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# PRORXD Broadcast Receiver User Guide

Broadcast Solutions, HD/SD Products

Commercial in Confidence

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# 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 <b>bold</b> emphasises a new word or term of significance.   | We name this a <b>protocol</b> 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:<br>Select the <b>Insert</b> menu, then select <b>picture</b> , then select <b>from file</b> . | <b>Insert&gt;picture&gt;from file</b>                 |

## 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

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## 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                                      |

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# 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<br>(x denotes the receive diversity, available as 2 or 4-way)       |
| PRORXD-x-2RU | Professional dual channel receiver and decoder, 2U rack mount version<br>(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)
- 2<sup>nd</sup> 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)
- 2<sup>nd</sup> 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.

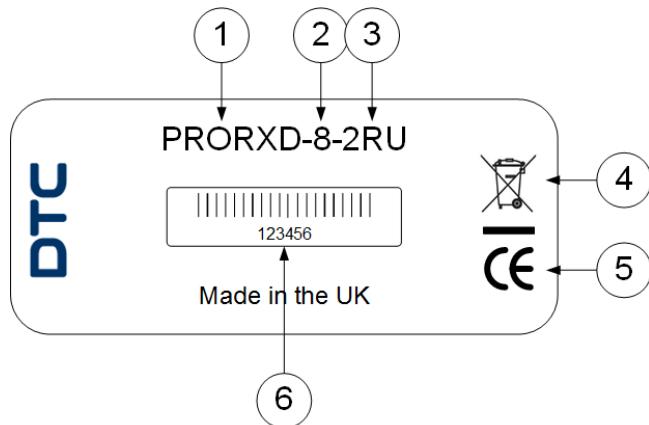


Figure 2-2 PRORXD Label

| 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 <b>CE marking</b> (also known as <b>CE mark</b> ) is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA).<br>The <b>CE marking</b> 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.<br>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.<br>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.<br>Turn the joystick for selection.<br>Short push the joystick for ENTER.<br>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

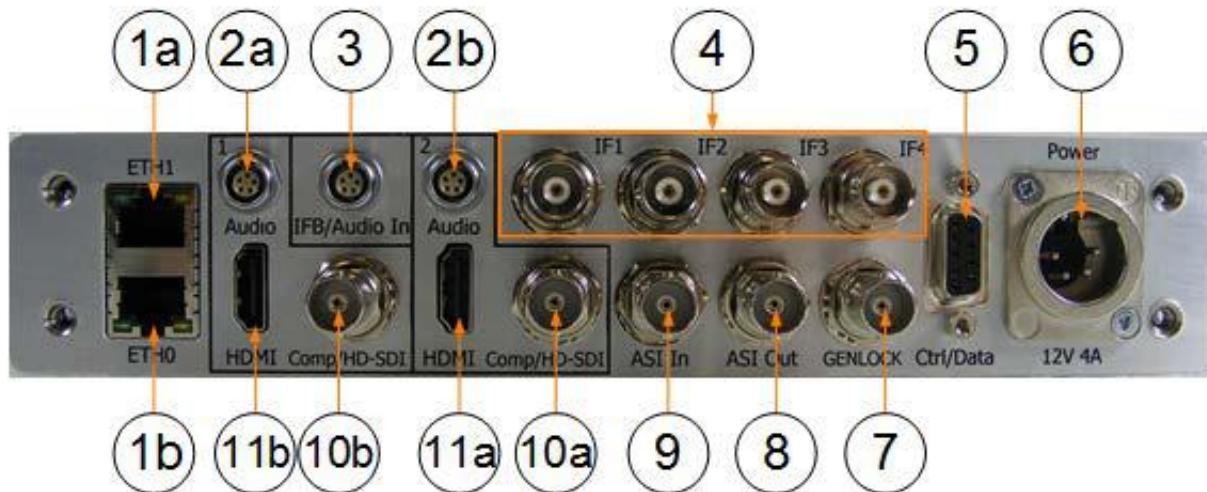


Figure 3-2 PRORXD-1RU Rear Panel

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

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

Table 3-2 PRORXD-1RU Rear Panel Key

## 3.4 PRORXD-2RU

### Front Panel

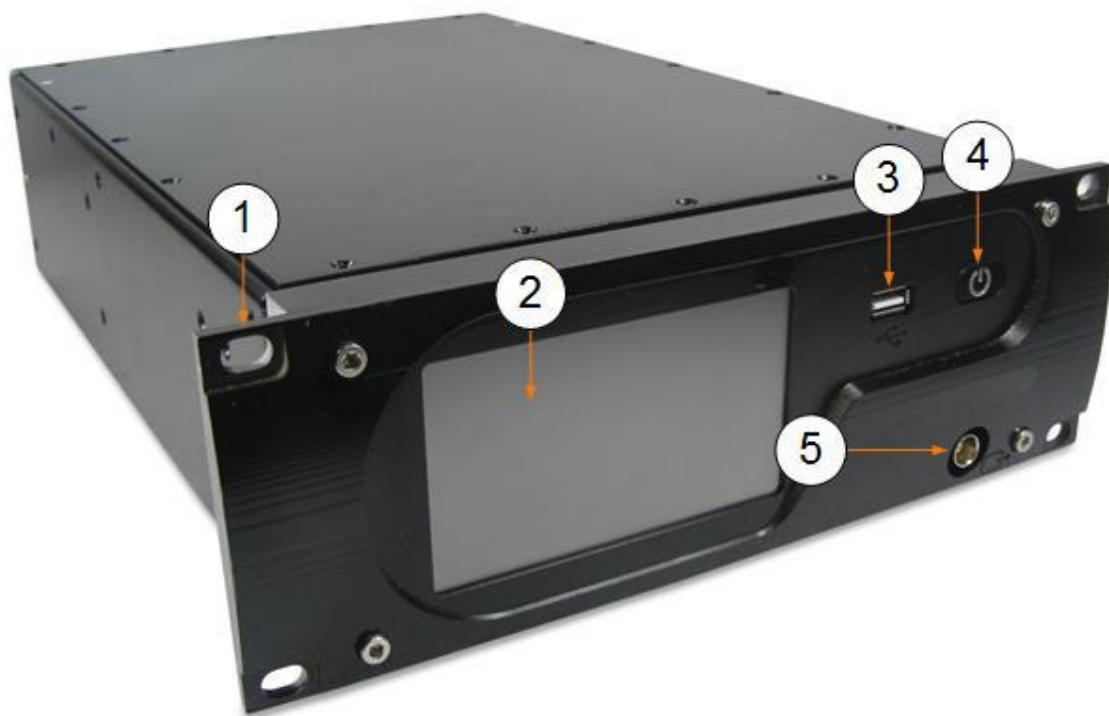


Figure 3-3 PRORXD-2RU Front Panel

| 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.<br>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.<br>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

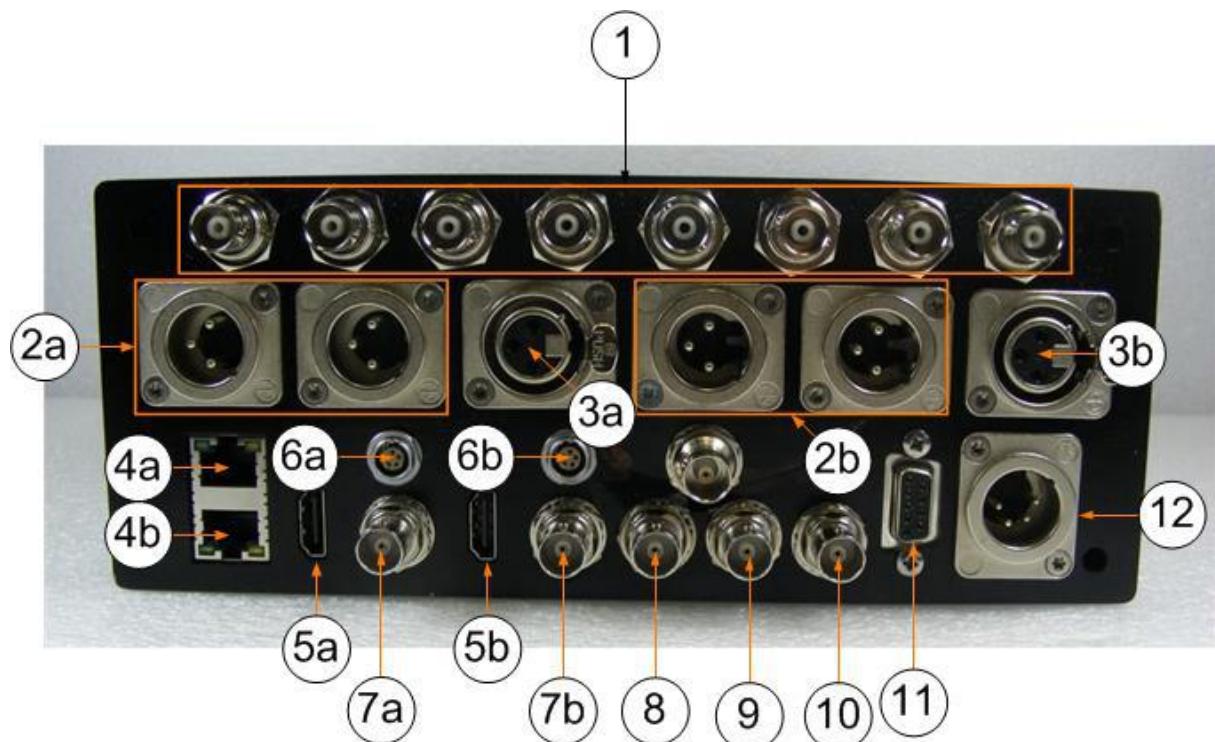


Figure 3-4 PRORXD-2RU Rear Panel

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

| No  | Item  | Function  |
|-----|---|---|
| 3ab | XLR 3-way receptacle (sockets) marked IFB/Audio In 1.<br>Channel 2 is marked IFB/Audio In 2.  | IFB – Interruptible Fold back.<br>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.<br>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.<br>Each channel has this facility.   |
| 6ab | Lemo OB 5-way receptacle (sockets) twin key marked AUDIO 3.<br>Channel two is marked AUDIO 4. | For Audio output.<br>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.<br>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:

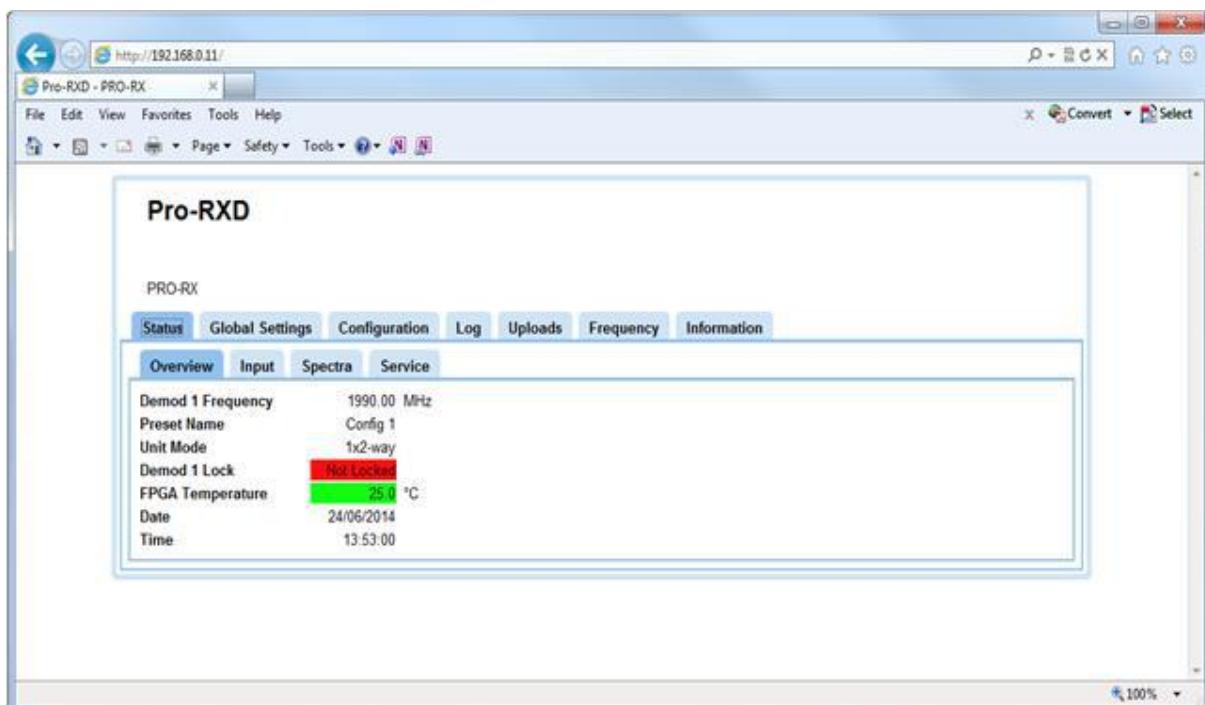
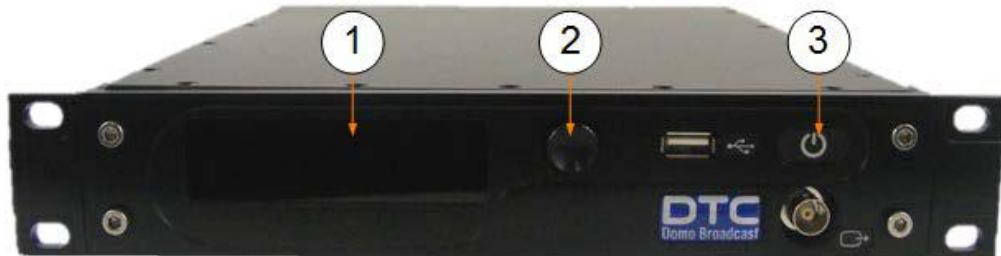


Figure 4-1 PRORXD Control Page

## 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.<br>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.

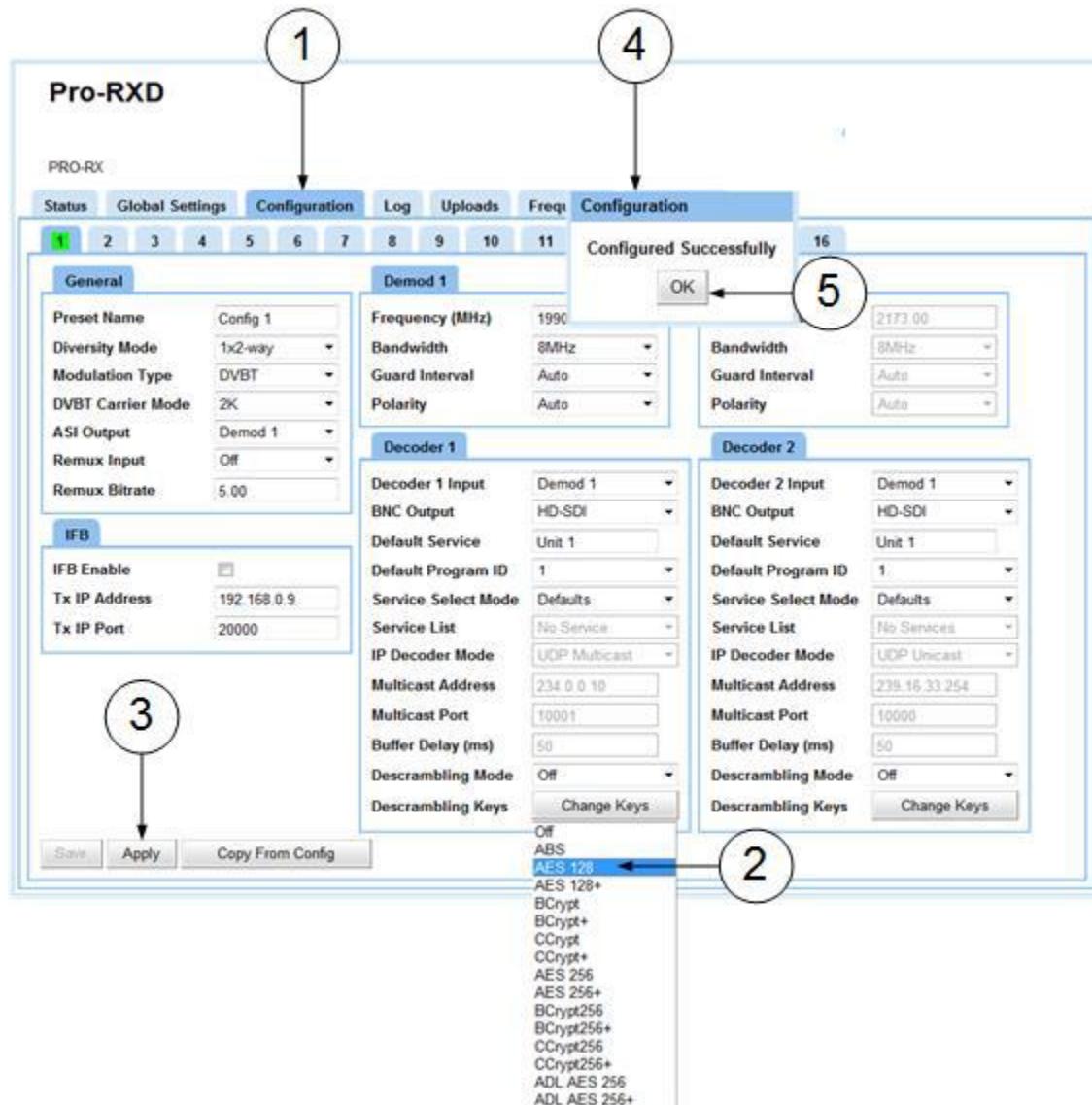


Figure 5-1 Select the Encryption Mode

## 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.

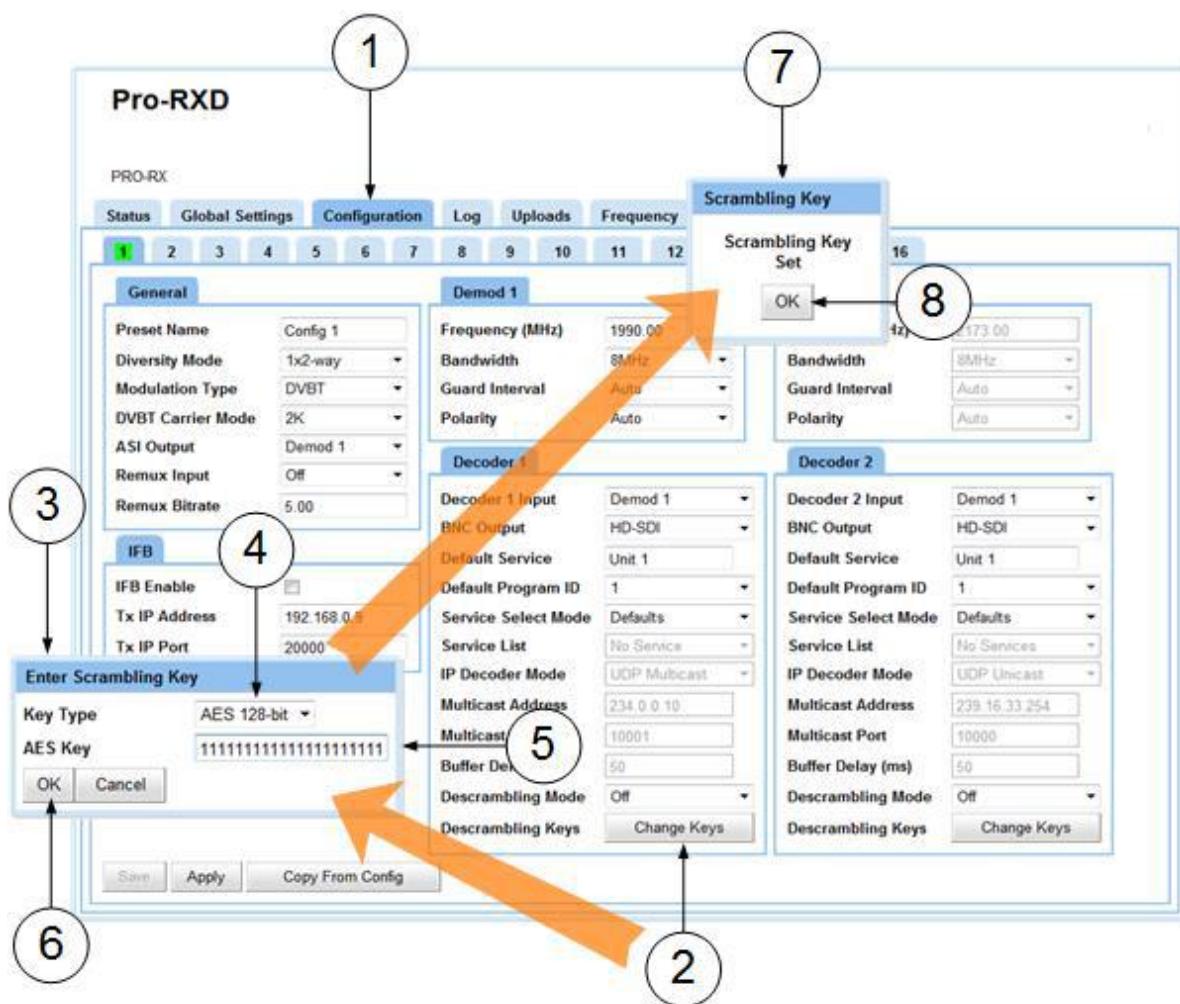


Figure 5-2 Change the Encryption Key

## 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.

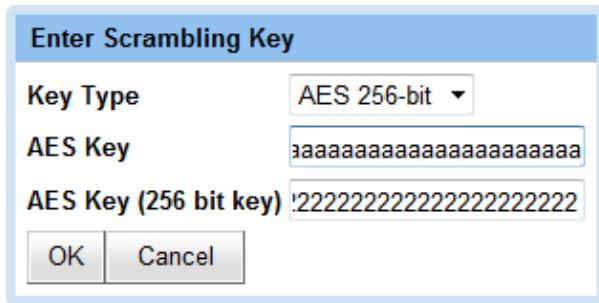


Figure 5-3 Encryption Key for AES256

| 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.

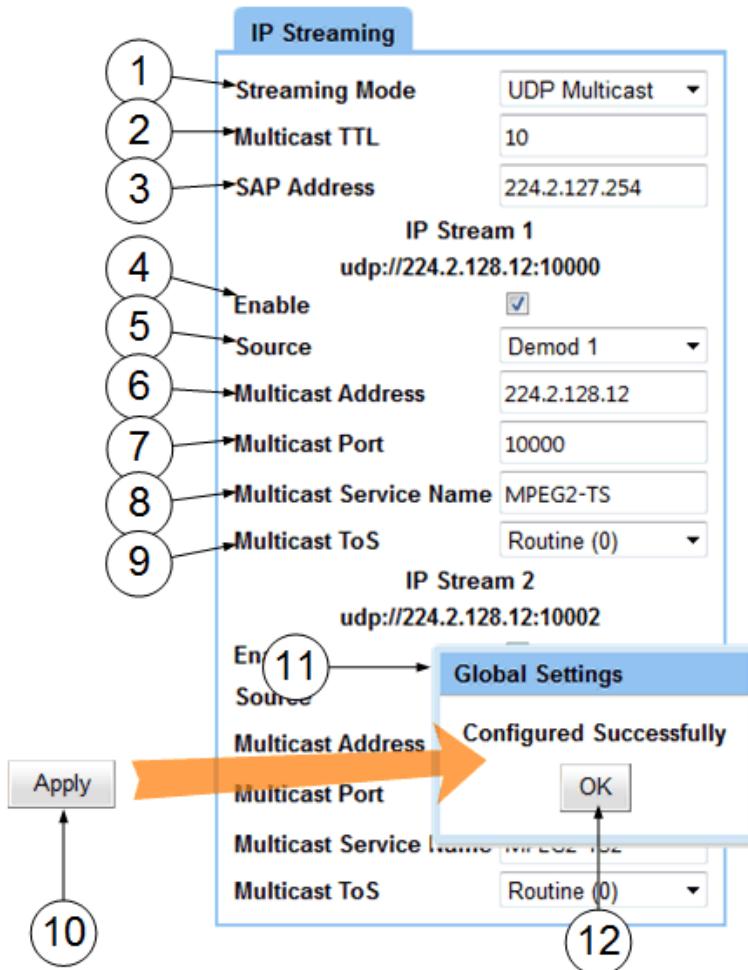


Figure 5-4 Configure the Streaming Settings Pane

## 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 your 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.

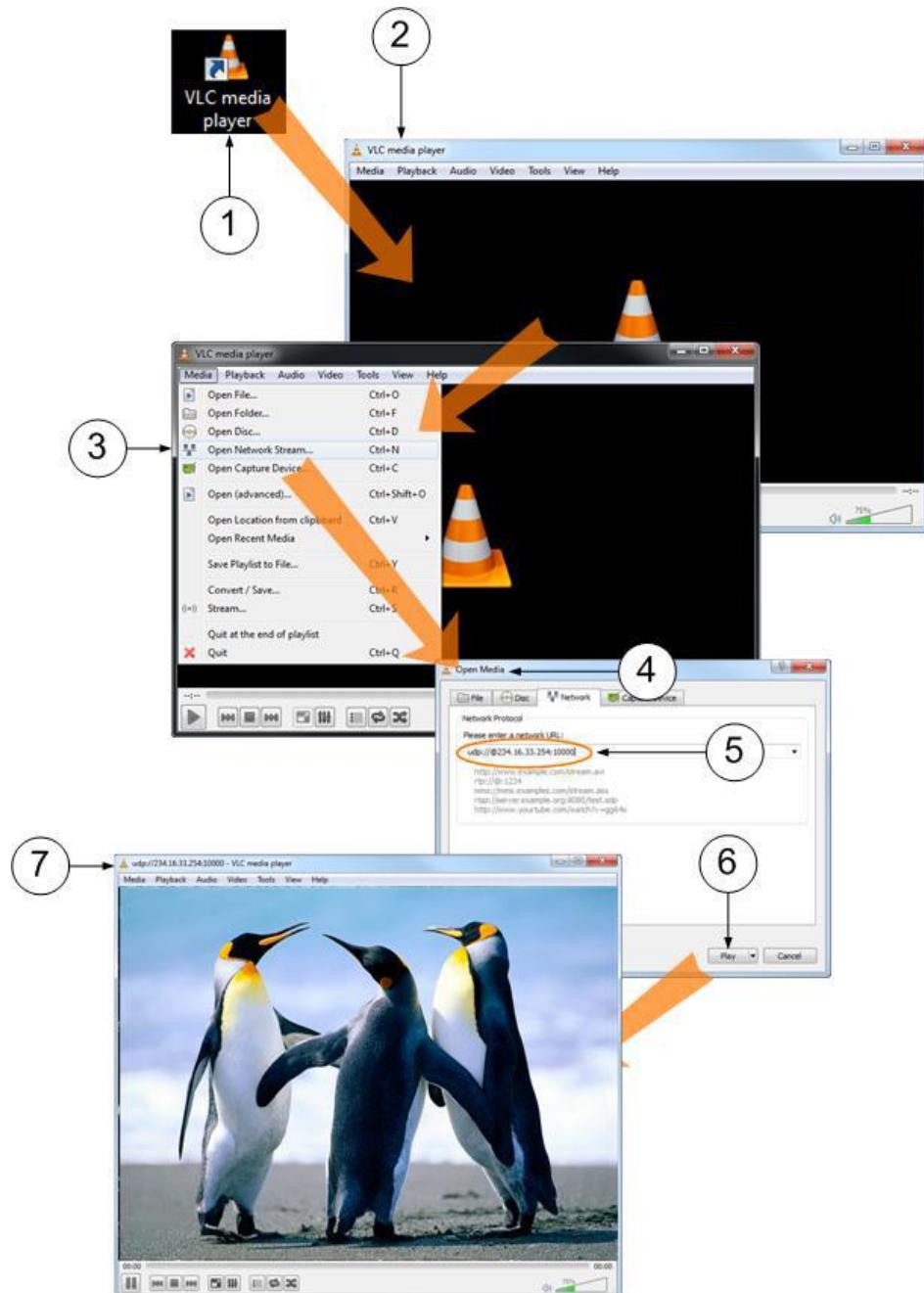


Figure 5-5 Recovering a UDP Multicast Stream

## 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 your 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.

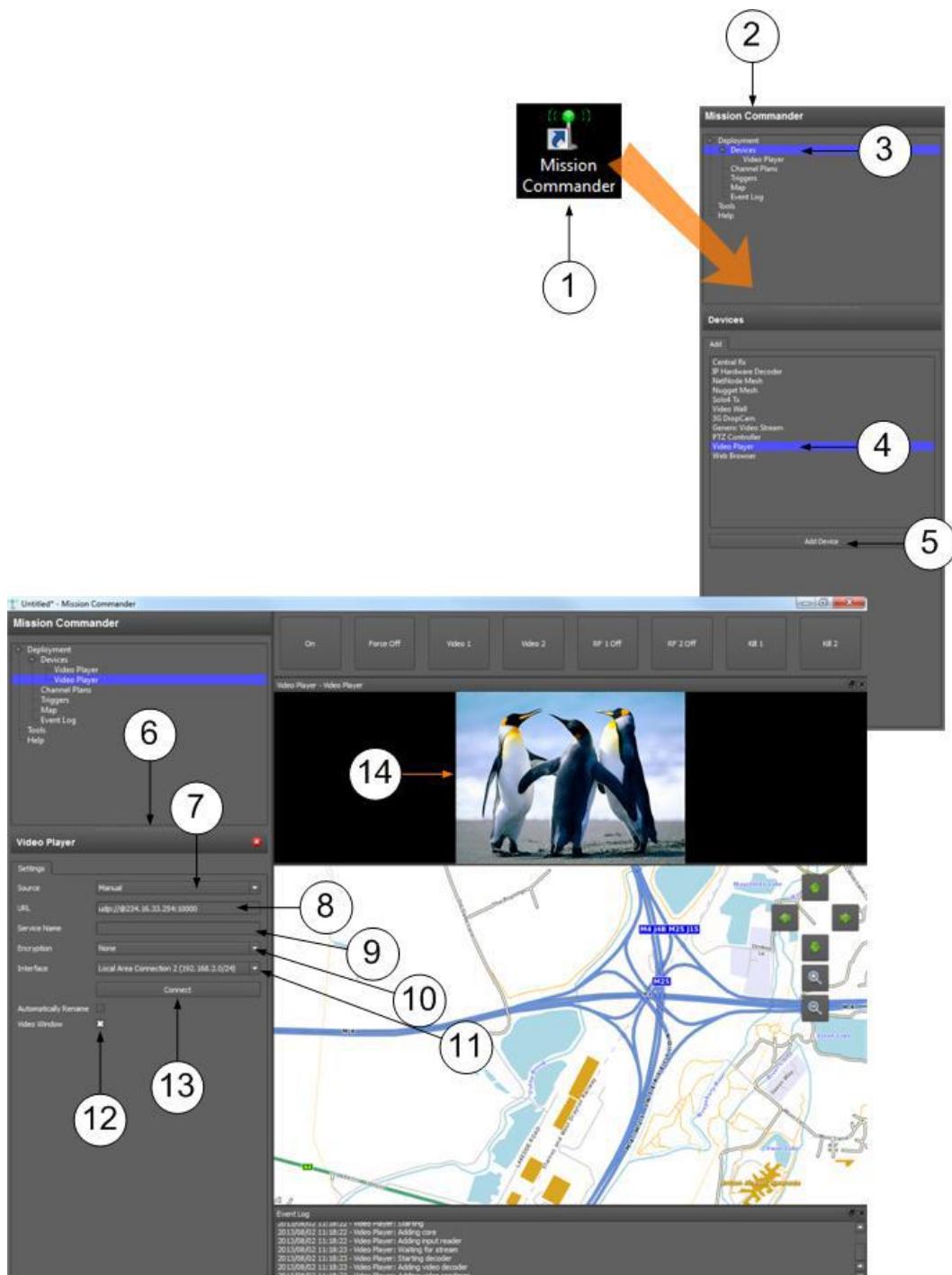


Figure 5-6 Recovering a UDP Multicast Stream – Mission Commander

## 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.

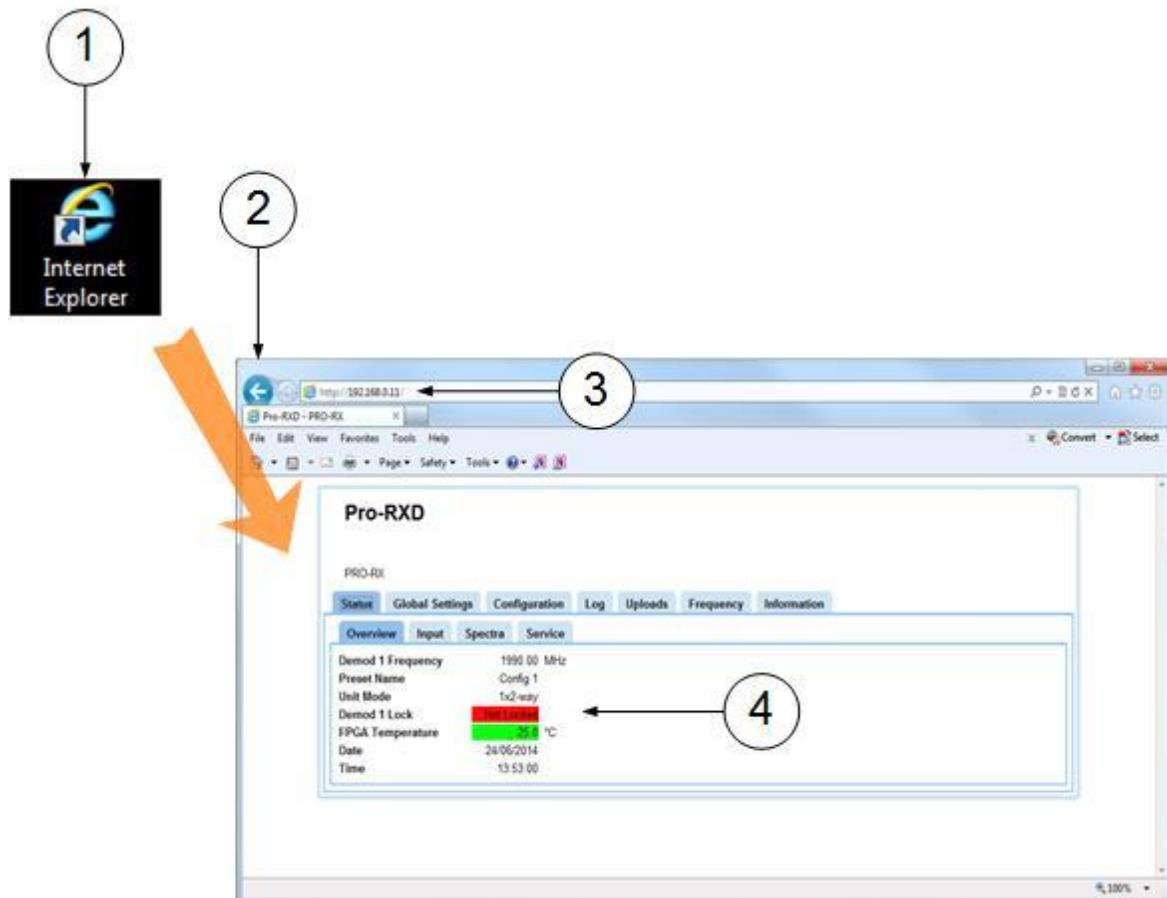


Figure 6-1 Open Web Browser and Log on

## Troubleshooting

- :( I don't know the IP address of the unit.
- :smiley: 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.
- :smiley: 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

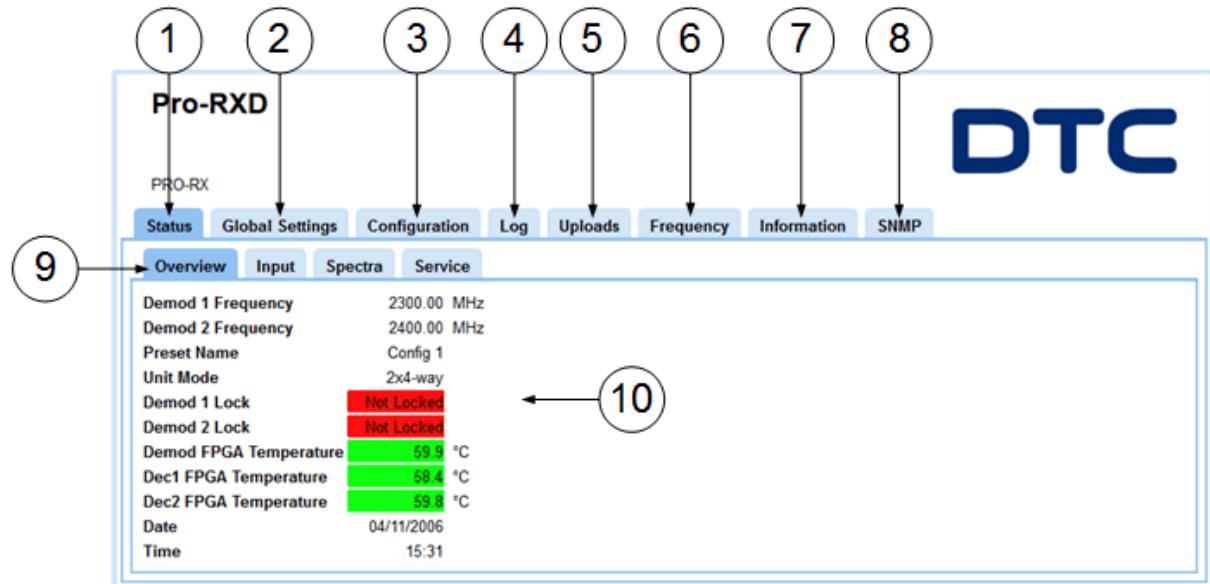


Figure 6-2 Explore the Control Pages

| 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.<br><br>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

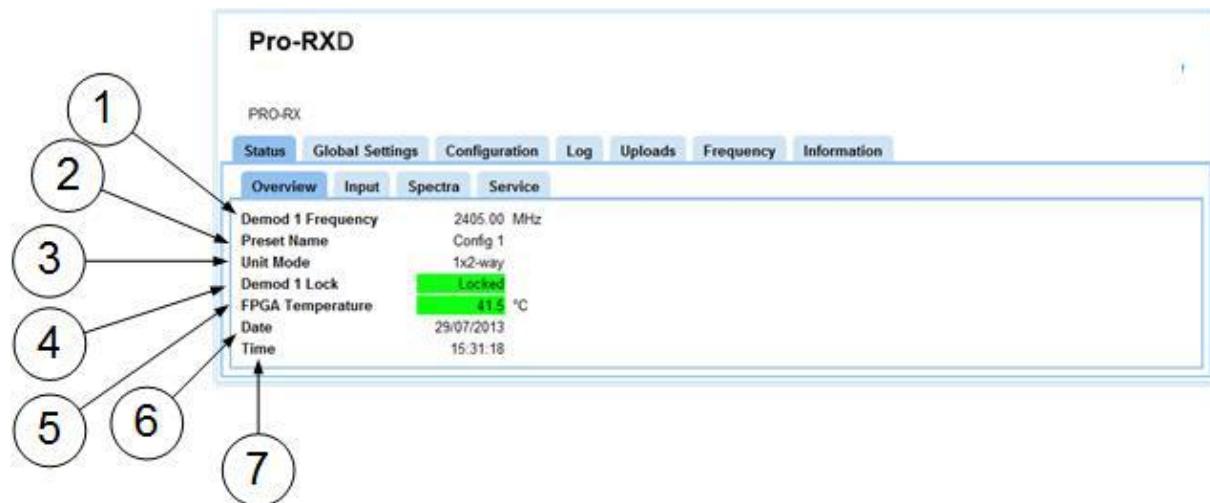
### Before you Start

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 <b>frequency</b> 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<br>1x4-way<br>2x4-way etc.                           | The configuration of the diversity and channel configuration of the receiver.  |
| 4  | Demod 1 Lock            | Locked (Green background) or<br>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.<br><br>If the field background is green, the temperature is in limits.<br><br>If the background shows red, then the FPGA is overheating and the unit must be switched off immediately.<br><br>It must be in the region of 50 to 80 degrees Celsius. |
| 6  | Date                    | A correct date.  | You can set this in <b>Global Settings&gt;Set Clock</b> button.  |
| 7  | Time                    | A correct time.  | You can set this in <b>Global Settings&gt;Set Clock</b> button.  |

Table 6-2 Overview Sub-Tab Key

## Step 2: Open the Input Sub-Tab

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

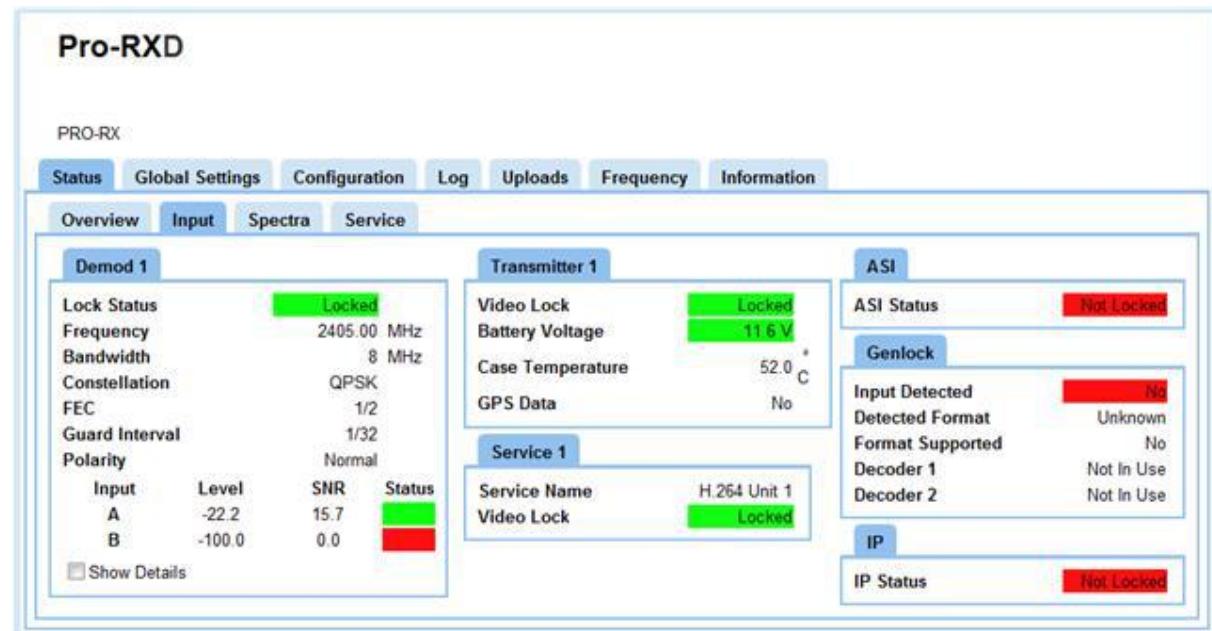


Figure 6-4 Status Tab showing Input Sub-Tab

## Step 3: Interpret the Demod Pane

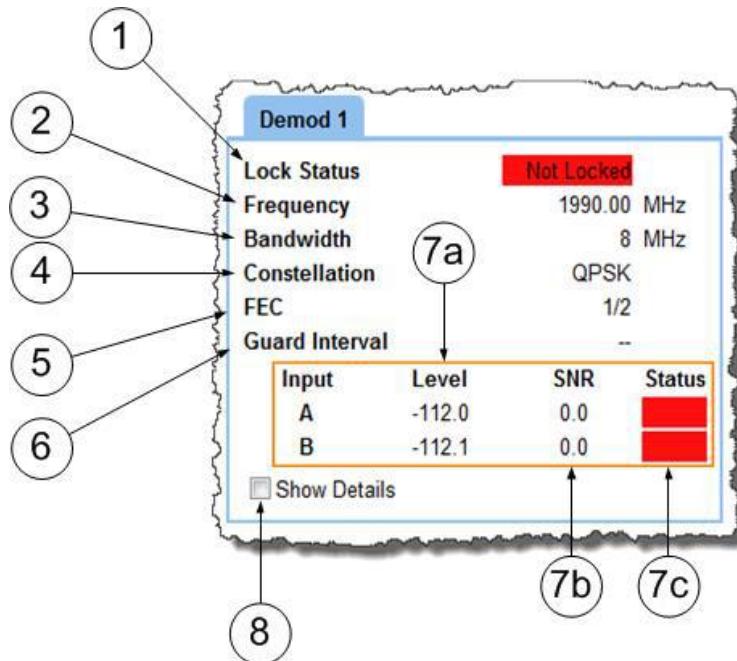


Figure 6-5 Input Sub-Tab showing Demod Pane

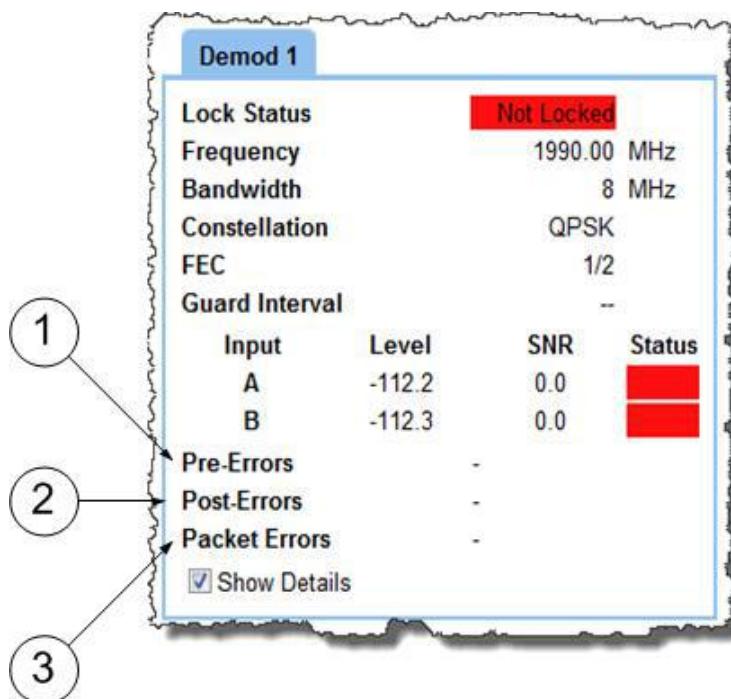
| No | Property    | Range   | Description  |
|----|-------------|---|--|
| 1  | Lock Status | Locked (green background) or Not Locked (red background). | Tells you if the first demodulator has successfully locked to the incoming bit stream. |

| 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:<br>6, 7 and 8MHz<br>Narrowband:<br>2.5MHz<br>1.25MHz and 625kHz        | DVB-T/UMVL bandwidths (usually used for broadcast).<br>DTC narrowband (usually for surveillance).<br>DTC Ultra-narrowband (this is a licensable feature, usually for surveillance).   |
| 4  | Constellation   | DVBT:<br>QPSK, 16QAM, 64QAM<br><br>Narrowband/UMVL:<br>BPSK, 8PSK, QPSK,<br>16QAM | This field indicates the OFDM constellation being received.<br>QPSK-less user data, more robust, more range.<br>16QAM-more user data, less robust, less range.<br>The mode is automatically detected and is simply displayed here. You can't change it other than at the transmitter.   |
| 5  | FEC             | DVBT:<br>1/2, 2/3, 3/4, 5/6, 7/8<br><br>Narrowband/UMVL:<br>1/3 or 2/3            | This field indicates the forward error correction (FEC) rate which is being applied. Think 'data bits/all bits'<br>1/3 means 1 bit out of 3 bits is data and thus 2 bits are used for error correction.<br>Small quantity of user data means less picture quality, but more error correction means a more robust signal and thus more range.<br>2/3 means 2 bits out of 3 bits are data and thus 1 bit is used for error correction.<br>More user data means better picture quality, but less error correction means less robust signal and thus less range.<br>The mode is automatically detected and is simply displayed here. You can't change it other than at the transmitter. |
| 6  | Guard interval  | DVBT:<br>1/32, 1/16, 1/8, 1/4<br><br>Narrowband/UMVL:<br>1/16 or 1/8              | The guard interval which is being applied to the narrowband mode in operation.<br>The guard interval is a deliberate extension of the RF symbol period to give immunity to reflections.<br>1/16, short extension, deals with fast reflections, more data, less range.<br>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<br>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.<br>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.<br>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.

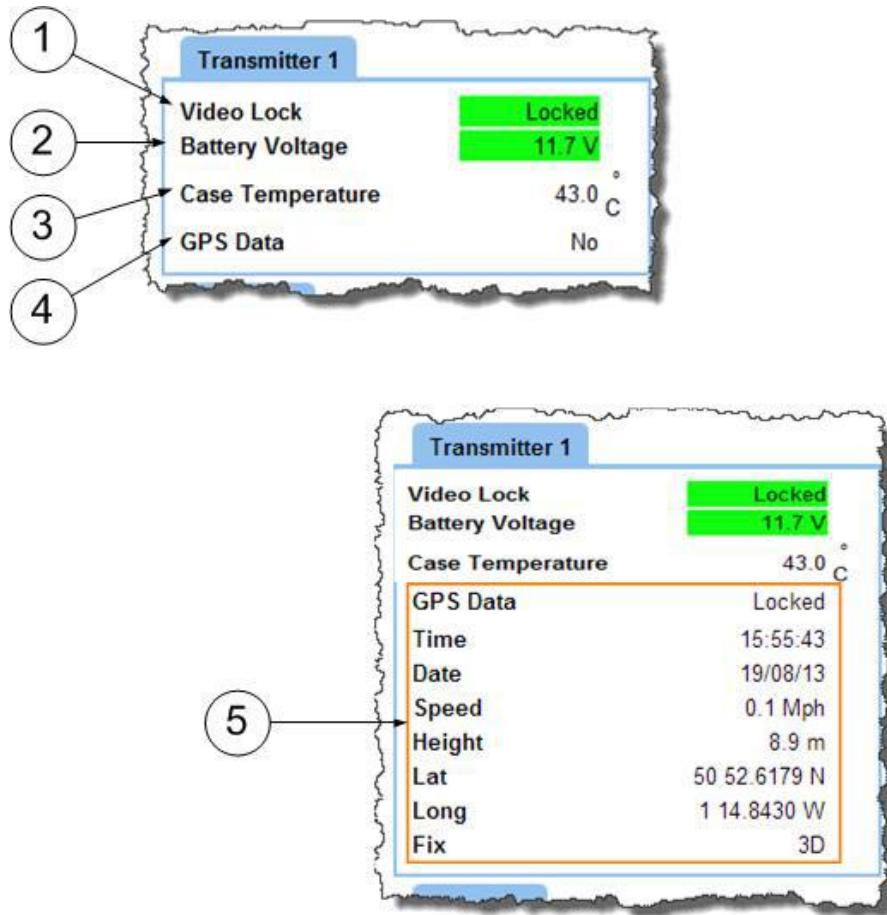


Figure 6-7 Input Sub-Tab showing Transmitter Pane

| 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.           | <p>This field reports the current voltage of the transmitter's battery in VDC.</p> <p>If the field background is green, the voltage is more than the TX Battery Alarm voltage parameter specified in the Global Settings&gt;General Settings pane.</p> <p>If the background shows red, then the voltage is below the alarm limit, too low and the unit will not operate correctly.</p> |
| 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

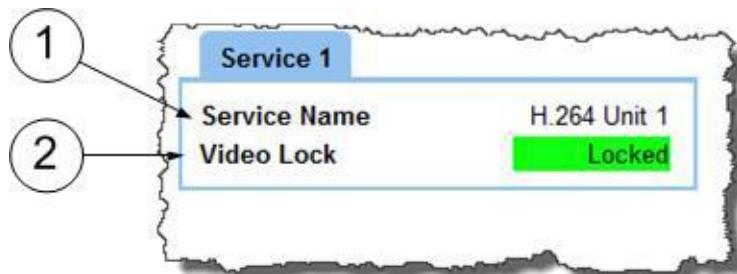


Figure 6-8 Input Sub-Tab showing Service Pane

| 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

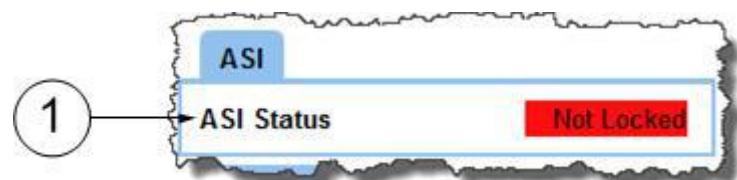


Figure 6-9 Input Sub-Tab showing ASI Pane

| 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

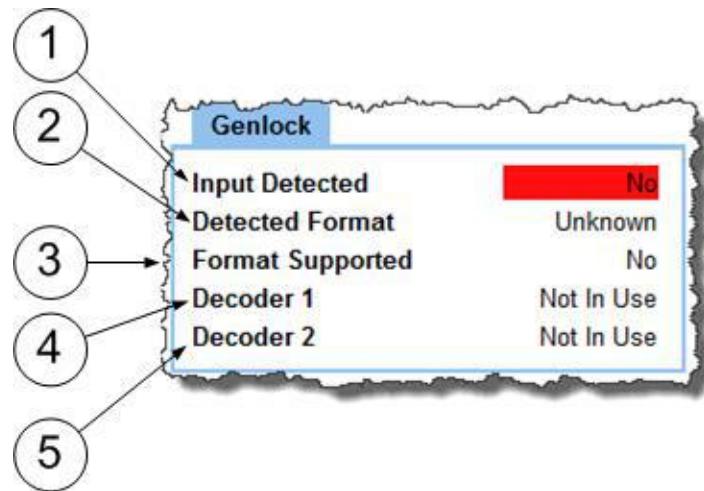


Figure 6-10 Input Sub-Tab showing Genlock Pane

| 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<br>PALNTSC<br>HD standards                           | Tells you the format of the Genlock signal.<br>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<br>Not in Use  | Using - External Genlock has been selected and is supported.<br>Not in use – External Genlock not selected or not supported.    |
| 5  | Decoder 2        | Using<br>Not in Use  | Using - External Genlock has been selected and is supported.<br>Not in use – External Genlock is not selected or not supported. |

Table 6-8 – Genlock Pane Key

## Step 9: Interpret the IP Pane

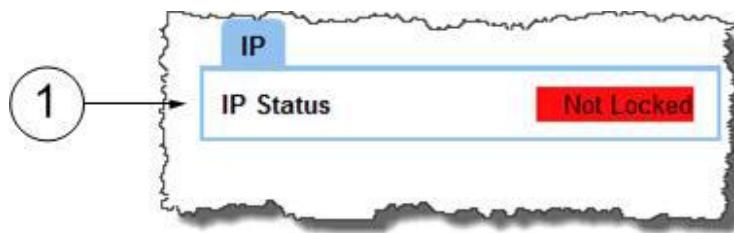
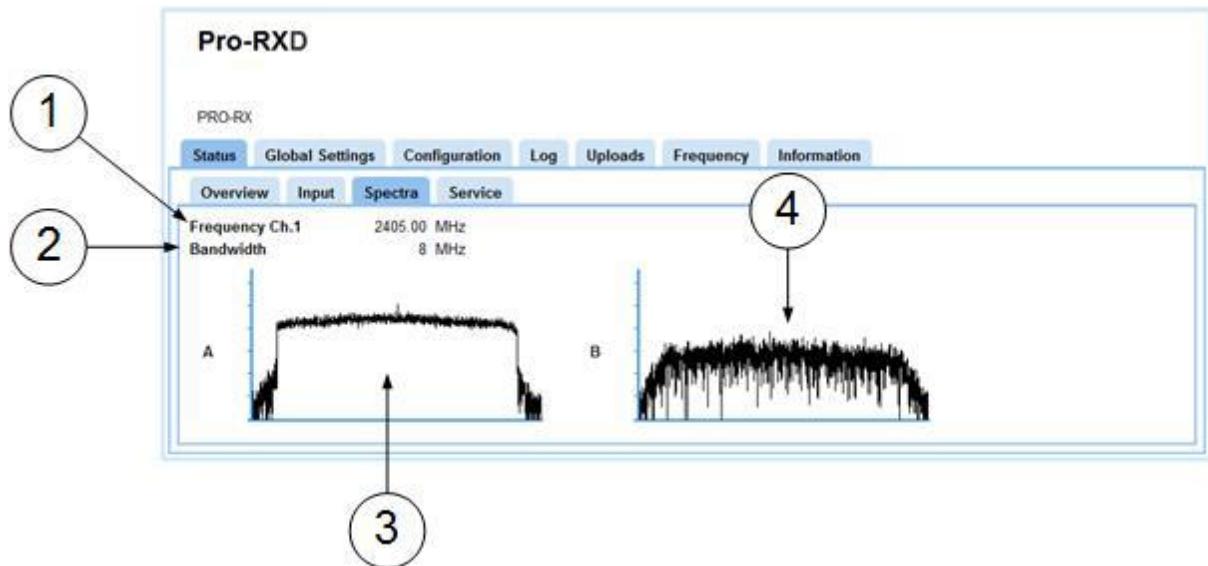


Figure 6-11 Input Sub-Tab showing IP Pane

| 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.<br>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:<br>6, 7 and 8MHz<br>Narrowband:<br>2.5MHz<br>1.25MHz and 625kHz                                     | The bandwidth which is currently in operation.<br>DVB-T bandwidths (usually used for broadcast).<br>DTC narrowband (usually for surveillance).<br>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.<br><br>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.

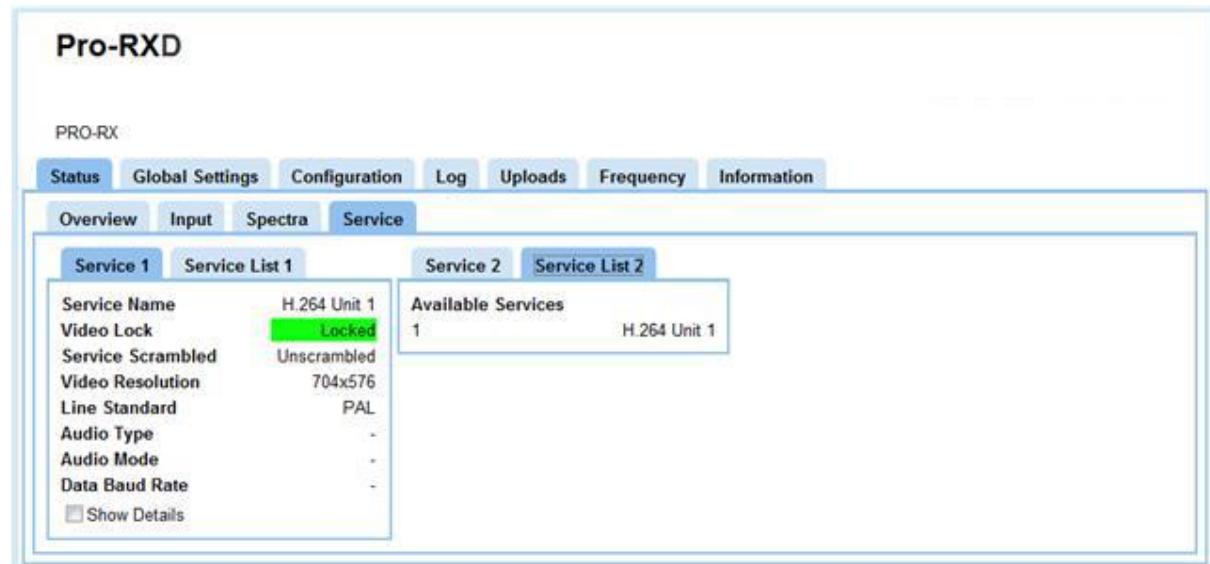


Figure 6-13 Status Tab showing Service Sub-Tab

## Step 12: Interpret the Service 1 Pane

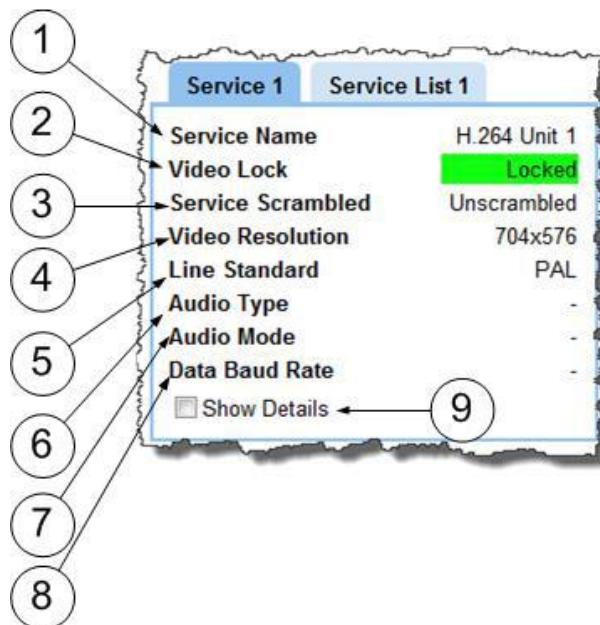


Figure 6-14 Service Sub-Tab showing Service 1 Pane

| 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<br>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.

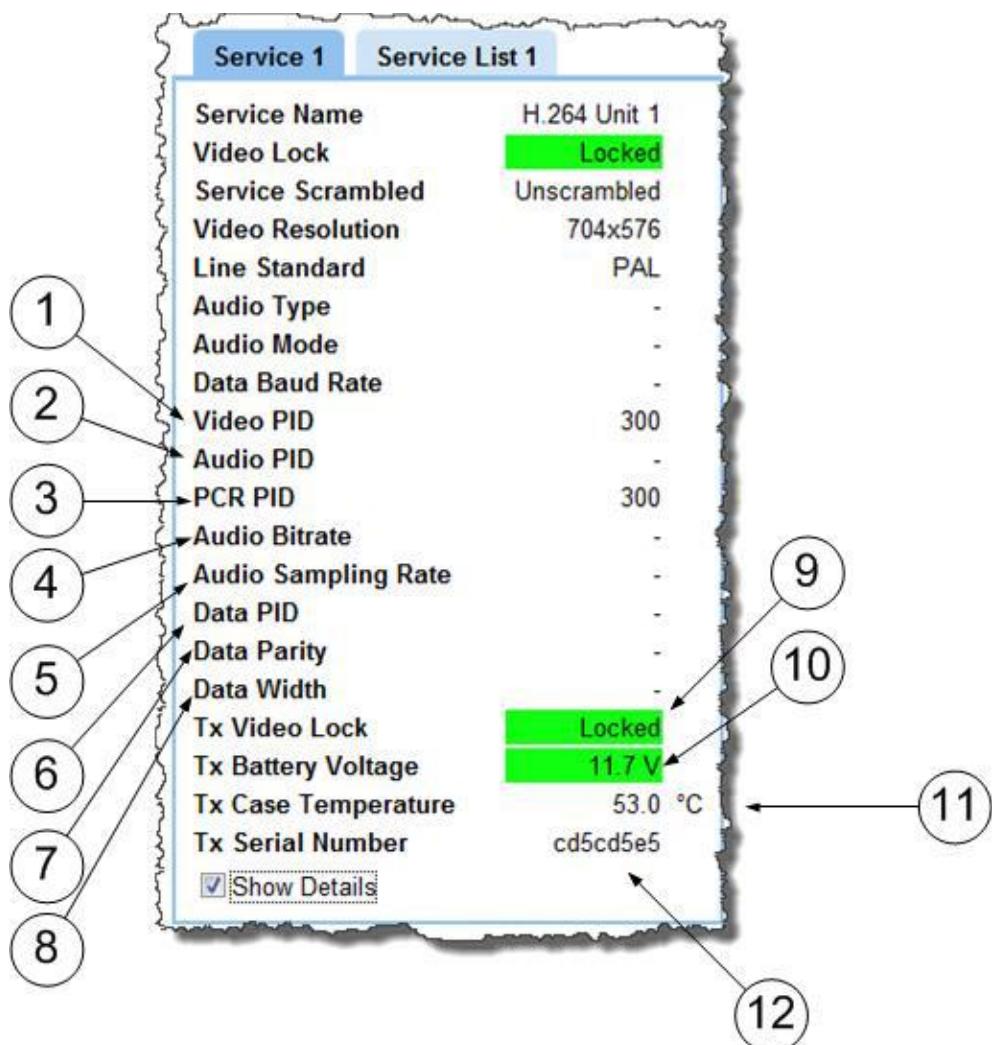


Figure 6-15 Service 1 Pane with Show Details Selected

| 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<br>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.<br><br>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.<br>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.<br>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.<br>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 <b>transmitter</b> has successfully locked to an incoming video signal.<br>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 <b>transmitter's</b> battery in VDC.<br>If the field background is green, the voltage is in limits.<br>If the background shows red, then the voltage is too low and the unit will not operate correctly.<br>The voltage alarm threshold is set in <b>Global Settings&gt;General Settings&gt;Tx Battery Alarm(v)</b> |
| 11 | TX Case Temperature | A temperature reading.   | This field reports the current temperature of the <b>transmitter</b> 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

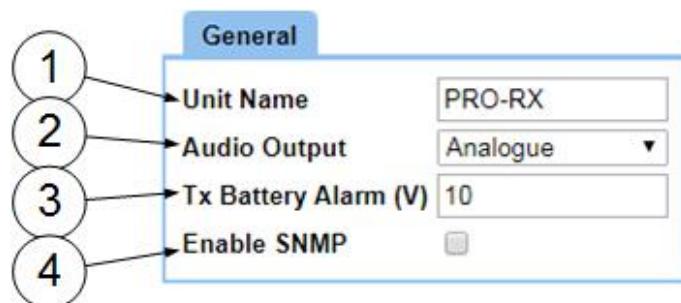


Figure 6-18 General Settings Pane

| 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

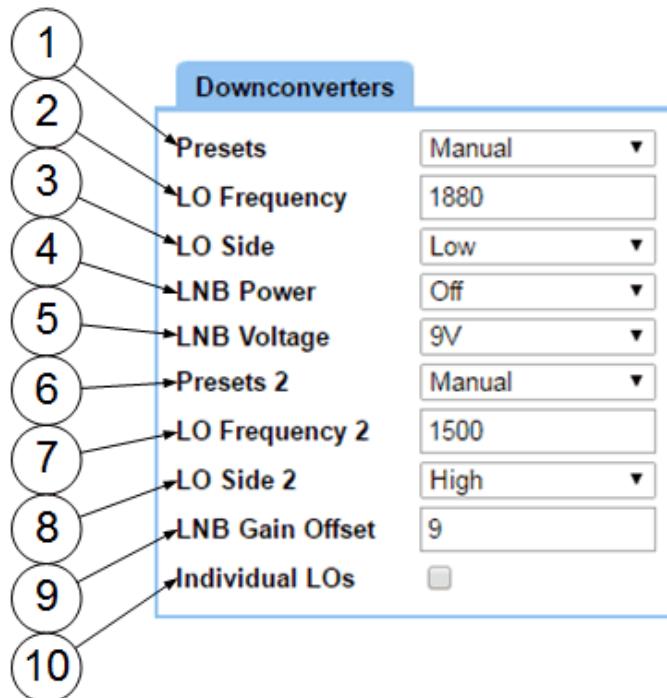


Figure 6-19 Downconverter Settings Pane

| No  | Property | Range   | Description  |
|-----|----------|---|--|
| 1+6 | Presets  | Manual<br>UHF<br>DCB-100150<br>DCB-150200<br><b>DCB-200250</b><br>DCB-250300<br>DCB-300350<br>DCB-340370<br>DCB-450500<br>DCB-550600<br>DCB-810860<br>DCBGS-100150<br>DCBGS-167203<br>DCBGS-203255<br>DCBGS-310360<br>DCBGS-440500<br>DCBGS-550600<br>DCBGS-640700<br>DCBGS-700750<br>DCEBGS-198270<br>DC-100140<br>DC-225265 | <p>If you select <b>Manual</b> 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.</p> <p>If you select <b>UHF</b> 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.</p> <p>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.</p> |

| No  | Property           | Range   | Description  |
|-----|--------------------|---|--|
| 2+7 | LO Frequency (MHz) | 1880 or a correct downconverter frequency.  | <p>Most of our receiver units operate <b>downconverters</b> 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.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p>   |
| 3+8 | LO Side            | Low or High   | <p>It is necessary to set which side (of the expected incoming frequency) the LO frequency will be.</p> <p>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 <i>lower</i> than 2.25GHz, thus I set the LO side to be <b>Low</b>.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p> |
| 4   | LNB Power          | On or Off   | <p>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.</p> <p>LNB=Low Noise Block.</p> <p>You can wish to switch LNB power off if you are operating a third party downconverter that has its own power supply for example.</p>   |
| 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. | <p>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.</p> <p>To make sense of the signal strength numbers it is necessary to apply this correction.</p>  |
| 10  | Individual LOs     | Select or Clear   | <p>When cleared the LO Frequency and LO Side apply globally to all downconverters attached to the receiver.</p> <p>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.</p>  |

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.

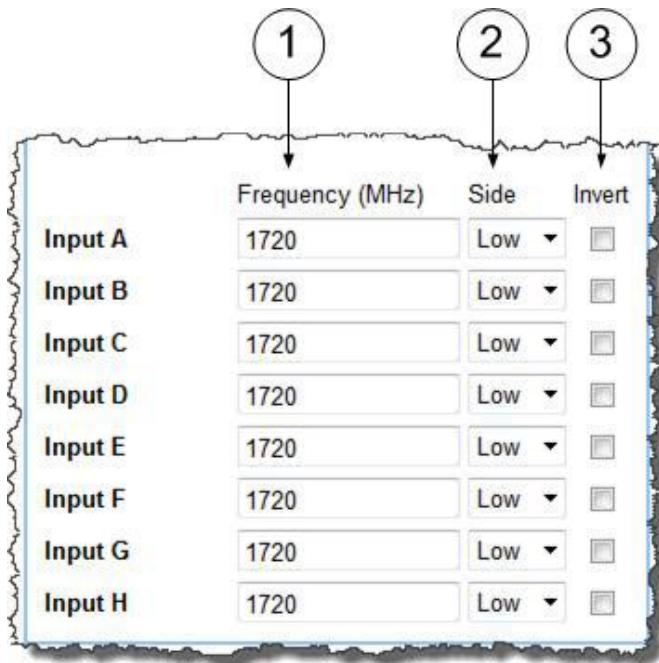


Figure 6-20 Downconverter Settings Pane with Individual LOs Selected

| No | Property           | Range                                      | Description  |
|----|--------------------|--|--|
| 1  | LO Frequency (MHz) | 1720 or a correct downconverter frequency. | <p>All our receiver units operate <b>downconverters</b> 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.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p> |
| 2  | LO Side            | Low or High                                | <p>It is necessary to set which side (of the expected incoming frequency) the LO frequency will be.</p> <p>We find this information from the downconverter frequency and side table in <i>Appendix D – Downconverter Data</i>.</p>   |
| 3  | Invert             | Select or Clear                            | <p>Selected=Inverted<br/>Cleared=Normal</p> <p>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.</p>   |

Table 6-16 Individual LO Settings Key

## Step 4: Configure the IP Config Pane

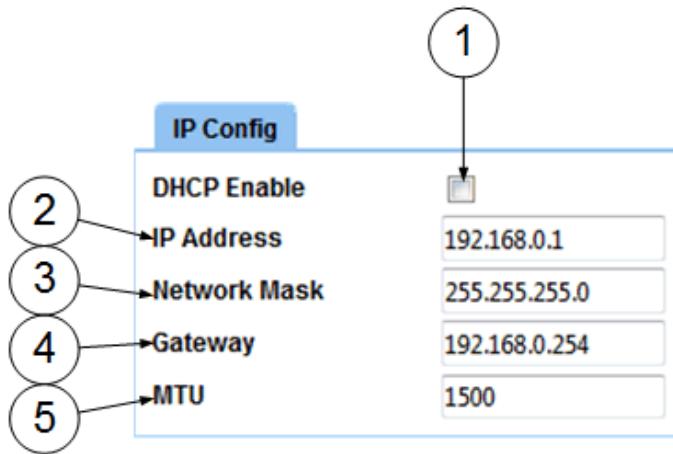


Figure 6-21 IP Settings Pane

| No | Property   | Range                     | Description   |
|----|--|---------------------------|---|
| 1  | DHCP Enable<br>(Dynamic host configuration protocol) | Select or Clear           | <p>When selected the PRORXD is given an IP address by an external DHCP server.</p> <p>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.</p>   |
| 2  | IP Address   | Example:<br>192.168.2.65  | <p>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</p> <p>Type an <b>IP address</b> for this PRORXD in the IP address text box. You can select a class of network of your choosing.</p>  |
| 3  | Network Mask   | Example:<br>255.255.255.0 | <p>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.</p> <p>Type a <b>subnet mask</b> in the Network mask text box.</p>   |
| 4  | Gateway  | Example:<br>192.168.2.254 | <p>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.</p> <p><b>Note:</b> For correct streaming operation, a correct Gateway address in the IP subnet range must be set manually or through DHCP.</p> |
| 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

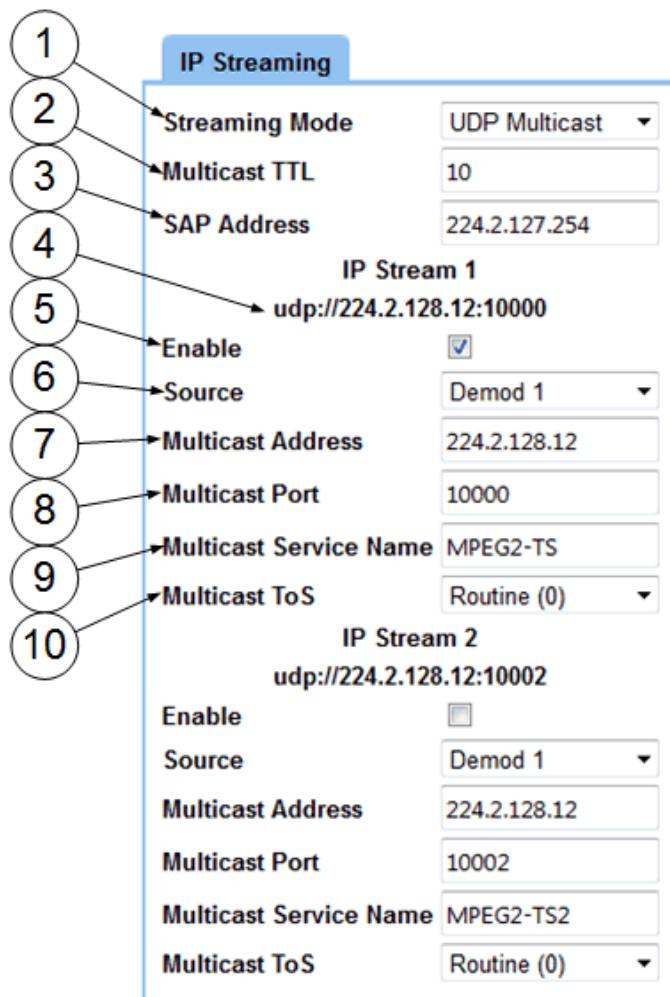


Figure 6-22 Streaming Settings Pane

| No | Property       | Range   | Description   |
|----|----------------|---|---|
| 1  | Streaming Mode | UDP Multicast<br>RTSP Multicast<br>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  |   | <p>This is the URL you will need to enter into your media player to run IP streams.</p> <p><b>Note:</b> You will need to add @ to the UDP URL. See Recovering a UDP Multicast Stream – VLC.</p> |

| No | Property               | Range   | Description   |
|----|------------------------|---|---|
| 5  | Enable                 | Select or Clear   | <p>Switches the streaming item on or off.</p> <p><b>Note:</b> 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.</p>   |
| 6  | Streamer Select        | <p>Demod 1</p> <p>Demod 2</p> <p>ASI Input 1</p> <p>ASI Input 2</p> <p>Remux</p> <p>Decoder 1</p> <p>Decoder 2</p>  | <p>You select the source that will give the stream from this drop-down box.</p> <p>Demod 1 for example means the stream will come from the first receiver channel.</p>  |
| 7  | Multicast Address      | Default – 224.2.128.12  | <p>This text box enables you to change the multicast address used by the unit.</p> <p>It is also possible to Unicast by specifying an applicable destination IP address in the local subnet range.</p>  |
| 8  | Multicast Port         | 10000<br>Range available is 1-65535   | <p>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.</p> <p>A good rule is to use numbers above 10,000 to stop confliction with existing services.</p> <p>When you set up a port number on many computers on a network they will all listen for packets directed to that port.</p> <p>The default values are 10000 and 10002.</p> |
| 9  | Multicast Service Name | Up to 20 ASCII characters.  | <p>The defaults are MPEG2-TS and MPEG2-TS2.</p> <p>This is an identifier for the service.</p>   |
| 10 | Multicast ToS          | <p>Routine (0)</p> <p>Priority (1)</p> <p>Immediate (2)</p> <p>Flash (3)</p> <p>Flash Override (4)</p> <p>Critical (5)</p> <p>Internet Control (6)</p> <p>Network Control (7)</p> | <p>The importance of the Multicast can be set here.</p>   |

Table 6-18 Streaming Settings Pane Key

## Step 6: Configure the OSD Settings Pane

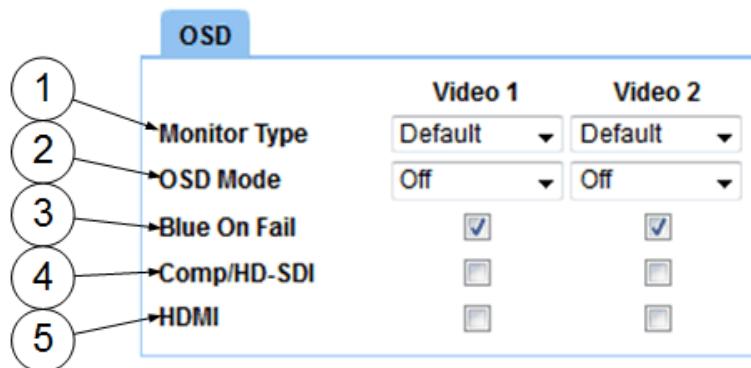


Figure 6-23 OSD Settings Pane

| No | Property     | Range  | Description   |
|----|--------------|--|---|
| 1  | Monitor Type | Default<br>ALR-1920                                  | For most systems use the <b>Default</b> setting.  |
| 2  | OSD Mode     | Off<br>Date/Time<br>Detailed<br>Spectra<br>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

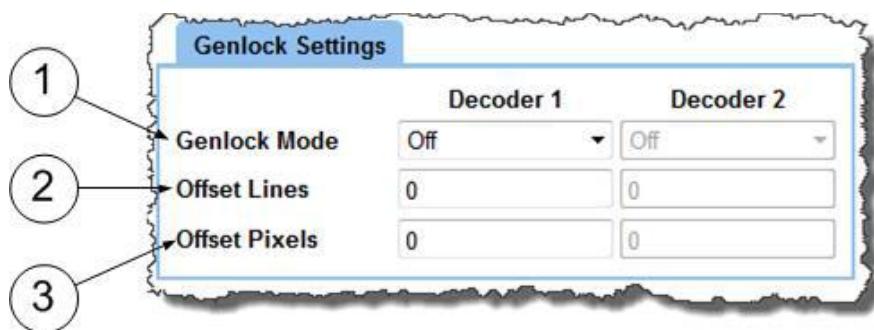


Figure 6-24 Genlock Settings Pane

| No | Property      | Range                       | Description  |
|----|---------------|-----------------------------|--|
| 1  | Genlock Mode  | Off<br>External<br>Internal | Off - Genlock switched off and system is not locked.<br>External – Operating with the Genlock source connected to the external port on the rear of the receiver. This is usually your station SPG.<br>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**.

The screenshot shows the Pro-RXD Configuration Tab interface. The top navigation bar includes Status, Global Settings, Configuration (highlighted in blue), Log, Uploads, Frequency, Information, and SNMP. Below the navigation bar is a row of 16 tabs numbered 1 to 16, with tab 1 highlighted in green. The configuration area is divided into several sections:

- General:** Preset Name (Config 1), Diversity Mode (2x4-way), Modulation Type (DVBT), DVBT Carrier Mode (2K), ASI Output (Demod 1).
- Demod 1:** Frequency (MHz) 2290.00, Bandwidth 8MHz, Guard Interval 1/32, Polarity Normal, Use Packet Diversity (unchecked), Packet Diversity Source ASI 1.
- Demod 2:** Frequency (MHz) 9999.00, Bandwidth 8MHz, Guard Interval 1/32, Polarity Normal, Use Packet Diversity (unchecked), Packet Diversity Source ASI 2.
- IFB:** Enable (unchecked), Tx IP Address 239.16.33.254, Tx IP Port 20000, Mic Gain, Preamp Gain, Mute Level.
- IP Input 1:** IP Decoder Mode UDP Multicast, Multicast Address 224.2.128.12, Stream Port 17111, Buffer Delay (ms) 20, FEC Mode Off, Adaptive Bitrate.
- IP Input 2:** IP Decoder Mode UDP Unicast, Multicast Address 239.16.33.254, Stream Port 18334, Buffer Delay (ms) 20, FEC Mode Off, Adaptive Bitrate.
- Decoder 1:** Default Format 1080p25, Input Demod 1, BNC Output HD-SDI, Default Service Unit 1, Default Program ID 1, Service Select Mode Defaults, Service List No Services, Descrambling Mode Off, Descrambling Keys Change Keys, Low Delay H.264 4:2:0 Optimised (unchecked), Reset Decoder.
- Decoder 2:** Default Format PAL, Input Demod 1, BNC Output HD-SDI, Default Service Unit 1, Default Program ID 1, Service Select Mode Defaults, Service List No Services, Descrambling Mode Off, Descrambling Keys Change Keys, Low Delay H.264 4:2:0 Optimised (unchecked), Reset Decoder.

At the bottom of the configuration area are buttons for Save, Apply, Copy From Config, Save to file, Choose File (No file chosen), and Load from file.

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**.

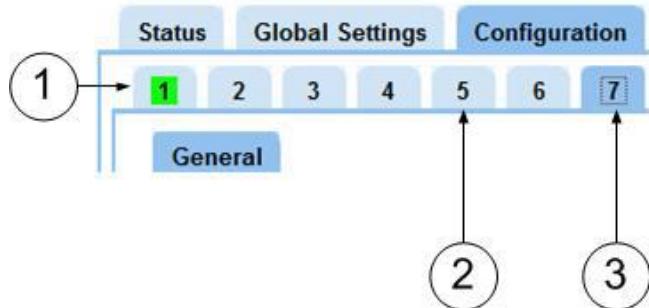


Figure 6-26 Preset Tab Colours

## The General Pane

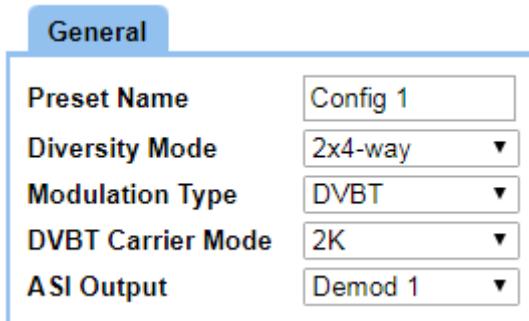


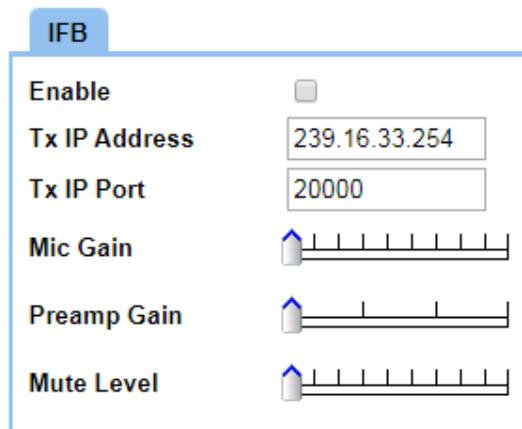
Figure 6-27 General Pane

| Property          | Range  | Description  |
|-------------------|--|--|
| Preset Name       | User defined   | This is where you <b>name</b> the current configuration.   |
| Diversity Mode    | 1x2-way<br>1x4-way<br>1x6-way<br>1x8-way<br>2x2-way<br>2x4-way | The configuration of the diversity and channel configuration of the receiver.  |
| Modulation type   | Narrowband<br>DVBT<br>UMVL                                     | Select the modulation bandwidth you wish to operate with.<br>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).<br>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.<br>2K=About 2000<br>4K=About 4000 (dual pedestal mode)   |

| Property   | Range   | Description  |
|------------|---|--|
| ASI Output | <b>Demod 1</b><br>Demod 2<br>ASI In 1<br>ASI In 2<br>IP 1<br>IP 2<br>Dec 1<br>Dec 2 | The source for the ASI output is selected here.<br>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.<br>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:<br>192.168.2.65         | This is the IP Address of the device to which you are sending the fold back.<br>This device is usually be located with the presenter.  |
| Tx IP Port    | Range available<br>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.<br>A good rule is to use numbers above 20,000 to stop confliction with existing services.<br>When you set up a port number on many computers on a network they will all listen for packets directed to that port.<br>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

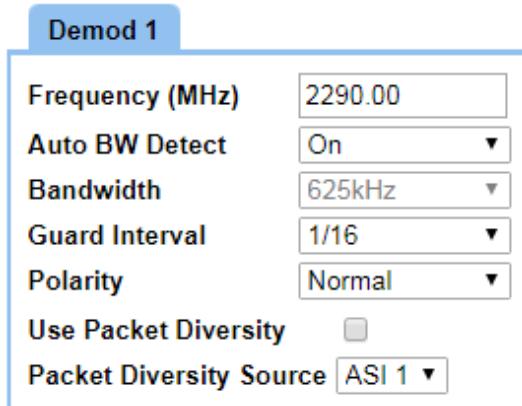


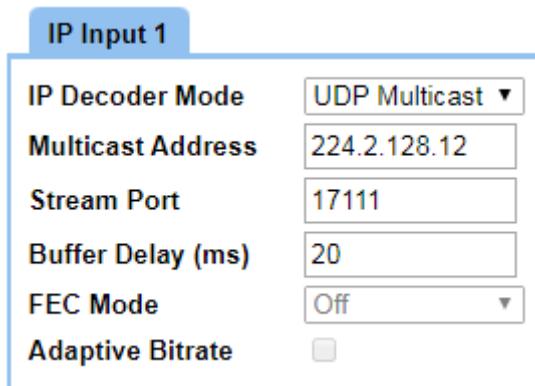
Figure 6-29 Demod Configuration Pane

| Property        | Range  | Description   |
|-----------------|--|---|
| Frequency (MHz) | L, S and C Bands   | The frequency in megahertz (MHz) that you wish to operate with this preset.<br>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  | <b>Narrowband only.</b> When on, the receiver will try to automatically find the bandwidth.   |
| Bandwidth       | DVBT:6, 7 & 8MHz<br>Narrowband:<br>2.5MHz<br>1.25MHz<br>625kHz | DVB-T bandwidths (usually used for broadcast)<br>Narrowband (usually surveillance)<br>625kHz Ultra-Narrowband (this is a licensable item, usually surveillance)   |
| Guard Interval  | Narrowband:<br>1/16 or 1/8<br>DVBT:<br>1/32, 1/16, 1/8, 1/4    | The guard interval which is being applied to the narrowband mode in operation.<br>The guard interval is a deliberate extension of the RF symbol period to give immunity to reflections.<br>1/16, short extension, deals with fast reflections, more data, less range.<br>1/8, long extension, deals with slower reflections, less data, more range. |
| Polarity        | Normal<br>Inverted<br>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.<br>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<br>IP | Select the packet diversity 2 <sup>nd</sup> source.  |

**Table 6-23 Demod Configuration Pane Key**

## The IP Input Pane

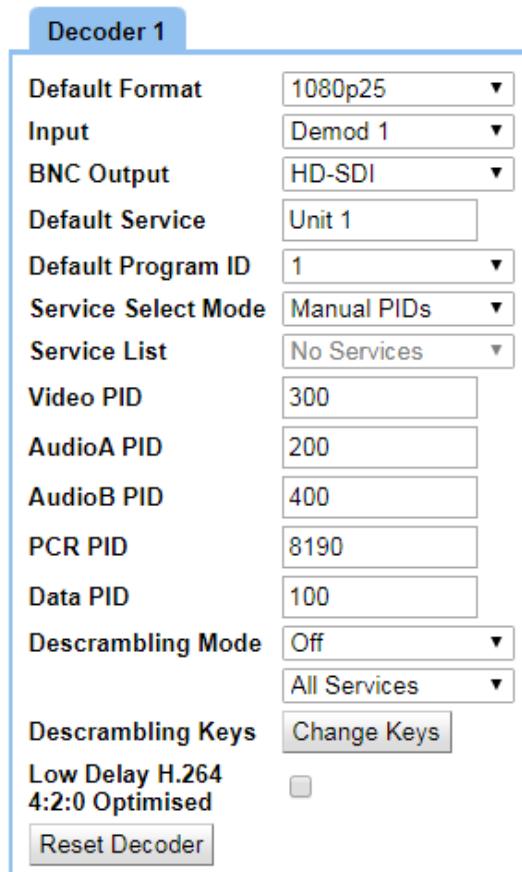
**Figure 6-30 IP Input Pane**

| Property          | Range  | Description   |
|-------------------|--|---|
| IP Decoder Mode   | UDP Unicast<br>UDP Multicast<br>RTP Unicast<br>RTP Multicast | Select the mode of the received IP stream.  |
| Multicast Address | Default:<br>239.16.33.254                                    | Enter the multicast address to be received by the unit.   |
| Stream Port       | Range available is<br>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 SMTP (for your email service) uses port 25.<br><br>A good rule is to use numbers above 10,000 to stop confliction with existing services.<br><br>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<br>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<br>ProMPEG   | Only selectable when RTP is selected as the IP Decoder Mode.<br>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<br>PAL<br>NTSC                            | Select the video format for your system from the dropdown list.        |
| Input          | Demod 1<br>Demod 2<br>ASI 1<br>ASI 2<br>IP 1<br>IP 2 | Source feeding the decoder. Licence dependent.                         |
| BNC Output     | HD-SDI<br>Composite<br>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<br>List<br>Manual PIDs  | <p>This selects how services in the transport stream will be selected.</p> <p>Defaults – Uses Default Service name and Program ID as set earlier.</p> <p>List – Will show a list of available services in <b>Status&gt;Service&gt;Service List 1 or 2</b>.</p> <p>Manual PIDs – Enables you to select applicable elements from the transport stream like alternative language audio. Additional selections will appear in the <b>Decoder</b> menu.</p> |
| Service List        | H.264 Unit 1 for example.        | If you select <b>List</b> in <b>Service Select Mode</b> , 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                 | <p>This is available when you select <b>Manual PIDs</b> in the <b>Service Select Mode</b>.</p> <p>Set the manual video service PID for decoding</p>  |
| AudioA PID          | 0x0020 to 0x1FFE                 | <p>This is available when you select <b>Manual PIDs</b> in the <b>Service Select Mode</b>.</p> <p>Set the manual audio service PID for decoding</p>  |
| AudioB PID          | 0x0020 to 0x1FFE                 | <p>This is available when you select <b>Manual PIDs</b> in the <b>Service Select Mode</b>.</p> <p>Set the manual audio service PID for decoding</p>  |
| PCR PID             | 0x0020 to 0x1FFE                 | <p>This is available when you select <b>Manual PIDs</b> in the <b>Service Select Mode</b>.</p> <p>Set the manual PCR PID for clock reference</p>   |
| Data PID            | 0x0020 to 0x1FFE                 | <p>This is available when you select <b>Manual PIDs</b> in the <b>Service Select Mode</b>.</p> <p>Set the manual Data service PID for decoding</p>   |
| 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<br>Selected Service | If you select <b>List</b> in <b>Service Select Mode</b> , this field will allow you to apply descrambling just to the service you selected in the <b>Service List</b> .  |

| 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.<br>See <i>Setting up Encryption</i> .  |
| Low Delay H.264 4:2:0 Optimised | Checkbox            | If set, Low Delay mode is particularly useful in critical real-time applications.<br><br><b>Note:</b> Low Delay mode will <b>only</b> support <b>H.264</b> video from a <b>DTC</b> transmitter or encoder device.<br><br>It does not support MPEG-2 or MPEG-4 ASP, and it is not compatible with 3 <sup>rd</sup> party systems. |
| Reset Decoder                   |                     | Click to reset the Decoder.<br><br>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.

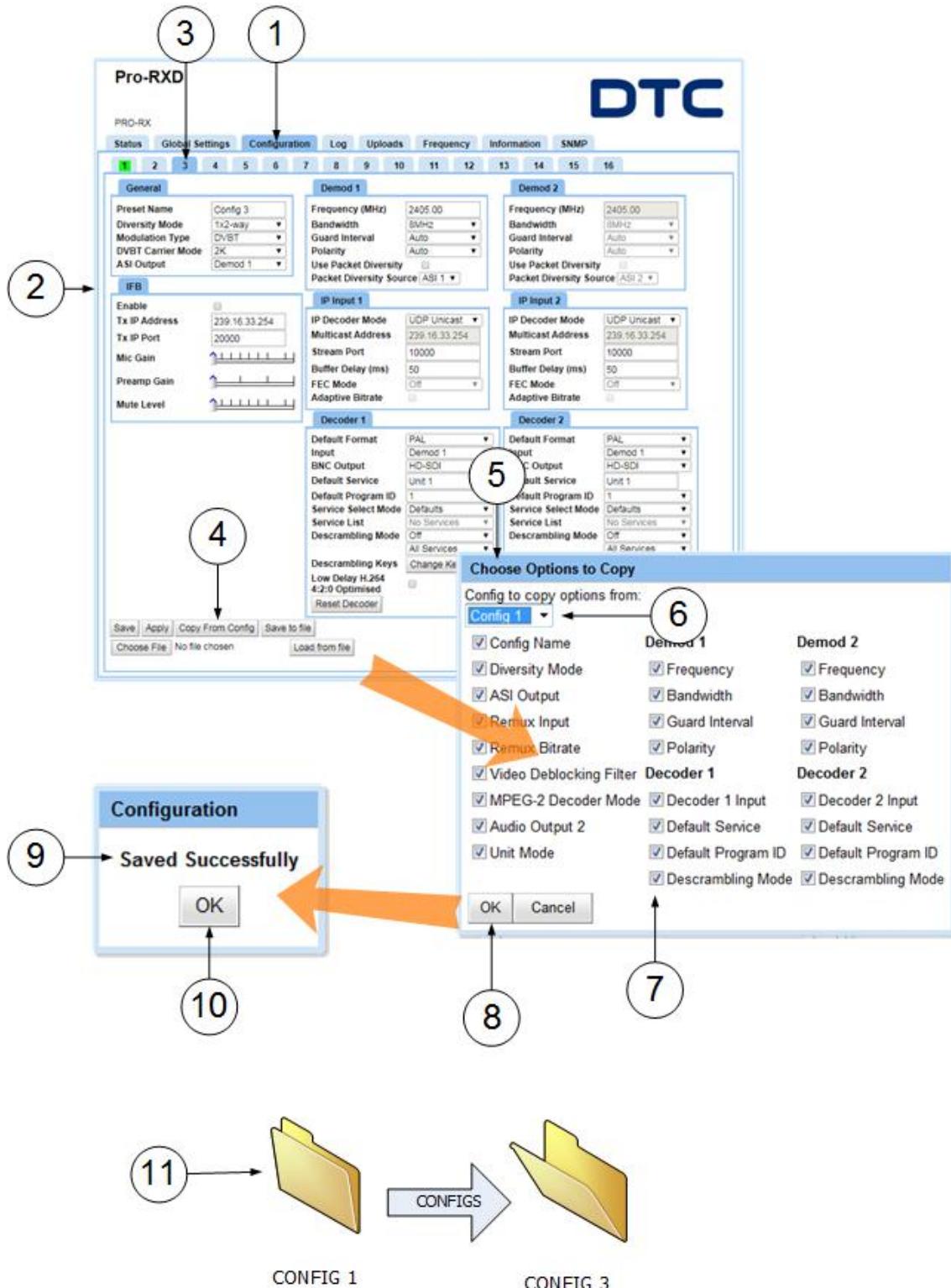


Figure 6-32 Working with the Copy from Config Button

## 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 Watchdog 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.

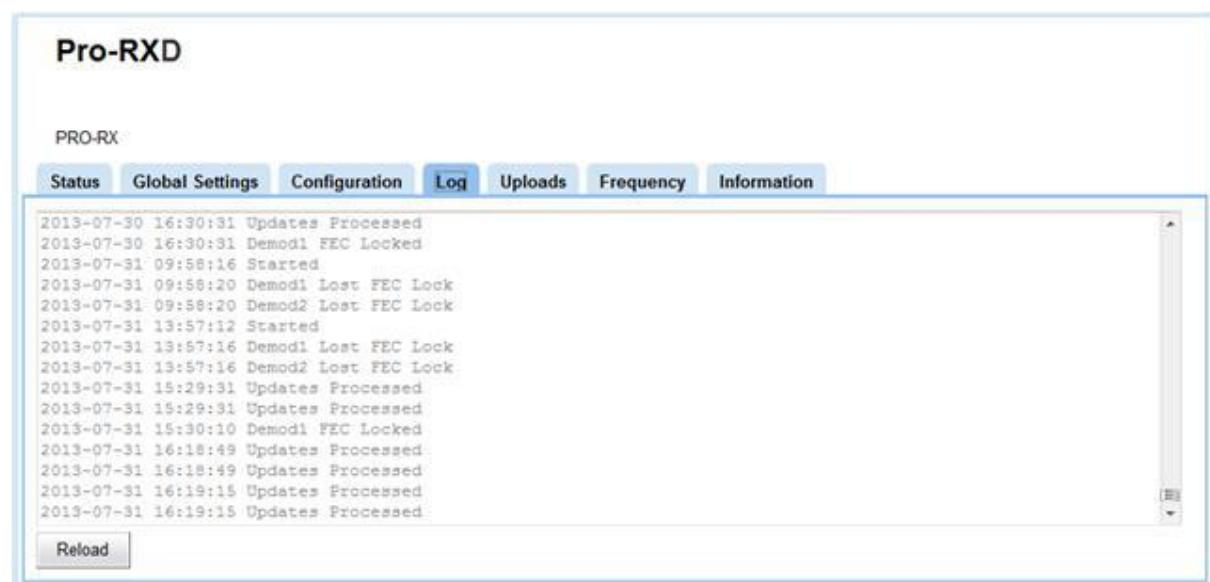


Figure 6-33 Log Tab

### 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 than 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.

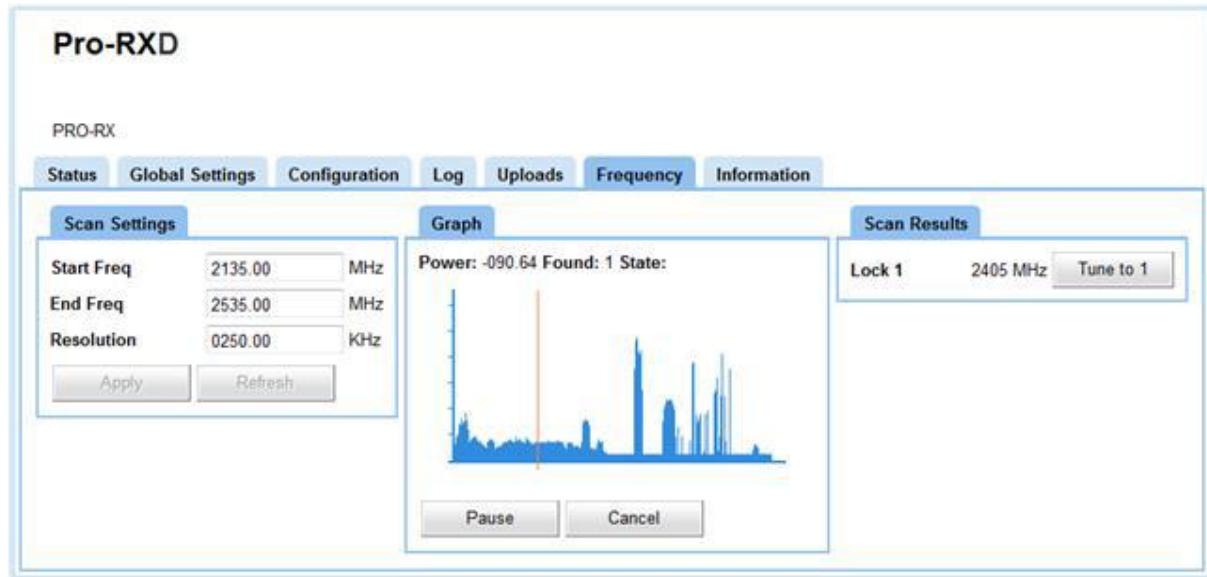


Figure 6-35 Frequency Tab

## 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.

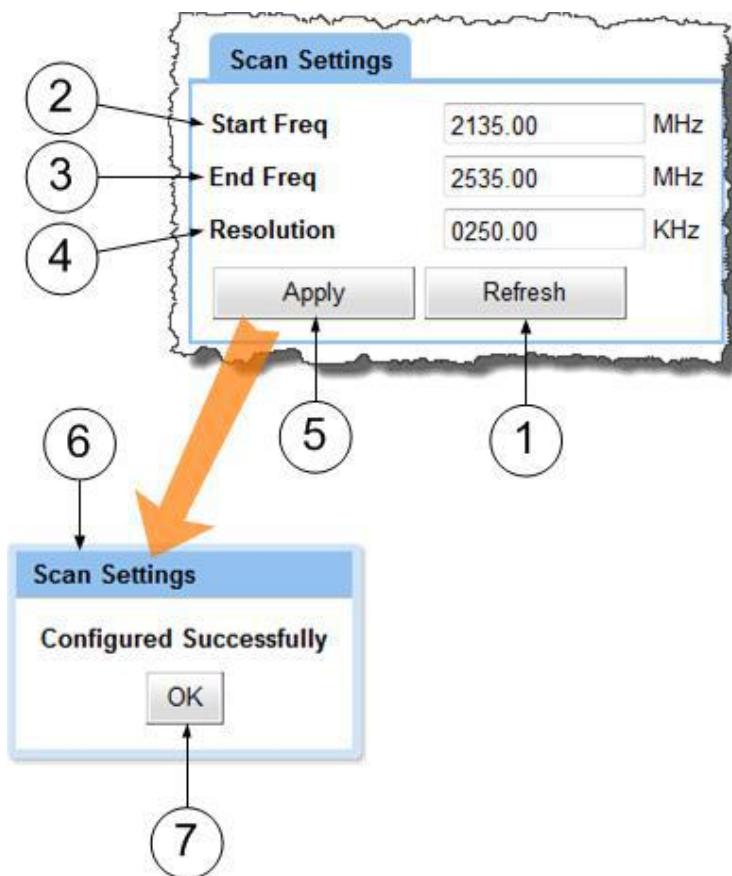


Figure 6-36 Scan Settings Pane

### 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.

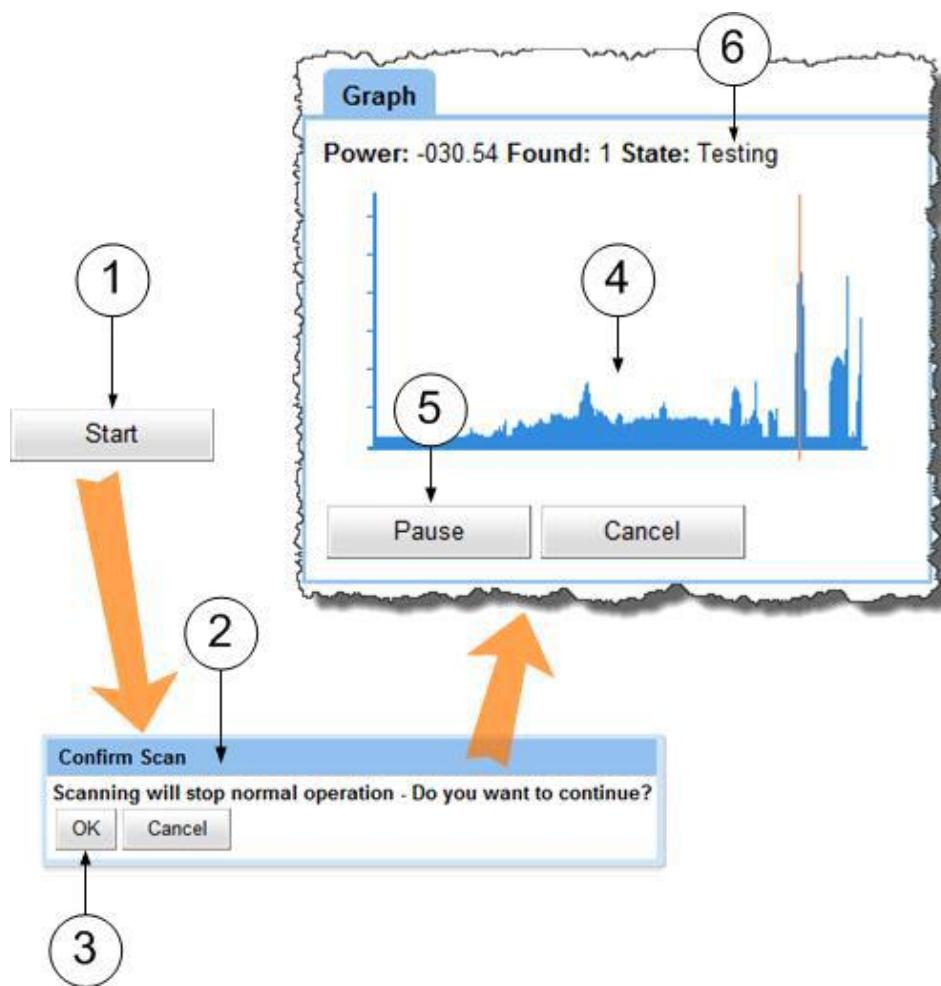


Figure 6-37 Graph Pane

#### 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.

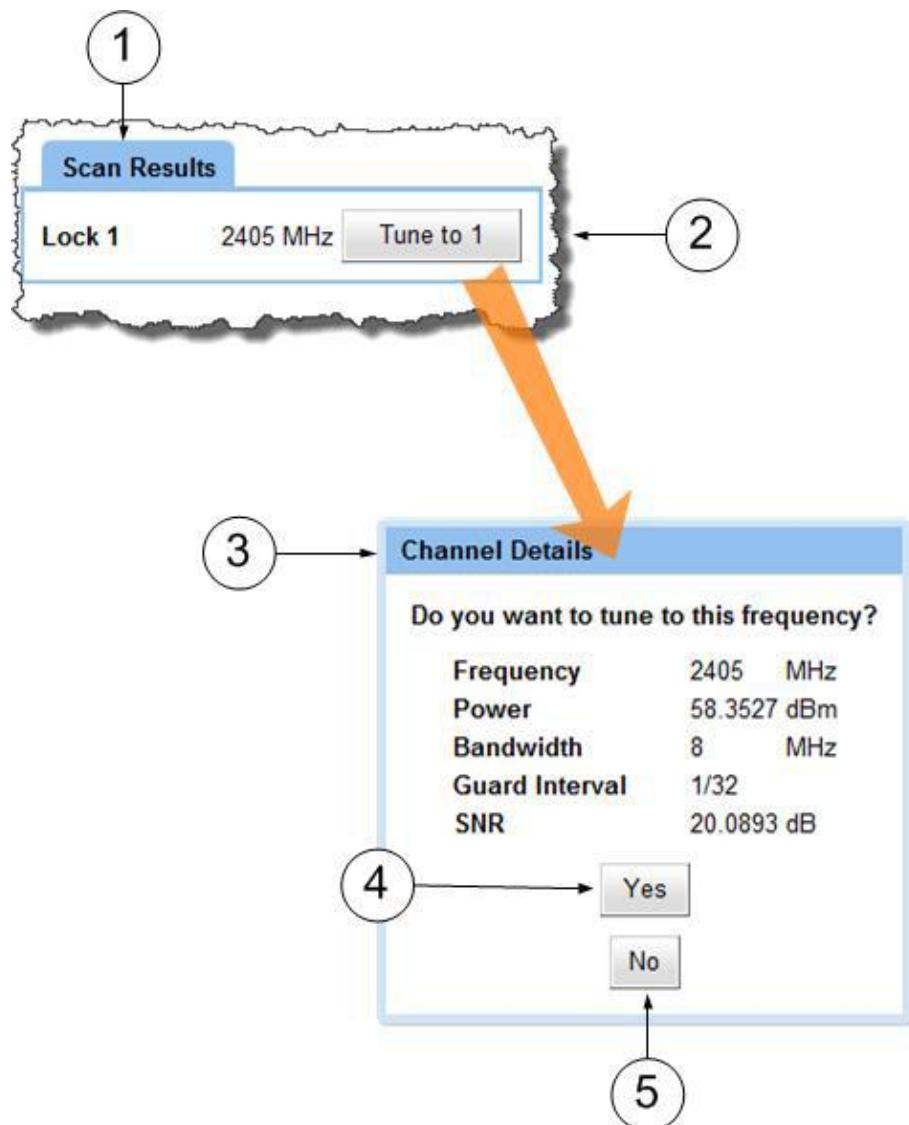


Figure 6-38 Scan Results Pane

## 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 Licensed Codes

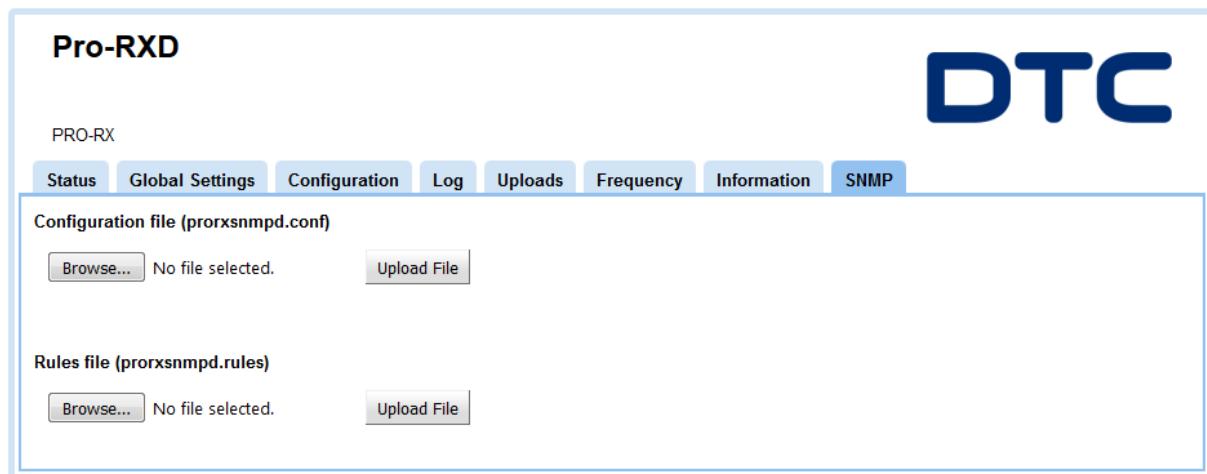
DTC products use licence codes to switch features on and off in your device. Each item has a letter and your licence is made up of many of these letters.

### 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.



PRO-RXD

DTC

Status Global Settings Configuration Log Uploads Frequency Information SNMP

Configuration file (prorxsnmpd.conf)

Browse... No file selected. Upload File

Rules file (prorxsnmpd.rules)

Browse... No file selected. Upload File

Figure 6-40 The SNMP Tab

## 7. Appendix A – Cautions and Warnings

### 7.1 Cautions and Warnings

| Serial | Area                                       | Note   |
|--------|--|--|
| 1      | Enclosures                                 | <p>Do not remove factory installed screws or fastenings. Damage to the units can be caused and void warranties.</p> <p>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.</p> |
| 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                     | <p>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.</p> <p>Also, if worn near the body, you must be careful to give protection the operator from large temperatures.</p>  |
| 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 submerge 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](mailto: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](mailto: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](mailto: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                   | <b>Alternating Current.</b> 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 <b>Advanced Encryption Standard (AES)</b> 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 <b>Rijndael</b> . Each AES cipher has a 128-bit block, with keys of 128, 192 and 256 bits, respectively.  |
| ASI                  | <b>Asynchronous Serial Interface.</b> A streaming data interface which often carries an MPEG Transport Stream.<br><br>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             | <b>Analog transmission</b> 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 <b>antenna</b> (or <b>aerial</b> ) 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       | <b>Bayonet Neill-Concelman</b> – A very well-known <b>type</b> of RF connector used for terminating coaxial cable. |
| Bandwidth | The width of a band of frequencies used for a function.  |

| C     | Means...  |
|-------|---|
| COFDM | <b>Coded Orthogonal Frequency Division Multiplexing</b> 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 <b>digital signal</b> 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 <b>Milestone</b> or a player that cannot operate with Transport streams.<br>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                  | <b>Forward Error Correction</b> is a system of error control for data transmission, whereby the sender adds redundant data to its messages, also known as an <b>error-correction code</b> . 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                  | <b>Field of View</b> - 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.<br>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 <b>FM</b> .  |
| FPGA                 | <b>Field-Programmable Gate Array</b> - an integrated circuit designed to be configured by the customer or designer after manufacturing, hence "field-programmable".   |

| G    | Means...  |
|------|---|
| GUI  | <b>Graphical User Interface</b> .   |
| GHz  | <b>Gigahertz</b> - 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 | <b>Internet Protocol Address</b> – A unique numeric ID for a device in a network.   |
| IR         | <b>Infra-Red</b> - 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 | <b>Line-of-sight</b> 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.<br>NLOS is Non Line-of-sight. |
| Load         | A device that consumes electrical power.   |
| Lux          | The <b>lux</b> (symbol: <b>lx</b> ) is the SI unit of illuminance and luminous emittance. It is used in photometry as a measure of the <i>apparent</i> intensity of light hitting or passing through a surface.  |

| M          | Means...  |
|------------|---|
| MHz        | <b>Megahertz</b> is the same as 1,000,000 Hz  |
| mW         | <b>Milliwatt</b> - 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.<br><br>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 <i>want</i> to receive the data.   |

| N         | Means...   |
|-----------|--|
| nm        | A <b>nanometre</b> (American spelling: <b>nanometer</b> ; symbol <b>nm</b> ) 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 | <b>NMEA 0183</b> 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         | <b>Passive Infra-Red</b> sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view.    |
| PTZ         | <b>Pan, Tilt and Zoom</b> – 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   | <b>Radio Frequency.</b>   |
| RTSP | <b>Real Time Streaming Protocol</b> (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              | <b>Receiver</b> , 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           | <b>Signal to Noise Ratio</b> 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 <b>Shannon limit</b> or <b>Shannon capacity</b> 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     | <b>Streaming</b> is the transmission of digital audio or video or the listening and viewing of such data without first storing it.  |

| T                     | Means...  |
|-----------------------|---|
| Tx                    | A <b>transmitter</b> 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 <b>TNC (threaded Neill-Concelman) connector</b> is a threaded version of the BNC connector. The connector has a $50 \Omega$ 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     | <b>User Datagram Protocol</b> (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    | <b>Universal Video Management System</b> , 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             | <b>Very High Frequency</b> – 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 <b>watt</b> (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 of 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<br>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<br>1=UHF<br>2=DCB100150<br>3=DCB150200<br>4=DCB200250<br>5=DCB250300<br>6=DCB300350<br>7=DCB340370<br>8=DCB450500<br>9=DCB550600<br>10=DCB810860<br>11=DCBGS100150<br>12=DCBGS167203<br>13=DCBGS203255<br>14=DCBGS310360<br>15=DCBGS440550<br>16=DCBGS550600<br>17=DCBGS640700<br>18=DCBGS700750<br>19=DCEBGS198270<br>20=DC100140<br>21=DC225265<br>22=DCBGS175238 |

| Command | Description                              | Access | Setting Type | Default | Type    | Possible Values   |
|---------|--|--------|--------------|---------|---------|---|
| dcp2    | Demod 2 Downconverter Preset             | RW     | Global       | 0       | Integer | 0=Off<br>1=UHF<br>2=DCB100150<br>3=DCB150200<br>4=DCB200250<br>5=DCB250300<br>6=DCB300350<br>7=DCB340370<br>8=DCB450500<br>9=DCB550600<br>10=DCB810860<br>11=DCBGS100150<br>12=DCBGS167203<br>13=DCBGS203255<br>14=DCBGS310360<br>15=DCBGS440550<br>16=DCBGS550600<br>17=DCBGS640700<br>18=DCBGS700750<br>19=DCEBGS198270<br>20=DC100140<br>21=DC225265<br>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<br>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<br>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<br>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<br>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<br>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<br>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<br>1=High           |
| dlia    | Input A Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlib    | Input B Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlic    | Input C Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlid    | Input D Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlie    | Input E Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlif    | Input F Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlig    | Input G Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlih    | Input H Individual Spectrum inversion | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| dlo2    | Downconverter LO side Demod 2         | RW     | Global       | 0       | Integer | 0=low side<br>1=high side |
| dlos    | Downconverter LO side Demod 1         | RW     | Global       | 0       | Integer | 0=low side<br>1=high side |
| dlsa    | Input A Individual LO side            | RW     | Global       | 0       | Integer | 0=Low<br>1=High           |
| dtlm    | Data Alinks Legacy Mode               | RW     | Global       | 0       | Integer | 0=Off<br>1=On             |
| gadd    | ControlAddress                        | RW     | Global       | 1       | Integer | 1 to 9998                 |
| gln2    | LNB Phantom Power Enable Demod 2      | RW     | Global       | 1       | Integer | 0=off<br>1=on             |
| glnb    | LNB Phantom Power Enable Demod 1      | RW     | Global       | 1       | Integer | 0=off<br>1=on             |
| iloe    | Enable Individual LO settings         | RW     | Global       | 0       | Integer | 0=Off<br>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<br>1=On  |
| osc2    | Controls the OSD for Comp/HD-SDI 2    | RW     | Global       | 0             | Integer | 0=Off<br>1=On  |
| osd1    | OSD Mode Decoder 1                    | RW     | Global       | 0             | Integer | 0=off<br>1=Date/Time only<br>2=Detailed<br>3=Spectra<br>4=Frequency Scan         |
| osd2    | OSD Mode Decoder 2                    | RW     | Global       | 0             | Integer | 0=off<br>1=Date/Time only<br>2=Detailed<br>3=Spectra<br>4=Frequency Scan         |
| osh1    | HDMI 1 OSD Enable                     | RW     | Global       | 0             | Integer | 0=Off<br>1=On  |
| osh2    | HDMI 2 OSD Enable                     | RW     | Global       | 0             | Integer | 0=Off<br>1=On  |
| rdef    | Restore Unit Defaults                 | W      | Global       | N/A           | Integer | Any  |
| snmp    | Enable SNMP                           | RW     | Global       | 0             | Integer | 0=Off<br>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<br>1=On  |
| sten    | Streaming Enable                      | RW     | Global       | 0             | Integer | 0=off<br>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<br>1=demod 2<br>2=asi in 1<br>3=asi in 2<br>5=descram 1<br>6=descram 2 |
| strm    | Streamer Mode                         | RW     | Global       | 0             | Integer | 0=UDP<br>1=RTSP Multicast<br>2=RTSP Unicast                                      |

| Command | Description                      | Access | Setting Type | Default       | Type    | Possible Values  |
|---------|----------------------------------|--------|--------------|---------------|---------|--|
| strs    | Streaming Source                 | RW     | Global       | 0             | Integer | 0=demod 1<br>1=demod 2<br>2=asi in 1<br>3=asi in 2<br>5=descram 1<br>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<br>1=On  |
| vbf2    | Decoder 2 Blue on Fail           | RW     | Global       | 0             | Integer | 0=Off<br>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<br>1=External<br>2=Internal  |
| vgm2    | Decoder 2 Genlock Mode           | RW     | Global       | 0             | Integer | 0=Off<br>1=External<br>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<br>1=On             |
| abd2    | Demod 2 Auto Bandwidth Detection                   | RW     | Config       | 0       | Integer    | 0=Off<br>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<br>1=demod2<br>2=asi_in1<br>3=asi_in2<br>4=ip1<br>5=ip2<br>6=dec1<br>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<br>1=1080p24<br>2=1080p25<br>3=1080p29.97<br>4=1080p30<br>5=1080p50<br>6=1080p59.94<br>7=1080p60<br>8=1080i23.98<br>9=1080i24<br>10=1080i25<br>11=1080i29.97<br>12=1080i30<br>13=720p23.98<br>14=720p24<br>15=720p25<br>16=720p29.97<br>17=720p30<br>18=720p50<br>18=720p59.94<br>19=720p60<br>20=PAL<br>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<br>1=1080p24<br>2=1080p25<br>3=1080p29.97<br>4=1080p30<br>5=1080p50<br>6=1080p59.94<br>7=1080p60<br>8=1080i23.98<br>9=1080i24<br>10=1080i25<br>11=1080i29.97<br>12=1080i30<br>13=720p23.98<br>14=720p24<br>15=720p25<br>16=720p29.97<br>17=720p30<br>18=720p50<br>18=720p59.94<br>19=720p60<br>20=PAL<br>21=NTSC |
| dbo1    | Decoder 1 BNC output mode          | RW     | Config       | 0       | Integer | 0=HD-SDI<br>1=Composite<br>2=ASI  |
| dbo2    | Decoder 2 BNC output mode          | RW     | Config       | 0       | Integer | 0=HD-SDI<br>1=Composite<br>2=ASI  |
| dcs2    | Descrambler 2 Current Service Only | RW     | Config       | 0       | Integer | 0=Current Service Only<br>1= All services   |
| dcs0    | Descrambler 1 Current Service Only | RW     | Config       | 0       | Integer | 0=Current Service Only<br>1= All services   |
| des2    | Decoder 2 Descrambling Mode        | RW     | Config       |         | Integer | 0=Off<br>1=ABS<br>4=AES128<br>5=AES128+<br>6=AES256<br>7=AES256+<br>8=AES128 BCRYPT<br>9=AES128 BCRYPT+<br>10=AES256 BCRYPT<br>11=AES256 BCRYPT+<br>12=AES128 CCRYPT<br>13=AES128 CCRYPT+<br>14=AES256 CCRYPT<br>15=AES256 CCRYPT+<br>18=AES256 ADL<br>19=AES256 ADL+   |

| Command | Description                         | Access | Setting Type | Default | Type    | Possible Values   |
|---------|-------------------------------------|--------|--------------|---------|---------|---|
| desm    | Decoder 1 Descrambling Mode         | RW     | Config       |         | Integer | 0=Off<br>1=ABS<br>4=AES128<br>5=AES128+<br>6=AES256<br>7=AES256+<br>8=AES128 BCRYPT<br>9=AES128 BCRYPT+<br>10=AES256 BCRYPT<br>11=AES256 BCRYPT+<br>12=AES128 CCRYPT<br>13=AES128 CCRYPT+<br>14=AES256 CCRYPT<br>15=AES256 CCRYPT+<br>18=AES256 ADL<br>19=AES256 ADL+ |
| dgu2    | OFDM Guard Interval Demodulator 2   | RW     | Config       | 0       | integer | 0=1/32<br>1=1/16<br>2=1/8<br>3=1/4<br>4= AUTO (DVB-T only)  |
| dgua    | OFDM Guard Interval Demodulator 1   | RW     | Config       | 0       | integer | 0=1/32<br>1=1/16<br>2=1/8<br>3=1/4<br>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<br>1=4-way<br>2=6-way<br>3=8-way<br>4=2x2-way<br>5=2x4-way  |
| dpo2    | OFDM Polarity Demodulator 2         | RW     | Config       | 0       | integer | 0=Normal<br>1=Inverted  |
| dpol    | OFDM Polarity Demodulator 1         | RW     | Config       | 0       | integer | 0=Normal<br>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<br>1=demod2<br>2=asi in 1<br>3=asi in 2<br>4=ip   |
| dsl2    | Decoder 2 Input Select         | RW     | Config       | 0             | Integer    | 0=demod1<br>1=demod2<br>2=asi in 1<br>3=asi in 2<br>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<br>1=7MHz<br>2=6MHz<br>3=2.5MHz<br>4=1.25MHz<br>5=625kHz<br>6=UMVL 6MHz<br>7=UMVL 7MHz<br>8=UMVL 8MHz |
| dwid    | OFDM bandwidth Demodulator 1   | RW     | Config       | 0             | Integer    | 0=8MHz<br>1=7MHz<br>2=6MHz<br>3=2.5MHz<br>4=1.25MHz<br>5=625kHz<br>6=UMVL 6MHz<br>7=UMVL 7MHz<br>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<br>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<br>1=List<br>2=Manual PIDs |
| ssm2    | Decoder 2 Service Selection Mode | RW     | Config       | 0       | Integer | 0=Defaults<br>1=List<br>2=Manual PIDs |
| umod    | Unit Mode                        | RW     | Config       | 1       | Integer | 0=Narrowband<br>1=DVBT<br>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<br>1=Stereo |

| Command | Description                     | Access | Setting Type | Default | Type    | Possible Values                                 |
|---------|---------------------------------|--------|--------------|---------|---------|---|
| adm2    | Decoder 1 Audio B Mode          | RW     | Status       |         | Integer | 0=Mono<br>1=Stereo                              |
| adm3    | Decoder 2 Audio A Mode          | RW     | Status       |         | Integer | 0=Mono<br>1=Stereo                              |
| adm4    | Decoder 2 Audio B Mode          | RW     | Status       |         | Integer | 0=Mono<br>1=Stereo                              |
| ads1    | Decoder 1 Audio A Sampling Freq | RW     | Status       |         | Integer | 0=44.1kHz (Not supported)<br>1=48kHz<br>2=32kHz |
| ads2    | Decoder 1 Audio B Sampling Freq | RW     | Status       |         | Integer | 0=44.1kHz (Not supported)<br>1=48kHz<br>2=32kHz |
| ads3    | Decoder 2 Audio A Sampling Freq | RW     | Status       |         | Integer | 0=44.1kHz (Not supported)<br>1=48kHz<br>2=32kHz |
| ads4    | Decoder 2 Audio B Sampling Freq | RW     | Status       |         | Integer | 0=44.1kHz (Not supported)<br>1=48kHz<br>2=32kHz |
| adt1    | Decoder 1 Audio A Type          | RW     | Status       | 0       | Integer | 0=MPEG Layer 1<br>1=MPEG Layer 2<br>2=NICAM     |
| adt2    | Decoder 1 Audio B Type          | RW     | Status       | 0       | Integer | 0=MPEG Layer 1<br>1=MPEG Layer 2<br>2=NICAM     |
| adt3    | Decoder 1 Audio A Type          | RW     | Status       | 0       | Integer | 0=MPEG Layer 1<br>1=MPEG Layer 2<br>2=NICAM     |
| adt4    | Decoder 2 Audio B Type          | RW     | Status       | 0       | Integer | 0=MPEG Layer 1<br>1=MPEG Layer 2<br>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<br>1=Locked                        |

| Command | Description             | Access | Setting Type | Default | Type    | Possible Values   |
|---------|-------------------------|--------|--------------|---------|---------|---|
| dbr1    | Data baudrate Decoder 1 | R      | Status       | 3       | integer | 0=300<br>1=600<br>2=1200<br>3=2400<br>4=4800<br>5=9600<br>6=19200<br>7=38400<br>8=57600<br>9=115200 |
| dbr2    | Data baudrate Decoder 2 | R      | Status       | 3       | integer | 0=300<br>1=600<br>2=1200<br>3=2400<br>4=4800<br>5=9600<br>6=19200<br>7=38400<br>8=57600<br>9=115200 |
| dfe2    | FEC rate Demod 2        | R      | Status       | N/A     | string  | 1/2<br>2/3<br>3/4<br>5/6<br>7/8   |
| dfec    | FEC rate Demod 1        | R      | Status       | N/A     | string  | 1/2<br>2/3<br>3/4<br>5/6<br>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  |
| dl02    | Lock Status Demod 2     | R      | Status       |         | integer | 0=Not Locked<br>1=Locked  |

| Command | Description                               | Access | Setting Type | Default | Type    | Possible Values                |
|---------|---|--------|--------------|---------|---------|--------------------------------|
| dloc    | Lock Status Demod 1                       | R      | Status       |         | integer | 0=Not Locked<br>1=Locked       |
| dmo2    | Constellation Demod 2                     | R      | Status       | N/A     | string  | BPSK<br>QPSK<br>16QAM<br>64QAM |
| dmod    | Constellation Demod 1                     | R      | Status       | N/A     | string  | BPSK<br>QPSK<br>16QAM<br>64QAM |
| dndi    | Diversity Setting (num ways licensed for) | R      | Status       |         | integer | 0<br>2<br>4<br>6<br>8          |
| dpa1    | Data parity mode Decoder 1                | R      | Status       | 0       | integer | 0=no parity<br>1=odd<br>2=even |
| dpa2    | Data parity mode Decoder 2                | R      | Status       | 0       | integer | 0=no parity<br>1=odd<br>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<br>1=1080p24<br>2=1080p25<br>3=1080p29.97<br>4=1080p30<br>5=1080p50<br>6=1080p59.94<br>7=1080p60<br>8=1080i23.98<br>9=1080i24<br>10=1080i25<br>11=1080i29.97<br>12=1080i30<br>13=720p23.98<br>14=720p24<br>15=720p25<br>16=720p29.97<br>17=720p30<br>18=720p50<br>19=720p59.94<br>20=720p60<br>21=PAL<br>22=NTSC<br>23=PAL704<br>24=NTSC704 |
| eli2    | Video Line Standard Decoder 2 | R      | Status       |         | integer | 0=1080p23.98<br>1=1080p24<br>2=1080p25<br>3=1080p29.97<br>4=1080p30<br>5=1080p50<br>6=1080p59.94<br>7=1080p60<br>8=1080i23.98<br>9=1080i24<br>10=1080i25<br>11=1080i29.97<br>12=1080i30<br>13=720p23.98<br>14=720p24<br>15=720p25<br>16=720p29.97<br>17=720p30<br>18=720p50<br>19=720p59.94<br>20=720p60<br>21=PAL<br>22=NTSC<br>23=PAL704<br>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<br>1=yes   |
| gd2u    | Genlock In Use on Decoder 2                 | RW     | Status       |         | Integer    | 0=no<br>1=yes   |
| gdt1    | Decoder 1 GPS Date                          | RW     | Status       |         | Integer    | Decimal representation e.g. 230316 -> 23 <sup>rd</sup> March 2016   |
| gdt2    | Decoder 2 GPS Date                          | RW     | Status       |         | Integer    | Decimal representation e.g. 230316 -> 23 <sup>rd</sup> March 2016   |
| genf    | Genlock Input Format                        | RW     | Status       |         | String     | e.g. PAL, 720p50, 1080i60   |
| geni    | Genlock Input Status                        | RW     | Status       |         | Integer    | 0=unlocked<br>1=locked  |
| gens    | Genlock Input Supported with current format | RW     | Status       |         | Integer    | 0=no<br>1=yes   |
| gfpg    | FPGA Version Number                         | R      | Status       | N/A     | hex string |   |
| gfx1    | Decoder 1 GPS Fix type                      | RW     | Status       |         | String     | 1=No fix<br>2=2D fix<br>3=3D fix  |
| gfx2    | Decoder 2 GPS Fix type                      | RW     | Status       |         | String     | 1=No fix<br>2=2D fix<br>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.<br>0=OK<br>1=fault tuner card A<br>2=fault tuner card B<br>3=fault tuner card A and B for example. |
| glo1    | Decoder 1 GPS Longitude position            | RW     | Status       |         | Float      |   |

| Command | Description                                     | Access | Setting Type | Default | Type                     | Possible Values |
|---------|---|--------|--------------|---------|--------------------------|-----------------|
| glo2    | Decoder 2 GPS Longitude position                | RW     | Status       |         | Float                    |                 |
| glv1    | Decoder 1 GPS Lat/Long valid                    | RW     | Status       |         | Integer                  | 0=no<br>1=yes   |
| glv2    | Decoder 2 GPS Lat/Long valid                    | RW     | Status       |         | Integer                  | 0=no<br>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<br>1=yes   |
| grc2    | Decoder 2 GPS Received                          | RW     | Status       |         | Integer                  | 0=no<br>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,<br>1=Encrypted service  |
| scr2    | Encrypted Service Status Decoder 2                                  | R      | Status       |         | integer |  |
| sgu2    | Detected OFDM Guard Interval (Useful in AUTO mode)<br>Demodulator 2 | R      | Status       | 0       | string  | 1/32<br>1/16<br>1/8<br>1/4   |
| sgua    | Detected OFDM Guard Interval (Useful in AUTO mode)<br>Demodulator 1 | R      | Status       | 0       | string  | 1/32<br>1/16<br>1/8<br>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<br>1=Locked   |
| vlk2    | Video Lock Status Decoder 2         | R      | Status       |         | integer | 0=Not Locked<br>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<br>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   |