Resource Identifier 100167
Revision: 11.0

PRORXD Broadcast Receiver User Guide

Broadcast Solutions, HD/SD Products

Commercial in Confidence

DTC - Solent
Fusion 2
1100 Parkway
Solent Business Park
Whiteley
Hampshire
PO15 7AB
United Kingdom

+44 (0)1489 566 750

0. Preface

0.1 About this Publication

This publication contains details required for the Operation and Administration of the equipment or system.

Since the available functions are licensed and rely on the actual installation, not all the functions and or applications contained in this document can be related or applicable to the system you will be working with.

Actual screen presentation can be different from those in this document because of software changes or your browser configuration.

0.2 Who Should Read this Book

This document is meant for anyone interested in how the system can best be used but it is of most benefit to:

- **Operators** who are in charge of the daily operation of the equipment
- **Installers** who are responsible for the pre-installation, on-site installation and configuration of the system in the end-user environment
- **Maintainers** who are responsible for maintaining the equipment or system

0.3 Assumed Knowledge

Throughout this book it is assumed that the reader has a thorough knowledge of:

- Basic Personal Computer Operations
- Basic Radio Frequency (RF) Principles

0.4 Notice about Specifications

While DTC makes every attempt to maintain the accuracy of the information contained in its product manuals, the information is subject to change without notice. Performance specifications included in this manual are design-centre specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.

0.5 Notice about this Guide

The product described in this manual is subject to continuous development and improvement. All particulars of the product and its use (including the information and particulars in this guide) are given by DTC in good faith. However, it is acknowledged there may be errors or omissions in this guide.

0.6 Typographic Conventions

This publication uses these typographic conventions to identify text that has a special meaning:

Typographic Convention	Example
TEXT in small capitals represents a key push on the console keyboard or hardware panel.	ESC, F1, SHIFT
The + sign means “hold down the first key while pushing the second key”.	Push CTRL+C to abort
<Text> Serves as a placeholder for text that you will replace as applicable to its context.	Use the filename <system_name>.sys for…
Text in **bold** emphasises a new word or term of significance.	We name this a **protocol** and its function is…
[-a] Text in these brackets shows an optional component that can be left out.	Ls [-a]
NN This shows a value entered on a numeric keypad.	45 on the numeric keypad
Successive menu selections are shown with arrows to show a sub-menu. In this example this means: Select the **Insert** menu, then select **picture**, then select **from file**.	**Insert>picture>from file**

0.7 Symbols

This publication uses these symbols to highlight important information:

WARNING: A written notice given to a reader when a situation might cause personal injury or loss of life.

CAUTION: A written notice given when a situation might cause damage to or destruction of equipment or systems.

Note: A written notice given to tell you something or to supply more information.

0.8 Trademarks

All trademarks or registered trademarks that appear in this document are the property of their respective owners.

0.9 Related Documents

It can also be necessary to read:

Publication	Source
Solo Concept Guide	DTC
IP Concept Guide	DTC
JSON Integration Document	DTC

0.10 Document History

This publication was written and produced by the DTC Technical Publications Team.

This is a change controlled publication. Each page of this publication shows a revision number at the bottom left corner.

Changes to a page will increase the revision status of the full publication.

Revision	Date	Authors	Summary of Changes
1.0	27/06/2014	RC	Initial release
2.0	28/11/2014	RC	
3.0	20/01/2016	IR	Enhanced upgrade details
4.0	28/04/2016	IR	DTC rebranding
5.0	10/08/2016	IR	Remote commands update
6.0	14/10/2016	IR	Corrections to remote commands reply packet structure
7.0	07/11/2016	IR	Added low delay and general software updates
8.0	18/01/2017	IR	Added Set Password
9.0	25/01/2017	IR	Single receiver sensitivity
10.0	03/05/2017	IR	Added pinout data
11.0	21/08/2017	IR	Software updates

Contents

1. Product Overview

1.1 Product Family

The equipment in this user guide is:

Product Code	Product Description
PRORXD-x-1RU	Professional dual channel receiver and decoder, 1U rack mount version (*x* denotes the receive diversity, available as 2 or 4-way)
PRORXD-x-2RU	Professional dual channel receiver and decoder, 2U rack mount version (*x* denotes the receive diversity, available as 2, 4 ,6 or 8-way)

1.2 PRORXD-1RU

Figure 1-1 PRORXD-1RU Version

The PRORXD-1RU is a feature-rich COFDM receiver/decoder with DUAL optional receive and HD decoding capability in a single enclosure. Designed specifically for the demanding broadcast market, it is supplied in a 1/2 19" 1RU high rack chassis, where two units can be mounted together to occupy a 19" slot and uses standard broadcast connectors for signal interfaces.

The PRORXD-1RU is available with 2-way or 4-way maximum ratio combining RF inputs, ensuring video is recovered free from the distortions typically associated with fading and multipath. All DVB-T 6/7/8MHz modes are supported, plus DTC's 6/7/8MHz UMVL (Ultra Mobile Video Link) modulation – designed to enhance performance when utilising higher frequency bands or in high-speed TX applications such as Motorsport. DTC Narrowband, enabling broadcast quality (4.8Mbps) signals to be transmitted in only

2.5MHz bandwidth is available as an option. Designed to work with external DTC down-converters, the receiver can be located up to 100m from the antennas using standard 75Ω co-axial cables.

The unit incorporates an extremely flexible decoding platform, with low delay H.264 decoding ensuring compatibility with all DTC and most 3rd party encoders. An optional 2nd decoder can be enabled, allowing 2x SD or HD signals to be decoded. Multiple video output formats are offered with composite and SDI outputs in SD mode and HD-SDI and in HD mode. SDI/HD-SDI both feature embedded audio and HDMI outputs are provided for use with domestic TV's. ASI in/out is offered as an option.

A full Genlock facility is available in both SD and HD modes. When in HD mode, an optional downconverted SD composite video monitoring output is also offered.

The unit can also be used as an IP decoder. When paired with a DTC Broadcast IP Encoder, the unit can send an IFB signal to the remote location via the reverse leg of the IP link. An optional adaptive bit-rate encoding/decoding mode is also available, allowing fully automated operation on variable capacity or contended networks such as VSAT or BGAN terminals.

The PRORXD-1RU can be controlled through its OLED front panel display, as well as on its RS232 or IP Ethernet browser control interfaces.

A comprehensive On Screen Graphical display is available for monitoring and diagnostics, which can be enabled or disabled separately on the two video outputs.

1.3 PRORXD-1RU Features

- DVB-T & UMVL (optional) demodulation
- 2 or 4 RF inputs with 8/12DC switchable down converter powering
- Fully compliant MPEG2 and H.264 SD/HD decoding
- HD-SDI/SDI with embedded audio out
- Composite video outputs (with optional HD down-conversion)
- HDMI outputs
- IFB input (IP mode)
- 2nd decoder (optional)
- Auto bit-rate capability (with DTC Broadcast IP Encoder)
- ASI input and output (optional)
- Front panel control (+ web-browser and RS232)
- Genlock input
- Full on-screen display (OSD) diagnostics
- Low delay video operation for real-time applications (DTC H.264 systems only)
- 1RU half-rack mounting
- 12VDC powering (AC adaptor supplied)

1.4 PRORXD-2RU

Figure 1-2 PRORXD-2RU Version

The PRORXD-2RU is a feature-rich COFDM receiver/decoder with DUAL receive and HD decoding capability in a single enclosure. Designed specifically for the demanding broadcast market, it is supplied in a 1/2 19" 2RU high rack chassis, where two units can be mounted together to occupy a 19" slot and uses standard broadcast connectors for signal interfaces.

It is available with 6-way or 8-way maximum ratio combining RF inputs, ensuring video is recovered free from the distortions typically associated with fading and multipath. All DVB-T 6/7/8MHz modes are supported, plus DTC's 6/7/8MHz UMVL (Ultra Mobile Video Link) modulation – designed to enhance performance when utilising higher frequency bands or in high-speed TX applications such as Motorsport. DTC Narrowband, enabling broadcast quality (4.8Mbps) signals to be transmitted in only 2.5MHz bandwidth is available as an option. Designed to work with external DTC down- converters, the receiver can be located up to 100m from the antennas using standard 75Ω co-axial cables.

The unit incorporates an extremely flexible decoding platform, with low delay H.264 decoding ensuring compatibility with all DTC and most 3rd party encoders. An optional 2nd decoder can be enabled, allowing 2x SD or HD signals to be decoded. Multiple video output formats are offered with composite and SDI outputs in SD mode and HD-SDI and in HD mode. SDI/HD-SDI both feature embedded audio and HDMI outputs are provided for use with domestic TV's. ASI in/out is offered as an option.

A full Genlock facility is available in both SD and HD modes. When in HD mode, an optional downconverted SD composite video monitoring output is also offered.

The unit can also be used as an IP decoder. When paired with a DTC IP Encoder, the unit can send an IFB signal to the remote location via the reverse leg of the IP link. An optional adaptive bit-rate encoding/decoding mode is also available, allowing fully automated operation on variable capacity or contended networks such as VSAT or BGAN terminals.

The PRORXD-2RU can be controlled through its comprehensive, full-colour front panel touch- screen display, as well as on its RS232 or IP Ethernet browser control interfaces.

A comprehensive On Screen Graphical display is available for monitoring and diagnostics, which can be enabled or disabled separately on the two video outputs.

1.5 PRORXD-2RU Features

- DVB-T & UMVL demodulation
- 2, 4, 6 or 8 RF inputs with 8/12DC switchable downconverter powering
- Fully compliant MPEG2 and H.264 SD/HD decoding
- HD-SDI/SDI with embedded audio out
- Composite video outputs (with optional HD down- conversion)
- HDMI outputs
- IFB input (IP mode)
- 2nd decoder optional
- Auto bit-rate capability (with DTC Broadcast IP Encoder)
- ASI input and output
- Front panel control (+ web-browser and RS232)
- Genlock input
- Full on-screen display (OSD) diagnostics
- Low delay video operation for real-time applications (DTC H.264 systems only)
- 2RU half-rack mounting
- 12VDC powering (AC adaptor supplied)

2. Product Identity

2.1 Dimensions and Specifications

There are two types of device described in this User Guide, the PRORXD-1RU Professional Dual Channel Receiver and Decoder and the PRORXD-2RU Professional Dual Channel Receiver and Decoder.

Product Code: PRORXD-x-1RU (where *x* is 2 or 4-way diversity)

Dimensions (mm): 320 (L) x 220 (W) x 44 (H)

Weight: 2.1kg

Operating Temperature: -20°C to +60°C

DC Input: 6 to 26VDC reverse polarity protected

Power Consumption: 27-49W (downconverter dependent)

Product Code: PRORXD-x-2RU (where *x* is 2, 4, 6 or 8-way diversity)

Dimensions (mm): 320 (L) x 220 (W) x 88 (H)

Weight: 2.7kg

Operating Temperature: -20°C to +60°C

DC Input: 6 to 26VDC reverse polarity protected

Power Consumption: 27-49W (downconverter dependent)

Figure 2-1 PRORXD Receiver Showing Rear Panel

2.2 Package Contents

Carefully open the packaging and remove the device. Verify that all the components have been included in the package as shown in the packing list. Inspect the unit for shipping damage.

Keep the packing list and all the packing materials for storage.

The codes mean:

- CA – Cable Assembly
- SA – Sub Assembly
- AP – Assembly Part.

The codes may be useful if you need to order a new part sometime.

PRORXD-1RU

Item	Notes
SA3838	PRORXD-1RU top level assembly
AP006534	Dust cover, HDMI
CA0512	XLR audio cable 2m (Lemo 5-way plug to 2 x 3-way XLR plug)
CA0579	XLR audio cable 3m (Lemo 5-way plug to 2 x 3-way XLR socket)
CA0649	12V 6.67A 80W desktop power supply unit (XLR 4-way socket)

Table 2-1 Parts in the PRORXD-1RU Package

PRORXD-2RU

Item	Notes
SA3724	PRORXD-2RU top level assembly
CA0512	XLR audio cable 2m (Lemo 5-way plug to 2 x 3-way XLR plug)
CA0649	12V 6.67A 80W desktop power supply unit (XLR 4-way socket)

Table 2-2 Parts in the PRORXD-2RU Package

Troubleshooting

☹ I don't have all the parts you described!

☺ Call DTC right away and we will get this solved for you. See *Section 8.7*.

2.3 PRORXD Variants

The variant will be indicated on the label or the PRORXD.

Part Number	Equipment Title
PRORXD-2-1RU	2-way diversity 1U Professional Dual Channel Receiver and Decoder
PRORXD-4-1RU	4-way diversity 1U Professional Dual Channel Receiver and Decoder
PRORXD-2-2RU	2-way diversity 2U Professional Dual Channel Receiver and Decoder
PRORXD-4-2RU	4-way diversity 2U Professional Dual Channel Receiver and Decoder
PRORXD-6-2RU	6-way diversity 2U Professional Dual Channel Receiver and Decoder
PRORXD-8-2RU	8-way diversity 2U Professional Dual Channel Receiver and Decoder

Table 2-3 PRORXD Variants

2.4 Labelling

This topic contains information covering labels and markings on your device. The legend and location of each label or marking will be identified and explained for safety or maintenance significant information.

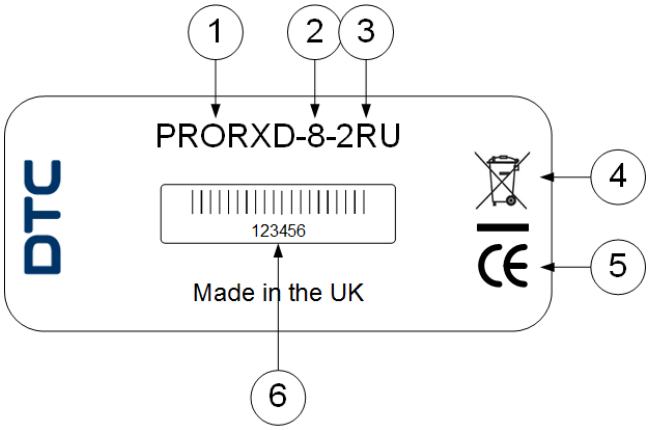

Figure 2-2 PRORXD Label

No	Item
1	Professional receiver family.
2	Number of ways of diversity (eight in this example).
3	One or two rack unit version (this example is 2RU).
4	Disposal mark.
5	The **CE marking** (also known as **CE mark**) is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA). The **CE marking** certifies that a product has met EU consumer safety, health or environmental requirements.

No	Item
6	Barcode with six digit serial number. This number will be necessary during a support call.

Table 2-4 PRORXD Label Key

2.5 Accessory Options

If you have purchased these items, they will be in the package too.

PRORXD-1RU

Part Number	Equipment Title
PRORXDSRFP-1RU	Single rack, front panel extender 1RU
PRORXCPLKT-1RU	PRORXD-1RU coupling kit
DCB/DCBGS	Downconverter barrel/downconverter barrel gain selectable. Various frequencies available.
CABRF	RF cable. Various lengths available.

Table 2-5 PRORXD-1RU Accessory Options

PRORXD-2RU

Part Number	Equipment Title
PRORXDSRFP-2RU	Single rack, front panel extender 2RU
PRORXCPLKT-2RU	PRORXD-2RU coupling kit
DCB/DCBGS	Downconverter barrel/downconverter barrel gain selectable. Various frequencies available.
CABRF	RF cable. Various lengths available.

Table 2-6 PRORXD-2RU Accessory Options

2.6 Licensing Options

PRORXD is a licensed product. Licenses are used to tailor the functionality of the PRORXD to the operational requirement.

Part Number	Equipment Title
SILVER - PRORXD	Includes DVB-T, MPEG-2 and H.264 SD
GOLD - PRORXD	Silver plus H.264 HD, MPEG-4 ASP, Narrowband 2.5MHz and 1.25MHz, and IP Streaming
PLATINUM - PRORXD	Gold plus Ultra Extreme Narrowband 625kHz and Ultra Mobile Video Link (UMVL)
AES128RX	AES Receiver 128 Bit decryption
AES256RX	AES Receiver 256 Bit decryption
PRORXD-DEC2	Upgrade with 2nd Decoder output
PRORXD-UP	2 way diversity upgrade for PRORX-D

Table 2-7 PRORXD Licensing Options

3. Connections, Controls and Indicators

3.1 About Controls, Connections and Indicators

You'll need to be able to find all the connections and controls on the unit. The following topics will help you identify these features, where relevant.

Each PRORXD has front and rear panels which contain all the interfaces for the unit.

3.2 Planning the Hardware Installation

There are some general considerations for the installation of any electronics device or system. Not all of these may apply to your installation but are worth noting:

- Space – leave enough room to allow for cable bending and servicing
- Proximity to other devices (for example, source equipment)
- Length of cable runs – try to keep cables short
- Environmental conditions (temperature, humidity, etc.)
- Access for service repair
- Compliance with local regulations

3.3 PRORXD-1RU

Front Panel

Figure 3-1 PRORXD-1RU Front Panel

No	Item	Used for...
1	Rack mounting ears.	Metalwork that can be removed to let the PRORXD to be fitted in a half of a 19" rack. Two PRORXDs can be joined together to fill a full 19" rack with the 1RU Joining kit.
2	Display screen.	This OLED display with the navigation keys lets you quickly set up many of the features of the PRORXD. You can see spectrum, RX SNR and RX Power for example.
3	Joystick confirm/navigate button	Move the joystick for UP, DOWN, LEFT and RIGHT. Turn the joystick for selection. Short push the joystick for ENTER. Long push the joystick for BACK.
4	USB 4-way receptacle.	Used for Preset loading.
5	Power button.	Toggles the power on or off.
6	BNC receptacle.	Composite video output for monitoring.

Table 3-1 PRORXD-1RU Front Panel Key

Rear Panel

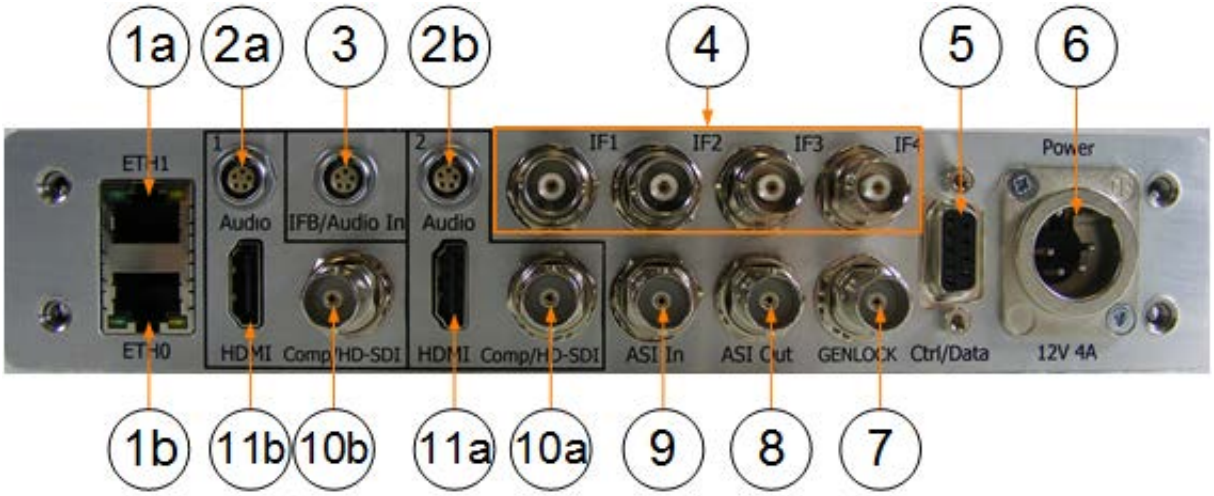

Figure 3-2 PRORXD-1RU Rear Panel

No	Item	Used for...
1a 1b	RJ45 8-way receptacle, (sockets) marked **ETH0** and **ETH1**.	Ethernet input/output to your PC or network.
2a 2b	Lemo 5-way receptacle (sockets) twin key marked **1 Audio**. Channel two is marked **2 Audio**.	Connect the supplied CA0512 or CA0579 for balanced audio left/right output to XLR connectors.
3	Lemo OB 5-way receptacle (sockets) marked **IFB/Audio In**.	You can also use CA0512 and CA0579 for IFB audio.
4	BNC 2-way receptacle (sockets) x 4 marked **IF1** to **IF4**.	Connect your IF cables from the downconverter/antenna assembly here.
5	D-Type 9-way receptacle, (sockets) marked **Ctrl/Data**.	RS232 Data/Control port. Also enables you to control the PRORXD serially if required.
6	XLR 4-way receptacle, (pins) marked **Power 12V 4A**.	Connect the supplied CA0649 PSU here for power to the PRORXD.
7	BNC 2-way receptacle (sockets) marked **GENLOCK**.	Connect a Genlock device to this port to keep the receiver synchronised with all the other equipment in your facility.
8	BNC 2-way receptacle (sockets) marked **ASI Out**.	Connect the ASI output from this receiver to other equipment.

No	Item	Used for...
9	BNC 2-way receptacle (sockets) marked **ASI In**.	Connect an ASI input to this receiver.
10a 10b	BNC 2-way Receptacles, (sockets) marked **Comp/HD-SDI**.	CBVS/SDI/HD-SDI//ASI video output.
11a 11b	HDMI Type-A 19-way Receptacle, sockets marked **HDMI**.	HDMI output.

Table 3-2 PRORXD-1RU Rear Panel Key

3.4 PRORXD-2RU

Front Panel

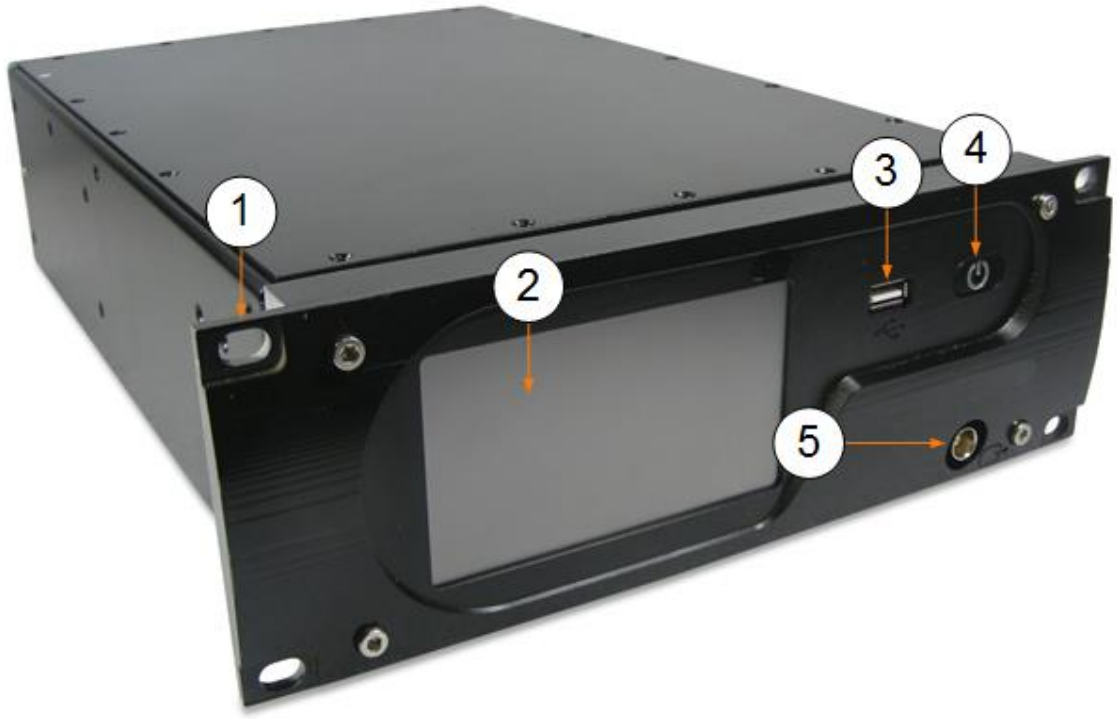

Figure 3-3 PRORXD-2RU Front Panel

No	Item	Used for...
1	Rack Mounting Ears.	Metalwork that can be removed to let the PRORXD to be fitted in a half of a 19" rack. Two PRORXDs can be joined together to fill a full 19" rack with the 2RU Joining kit.

No	Item	Used for...
2	Display Screen.	This OLED display with the navigation keys let you quickly set up many of the features of the PRORXD. You can see spectrum, RX SNR and RX Power for example.
3	USB 4-way receptacle.	Used for Preset loading.
4	Power Button.	Toggles the power on or off.
5	BNC Receptacle.	Video output for monitoring.

Table 3-3 PRORXD-2RU Front Panel Key

Rear Panel

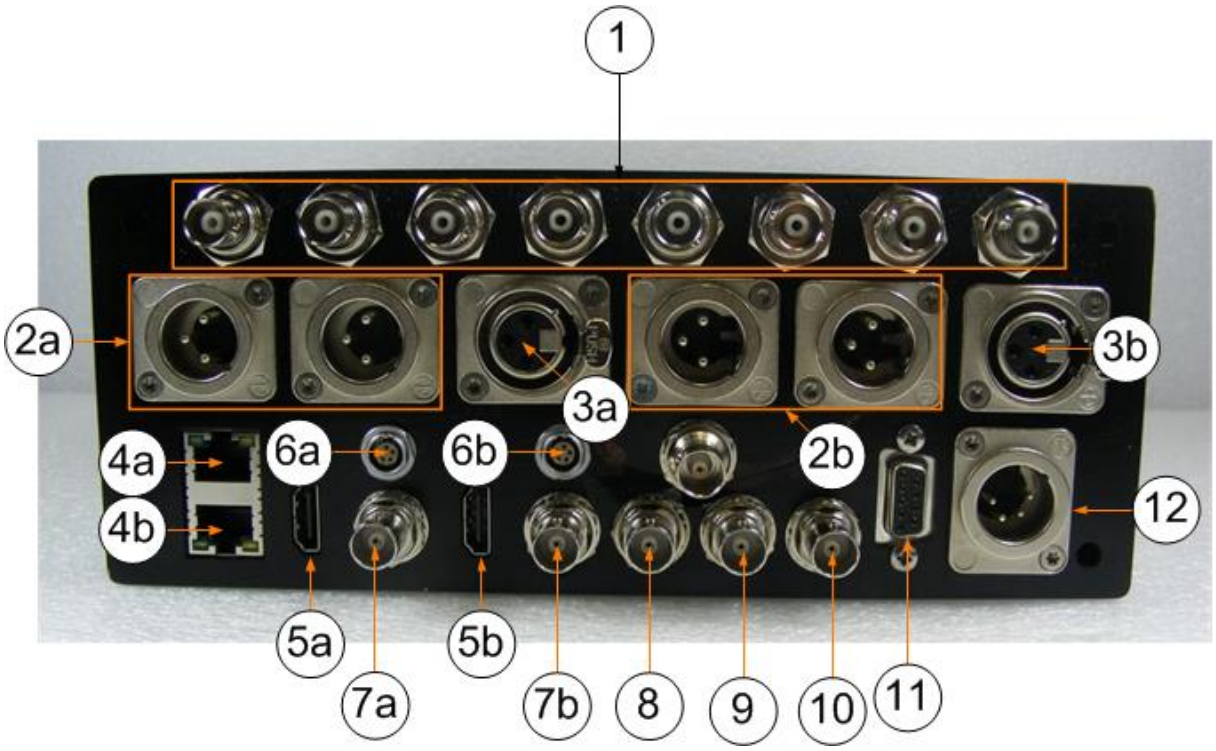

Figure 3-4 PRORXD-2RU Rear Panel

No	Item	Function
1	BNC 2-way receptacle (sockets), 50-850MHz marked IF1 to IF8.	The IF cables from the downconverters connect here. IF=Intermediate frequency.
2ab	XLR 3-way receptacle (pins) marked AUDIO 1L and AUDIO 1R. Channel two is marked AUDIO 2L and AUDIO 2R.	Stereo Line Level Audio Outputs, left and Right, channel one. Each channel has this facility.

No	Item	Function
3ab	XLR 3-way receptacle (sockets) marked IFB/Audio In 1. Channel 2 is marked IFB/Audio In 2.	IFB – Interruptible Fold back. The IFB is a special intercom circuit that consists of a mix-minus program feed sent to an earpiece worn by presenter via IP (audio that is being "fed back" to presenter) that can be interrupted and replaced by a television producer's or director's intercom microphone. That microphone is connected here. Each channel has this facility.
4ab	RJ45 8-way receptacle (sockets) marked ETH0 and ETH1.	Ethernet 1 and 2. 10/100/1G Ethernet Ports with PoE (Power over Ethernet) support. Used for Remote Control through a web browser and for streaming.
5ab	HDMI receptacle (sockets) marked HDMI.	HDMI Video output. Each channel has this facility.
6ab	Lemo OB 5-way receptacle (sockets) twin key marked AUDIO 3. Channel two is marked AUDIO 4.	For Audio output. Each channel has this facility.
7ab	BNC 2-way receptacle (sockets) marked COMP/HD-SDI.	CBVS/SDI/HD-SDI//ASI video output.
8	BNC 2-way receptacle (sockets) marked ASI IN.	ASI Input
9	BNC 2-way receptacle (sockets) marked ASI OUT.	ASI Output
10	BNC 2-way receptacle (sockets) marked GENLOCK.	Genlock Input.
11	D-Type 15-way receptacle (sockets) marked CTRL/DATA.	RS232 Control from PC GUI Application. RS232 Data Output, 1K2 to 115K2 baud switchable.
12	XLR 4-way receptacle (pins) marked POWER, 12V 4A.	6 to 26V Reverse Polarity Protected Power from AC Adapter.

Table 3-4 PRORXD-2RU Rear Panel Key

4. Basic Operation

4.1 About the Software with your PRORXD

The PRORXD has **two** software elements:

- **Firmware** that operates on the primary board of the device.
- **Control Pages** that you operate on your web browser on your Windows PC.

About the Firmware

Although much of the unit is built up of hardware components, many of the sophisticated features are done in the firmware operating on a Field Programmable Gate Array (FPGA) in the device.

When you must do an internal software upgrade we can give you an installer which contains all the code to do this easily.

About the Control Pages

The software tools give users a convenient access to the most usual features and functions of the device. All software tools are implemented as a web interface. The advantage of a web interface is that it is independent from the user's operating system and it is not necessary to have special software on the host PC.

The Control Panel on the front of the unit gives access to many of the features of the radio but for more sophisticated operations and configuration tasks you'll connect up a PC operating a web browser to access the Control Pages on your PRORXD.

The Control Pages enables you to set up sixteen presets in the radio and have control of many parameters of the unit.

Here's what one of the PRORXD Control Pages look like:

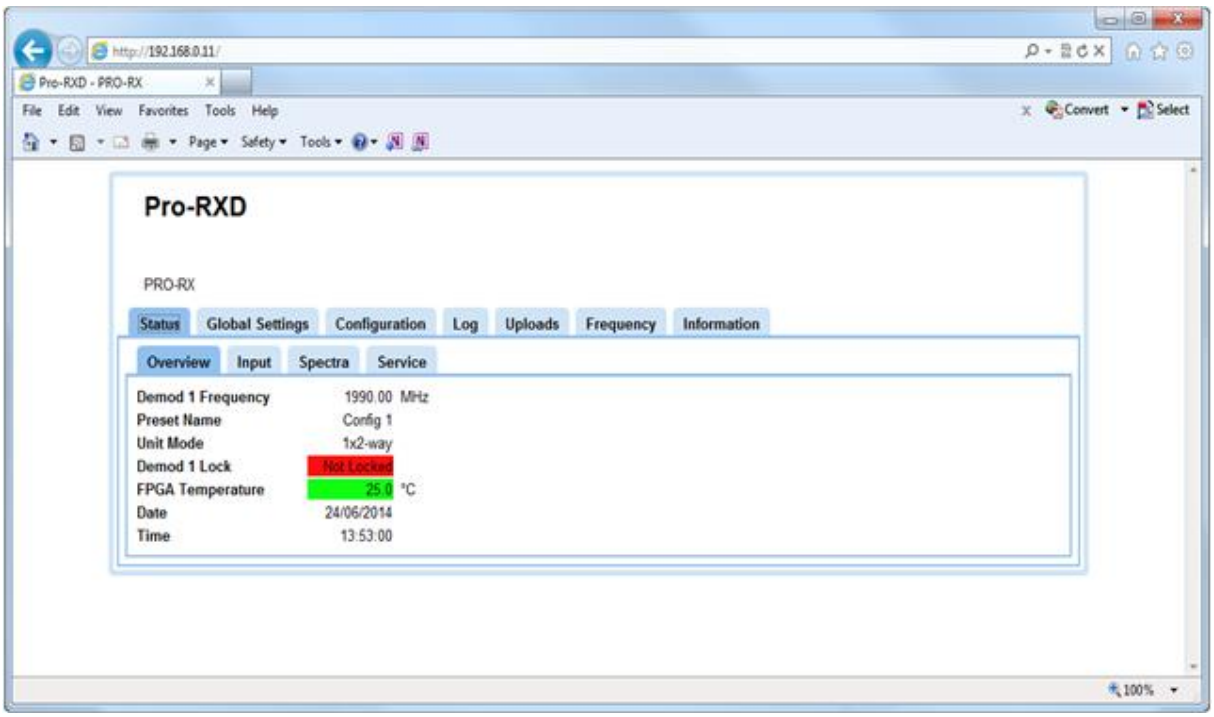

Figure 4-1 PRORXD Control Page

4.2 Exploring the Control Panel – 1RU

When you have powered up the PRORXD you'll see the control panel located on the front panel.

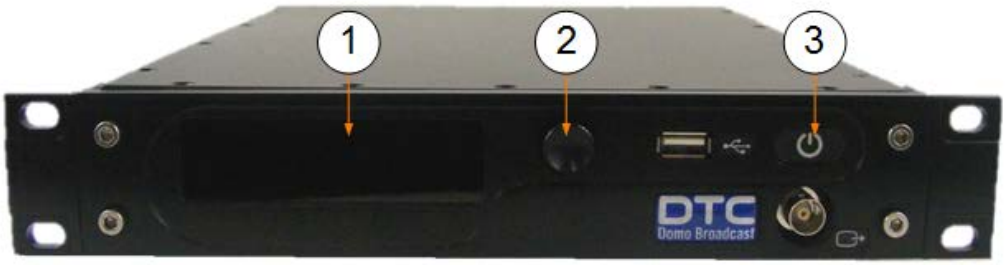

Figure 4-2 1RU Control Panel

No	Item	Used for...
1	Display screen.	This OLED display with the joystick/control button let you set up many of the features of the PRORXD. You can see spectrum, SNR and receive power for example.
2	Joystick/confirm button	Move the joystick to navigate the display. Push up/down/left/right and rotate for selection. Short push the joystick to enter. Long push the joystick to go back.
3	On/Off switch	Toggle switch to power up or power down the PRORXD.

Table 4-1 Control Panel Key

4.3 Exploring the LCD Display – 2RU

When you have powered up the PRORXD you'll see the LCD Display located on the front panel.

Figure 4-3 2RU Control Panel

The PRORXD-2RU front panel display is a touchscreen LCD. You can navigate to many of the services and configurations that are detailed in the *Advanced Setup* without the need for PC connection.

5. Advanced Operation

5.1 About Encryption

The target is focused on intercepting your radio signal. To do this, all that is necessary is a radio receiver that operates in the same mode and on the same frequency you are using to transmit. The fact that you are operating gives them valuable information. It tells them that you are in the area and by the number of stations operating on the same frequency they can estimate the dimensions of the operation against them. If your radio net is operating in the clear, the target specialists can see or hear fully what is being transmitted for more information. When analysing the traffic patterns, the target can understand which location is the net control post and identify the headquarters.

5.2 Setting up Encryption

If AES scrambling has been purchased for the SOLO system, then it is possible to encrypt the link. AES128 and AES256 are licence-controlled features. It will be necessary to encrypt the traffic leaving the transmitter and set up the receiver for decrypt.

Note: The word **Encryption** applies to the full procedure of encryption and decryption. We will use the word encryption for this receiver manual though what is actually going on here is a decryption procedure.

Before you Start

This is necessary:

- A fully powered PRORXD
- The correct license loaded on the PRORXD for encryption
- A PC connected to the PRORXD configured to browse the control pages

Step 1: Select the Encryption Mode

1. Click on the **Configuration** tab.
2. In the **Descrambling Mode** drop-down box click the drop-down arrow and select an encryption type. (AES128 in my example).
3. Click the **Apply** button.
4. The **Configured Successfully** message box opens.
5. Click the **OK** button.

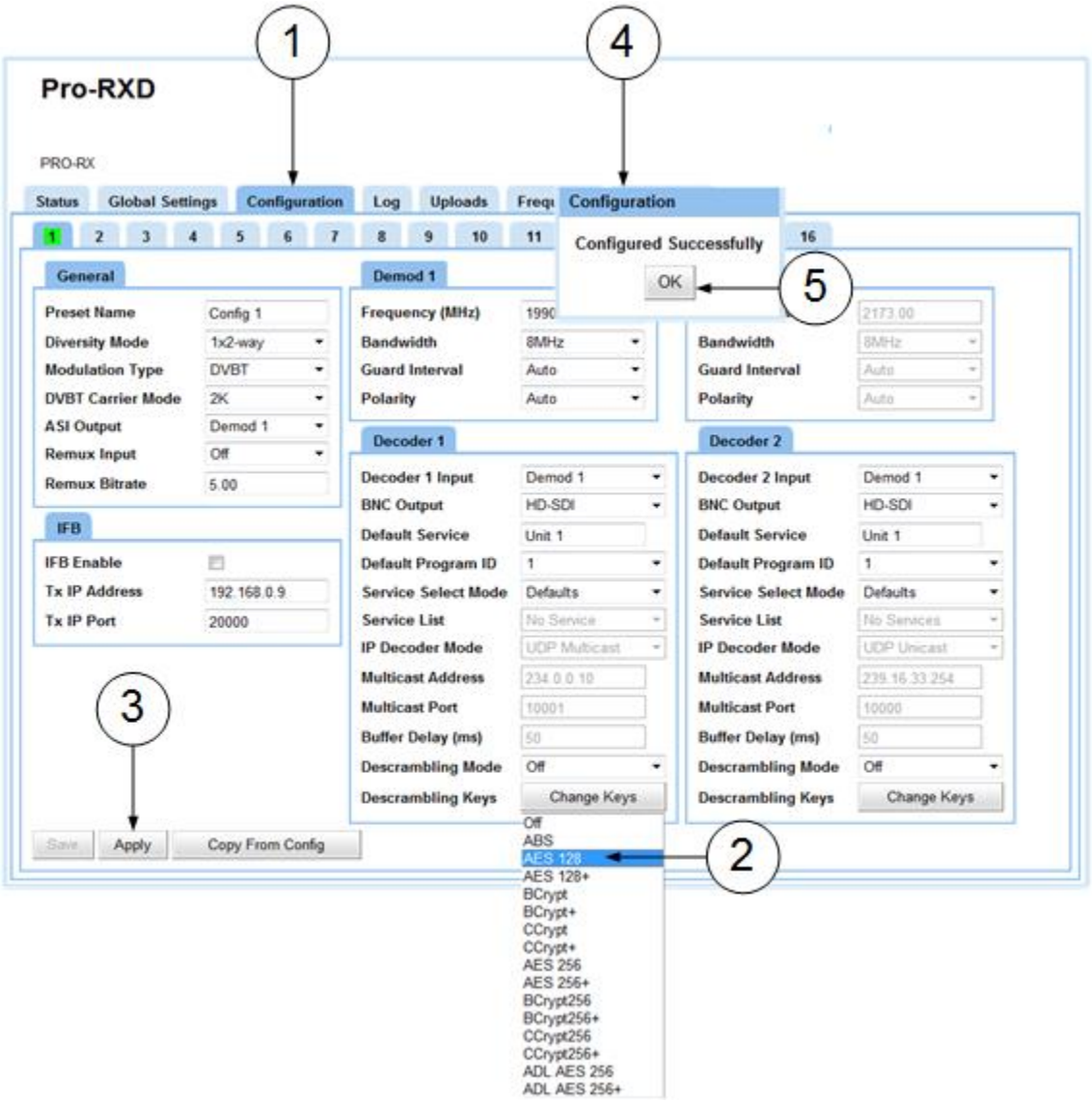

Figure 5-1 Select the Encryption Mode

Step 2: Change the Descrambling Keys

The **encryption key** is a 128bit value for AES128 and a 256bit value for AES256, and is entered as 32 or 64 ASCII hexadecimal characters (0..9, A..F).

1. Click on the **Configuration** tab.
1. Click the **Change Keys** button.
2. The **Enter Scrambling Key** dialog box opens.
3. In the **Key Type** drop-down box click the drop-down arrow and select the key type you are trying to write (must align with the key type you chose in *Select the Encryption Mode* above).
4. In the **AES128 key** text box, type the encryption key you wish to use.
5. Click the **OK** button.
6. The **Scrambling Key Set** box opens.
7. Click the **OK** button.

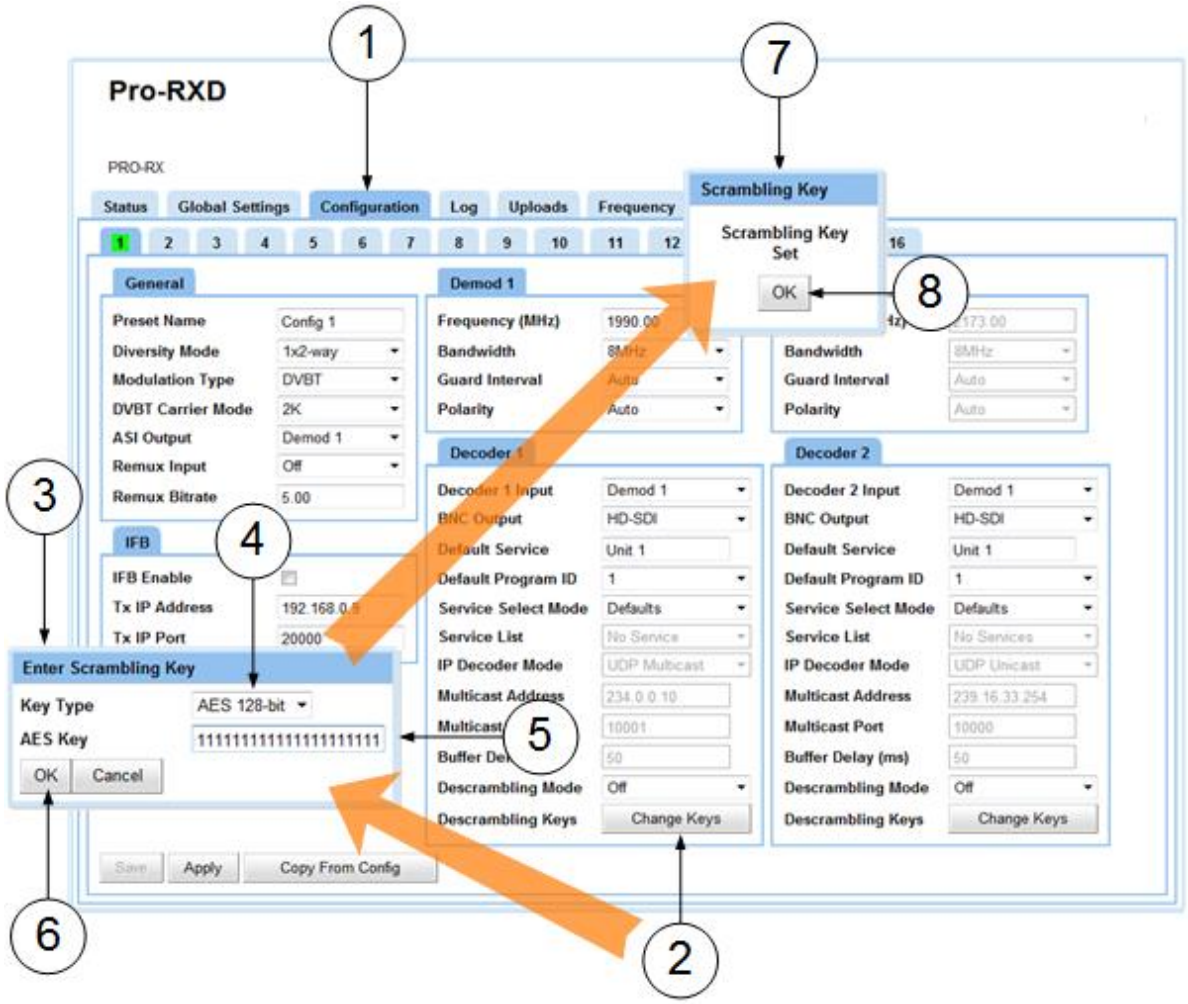

Figure 5-2 Change the Encryption Key

5.3 About the Encryption Key Characters Required

In our example above we used AES128 encryption. This needed a key of 32 characters. If we had chosen AES256 it needs a 64 character key which we apply along two fields.

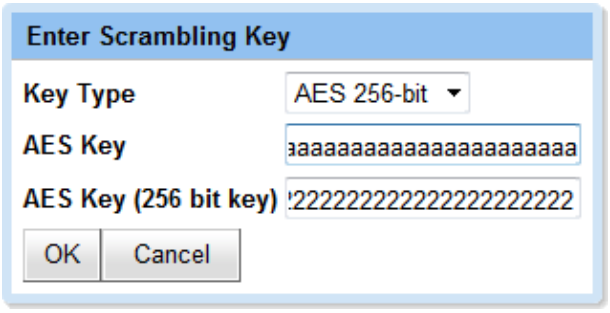

Figure 5-3 Encryption Key for AES256

Key Type	Number of Characters Needed
ABS	8
AES128	32
AES256	64 (32 in each field)

Table 5-1 Encryption Key Characters Required

5.4 About IP Streaming

Note: This section is related only to customers that have the Streaming licence loaded onto their PRORXD unit.

Streaming is the transmission of digital audio or video or the listening and viewing of such data without first storing it.

The PRORXD supports:

- Raw Multicast streaming
- UDP/RTSP streaming.

5.5 Configuring UDP Multicast Streaming

When you have got a Video or Audio service into the PRORXD, you could wish to stream that information down a fixed IP link.

For multicast streaming the transport stream video data is transmitted along the Ethernet network by means of multicasting i.e. continuous real-time streaming of packets that can be accessed by a PC connected to the network.

It is thus possible for more than one connected PC to see the streamed data at the same time.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection
- To be logged on to the PRORXD unit

- The PRORXD must have a Streaming licence installed
- Have a video transmission being received on Demod 1 of your PRORXD

Step 1: Open the Global Settings Tab

1. Click on the **Global Settings** tab.
2. Find the **IP Streaming** pane.

Step 2: Configure the IP Streaming Settings

1. In the **Streaming Mode** box select UDP Multicast.
2. In the **Multicast TTL** box set 10.
3. In the **SAP Address** box set 224.2.127.254.
4. Check the **Enable** checkbox.
5. In the **Source** box select the source you wish to stream (Demod 1 in my example).
6. In the **Multicast Address** box set 224.2.128.12.
7. In the **Multicast Port** box set 10000.
8. In the **Multicast Service Name** box set MPEG2-TS.
9. In the **Multicast ToS** box set Routine (0).
10. Click the **Apply** button.
11. The **Configured Successfully** message opens.
12. Click the **OK** button.

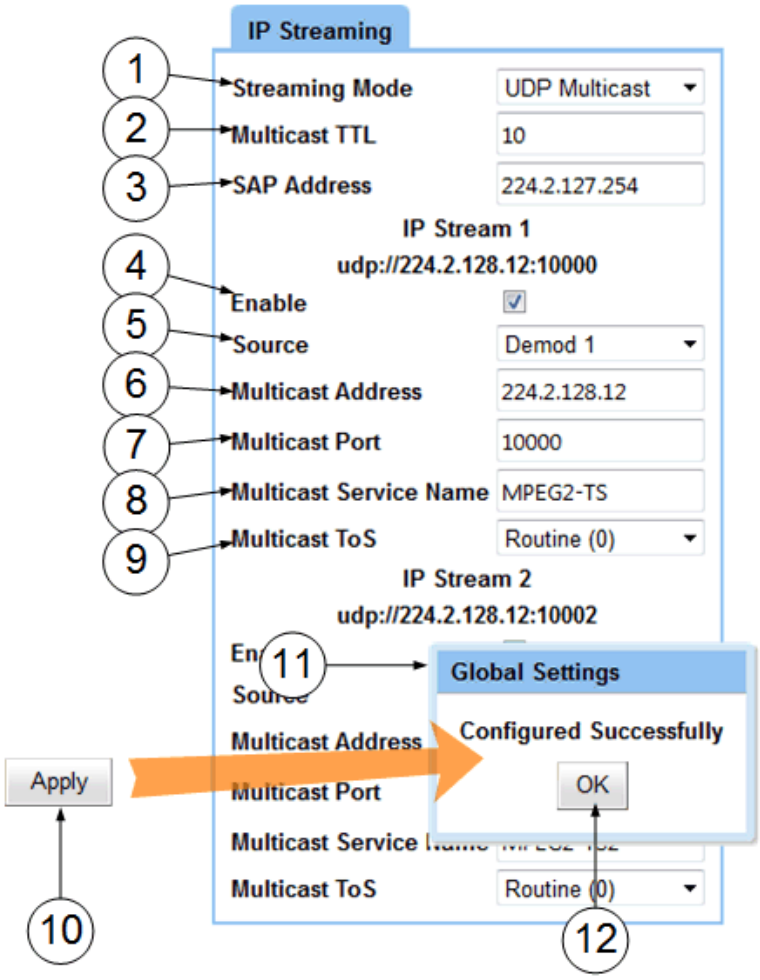

Figure 5-4 Configure the Streaming Settings Pane

5.6 Recovering a UDP Multicast Stream – VLC

You have configured your multicast stream at the PRORXD. You will wish to collect that stream on you PC. We'll operate VLC Media Player for this example as it is free to download from the internet.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection
- To be logged on to the PRORXD unit
- The PRORXD must have a UDP Multicast Stream Configured
- Your PC must have VLC loaded

Step 1: Open VLC

1. On your desktop, double-click the **VLC Media Player** Icon.
2. The **VLC Media Player** window opens.

Step 2: Configure the Playback

3. From the **Media** menu, select **Open Network Stream**.

4. The **Open Media** window opens.
5. Type the Network URL in this format: udp://@<*multicast_address*>:<*multicast_port*>
6. Click the **Play** button.
7. Your **stream** will start playing in a new window.

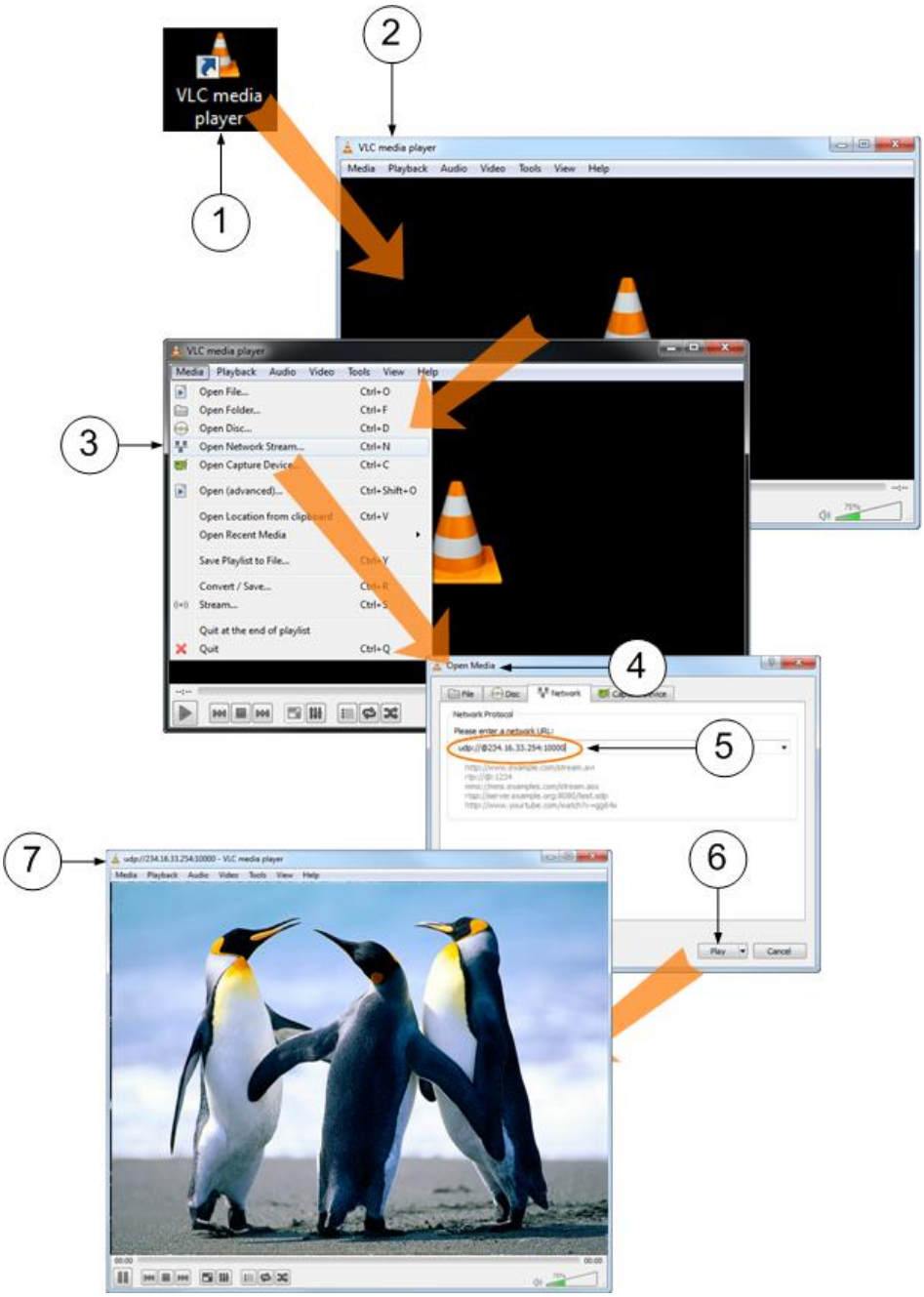

Figure 5-5 Recovering a UDP Multicast Stream

5.7 Recovering a UDP Multicast Stream – Mission Commander

You have configured your multicast stream at the PRORXD. You will wish to collect that stream on you PC. We'll operate Mission Commander for this example.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.
- The PRORXD must have a UDP Multicast Stream Configured.
- Your PC must have Mission Commander loaded.

Step 1: Open Mission Commander

1. On your desktop **double-click** the **Mission Commander Icon**.
2. The **Mission Commander** window opens.

Step 2: Open the Video Player

3. From the **Tree pane**, select **Devices**.
4. From the **Details pane**, select **Video Player**.
5. Click the **Add Device** button.
6. The Details pane switches to **Video Player**.

Step 3: Configure the Video Player

7. In the **Source** drop-down box select **Manual**.
8. Type the **URL** in the format: udp://@<*multicast_address*>:<*multicast_port*>
9. It is not necessary to have a **Service Name**.
10. Keep **Encryption** to **None** for this example.
11. Set the **Interface** box to be the Local Area Connection you are using to connect the PC to the PRORXD.
12. Make sure the **Video Window** checkbox is **selected**.
13. Click the **Connect** button.
14. Your **stream** will start playing in the **Video Player** window.

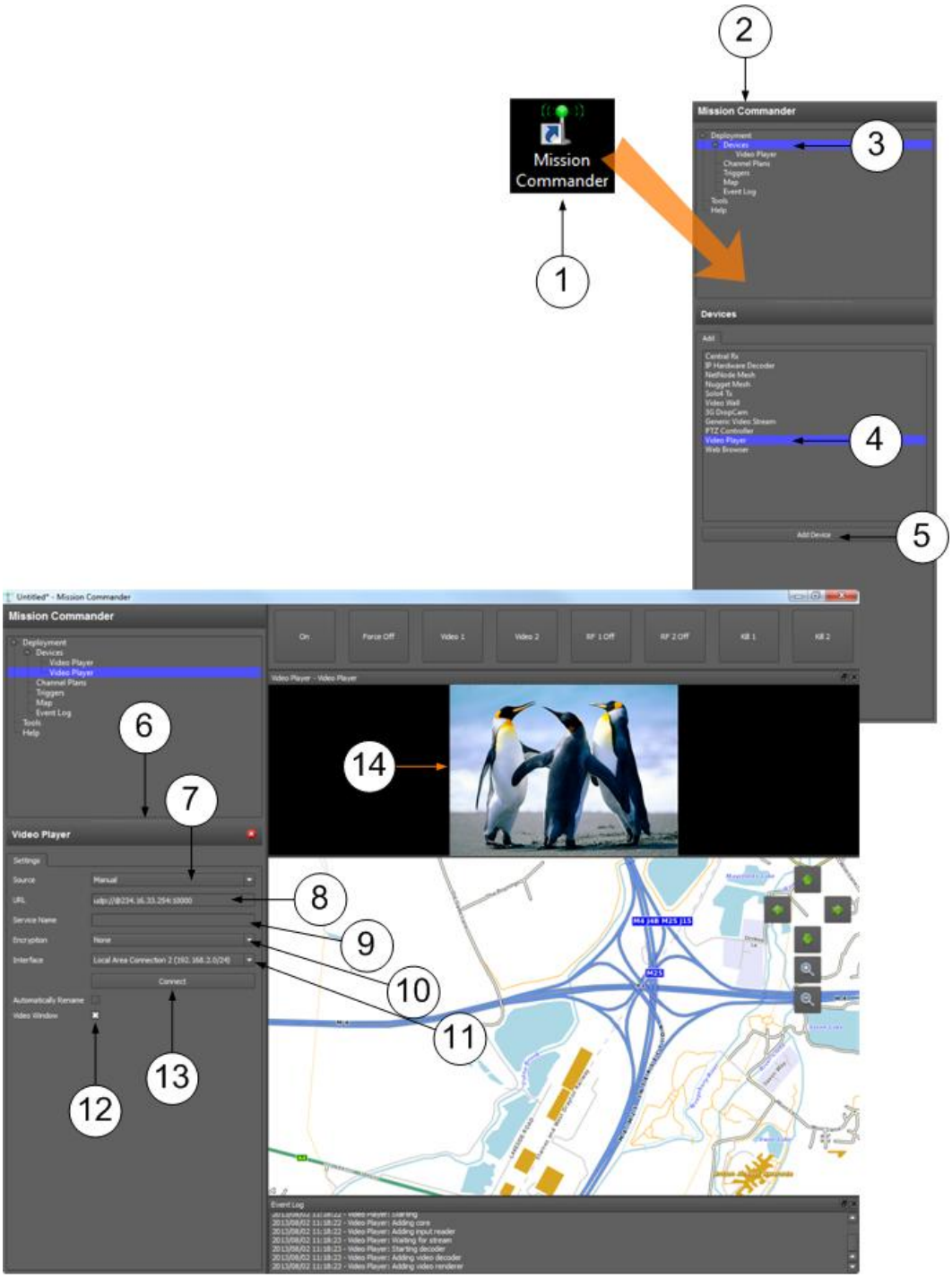

Figure 5-6 Recovering a UDP Multicast Stream – Mission Commander

5.8 About RTSP Multicast and Unicast

If you set the streaming mode on the PRORXD to be RTSP Multicast or RTSP Unicast then the Network URL that will be necessary in VLC or Mission Commander will be:

rtsp://<*ip_address*>/stream1.sdp

The IP Address here is that of the PRORXD you are streaming from.

If you were operating the second streamer on the PRORXD then the URL will be:
rtsp://<*ip_address*>/stream2.sdp

6. Advanced Setup

6.1 About Advanced Setup

To get the most from your radio system you must customise the programming for your operations and area.

CAUTION: Before you start programming your radio make sure the batteries are new and fully charged. If not, you could operate an AC adapter to power your radio.

If the radio loses power while you program it, its memory might be corrupted and it will be necessary to reset defaults. All information programmed in the radio might be lost.

The **Control Application** or **Control Pages** let you control the communication system, to keep it operating in a correct and stable mode. It lets you to change many of the settings of the unit like frequency or bandwidth.

The control system can be a **Control Application** that operates on your PC connected to the device using Serial communications.

If not, it can be **Control Pages** that are viewed on your PC browser when connected to the device using IP communications.

The PRORXD Receiver uses **Control Pages** accessed from your web browser which enables you to do many configuration tasks quickly and easily. These next topics tell you how to connect your PC to the receiver and then operate your browser to configure the unit.

6.2 Installing the Browser Application on your PC

Note: Most PCs have a browser installed. This topic will only be necessary if you wish to change to a different browser.

Before you Start

This is necessary:

- A PC operating Windows 7 or better.
- The PC to have a network card configured for a fixed IP Address.
- The Browser Application you wish to operate. (Internet Explorer or Firefox for example).

Step 1: Install the Browser Application on your PC

1. Install Browser on your desktop or other convenient location on your PC.
2. Make sure you have a Browser start-up icon on your desktop to start the program.

Next Steps

Connect the PRORXD to your PC with an IP connection.

6.3 Connecting your PC to the PRORXD with IP

You'll wish to configure your PRORXD to do useful operations immediately.

The PRORXD has **Control Pages** accessed from your web browser which let you do many configuration tasks quickly and easily.

Before you Start

This is necessary:

- A PC with a web browser.
- An Ethernet cable.
- A powered PRORXD unit.
- The IP Address of the PRORXD unit.

Step 1: Install the Web Browser Application on your PC

1. Make sure you have installed a **browser** (Internet Explorer, Firefox or Chrome for example) onto your Personal Computer (PC).

Step 2: Make an IP Connection between PRORXD and the PC

1. Connect the RJ45 8-way plug (pins) on the Ethernet Cable to the RJ45 8-way Receptacle (sockets) on the PRORXD receiver marked ETH0.
2. Connect the RJ45 8-way plug (pins) on the Ethernet Cable to the RJ45 8-way Receptacle (sockets) of your Personal Computer.

Step 3: Open your Web Browser and Log on

1. On your PC, double-click your **Internet Browser** icon.
2. The Web browser **Home Page** window **opens**.
3. In the **Address bar**, type the **IP Address** of the PRORXD you want to configure like this example: http://192.168.2.65/
4. Your PRORXD **Control Page** opens in your Web Browser.

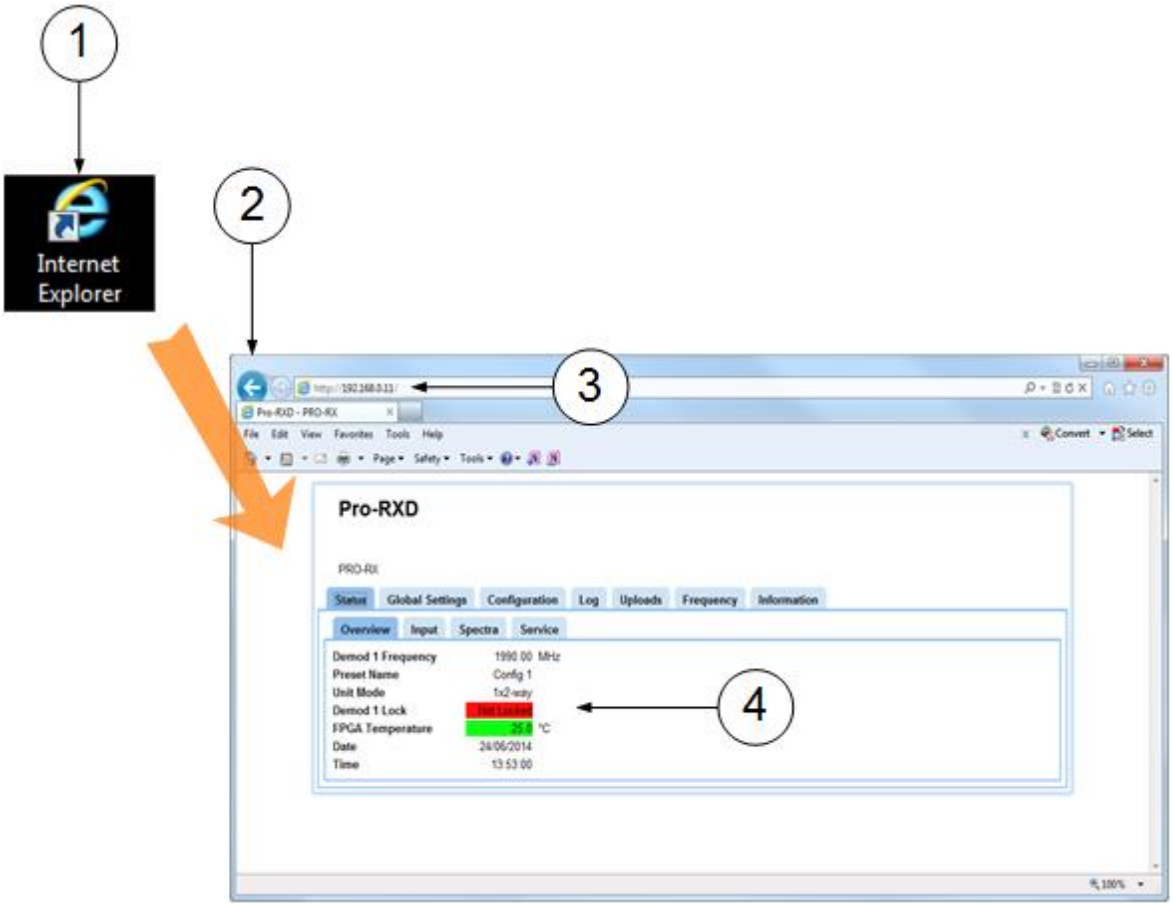

Figure 6-1 Open Web Browser and Log on

Troubleshooting

☹ I don't know the IP address of the unit.

☺ You'll find the IP Address on the front panel **Config>Global Setup>IP Address** page.

☹ I got the unit out of the box and it's in DHCP mode.

☺ You can toggle DHCP to OFF on the front panel **Config>Global Setup>DHCP** page

Next Steps

Explore the Primary Window.

6.4 Exploring the Primary Window

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection
- To be logged on to the PRORXD unit

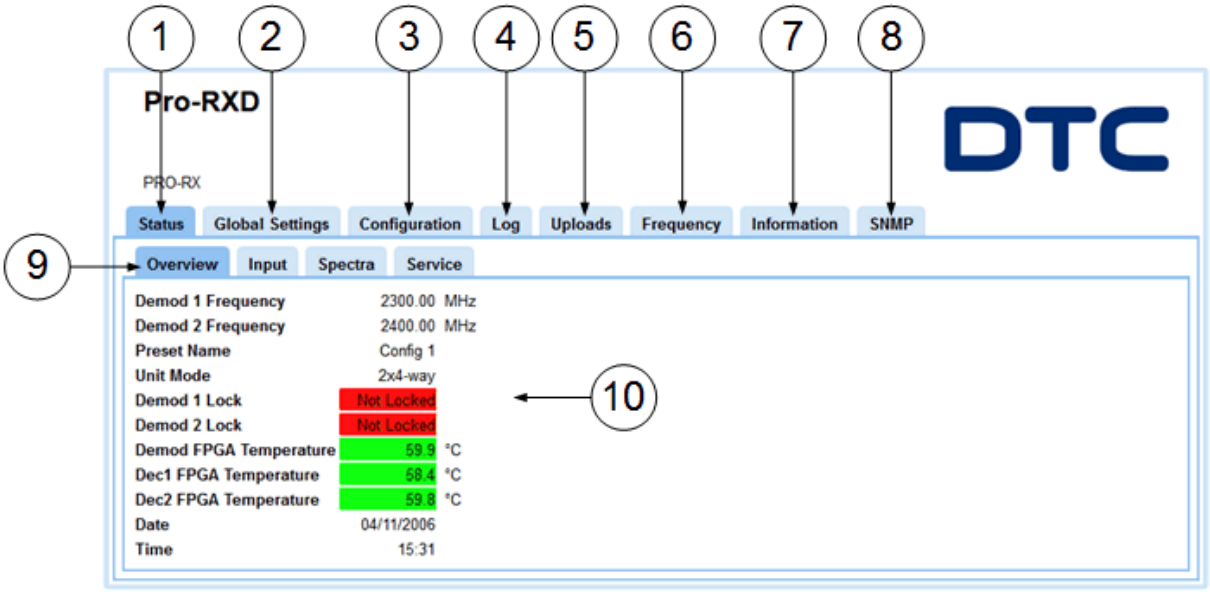

Figure 6-2 Explore the Control Pages

No	Property	Description
1	Status tab	Divided into Overview, Input, Spectra and Service sub-tabs. This displays detailed status information of received signal quality and decoded video and audio services.
2	Global Settings tab	Divided into General Settings, Downconverter Settings, IP Settings, Streaming Settings, OSD Settings and Genlock Settings panes.
3	Configuration tab	Divided into General, IFB, Demod 1, Decoder 1, Demod 2 and Decoder 2 panes. The Configuration tab contains the list of 16 presets. Each preset the user can specify demodulation parameters, decoding modes, and descrambling configuration.
4	Log tab	The PRORXD receiver has the facility for generating log files of receiver status information.
5	Uploads tab	Enables you to upload a license file to enable licensable features, and send software upgrade files to the PRORXD.
6	Frequency tab	The PRORXD is can examine frequencies and find operating channels for tuning quickly.
7	Information tab	Contains information with software versions and unit special data. This information is necessary during a support call for example.

No	Property	Description
8	SNMP	You can upload SNMP MIBs data from this tab. If this is a requirement, please contact DTC Technical Support.
9	Overview sub-tab	Some of the tabs have sub-tabs to divide the information more or they will use panes to divide information.
10	Information Fields	The sub-tabs or panes are divided into fields of information that you will operate with.

Table 6-1 Control Pages Key

6.5 Working with the Status Tab

The **Status Tab** displays detailed status information of received signal quality and decoded video and audio services.

The Status Tab is divided into four sub-tabs:

- Overview
- Input
- Spectra
- Service

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Overview Sub-Tab

1. Click on **Status>Overview** tab.

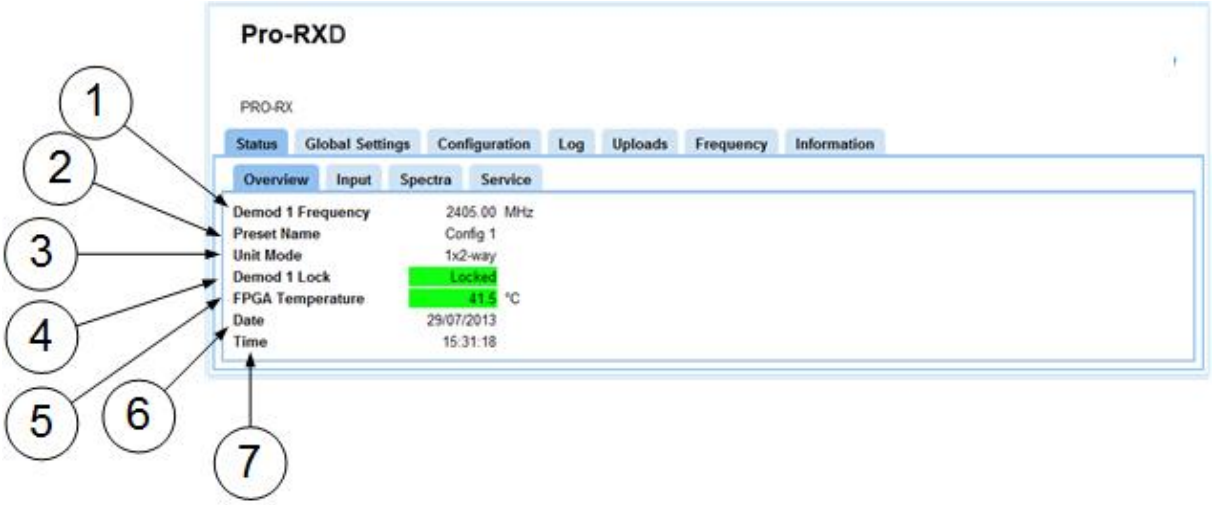

Figure 6-3 Status Tab showing Overview Sub-Tab

No	Property	Range	Description
1	Demod 1 Frequency (MHz)	L, S and C Bands	The **frequency** in megahertz (MHz) to which the receiver's first demodulator is tuned.
2	Preset Name	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	This is the configuration you are currently working on. Only 1 to 16.
3	Unit Mode	1x2-way 1x4-way 2x4-way etc.	The configuration of the diversity and channel configuration of the receiver.
4	Demod 1 Lock	Locked (Green background) or Not Locked (red background).	Tells you if the first demodulator has successfully demodulated the incoming RF.
5	FPGA Temperature	A temperature on a green or red field background.	This field reports the current temperature of the FPGA in degrees Celsius. If the field background is green, the temperature is in limits. If the background shows red, then the FPGA is overheating and the unit must be switched off immediately. It must be in the region of 50 to 80 degrees Celsius.
6	Date	A correct date.	You can set this in **Global Settings>Set Clock** button.
7	Time	A correct time.	You can set this in **Global Settings>Set Clock** button.

Table 6-2 Overview Sub-Tab Key

Step 2: Open the Input Sub-Tab

1. Click on, **Status>Input** tab.

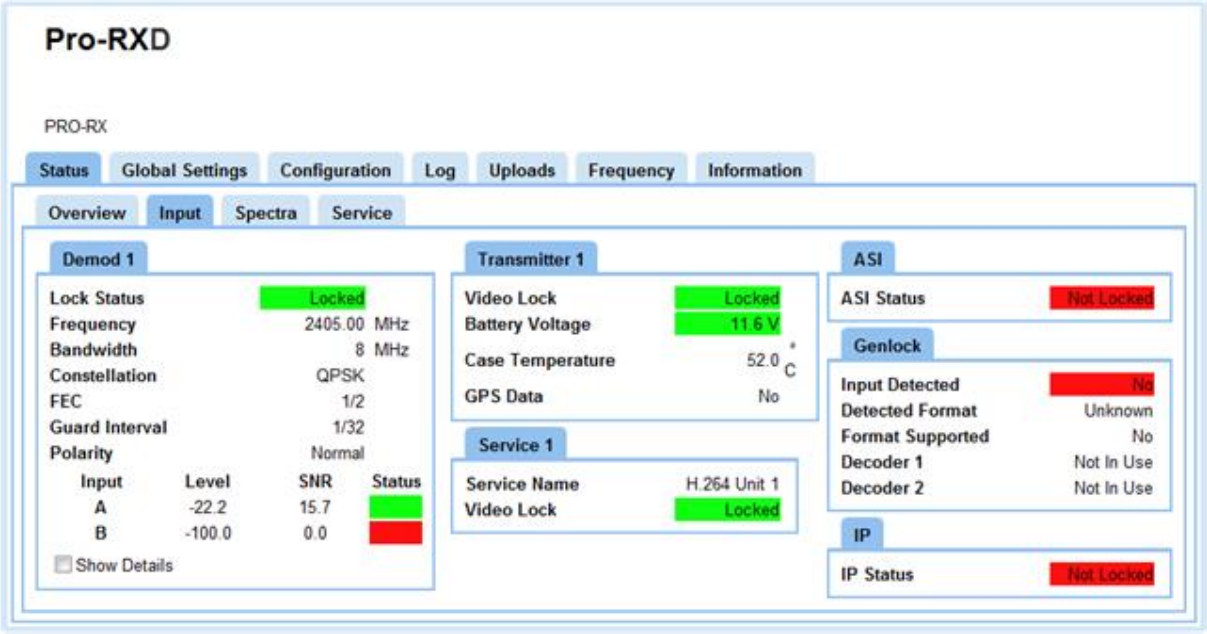

Figure 6-4 Status Tab showing Input Sub-Tab

Step 3: Interpret the Demod Pane

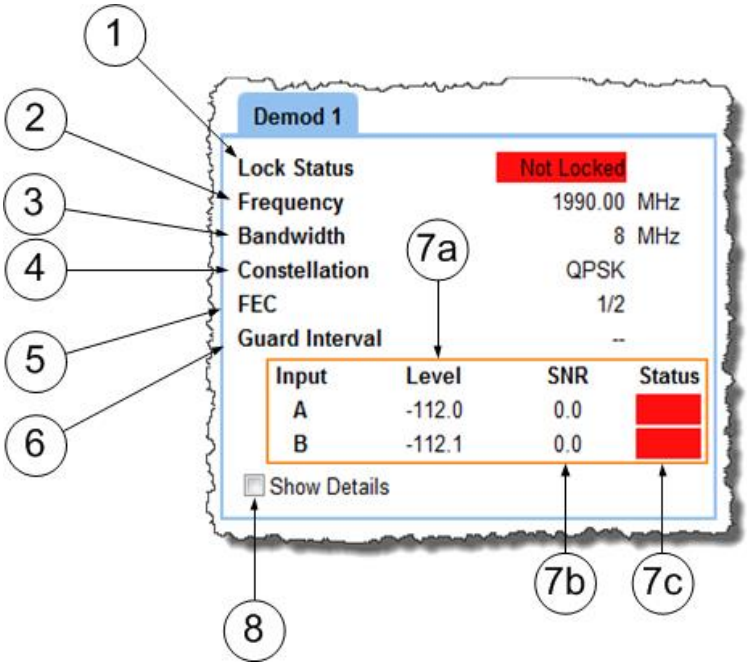

Figure 6-5 Input Sub-Tab showing Demod Pane

No	Property	Range	Description
1	Lock Status	Locked (green background) or Not Locked (red background.	Tells you if the first demodulator has successfully locked to the incoming bit stream.

No	Property	Range	Description
2	Frequency (MHz)	L, S and C Bands	The frequency in megahertz (MHz) to which the receiver's first demodulator is tuned.
3	Bandwidth	DVBT/UMVL: 6, 7 and 8MHz Narrowband: 2.5MHz 1.25MHz and 625kHz	DVB-T/UMVL bandwidths (usually used for broadcast). DTC narrowband (usually for surveillance). DTC Ultra-narrowband (this is a licensable feature, usually for surveillance).
4	Constellation	DVBT: QPSK, 16QAM, 64QAM Narrowband/UMVL: BPSK, 8PSK, QPSK, 16QAM	This field indicates the OFDM constellation being received. QPSK-less user data, more robust, more range. 16QAM-more user data, less robust, less range. The mode is automatically detected and is simply displayed here. You can't change it other than at the transmitter.
5	FEC	DVBT: 1/2, 2/3, 3/4, 5/6, 7/8 Narrowband/UMVL: 1/3 or 2/3	This field indicates the forward error correction (FEC) rate which is being applied. Think 'data bits/all bits' 1/3 means 1 bit out of 3 bits is data and thus 2 bits are used for error correction. Small quantity of user data means less picture quality, but more error correction means a more robust signal and thus more range. 2/3 means 2 bits out of 3 bits are data and thus 1 bit is used for error correction. More user data means better picture quality, but less error correction means less robust signal and thus less range. The mode is automatically detected and is simply displayed here. You can't change it other than at the transmitter.
6	Guard interval	DVBT: 1/32, 1/16, 1/8, 1/4 Narrowband/UMVL: 1/16 or 1/8	The guard interval which is being applied to the narrowband mode in operation. The guard interval is a deliberate extension of the RF symbol period to give immunity to reflections. 1/16, short extension, deals with fast reflections, more data, less range. 1/8, long extension, deals with slower reflections, less data, more range.
7a	Input Level A		The level in dBm of the signal being received on antenna A There are readings for each of the antennas.

No	Property	Range	Description
7b	Input A SNR	Could be any number.	The signal to noise ratio of the signal being received on antenna A. There are readings for each of antennas.
7c	Status	Green or Red	A visual indication of signal strength.
8	Show Detail Check Box	Select or Clear	When selected, more details about the error corrector on this page are displayed.

Table 6-3 Demod 1 Pane Key

Step 4: Check the Show Details Checkbox

When selected, the extra details about the error corrector on this page are displayed.

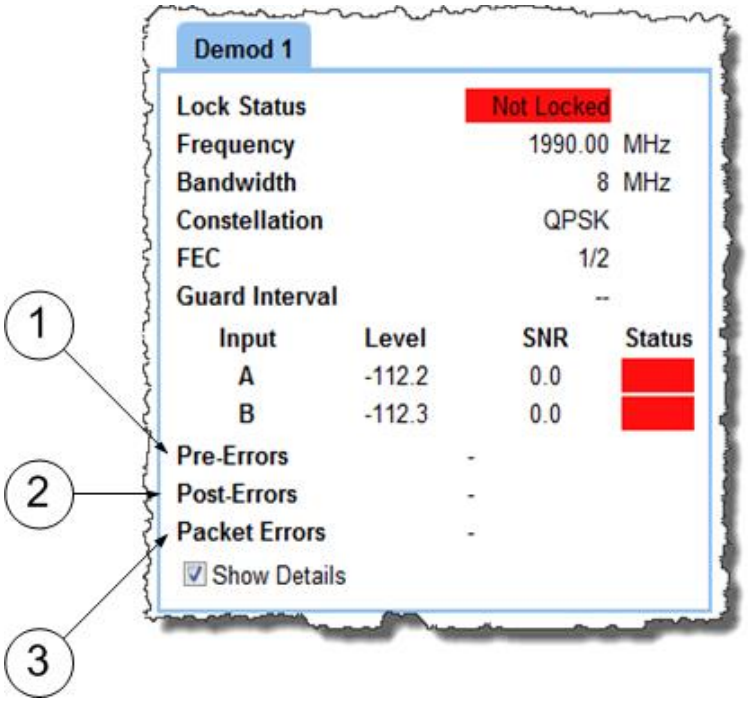

Figure 6-6 Demod Pane with Show Details Selected

No	Property	Range	Description
1	Pre-Errors	0 is ideal. Must be a number.	The bit error rate for pre-errors.
2	Post-Errors	0 is ideal. Must be a number.	The bit error rate for post-errors.
3	Packet Errors	0 is ideal. Could be any number.	The number of packet errors coming out of the error correction system. An error here will corrupt the video, audio or data signals coming through the receiver.

Table 6-4 Demod 1 Pane with Show Details Key

Step 5: Interpret the Transmitter Pane

Some DTC transmitters can send metadata with the RF signal. This metadata must be switched on at the transmitter and then gives useful information at the receiver.

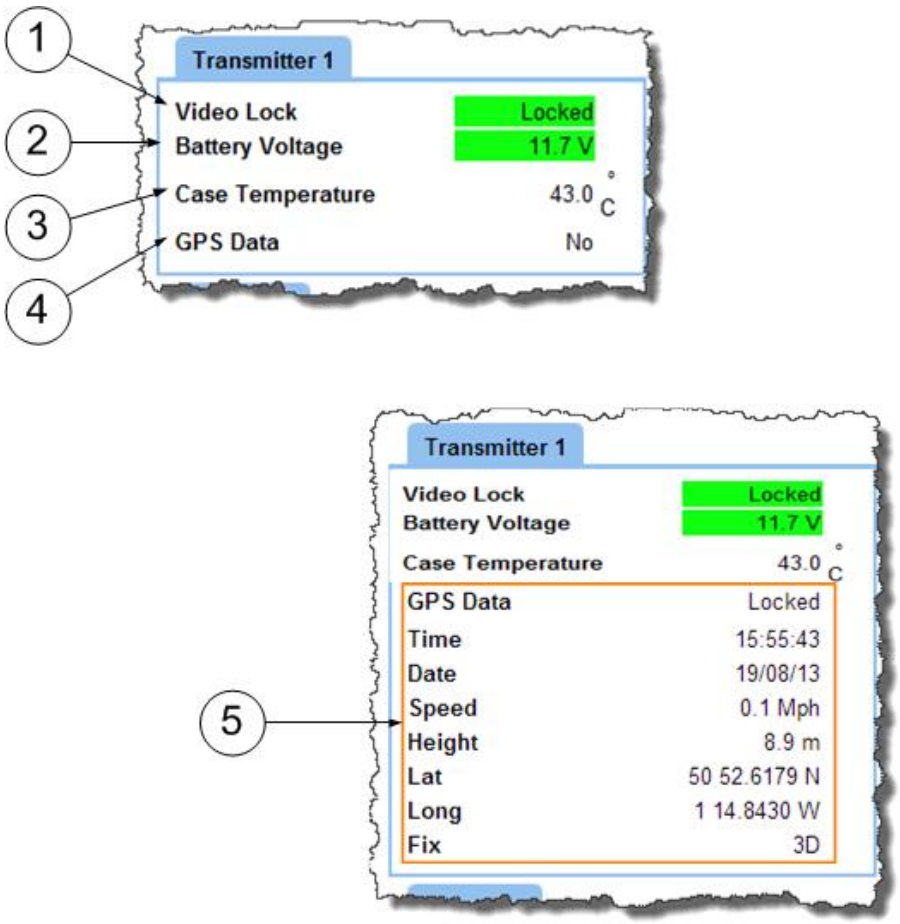

Figure 6-7 Input Sub-Tab showing Transmitter Pane

No	Property	Range	Description
1	Video Lock	Locked (green background) or Not Locked (red background.	Tells you if the transmitter has successfully locked to its incoming video signal.
2	Battery Voltage	Any voltage on a green or red field background.	This field reports the current voltage of the transmitter's battery in VDC. If the field background is green, the voltage is more than the TX Battery Alarm voltage parameter specified in the Global Settings>General Settings pane. If the background shows red, then the voltage is below the alarm limit, too low and the unit will not operate correctly.
3	Case Temperature	Any temperature on a green or red field background.	This field reports the current temperature of the transmitter's enclosure in degrees Celsius.

No	Property	Range	Description
4	GPS Data	Locked or No	Indicates if GPS Data is being sent from the transmitter. If GPS NMEA data is available, the receiver will find and show it.
5	GPS Data	Locked in this example.	This shows the Transmitter 1 Pane with GPS data being received.

Table 6-5 Transmitter 1 Pane Key

Step 6: Interpret the Service Pane

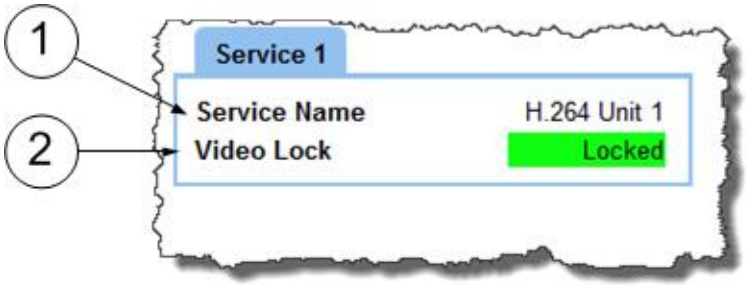

Figure 6-8 Input Sub-Tab showing Service Pane

No	Property	Range	Description
1	Service Name	Could be anything.	This text box lets you name the multicast stream as delivered in the SAP/SDP packets from the unit. The Service Name on the receiver must align with the transmitter's service name.
2	Video Lock	Locked (green background) or Not Locked (red background.	Tells you if the unit has successfully locked to the incoming video signal.

Table 6-6 Service Pane Key

Step 7: Interpret the ASI Pane

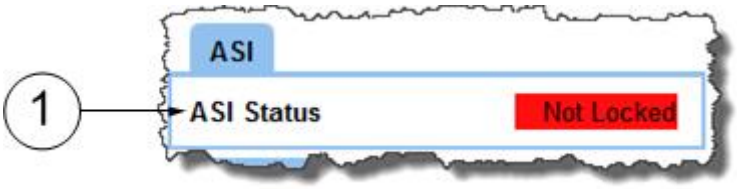

Figure 6-9 Input Sub-Tab showing ASI Pane

No	Property	Range	Description
1	ASI Status	Locked (green background) or Not Locked (red background.	Tells you if the unit has successfully locked to the incoming ASI signal.

Table 6-7 ASI Pane Key

Step 8: Interpret the Genlock Pane

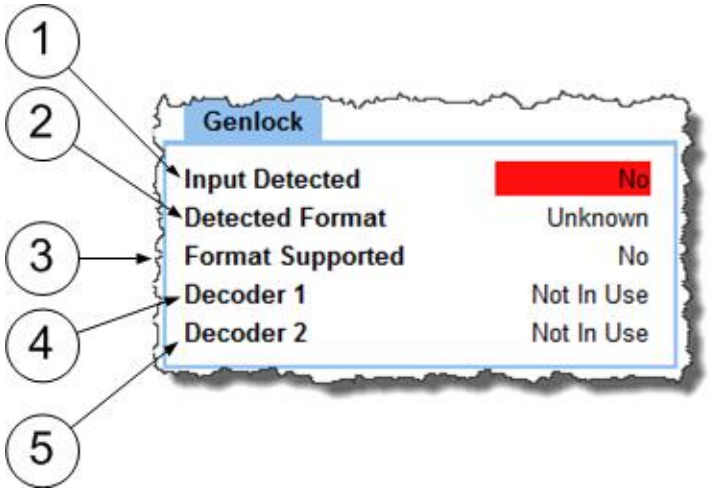

Figure 6-10 Input Sub-Tab showing Genlock Pane

No	Property	Range	Description
1	Input Detected	Yes (stable green background) or No (stable red background.	Tells you if the unit has successfully discovered an incoming Genlock signal.
2	Detected Format	Unknown PALNTSC HD standards	Tells you the format of the Genlock signal. If the unit features the tri-level sync upgrade, HD standards are also detected.
3	Format Supported	Yes or No.	Tells you if the currently received Genlock format is correct for operation with this receiver.
4	Decoder 1	Using Not in Use	Using - External Genlock has been selected and is supported. Not in use – External Genlock not selected or not supported.
5	Decoder 2	Using Not in Use	Using - External Genlock has been selected and is supported. Not in use – External Genlock is not selected or not supported.

Table 6-8 – Genlock Pane Key

Step 9: Interpret the IP Pane

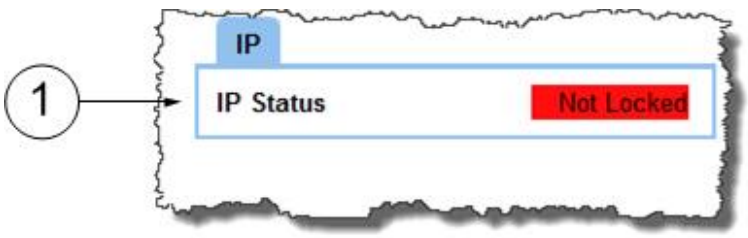

Figure 6-11 Input Sub-Tab showing IP Pane

No	Property	Range	Description
1	IP Status	Locked (green background) or Not Locked (red background.	Tells you if the unit has successfully locked an IP signal. Not Locked – IP Input not selected or is not being received.

Table 6-9 IP Pane Key

Step 10: Open the Spectra Sub-Tab

1. Click on, **Status>Spectra** tab.

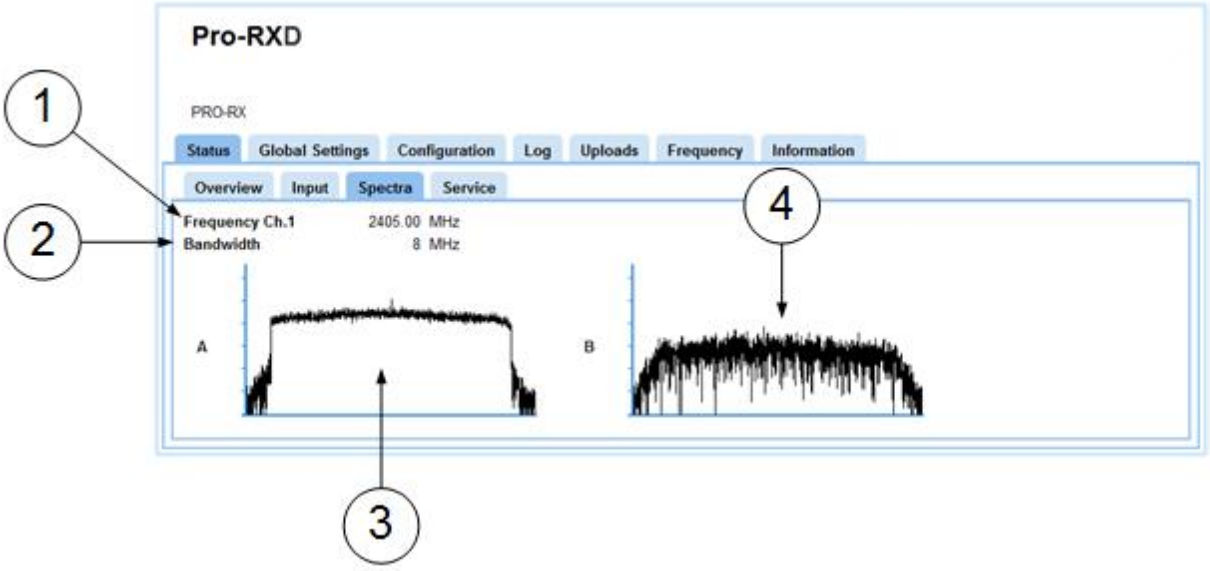

Figure 6-12 Status Tab showing Spectra Sub-Tab

No	Property	Range	Description
1	Frequency (MHz).	L, S and C Bands	The frequency in megahertz (MHz) to which the receiver's channel 1 is currently tuned.
2	Bandwidth.	DVBT/UMVL: 6, 7 and 8MHz Narrowband: 2.5MHz 1.25MHz and 625kHz	The bandwidth which is currently in operation. DVB-T bandwidths (usually used for broadcast). DTC narrowband (usually for surveillance). DTC Ultra-narrowband (this is a licensable item, usually for surveillance).
3	Spectrum Display for Antenna A.	Displays for the A and B antennas are shown in my example, but there may be up to eight displays here, A to H.	When tuned in correctly it is possible to see the classic 'top hat' COFDM waveform as in this example.

No	Property	Range	Description
4	Spectrum for Antenna B.		Antenna B has been disconnected here to show you what a noisy channel looks like. Compare this to the COFDM waveform in channel A.

Table 6-10 Spectra Sub-tab Key

Step 11: Open the Service Sub-Tab

1. Click on, **Status>Service** tab.

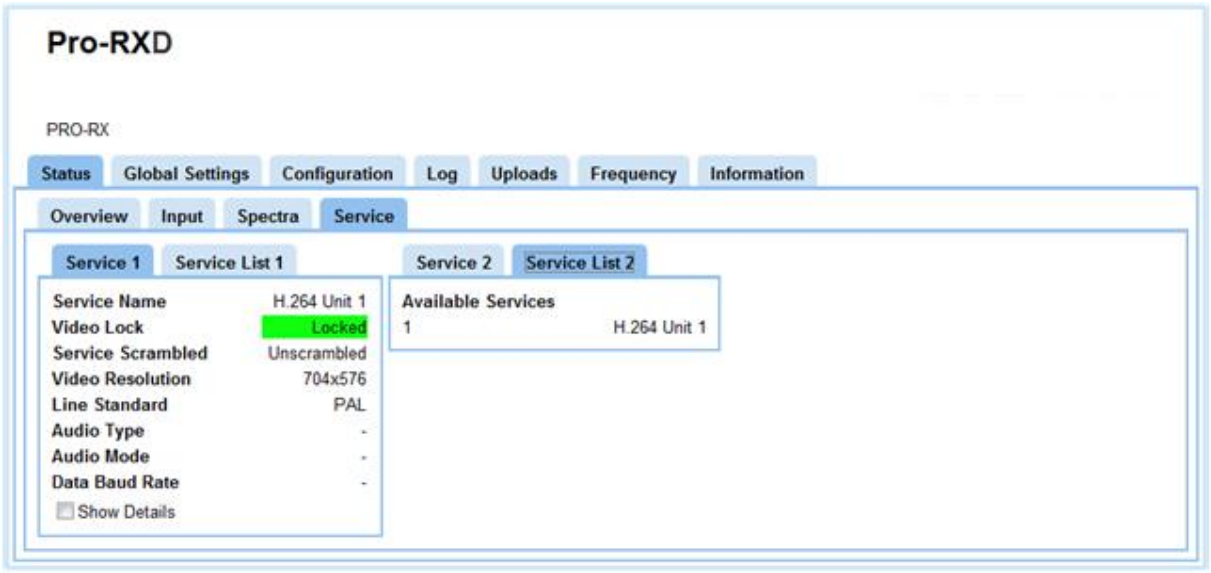

Figure 6-13 Status Tab showing Service Sub-Tab

Step 12: Interpret the Service 1 Pane

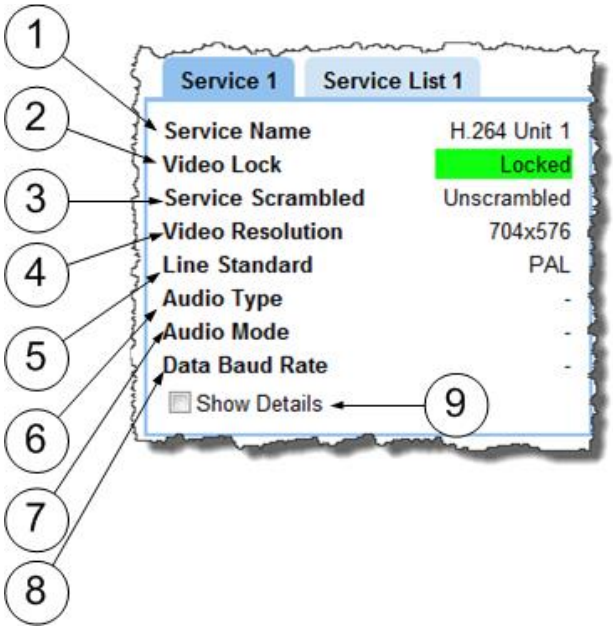

Figure 6-14 Service Sub-Tab showing Service 1 Pane

No	Property	Range	Description
1	Service Name	Could be anything.	Displays the currently received and decoded service name from the incoming service.
2	Video Lock	Locked (green background) or Not Locked (red background.	Tells you if the unit is successfully decoding the incoming video signal.
3	Service Scrambled	Scrambled or Unscrambled	Tells you the encryption status of the incoming signal.
4	Video Resolution	704x576 or an applicable resolution.	Tells you the resolution of the video that was set at the transmitter.
5	Line Standard	SD: PAL or NTSC HD: 720p50, 720p59, 720p60, 1080i50, 1080i59, 1080i60, 1080p23, 1080p24, 1080p25, 1080p29, 1080p30, 1080psf23, 1080psf24, 1080psf25, 1080psf29, 1080psf30	Tells you the line standard of the video that was set at the transmitter.
6	Audio Type	MPEG Layer 1, MPEG Layer 2 or Solo Nicam	Tells you the type of the audio that was set at the transmitter.
7	Audio Mode	Stereo or Mono	Tells you the mode of the audio that was set at the transmitter.
8	Data Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	Tells you the baud rate of the date that was set at the transmitter.
9	Show Details Checkbox	Select or Clear.	When selected, you will see more information in the Service 1 Pane. You can keep this cleared to have less clutter on the screen.

Table 6-11 Service 1 Sub-tab Key

Step 13: Check the Show Details Checkbox

When selected, more details about the Service 1 Pane on this page are displayed.

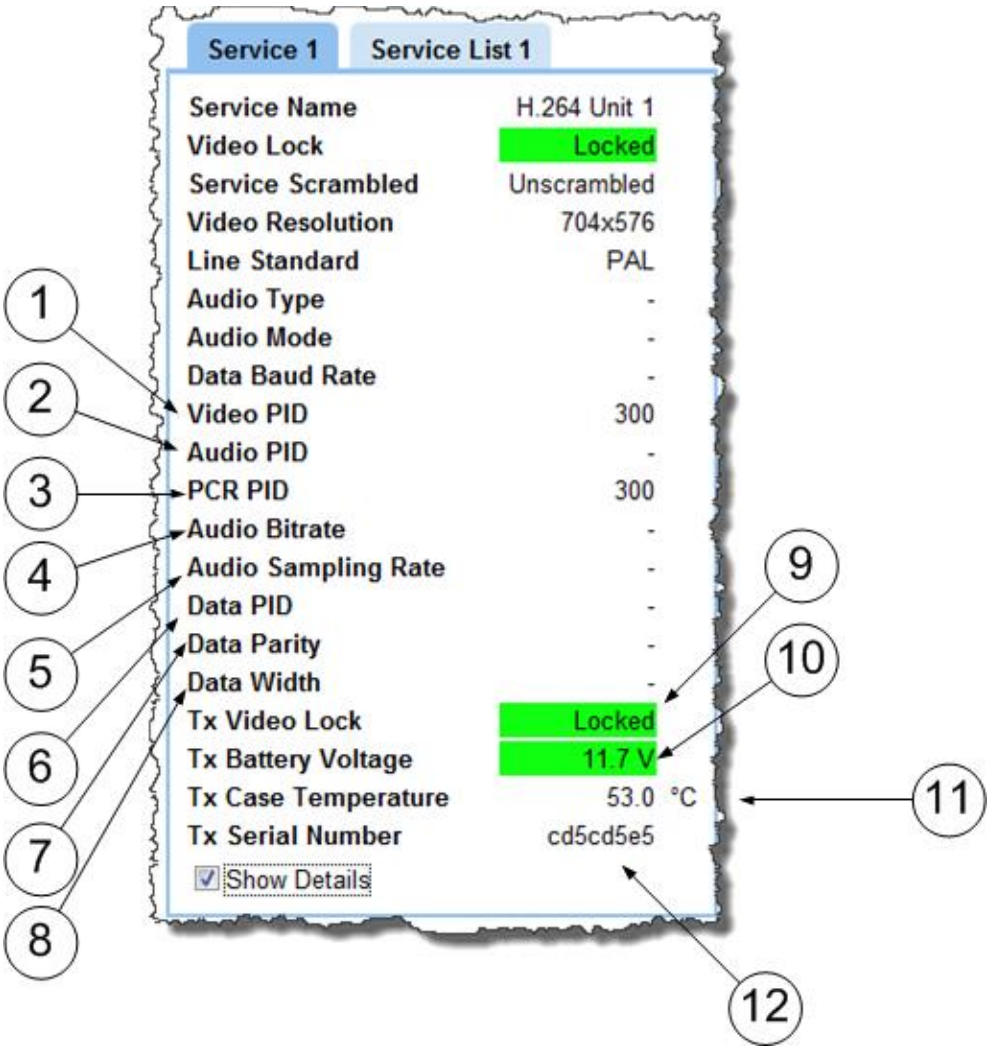

Figure 6-15 Service 1 Pane with Show Details Selected

No	Property	Range	Description
1	Video PID	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter.
2	Audio PID	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter.
3	PCR PID PCR=Program Clock Reference	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter. Used to sync the audio and video. The PCR keeps the system clock synced. If the clock starts to drift, it is corrected with the PCR value.

No	Property	Range	Description
4	Audio Bitrate	64, 96, 128, 160, 192, 224, 256, 288, 320, 352, 384, 416 and 448kbits/s are examples of MPEG L1 bit-rates.	Reports the audio bitrate that has been set at the transmitter. This is the MPEG audio encoding bit-rate. Usually the higher the number the better the quality.
5	Audio Sampling Rate	44.1kHz, 48kHz or 32kHz	Reports the audio sampling rate that has been set at the transmitter.
6	Data PID	Default or 0x0020 to 0x1FFE	Each table or elementary stream in a transport stream is identified by a 13-bit packet ID (PID). This is set at the transmitter.
7	Data Parity	None, Even, Odd	This is the parity of serial data passing through the unit. Usually, this must align with the data device you are planning to operate. Reports the Data parity that has been set at the transmitter.
8	Data Width	7 or 8 bit	8 bit is the DTC standard and 7 bit is available for interoperability with third party equipment. Tells you the Data Width that has been set at the transmitter.
9	TX Video Lock	Locked (stable green background) or Not Locked (stable red background.	Tells you if the **transmitter** has successfully locked to an incoming video signal. This does not mean this receiver necessarily has video lock.
10	Battery Voltage	A voltage on a green or red field background.	This field reports the current voltage of the **transmitter's** battery in VDC. If the field background is green, the voltage is in limits. If the background shows red, then the voltage is too low and the unit will not operate correctly. The voltage alarm threshold is set in **Global Settings>General Settings>Tx Battery Alarm(v)**
11	TX Case Temperature	A temperature reading.	This field reports the current temperature of the **transmitter** enclosure in degrees Celsius.
12	TX Serial Number	A correct electronic serial number (ESN).	The ESN is used for licencing and it can be necessary for you to tell us this number during a support call for example.

Table 6-12 Service 1 Pane with Show Details Key

Step 14: Configure the Service List 1 Pane

Figure 6-16 Service Sub-Tab showing Service List 1 Pane

No	Property	Range	Description
1	Available Services	A correct Service	Provides a list of services which have been recovered from the transport stream and are available for you to see.

Table 6-13 Service List 1 Pane Key

Note: Service 2 and Service List 2 operate with the same procedure as Service 1 and Service List 1.

6.6 Working with the Global Settings Tab

The Global Settings tab contains parameters that control global unit features common to all presets, including downconverter settings, IP settings, streamer settings and OSD configuration for example.

The Global Settings tab is divided into six panes:

- General Settings
- Downconverter Settings
- IP Settings
- Streaming Settings
- OSD Settings
- Genlock Settings

There are also buttons along the bottom of the page which will allow you to **Apply** settings, **Refresh** the page, set the **Clock** and set a **Password**.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Global Settings Tab

1. Click on the **Global Settings** tab.

Screenshot: Global Settings Tab

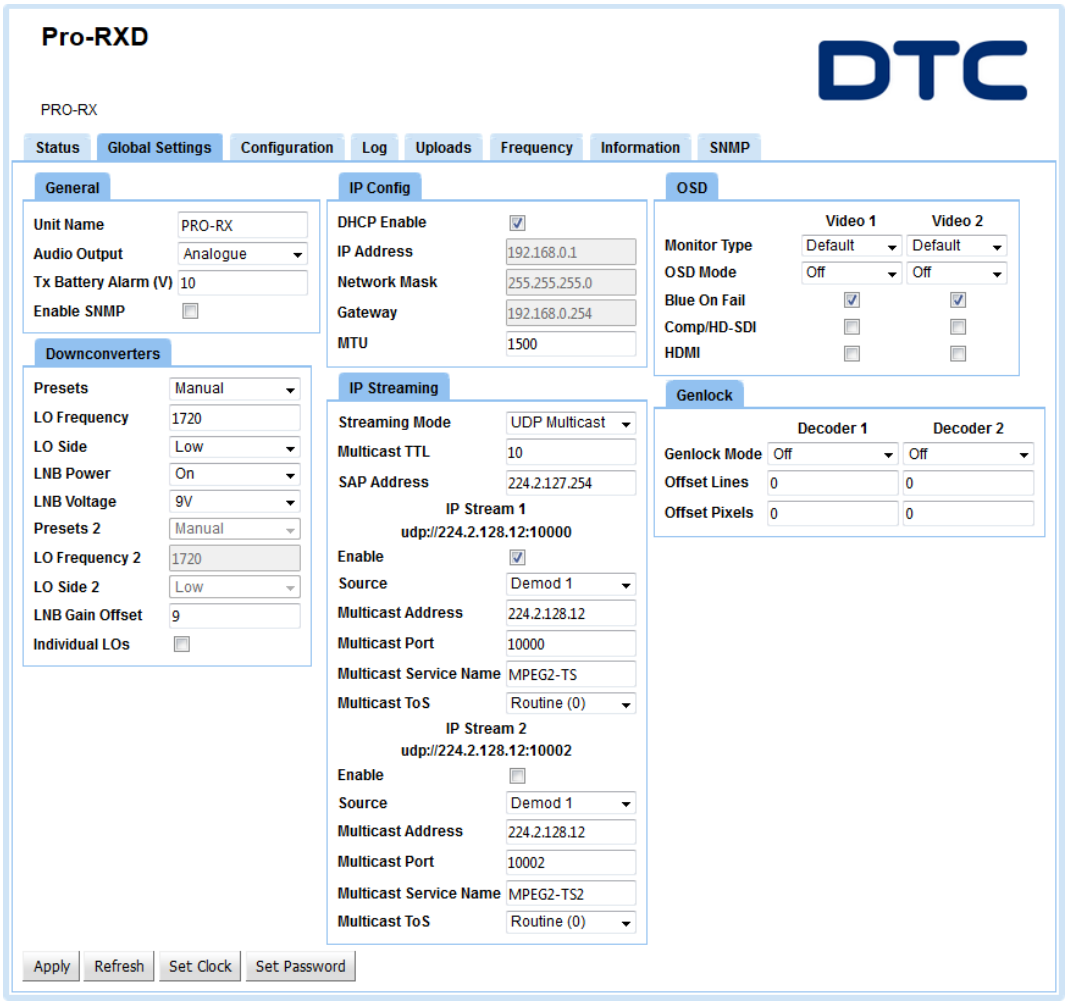

Figure 6-17 Global Settings Tab

Step 2: Configure the General Settings Pane

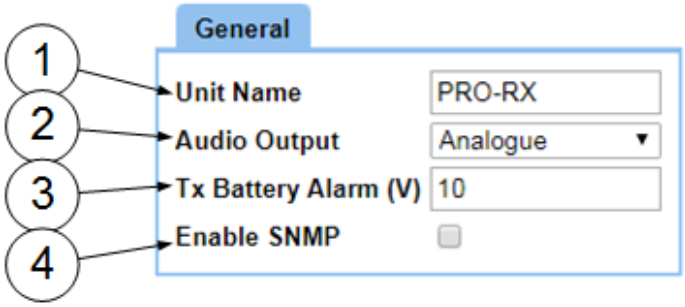

Figure 6-18 General Settings Pane

No	Property	Range	Description
1	Unit Name	User defined	Enter a name for the unit. It can be user friendly or be a reference to location, for example.
2	Audio Output	Analogue or Digital	Select the audio mode to suit your operation.

No	Property	Range	Description
3	TX Battery Alarm (V)	A value from 0 to 20V	The voltage where the TX battery voltage caption turns red.
4	Enable SNMP	Checkbox	If you need to work with SNMP you need to set this feature.

Table 6-14 General Settings Pane Key

Step 2: Configure the Downconverter Settings Pane

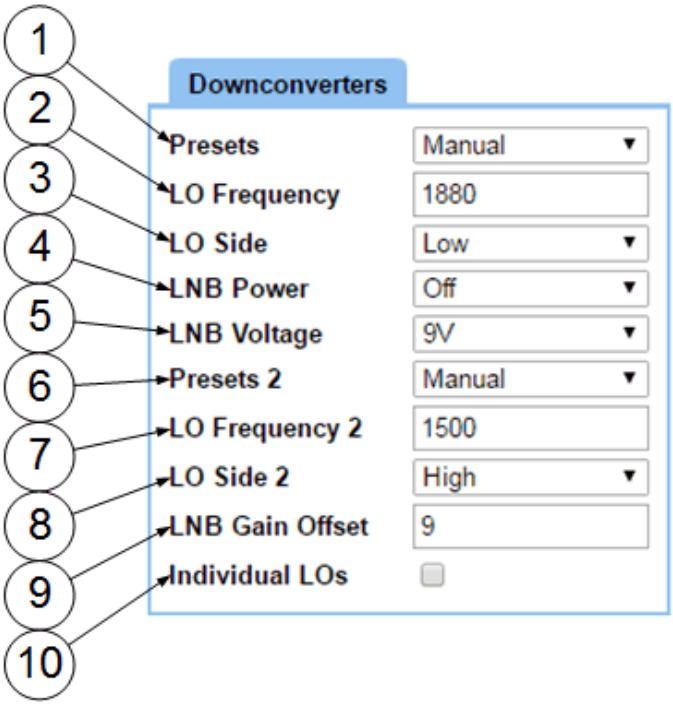

Figure 6-19 Downconverter Settings Pane

No	Property	Range	Description
1+6	Presets	Manual UHF DCB-100150 DCB-150200 DCB-200250 DCB-250300 DCB-300350 DCB-340370 DCB-450500 DCB-550600 DCB-810860 DCBGS-100150 DCBGS-167203 DCBGS-203255 DCBGS-310360 DCBGS-440500 DCBGS-550600 DCBGS-640700 DCBGS-700750 DCEBGS-198270 DC-100140 DC-225265	If you select **Manual** it means it will be necessary to type in the LO Frequency and LO Side in the next two fields manually. You might do this for an unusual frequency that requires an odd downconverter. If you select **UHF** it means it is not really necessary to have a downconverter because the receiver is UHF anyway. There can be an amplifier up near the antenna. The easiest thing to do is select your downconverter from the list. Then the LO Frequency and LO Side will be filled in for you. Look at the label on your downconverter to see which model you have.

No	Property	Range	Description
2+7	LO Frequency (MHz)	1880 or a correct downconverter frequency.	Most of our receiver units operate **downconverters** to lower the frequency from microwave (L, S and C-Band) to an Intermediate Frequency (IF) between 51 and 858MHz that the on-board tuners in the receivers can operate with. We find this information from the downconverter frequency and side table in *Appendix D – Downconverter Data*.
3+8	LO Side	Low or High	It is necessary to set which side (of the expected incoming frequency) the LO frequency will be. In my example the incoming frequency I wish to receive is in S-Band, 2.25GHz to 2.65 GHz. I've selected a DC-225265 downconverter with a LO Frequency of 1880MHz. We see that 1880MHz is *lower* than 2.25GHz, thus I set the LO side to be **Low**. We find this information from the downconverter frequency and side table in *Appendix D – Downconverter Data*.
4	LNB Power	On or Off	It is necessary for the downconverters up on the mast to have power. We send this along the IF line. We name this LNB power and this is where you switch it on. LNB=Low Noise Block. You can wish to switch LNB power off if you are operating a third party downconverter that has its own power supply for example.
5	LNB Voltage	9V or 12V	When the unit is fitted with latest tuner PCBs, the LNB voltage is selectable.
9	LNB Gain Offset	9 typically, but an applicable value to suit the downconverter you are operating.	Most downconverters introduce gain to the RF path. A DCB-200250 for example introduces 9dB in its standard gain version and 19dB in the high gain version. To make sense of the signal strength numbers it is necessary to apply this correction.
10	Individual LOs	Select or Clear	When cleared the LO Frequency and LO Side apply globally to all downconverters attached to the receiver. When selected, new fields open up to let you set individual LO Frequencies and LO Sides for each downconverter. This means you could have one half of the antennas set up for S-Band and the others, L-Band.

Table 6-15 Downconverter Settings Pane Key

Step 3: Select the Individual LOs Checkbox

When selected, more fields which let you see individual LO Frequencies are shown. You will also find a checkbox which enables you to invert the COFDM spectrum.

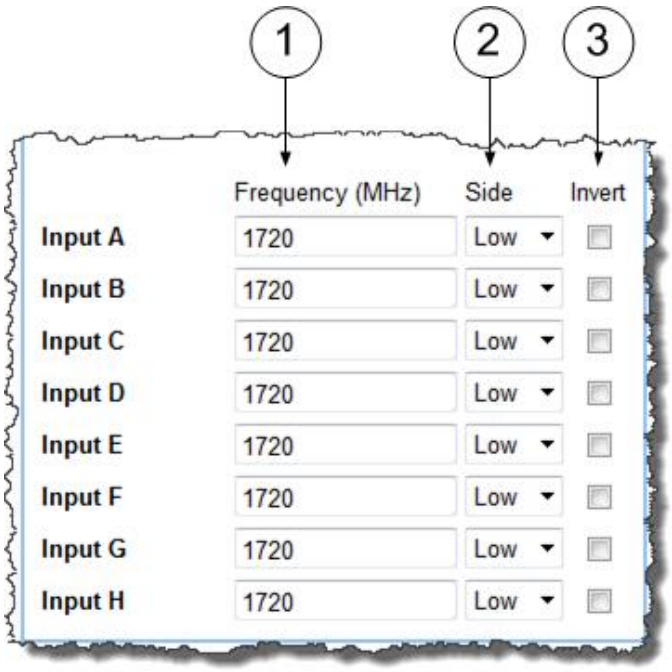

Figure 6-20 Downconverter Settings Pane with Individual LOs Selected

No	Property	Range	Description
1	LO Frequency (MHz)	1720 or a correct downconverter frequency.	All our receiver units operate **downconverters** to lower the frequency from microwave (L, S and C-Band) to an Intermediate Frequency (IF) between 51 and 858MHz that the on-board tuners in the receivers can operate with. We find this information from the downconverter frequency and side table in *Appendix D – Downconverter Data*.
2	LO Side	Low or High	It is necessary to set which side (of the expected incoming frequency) the LO frequency will be. We find this information from the downconverter frequency and side table in *Appendix D – Downconverter Data*.
3	Invert	Select or Clear	Selected=Inverted Cleared=Normal All DTC equipment must operate with normal mode. The receivers can be used with other manufacturer's products and sometimes this requires us to change the polarity to inverted to align with this third party equipment.

Table 6-16 Individual LO Settings Key

Step 4: Configure the IP Config Pane

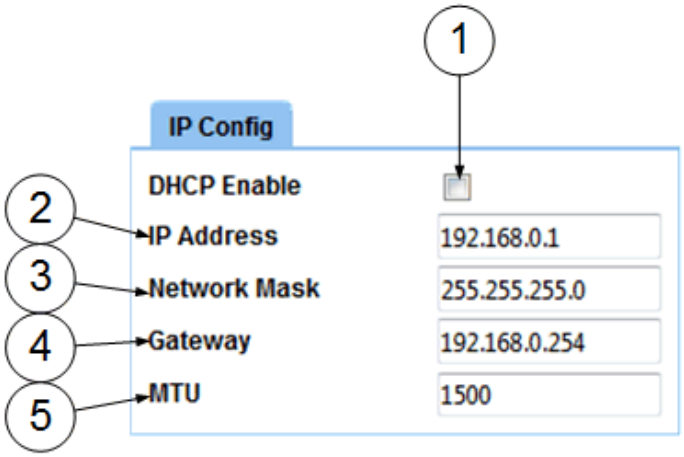

Figure 6-21 IP Settings Pane

No	Property	Range	Description
1	DHCP Enable (Dynamic host configuration protocol)	Select or Clear	When selected the PRORXD is given an IP address by an external DHCP server. In managed networks which use DHCP address allocation this must be selected. In networks that are manually managed (or do not have a DHCP server), users can give an IP address manually.
2	IP Address	Example: 192.168.2.65	If the PRORXD is not automatically acquiring its IP address through a DHCP server then a fixed IP address needs to be assigned to the unit Type an **IP address** for this PRORXD in the IP address text box. You can select a class of network of your choosing.
3	Network Mask	Example: 255.255.255.0	The network mask allows a network administrator to divide a network into smaller more useful subnets to stop too many numbers of IP packets being routed through the network. This is usually defined by the network administrator. Type a **subnet mask** in the Network mask text box.
4	Gateway	Example: 192.168.2.254	A default gateway is used by a host when an IP packet's destination address belongs to someplace external to the local subnet. The default gateway address is usually an interface belonging to the LAN's border router. **Note**: For correct streaming operation, a correct Gateway address in the IP subnet range must be set manually or through DHCP.
5	MTU	1344 – 1500	Maximum Transmission Unit (MTU) - This should be set to the same value as the network supports. For normal LAN this would be 1500.

Table 6-17 IP Settings Pane Key

Step 5: Configure the IP Streaming Pane

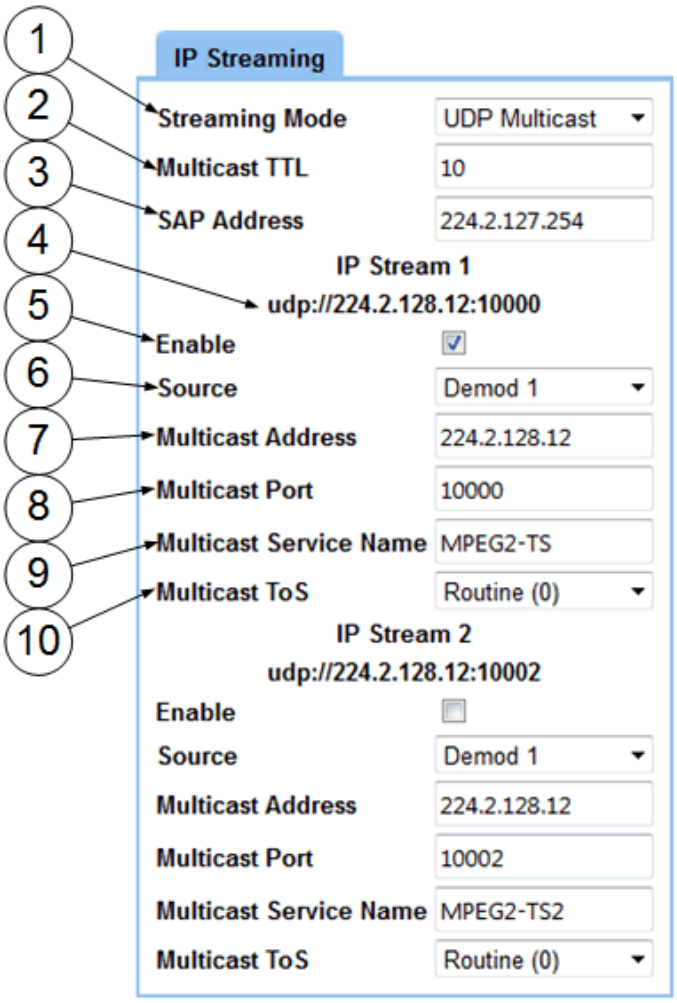

Figure 6-22 Streaming Settings Pane

No	Property	Range	Description
1	Streaming Mode	UDP Multicast RTSP Multicast RTSP Unicast	Select the streaming mode you wish to operate with.
2	Multicast TTL	1 to 255	This is the multicast time to live value.
3	SAP Address	Default – 224.2.127.254	SAP/SDP contains announcement and descriptor data. This will allow you to change the SAP address, if required.
4	Streaming URL		This is the URL you will need to enter into your media player to run IP streams. **Note**: You will need to add @ to the UDP URL. See Recovering a UDP Multicast Stream – VLC.

No	Property	Range	Description
5	Enable	Select or Clear	Switches the streaming item on or off. **Note**: The PRORXD must be licensed for Streaming. If it is not, it is not possible to switch Streaming on. Also, for correct streaming operation, a correct Gateway address in the IP subnet range must be set manually or through DHCP.
6	Streamer Select	Demod 1 Demod 2 ASI Input 1 ASI Input 2 Remux Decoder 1 Decoder 2	You select the source that will give the stream from this drop-down box. Demod 1 for example means the stream will come from the first receiver channel.
7	Multicast Address	Default – 224.2.128.12	This text box enables you to change the multicast address used by the unit. It is also possible to Unicast by specifying an applicable destination IP address in the local subnet range.
8	Multicast Port	10000 Range available is 1-65535	Protocols like TCP or UDP use port numbers in the header to point traffic around the network. Low port numbers are used by computer systems for predefined tasks. For example SMPT (for your email service) uses port 25. A good rule is to use numbers above 10,000 to stop confliction with existing services. When you set up a port number on many computers on a network they will all listen for packets directed to that port. The default values are 10000 and 10002.
9	Multicast Service Name	Up to 20 ASCII characters.	The defaults are MPEG2-TS and MPEG2-TS2. This is an identifier for the service.
10	Multicast ToS	Routine (0) Priority (1) Immediate (2) Flash (3) Flash Override (4) Critical (5) Internetwork Control (6) Network Control (7)	The importance of the Multicast can be set here.

Table 6-18 Streaming Settings Pane Key

Step 6: Configure the OSD Settings Pane

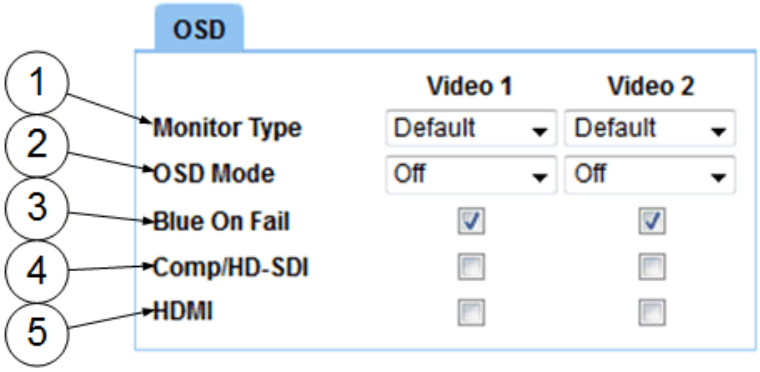

Figure 6-23 OSD Settings Pane

No	Property	Range	Description
1	Monitor Type	Default ALR-1920	For most systems use the **Default** setting.
2	OSD Mode	Off Date/Time Detailed Spectra Freq Scan	You can select how much information is displayed on the On Screen Display (OSD).
3	Blue On Fail	Select or Clear	When selected, if the link is broken, a blue screen appears. Some broadcasters prefer not to have blue on fail set.
4	Comp/HD-SDI	Select or Clear	When selected the OSD is displayed on the Composite and HD-SDI outputs.
5	HDMI	Select or Clear	When selected the OSD is displayed on the HDMI output.

Table 6-19 OSD Settings Pane Key

Step 7: Configure the Genlock Settings Pane

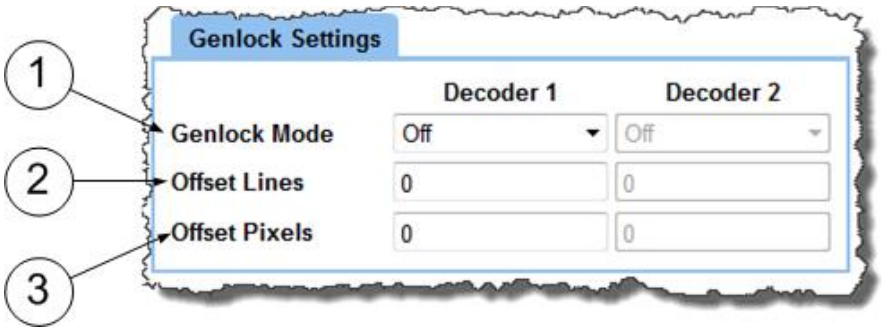

Figure 6-24 Genlock Settings Pane

No	Property	Range	Description
1	Genlock Mode	Off External Internal	Off - Genlock switched off and system is not locked. External – Operating with the Genlock source connected to the external port on the rear of the receiver. This is usually your station SPG. Internal – Operating with the receiver's own Genlock source built into the unit.
2	Offset Lines	0	Standard dependant. Enables you to apply delay adjustment.
3	Offset Pixels	0	Standard dependant. Enables you to apply delay adjustment.

Table 6-20 – Genlock Settings Pane Key

Step 8: The Apply Button

When you change a parameter on the Control Application it is very important to click the Apply button and wait for a moment for the changes to be sent to the device.

Frequently personnel change a parameter and then wonder why the device has not changed behaviour. Always click the **Apply** button.

Step 9: The Refresh Button

If the Polling is enabled then the Control Application will poll the device at intervals of two seconds thus it can update the Transmitter Control Window with the latest configuration changes.

Sometimes, it might be necessary to keep the polling off. To update the Window in this situation it will be necessary to click the Refresh Button to see the latest changes.

Step 10: Set Clock

The PRORX-D has an on board real time clock battery which will allow you to set the time and date for the unit.

When you click the **Set Clock** button, a window will open which will allow you to enter the current **Date**, **Time**, **Time Zone** and apply **Daylight Saving** (if applicable).

Step11: Set Password

You can set a Password for your PRORX-D to provide a secure login for anyone wishing to view the web browser control.

When you click on the **Set Password** button, a window will open which will allow you to change the password.

You will need to know your **Old Password** if you have previously set one (if not leave this blank), check the **Enable Password** box and enter and confirm your **New Password**.

You will immediately be presented with a login dialogue for your web browser. Enter the **User Name** as **admin**, which **cannot be edited**, and your Password to re-login to your PRORX-D.

If you wish to reset your PRORX-D so that it no longer requires a password login, uncheck the **Enable Password** box and enter your **Old Password**.

6.7 Working with the Configuration Tab

The Configuration tab contains the list of 16 presets. Each preset enables you to specify demodulation parameters, decoding modes, and descrambling configuration.

You can easily install a different preset by selecting one of the 16 configuration tabs and clicking the **Apply** button.

The **Live** preset is indicated by a **green box** around the preset number.

Changes to the live preset are automatically applied with the **Apply** button. Changes made to all other non-live presets can be saved by clicking on **Save**.

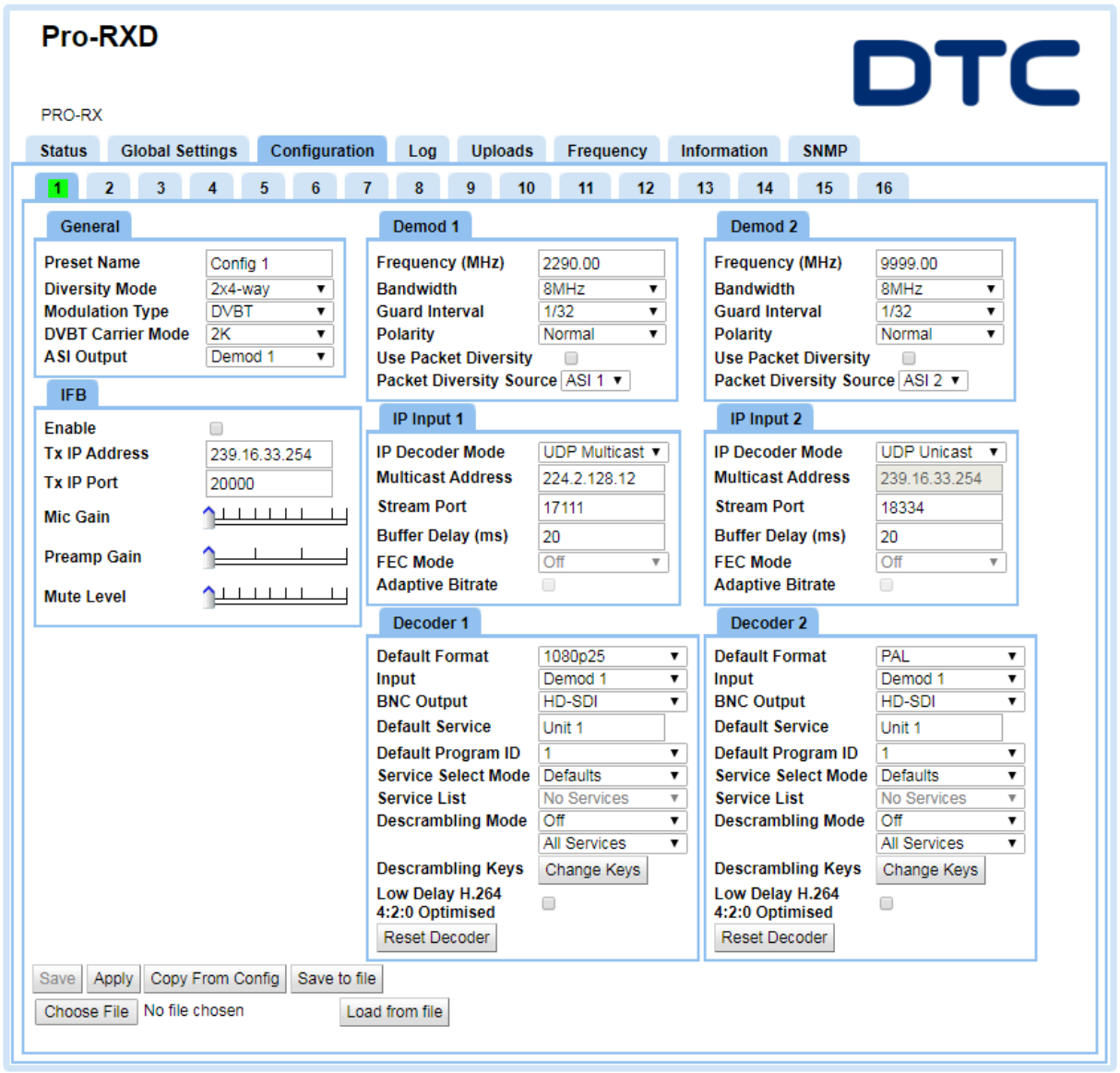

Figure 6-25 Configuration Tab

The Preset Tab Colours

1. The **green box** shows which preset is currently **in operation** in the receiver.
2. The **light blue** tab shows presets available for you to operate with (there are 16).
3. The **dark blue** tab shows the preset you are currently **editing**.

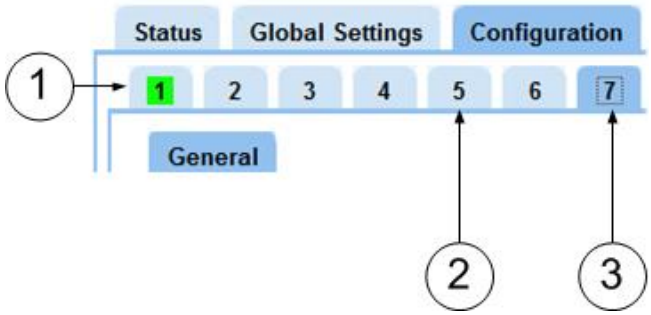

Figure 6-26 Preset Tab Colours

The General Pane

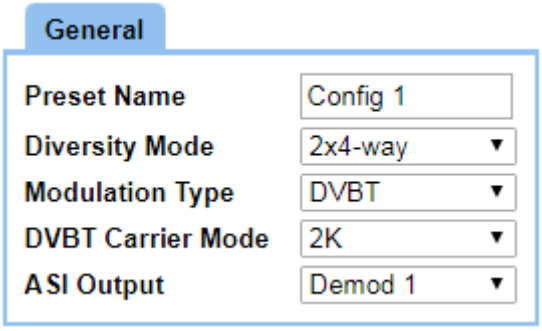

Figure 6-27 General Pane

Property	Range	Description
Preset Name	User defined	This is where you **name** the current configuration.
Diversity Mode	1x2-way 1x4-way 1x6-way 1x8-way 2x2-way 2x4-way	The configuration of the diversity and channel configuration of the receiver.
Modulation type	Narrowband DVBT UMVL	Select the modulation bandwidth you wish to operate with. UMVL (Ultra Mobile Video Link) is a mixture of technologies between DVBT and Narrowband. It is optimised for operation in high speed mobile environments (like car racing for example). UMVL is also excellent when you are operating with high frequency (4 GHz and above) transmissions.
DVBT Carrier Mode	2K or 4K	If you selected DVBT as your Modulation Type earlier, you can select how many carriers will be used at this time. 2K=About 2000 4K=About 4000 (dual pedestal mode)

Property	Range	Description
ASI Output	Demod 1 Demod 2 ASI In 1 ASI In 2 IP 1 IP 2 Dec 1 Dec 2	The source for the ASI output is selected here. For example if you select Demod 1, then this will send an ASI signal to the ASI Out port.

Table 6-21 General Pane Key

The IFB Pane

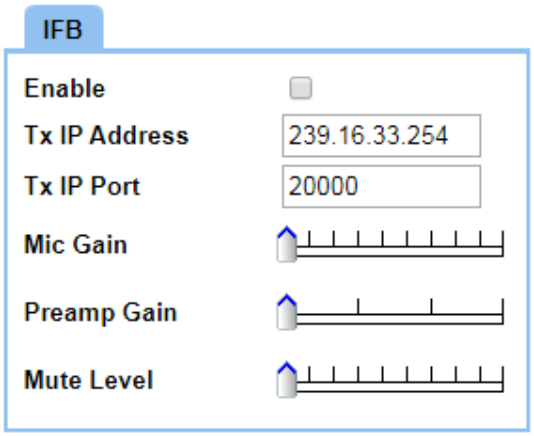

Figure 6-28 IFB Pane

Property	Range	Description
Enable	Select or Clear	When selected the Interruptible fold back system is switched on. The IFB is a special intercom circuit that consists of a mix-minus program feed sent to an earpiece worn by presenter via IP (audio that is being “fed back” to presenter) that can be interrupted and replaced by a television producer's or director's intercom microphone.
Tx IP Address	Example: 192.168.2.65	This is the IP Address of the device to which you are sending the fold back. This device is usually be located with the presenter.
Tx IP Port	Range available is 1024-65535	Protocols like TCP or UDP use port numbers in the header to point traffic around the network. Low port numbers are used by computer systems for predefined tasks. For example SMPT (for your email service) uses port 25. A good rule is to use numbers above 20,000 to stop confliction with existing services. When you set up a port number on many computers on a network they will all listen for packets directed to that port. The default value is 20000.
Mic Gain	Slider	Drag and drop the slider to adjust.
Preamp Gain	Slider	Drag and drop the slider to adjust.

Property	Range	Description
Mute Level	Slider	Drag and drop the slider to adjust.

Table 6-22 IFB Pane Key

The Demod Pane

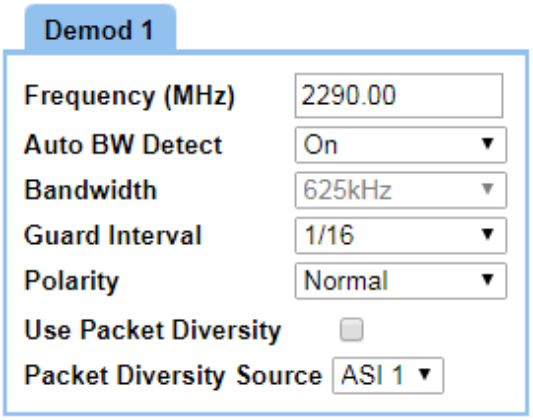

Figure 6-29 Demod Configuration Pane

Property	Range	Description
Frequency (MHz)	L, S and C Bands	The frequency in megahertz (MHz) that you wish to operate with this preset. If you try to input a frequency that is out of range, the radio will tune the nearest available frequency automatically.
Auto BW Detect	Off or On	**Narrowband only**. When on, the receiver will try to automatically find the bandwidth.
Bandwidth	DVBT:6, 7 & 8MHz Narrowband: 2.5MHz 1.25MHz 625kHz	DVB-T bandwidths (usually used for broadcast) Narrowband (usually surveillance) 625kHz Ultra-Narrowband (this is a licensable item, usually surveillance)
Guard Interval	Narrowband: 1/16 or 1/8 DVBT: 1/32, 1/16, 1/8, 1/4	The guard interval which is being applied to the narrowband mode in operation. The guard interval is a deliberate extension of the RF symbol period to give immunity to reflections. 1/16, short extension, deals with fast reflections, more data, less range. 1/8, long extension, deals with slower reflections, less data, more range.
Polarity	Normal Inverted Auto	All DTC equipment must operate in normal mode. The receivers can be used with other manufacturer's products and sometimes it will be necessary to change the polarity to inverted to align with this third party equipment. If you select Auto the receiver will try to automatically select the correct format for you.

Property	Range	Description
Use Packet Diversity	Checkbox	Packet diversity combines the MPEG-2 Transport Streams from two receivers that are tuned to the same transmitter into a single stream such that if one stream has an error then the packet can be taken from the second stream if that one was received correctly.
Packet Diversity Source	ASI IP	Select the packet diversity 2nd source.

Table 6-23 Demod Configuration Pane Key

The IP Input Pane

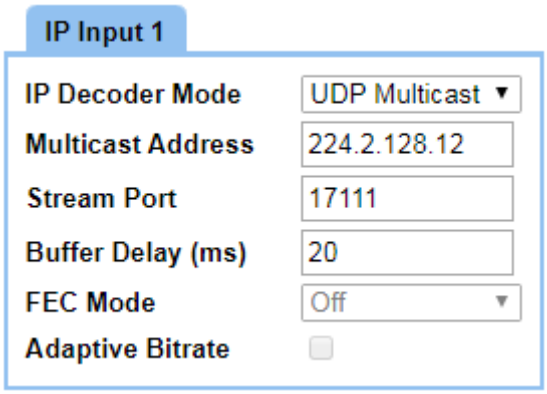

Figure 6-30 IP Input Pane

Property	Range	Description
IP Decoder Mode	UDP Unicast UDP Multicast RTP Unicast RTP Multicast	Select the mode of the received IP stream.
Multicast Address	Default: 239.16.33.254	Enter the multicast address to be received by the unit.
Stream Port	Range available is 1024-65535	Protocols like TCP or UDP use port numbers in the header to point traffic around the network. Low port numbers are used by computer systems for predefined tasks. For example SMPT (for your email service) uses port 25. A good rule is to use numbers above 10,000 to stop confliction with existing services. When you set up a port number on many computers on a network they will all listen for packets directed to that port.
Buffer Delay	50ms for example ms – milliseconds.	IP packets can be delivered unevenly which causes jitters. This buffer is designed to make the flow of data smoother by adding a small delay to the stream.
FEC Mode	Off ProMPEG	Only selectable when RTP is selected as the IP Decoder Mode. ProMPEG offers error correction for real-time video streams.

Property	Range	Description
Adaptive Bitrate	Checkbox	Only selectable when RTP Unicast is selected as the IP Decoder Mode.

Table 6-24 IP Input Pane Key

The Decoder Pane

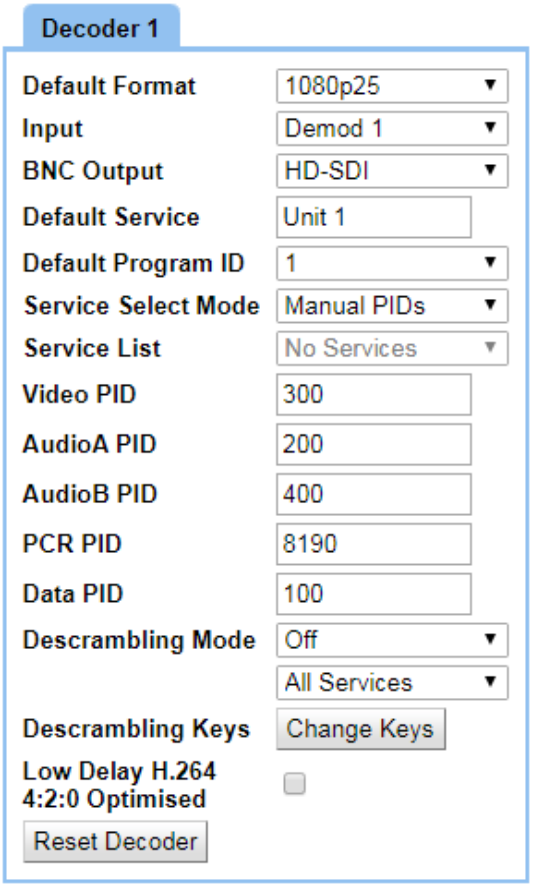

Figure 6-31 Decoder Configuration Pane

Property	Range	Description
Default Format	Various HD PAL NTSC	Select the video format for your system from the dropdown list.
Input	Demod 1 Demod 2 ASI 1 ASI 2 IP 1 IP 2	Source feeding the decoder. Licence dependent.
BNC Output	HD-SDI Composite ASI	You can select the signal to be passed to the decoder's BNC connector.

Property	Range	Description
Default Service	User defined	If the received stream contains multiple services, this service name will be checked to see if anything is the same and used as preference.
Default Program ID	1 to 10	This sets which program number in the transport stream will be used on initial power up. If the received stream contains multiple services, this program ID will be checked to see if anything is the same and used as preference.
Service Select Mode	Defaults List Manual PIDs	This selects how services in the transport stream will be selected. Defaults – Uses Default Service name and Program ID as set earlier. List – Will show a list of available services in **Status>Service>Service List 1** or **2**. Manual PIDs - Enables you to select applicable elements from the transport stream like alternative language audio. Additional selections will appear in the **Decoder** menu.
Service List	H.264 Unit 1 for example.	If you select **List** in **Service Select Mode**, this field will show a list of available services on the current transport stream. The selected service from the list will be decoded.
Video PID	0x0020 to 0x1FFE	This is available when you select **Manual PIDs** in the **Service Select Mode**. Set the manual video service PID for decoding
AudioA PID	0x0020 to 0x1FFE	This is available when you select **Manual PIDs** in the **Service Select Mode**. Set the manual audio service PID for decoding
AudioB PID	0x0020 to 0x1FFE	This is available when you select **Manual PIDs** in the **Service Select Mode**. Set the manual audio service PID for decoding
PCR PID	0x0020 to 0x1FFE	This is available when you select **Manual PIDs** in the **Service Select Mode**. Set the manual PCR PID for clock reference
Data PID	0x0020 to 0x1FFE	This is available when you select **Manual PIDs** in the **Service Select Mode**. Set the manual Data service PID for decoding
Descrambling Mode	Various	If you wish to operate descrambling you'll select your mode here. You might not have all the modes shown here as they are licensable features.
	All Services Selected Service	If you select **List** in **Service Select Mode**, this field will allow you to apply descrambling just to the service you selected in the **Service List**.

Property	Range	Description
Descrambling Keys	Change Keys button.	After selecting a Descrambling Mode, push this button to open the Enter Scrambling Key dialog where you can set the key. See *Setting up Encryption.*
Low Delay H.264 4:2:0 Optimised	Checkbox	If set, Low Delay mode is particularly useful in critical real-time applications. **Note**: Low Delay mode will **only** support **H.264** video from a **DTC** transmitter or encoder device. It does not support MPEG-2 or MPEG-4 ASP, and it is not compatible with 3rd party systems.
Reset Decoder		Click to reset the Decoder. If you are having problems with picture quality, try clicking this button to reset the decoder as a first line of troubleshooting. The reset is quick and immediate.

Table 6-25 Decoder Configuration Pane Key

6.8 Working with the Copy from Config Button

Sometimes you wish to assemble a new configuration from one that exists. For example, you might have a complex configuration you like to operate with, but want to change the frequency. The **Copy from Config** button makes this very simple.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Configuration Tab

1. Click on the **Configuration** tab.
2. The Configuration Page opens.

Step 2: Select the Preset you wish to Setup

3. Click on a **Config** tab. I've chosen config 3 in my example. It turns **dark blue** which means you are **editing** that config.

Step 3: Open the Choose Options to Copy Window

4. Click the **Copy from Config** button.
5. The **Choose Options to Copy** window opens.
6. Select a **Config** to copy options **from**. I've chosen Config 1 in my example.
7. **Select** items you wish to be copied **to** your new preset.
8. Click the **OK** button.
9. You'll see the **Saved Successfully** message box.

10. Click the **OK** button.
11. All the configs you selected from Config 1 are pasted into config 3 at this time.

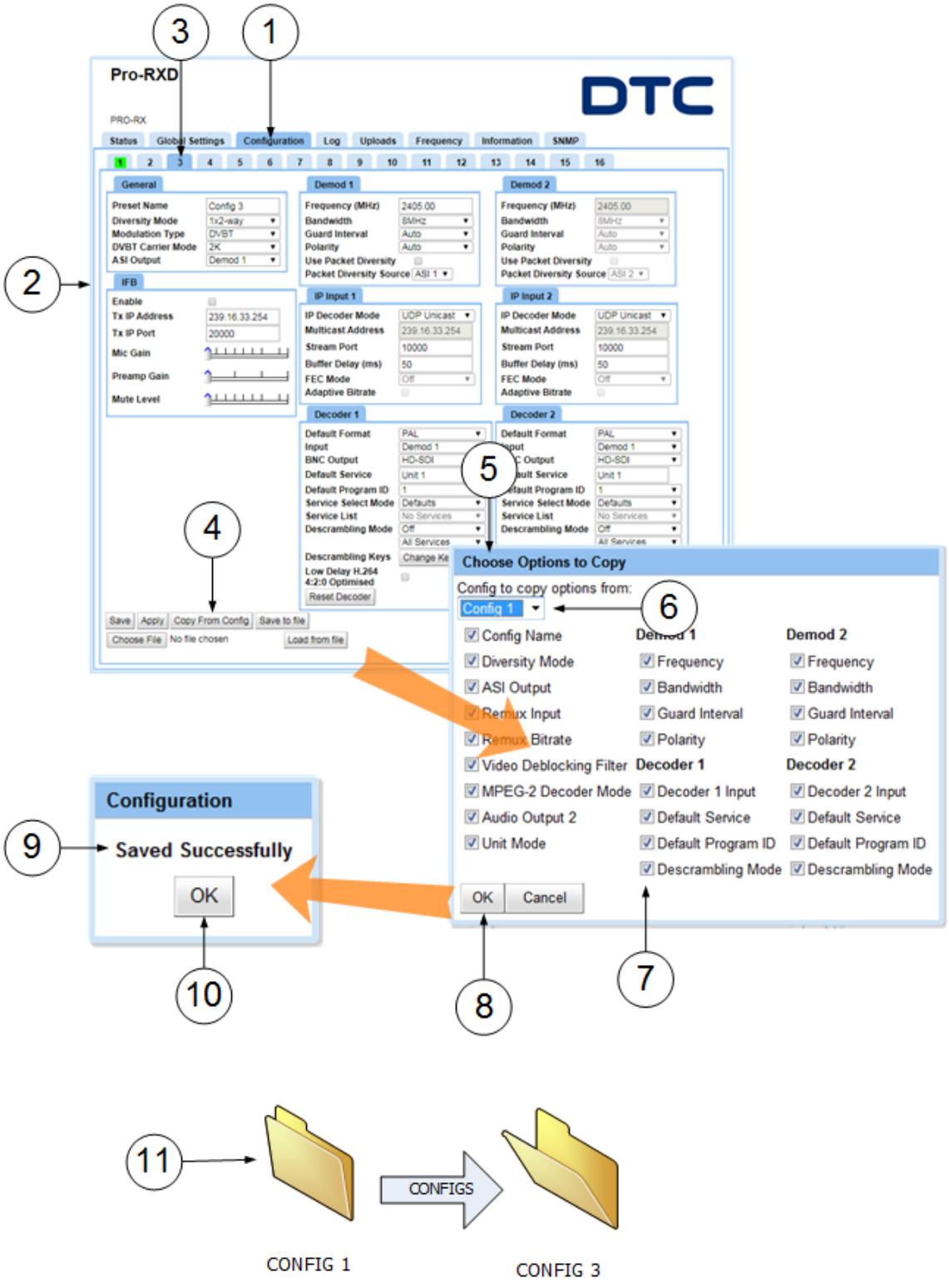

Figure 6-32 Working with the Copy from Config Button

6.9 Working with JSON Config Files

The **Save to file**, **Choose File** and **Load from file** buttons allow you to work with JSON formatted files in order to reconfigure a PRORXD. These buttons can all be found on the Configuration tab.

Save to file Click this button to download the current PRORXD config in a JSON formatted file. This file can be read and edited with a text editor program, Notepad, WordPad etc.

Choose File Click this button to browse to a location on your PC or Network, where a previously saved and edited JSON formatted config file is stored.

Load from file Click this button to complete the process and upload the file to the PRORXD.

Note: You can refer to the *JSON Integration Document* for a full list of JSON attributes for the PRORXD. This can be found on DTCs Watchdox facility.

6.10 Working with the Log Tab

The PRORXD receiver generates log files of receiver status information.

Before you Start

It is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Log Tab

1. Click on **Log** tab.

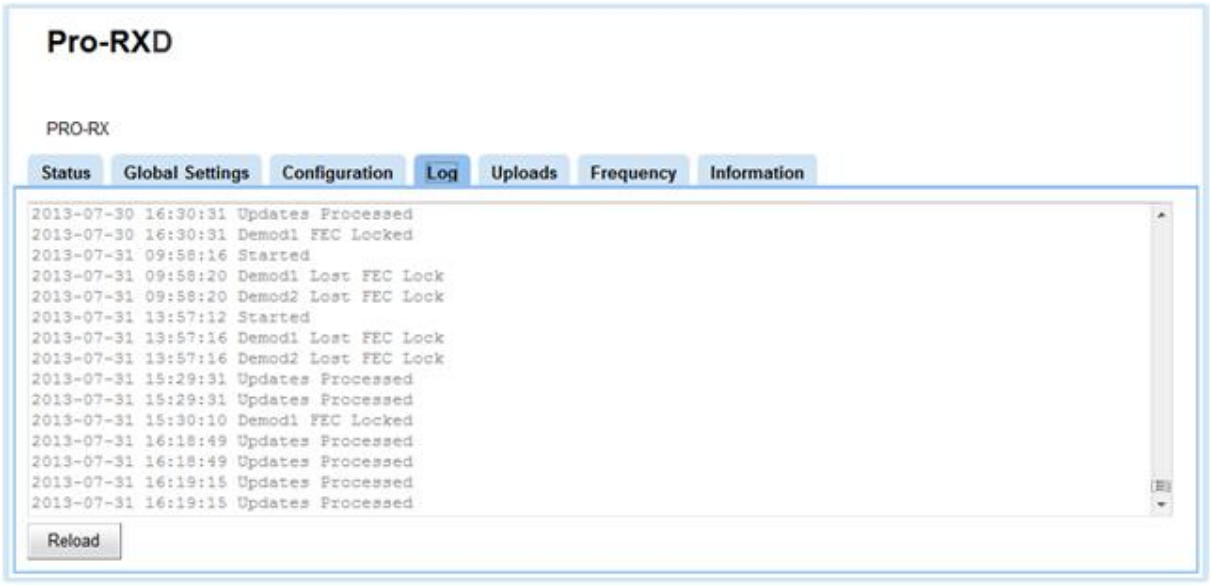

Figure 6-33 Log Tab

Step 2: Interpret the Information Presented in the Log Tab

The log tab shows events with time information. The events logged include stream errors and software updates processed.

Step 3: Reload Button

Click the **Reload** button to make a reload of the page data.

6.11 Working with the Upload Tab

This page enables you to upload a license file, enable licensable features, or send software upgrade files to the PRORXD.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Uploads Tab

1. Click on **Uploads** tab.

Figure 6-34 Uploads Tab

Step 2: Upload a New License File

If a new licensable feature is purchased for a unit then a new license code has to be programmed into the PRORXD to let you operate it.

DTC will make a new license file (with the file extension .lic) which we will send to you.

1. Open the **Uploads** Tab
2. Click the **Browse** button near to the **Licence** text box
3. The **Choose File to Upload** window opens
4. Navigate to the .lic file we sent you
5. Click **Open**
6. Check the **correct file** is shown in the **Licence** text box
7. Click **Upload File**
8. The licence is written to the unit, you'll see a **message**
9. After **rebooting** the unit, the new features will be available.

Step 3: Upgrade your PRORXD

When a new software release is available for the PRORXD, DTC can supply customers with a software upgrade.

The upgrade is provided as a single file or two files which need to be uploaded in sequence. The single file can be used for upgrades of software v2.2.0 onwards, but if the software is v2.1.1 or earlier use the two files.

Refer to *Figure 6-34* when reading these instructions.

1. Open the **Uploads** tab.
2. Click the **Browse** button near to the **Upgrade** text box.
3. The **File Upload** window opens.
4. Navigate to the *d330_os_x.x.x.upg* file we sent you or *d330_all_x.x.x.upg* if using the single file, where *x.x.x* is the software version.
5. Click **Open.**
6. On the web browser, click **Upload File,** a **Please Wait - Unit Upgrading** message will be displayed for a few minutes.
7. When the upgrade is successful, choose the option **No, I'll do a manual reboot**, or if using the single file skip to step 10.
8. On the web browser, click **Browse** and select the *d330_prorxd_data_x.x.x.upg* file followed by **Open**.
9. Again click **Upload File** and wait a few minutes more for the upgrade to complete. This should take a little longer that the previous file.
10. This time when the upgrade is successful, choose the option **Yes, reboot now**.
11. After rebooting the unit, the new features will be enabled. Refresh the web browser to view the new software version in the **Information** tab.

6.12 Working with the Frequency Tab

The **Frequency** tab enables you to scan the spectrum around you within a **bandwidth** and **resolution** of your choice.

You can operate the **Find** item which will tag the strongest signals and report their frequencies to you.

You can operate the **Cycle** button to select found frequencies in turn and if you wish you can push the **Select** button which will make that frequency currently in operation in your PRORXD.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Frequency Tab

1. Click on **Frequency** tab.

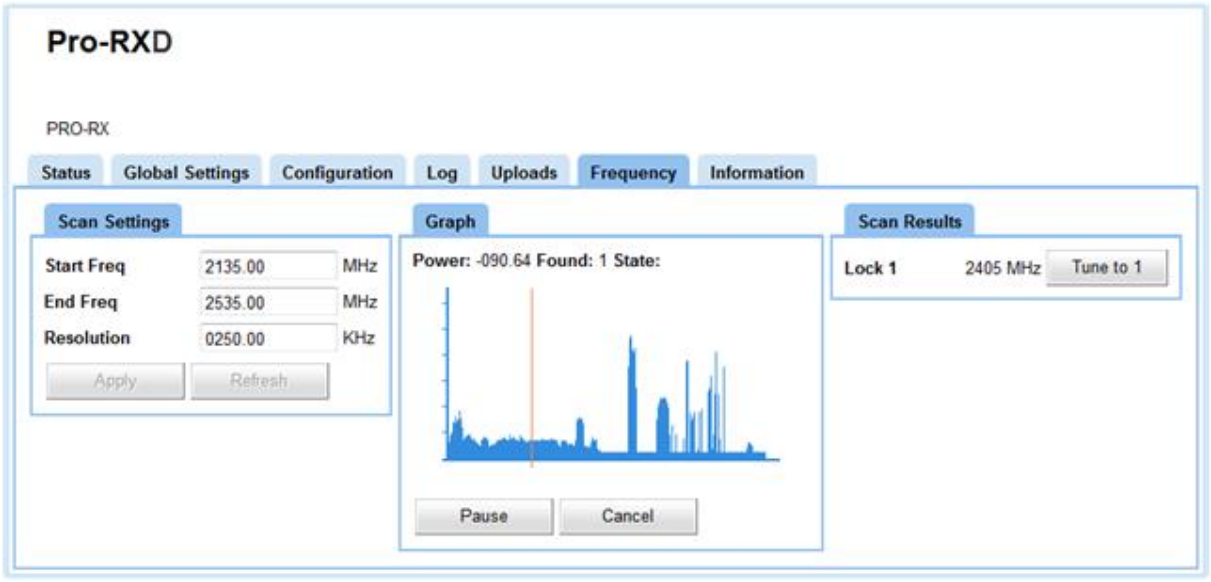

Figure 6-35 Frequency Tab

Step 2: Configure the Scan Settings Pane

1. Click the **Refresh** button – this resets scans in the frequency scanner made before.
2. Type in the **Start** frequency in MHz you wish to use for your Frequency scan. If you type a frequency that is too low the Start frequency will set itself to the lowest frequency this PRORXD can do.
3. Type in the **End** frequency in MHz you wish to use for your Frequency scan. If you type a frequency that is too high the End frequency will set itself to the highest frequency this PRORXD can do.

Note: The wider the band you wish to scan with the Start and Stop values, the longer the scan will be.

4. Type in the **Resolution** frequency in MHz you wish to use for your Frequency scan. If you type a very small resolution like 0.5 MHz the scan will find many more individual frequencies but the scan will be much longer. Operating with a larger resolution will speed up the scan but can miss very small frequency steps.
5. Click the **Apply** button.
6. The **Scan Settings** message window opens.
7. Click the **OK** button.

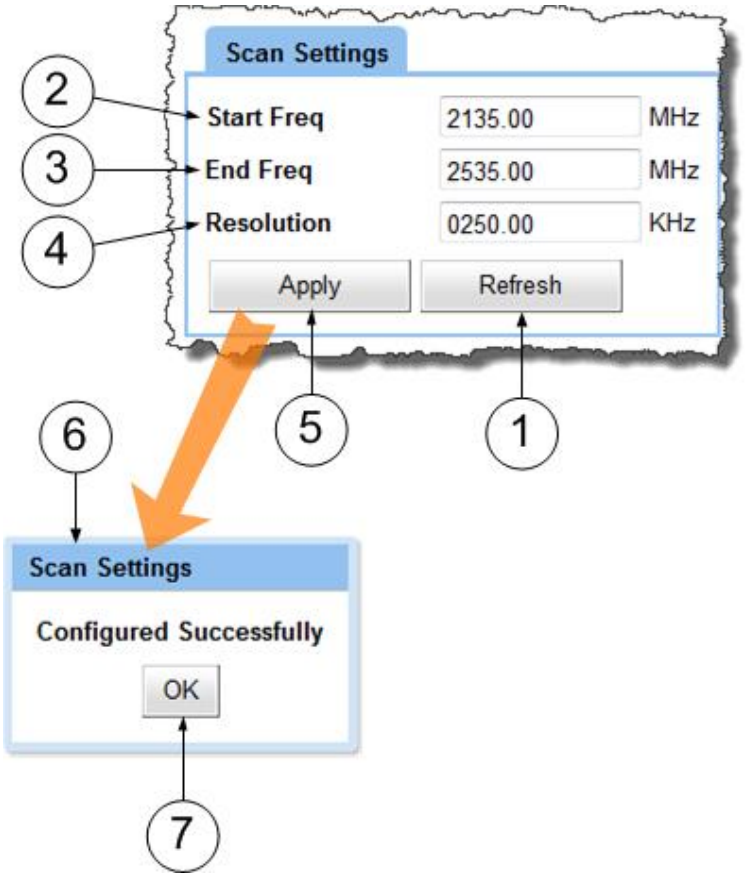

Figure 6-36 Scan Settings Pane

Step 3: Start the Scan

1. Click the **Start** button.
2. The **Confirm Scan** message window opens. This reminds you that all usual operations will stop.

CAUTION: This means the receiver will stop channel it is receiving. Do not operate the scan if the receiver is on air!

3. Click the **OK** button.
4. Look at the **graphical display** of the scan. The orange line will move across the screen drawing a graph of RF power levels. The **State** indicator shows **scanning**.
5. You can click the **Pause** button if you wish at this time. Click the **Continue** button to let the scan continue.
6. After the scan, there is a **testing** phase – please wait until this is finished.

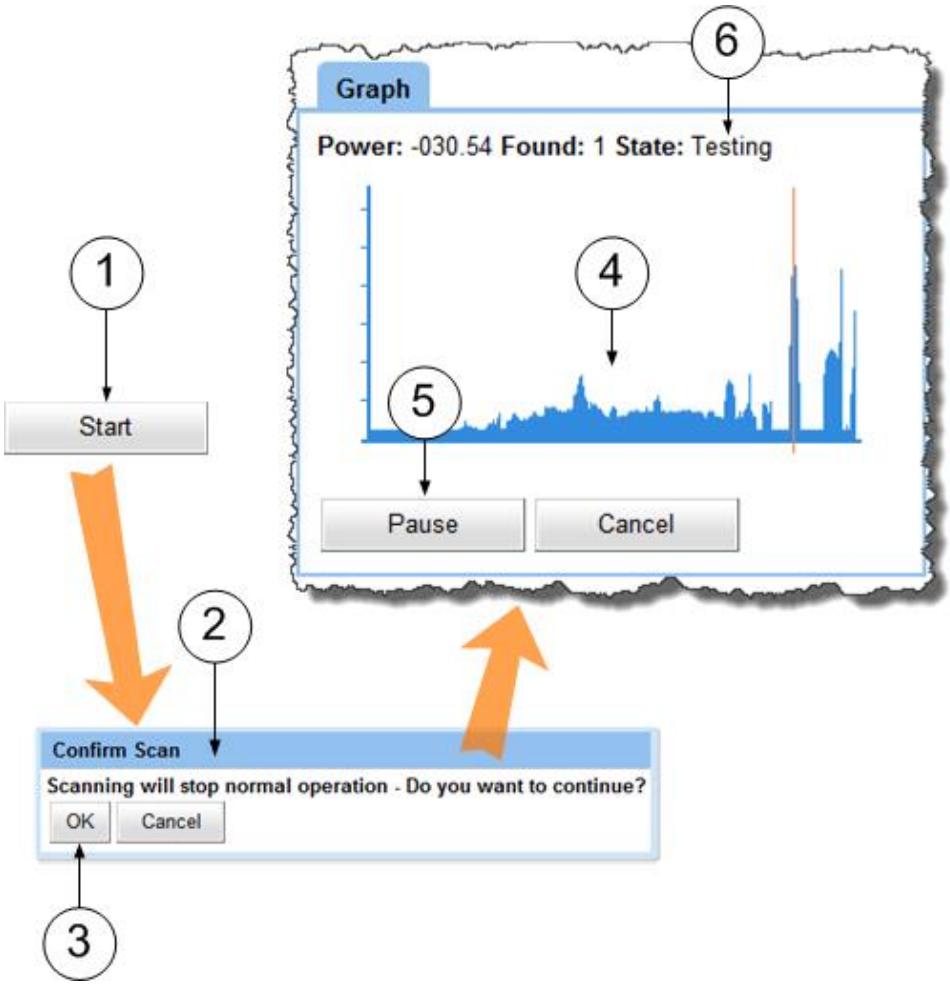

Figure 6-37 Graph Pane

Step 4: Check the Scan Results

1. Look at the **Scan Results** pane – It will list frequencies it has found that it can tune for you.
2. Click the **Tune to** button for your required channel.
3. The **Channel Details** window opens. It tells you some things about the channel like its frequency and bandwidth for example.
4. If you wish the PRORXD to tune to this channel, push the **Yes** button. This will save the channel configuration parameters on the currently operating configuration preset.
5. If you wish the PRORXD to keep on its current channel, then push the **No** button.

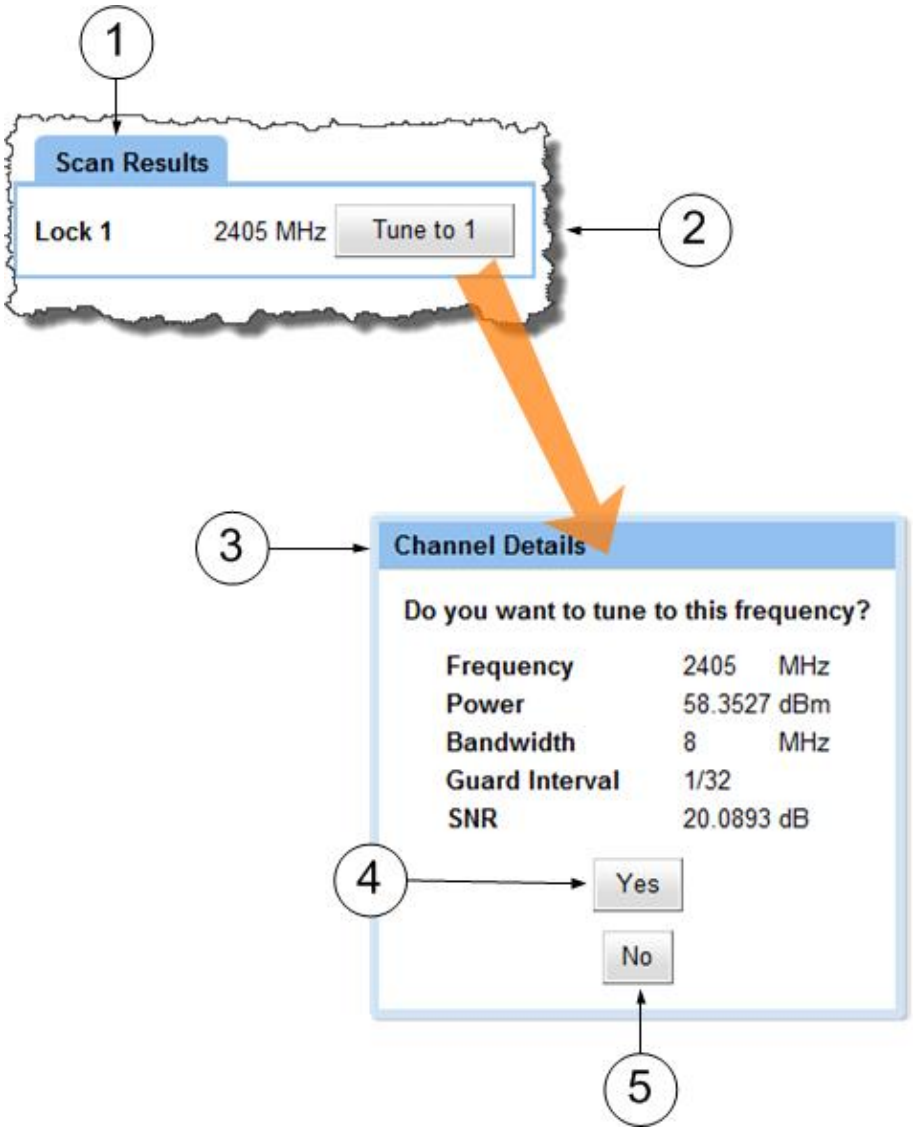

Figure 6-38 Scan Results Pane

6.13 Working with the Information Tab

The Information tab contains generic information like software versions and unit special data. It will be necessary to have this information during a support call for example.

Before you Start

This is necessary:

- To have connected your PC to the PRORXD with an IP connection.
- To be logged on to the PRORXD unit.

Step 1: Open the Information Tab

1. Click on the **Information** tab.

Screenshot: Information Tab

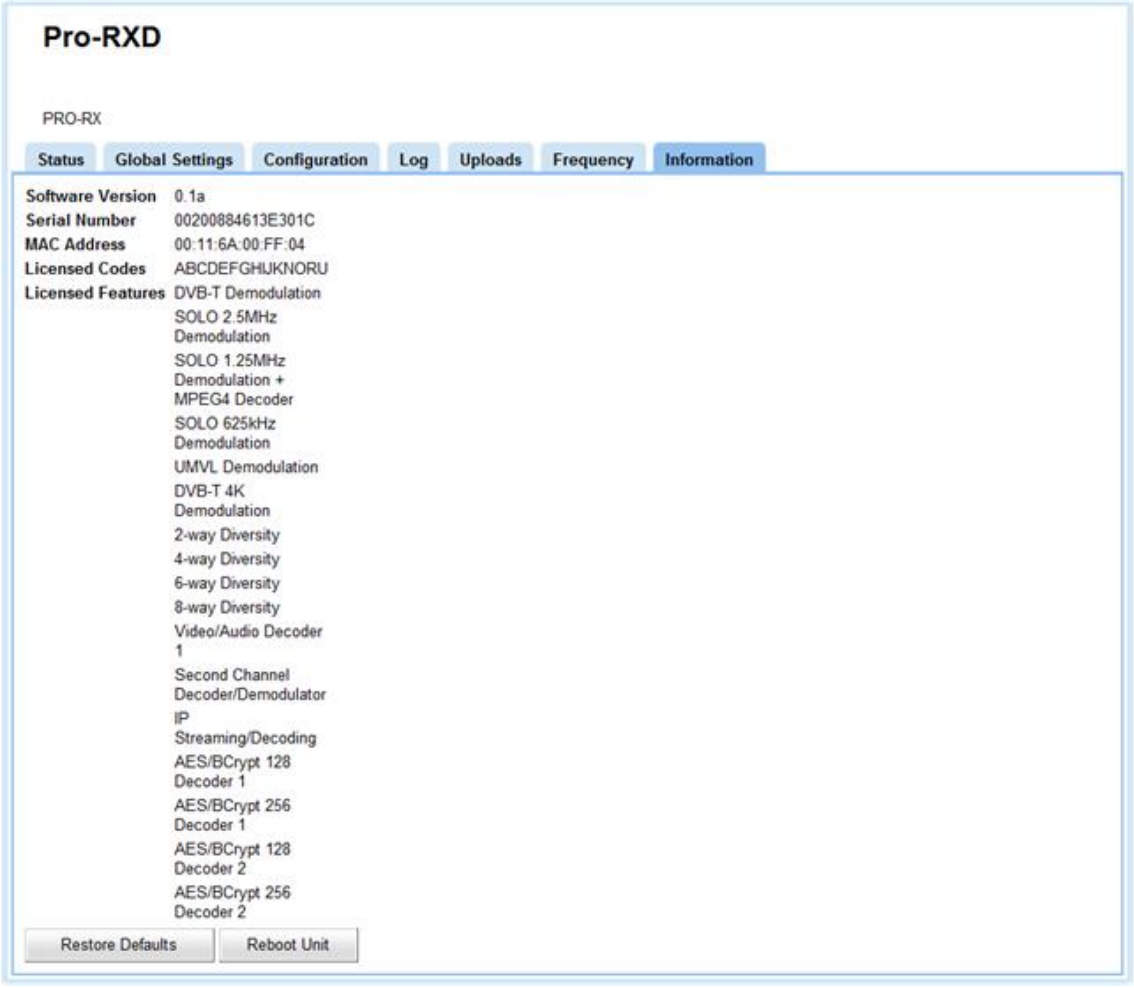

Figure 6-39 Information Tab

Step 2: Check the Software Version

This field returns the current version of software loaded onto the PRORXD unit. When you do an upgrade, it will be necessary to look here to see that the upgrade is correct.

Step 3: Check the Serial Number

During a support call it will be necessary for you to tell us the Serial Number of your PRORXD. This is where you find it.

Step 4: Check the MAC Address

Media Access Control Address (MAC) is reported by this field. This is necessary if you are involved in network operations with your PRORXD.

Step 5: Check the Licenced Codes

DTC products use licence codes to switch features on and off in your device. Each item has a letter and your licence is made up of many of these letters.

Step 6: Check the Licensed Features

The **Licensed Features Pane** is a list of all the licensed features on this device.

6.14 Working with the SNMP Tab

You can upload SNMP MIBs data from this tab. If this is a requirement, please contact DTC Technical Support.

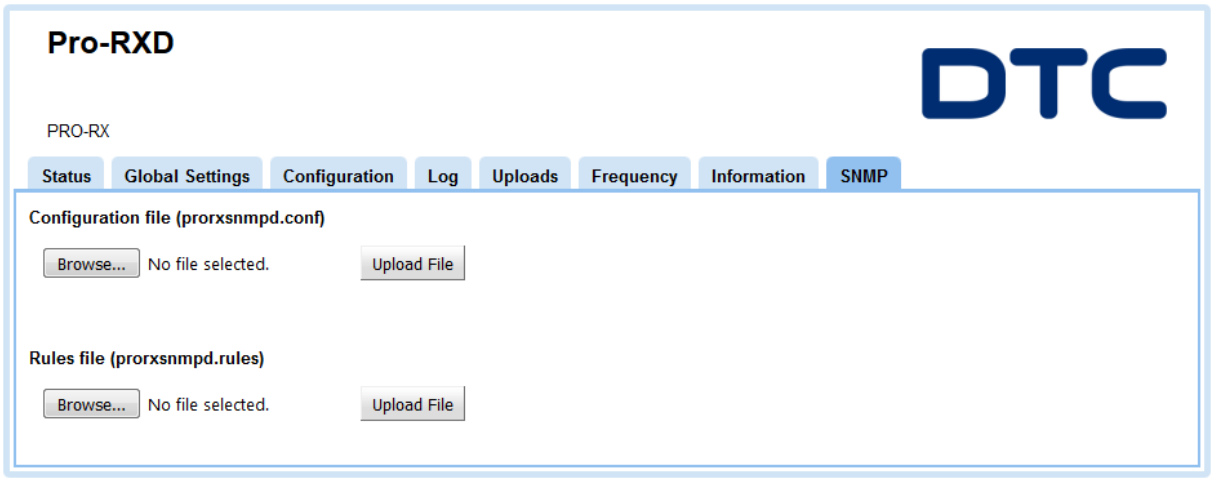

Figure 6-40 The SNMP Tab

7. Appendix A – Cautions and Warnings

7.1 Cautions and Warnings

Serial	Area	Note
1	Enclosures	Do not remove factory installed screws or fastenings. Damage to the units can be caused and void warranties. Only approved personnel must open the device. There are no operations that required the user to access the device internally. There are no user serviceable parts internally.
2	Maintenance	Other than cleaning, no scheduled maintenance is required to make sure of the correct operation of the unit.
3	Environment	The equipment must not be used in dangerous or atmospheres that can cause corrosion. Users are reminded of the necessity of complying with restrictions regarding the operation of radio devices in refuel depots, chemical plants and locations where explosives are kept and/or used.
4	Power Supply	Make sure that the power supply arrangements are sufficient to align with the requirements of each device. Obey all electrical safety precautions.
5	Electro Static Discharge (ESD) Precautions	ESD guidelines must be followed for this electrostatic sensitive device.
6	Lightning Hit	There is a risk of lightning hits to antennas. The equipment must not be assembled in an area during lightning. Antennas must be adequately protected from lightning hits.
7	Working at Height	You must be careful when locating the device at height, for example on a mast. Make sure the unit is correctly attached to stop it falling and injuring personnel.
8	Risk of Eye Injury	You must be careful to stop your eye touching the antennas.
9	Cables	Connecting cables must not be put where they can become damaged or where they can be dangerous by personnel tripping on them.
10	Thermal Control System	Energized devices always become hot during operation. If you operate this device in a closed area you must make sure it has sufficient airflow to keep it at a low temperature. Also, if worn near the body, you must be careful to give protection the operator from large temperatures.
11	RF Emission System	When operating this device please make sure a distance of 20cm is kept between your device and your body while the device is transmitting.
12	Aircraft Safety	Operating this equipment on board aircraft is not permitted. Operating radio transmitter equipment in an aircraft can be dangerous to navigation and other systems.

Table 7-1 Cautions and Warnings

7.2 EMC/Safety and Radio Approvals

The equipment has been designed to align with, and has been tested against harmonized EMC and safety standards.

7.3 CE Marking

The CE mark is attached to all products, and the CE Declaration of Conformity, as well as the technical file is available on request.

8. Appendix B – Precautions and Maintenance

8.1 Caring for your Equipment

- Do not subject the unit to physical abuse, excessive shock or vibration
- Do not drop, jar or throw the unit
- Do not carry the unit by the antenna
- Avoid exposure to excessive moisture or liquids
- Do not submerse the unit unless it is designed to be submersible
- Do not expose the unit to corrosives, solvents, cleaners or mineral spirits.
- Avoid exposure to excessive cold and heat
- Avoid prolonged exposure to direct sunlight
- Do not place or leave units on surfaces that are unstable
- Always turn the unit off before installing optional accessories
- Only use accessories intended for the specific make and model of your unit, especially batteries, chargers and power adapters.

8.2 Charging

- Use approved batteries, chargers and adapters designed specifically for your make and model unit.
- Do not attempt to charge a wet unit or battery pack
- Do not charge the unit or battery pack near anything flammable
- Stabilize the battery pack to room temperature (22°C) before charging
- Do not charge units and/or battery packs on wet or unstable surfaces
- Do not leave units and/or batteries in chargers for excessive periods

8.3 Working with Lithium Batteries

- Charge only with the approved charging cable
- Batteries are to be used only for the specified purpose. Incorrect use will invalidate the warranty and may make the battery become dangerous.
- Charge in a clean, dry environment ideally at 10°C (0 to 45°C is permissible).
- Do not store or operate in direct sunlight for extended periods. Battery can be damaged by over-heating, for example if placed on the rear parcel shelf of a motor vehicle.
- Store in a cool dry environment. Storage at elevated temperatures can cause permanent loss of capacity.
- For short term storage (less than six months), store in a fully charged state.
- For extended periods of storage (more than one year), charge before storage and recharge every six to nine months.
- Always fully recharge the battery after any storage period greater than one month before use.
- Do not store the battery with the charge depleted as this can cause failure of the battery and invalidate warranty.

- Do not short circuit
- Do not immerse in water
- Do not incinerate. Cells are likely to explode if placed in a fire.
- Dispose of batteries in accordance with the regulations in place for the country of use. Batteries are normally considered separate waste and should not be allowed to enter the normal waste stream. Either return to the seller, or deliver to an approved re-cycling facility.

8.4 Cleaning

- Turn off the unit and remove batteries (if applicable) before maintenance
- Use a clean, soft, damp cloth to clean the unit. A microfiber cloth is recommended.
- Do not use alcohol or cleaning solutions to clean the unit
- Do not immerse the unit in water to clean it
- If the unit becomes wet, immediately dry it with a microfiber or other lint-free cloth.

8.5 Storage

- Turn off the unit and remove batteries before storage
- Store units and battery packs in a cool, dry area at room temperature (22°C)
- Do not store units and/or batteries in active chargers

8.6 Repairs

Do not attempt any repair, the unit contains no user serviceable parts. Contact the DTC Customer Service Centre.

8.7 Getting Technical Support

Contact Technical Support

Enquiries should be sent to the Tech Support team.

Post: DTC – Solent, Fusion 2, 1100 Parkway, Solent Business Park, Whiteley, Hampshire, PO15 7AB, England

Phone: +44 1489 884 550. Office hours: 0900-1700 UK time excluding holidays.

Email: solent.support@domotactical.com (no restricted content).

For technical support we undertake to get a first response to you in less than one working day and a progress update at least every two weeks.

Documentation and Software

It is DTC's practice to make the majority of our latest user guides and software available to customers online, by using our WatchDox facility. To access this site please contact your Account Manager or send a request to solent.support@domotactical.com.

You will then be sent a link where you can login and create your own password. You will then receive a confirmation email. Once you have done this you will then be able log into your account.

8.8 Using the DTC RMA Service

You have a problem and all troubleshooting steps have been unsuccessful. You need to contact DTC for Return Material Authorisation (RMA) Service.

Step 1: Email DTC

To return something to Solent please Email solent.customerhub@domotactical.com. We will then send you an RMA request form to complete and return. We'll then send you an RMA number and shipping instructions.

Step 2: Save your Personal Kit

Remove all personal kit or media from the device.

Step 3: Pack the Unit

Use the original shipping container and packing materials if possible.

If the original packing materials are not available, wrap the equipment with soft material (e.g. PU/PE form) then put the wrapped equipment into a hard cardboard shipping box.

Step 4: Prepare an Information Sheet

Include a sheet with the following information.

Note: Please keep a copy of this sheet for your records.

- Name
- Address
- Unit serial number
- Date of purchase or the original invoice number
- Date of failure
- A detailed description of the problems you have encountered
- A list of the hardware/software configuration if applicable

Step 5: Put the RMA Number on the Box

Clearly mark the outside of the shipping box with the RMA number. If an RMA number is not present on the shipping box, receiving will be unable to identify it and it might be returned.

Step 6: Send the Box to DTC

Send the box using your normal shipping process.

9. Appendix C – Glossary

9.1 Glossary

0-9	Means…
16QAM	16-state Quadrature Amplitude Modulation.
64QAM	64-state Quadrature Amplitude Modulation.

A	Means…
AC	**Alternating Current.** Current that is continually changing in magnitude and at intervals in direction from a zero reference level.
A/V	Audio/Video.
AES	In cryptography, the **Advanced Encryption Standard** (**AES**) is an encryption standard adopted by the U.S. government. The standard comprises three block ciphers, AES-128, AES-192 and AES-256, adopted from a larger collection originally published as **Rijndael.** Each AES cipher has a 128-bit block, with keys of 128, 192 and 256 bits, respectively.
ASI	**Asynchronous Serial Interface**. A streaming data interface which often carries an MPEG Transport Stream. An ASI signal can carry one or multiple SD, HD or audio programs that are already compressed, not like an uncompressed SD-SDI (270Mbs) or HD-SDI (1.45Gbs). An ASI signal can carry differing quantities of data but is always padded to operate at a fixed line rate of 270 Mb/s.
Amplification	Increasing the strength (current, voltage or power) of a signal.
Amplitude	The level of an audio or other signal in voltage or current. The magnitude of variation in a changing quantity from its zero value.
Amplitude Modulation	Modulation in which the amplitude of the carrier wave is varied above and below its usual value in accordance with the intelligence of the signal being transmitted. Also called AM.
Analogue	**Analog transmission** is a transmission method of conveying voice, data, image, signal or video information with a continuous signal which varies in amplitude, phase, or some other property in proportion to that of a variable.
Antenna	An **antenna** (or **aerial**) is a transducer designed to radiate or receive electromagnetic energy (generally RF).
Antenna Bandwidth	The frequency range over which a given antenna will accept signals.
Antenna Gain	The effectiveness of a directional antenna as compared to a standard non-directional antenna. It is usually expressed as the ratio in decibels of standard antenna input power to directional antenna input power that will make the same field strength in the wanted direction. For a receiving antenna, the ratio of signal power values produced at the receiver input terminals is used. The more directional an antenna is, the higher is its gain.

A	Means…
Attenuation	Power loss resulting from conductor resistance and dielectric loss in the insulating material used to isolate the conductors.

B	Means…
BNC	**Bayonet Neill-Concelman** – A very well-known **type** of RF connector used for terminating coaxial cable.
Bandwidth	The width of a band of frequencies used for a function.

C	Means…
COFDM	**Coded Orthogonal Frequency Division Multiplexing** is a frequency-division multiplexing (FDM) scheme utilized as a digital multi-carrier modulation method. A large number of closely-spaced orthogonal sub-carriers are used to carry data.

D	Means…
D/C	Downconverter. A device which changes microwave frequencies to UHF frequencies for operation in DTC receivers.
Digital	A **digital signal** is a discontinuous signal that changes from one condition to one more condition in discrete steps.
Decibel	The standard unit used to express transmission gain or loss and relative power levels. Also written as dB.
Decoder	Processor in a video receiver that changes digital video data to analogue signals for replay on analogue monitors; or in some cases a software decoder, a program that decodes digital data for replay on the PC (decompression etc.).
Demodulate	To collect the information originally impressed on the radio wave.

E	Means…
Electromagnetic field	The field of force that an electrical current produces around the conductor through which it flows.
Electromagnetic Waves	A wave propagating as a periodic disturbance of the electrical and magnetic fields and having frequency in the electromagnetic spectrum; the means by which energy is transmitted from one area to one more area.
Elementary Stream (ES)	Elementary streams: These streams contain only one MPEG-2 video channel and no audio. Elementary streams are required if you intend to operate **Milestone** or a player that cannot operate with Transport streams. You must be in RTSP mode to operate Elementary streams.

E	Means…
Encoder	A processor in a video transmitter which changes analogue video from a camera to digital data.

F	Means…
FEC	**Forward Error Correction** is a system of error control for data transmission, whereby the sender adds redundant data to its messages, also known as an **error-correction code**. This lets the receiver find and correct errors (inside some bound) without the need to ask the sender for additional data. The advantage of forward error correction is that a back-channel is not required, or that retransmission of data can often be prevented, at the cost of higher bandwidth requirements on average. FEC is thus applied in situations where retransmissions are relatively costly or impossible.
Firmware	Software which is installed directly on a device and is intended specially for that device and is used to control it.
FOV	**Field of View -** The field of view (also field of vision) is the angular quantity of the observable world that is seen at a given moment.
Fading	A periodic decrease in the received signal strength.
Frequency	The rate at which a procedure repeats itself. In radio communications, frequency is expressed in cycles for each second. Signals also have a property called wavelength, which is inversely in proportion to the frequency.
Frequency Modulation	Changing the frequency of a carrier wave, usually with an audio frequency, to send intelligence. Also called **FM**.
FPGA	**Field-Programmable Gate Array -** an integrated circuit designed to be configured by the customer or designer after manufacturing, hence "field-programmable".

G	Means…
GUI	**Graphical User Interface.**
GHz	**Gigahertz** - One gigahertz is equal to 1,000 megahertz (MHz) or 1,000,000,000 Hz.
Gain	The increase in signal strength that is produced by an amplifier.

H	Means…
Hertz	One cycle for every second.

I	Means…
IFB	Interruptible Fold back. The IFB is a special intercom circuit that consists of a mix-minus program feed sent to an earpiece worn by presenter via IP (audio that is being "fed back" to presenter) that can be interrupted and replaced by a television producer's or director's intercom microphone. That microphone is connected here.
IP Address	**Internet Protocol Address** – A unique numeric ID for a device in a network.
IR	**Infra-Red** - Infrared (IR) radiation is electromagnetic radiation whose wavelength is longer than that of visible light.
Impedance	The total opposition offered by a circuit or component to the flow of alternating current.

L	Means…
LOS and NLOS	**Line-of-sight** propagation refers to electro-magnetic radiation including light emissions moving in a straight line. The rays or waves are diffracted, refracted, reflected, or absorbed by atmosphere and obstructions with material and usually cannot move above the horizon or behind obstacles. NLOS is Non Line-of-sight.
Load	A device that consumes electrical power.
Lux	The **lux** (symbol: **lx**) is the SI unit of illuminance and luminous emittance. It is used in photometry as a measure of the *apparent* intensity of light hitting or passing through a surface.

M	Means…
MHz	**Megahertz** is the same as 1,000,000 Hz
mW	**Milliwatt** - The milliwatt (symbol: mW) is equal to one thousandth (10^{-3}) of a watt.
MPEG	Moving Pictures Experts Group.
Modulation	To change the output of a transmitter in amplitude, phase or frequency in accordance with the information to be transmitted. Data is superimposed on a carrier current or wave by means of a procedure called modulation. Signal modulation can be done in one of two ways: analogue and digital. In recent years, digital modulation has been getting more usual, while analogue modulation methods have been used less. There continues to be plenty of analogue signals around, but, and they will probably not become totally extinct.
Multicast	Multicasting is sending data from a sender to multiple receivers where each receiver signals that they *want* to receive the data.

N	Means…
nm	A **nanometre** (American spelling: **nanometer**; symbol **nm**) is a unit of length in the metric system, equal to one billionth of a metre (i.e., 10^{-9} m or one millionth of a millimetre).
NMEA 0183	**NMEA 0183** is a combined electrical and data specification for communication between marine electronic devices such as echo sounder, sonar, anemometer, gyrocompass, autopilot, GPS receivers and many other types of instruments. It has been specified by, and is controlled by, the U.S.-based National Marine Electronics Association.
NTSC	National Television Systems Committee.
Noise	Random pulses of electromagnetic energy generated by lightening or electrical equipment.

O	Means…
Omni directional antenna	An antenna radiation pattern that shows the same radiation in all horizontal directions.
Oscillation	A periodic, repetitive movement or set of values (voltage, current, velocity).

P	Means…
PAL	Phase Alternate Line.
PIR	**Passive Infra-Red** sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view.
PTZ	**Pan, Tilt and Zoom** – PTZ is a usual description of controllable cameras.
Propagation	A phenomenon by which a wave moves from one point to a second point; the movement of electromagnetic waves through space or along a transmission line.

Q	Means…
QPSK	Quadrature Phase Shift Keying.

R	Means…
RF	**Radio Frequency.**
RTSP	**Real Time Streaming Protocol** (RTSP) is a network control protocol designed for operation in entertainment and communications systems to control streaming media servers. The protocol is used for establishing and controlling media sessions between end points. Clients of media servers issue VCR-like commands, such as play and pause, to let real-time control of playback of media files from the server.

R	Means…
Rx	**Receiver**, an electronic device that changes a radio signal from a transmitter into useful information.
Radiate	To transmit RF energy.
Radio Frequency	Frequency of electrical energy capable of propagation into space (usually above 20kHz). Also called RF.

S	Means…
SNR	**Signal to Noise Ratio** is an electrical engineering measurement specified as the ratio of a signal power to the noise power corrupting the signal. Signal-to-noise ratio compares the level of a desired signal (such as music) to the level of background noise. The higher the ratio, the less obtrusive the background noise is.
Shannon Limit	The **Shannon limit** or **Shannon capacity** of a communications channel is the theoretical maximum information transfer rate of the channel, for a noise level.
Signal	In electronics, a signal is an electrical current or electromagnetic field used to send data from one area to a second area. The simplest type of signal is a direct current (DC) that is switched on and off; this is the principle by which the earliest telegraph worked. More complex signals consist of an alternating-current (AC) or electromagnetic carrier that contains one or more data streams.
Streaming	**Streaming** is the transmission of digital audio or video or the listening and viewing of such data without first storing it.

T	Means…
Tx	A **transmitter** is an electronic device which, usually with the aid of an antenna, propagates an electromagnetic signal such as radio, television, or other telecommunications.
TNC	The **TNC (threaded Neill-Concelman) connector** is a threaded version of the BNC connector. The connector has a 50 Ω impedance and operates best in the 0–11 GHz frequency spectrum.
Transport Stream (TS)	Transport streams: These streams can contain some MPEG-2 content channels and related audio. All the channels are multiplexed together, letting the receiver select which to play back.

U	Means…

U	Means…
UDP	**User Datagram Protocol** (UDP) Sometimes called fire and forget because there is no dialog between the sender and receiver. If the receiver does not receive a packet, the sender will not know. But, UDP is very satisfactory when there is a small risk of errors (like in your LAN), or when TCP can give "too late" delivery.
USB	Universal Serial Bus.
UVMS	**Universal Video Management System**, a network video recorder storage solution from BAE Systems. Gives full archiving coupled with live and retrospective viewing.
Unicast	Unicast is simply sending packets from one source to one destination. For example, from one web server to one (or each) person viewing a page on a web browser.

V	Means…
VHF	**Very High Frequency** – 30 MHz to 300 MHz
V	Volt.
Viterbi Decoder	A Viterbi decoder uses the Viterbi algorithm for decoding a bit stream that has been encoded using forward error correction based on a Convolutional code.

W	Means…
Watt	The **watt** (symbol: **W**) is a derived unit of power in the International System of Units (SI). It measures rate of energy conversion. One watt is equivalent to 1 joule (J) of energy per second.
Waveform	Signal shape.
Waveguide	A specially formed hollow metal tube, usually rectangular in shape in cross section, used to connect a High Power amplifier to the antenna.

10. Appendix D – Reference

10.1 Pinouts – PRORXD-1RU

Power

Pin	Function
1	0V
2	No connect
3	No connect
4	VIN

Ctrl/Data

Pin	Function
1	0V
2	RX CTRL RS232
3	TX CTRL RS232
4	TX DATA 1
5	0V
6	RX DATA 1
7	TX DATA 2
8	RX DATA 2
9	0V

Audio 1/2

Pin	Function
1	AUD OUT L+
2	AUD OUT L-
3	0V
4	AUD OUT R+
5	AUD OUT R-

IFB/Audio In

Pin	Function
1	AUD IN L+
2	AUD IN L-
3	0V
4	AUD IN R+
5	AUD IN R-

10.2 Pinouts – PRORXD-2RU

Power

Pin	Function
1	0V
2	No connect
3	No connect
4	VIN

Ctrl/Data

Pin	Function
1	0V
2	RX CTRL RS232
3	TX CTRL RS232
4	TX DATA 1
5	0V
6	RX DATA 1
7	TX DATA 2
8	RX DATA 2
9	0V

Audio 1L/2L

Pin	Function
1	0V
2	AUD OUT L+
3	AUD OUT L-

Audio 1R/2R

Pin	Function
1	0V
2	AUD OUT R+
3	AUD OUT R-

IFB/Audio In 1

Pin	Function
1	0V
2	AUD IN L+
3	AUD IN L-

IFB/Audio In 2

Pin	Function
1	0V
2	AUD IN R+
3	AUD IN R-

Audio 3/4

Pin	Function
1	AUD OUT L+
2	AUD OUT L-
3	0V
4	AUD OUT R+
5	AUD OUT R-

10.3 Downconverter Data

About Downconverters, Square

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DC-100140	1700MHz	High	9dB	19dB
DC-168185	1050MHz	Low	9dB	19dB
DC-225265	1880MHz	Low	9dB	19dB

About Downconverters, Barrel

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCB-100150	1800MHz	High	9dB	19dB
DCB-150200	2300MHz	High	9dB	19dB
DCB-200250	1700MHz	Low	9dB	19dB
DCB-250300	2200MHz	Low	9dB	19dB
DCB-300350	2700MHz	Low	9dB	19dB
DCB-450500	4200MHz	Low	9dB	19dB
DCB-550600	5200MHz	Low	9dB	19dB

About Downconverters, Barrel, Gain Selectable, TNC-TNC

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCBGS-100150	1800MHz	High	10dB	30dB
DCBGS-167203	2350MHz	High	10dB	30dB
DCBGS-203255	1720MHz	Low	10dB	30dB
DCBGS-310360	2750MHz	Low	10dB	30dB
DCBGS-440500	4150MHz	Low	10dB	30dB
DCBGS-550600	5200 MHz	Low	10dB	30dB

About Downconverters, Barrel, Gain Selectable, Broadcast, N Type to BNC

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCBGSB-167203	2350 MHz	High	10dB	30dB
DCBGSB-203255	1720 MHz	Low	10dB	30dB
DCBGSB-310360	2750 MHz	Low	10dB	30dB
DCBGSB-440500	4150 MHz	Low	10dB	30dB
DCBGSB-550600	5200 MHz	Low	10dB	30dB
DCBGSB-640700	6150 MHz	Low	10dB	30dB
DCBGSB-700750	6650 MHz	Low	10dB	30dB

About Downconverters, Extended Barrel, Gain Selectable, Broadcast (N Type to BNC)

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCEBGSB-198270	1850MHz	Low	10dB	30dB

10.4 Single Channel Sensitivity

The following sensitivity figures have been measured for all inputs at mid-band frequency for a given transmitter. These figures may be useful when calculating link budget.

Note: Sensitivity is defined as -1dB of attenuation below the point at which errors are transmitted to produce error free video for 30 seconds.

Modulation and Bandwidth	Constellation	FEC	Guard Interval	Sensitivity
DVB-T 8MHz	16QAM	1/2	1/32	< -89dBm
DVB-T 8MHz	QPSK	1/2	1/32	< -95dBm
DVB-T 7MHz	QPSK	1/2	1/32	< -95dBm
DVB-T 6MHz	QPSK	1/2	1/32	< -95dBm
Narrowband 2.5MHz	16QAM	2/3	1/16	< -94dBm
Narrowband 2.5MHz	QPSK	2/3	1/16	< -99dBm
Narrowband 2.5MHz	QPSK	1/3	1/16	< -102dBm
Narrowband 2.5MHz	QPSK	2/3	1/8	< -99dBm
Narrowband 1.25MHz	QPSK	1/3	1/16	< -104dBm
Narrowband 625kHz	QPSK	1/3	1/16	< -107dBm
Narrowband 625kHz	BPSK	1/3	1/16	< -110dBm

Table 10-1 Sensitivity Measurements

11. Appendix E – Remote Control Guide

This section describes the control protocol used on the RS232 interface for controlling the PRORXD.

11.1 About the RS232 Control General Principles

The physical interface is RS232 but this can be converted to RS485 with an external adapter where multiple units are controlled across one RS485 bus.

Usual operation involves sending a packet from the control device (usually a PC) to the device being controlled. If the packet satisfies an address integrity check, then the controlled device will action the command and send a reply.

For compatibility with modems an ASCII style protocol is used.

Ports are set for 115200 baud, 8 bits, No parity, 1 stop.

11.2 About the Command Packet Structure

ASCII	Value	Notes
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
R	20h-7Eh	1 byte command type. **r** read, **w** write
ABCD	20h-7Eh	Command – four byte mnemonic
;	3Bh	Separator
PQR	20h-7Eh	Data – Optional, variable length
;	3Bh	Separator
X	20h-7Eh	Sum Check
ETX	03h	End byte

11.3 About the Reply Packet Structure

ASCII	Value	Notes
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
Z	20h-7Eh	Status BYTE
PQR	20h-7Eh	Data – Optional, variable length
;	3Bh	Separator
X	20h-7Eh	Sum Check

ASCII	Value	Notes
ETX	03h	End byte

The Sum check byte is the summation of all bytes in the packet, not including the start and end bytes.

The final result is modified to stop ASCII control characters being sent, by forcing the most significant bit to '1'. This is equivalent to logically OR'ing the result with 0x80. This ensures the sum check has a value between 128 and 255 decimal.

The Status byte will show if the command was performed OK, or will show an error.

ASCII	Meaning
1	All OK
E	General error, command could not be actioned.

Typically E will be returned if the message is formatted incorrectly (separators in the incorrect location) or if commands are in upper case, or if commands do not align with the allowed list of commands, or if the checksum is incorrect.

Addresses in the range 0001 to 9998 are for general use. Address 0000 is reserved and 9999 is a broadcast address. i.e. any device will reply to this address. Its reply will contain its own specific address.

All data in the transmitter and receiver is stored as one of 5 data types, Double, String, List, Integer or HexInteger. The data type dictates the contents of the data section of the reply.

- List – 1 byte for sending. Value is hexadecimal coded as ASCII. 2 byte reply. Reply represents index into original choice list. E.g. Reply 02 indicates entry 2 in original list.
- Float - variable length. Reply always contains decimal point and 4 decimal places. Can have 1 to 3 digits before decimal.
- Integer - 6byte reply. Integer value with stuffed with preceding zeros, e.g. GOP reply 000012 = GOP length 12.
- String - Variable length. Reply is string excluding null terminator.
- HexInteger – 8byte Hex reply.

11.4 About the Programming Model

The control commands operate on four sets of parameters:

- Global parameters which apply to all configs
- Config parameters which apply to one specific config
- Status Parameters which are read-only
- Specials which have unique actions.

To make changes to the settings on the board for Global and Config parameters, they have to be loaded into a "scratch" area. When in the scratch area changes can be made to the parameters. To make the changes permanent the scratch area has to be saved.

To edit a config you have to load it into scratch by specifying the config number you wish to edit. A simple example or changing input frequency is shown below: (<C> represents the checksum)

<STX>0001wload;1;<C><ETX> "Load config 1 into scratch area"

<STX>0001wdipf;2360.00;<C><ETX> "Change input frequency to 2360"

<STX>0001wsave;1;<C><ETX> "Save scratch to config 1"

The config you edit can be different from the currently active config. This means you could edit config 8 in the scratch area and then save it back while config 1 was active. If you edit the active config in scratch, when you save it back it will automatically action any changes. To find the config number currently being edited in scratch, perform an rload command.

The same process applies to Global Settings except that no config number needs to be supplied and the commands change to "wloau" and "wsavu". When editing globals if the changes are saved they are actioned immediately.

Please note that when issuing read and write commands to Global and Config parameters they always read and write to the scratch area.

The load and loau commands can also be used like a reset if any changes must be cancelled, i.e. If the user backs out of an edit menu before saving.

Status parameters are always current and not affected by loads and saves.

Specials are actioned immediately.

11.5 Commands

Global settings

Command	Description	Access	Setting Type	Default	Type	Possible Values
aout	Audio Output Format	RW	Global	0	Integer	0=Analogue 1=Digital
ccon	Current Active Config Number	RW	Global	1	Integer	1 to 16
dcp1	Demod 1 Downconverter Preset	RW	Global	0	Integer	0=Off 1=UHF 2=DCB100150 3=DCB150200 4=DCB200250 5=DCB250300 6=DCB300350 7=DCB340370 8=DCB450500 9=DCB550600 10=DCB810860 11=DCBGS100150 12=DCBGS167203 13=DCBGS203255 14=DCBGS310360 15=DCBGS440550 16=DCBGS550600 17=DCBGS640700 18=DCBGS700750 19=DCEBGS198270 20=DC100140 21=DC225265 22=DCBGS175238

Command	Description	Access	Setting Type	Default	Type	Possible Values
dcp2	Demod 2 Downconverter Preset	RW	Global	0	Integer	0=Off 1=UHF 2=DCB100150 3=DCB150200 4=DCB200250 5=DCB250300 6=DCB300350 7=DCB340370 8=DCB450500 9=DCB550600 10=DCB810860 11=DCBGS100150 12=DCBGS167203 13=DCBGS203255 14=DCBGS310360 15=DCBGS440550 16=DCBGS550600 17=DCBGS640700 18=DCBGS700750 19=DCEBGS198270 20=DC100140 21=DC225265 22=DCBGS175238
ddc2	Downconverter LO frequency (MHz) Demod 2	RW	Global	1720	Float	0 - 10000
ddcf	Downconverter LO frequency (MHz) Demod 1	RW	Global	1720	Float	0 - 10000
dlfa	Input A Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz
dlfb	Input B Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz
dlfb	Input B Individual LO side	RW	Global	0	Integer	0=Low 1=High
dlfc	Input C Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz
dlfc	Input C Individual LO side	RW	Global	0	Integer	0=Low 1=High
dlfd	Input D Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz
dlfd	Input D Individual LO side	RW	Global	0	Integer	0=Low 1=High
dlfe	Input E Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz
dlfe	Input E Individual LO side	RW	Global	0	Integer	0=Low 1=High
dlff	Input F Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz

Command	Description	Access	Setting Type	Default	Type	Possible Values
dlff	Input F Individual LO side	RW	Global	0	Integer	0=Low 1=High
dlfg	Input G Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz
dlfg	Input G Individual LO side	RW	Global	0	Integer	0=Low 1=High
dlfh	Input H Individual LO Frequency	RW	Global	1720	Float	0 to 10000 in MHz
dlfh	Input H Individual LO side	RW	Global	0	Integer	0=Low 1=High
dlia	Input A Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlib	Input B Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlic	Input C Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlid	Input D Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlie	Input E Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlif	Input F Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlig	Input G Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlih	Input H Individual Spectrum inversion	RW	Global	0	Integer	0=Off 1=On
dlo2	Downconverter LO side Demod 2	RW	Global	0	Integer	0=low side 1=high side
dlos	Downconverter LO side Demod 1	RW	Global	0	Integer	0=low side 1=high side
dlsa	Input A Individual LO side	RW	Global	0	Integer	0=Low 1=High
dtlm	Data Alinks Legacy Mode	RW	Global	0	Integer	0=Off 1=On
gadd	ControlAddress	RW	Global	1	Integer	1 to 9998
gln2	LNB Phantom Power Enable Demod 2	RW	Global	1	Integer	0=off 1=on
glnb	LNB Phantom Power Enable Demod 1	RW	Global	1	Integer	0=off 1=on
iloe	Enable Individual LO settings	RW	Global	0	Integer	0=Off 1=On

Command	Description	Access	Setting Type	Default	Type	Possible Values
lnbg	LNB gain offset	RW	Global	9	Float	-40 to +40
osc1	Controls the output for Comp/HD-SDI 1	RW	Global	0	Integer	0=Off 1=On
osc2	Controls the OSD for Comp/HD-SDI 2	RW	Global	0	Integer	0=Off 1=On
osd1	OSD Mode Decoder 1	RW	Global	0	Integer	0=off 1=Date/Time only 2=Detailed 3=Spectra 4=Frequency Scan
osd2	OSD Mode Decoder 2	RW	Global	0	Integer	0=off 1=Date/Time only 2=Detailed 3=Spectra 4=Frequency Scan
osh1	HDMI 1 OSD Enable	RW	Global	0	Integer	0=Off 1=On
osh2	HDMI 2 OSD Enable	RW	Global	0	Integer	0=Off 1=On
rdef	Restore Unit Defaults	W	Global	N/A	Integer	Any
snmp	Enable SNMP	RW	Global	0	Integer	0=Off 1=On
sta2	Streamer 2 Multicast Address	RW	Global	224.2.128.12	String	
stad	Streaming Multicast Address	RW	Global	239.16.33.254	String	IP address format in multicast range
ste2	Streamer 2 enable	RW	Global	0	Integer	0=Off 1=On
sten	Streaming Enable	RW	Global	0	Integer	0=off 1=on
stp2	Streamer 2 Multicast Port	RW	Global	10002	Integer	1024-65535
stpo	Streaming Multicast Port number	RW	Global	10000	Integer	Range 1 - 65535
str2	Streamer 2 source	RW	Global	0	Integer	0=demod 1 1=demod 2 2=asi in 1 3=asi in 2 5=descram 1 6=descram 2
strm	Streamer Mode	RW	Global	0	Integer	0=UDP 1=RTSP Multicast 2=RTSP Unicast

Command	Description	Access	Setting Type	Default	Type	Possible Values
strs	Streaming Source	RW	Global	0	Integer	0=demod 1 1=demod 2 2=asi in 1 3=asi in 2 5=descram 1 6=descram 2
stsa	Streaming SAP Address	RW	Global	224.2.127.254	String	IP address format in SAP range
stsn	Streaming Multicast Service Name	RW	Global	MPEG2-TS	Integer	Max Length 20 characters
sttl	Streaming Multicast TTL	RW	Global	127	Integer	Range 1 - 255
unam	Unit Name	RW	Global	PRO-RX	String	Max Length = 20
vbf1	Decoder 1 Blue on Fail	RW	Global	0	Integer	0=Off 1=On
vbf2	Decoder 2 Blue on Fail	RW	Global	0	Integer	0=Off 1=On
vgl1	Decoder 1 Genlock Lines Offset	RW	Global	0	Integer	0-2047
vgl2	Decoder 2 Genlock Lines Offset	RW	Global	0	Integer	0-2047
vgm1	Decoder 1 Genlock Mode	RW	Global	0	Integer	0=Off 1=External 2=Internal
vgm2	Decoder 2 Genlock Mode	RW	Global	0	Integer	0=Off 1=External 2=Internal
vgp1	Decoder 1 Genlock Pixel Offset	RW	Global	0	Integer	0-4095
vgp2	Decoder 2 Genlock Pixel Offset	RW	Global	0	Integer	0-4095

Config settings

Command	Description	Access	Setting Type	Default	Type	Possible Values
a2k2	Decoder 2 AES256 Descrambling Key (upper 128 bits)	W	Config	N/A	Hex String	32 Hexadecimal characters
abd1	Demod 1 Auto Bandwidth Detection	RW	Config	0	Integer	0=Off 1=On
abd2	Demod 2 Auto Bandwidth Detection	RW	Config	0	Integer	0=Off 1=On

Command	Description	Access	Setting Type	Default	Type	Possible Values
adl2	Descrambler 2 ADL Key	W	Config		String	Max length 256
adlk	Descrambler 1 ADL Key	W	Config		String	Max length 256
ae2k	Decoder 1 AES256 Descrambling Key (upper 128 bits)	W	Config	N/A	Hex String	32 Hexadecimal characters
aes2	Decoder 2 AES Descrambling Key/ AES256 lower 128 bits	W	Config	N/A	Hex String	32 Hexadecimal characters
aesk	Decoder 1 AES Descrambling Key/ AES256 lower 128 bits	W	Config	N/A	Hex String	32 Hexadecimal characters
asos	ASI Output Source	RW	Config	0		0=demod1 1=demod2 2=asi_in1 3=asi_in2 4=ip1 5=ip2 6=dec1 7=dec2
cnam	Config Name	RW	Config	Config <x>	String	Max Length = 20
d1pf	Decoder 1 Power Up Video Format	RW	Config	21	Integer	0=1080p23.98 1=1080p24 2=1080p25 3=1080p29.97 4=1080p30 5=1080p50 6=1080p59.94 7=1080p60 8=1080i23.98 9=1080i24 10=1080i25 11=1080i29.97 12=1080i30 13=720p23.98 14=720p24 15=720p25 16=720p29.97 17=720p30 18=720p50 18=720p59.94 19=720p60 20=PAL 21=NTSC

Command	Description	Access	Setting Type	Default	Type	Possible Values
d2pf	Decoder 2 Power Up Video Format	RW	Config	21	Integer	0=1080p23.98 1=1080p24 2=1080p25 3=1080p29.97 4=1080p30 5=1080p50 6=1080p59.94 7=1080p60 8=1080i23.98 9=1080i24 10=1080i25 11=1080i29.97 12=1080i30 13=720p23.98 14=720p24 15=720p25 16=720p29.97 17=720p30 18=720p50 18=720p59.94 19=720p60 20=PAL 21=NTSC
dbo1	Decoder 1 BNC output mode	RW	Config	0	Integer	0=HD-SDI 1=Composite 2=ASI
dbo2	Decoder 2 BNC output mode	RW	Config	0	Integer	0=HD-SDI 1=Composite 2=ASI
dcs2	Descrambler 2 Current Service Only	RW	Config	0	Integer	0=Current Service Only 1= All services
dcso	Descrambler 1 Current Service Only	RW	Config	0	Integer	0=Current Service Only 1= All services
des2	Decoder 2 Descrambling Mode	RW	Config		Integer	0=Off 1=ABS 4=AES128 5=AES128+ 6=AES256 7=AES256+ 8=AES128 BCRYPT 9=AES128 BCRYPT+ 10=AES256 BCRYPT 11=AES256 BCRYPT+ 12=AES128 CCRYPT 13=AES128 CCRYPT+ 14=AES256 CCRYPT 15=AES256 CCRYPT+ 18=AES256 ADL 19=AES256 ADL+

Command	Description	Access	Setting Type	Default	Type	Possible Values
desm	Decoder 1 Descrambling Mode	RW	Config		Integer	0=Off 1=ABS 4=AES128 5=AES128+ 6=AES256 7=AES256+ 8=AES128 BCRYPT 9=AES128 BCRYPT+ 10=AES256 BCRYPT 11=AES256 BCRYPT+ 12=AES128 CCRYPT 13=AES128 CCRYPT+ 14=AES256 CCRYPT 15=AES256 CCRYPT+ 18=AES256 ADL 19=AES256 ADL+
dgu2	OFDM Guard Interval Demodulator 2	RW	Config	0	integer	0=1/32 1=1/16 2=1/8 3=1/4 4= AUTO (DVB-T only)
dgua	OFDM Guard Interval Demodulator 1	RW	Config	0	integer	0=1/32 1=1/16 2=1/8 3=1/4 4=AUTO (DVB-T only)
dif2	Input Frequency Demodulator 2 (MHz)	RW	Config	2405	Float	50.000MHz -> 850MHz offset from LO
dipf	Input Frequency Demodulator 1 (MHz)	RW	Config	2405	Float	50.000MHz -> 850MHz offset from LO
divm	Diversity Mode	RW	Config	0	Integer	0=2-way 1=4-way 2=6-way 3=8-way 4=2x2-way 5=2x4-way
dpo2	OFDM Polarity Demodulator 2	RW	Config	0	integer	0=Normal 1=Inverted
dpol	OFDM Polarity Demodulator 1	RW	Config	0	integer	0=Normal 1=Inverted
dpr1	Default Program ID Decoder 1	RW	Config	1	Integer	Range = 1 - 10
dpr2	Default Program ID Decoder 2	RW	Config	1	Integer	Range = 1 - 10

Command	Description	Access	Setting Type	Default	Type	Possible Values
dsl1	Decoder 1 Input Select	RW	Config	0	Integer	0=demod1 1=demod2 2=asi in 1 3=asi in 2 4=ip
dsl2	Decoder 2 Input Select	RW	Config	0	Integer	0=demod1 1=demod2 2=asi in 1 3=asi in 2 4=ip
dsr1	Default Service Name Decoder 1	RW	Config	Unit 1	String	Max Length = 20 characters
dsr2	Default Service Name Decoder 2	RW	Config	Unit 1	String	Max Length = 20 characters
dwd2	OFDM bandwidth Demodulator 2	RW	Config	0	Integer	0=8MHz 1=7MHz 2=6MHz 3=2.5MHz 4=1.25MHz 5=625kHz 6=UMVL 6MHz 7=UMVL 7MHz 8=UMVL 8MHz
dwid	OFDM bandwidth Demodulator 1	RW	Config	0	Integer	0=8MHz 1=7MHz 2=6MHz 3=2.5MHz 4=1.25MHz 5=625kHz 6=UMVL 6MHz 7=UMVL 7MHz 8=UMVL 8MHz
ebs2	Decoder 2 ABS Descrambling Key	W	Config	N/A	Hex String	8 Hexadecimal characters
ebsk	Decoder 1 ABS Descrambling Key	W	Config	N/A	Hex String	8 Hexadecimal characters
ifmg	IFB Mic Gain	RW	Config	0	Integer	0-9
ifml	IFB Mute Level	RW	Config	0	Integer	0-9
ifpg	IFB Pre Gain	RW	Config	0	Integer	0-3
ifta	IFB TX IP Address	RW	Config	239.16.33.254	String	
ifte	IFB TX Enable	RW	Config	0	Integer	0=Off 1=On
iftp	IFB TX IP Port	RW	Config	20000	Integer	1024-65535
map1	Decoder 1 Manual Audio A PID	RW	Config	300	Integer	32-8190
map2	Decoder 2 Manual Audio A PID	RW	Config	300	Integer	32-8190

Command	Description	Access	Setting Type	Default	Type	Possible Values
mbp1	Decoder 1 Manual Audio B PID	RW	Config	300	Integer	32-8190
mbp2	Decoder 2 Manual Audio B PID	RW	Config	300	Integer	32-8190
mdp1	Decoder 1 Manual Data PID	RW	Config	300	Integer	32-8190
mdp2	Decoder 2 Manual Data PID	RW	Config	300	Integer	32-8190
mpp1	Decoder 1 Manual PCR PID	RW	Config	300	Integer	32-8190
mpp2	Decoder 2 Manual PCR PID	RW	Config	300	Integer	32-8190
mvp1	Decoder 1 Manual Video PID	RW	Config	300	Integer	32-8190
mvp2	Decoder 2 Manual Video PID	RW	Config	300	Integer	32-8190
ssi1	Decoder 1 Service Select Index	RW	Config	0	Integer	0-31
ssi2	Decoder 2 Service Select Index	RW	Config	0	Integer	0-31
ssm1	Decoder 1 Service Selection Mode	RW	Config	0	Integer	0=Defaults 1=List 2=Manual PIDs
ssm2	Decoder 2 Service Selection Mode	RW	Config	0	Integer	0=Defaults 1=List 2=Manual PIDs
umod	Unit Mode	RW	Config	1	Integer	0=Narrowband 1=DVBT 2=UMVL

Status settings

Command	Description	Access	Setting Type	Default	Type	Possible Values
adb1	Decoder 1 Audio A Bitrate	RW	Status		Integer	kbps
adb2	Decoder 1 Audio B Bitrate	RW	Status		Integer	kbps
adb3	Decoder 2 Audio A Bitrate	RW	Status		Integer	kbps
adb4	Decoder 2 Audio B Bitrate	RW	Status		Integer	kbps
adm1	Decoder 1 Audio A Mode	RW	Status		Integer	0=Mono 1=Stereo

Command	Description	Access	Setting Type	Default	Type	Possible Values
adm2	Decoder 1 Audio B Mode	RW	Status		Integer	0=Mono 1=Stereo
adm3	Decoder 2 Audio A Mode	RW	Status		Integer	0=Mono 1=Stereo
adm4	Decoder 2 Audio B Mode	RW	Status		Integer	0=Mono 1=Stereo
ads1	Decoder 1 Audio A Sampling Freq	RW	Status		Integer	0=44.1kHz (Not supported) 1=48kHz 2=32kHz
ads2	Decoder 1 Audio B Sampling Freq	RW	Status		Integer	0=44.1kHz (Not supported) 1=48kHz 2=32kHz
ads3	Decoder 2 Audio A Sampling Freq	RW	Status		Integer	0=44.1kHz (Not supported) 1=48kHz 2=32kHz
ads4	Decoder 2 Audio B Sampling Freq	RW	Status		Integer	0=44.1kHz (Not supported) 1=48kHz 2=32kHz
adt1	Decoder 1 Audio A Type	RW	Status	0	Integer	0=MPEG Layer 1 1=MPEG Layer 2 2=NICAM
adt2	Decoder 1 Audio B Type	RW	Status	0	Integer	0=MPEG Layer 1 1=MPEG Layer 2 2=NICAM
adt3	Decoder 1 Audio A Type	RW	Status	0	Integer	0=MPEG Layer 1 1=MPEG Layer 2 2=NICAM
adt4	Decoder 2 Audio B Type	RW	Status	0	Integer	0=MPEG Layer 1 1=MPEG Layer 2 2=NICAM
apd1	Audio PID Decoder 1	R	Status		integer	
apd2	Audio PID Decoder 2	R	Status		integer	
asil	ASI Input Lock Status	R	Status		integer	0=Not Locked 1=Locked

Command	Description	Access	Setting Type	Default	Type	Possible Values
dbr1	Data baudrate Decoder 1	R	Status	3	integer	0=300 1=600 2=1200 3=2400 4=4800 5=9600 6=19200 7=38400 8=57600 9=115200
dbr2	Data baudrate Decoder 2	R	Status	3	integer	0=300 1=600 2=1200 3=2400 4=4800 5=9600 6=19200 7=38400 8=57600 9=115200
dfe2	FEC rate Demod 2	R	Status	N/A	string	1/2 2/3 3/4 5/6 7/8
dfec	FEC rate Demod 1	R	Status	N/A	string	1/2 2/3 3/4 5/6 7/8
dina	Input Level A Demod 1	R	Status		float	input level in dBm
dinb	Input Level B Demod 1	R	Status		float	input level in dBm
dinc	Input Level C Demod 1	R	Status		float	input level in dBm
dind	Input Level D Demod 1	R	Status		float	input level in dBm
dine	Input Level E Demod 1/2	R	Status		float	input level in dBm
dinf	Input Level F Demod 1/2	R	Status		float	input level in dBm
ding	Input Level G Demod 1/2	R	Status		float	input level in dBm
dinh	Input Level H Demod 1/2	R	Status		float	input level in dBm
dlo2	Lock Status Demod 2	R	Status		integer	0=Not Locked 1=Locked

Command	Description	Access	Setting Type	Default	Type	Possible Values
dloc	Lock Status Demod 1	R	Status		integer	0=Not Locked 1=Locked
dmo2	Constellation Demod 2	R	Status	N/A	string	BPSK QPSK 16QAM 64QAM
dmod	Constellation Demod 1	R	Status	N/A	string	BPSK QPSK 16QAM 64QAM
dndi	Diversity Setting (num ways licensed for)	R	Status		Integer	0 2 4 6 8
dpa1	Data parity mode Decoder 1	R	Status	0	integer	0=no parity 1=odd 2=even
dpa2	Data parity mode Decoder 2	R	Status	0	integer	0=no parity 1=odd 2=even
dpd1	Data PID Decoder 1	R	Status		integer	
dpd2	Data PID Decoder 2	R	Status		integer	
dpk2	Packet errors Demod 2	R	Status		integer	
dpkt	Packet errors Demod 1	R	Status		integer	
dpos	BER Post-Viterbi Demod 1	R	Status		integer	Post Viterbi x 10^-6
dpr2	BER Pre-Viterbi Demod 2	R	Status		integer	Pre Viterbi x 10^-6
dpre	BER Pre-Viterbi Demod 1	R	Status		integer	Pre Viterbi x 10^-6
dpv2	BER Post-Viterbi Demod 2	R	Status		integer	Post Viterbi x 10^-6
dty1	Data type Decoder 1	R	Status	0	integer	
dty2	Data type Decoder 2	R	Status	0	integer	
dwi1	Data width Decoder 1	R	Status	0	integer	
dwi2	Data width Decoder 2	R	Status	0	integer	

Command	Description	Access	Setting Type	Default	Type	Possible Values
eli1	Video Line Standard Decoder 1	R	Status		integer	0=1080p23.98 1=1080p24 2=1080p25 3=1080p29.97 4=1080p30 5=1080p50 6=1080p59.94 7=1080p60 8=1080i23.98 9=1080i24 10=1080i25 11=1080i29.97 12=1080i30 13=720p23.98 14=720p24 15=720p25 16=720p29.97 17=720p30 18=720p50 19=720p59.94 20=720p60 21=PAL 22=NTSC 23=PAL704 24=NTSC704
eli2	Video Line Standard Decoder 2	R	Status		integer	0=1080p23.98 1=1080p24 2=1080p25 3=1080p29.97 4=1080p30 5=1080p50 6=1080p59.94 7=1080p60 8=1080i23.98 9=1080i24 10=1080i25 11=1080i29.97 12=1080i30 13=720p23.98 14=720p24 15=720p25 16=720p29.97 17=720p30 18=720p50 19=720p59.94 20=720p60 21=PAL 22=NTSC 23=PAL704 24=NTSC704
gbln	Build Number	RW	Status		String	Build number of the software version installed
gbty	Board Type	R	Status	D320	String	D330

Command	Description	Access	Setting Type	Default	Type	Possible Values
gd1u	Genlock In Use on Decoder 1	RW	Status		Integer	0=no 1=yes
gd2u	Genlock In Use on Decoder 2	RW	Status		Integer	0=no 1=yes
gdt1	Decoder 1 GPS Date	RW	Status		Integer	Decimal representation e.g. 230316 -> 23rd March 2016
gdt2	Decoder 2 GPS Date	RW	Status		Integer	Decimal representation e.g. 230316 -> 23rd March 2016
genf	Genlock Input Format	RW	Status		String	e.g. PAL, 720p50, 1080i60
geni	Genlock Input Status	RW	Status		Integer	0=unlocked 1=locked
gens	Genlock Input Supported with current format	RW	Status		Integer	0=no 1=yes
gfpg	FPGA Version Number	R	Status	N/A	hex string	
gfx1	Decoder 1 GPS Fix type	RW	Status		String	1=No fix 2=2D fix 3=3D fix
gfx2	Decoder 2 GPS Fix type	RW	Status		String	1=No fix 2=2D fix 3=3D fix
gla1	Decoder 1 GPS Latitude position	RW	Status		Float	
gla2	Decoder 2 GPS Latitude position	RW	Status		Float	
glh1	Decoder 1 GPS Latitude Hemisphere	RW	Status		String	“N” or “S”
glh2	Decoder 2 GPS Latitude Hemisphere	RW	Status		String	“N” or “S”
glnf	LNB Fault	R	Status	N/A	integer	0 to 15 relating to bit mask of faulty card. 0=OK 1=fault tuner card A 2=fault tuner card B 3=fault tuner card A and B for example.
glo1	Decoder 1 GPS Longitude postition	RW	Status		Float	

Command	Description	Access	Setting Type	Default	Type	Possible Values
glo2	Decoder 2 GPS Longitude postition	RW	Status		Float	
glv1	Decoder 1 GPS Lat/Long valid	RW	Status		Integer	0=no 1=yes
glv2	Decoder 2 GPS Lat/Long valid	RW	Status		Integer	0=no 1=yes
gmac	MAC address	R	Status	N/A	String	
gns1	Decoder 1 GPS Number of satellites used for fix	RW	Status		Integer	
gns2	Decoder 2 GPS Number of satellites used for fix	RW	Status		Integer	
goh1	Decoder 1 GPS Longitude Hemisphere	RW	Status		String	“N” or “S”
goh2	Decoder 2 GPS Longitude Hemisphere	RW	Status		String	“N” or “S”
grc1	Decoder 1 GPS Received	RW	Status		Integer	0=no 1=yes
grc2	Decoder 2 GPS Received	RW	Status		Integer	0=no 1=yes
gsa1	Decoder 1 GPS Accuracy	RW	Status		Float	
gsa2	Decoder 2 GPS Accuracy	RW	Status		Float	
gsc1	Decoder 1 GPS Course	RW	Status		Float	
gsc2	Decoder 2 GPS Course	RW	Status		Float	
gser	Serial Number (64 bit)	R	Status	N/A	Hex String (16 hex char)	
gsh1	Decoder 1 GPS Height	RW	Status		Float	Metres
gsh2	Decoder 2 GPS Height	RW	Status		Float	Metres
gsp1	Decoder 1 GPS Speed	RW	Status		Float	Mph

Command	Description	Access	Setting Type	Default	Type	Possible Values
gsp2	Decoder 2 GPS Speed	RW	Status		Float	Mph
gut1	Decoder 1 GPS UTC Time	RW	Status		Integer	UTC format
gut2	Decoder 2 GPS UTC Time	RW	Status		Integer	UTC format
gver	Application version	R	Status	N/A	String	
mpd1	Decoder 1 Meta PID	RW	Status		Integer	32-8190
mpd2	Decoder 2 Meta PID	RW	Status		Integer	32-8190
nsr1	Decoder 1 Number of Services available	RW	Status		Integer	
nsr2	Decoder 2 Number of Services available	RW	Status		Integer	
ppd1	PCR PID Decoder 1	R	Status		integer	
ppd2	PCR PID Decoder 2	R	Status		integer	
scr1	Encrypted Service Status Decoder 1	R	Status		integer	0=Clear service, 1=Encrypted service
scr2	Encrypted Service Status Decoder 2	R	Status		integer	
sgu2	Detected OFDM Guard Interval (Useful in AUTO mode) Demodulator 2	R	Status	0	string	1/32 1/16 1/8 1/4
sgua	Detected OFDM Guard Interval (Useful in AUTO mode) Demodulator 1	R	Status	0	string	1/32 1/16 1/8 1/4
smax	Receive Spectrum (maximum points)	R	Status		String	String length is 160 bytes. The lower 7 bits of each byte is a spectrum point value. Valid number range 0 to 127. Top bit always set to stop control characters being sent

Command	Description	Access	Setting Type	Default	Type	Possible Values
smin	Receive Spectrum (minimum points)	R	Status		String	String length is 160 bytes. The lower 7 bits of each byte is a spectrum point value. Valid number range 0 to 127. Top bit always set to stop control characters being sent
snra	Input SNR A Demod 1	R	Status		float	
snrb	Input SNR B Demod 1	R	Status		float	
snrc	Input SNR C Demod 1	R	Status		float	
snrd	Input SNR D Demod 1	R	Status		float	
snre	Input SNR E Demod 1/2	R	Status		float	
snrf	Input SNR F Demod 1/2	R	Status		float	
snrf	Input SNR G Demod 1/2	R	Status		float	
snrf	Input SNR H Demod 1/2	R	Status		float	
srv1	Service Name Decoder 1	R	Status		String	
srv2	Service Name Decoder 2	R	Status		String	
vlk1	Video Lock Status Decoder 1	R	Status		integer	0=Not Locked 1=Locked
vlk2	Video Lock Status Decoder 2	R	Status		integer	0=Not Locked 1=Locked
vpd1	Video PID Decoder 1	R	Status		integer	
vpd2	Video PID Decoder 2	R	Status		integer	
vrs1	Video Resolution Decoder 1	R	Status		integer	
vrs2	Video Resolution Decoder 2	R	Status		integer	
vvr1	Decoder 1 Vertical Video Resolution	RW	Status	0	Integer	
vvr2	Decoder 2 Vertical Video Resolution	RW	Status	0	Integer	

Special Settings

Command	Description	Access	Setting Type	Default	Type	Possible Values
date	Date and Time	RW	Special	N/A	Integer String	Date can be set and read using the following format: HHmmssDDMMYYYY - All dates and times are UTC no daylight savings.
icom	IP settings	RW	Special	192.168.0.1, 255.255.255.0, 192.168.0.254	String	Comma separated list of <IP_address>,<SubnetMask>,<DefaultGateway>
idhc	DHCP enable	RW	Special	1	integer	0=off 1=on
ipac	Active IP address and Subnet mask	R	Special	N/A	integer	Comma separated list of <IP_address>,<SubnetMask>
load	Load config to scratch (on read gives config number in scratch)	RW	Special	1	Integer	1 to 16
loau	Load Global Settings to scratch	W	Special	N/A	N/A	No data field required
save	Save config in scratch to config number given	W	Special	N/A	Integer	1 to 16
savu	Save Global Settings	W	Special	N/A	N/A	No data field required