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PRORXD Broadcast Receiver User Guide



Commercial in Confidence

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0. Preface

0.1 About this Document

This document contains relevant information required to identify, install and control the equipment or system.

Since the available functions can be licensed and depend on the specific implementation, not all the functions and or applications contained in this document may be applicable to the system you will be working with.

The actual presentation may differ from those in this document due to hardware or software changes.

0.2 Intended Audience

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 Notice about this Publication

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 for guidance. All particulars are given by DTC in good faith, actual performance may vary.

0.4 Text Conventions

This document uses these text conventions to identify text that has a special meaning.

Text Convention	Example
TEXT in capitals represents a key press on the keyboard. The + sign means hold down the first key while pressing the second key.	ESC, F1, SHIFT CTRL+C
<Text> Serves as a placeholder for variable text that is replaced as appropriate, the text may be written in italics.	Use the filename <system_name>.sys for...
Text in italics can represent a link to place in the existing document (often these are hyperlinks) or a reference to another document.	Refer to <i>Section 0.4, Text Conventions</i> .
Text in bold emphasises a term of significance.	We call this a protocol and its function is...
Successive software menu selections are shown using arrows to indicate sub-menus. This is often shown in bold.	Select Configuration>Global then edit...

0.5 Symbols

This publication uses these symbols to highlight important information:

WARNING: A notice of when a situation might result in personal injury or loss of life.

CAUTION: A notice of when a situation might result in damage to or destruction of equipment or systems, including data loss.

Note: A notice to draw attention to something or supply additional information.

0.6 Trademarks

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

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0.7 Related Documents

You may also need to read:

Document	Source
Solo Concept Guide	DTC
IP Concept Guide	DTC
RS232 Control and JSON Integration Document	DTC

0.8 Document History

This is a controlled document, written and produced by the DTC Technical Publications team. Changes are recorded in the table below.

Revision	Date	Author	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.
12.0	09/04/2019	IR	Document review. 64QAM sensitivity.
12.1	20/05/2019	IR	Removed remote command list. Added packet diversity and Remux. Password reset.

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1. Product Overview

1.1 Product Family

The equipment in this user guide is:

Product Code	Product Description
PRORXD-1RU	Professional dual channel receiver and decoder, 1U rack mount version
PRORXD-2RU	Professional dual channel receiver and decoder, 2U rack mount version

1.2 PRORXD-1RU



1.2.1 Product Description

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 down-converted 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.

1.2.2 Basic Specifications

Dimensions (mm)	320 (L) x 220 (W) x 44 (H)
Weight	2.1kg
DC Input	6 to 26VDC reverse polarity protected
Power Consumption	27-49W (downconverter dependent)
Operating Temperature	-20°C to +60°C

1.3 PRORXD-2RU



1.3.1 Product Description

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 UMLV (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.

1.3.2 Basic Specifications

Dimensions (mm)	320 (L) x 220 (W) x 88 (H)
Weight	2.7kg
DC Input	6 to 26VDC reverse polarity protected
Power Consumption	27-49W (downconverter dependent)
Operating Temperature	-20°C to +60°C

1.4 Approval Notices

1.4.1 EMC/Safety and Radio Approvals

The equipment has been designed to meet and has been tested against harmonized EMC and safety standards.

1.4.2 CE Marking

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

2. Product Package

2.1 Introduction

Verify that all the components have been included in the package as shown in the packing list. Retain the packing list and all the packing materials for storage.

The codes are useful to you for identification or if you need to order a new part. The codes mean:

- CA – cable assembly
- SA – sub assembly
- AP – assembly part

Note: If you don't have all the parts or you are not happy with the condition of your delivered product, please call DTC and we'll get this solved for you. See *section 8.2*.

2.2 Parts List

2.2.1 PRORXD-1RU

Item	Notes
SA3838	PRORXD-1RU top level assembly
AP006534	Dust cover, HDMI
CA0512 x 2	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)

2.2.2 PRORXD-2RU

Item	Notes
SA3724	PRORXD-2RU top level assembly
CA0512 x 2	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)

2.3 Accessory Options

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

2.3.1 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.

2.3.2 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.

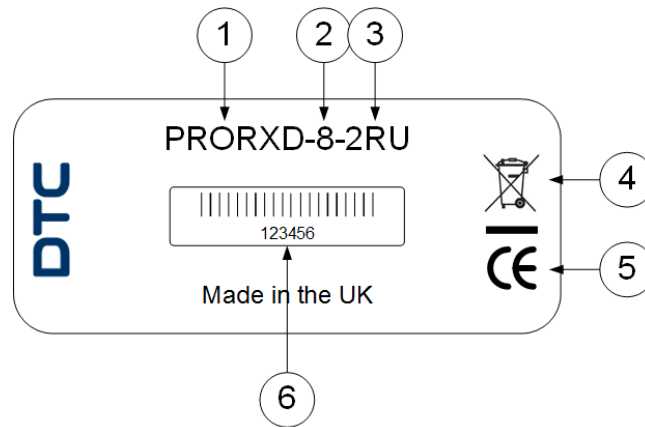
2.4 Variants

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

2.5 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.



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

2.6 Licensing Options

Licenses are used to tailor the functionality of the PRORXD to the operational requirement.

Part Number	Equipment Title
Silver (included)	Includes DVB-T, MPEG-2 and H.264 SD
Gold	Silver plus H.264 HD, MPEG-4 ASP, Narrowband 2.5MHz and 1.25MHz, and IP Streaming
Platinum	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 PRORXD

3. Connections, Controls and Indicators

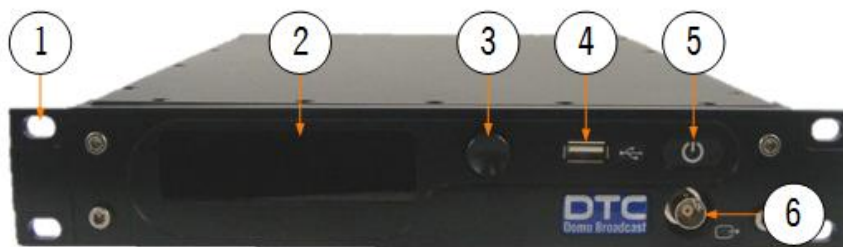
3.1 Introduction

This chapter will help you identify all the connections and interfaces to help you install and control your PRORXD.

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

3.2 PRORXD-1RU

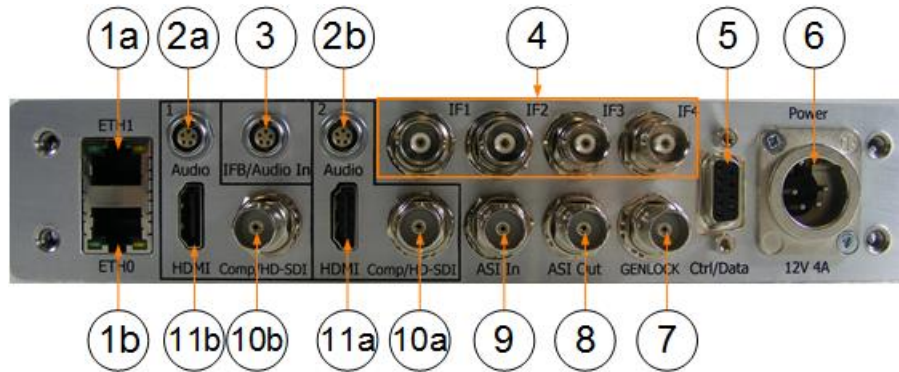
3.2.1 Front Panel



No	Item	Description
1	Rack mounting ears	These can be removed if required. Two PRORXDs can be joined together with the 1RU coupling kit to fit a full 19" width rack.
2	Display screen	OLED display. In combination with the joystick, provides convenient monitoring and control. Note: The OLED menu is similar to that of the web browser application, details of which can be found in <i>Chapter 5</i> .
3	Joystick control	Move the joystick for UP, DOWN, LEFT and RIGHT. Turn the joystick for selection. Short push the joystick for ENTER. Long push the joystick for BACK.
4	USB receptacle	Used for loading preset configurations.
5	Power button	Toggles the power on or off.
6	BNC receptacle	Composite video output for monitoring.

3.2.2 Rear Panel

Note: Pinout is detailed in *Section 6.1*.



No	Item	Description
1a/1b	RJ45 jack	Provides an Ethernet connection to your PC or network. Note: ETH1 is non-functional.
2a/2b	Lemo 5-way jack (sockets)	Channel 1 and 2 audio. Connect the supplied CA0512 or CA0579 for balanced audio left/right output to XLR connectors.
3	Lemo 5-way jack (sockets)	IFB audio is used in a studio to provide feedback to the presenter wearing an earpiece. CA0512 and CA0579 can also be used for IFB audio.
4	BNC 2-jack (socket)	IF input 1-4. Connect your IF cables from the downconverter/antenna assembly.
5	D-Type 9-way jack (sockets)	RS232 control/data port.
6	XLR 4-way jack (pins)	Connect the supplied CA0649 PSU here for power to the PRORXD.
7	BNC jack (socket)	Connect a Genlock device to this port to keep the receiver synchronised with all the other equipment in your facility.
8	BNC jack (socket)	ASI output.
9	BNC jack (socket)	ASI input.
10a/10b	BNC jack (socket)	Composite/HD-SDI/ASI video output.
11a/11b	HDMI Type-A jack	HDMI output.

3.3 PRORXD-2RU

3.3.1 Front Panel



No	Item	Description
1	Rack mounting ears	These can be removed if required. Two PRORXDs can be joined together to fill a full 19" rack with the 2RU Joining kit.
2	Display screen	OLED touchscreen display. Provides convenient monitoring and control. Note: The touchscreen menu is similar to that of the web browser application, details of which can be found in <i>Chapter 5</i> .
3	USB jack	Used for loading preset configurations.
4	Power button.	Toggles the power on or off.
5	BNC jack	Video output for monitoring.
6	Audio phono jack	Non-functional.

3.3.2 Rear Panel

Note: Pinout is detailed in *Section 6.2*.

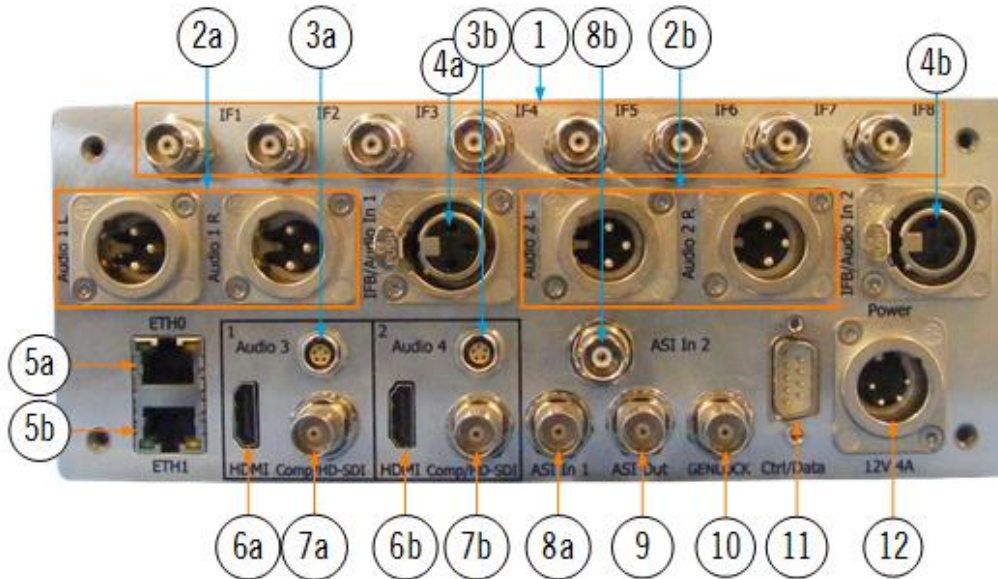


Figure 3-1 PRORXD-2RU Rear Panel

No	Item	Function
1	BNC jack (socket)	The IF output from the downconverters connect here. Up to eight way diversity can be achieved.
2a/2b	XLR 3-way jack (pins)	Audio 1 and 2, stereo line level audio output left and right. Supplied cable CA0512 can connect here.
3a/3b	Lemo 5-way jack (sockets)	Audio 3 (Decoder 1) and Audio 4 (Decoder 2) balanced stereo audio output.
4a/4b	XLR 3-way jack (sockets)	IFB audio is used in a studio to provide feedback to the presenter wearing an earpiece.
5a/5b	RJ45 jack	Provides an Ethernet connection to your PC or network. Note: ETH1 is non-functional.
6a/6b	HDMI jack	Decoder 1 and Decoder 2 HDMI video output.
7a/7b	BNC jack (socket)	Decoder 1 and Decoder 2 composite/HD-SDI/ASI video output.
8a/8b	BNC jack (socket)	ASI 1 and 2 input.
9	BNC jack (socket)	ASI output.
10	BNC jack (socket)	Connect a Genlock device to this port to keep the receiver synchronised with all the other equipment in your facility.
11	D-Type 15-way jack (pins)	RS232 control/data port.
12	XLR 4-way jack (pins)	6 to 26V reverse polarity protected power from AC adapter.

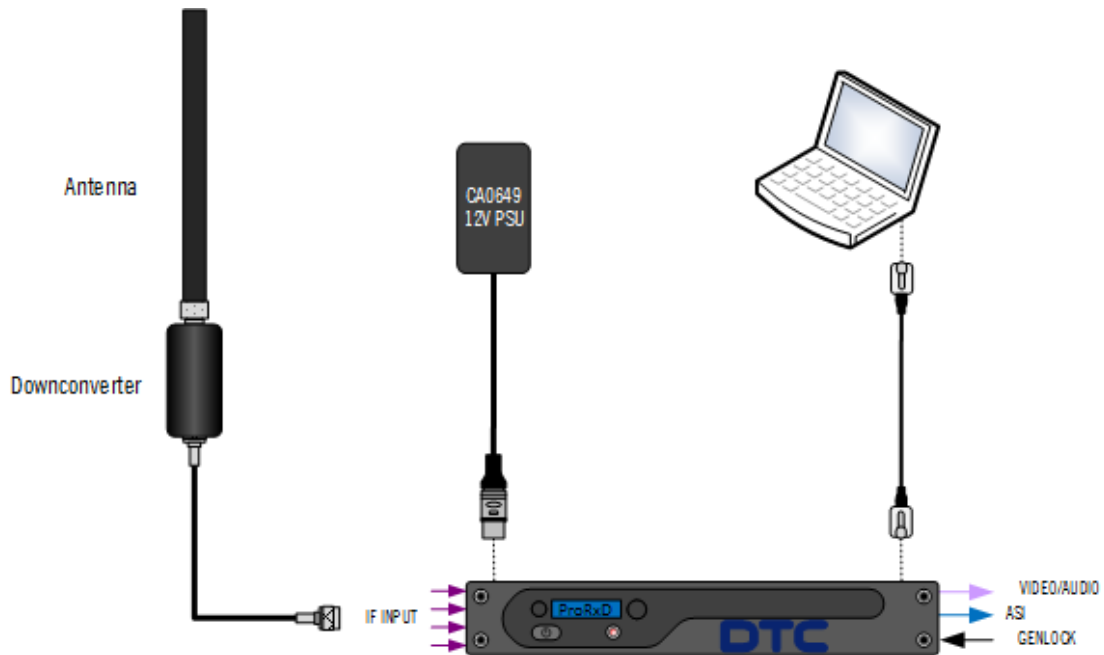
4. Getting Started

4.1 Initial Connections

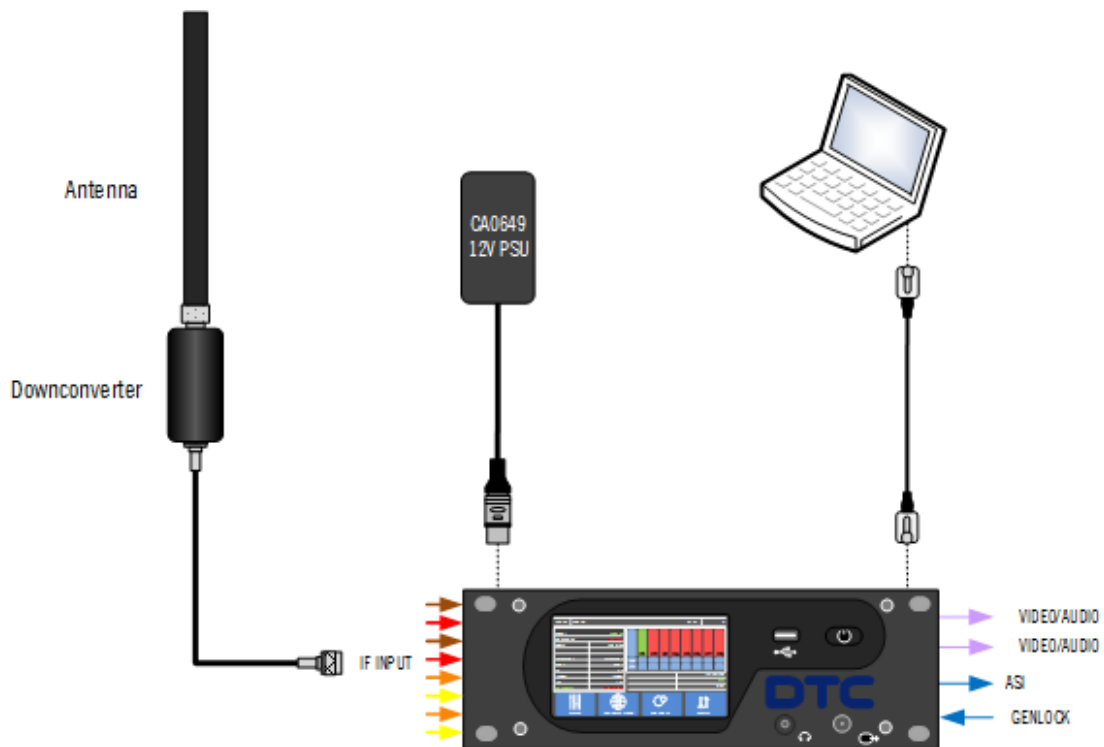
Connect the PRORXD according to your system requirements. Attach downconverter/antenna connections to meet your diversity needs.

If you need to pre-configure the unit, it is only necessary to attach power and Ethernet connections.

4.1.1 PRORXD-1RU Connections



4.1.2 PRORXD-2RU Connections



4.2 Node Finder

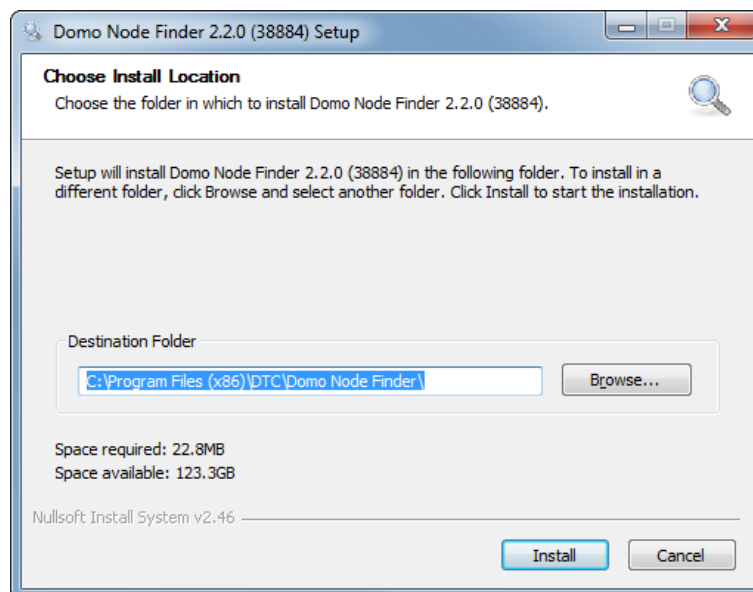
4.2.1 Introduction

Node Finder can be used to identify a PRORXD IP address on a network or the IP settings need to be reconfigured.

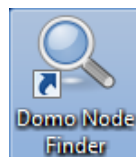
Node Finder is available from DTC's Watchdox facility, see *Section 8.1*.

4.2.2 Install Node Finder on your PC

1. **Node Finder** comes as a simple .exe file which you put on your desktop or other convenient location on your PC.
2. Double-click the **NodeFinder.exe** icon.
3. The **Node Finder Setup** window opens.

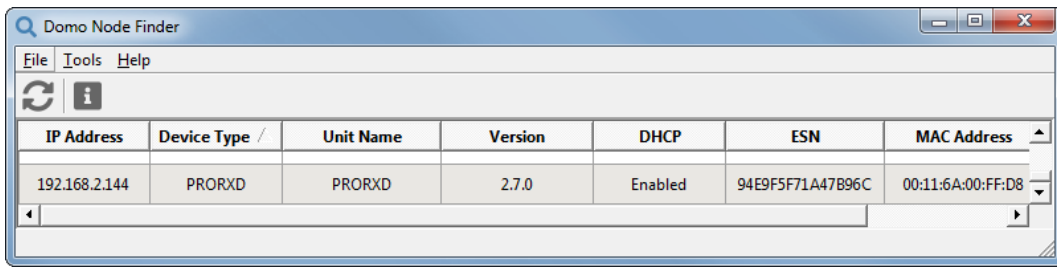


4. **Browse** to the location where you wish to install the software.
5. Click the **Install** button.
6. On completion, **Close** the installer. A Node Finder icon will appear on your desktop.

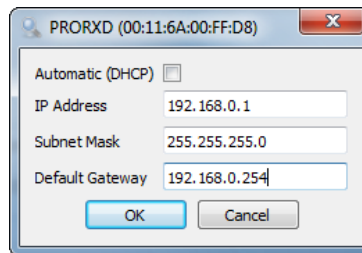


4.2.3 Establish IP Address using Node Finder

1. Double click the newly installed Node Finder icon from your PC desktop.
2. Establish the PRORXD IP address from Node Finder as shown:



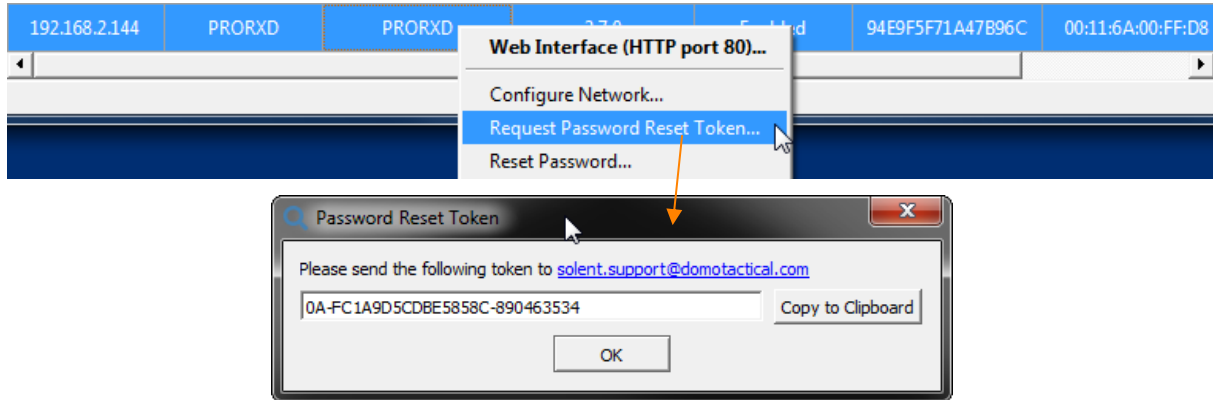
3. Right click on the IP address of the PRORXD to reconfigure, if required:



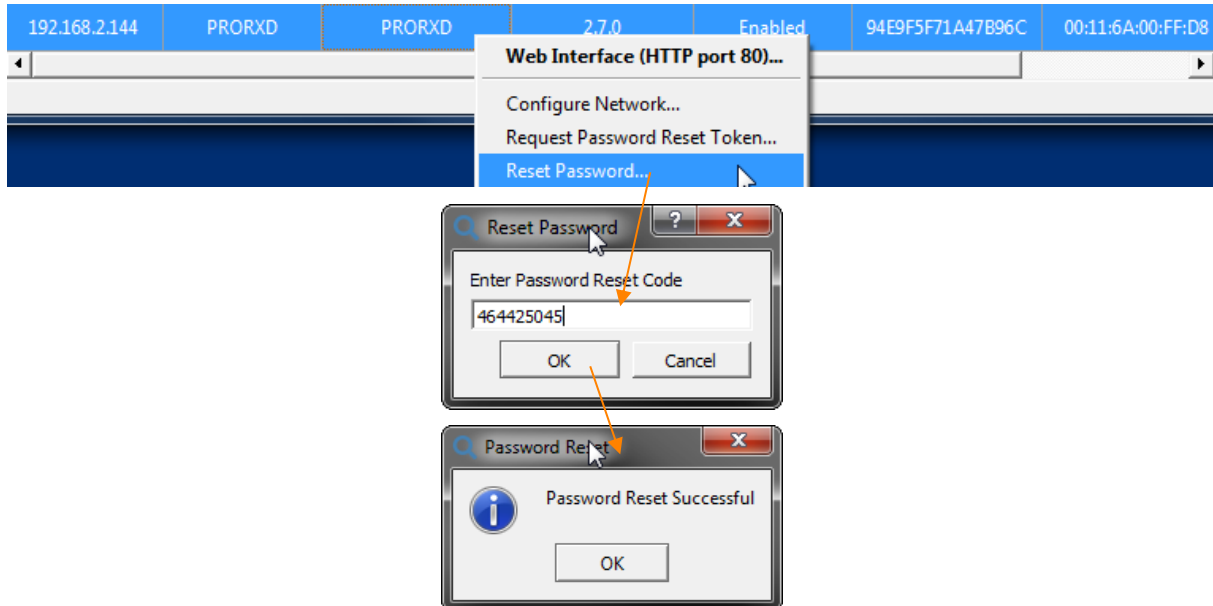
4.2.4 Password Reset

Users may set a password for web browser access security, see *Section 5.6.10*. If the password is forgotten and the user is locked out, Node Finder provides a means to reset the password.

Right-click on the PRORXD on Node Finder and select Request Password Reset Token.



If you click the link a pre-filled email will be generated to send to Technical Support. A code will be returned which needs to be entered in Node Finder Reset Password dialogue box.



On successful reset, the web browser application will be unlocked.

Note: You can only enter an incorrect reset code five times before a new token will need to be generated.

4.3 Web Browser Control

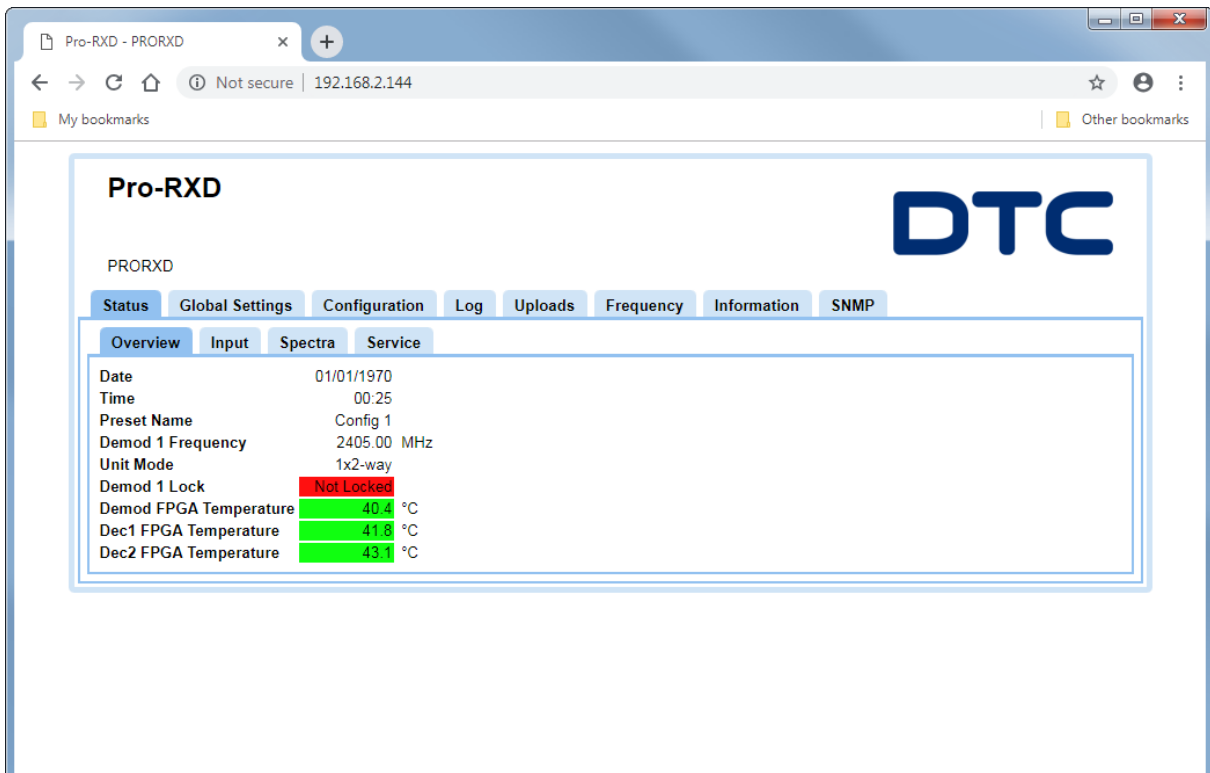
4.3.1 Introduction

In order to fully monitor and control the PRORXD, web browser communications via an Ethernet connection will allow you to do this.

Our PRORXD units are shipped to you with a fixed IP address (192.168.0.1). If it is necessary to change the IP address, this can be done via the front panel display or using DTC's Node Finder application.

4.3.2 Open Web Browser

Open a web browser on your PC and enter the PRORXD IP address in the address bar. The PRORXD web browser application will open.



Once you have web browser control, you can fully monitor and control the PRORXD for your operation. Up to sixteen preset configurations can be set up which allows easy reconfiguration of the system.

5. Web Browser Operation

5.1 Introduction

This chapter explains each parameter found in the web browser control application, to enable you to customise your device for your specific requirements. It will help you understand how to operate the PRORXD to optimise performance.

It is assumed that you have read and understood the previous sections in this document and have established web browser communications to the PRORXD.

5.2 Status>Overview Tab

Property	Description
Date/Time	You can set these parameters in the Global Settings tab.
Preset Name	This is the name of the preset configuration that is currently active. There are up to 16 presets that can be set up in the Configuration tab.
Demod Frequency	Displays the frequency which the demodulators are tuned to.
Unit Mode	The diversity and demodulator configuration of the receiver.
Demod Lock	Indicates if the demodulator has successfully locked to the incoming RF. Not Locked Locked
FPGA Temperature	This field reports the current temperature of the internal FPGAs. Green indicates the temperature is in limits. Red indicates the FPGA is overheating, the unit must be switched off immediately.

5.3 Status>Input Tab

The Input tab provides detailed information for all PRORXD inputs.

Pro-RXD **DTC**

PRORXD

[Status](#) [Global Settings](#) [Configuration](#) [Log](#) [Uploads](#) [Frequency](#) [Information](#) [SNMP](#)

[Overview](#) [Input](#) [Spectra](#) [Service](#)

Demod 1				IP 1		IP 2		ASI 1	
Lock Status	Unlocked			IP Status	Unlocked		IP Status	Unlocked	
Frequency	2400.00 MHz			Bitrate (Mbps)	-		Bitrate (Mbps)	-	
Bandwidth	8 MHz							ASI Status	
Constellation	QPSK							Unlocked	
FEC	1/2								
Guard Interval	--								
Bitrate	-- Mbps								
Input	Level	SNR	Status						
IF1	-111.0	0.0	■						
IF2	-112.0	0.0	■						
IF3	-112.0	0.0	■						
IF4	-111.0	0.0	■						
Pre-Errors	-								
Post-Errors	-								
Packet Errors	-								

Transmitter 1		Transmitter 2	
Video Lock	-	Video Lock	-
Config	-	Config	-
Serial Number	-	Serial Number	-
Battery Voltage	-	Battery Voltage	No
Case Temperature	- °C	Case Temperature	°C
GPS Data	No	GPS Data	

Service 1		Service 2	
Service Name	No Service	Service Name	No Service
Video Lock	Unlocked	Video Lock	Unlocked

ASI 2	
ASI Status	Unlocked

Genlock	
Input Detected	No
Detected Format	Unknown
Format Supported	No
Decoder 1	Not In Use
Decoder 2	Not In Use

5.4 Status>Spectra Tab

The Spectra tab shows the received COFDM RF spectrum. The expected COFDM spectra would be similar to that displayed in Ch1 below.

There can be up to eight spectra to observe in an 8-way or 2x4-way configured diversity scheme.

This display be helpful if there is some problems with the receive SNRs or levels.

Pro-RXD **DTC**

PRO-RX

[Status](#) [Global Settings](#) [Configuration](#) [Log](#) [Uploads](#) [Frequency](#) [Information](#)

[Overview](#) [Input](#) [Spectra](#) [Service](#)

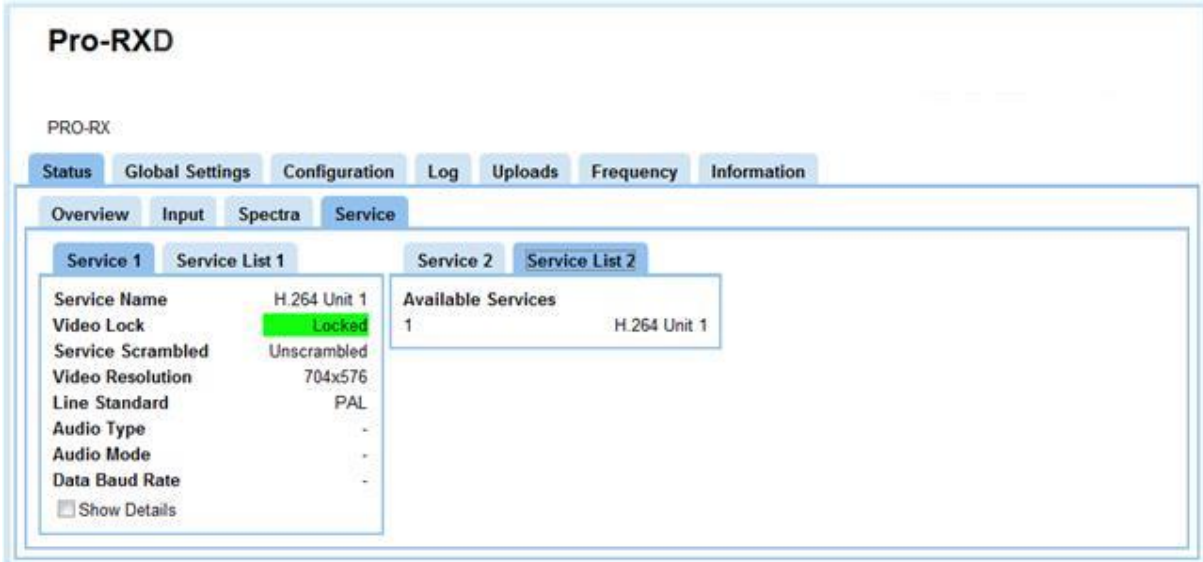
Frequency Ch.1: 2405.00 MHz
 Bandwidth: 8 MHz

A:
 B:

5.5 Status>Service Tab

The **Service** tab shows information relating to the services received in the received transport stream. Click on the **Show Details** checkbox to increase the level of information.

The **Service List** sub-tab shows the program number and service name.



5.6 Global Settings Tab

Global settings let you change parameters that apply to the PRORXD which do not affect the preset settings.

Pro-RXD

PRO-RX

Status
Global Settings
Configuration
Log
Uploads
Frequency
Information
SNMP

General

Unit Name:

Audio Output:

Tx Battery Alarm (V):

Enable SNMP:

IP Config

DHCP Enable:

IP Address:

Network Mask:

Gateway:

MTU:

OSD

	Video 1	Video 2
Monitor Type	<input type="text" value="Default"/>	<input type="text" value="Default"/>
OSD Mode	<input type="text" value="Off"/>	<input type="text" value="Off"/>
Blue On Fail	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Comp/HD-SDI	<input type="checkbox"/>	<input type="checkbox"/>
HDMI	<input type="checkbox"/>	<input type="checkbox"/>

Downconverters

Presets:

LO Frequency:

LO Side:

LNB Power:

LNB Voltage:

Presets 2:

LO Frequency 2:

LO Side 2:

LNB Gain Offset:

Individual LOs:

IP Streaming

Streaming Mode:

Multicast TTL:

SAP Address:

IP Stream 1
udp://224.2.128.12:10000

Enable:

Source:

Multicast Address:

Multicast Port:

Multicast Service Name:

Multicast To S:

IP Stream 2
udp://224.2.128.12:10002

Enable:

Source:

Multicast Address:

Multicast Port:

Multicast Service Name:

Multicast To S:

Genlock

	Decoder 1	Decoder 2
Genlock Mode	<input type="text" value="Off"/>	<input type="text" value="Off"/>
Offset Lines	<input type="text" value="0"/>	<input type="text" value="0"/>
Offset Pixels	<input type="text" value="0"/>	<input type="text" value="0"/>

Apply
Refresh
Set Clock
Set Password

5.6.1 General Settings

General

Unit Name:

Audio Output:

Tx Battery Alarm (V):

Enable SNMP:

Property	Description
Unit Name	Enter a user defined name for the unit.

Property	Description
Audio Output	Digital – embedded in the HDMI or HD-SDI video output. Analogue – output to the ports on the rear panel.
TX Battery Alarm (V)	Enter the voltage threshold where the TX battery voltage caption turns red.
Enable SNMP	If you need to work with SNMP you need to set this feature.

5.6.2 Downconverters

Downconverters

Presets	<input type="text" value="Manual"/>
LO Frequency	<input type="text" value="1880"/>
LO Side	<input type="text" value="Low"/>
LNB Power	<input type="text" value="Off"/>
LNB Voltage	<input type="text" value="9V"/>
Presets 2	<input type="text" value="Manual"/>
LO Frequency 2	<input type="text" value="1500"/>
LO Side 2	<input type="text" value="High"/>
LNB Gain Offset	<input type="text" value="9"/>
Individual LOs	<input type="checkbox"/>

Property	Description
Presets	<p>If you select Manual it means it will be necessary to type in the LO Frequency and LO Side in the next two fields manually. You might do this for an unusual frequency that requires an odd downconverter.</p> <p>If you select UHF it means it is not really necessary to have a downconverter because the receiver is UHF anyway. There can be an amplifier up near the antenna.</p> <p>Otherwise select your downconverter from the list, the LO Frequency and LO Side will be filled automatically.</p>
LO Frequency	<p>If you selected Manual from the Preset setting, you will need to enter an LO frequency in MHz.</p> <p>If it is a DTC downconverter which is not included in the preset list, you may find this detail in <i>Section 6.3</i>.</p>
LO Side	<p>The LO side can be Low or High depending on whether the LO frequency is lower or higher than the RF signal.</p> <p>If you selected Manual from the Preset setting, you will need to enter the LO side.</p> <p>If it is a DTC downconverter which is not included in the preset list, you may find this detail in <i>Section 6.3</i>.</p>
LNB Power	<p>DTC downconverters require power which is fed up the line from the PRORXD.</p> <p>You can switch LNB power off if you are operating a third party downconverter that has its own power supply.</p>
LNB Voltage	9V or 12V. DTC downconverters typically use an LNB voltage of 9V.

Property	Description
LNB Gain Offset	This may need to be adjusted to make sense of the signal strength numbers. Leave at default (9) unless this needs to be achieved.
Individual LOs	When cleared the LO Frequency and LO Side apply globally to all downconverters attached to the receiver. When selected, new fields open up to let you set individual LO Frequencies and LO Sides for each downconverter. This means you could have one half of the antennas set up for S-Band and the others, L-Band.

5.6.3 IP Config

IP Config

DHCP Enable	<input type="checkbox"/>
IP Address	<input type="text" value="192.168.0.1"/>
Network Mask	<input type="text" value="255.255.255.0"/>
Gateway	<input type="text" value="192.168.0.254"/>
MTU	<input type="text" value="1500"/>

Property	Description
DHCP Enable	If selected, a DHCP server on the network will allocate the PRORXD its IP address. If clear, the IP parameters will need to be set manually.
IP Address	This must be on the same subnet as the network or connected PC.
Network Mask	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.
Gateway	A gateway is used by a host when an IP packet's destination address belongs outside the local subnet. The default gateway address is usually an interface belonging to the LAN's router. Note: For correct streaming operation, a correct Gateway address in the IP subnet range must be set manually or through DHCP.
MTU	Maximum Transmission Unit (MTU) – this should be set to the same value as the network supports. For normal LAN this would be 1500.

5.6.4 IP Streaming

Note: Streaming is a licensed feature.

IP Streaming

Streaming Mode	UDP Multicast ▾
Multicast TTL	10
SAP Address	224.2.127.254
IP Stream 1	
udp://224.2.128.12:10000	
Enable	<input checked="" type="checkbox"/>
Source	Demod 1 ▾
Multicast Address	224.2.128.12
Multicast Port	10000
Multicast Service Name	MPEG2-TS
Multicast ToS	Routine (0) ▾
IP Stream 2	
udp://224.2.128.12:10002	
Enable	<input type="checkbox"/>
Source	Demod 1 ▾
Multicast Address	224.2.128.12
Multicast Port	10002
Multicast Service Name	MPEG2-TS2
Multicast ToS	Routine (0) ▾

Property	Description
Streaming Mode	Select the streaming mode you wish to operate with. The URL will be displayed
Multicast TTL	The multicast time to live value.
SAP Address	Session Announcement Protocol. SAP/SDP contains announcement and descriptor data required to be sent in a UDP multicast.
IP Stream 1/2	This is the URL you will need to enter into your media player to run IP streams. <div style="border: 1px solid #0070C0; padding: 2px; margin-top: 5px;">Note: You may need to add @ to the UDP URL before the multicast address in some media players.</div>
Enable	Switches the streaming on or off.
Source	Select the stream source from the drop-down box. Demod 1, for example, means the stream will come from the first receiver channel.
Multicast Address	This text box enables you to change the multicast address used by the unit. It is also possible to Unicast by specifying an applicable destination IP address in the local subnet range.

Property	Description
Multicast Port	Protocols like TCP or UDP use port numbers in the header to point traffic around the network. A good rule is to use numbers above 10,000 to stop confliction with existing services. The default values are 10000 and 10002.
Multicast Service Name	This is an identifier for the service.
Multicast ToS	The Type of Service priority.

5.6.5 OSD

OSD

	Video 1	Video 2
Monitor Type	Default ▾	Default ▾
OSD Mode	Off ▾	Off ▾
Blue On Fail	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Comp/HD-SDI	<input type="checkbox"/>	<input type="checkbox"/>
HDMI	<input type="checkbox"/>	<input type="checkbox"/>

Property	Description
Monitor Type	For most systems use the Default setting.
OSD Mode	Select which information is displayed on the on-screen display (OSD).
Blue On Fail	If selected, when the link is broken, a blue screen appears on the video output.
Comp/HD-SDI	If selected, the OSD is displayed on the Composite and HD-SDI video outputs.
HDMI	If selected, the OSD is displayed on the HDMI output.

5.6.6 Genlock Settings

Genlock

	Decoder 1	Decoder 2
Genlock Mode	Off ▾	Off ▾
Offset Lines	0	0
Offset Pixels	0	0

Property	Description
Genlock Mode	Off - Genlock switched off and system is not locked. External – the Genlock source connected to the external port on the rear of the receiver. Internal – the receiver has its own Genlock source built into the unit.
Offset Lines	Standard dependent. Enables you to apply delay adjustment.
Offset Pixels	Standard dependent. Enables you to apply delay adjustment.

5.6.7 Apply Button

When you change a parameter you must click the Apply button for the changes to be saved.

5.6.8 Refresh Button

If you make changes to parameters but do not click **Apply**, you can click the **Refresh** button to return the screen to the current settings.

5.6.9 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 and time.

5.6.10 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**.

Note: If you forget the password and have been locked out, follow the instructions to reset the password in *Section 4.2.4*.

5.7 Configuration Tab

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

You make a preset live by clicking the **Apply** button. The live preset is indicated by a green box around the preset number, e.g. 1.

Changes made to all other non-live presets can be saved by clicking on **Save**.

Pro-RXD **DTC**

PRORXD

Status Global Settings **Configuration** Log Uploads Frequency Information SNMP

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

General

Preset Name: Config 1

Diversity Mode: 2x4-way

Modulation Type: DVBT

DVBT Carrier Mode: Single

ASI Output: Demod 1

Demod 1

Frequency (MHz): 2400.00

Bandwidth: 8MHz

Guard Interval: Auto

Polarity: Auto

Use Packet Diversity:

Packet Diversity Source: ASI 1

Demod 2

Frequency (MHz): 2405.00

Bandwidth: 8MHz

Guard Interval: Auto

Polarity: Auto

Use Packet Diversity:

Packet Diversity Source: ASI 2

IFB

Enable:

Tx IP Address: 239.16.33.254

Tx IP Port: 20000

Mic Gain:

Preamp Gain:

Mute Level:

IP Input 1

IP Decoder Mode: UDP Unicast

Multicast Address: 239.16.33.254

Stream Port: 10000

Buffer Delay (ms): 50

FEC Mode: Off

Adaptive Bitrate:

IP Input 2

IP Decoder Mode: UDP Unicast

Multicast Address: 239.16.33.254

Stream Port: 10000

Buffer Delay (ms): 50

FEC Mode: Off

Adaptive Bitrate:

Remux 1

Input 1: Off

Input 2: Off

Bitrate (Mbps): 8.00

Remux 2

Input 1: Off

Input 2: Off

Bitrate (Mbps): 8.00

Decoder 1

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:

Decode Delay (ms): 50

Low Delay H.264 4:2:0 Optimised:

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:

Decode Delay (ms): 50

Low Delay H.264 4:2:0 Optimised:

No file chosen

5.7.1 General

General

Preset Name	Config 1
Diversity Mode	2x4-way ▼
Modulation Type	DVBT ▼
DVBT Carrier Mode	2K ▼
ASI Output	Demod 1 ▼

Property	Description
Preset Name	A user defined name for the configuration.
Diversity Mode	The configuration of the diversity and channel configuration of the receiver. The second demodulator license must be applied for the 2x configurations.
Modulation type	Select the modulation bandwidth, this will change the Demod settings. UMVL (Ultra Mobile Video Link) is optimised for operation in high speed mobile environments (like car racing for example). UMVL is also excellent when you are operating with high frequency (4GHz and above) transmissions.
DVBT Carrier Mode	DVB-T modulation only. This must match the transmitter setting. <ul style="list-style-type: none"> ■ Single = standard COFDM bandwidth ■ Dual = dual pedestal mode <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: Dual pedestal doubles the bitrate by using two adjacent COFDM channels with an approximate 1.5MHz separation. i.e. DVB-T 8MHz in dual pedestal mode will give a total bandwidth of 17.5MHz. See example spectrum in <i>Figure 5-1</i>.</p> </div>
ASI Output	The ASI output source.

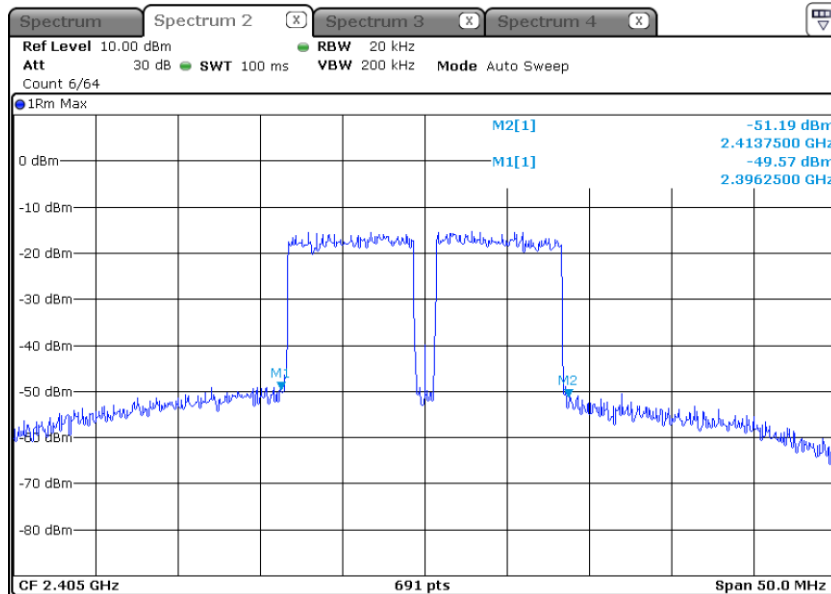


Figure 5-1 Dual Pedestal Spectrum Analyser Plot

5.7.2 IFB

IFB audio is used in a studio to provide feedback to the presenter wearing an earpiece.

IFB

Enable	<input type="checkbox"/>
Tx IP Address	<input type="text" value="239.16.33.254"/>
Tx IP Port	<input type="text" value="20000"/>
Mic Gain	<input type="range" value="0"/>
Preamp Gain	<input type="range" value="0"/>
Mute Level	<input type="range" value="0"/>

Property	Description
Enable	When selected the interruptible foldback system is switched on.
Tx IP Address	This is the IP address of the device to which you are sending IFB.
Tx IP Port	A good rule is to use numbers above 20,000 to stop confliction with existing services.
Mic Gain	Drag and drop the slider to adjust.
Preamp Gain	Drag and drop the slider to adjust.
Mute Level	Drag and drop the slider to adjust.

5.7.3 Remux

Multiple streams from RF, ASI and IP sources can be re-multiplexed on the PRORXD to form a multi-program stream. This is a licensed feature.

Remux 1

Input 1	<input type="text" value="Off"/>
Input 2	<input type="text" value="Off"/>
Bitrate (Mbps)	<input type="text" value="8.00"/>

Property	Description
Input 1/2	Select the inputs to be multiplexed.
Bitrate (Mbps)	Select the bitrate for the re-muxed stream.

5.7.4 Demod

Demod 1

Frequency (MHz)	2400.00
Auto BW Detect	Off ▼
Bandwidth	2.5MHz ▼
Guard Interval	1/16 ▼
Polarity	Normal ▼
Use Packet Diversity	<input type="checkbox"/>
Packet Diversity Source	ASI 1 ▼

Property	Description
Frequency (MHz)	The demodulator receive frequency. If you try to input a frequency that is out of range, the radio will tune the nearest available frequency automatically.
Auto BW Detect	Narrowband only. When on, the receiver will try to detect the bandwidth.
Bandwidth	DVB-T/UMVL bandwidths 8/7/6MHz (usually used for broadcast). Narrowband 625kHz, 1.25/2.5MHz (usually surveillance).
Guard Interval	The guard interval is an extension of the RF symbol period to give immunity to reflections. 1/16, short extension, deals with fast reflections, more data, less range. 1/8, long extension, deals with slower reflections, less data, more range.
Polarity	All DTC equipment must operate in Normal mode. It may be necessary to change the polarity to Inverted to align with third party equipment.
Use Packet Diversity	Packet diversity allows you to double the diversity of the system by linking a remote PRORXD via ASI or IP. This is a licensed feature.
Packet Diversity Source	Select the packet diversity source, ASI or IP.

5.7.5 IP Input

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	<input type="checkbox"/>

Property	Description
IP Decoder Mode	Select the mode of the received IP stream.
Multicast Address	Enter the received multicast address.
Stream Port	A good rule is to use numbers above 10,000 to stop confliction with existing services.
Buffer Delay	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	Only when RTP is selected as the IP Decoder Mode. ProMPEG offers error correction for real-time video streams.
Adaptive Bitrate	Only selectable when RTP Unicast is selected as the IP Decoder Mode.

5.7.6 Decoder

Decoder 1

Default Format	<input type="text" value="PAL"/>
Input	<input type="text" value="Demod 1"/>
BNC Output	<input type="text" value="HD-SDI"/>
Default Service	<input type="text" value="Unit 1"/>
Default Program ID	<input type="text" value="1"/>
Service Select Mode	<input type="text" value="Manual PIDs"/>
Service List	<input type="text" value="No Services"/>
Video PID	<input type="text" value="300"/>
AudioA PID	<input type="text" value="200"/>
AudioB PID	<input type="text" value="400"/>
PCR PID	<input type="text" value="8190"/>
Data PID	<input type="text" value="100"/>
Descrambling Mode	<input type="text" value="Off"/>
	<input type="text" value="All Services"/>
Descrambling Keys	<input type="button" value="Change Keys"/>
Decode Delay (ms)	<input type="text" value="50"/>
Low Delay H.264 4:2:0 Optimised	<input type="checkbox"/>
	<input type="button" value="Reset Decoder"/>

Property	Description
Default Format	Select the video format from the dropdown list.
Input	The input source for the decoder. Licence dependent.
BNC Output	Select the video format for the BNC connector.
Default Service	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	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	This selects how services in the transport stream will be selected. Defaults – uses Default Service name and Program ID as set earlier. List – Will show a list of available services in Status>Service>Service List . Manual PIDs – lets you manually set the packet identifiers.
Service List	If you select List in Service Select Mode , this field will show a list of available services on the current transport stream.
Video PID	0x0020 to 0x1FFE. This is available when you select Manual PIDs.
AudioA PID	0x0020 to 0x1FFE. This is available when you select Manual PIDs.

Property	Description
AudioB PID	0x0020 to 0x1FFE. This is available when you select Manual PIDs.
PCR PID	0x0020 to 0x1FFE. This is available when you select Manual PIDs.
Data PID	0x0020 to 0x1FFE. This is available when you select Manual PIDs.
Descrambling Mode	Select the descrambling mode, if needed. You might not have all the modes shown here as they are licensable features.
	If you select List in Service Select Mode, you can apply descrambling just to the selected service.
Descrambling Keys	Click the Change Keys button to open a dialog box which will let you set the descrambling key.
Decode Delay (ms)	This may need to be set for some low delay or third party streams. Not available when Low Delay Optimised is set.
Low Delay H.264 4:2:0 Optimised	If set, low delay mode is particularly useful in critical real-time applications. Note: Low Delay mode will only support H.264 video from a DTC transmitter or encoder device. It does not support MPEG-2 or MPEG-4 ASP, and it is not compatible with 3 rd party systems.
Reset Decoder	Click to reset the Decoder. If you are having problems with picture quality, try clicking this button to reset the decoder as a first line of troubleshooting. The reset is quick and immediate.

5.7.7 Save and Apply

If you make changes to parameters, the changes will not become active until you click the **Apply** button. By clicking **Apply** you will make the selected configuration active, indicated by the green numbered tab.

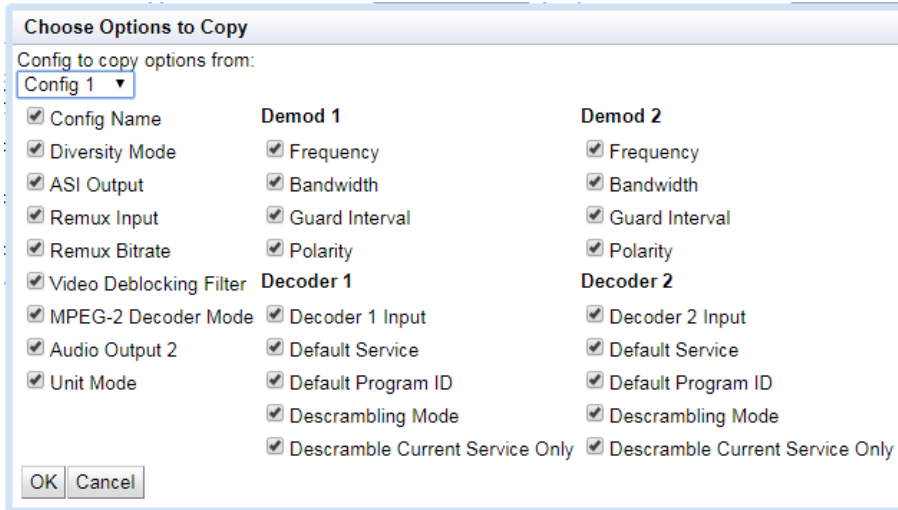
Changes to parameters can be made to all other non-active configs by clicking **Save**. The numbered tab will be coloured dark blue to indicate it is selected but not live.

5.7.8 Copy from Config Button

Copy From Config

The **Copy From Config** button lets you load a new configuration from one that exists. For example, you might have a complex configuration you would like to duplicate, but want to change the frequency. This makes it very simple.

When you click Copy From Config a dialogue box will open. Simply select the config from which to copy and select the features to transfer.



5.7.9 Save to File, Choose File and Load from File Buttons

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

Save to file

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

Choose File

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

Load from file

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

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

5.8 Log Tab

The PRORXD receiver generates log files of receiver status information. Click the **Reload** button to make a reload of the page data.

Pro-RXD

PRORXD

Status Global Settings Configuration **Log** Uploads Frequency Information SNMP

```
1970-01-01 06:37:55 Retuned input A - frequency lock failure
1970-01-01 06:38:19 Retuned input A - frequency lock failure
1970-01-01 06:38:43 Retuned input A - frequency lock failure
1970-01-01 00:00:12 Started
1970-01-01 00:00:11 Started
1970-01-01 00:09:12 Upgrade Installed
1970-01-01 00:16:57 Rebooted Remotely
1970-01-01 00:00:11 Started
1970-01-01 00:02:02 Default Config Restored
1970-01-01 00:00:12 Started
1970-01-01 00:00:12 Started
1970-01-01 00:00:12 Started
1970-01-01 00:00:11 Started
1970-01-01 00:00:11 Started
```

Reload

5.9 Uploads Tab

The Uploads tab enables you to upload a license file to enable licensable features, or send software upgrade files to the PRORXD.

Pro-RXD

PRORXD

Status Global Settings Configuration Log **Uploads** Frequency Information SNMP

License

Choose file No file chosen Upload File

Upgrade

Choose file No file chosen Upload File

5.9.1 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 which we will send to you, save this file to a convenient location on your PC. Check that the middle part of the license file matches the serial number displayed in the **Information** tab.

1. Click the **Choose file** button under the **License** text box.
2. The **Open File** window opens.
3. Navigate to the .lic file we sent you.
4. Click **Open**.
5. Click the **Upload File** button.

6. The licence is written to the unit.
7. After rebooting the unit, the new features will be enabled and appear in the **Information** tab.

5.9.2 Upgrade your PRORXD

When a new software release is available for the PRORXD, DTC will make it available on our WatchDox facility. See *Section 8.1*.

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.

1. Click the **Choose file** button under the **Upgrade** text box.
2. The **Open File** window opens.
3. 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.
4. Click **Open**.
5. Click **Upload File** button, a **Please Wait - Unit Upgrading** message will be displayed for a few minutes.
6. 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.
7. On the web browser, click **Browse** and select the *d330_prorxd_data_x.x.x.upg* file followed by **Open**.
8. 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.
9. This time when the upgrade is successful, choose the option **Yes, reboot now**.
10. After rebooting the unit, the new software will be enabled and appear in the **Information** tab.

5.10 Frequency Tab

The **Frequency** tab enables you to scan the radio spectrum within a specific bandwidth and resolution.


On completion of a successful scan, click the **Tune to** button to set the PRORXD demodulator setting to the desired signal.

The screenshot displays the Pro-RXD web interface. At the top, there are navigation tabs: Status, Global Settings, Configuration, Log, Uploads, Frequency (selected), and Information. Below these, the 'Frequency' tab is active, showing a 'Scan Settings' panel with input fields for Start Freq (2135.00 MHz), End Freq (2535.00 MHz), and Resolution (0250.00 KHz), along with 'Apply' and 'Refresh' buttons. The central 'Graph' panel shows a spectrum plot with a vertical line indicating a found signal at 2405 MHz, with a power of -090.64 dBm and state 1. Below the graph are 'Pause' and 'Cancel' buttons. The 'Scan Results' panel on the right shows 'Lock 1' at 2405 MHz and a 'Tune to 1' button.

5.11 Information Tab

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

The license list shows the licenses that are enabled in bold.

Pro-RXD


PRORXD

Status
Global Settings
Configuration
Log
Uploads
Frequency
Information
SNMP

Software Version	2.7.0
Build Number	49644
Board Type	D330
Serial Number	94E9F5F71A47B96C
MAC Address	00:11:6A:00:FF:D8
SD Card Size	0.0GB
USB Drive Size	0.0GB
Licensed Codes	ABEFKMNORUV7
Licensed Features	DVB-T Demodulation SOLO 2.5MHz Demodulation SOLO 1.25MHz Demodulation + MPEG4 Decoder SOLO 625kHz Demodulation UMVL Demodulation DVB-T 4K Demodulation 2-way Diversity 4-way Diversity 6-way Diversity 8-way Diversity Video/Audio Decoder 1 Second Channel Decoder/Demodulator IP Streaming AES 128 Decoder 1 AES 256 Decoder 1 AES 128 Decoder 2 AES 256 Decoder 2 IFB ASI 2 IP Decoding SD Decode Only 4:2:2 Video Decode Packet Diversity Remux

Restore Defaults
Reboot Unit

5.12 SNMP Tab

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

Pro-RXD **DTC**

PRO-RX

Status **Global Settings** **Configuration** **Log** **Uploads** **Frequency** **Information** **SNMP**

Configuration file (prorxsnmpd.conf)

No file selected.

Rules file (prorxsnmpd.rules)

No file selected.

6. Appendix A – Reference Material

6.1 Pinouts – PRORXD-1RU

6.1.1 Power

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

6.1.2 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

6.1.3 Audio 1/2

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

6.1.4 IFB/Audio In

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

6.2 Pinouts – PRORXD-2RU

6.2.1 Power

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

6.2.2 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

6.2.3 Audio 1L/2L

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

6.2.4 Audio 1R/2R

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

6.2.5 IFB/Audio In 1

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

6.2.6 IFB/Audio In 2

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

6.2.7 Audio 3/4

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

6.3 Downconverter Data

6.3.1 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

6.3.2 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

6.3.3 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

6.3.4 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

Product	LO Frequency	LO Side	Gain (Standard)	Gain (High Gain)
DCBGSB-550600	5200 MHz	Low	10dB	30dB
DCBGSB-640700	6150 MHz	Low	10dB	30dB
DCBGSB-700750	6650 MHz	Low	10dB	30dB

6.3.5 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

6.4 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 1: Sensitivity is defined as -1dB of attenuation below the point at which errors are transmitted to produce error free video for 30 seconds.

Note 2: Dual pedestal sensitivity is the same as for single.

Modulation and Bandwidth	Constellation	FEC	Guard Interval	Sensitivity
DVB-T 8MHz	64QAM	1/2	1/32	< -83dBm
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

7. Appendix B – Remote Control Guide

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

Note: For a full list of RS232 commands and options, refer to the *RS232 Control and JSON Integration Document*.

7.1 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.

7.2 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

7.3 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.

7.4 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.

8. Appendix C – Getting Technical Support

8.1 Documentation and Software

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

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

8.2 Contact Technical Support

The Technical Support team can be accessed by one of the following:

- Post: DTC – Solent, Fusion 2, 1100 Parkway, Solent Business Park, Whiteley, Hampshire, PO15 7AB, England
- Phone: +44 1489 884 550. Office hours: 0900-1700 UK time excluding holidays
- Email: solent.support@domotactical.com (no restricted content)

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

8.1 Using the DTC RMA Service

If there is a problem and all troubleshooting steps have been unsuccessful, you may need to contact DTC for Return Material Authorisation (RMA) service.

8.1.1 Step 1: Email DTC

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

8.1.2 Step 2: Save your Personal Kit

Remove all personal kit or media from the device.

8.1.3 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.

8.1.4 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

8.1.5 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.

8.1.6 Step 6: Send the Box to DTC

Send the box using your normal shipping process.

9. Appendix D – Safety and Maintenance

9.1 Cautions and Warnings

Note: The following guidelines may or may not be applicable to your product. However, we would ask that you read them to assess their relevance.

Area	Note
Enclosures	<p>Do not remove any factory installed screws or fastenings. Damage to the units may result and void any warranties.</p> <p>Only authorised, trained personnel should open the product. There are no functions that require the user to gain access to the interior of the product. There are no user serviceable parts inside.</p>
Maintenance	Other than cleaning, no scheduled maintenance is required to ensure proper function of the unit.
Environment	The equipment should not be used in hazardous or corrosive atmospheres. Users are reminded of the necessity of complying with restrictions regarding the use of radio devices in fuel depots, chemical plants and locations where explosives are stored and/or used.
Power supply	Ensure that the power supply arrangements are adequate to meet the stated requirements of each product. Observe all electrical safety precautions.
Electro static discharge precautions	ESD guidelines must be followed for this electrostatic sensitive device.
Lightning strike	There is a risk of lightning strike to antennas. The equipment should not be assembled in an area at the time of lightning activity. Antennas should be adequately protected from lightning strikes.
Working at height	Observe caution when locating the device at height, for example on a mast. Ensure the unit is well secured to prevent it falling and injuring personnel.
Risk of eye injury	Care should be taken to avoid eye contact with the antennas.
Cables	Connecting cables should not be positioned where they are likely to become damaged or where they may present a trip hazard.
Thermal control system	<p>Any powered device will always produce heat as a by-product of its operation. If you operate this device in an enclosed space you must ensure it has adequate airflow to keep it cool.</p> <p>Also, if worn close to the body, care must be taken to protect the operator from excessive temperatures.</p>
RF emission system	When using this device please ensure a distance of 20cm is maintained between your device and your body while the device is transmitting.
Aircraft safety	<p>Use of this equipment on board aircraft is strictly forbidden, unless confirmed as safe by the aircraft operator.</p> <p>Use of radio transmitter equipment in an aircraft can endanger navigation and other systems.</p>

9.2 Repairs and Alterations

Attempted repairs, alterations, improper installations or connections may invalidate the warranty. Please contact Technical Support if you suspect a faulty or defective component. See *section 8.2*.

9.3 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
- Only use accessories intended for the specific make and model of your unit, especially batteries, chargers and power adapters.

9.4 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

9.5 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.

9.6 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

9.7 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

10. Appendix E – Glossary

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

A	Means...
AV	Audio/Video.
AES	In cryptography, the Advanced Encryption Standard (AES) is an encryption standard adopted by the U.S. government. The standard comprises three block ciphers, AES-128, AES-192 and AES-256, adopted from a larger collection originally published as Rijndael. Each AES cipher has a 128-bit block size, with key sizes of 128, 192 and 256 bits, respectively.
ASI	Asynchronous Serial Interface (ASI) is a streaming data interface which often carries an MPEG Transport Stream. An ASI signal can carry one or multiple SD, HD or audio programs that are already compressed, not like an uncompressed SD-SDI (270Mbps) or HD-SDI (1.45Gbs). An ASI signal can carry varying amounts of data but is always padded to run at a fixed line rate of 270Mbps.
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.
Analogue	Analog transmission is a transmission method of conveying voice, data, image, signal or video information using a continuous signal which varies in amplitude, phase, or some other property in proportion to that of a variable.
Antenna	An antenna (or aerial) is a transducer designed to radiate or receive electromagnetic energy (generally RF).
Antenna Bandwidth	The frequency range over which a given antenna will accept signals.
Antenna Gain	The effectiveness of a directional antenna as compared to a standard non-directional antenna. It is usually expressed as the ratio in decibels of standard antenna input power to directional antenna input power that will produce the same field strength in the desired 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.
Attenuation	Power loss resulting from conductor resistance and dielectric loss within the insulating material used to separate the conductors.

B	Means...
Bandwidth	The width of a band of frequencies used for a particular purpose.

C	Means...
COFDM	Coded Orthogonal Frequency Division Multiplexing (COFDM) is an 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...
Digital	A digital signal is a discontinuous signal that changes from one state to another 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 converts digital video data to analogue signals for replay on analogue monitors; or in certain cases a software decoder, a program that decodes digital data for replay on the PC (decompression etc.).
Demodulate	To recover the information originally impressed on the radio wave.

E	Means...
Elementary Stream (ES)	These streams contain only one MPEG-2 video channel and no audio. Elementary streams are required if you intend to use Milestone or any player that cannot operate with transport streams. You must be in RTSP mode to use Elementary streams.
Encoder	A processor in a video transmitter which converts analogue video from a camera to digital data.

F	Means...
FEC	Forward Error Correction (FEC) is a system of error control for data transmission, whereby the sender adds redundant data to its messages, also known as an error-correction code. This lets the receiver detect and correct errors (within 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 avoided, at the cost of higher bandwidth requirements on average. FEC is therefore applied in situations where retransmissions are relatively costly or impossible.
Firmware	Software which is installed directly on a device and is intended specifically for that device and is used to control it.
FOV	Field of View (also field of vision) is the angular extent of the observable world that is seen at any given moment.
Fading	A periodic decrease in received signal strength

F	Means...
Frequency	The rate at which a process repeats itself. In radio communications, frequency is expressed in cycles per second. Signals also have a property called wavelength, which is inversely proportional to the frequency.
FPGA	A Field-Programmable Gate Array (FPGA) is an integrated circuit designed to be configured by the customer or designer after manufacturing, hence field-programmable.

G	Means...
GUI	A Graphical User Interface is an interface which lets the user interact with an electronic device.
GHz	Gigahertz - One gigahertz is equal to 1,000 megahertz (MHz) or 1,000,000,000 Hz.
Gain	The increase in signal strength that is produced by an amplifier.

I	Means...
IP Address	A unique numeric ID for a device within a network.

L	Means...
LOS	Line-of-sight (LOS) propagation is radio transmissions which travel in a direct path from the source to the receiver.

M	Means...
MHz	Megahertz is equal to 1,000,000 Hz
mW	The milliwatt (mW) is equal to one thousandth (10^{-3}) of a watt.
MJPEG	Motion JPEG is a video compression format in which each video frame is compressed as a JPEG image.
Modulation	To change the output of a transmitter in amplitude, phase or frequency in accordance with the information to be transmitted. Data is superimposed on a carrier current or wave by means of a process called modulation. Signal modulation can be done in either of two main ways: analogue and digital. In recent years, digital modulation has been getting more common, while analogue modulation methods have been used less and less. There are still plenty of analogue signals around, however, and they will probably never 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...
NLOS	Non-line-of-sight (NLOS) propagation is radio transmissions across a path that is partially obstructed, usually by a physical object
NTSC	NTSC is a colour encoding system for analogue television which is used predominantly in North America.
Noise	Random pulses of electromagnetic energy generated by lightening or electrical equipment.

O	Means...
Omni directional antenna	An antenna whose radiation pattern shows equal radiation in all horizontal directions.

P	Means...
PAL	PAL is a colour encoding system for analogue television.
PTZ	Pan, Tilt and Zoom (PTZ) is a common way of referring to controllable cameras.
Propagation	A phenomenon by which any wave moves from one point to another; the travel of electromagnetic waves through space or along a transmission line.

Q	Means...
QPSK	Quadrature Phase Shift Keying.

R	Means...
RTSP	Real Time Streaming Protocol (RTSP) is a network control protocol designed for use 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 facilitate real-time control of playback of media files from the server.
Radio Frequency (RF)	Any frequency of electrical energy capable of propagation into space (usually above 20kHz).

S	Means...
SDI	Serial Digital Interface (SDI) or High Definition SDI (HD-SDI) are used for transmission of uncompressed video which may contain embedded audio.

S	Means...
SNR	Signal to Noise Ratio (SNR) is an electrical engineering measurement defined 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.
Streaming	Streaming is the transmission of digital audio or video or the listening and viewing of such data without first storing it.

T	Means...
Transport Stream (TS)	These streams can contain several MPEG-2 content channels and associated audio. All the channels are multiplexed together, letting the receiver choose which to play back.

U	Means...
UDP	User Datagram Protocol (UDP) Sometimes called fire and forget because there is no dialog between the sender and receiver. If the receiver does not get a packet, the sender will never know. However, UDP is very efficient when there is little chance of errors (like in your LAN), or when TCP would provide "too late" delivery.
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...
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...
Waveform	Signal shape.
Waveguide	A specially form hollow metal tube, usually rectangular in shape in cross section, used to connect a High Power amplifier to the antenna.