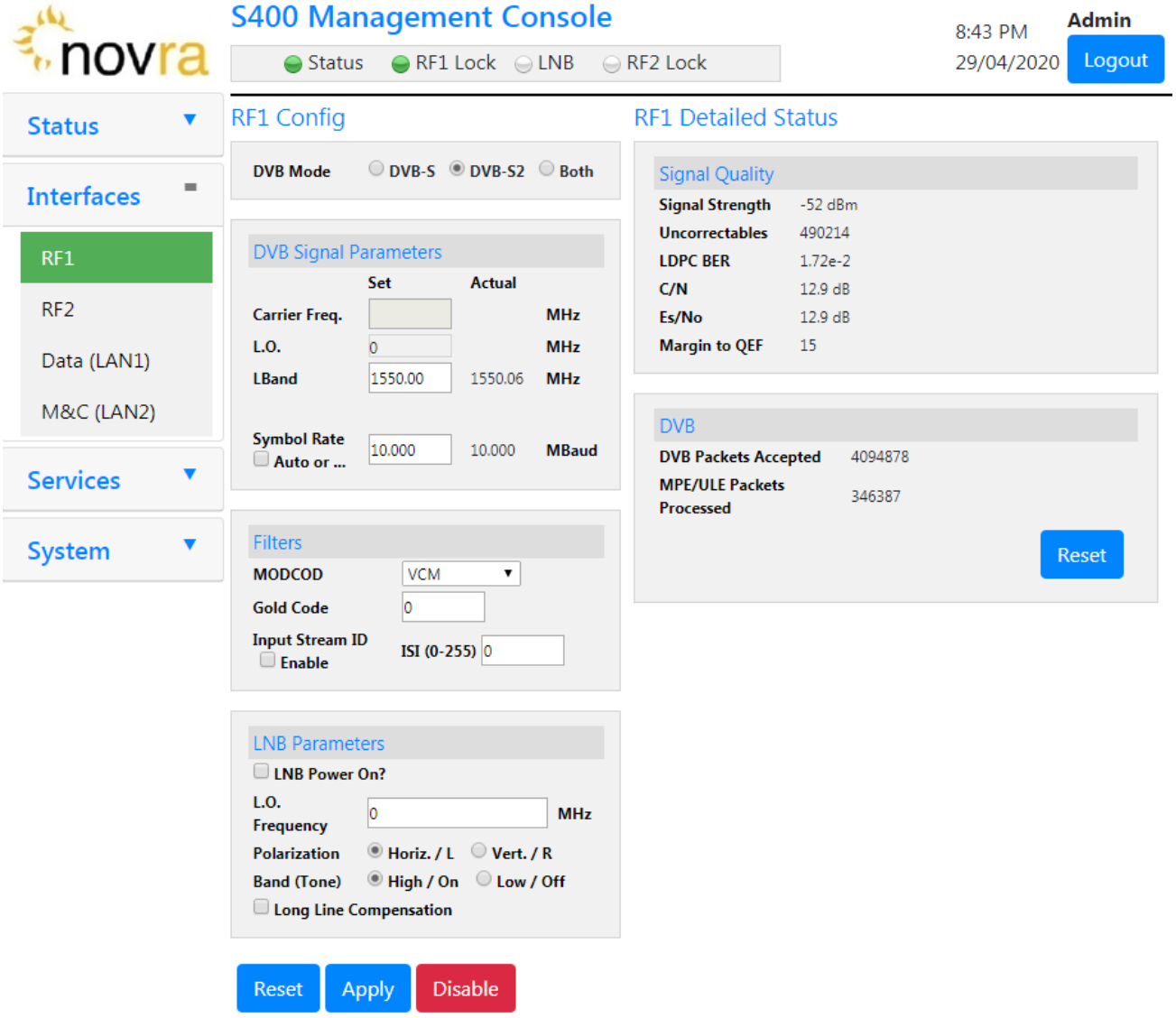
4 Configuring the S400/S401 PRO

> **NOTE:** - You can only change the S400 PRO settings if you login! The default password is “password”.

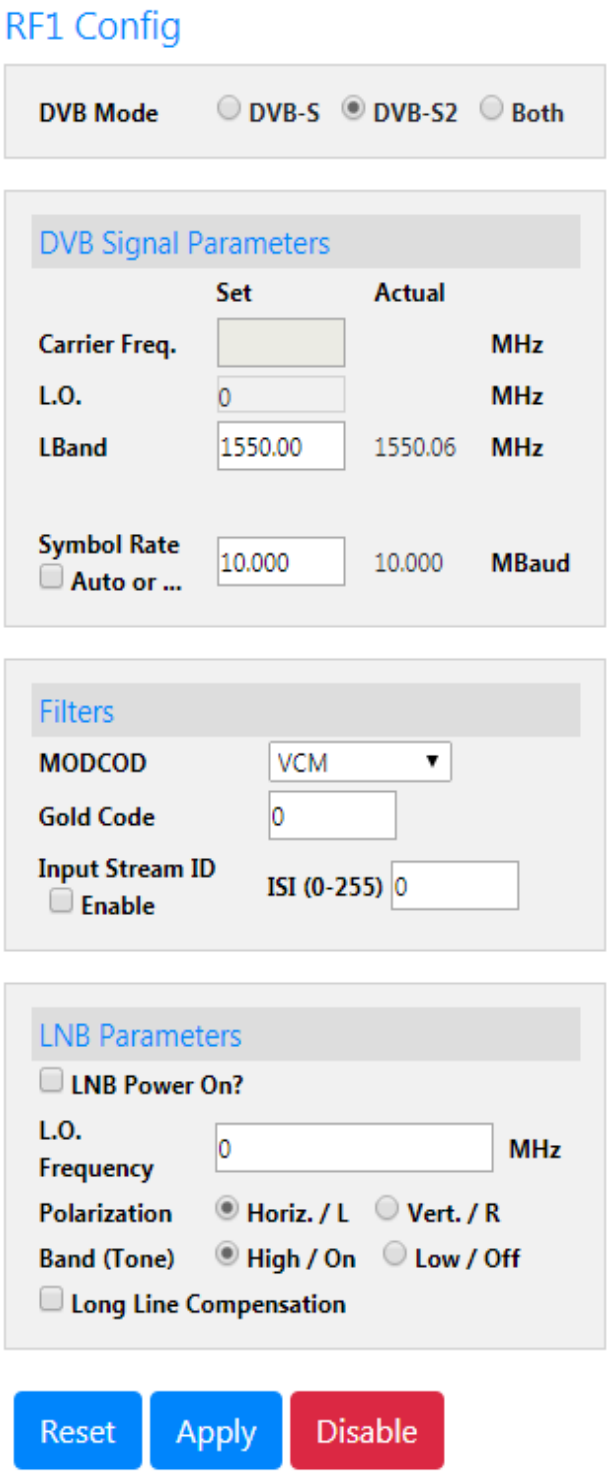
This chapter discusses how to configure the S400/S401 PRO. It covers the interfaces, services and system settings of the S400/S401 PRO.

4.1 Interfaces

The Interfaces menu allows the user to configure both satellite tuners, if equipped, and both Ethernet interfaces.



4.1.1 Tuner 1 (RF1)



In this example we will describe the DVB-S2 tuner options.

DVB Mode: Select to match your target transponder. If the Search Mode is set to BOTH and the received stream is DVB-S, then the contents of the ModCod box will be ignored by the receiver

Carrier Frequency: The Carrier frequency of the signal that you are trying to receive. Note: To use or view carrier frequency you must first configure your LNB below.

L.O. Frequency: The single-band local oscillator frequency in Mhz

LBand Frequency: The LBand frequency of the signal that you are trying to receive.

Symbol Rate: This is the symbol rate of the transponder that you are trying to tune. The S400/S401 PRO supports automatic detection of the incoming symbol rate (check box – DVB-S2 only) or you can manually specify which symbol rate you wish the receiver to tune.

ModCod: For multi-stream DVB-S2 operation, the S400/S401 PRO should be configured to receive 1 stream. This is accomplished by entering the ModCod of the signal you wish to receive in the ModCod drop down box. If you enter the wrong ModCod value, you receiver may not be able to lock onto the desired signal. For single stream DVB-S2 operation, the Modcod dropdown should be set to AUTO.

For DVB-S operation, the Modcod box will be grayed out.

Gold Code: Enter the Gold Code setting here. This must match the Gold Code setting in the modulator that is used to generate the DVB-S2 stream. For DVB-S operation, the Gold Code box will be grayed out.

Input Stream ID Filter: The Input Stream Identifier (ISI) Filter may be used by your receiver to filter streams based on this value. If the ISI CHECKBOX is selected, then the receiver will only demodulate streams that

have an ISI value that is the same as the value shown in the ISI box. This command should only be used if the ISI stream value is set on the incoming DVB-S2 stream and if the ISI value is known. You may have to contact your uplink provider for assistance. For DVB-S operation, the ISI input will be grayed out.

LNB Parameters: Use this section to enable the LNB settings for tuner 1 (RF1). It is used to set the LO frequency, polarization and LNB tone:

- **LNB Power On:** Turns the DC voltage and tone output of the receiver to ON or OFF.
- **LO Frequency:** Input the single-band LO frequency in Mhz.
- **Polarization:** Switches the DC output of the receiver between Horizontal/Left and Vertical/Right. This setting is only valid if the LNB power is on.
- **Band (Tone):** Switch the LNB Tone frequency of the receiver On (High) or Off (Low). This is only valid if the LNB power is on.
- **Long Line compensation:** Checking this box will increase the Polarity Switching voltage by 1 volt. This additional voltage may be used to compensate for the voltage drop due to a long I/F cable run between the S400/S401 PRO and the LNB.

Reset: By pressing this button, any changes on this page will be undone. No changes will be sent to the S400/S401 PRO.

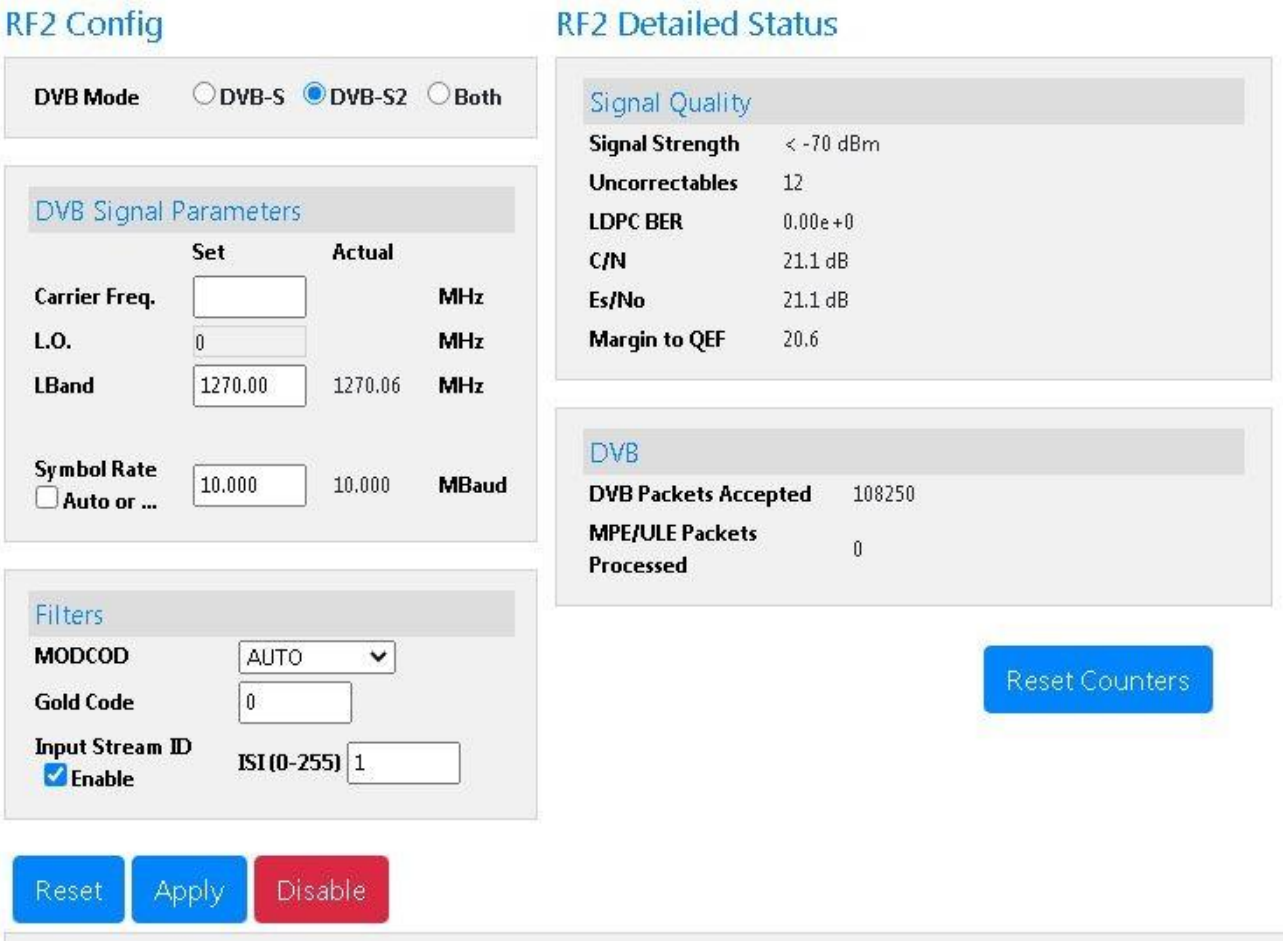
APPLY: SELECT THIS BUTTON TO SEND ALL OF THE SETTINGS ON THIS SCREEN TO THE S400/S401 PRO. Please wait for the changes to take effect on the S400/S401 PRO by monitoring the "Tuner Detailed Status" section on this page.

NOTE: - If a dual LNB is being deployed, ensure that the appropriate LO frequency is entered in the LO Frequency box and that the correct band (high or low) is selected in the Satellite screen.

Disable: Press this button to disable this S400/S401 PRO satellite interface.

4.1.2 **Tuner 2 (RF2) - Optional**

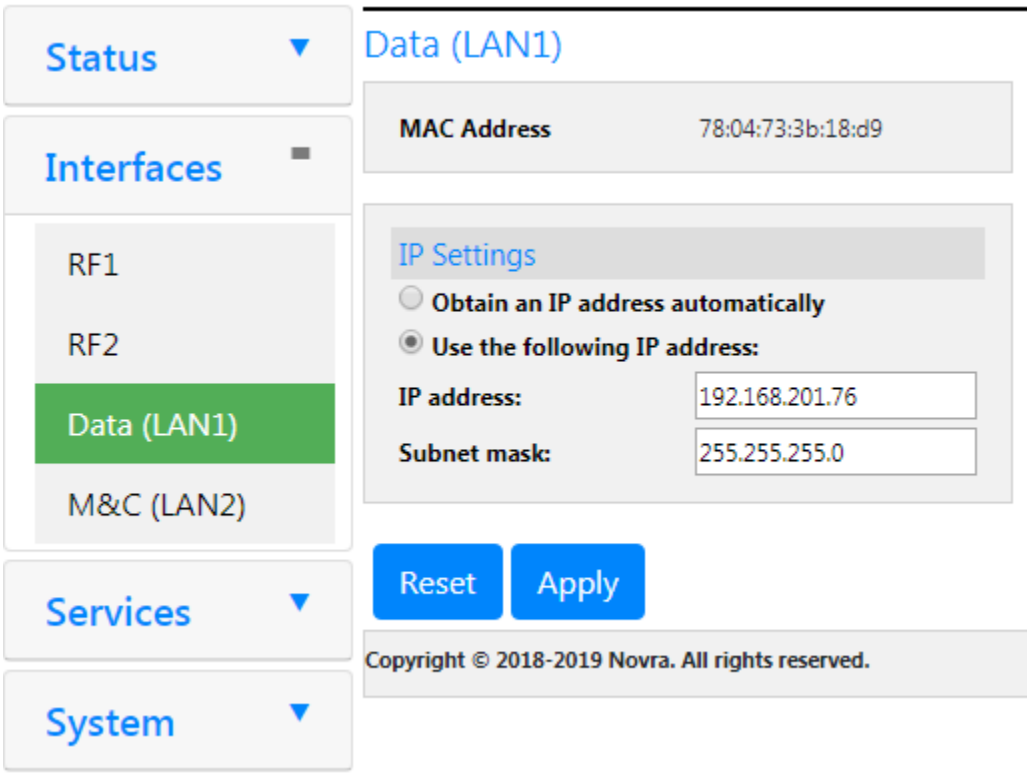
The main difference between tuner 1 and 2 is that tuner 2 does not have its own lnb control. Also it may not be available on your S400/S401 PRO version. Contact your reseller for possible upgrades or license of Tuner2.



or

4.1.3 DATA (LAN1)

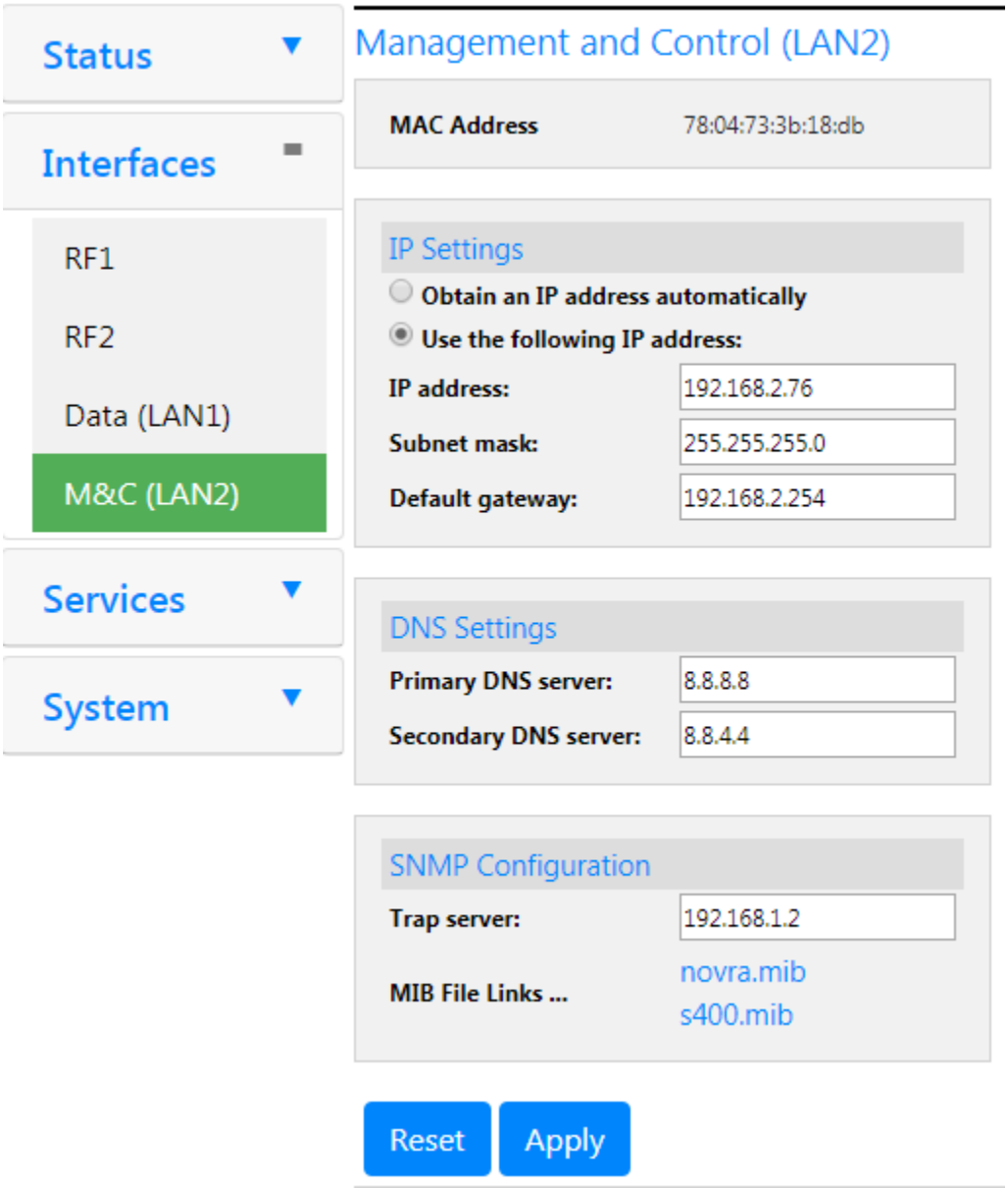
The LAN1 Ethernet settings may be modified by selecting the DATA (LAN1) INTERFACE MENU and changing the appropriate fields (as shown below).



1. **MAC Address:** The LAN1 Ethernet Interface MAC address is shown.
2. **Obtain an IP Address Automatically (DHCP)**: This option will force the S400/S401 PRO to use DHCP to automatically obtain its IP address.
3. **IP Address (Static)**: This is the IP address that is statically assigned to the receiver.
4. **Subnet Mask**: This is the subnet mask that the receiver should use to determine whether an IP address belongs to the same network.
5. **Reset:** By pressing this button, any changes on this page will be undone. No changes will be sent to the S400/S401 PRO.
6. **Apply:** By pressing this button, the updates are sent to the receiver

4.1.4 M&C (LAN2)

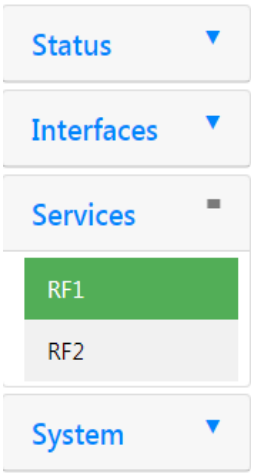
The Lan2 Ethernet settings of the S400/S401 PRO may be modified by selecting the M&C (LAN2) INTERFACE MENU and changing the appropriate fields (as shown below).



1. **MAC Address:** The LAN2 Ethernet Interface MAC address is shown.
2. **Obtain an IP Address Automatically (DHCP)**: This option will force the S400/S401 PRO to use DHCP to automatically obtain its IP address.
3. **IP Address (Static)**: This is the IP address that is statically assigned to the receiver.
4. **Subnet Mask**: This is the subnet mask that the receiver should use to determine whether an IP address belongs to the same network.

5. **Default Gateway:** This is the IP address of the router that the receiver should use whenever it wants to send traffic to a non-local address.
6. **Primary/Secondary DNS:** These DNS entries allow the S400/S401 PRO to send traffic to services on the Intra/Internet by name (eg. NTP, SNMP, etc…).
7. **Reset:** By pressing this button, any changes on this page will be undone. No changes will be sent to the S400/S401 PRO.
8. **Apply:** By pressing this button, the updates are sent to the receiver

4.2 Services



A user can specify which satellite DVB mpeg/data services are to be forwarded onto the network using these menus. The services are configured for each tuner separately. Not all S400/S401 PRO receivers are enabled for dual tuner operations. This manual will document three service forwarding types that are available for each tuner. For Generic Stream forwarding see Section 7 Generic Stream setup (NOAA GRB / KoreaSat GK-2A)

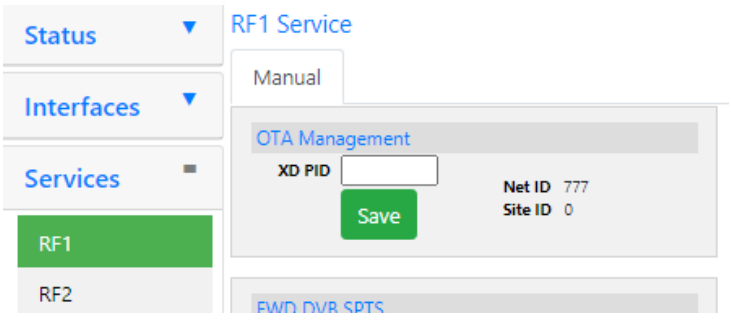
- Forward All
- DVB MPEG Forwarding
- DVB MPE/ULE Forwarding

This is also where to add an XD PID for optional over the air management or software upgrade.

4.2.1 **OTA Management**

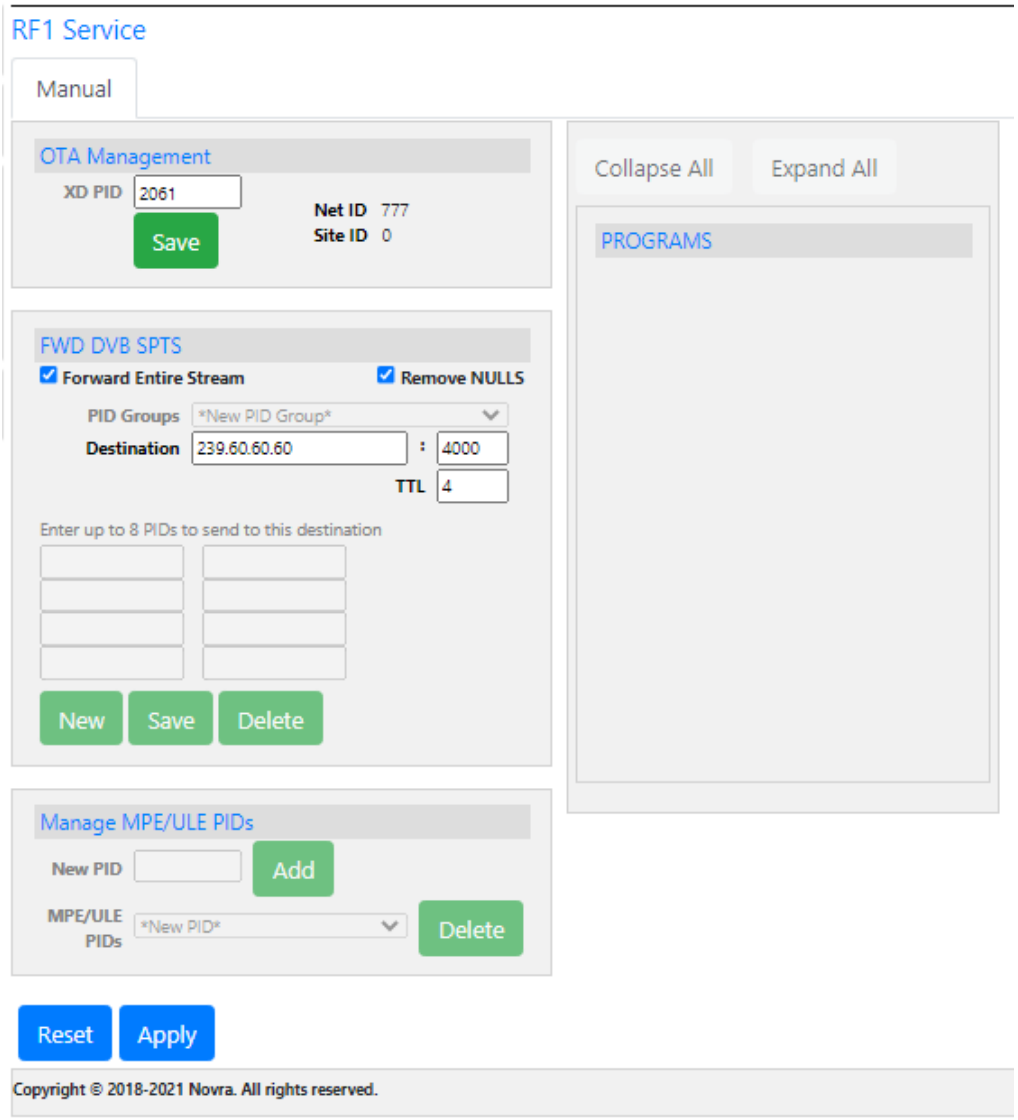
This is where to add an XD PID for optional over the air management or software upgrade. Once the XD PID is set it must be SAVEd and then APPLYed.

Over The Air Management and Software Update requires XD licensed with Net ID and Site ID configured.



4.2.2 Forward all

This is the simplest mode of service forwarding available on the S400/S401 PRO. This can be used for analyzing a full satellite transport stream or simply to forward it on to other devices on the network.



To use this mode, select the checkbox “Forward Entire Stream” and then specify the following options.

Remove Nulls: Use this to minimize the size of the resulting output transport stream. In order to “capture” a transport stream it can be useful to leave them in for some analysis of the transport stream.

Destination: A unicast or multicast IP address along with a UDP port number.

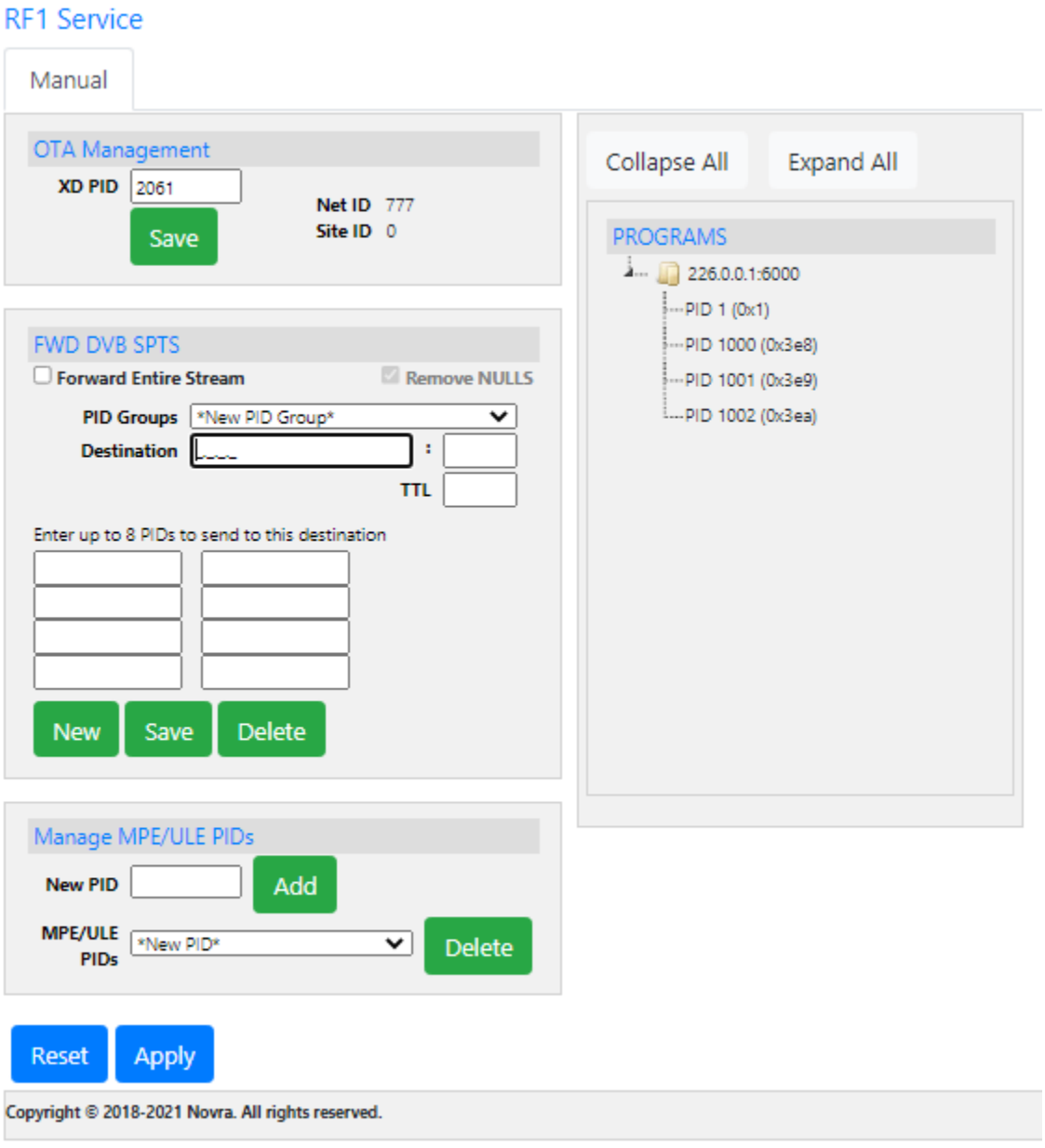
TTL: The time to live value for the output UDP packets

Reset: By pressing this button, any changes on this page will be undone. No changes will be sent to the S400/S401 PRO.

Apply: By pressing this button, the updates are sent to the receiver.

4.2.3 DVB Mpeg Forwarding

The S400/S401 PRO can be used to forward DVB PID bundles (Raw PID Groups) that represent a valid SPTS (Single Program Transport Stream). For each SPTS, the user specifies the stream details listed below. The user can specify up to 64 unique SPTS for a single transponder. To save your work please click on the Apply button as the data is entered.



Stream Forwarding Details

Destination: A unicast or multicast IP address along with a UDP port number.

TTL: The time to live value for the output UDP packets

Pids: Up to eight individual PIDs (decimal) can be specified for each PID bundle. The minimum required PIDs for a typical DVB video service would include the PAT, PMT, a video PID and one or more audio PIDs.

New: Start a new PID bundle

Save: Declare a PID bundle, which makes it appear on the list to the right. Note: This bundle is not yet on the S400/S401 PRO, click "Apply" to have it saved to the S400/S401 PRO active service list.

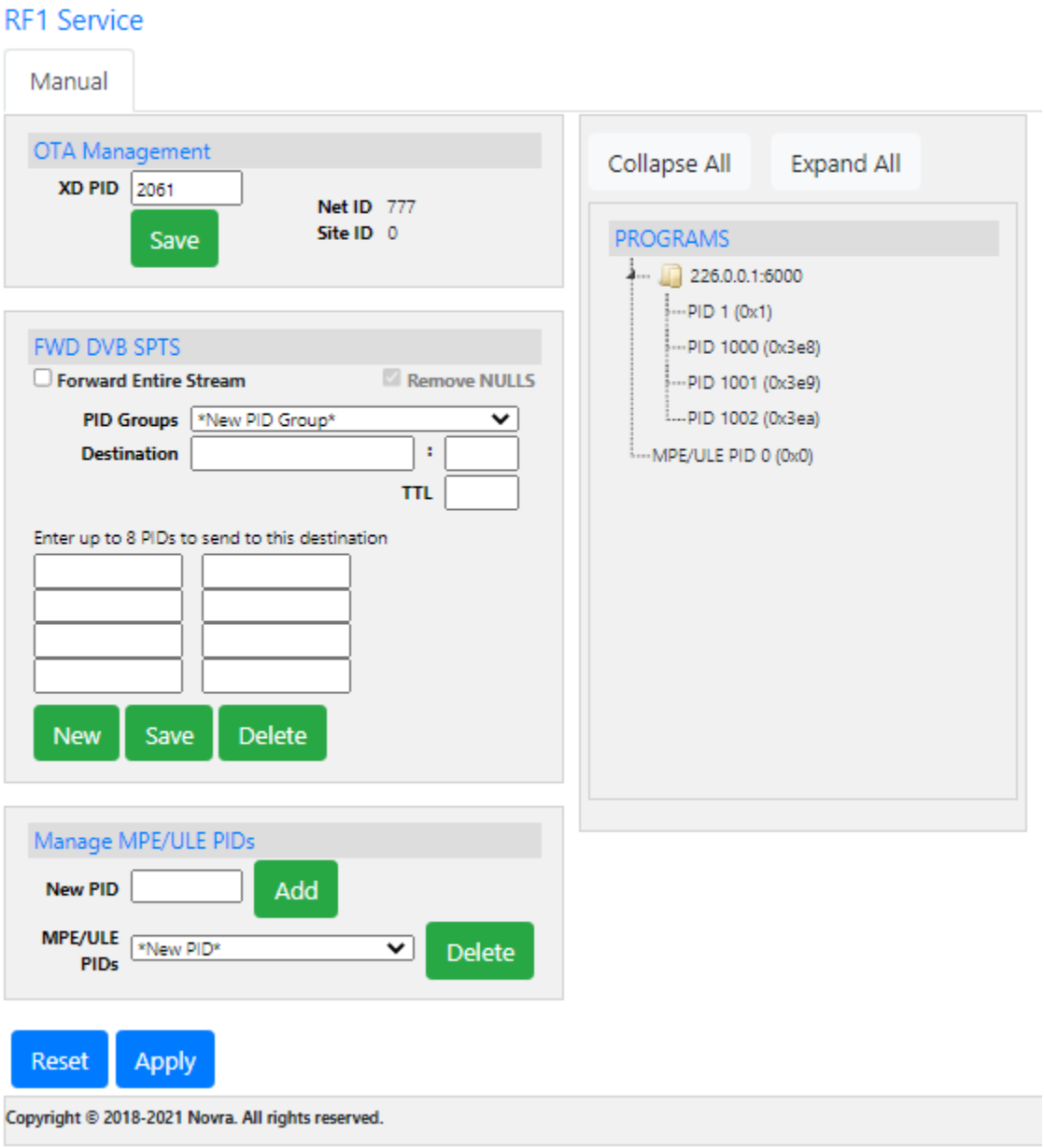
Delete: Remove a PID bundle from the working list. Click "Apply" to activate the change.

Reset: By pressing this button, any changes on this page will be undone. No changes will be sent to the S400/S401 PRO.

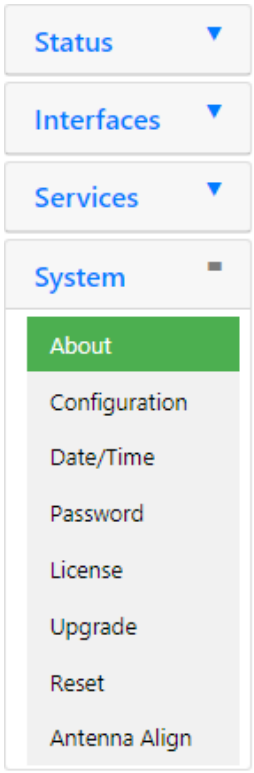
Apply: By pressing this button, the updates are sent to the receiver.

4.2.4 DVB MPE/ULE Forwarding

The S400/S401 PRO also supports DVB MPE for typical IP over satellite applications such as file delivery or IP streaming services. The S400/S401 PRO allows the user to specify up to 64 DVB MPE or ULE PIDs. MPE PIDs and SPTS PID bundles can be defined simultaneously. MPE PIDs are added by simply entering the decimal PID number in the "New PID" entry field in the "Manage MPE/ULE PID" section at the bottom of the screen. These MPE or ULE PIDs will be added to the working list on the right. When all changes are complete, use the "Apply" button to make your changes active on the S400/S401 PRO. MPE or ULE PIDs can be removed from the working list by selecting them from the "MPE/ULE PIDs" drop down list and clicking on "Delete". Changes are made active on the S400/S401 PRO only when the "Apply" button is clicked.



4.3 System Configuration



The following items can be viewed or managed in the system menu:

About : System Information about the device and its operating system.

Configuration: Options to save and restore S400/S401 PRO configurations

Date/Time: Options on setting the date and time of the S400/S401 PRO

Password: Changing the password for your S400/S401 PRO

License: Ability to apply a software license to your S400/S401 PRO

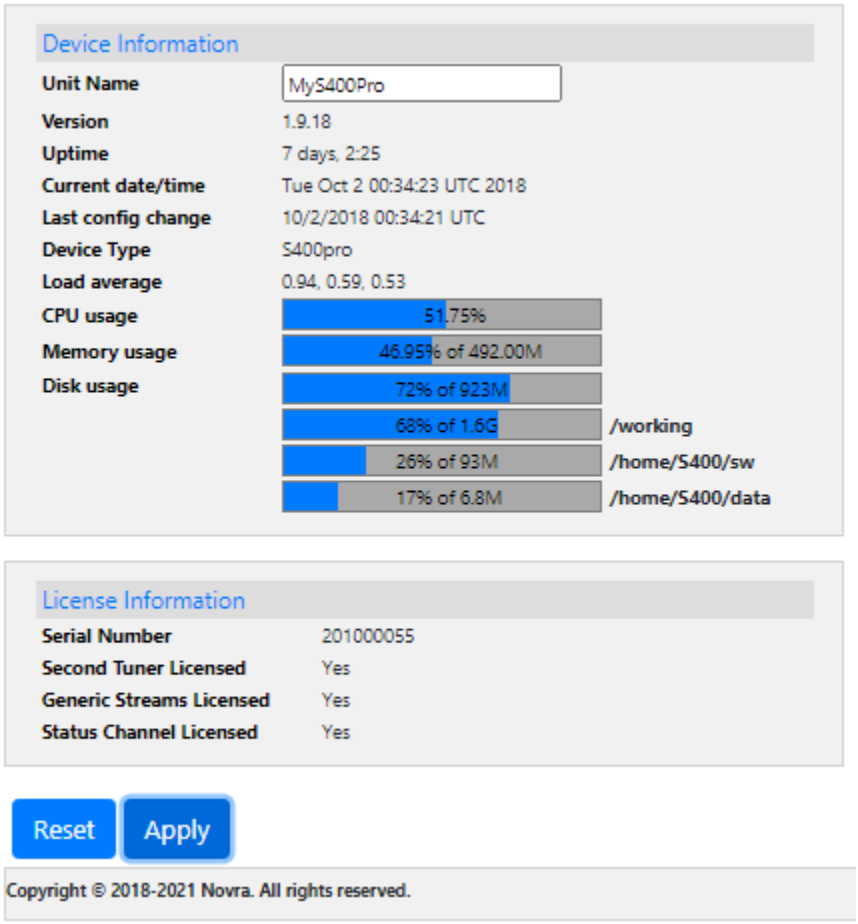
Upgrade: Ability to apply a software upgrade to your S400/S401 PRO

Reset: Ability to apply various reset options on the internal services of your S400/S401 PRO

Antenna Align: Signal Strength indicator to optimize antenna-satellite alignment

4.3.1 About

Various details about the internals of your S400/S401 PRO that may be useful for support and diagnostics.



Device Information

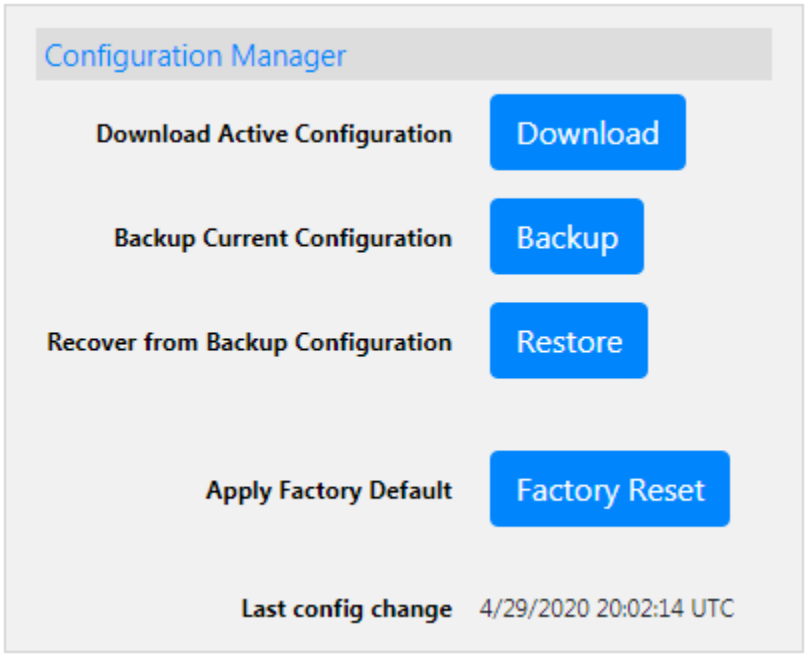
Name: Editable Name of S400/S401 PRO Unit
Version: S400/S401Pro release version
Uptime: How long the S400/S401 PRO has been running since its last power up.
Current date/time: Date and time displayed in UTC
Last Config Change: Date of last change to S400/S401Pro configuration parameters.
Device Type: S400/S401Pro hardware build type – factory assigned
Load Average: CPU load
CPU Usage: percent of CPU used
Memory usage: percent of memory used
Disk usage: percent of internal storage used

S400/S401S400/S401**License Information**

Serial Number: Serial Number of this S400/S401 PRO Unit
Second Tuner Licensed: Status of license to use the second tuner (RF2)
Generic Streams Licensed: Status of license to use GSE (Generic Stream Encapsulation)
Status Channel Licensed: Broadcast Status PID

4.3.2 Configuration

These options allow the user to save and restore S400/S401 PRO configurations.



Download Active Configuration: This option is used to provide your support team the active S400/S401 PRO configuration. Click on this button and send the resulting configuration file to your support contact.

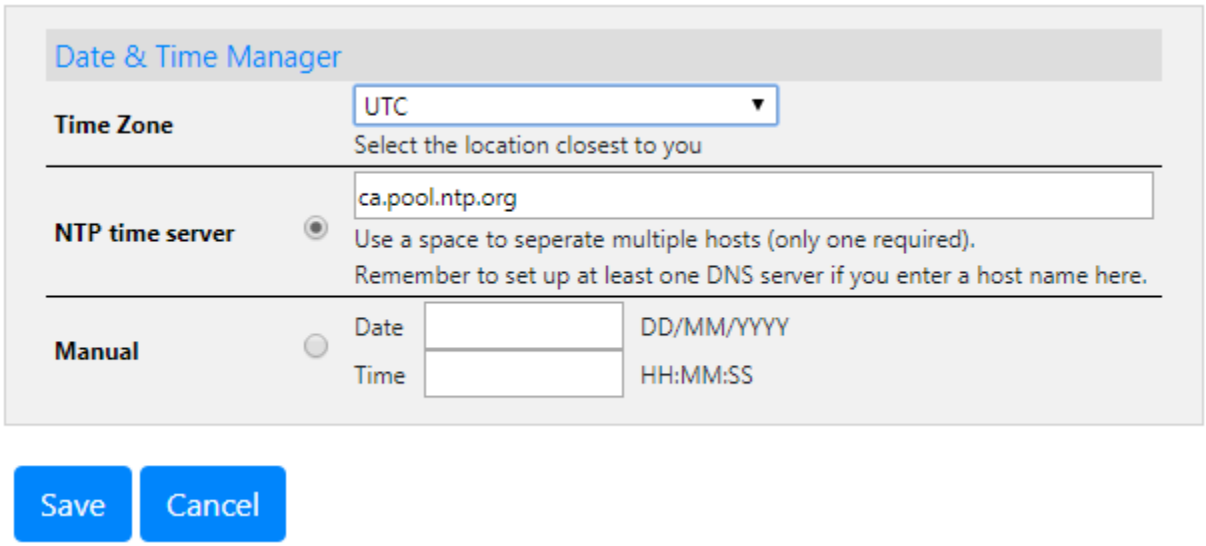
Backup Current Configuration: Use this option to save your current configuration. Later you can go back to this configuration using the "Restore" option.

Recover from Backup Configuration: Use this option to return your S400/S401 PRO to a previous backup configuration as saved under Backup Current Configuration.

Apply Factory Default: Use this option to return your S400/S401 PRO to the same configuration it had at the factory. Note: This includes the IP address of the M&C (LAN1) interface (192.168.1.2)!

4.3.3 Date/Time

These options allow the user to configure the date and time on your S400/S401 PRO.



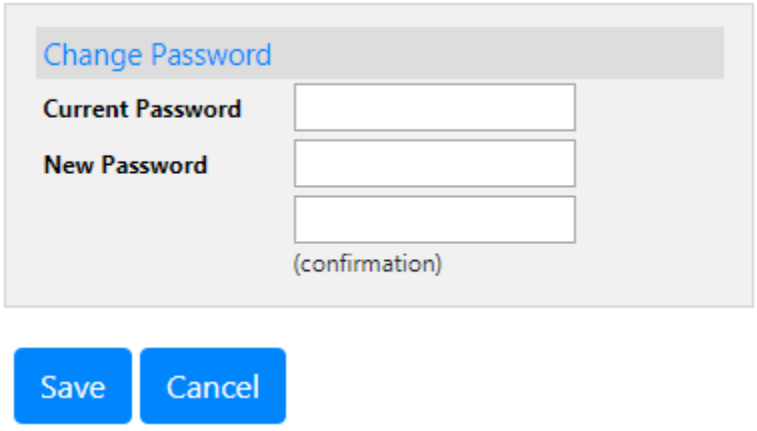
Time Zone: Use this drop down to select the time zone for your S400/S401 PRO.

NTP time server: Allows entry of a NTP timer server(s) on the Internet.

Manual: Use this option if you want to enter your date and time manually. This would be used if your S400/S401 PRO does not have Internet access. Note: On the next reset/reboot, your S400/S401 PRO will revert back to its factory date/time if in Manual Mode.

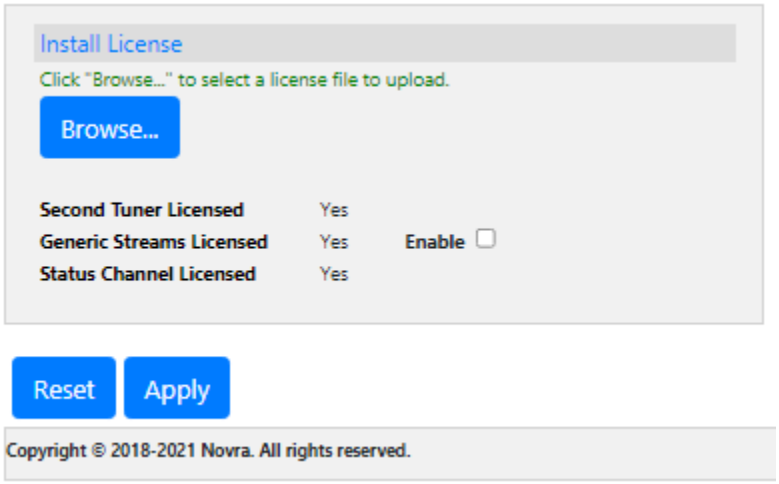
4.3.4 Password

Enter existing password and the new password (twice). Then click Save to change your S400/S401 PRO's password.



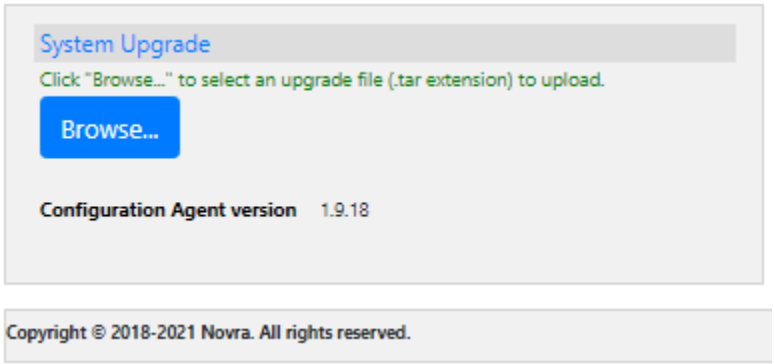
4.3.5 License

Use the “License” button to add licensed features to your S400/S401 Pro.



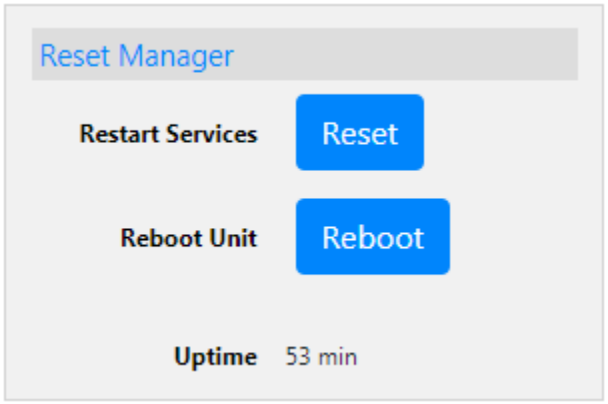
4.3.6 Upgrade

Use the “Browse” button to select the S400/S401 PRO upgrade file provided to you from an authorized support source. The upgrade may take several minutes to complete.



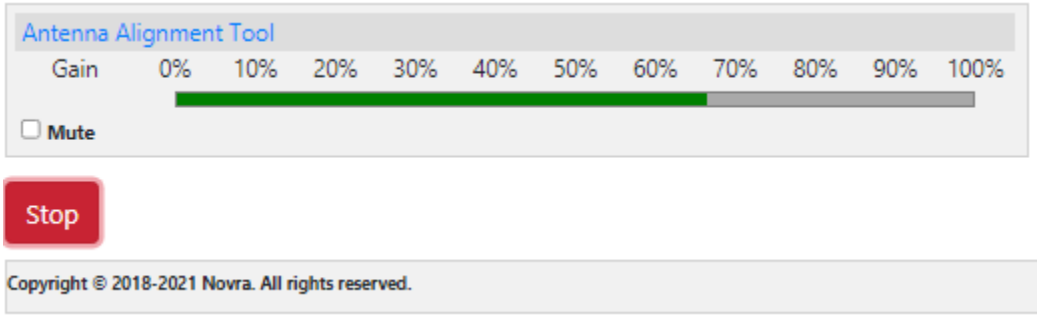
4.3.7 Reset

Click the “Reset” button to reset the software services in your S400/S401 PRO. Click “Reboot” to perform a full restart of the S400/S401 PRO. Contact your S400/S401 PRO support service if you are having issues with your S400/S401 PRO application.



4.3.8 Antenna Align

1. Set RF parameters for signal at RF1 input port.
2. For best sensitivity, enter actual Symbol Rate as opposed to AUTO symbol rate.
3. Go to System->Antenna Align and press START button.
4. Adjust mobile device volume or use mute to stop audio tone – tone plays with pitch proportional to Signal Strength.
5. Adjust antenna to maximize signal. Green bar indicates signal is acceptable strength. Red bar indicates signal weak or overdriven.
6. Audio
7. Stop Antenna Align mode with STOP button or press another Management Console button.



5 Troubleshooting

This section can help you resolve most of the common problems when installing the S400/S401 PRO.

1) **I connected the receiver and when I start my browser with the IP address of the S400/S401 PRO there is no response**

- Make sure the S400/S401 PRO is connected to the same LAN that your computer (running web browser) is connected to. The best way to rule that out is to use a cross over cable.
- Make sure the unit is powered up and the Ethernet link is established. The amber LED on the back of the Ethernet connector should be on solid, and the yellow LED should be blinking.
- Check the LCD display on the receiver and make sure you have the correct IP address.

2) **Why won't the receiver lock to my settings?**

- Is the RF cable connected?
- Are you using the correct RF Settings (frequency and symbol rate)?
- Are you using the correct voltage/tone settings for the LNB?

3) **The receiver is locked to my signal and there is no Data, why?**

- Do you have the right PID selected?
- Are you sure you are on the right transponder?
- If the Ethernet Transmitted packet counter is counting up. Use program such as Wireshark to determine where the traffic is going?
- Is the default gateway on the receiver set correctly?
- Does the DVB MAC address of the traffic match the Mac address of your unit? (UNICAST)

6 Specifications

6.1 Minimum System Requirements

Your computer must operate a modern browser such as Chrome, Explorer, Safari, or Firefox.

6.2 Supplied Equipment

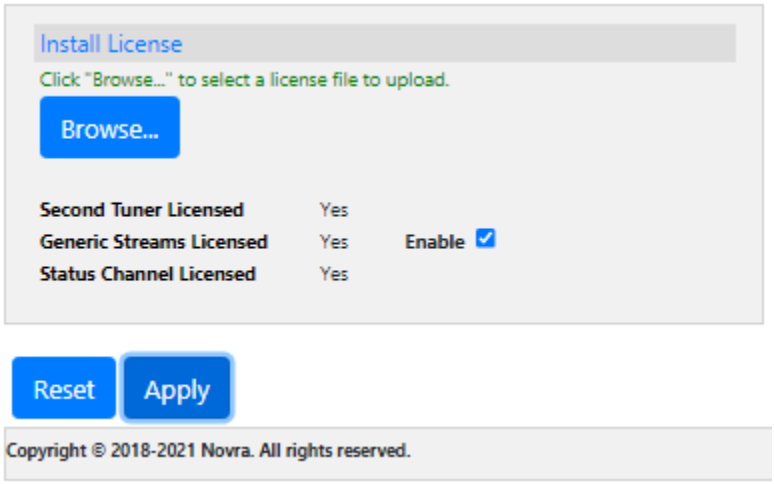
Please confirm you have received all the equipment listed below.

- Novra S400/S401 PRO Receiver
- Power adapter 90-240Vac to 12Vdc

7 Continuous Generic Stream Mode for GOES-GRB and GK-2A

7.1 Generic Streams License

Use of the S400/S401 for reception of Continuous Generic Stream broadcasts like GOES Rebroadcast (GRB) or Koreasat GK-2A requires installation of a license file to enable Generic Streams. When properly licensed, you will see the following : Generic Streams Licensed YES display under the System->License tab on the unit's web interface. If your unit is not properly licensed, see section 4.3.5 for instructions on how to install a license file.



7.2 Enable/Disable Generic Streams - GRB and GK-2A

To turn on Generic Stream mode simply check the Enable box and Apply the setting. To revert your unit from GRB back to normal mode, uncheck the Enable box and Apply the new setting.

Generic Stream Enable mode disables MPEG / MPE mode on both RF1 and RF2.

7.3 GRB Parameters

The following table shows the proper unit settings to receive the GOES-GRB feed.

GRB Settings	
Transponder	1686.6 MHz
Symbol Rate	8.665938 Msps
ModCod	QPSK 9/10
Band	L Band
Forward GRB CADU	checked

GOES-GRB Settings

7.4 GK-2A Parameters

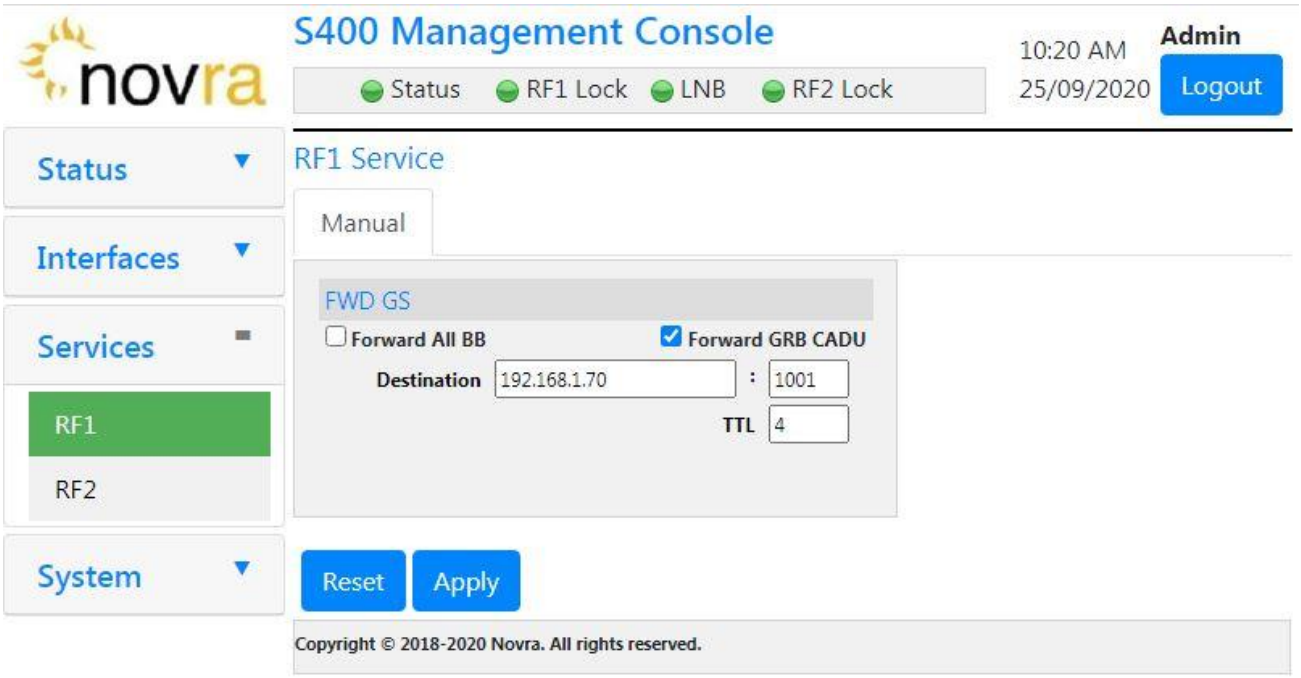
The following table shows the proper unit settings to receive the GK-2A UHRIT feed.

GK-2A UHRIT Settings	
Transponder	8070 MHz
Symbol Rate	15.62244 Msps
ModCod	8PSK 2/3
Band	X Band
Forward GRB CADU	checked

GK-2A UHRIT Settings

7.5 GRB Setup

The destination for GRB packets can be setup for each tuner input under the Services->RF1 or Services->RF2 menu choices. See screen image below for details:



Stream Forwarding Details

Forward All BB: This selection will result in forwarding of all Baseband packets to the destination.

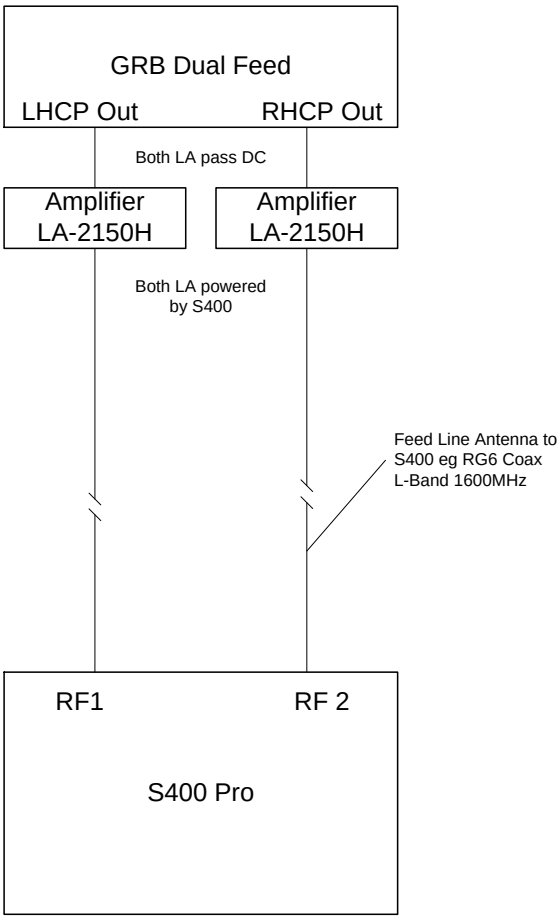
Forward GRB CADU: This selection will result in forwarding of GRB CADU packets.

Destination: A unicast or multicast IP address along with a UDP port number.

TTL: The time to live value for the output UDP packets

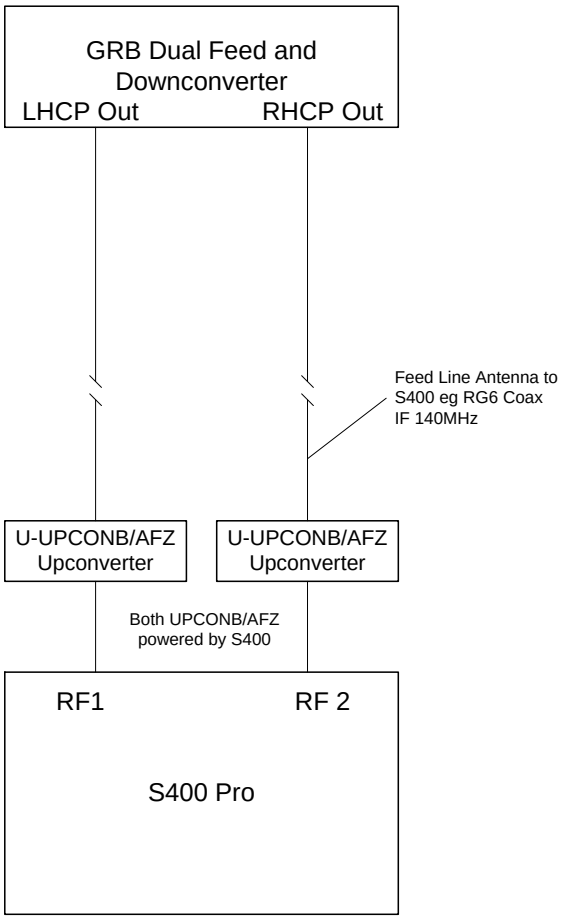
7.6 GRB Feed Types

See below for two possible cabling configurations. Feed Type 1 is supported with purchase of a standard kit. Feed type 2 can be supported with request for a custom quotation.



Feed Type 1 – Direct RF Out
(no frequency conversion)

LNA and cable available as add-on kit with purchase of S400 GRB.



Feed Type 2 – 140 MHz IF Out
(feed includes LO and
Frequency conversion)

Please request a quote if custom equipment is required.

APPENDIX

Terms, Definitions, and Other Tidbits of Information

Crossover Cable A crossover cable is a cable that is used to connect two computers by reversing, or crossing over, the cable pin contacts. This eliminates the need to use a switch when connecting two PCs. It is also referred to as a "Null Modem" cable.

Coax Cable Looks like this: 

The coaxial cable is most commonly used for Cable TV feeds inside a house or apartment. This form of cable allows the high frequencies of TV, and Satellite type signals to move from one place to another with a minimal amount signal loss.

DVB Digital Video Broadcasting (DVB) is a set of standards that define digital broadcasting using satellite, cable, and terrestrial infrastructures.

FEC Forward Error Correction (FEC) is a system of error control for data transmission where the receiving device can detect and correct certain errors.

Feed Horn This is the device that receives and focuses signals from a satellite dish. It collects these signals and submits them to the next piece of equipment in the network, usually a Low Noise Block converter which then changes the signals into a better format for transfer to the receiver.

Geostationary Orbit The position where a satellite is located at 35,786 kilometers (22,241 miles) above the equator. At this distance, the satellite Orbits the earth at the same rate as the earth is turning. This causes the satellite to appear stationary in relation to an observer on the ground.

IP The Internet Protocol (IP) is a network communication protocol used on Ethernet networks and the Internet.

IP Address The 32-bit computer address defined by the Internet Protocol. It is usually represented in dotted decimal notation. Example: 192.168.111.112

L-Band This range of frequencies is from 950 MHz to 2,150 Mhz It is much lower than those used by satellites (About 1/10 to 1/6). Satellite frequencies travel well through space and our atmosphere but do not do well through the cable that comes from the dish on the roof to the receiver. So LNBs convert satellite frequencies to the lower, easier to transport, band of frequencies referred to as L-Band. It is L-Band frequencies that the S400/S401 PRO receiver tunes to.

LNA Older systems used a unit called an LNA (Low Noise Amplifier). This unit amplifies the RF frequency and then transmits the signals down a special (expensive) cable to the receiver. Note that received signals are not converted to lower frequencies by this unit.

LNB LNB stands for Low Noise Block-converter. This unit receives the signals collected from a satellite and converts their very high frequencies (12 Giga Hertz, written 12 GHz, which is actually 12,000,000,000 cycles per second) to a lower and somewhat more usable range. All LNBs have a Local Oscillator (LO). This number is usually stamped on the LNB but not always. It may be necessary to check the original

	specifications that came with the LNB or use the model number and brand name to search the Internet.
LNBF	LNBF stands for a Low Noise Block-converter and Feed horn. This is quite a common arrangement where the Feed Horn that collects reflected signals from the satellite dish and the Low Noise Block-converter are combined into one package.
LO	The Local Oscillator (LO) is a circuit that creates a tone of a very specific frequency. These units have many applications in electronics. The important thing to remember is that there is an LO in the LNB (Low Noise Block-converter) and it is part of the circuit that converts the received satellite RF Frequencies to the more user friendly L-Band Frequencies. Typical values include 9.75, 10.60, 10.75, 11.00 and 11.25 GHz for the Ku band and 5.15 GHz for the C Band of satellite frequencies.
MAC Address	The Media Access Control (MAC) address is the unique hardware address for any piece of electronic equipment attached to an Ethernet network. There is a separate MAC address for each Ethernet interface. These MAC Addresses can be found on the web interface display.
Mbps	Mega bits per second. (Million bits per second)
MBps	Mega Bytes per second. One "Byte" in computer terms is the same as 8 bits. It is often referred to as a word. 1 Mbps = 8 Mbps = 1 million Bytes (Words) per second = 8 million bits per second.
Msps	Mega symbols per second. Suppose you have four symbols, call them A, B, C & D. Let the Symbol A represent two bits of data with the value 00. Let B represent two bits of data with the value 01 Let C represent two bits of data with the value 10 Let D represent two bits of data with the value 11 This means that if the signals we are interested in consist of 1.0 Msps (That's 1 Million symbols per second), and each symbol represents two bits of data, then our signal has a data rate of 2.0 million bits per second (2.0 Mbps). The important point to remember is that satellite systems send and receive symbols which are then converted into data. The S400/S401 PRO takes the resulting data and forwards it to your computer in bursts called "packets."
Packet	A packet is the unit of data that is routed between an origin and a destination. When any file is sent from one place to another (the Internet as an example) it is divided into "chunks" of an efficient size for routing. Each of these packets is separately numbered and includes the Internet address of the destination.
PID	The Packet Identification Code (PID) is used by the receiver to sift through the different packets of the transport stream. The transport stream contains data representing many different signals. The S400/S401 PRO software running on your PC uses the PID number to find only those packets of data that contain the information you have requested.
Polarization, Circular (Right / Left)	In layman's terms, a circularly polarized signal corkscrews towards the earth. Unlike linear polarization (described below), where the signal is fixed in an up and down fashion or a side to side fashion, Circular Polarization causes the signal to rotate. If it were possible to actually see the incoming signal, it would rotate like the

hands on a clock. As with Linear Polarization, this has two modes of operation. It can either rotate in a clock wise fashion or counter clockwise. Polarization is very useful because it allows the frequency of a Right polarized signal to overlap with the same frequencies of a Left polarized signal.

Polarization, Linear (Horizontal/Vertical) — In layman's terms, a linearly polarized signal from a satellite approaches the earth as a wave that goes up and down like the waves on the ocean, or from side to side. These two types of waves are classified as being vertically or horizontally polarized. Polarization is very useful because it allows the frequency of a vertically polarized signal to overlap with the same frequencies of a horizontally polarized signal.

RAM — Random access memory. Used for short term storage of information requiring quick access on a computer. Information stored in RAM can be accessed by the computer much faster than information on the Hard Drive can be accessed.

RF Frequency — Each satellite in orbit has several channels that it can use, each with its own RF Frequency. (Each channel is often referred to as a transponder.) The easiest way to understand them is to think of your FM radio. There are many channels on the FM dial that one can choose from. ("*99.9 FM, All Rock, All the Time*") When you input the station number to your FM receiver you are actually telling it what RF Frequency it should look at. (99.9 FM means that 99.9 Mega Hz is the desired frequency.) But unlike the FM radio where the channel you tune to only contains one stream of music, a satellite channel contains many individual signals. One channel can contain Internet data **and** video **and** audio **and** specialized data in any number of permutations and combinations. The S400/S401 PRO uses the PID numbers that come with each Internet data, video, audio and specialized data signal to separate them all. (See PID.)

Satellite Signal Hierarchy

1 Satellite has -
|
10 - 24 Transponders (Channels) each with
|
dozens of distinct RF Frequencies each containing
|
up to a theoretical maximum of 8190 packet streams identified by their individual PIDs.

Subnet — A portion of a network, which may be a physically independent network segment, and which shares a network address with other portions of the network.

Symbol Rate — See Msps

Transponder — This is the unit on the satellite that receives a signal transmitted from the earth station, amplifies it, changes its frequency and retransmits it back down to earth. Each radio channel has its own transponder and a number of transponders on the satellite are used to cover the allocated frequency band. A typical satellite will have 24 transponders.

Viterbi — "Convolutional encoding with Viterbi decoding is a Forward Error Correction technique that is particularly suited to a channel in which the transmitted signal is corrupted mainly by additive white Gaussian noise." Further information can be found by searching the Internet or looking at any of these sites.
http://pw1.netcom.com/~chip.f/Viterbi.html
http://hissa.nist.gov/dads/HTML/viterbiAlgorithm.html