



SRA/SFX2100 Series Satellite Receiver Appliance



INTERNATIONAL
DATACASTING

User's Guide

Preface

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SRA/SFX2100 Series Satellite Receiver Appliance International Datacasting Corporation Part No. 90076610-50

NOTE: *The screen captures shown in this User's Guide are for reference only and may not exactly match the pages that are displayed on your browser. Not all receiver models and/or versions of the application firmware will support all features described in this guide. If you have any questions regarding availability of certain features, please contact International Datacasting's Customer Service Department (see Chapter 5!).*

Record of Revisions

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Chapter 1

Introduction

International Datacasting Corporation (IDC) would like to thank you for purchasing the SRA2100 or SFX2100 Series SuperFlex Satellite Receiver Appliance. At International Datacasting, we take pride in our products and believe the satellite receiver that you have chosen will satisfy your needs for years to come. Satellite Communications is our business and quality is our goal. We welcome your comments and respect your opinions.

The SRA and SFX family is an important leap forward in performance and functionality. These products combine IDC's experience of 20 years as a long-time leader in the design and manufacture of satellite receivers for edge applications with a proven ability to provide complete systems solutions. This product is designed to provide for the flexibility, functionality and high reliability required in today's leading-edge applications.

General

Throughout this manual, the SRA2100 or SFX2100 series SuperFlex satellite receiver appliance will be referred to as simply the "receiver". Unless explicitly stated, receiver references can be exchanged with any model in the SRA2100 or core SFX2100 family (e.g. SRA2100B, SFX2100R, etc). Please refer to the Appendices corresponding to your specific model to determine which features are available with your unit. **The content of this manual will depict a fully featured SRA2100x or core SFX2100x (no multimedia applications) receiver.**

This chapter provides a brief overview of the SRA2100 family and SFX2100 family of receiver appliances.



SRA2100 IP/DVB Satellite Router Appliance-

Product Overview

The SuperFlex SRA2100 family of satellite router appliances is the latest generation of advanced DVB/IP satellite router appliances available from IDC. The SRA2100 family is an industrial-grade satellite receiver with advanced router functionality capable of filtering up to 250 PIDs and outputting over 70mb/s. The SRA2100 family features dual high-speed Ethernet outputs and a new web browser based interface for local and remote status and control.

The SRA2100 family is a next generation product line that evolved directly from IDC's proven SR2000 and SR2001 family of DVB-S receivers. The significant new features and options are summarized below.

Standard Features

- DVB transport format compatible ISO/IEC 13818 with filtering up to 250 PIDs.
- QPSK DVB compliant demodulator, or QPSK/8PSK/16QAM compliant demodulator, depending on model.
- Embedded Linux operating system for maximum performance and stability.
- Dual Ethernet ports: two full capability 10/100 Base-T Ethernet ports to support complete routing and subnetting. Now operators can elect to use one output for multicasting and a second for unicasting.
- Asynchronous and Synchronous outputs – standard interfaces for serial protocol applications and ease of integration into legacy satellite networks.
- Intel processor based – most powerful receiver on the market; processors scalable for even more power, leaving available processing power for future applications.
- Available in one rack unit-high model (with or without rack-mount brackets/ears).
- On board watchdog timer for failsafe operation.
- Asynchronous Terminal interface on separate connector for easy local installation and metrics using minimal support equipment.
- SNMP Manageable using MIB-II (relevant portions) and IDC Enterprise MIB.
- Web browser compatible Graphical User Interface (GUI)
- Compatible with IDC's proven NetManager2 for over-the-satellite network management.
- Return channel via IP/Ethernet or optional PPP/telephone modem return channel interface.

- Unicast and multicast IP Routing.
- IP Filtering and Firewalling.
- Source & Destination Network Address Translation.
- Secure background firmware/software downloading – the SRA2100 always has most current code.
- Front panel indicators for Lock, Status, Control, and data traffic.
- Fully interoperable with IDC's family of SuperFlex DVB products.

Options

- (SRA2100R or SRA2100MR series Only) Integrated IP security client and smartcard reader (requires a software key to enable) – works with CypherCast, the latest IP Security conditional access system available from Irdeto Access.
- (SRA2100B or SRA2100MB series Only) Integrated DVB Conditional Access System (CAS) Common Interface (CI) slot for a CA Module (CAM) and Smartcard. This interface supports a number of CA systems, including Irdeto Access M-Crypt and NagraVision.
- Automatic redundancy peering.
- Industry standard PCI option slot – telephone modem available today, other PCI options will be available for future applications for custom applications upon request.
- S-Video, Composite Video, Parallel Output, USB connectors, Keyboard, mouse, AC97 audio, IrDA and monitor connections available and reserved for future applications and for custom applications upon request.

Router Functionality

The SRA2100 series have an integral microprocessor running the highly reliable Linux real-time operating system. This combined with the two Ethernet ports provides highly flexible router functionality. The following networking and routing protocols are supported:

- ICMP, IGMP, SNMP, DHCP, NAT
- DVB MPE
- PPP (with modem option)
- MAC Filtering
- Multicast Routing

Mechanical Packaging

The SRA2100 series is available as a low-profile 1RU high model for rack mount and desktop installations. The SRA2100 series comes with easy to read front panel indicators and a full suite of industry standard rear panel interfaces, for ease of implementing standard and custom-defined network configurations.

SFX2100 IP/DVB Satellite Multimedia Appliance - Product Overview

The SFX2100 family is functionally equivalent to the SRA2100 family. The addition of a minimum 40 Gbyte integrated hard drive and Datacast XD software makes it ideal for those multimedia applications where a reliable satellite receiver and computer are required in an integrated self-contained package. Many of the optional interfaces on the SRA are standard on the SFX.

Multimedia Applications

The SFX2100 series of satellite multimedia server appliances comes complete with Datacast XD, IDC's leading multimedia content distribution software ([see separate product information]). With Datacast XD, the SFX2100 is a powerful server with advanced routing capabilities that can be used as-is for a wide range of file transfer, streaming media and multimedia content distribution applications.

The SFX2100 can also be configured for specific customer applications and IDC's technical resources are available to assist with this – including specialized and proprietary configurations for Original equipment Manufacturers (OEM's).

In addition, IDC intends to develop a family of application-specific software packages to help enable specific business models. An example of an application that is currently available is described in the following paragraphs.

Multimedia Player Application

The Multimedia Player Application is intended to create and present multimedia displays for kiosks. Functional elements of this application are summarized as follows:

- Ability to play video files, optionally from a carousel playlist.
- Ability to play audio files, optionally from a carousel playlist.
- Ability to display graphics files.
- Built-in Apache web server.
- Streaming MPEG2 and MPEG4 video/audio with MPEG Accelerator PCI card option.

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- Built-in Samba Daemon, which allows networked PCs running other operating systems such as Windows®, to access the files deposited by XD on the integrated hard drive.

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Chapter 2

Installation

This chapter provides information to familiarize you with the SRA2100 and basic SFX2100 series satellite receiver appliance, as it comes out of the box. This information can be used to step through a preliminary investigation of the unit you have received, as well as initially applying power to ensure that it is operating correctly and has not been damaged during transit.

The illustrations that are provided in this chapter identify indicators and connectors on the satellite receiver, both in the rack mount and cube configurations. Acquaint yourself with these parts as illustrated, and refer to the physical unit itself. Throughout the remainder of this guide, reference will be made to these parts. There are no adjustable components on the receiver, only display indicators.

Varying levels of Status and Control for configuration of the satellite receiver are available through one of the following: locally using the Terminal Interface, locally or remotely using the Web based Graphical User Interface (GUI), remotely using SNMP, or remotely using NetManager. Status and control via these methods is detailed in Chapters 3 and 4 of this manual.

What You Should Have Received

You should have received the following package:

- One (1) SRA2100 or SFX2100 series satellite receiver appliance;
- One (1) power cord, suitable for use in your country;
- One (1) copy of this manual (optional) – also available online from the IDC customer service FTP site – see Chapter 5 for contact information.

It is highly recommended that you retain the box and foam packaging that came with the unit, in the rare event that it has to be shipped back for repair.

Front Panel

Once you have removed the satellite receiver from the box, please familiarize yourself with the front panel. Refer to Figures 2-1 for the location of the indicators. These are described in the table under the figure.



Figure 2-1 Front Panel Indicators – Rack Mount Unit

Indicator	Description
LOCK	<p>Purpose: provides indication of receiver lock to the incoming satellite DVB carrier on the L-Band input.</p> <p>Colour: off/red/green, where:</p> <p>Off – no power is applied to the receiver.</p> <p>Solid Green – indicates that the demodulator is locked onto the satellite DVB carrier.</p> <p>Solid Red – the demodulator is not locked onto the DVB carrier.</p>
STATUS	<p>Purpose: provides indication of various power-up states of the receiver, including LNB DC power status to the L-Band connector.</p> <p>Colour: off/red/green/orange, where:</p> <p>Off – no power is applied to the receiver.</p> <p>Solid Green – normal operation and one of:</p> <ol style="list-style-type: none"> the LNB is being powered by the receiver; current draw is between 50 and 350 mA; or the receiver has not been configured to power the LNB. <p>Solid Orange – power is being supplied to the LNB, and it is under current (power drawn is <50 mA, which may possibly indicate an open circuit).</p> <p>Solid Red – boot and normal operation, can be one of:</p> <ol style="list-style-type: none"> during the boot, start-up and initialization of the receiver application firmware, remains red until startup is

Indicator	Description
	<p>completed, then turns solid green, orange, or remains red, depending on LNB status; and</p> <p>2. during operation, power is being supplied to the LNB and it is over current (power drawn is >350 mA, which may possibly indicate a short circuit).</p>
CONTROL	<p>Purpose: provides indication of the authorization for the receiver to process control commands from the Network Control Channel (NetManager NCC PID stream for the DVB Carrier – see Chapter 4).</p> <p>Colour: off/green, where:</p> <p>Off – normal operation, receiver is not authorized to process commands from the Network Control Channel on the NCC PID for the DVB Carrier.</p> <p>Green - normal operation, receiver is authorized to process commands from the Network Control Channel.</p> <p>Flashing Off/Green – indicates that DVB packets are being received on the NCC PID.</p>
R/W	<p>Purpose: provides indication of read/write activity of the storage device in the receiver (either compact flash disk or hard drive, depending on model).</p> <p>Colour: off/green, where:</p> <p>Off – no storage device activity.</p> <p>Flashing Off/Green – storage device read/write activity, as well as an indication that the receiver is booting after power-up.</p>
NETWORK	<p>Purpose: provides indication of the authorization and data activity on the satellite network interface.</p> <p>Colour: off/green/orange, where:</p> <p>Solid Green – satellite network interface is authorized (enabled), but there is no data activity.</p> <p>Flashing Off/Green – satellite network interface is authorized and there is data activity on one or more of the selected MPE PIDs (see Chapter 4). If the DVB CAS or Cyphercast option is installed, this also indicates that the data is being decrypted.</p> <p>Flashing Off/Orange – DVB CAS or Cyphercast option is installed, satellite network interface is authorized and there is data activity on one or more of the selected MPE PIDs (see Chapter 4). However, the data is not being decrypted.</p> <p>Off – satellite network interface is not authorized.</p>
SYNC	<p>Purpose: provides indication of the authorization and data activity</p>

Indicator	Description
	<p>on the synchronous interface.</p> <p>Colour: off/green, where:</p> <p>Solid Green – the SYNC port is authorized, but there is no data activity.</p> <p>Flashing Off/Green – the SYNC port is authorized and there is data activity.</p> <p>Off – the SYNC port is not authorized.</p>
ASYNC	<p>Purpose: provides indication of the authorization and data activity on the asynchronous interface.</p> <p>Colour: off/green, where:</p> <p>Solid Green – the ASYNC port is authorized, but there is no data activity.</p> <p>Flashing Off/Green – the ASYNC port is authorized and there is data activity.</p> <p>Off – the ASYNC port is not authorized.</p>
OPTIONS	<p>Purpose: provides operational status indication of options installed in the receiver, as applicable. Currently, status is provided for the conditional access (Cyphercast in the SRA/SFX2100R series and DVB CAS in the SRA/SFX2100B series) options.</p> <p>Colour: off/green, where:</p> <p>Solid Green – conditional access option is installed.</p> <p>Flashing Off/Green – for Cyphercast option EMM/ECM packets are being received, or for DVB CAS option PAT/PMT tables are being received.</p> <p>Off – the Cyphercast or DVB CAS option is not installed.</p>

Rear Panel

Once you have acquainted yourself with the front panel and the associated indicators, turn the receiver around so that the rear panel is fully visible. Please refer to Figures 2-2. A description of each of the visible connectors on the rear panel is provided in the table after the figure.

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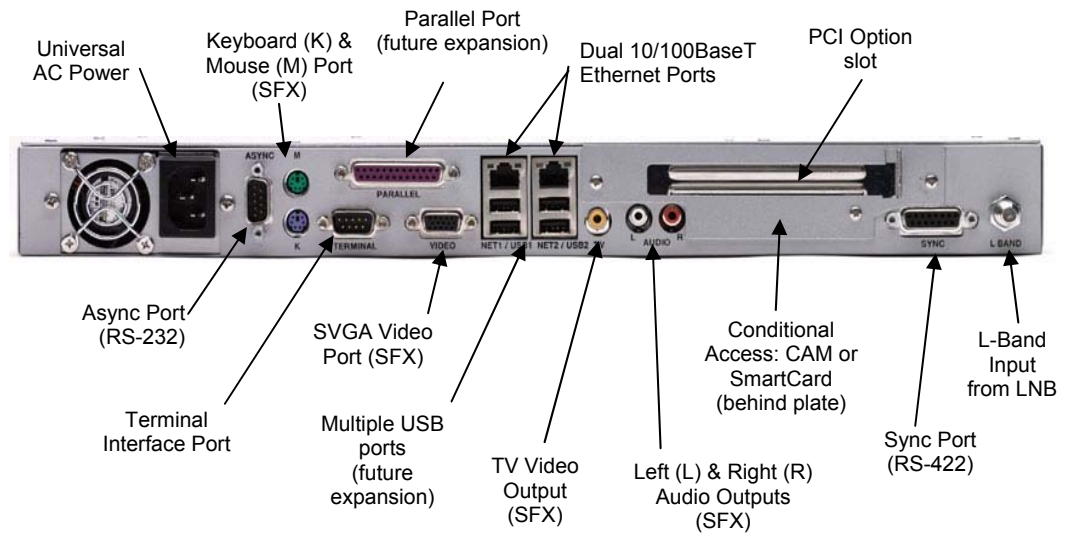


Figure 2-2 Rear Panel Connectors – Rack Mount Unit

Connector	Description																														
AC Power	The Alternating Current (AC) inlet is the main power disconnect. The power cord connector is used to provide AC power to the satellite receiver. The power requirements for this equipment is quite flexible, with an acceptable power range of 100 to 240 VAC at 50 or 60 Hz.																														
ASYNC Port	<p>This is a 9-pin RS-232 (DTE) DE-9P (male) connector. It is used as a unidirectional (output) low speed asynchronous data port. The pinouts for this port are as follows:</p> <table><tr><th>PIN</th><th>Acronym</th><th>Reference</th></tr><tr><td>1</td><td>DCD</td><td>Data Carrier Detect</td></tr><tr><td>2</td><td>RD</td><td>Receive Data</td></tr><tr><td>3</td><td>TD</td><td>Transmit Data</td></tr><tr><td>4</td><td>DTR</td><td>Data Terminal Ready</td></tr><tr><td>5</td><td>GND</td><td>Ground</td></tr><tr><td>6</td><td>DSR</td><td>Data Set Ready</td></tr><tr><td>7</td><td>RTS</td><td>Request To Send</td></tr><tr><td>8</td><td>CTS</td><td>Clear To Send</td></tr><tr><td>9</td><td>RI</td><td>Ring Indicator</td></tr></table>	PIN	Acronym	Reference	1	DCD	Data Carrier Detect	2	RD	Receive Data	3	TD	Transmit Data	4	DTR	Data Terminal Ready	5	GND	Ground	6	DSR	Data Set Ready	7	RTS	Request To Send	8	CTS	Clear To Send	9	RI	Ring Indicator
PIN	Acronym	Reference																													
1	DCD	Data Carrier Detect																													
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4	DTR	Data Terminal Ready																													
5	GND	Ground																													
6	DSR	Data Set Ready																													
7	RTS	Request To Send																													
8	CTS	Clear To Send																													
9	RI	Ring Indicator																													
K (Keyboard) & M (Mouse) Ports	These are standard PS/2 type keyboard and mouse connectors, used when keyboard, monitor, and mouse are required for some SFX applications.																														
TERMINAL Interface Port	This is a 9-pin RS-232 (DTE) DE-9P (male) connector. It is used as a bi-directional low speed asynchronous data port for the Terminal Interface at 9600 baud. Pinouts for this port are the same as the ASYNC port.																														

Connector	Description																											
PARALLEL Port	This is a standard parallel printer type port, available for future applications.																											
VIDEO SVGA Port	This is a standard SVGA output, used when keyboard, monitor, and mouse are required for some SFX applications. This port is full AGP 4X Rev 2.0 compliant, with support for 2D/3D resolutions up to 1920x1440.																											
NETx Ethernet Ports (2)	<p>These are bi-directional RJ-45 8-wire (female) connectors, with 10/100Base-T auto sensing Ethernet interfaces. Two indicators are provided immediately above the RJ-45 connector:</p> <ol style="list-style-type: none">1. Yellow (left) – indicates Link status. On indicates that the Ethernet link has been established, either in 10 Base-T or 100 Base-TX modes.2. Green (right) – indicates transmit or receive data activity. Off indicates that there is no data activity and flashing green indicates that there is activity. <p>The pinouts for these ports are as follows:</p> <table><thead><tr><th>PIN</th><th>Acronym</th><th>Reference</th></tr></thead><tbody><tr><td>1</td><td>T+</td><td>Transmit Data +</td></tr><tr><td>2</td><td>T-</td><td>Transmit Data -</td></tr><tr><td>3</td><td>R+</td><td>Receive Data +</td></tr><tr><td>4</td><td></td><td>Not connected</td></tr><tr><td>5</td><td></td><td>Not connected</td></tr><tr><td>6</td><td>R-</td><td>Receive Data -</td></tr><tr><td>7</td><td></td><td>Not connected</td></tr><tr><td>8</td><td></td><td>Not connected</td></tr></tbody></table>	PIN	Acronym	Reference	1	T+	Transmit Data +	2	T-	Transmit Data -	3	R+	Receive Data +	4		Not connected	5		Not connected	6	R-	Receive Data -	7		Not connected	8		Not connected
PIN	Acronym	Reference																										
1	T+	Transmit Data +																										
2	T-	Transmit Data -																										
3	R+	Receive Data +																										
4		Not connected																										
5		Not connected																										
6	R-	Receive Data -																										
7		Not connected																										
8		Not connected																										
USBx Ports (4)	These are bi-directional USB ports, available for future applications. These ports are USB v1.1 and Intel HCI v1.1 compatible.																											
TV Video Output	This RCA connector provides baseband composite PAL or NTSC video output.																											
L & R AUDIO Outputs	These are two audio line outputs, as provided by the internal AC97 2.1 compliant codec.																											
PCI Option Slot	One PCI option slot is provided, for PCI card options.																											
Conditional Access: CAM or SmartCard	<p>Conditional Access support is provided as follows:</p> <p>SRA/SFX2100B – support for one (1) DVB Conditional Access (CA) module with smart card that is compliant with the Common Interface (CI) standard and the DVB scrambling system at the head-end (e.g. Nagra Vision or Irdeto M-Crypt systems)</p> <p>SRA/SFX2100R – support for one (1) smart card that is compliant with the software based decryption system and the</p>																											

Connector	Description																																																
	head-end encryption system (e.g. Irdeto Cyphercast system).																																																
SYNC Port	<p>This is a X.21 (DCE compatible) DA-15S (female) connector used as a unidirectional (output) synchronous data port. The pinouts for this port are as follows:</p> <table><tr><th>PIN</th><th>Acronym</th><th>Reference</th></tr><tr><td>1</td><td>SHIELD</td><td>Ground</td></tr><tr><td>2</td><td>T (A)</td><td>Not connected</td></tr><tr><td>3</td><td>C (A)</td><td>Not connected</td></tr><tr><td>4</td><td>R (A)</td><td>Transmit Data A</td></tr><tr><td>5</td><td>I (A)</td><td>Data Valid A</td></tr><tr><td>6</td><td>S (A)</td><td>Transmit Clock A</td></tr><tr><td>7</td><td>B (A)</td><td>Not connected</td></tr><tr><td>8</td><td>GND</td><td>Ground</td></tr><tr><td>9</td><td>T (B)</td><td>Not connected</td></tr><tr><td>10</td><td>C (B)</td><td>Not connected</td></tr><tr><td>11</td><td>R (B)</td><td>Transmit Data B</td></tr><tr><td>12</td><td>I (B)</td><td>Data Valid B</td></tr><tr><td>13</td><td>S (B)</td><td>Transmit Clock B</td></tr><tr><td>14</td><td>B (B)</td><td>Not connected</td></tr><tr><td>15</td><td></td><td>Not connected</td></tr></table>	PIN	Acronym	Reference	1	SHIELD	Ground	2	T (A)	Not connected	3	C (A)	Not connected	4	R (A)	Transmit Data A	5	I (A)	Data Valid A	6	S (A)	Transmit Clock A	7	B (A)	Not connected	8	GND	Ground	9	T (B)	Not connected	10	C (B)	Not connected	11	R (B)	Transmit Data B	12	I (B)	Data Valid B	13	S (B)	Transmit Clock B	14	B (B)	Not connected	15		Not connected
PIN	Acronym	Reference																																															
1	SHIELD	Ground																																															
2	T (A)	Not connected																																															
3	C (A)	Not connected																																															
4	R (A)	Transmit Data A																																															
5	I (A)	Data Valid A																																															
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7	B (A)	Not connected																																															
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9	T (B)	Not connected																																															
10	C (B)	Not connected																																															
11	R (B)	Transmit Data B																																															
12	I (B)	Data Valid B																																															
13	S (B)	Transmit Clock B																																															
14	B (B)	Not connected																																															
15		Not connected																																															
L-BAND	<p>This is a 75 ohm, F-type connector that permits connection to the LNB and antenna. An RG-6 or similar cable of less than 200 feet is recommended. High quality cabling may be used to provide additional shielding, lower loss or protection from harsh environments. Direct Current (DC) power is provided to the LNB at either 13 VDC or 18 VDC at 350 mA maximum.</p>																																																

Equipment Installation

The following points and precautions should be considered when planning the installation of your satellite receiver.

- The satellite receiver should be placed in a sheltered, but well ventilated location away from sources of water or high humidity, extreme heat or cold, excessive dust, vibration or Electromagnetic Interference (EMI).
- Should any foreign material fall into the satellite receiver (either liquid or solid), unplug the receiver immediately and have a qualified technician examine the unit prior to further operation.
- The satellite receiver should be placed on a stable surface or rack mounted, as applicable.

To install your receiver, you should ensure that you have equipment similar to the following:

- A computer platform (or laptop computer), with a program such as HyperTerminal to talk to the terminal interface. If you wish to use the Web GUI, the minimum platform would consist of a Pentium 75 MHz computer with an installed Local Area Network (LAN) card and Microsoft™ Internet Explorer Version 5.0 or later. Chapter 3 provides further information on the Terminal Interface and Web GUI.
- A spectrum analyzer. Although not essential, this piece of test equipment is highly recommended for installing any satellite equipment.

Power up procedure

It is good practice to do a quick test to ensure the satellite receiver is operational after shipment. To do this, simply plug the supplied AC power cord into the rear panel of the unit and into the proper voltage AC outlet. If you now turn the receiver around so that you are facing the front panel, you should notice the STATUS LED is illuminated and after some period of time, the R/W light starts flashing (indicating that the unit is booting). At this point, ignore the colour of any indicators, as this is just an indication that the receiver has power and is commencing operation.

If no indicators have illuminated, power cycle the unit once to make sure, and if there is still a problem, please proceed to Chapter 5 (Troubleshooting).



Chapter 3

Getting Started

Status and Control of the Satellite Receiver

As previously mentioned, varying levels of status and control of the satellite receiver can be accomplished by one of the following:

1. Locally, using the Terminal Interface;
2. Locally or remotely, using the Web based Graphical User Interface (GUI);
3. Remotely, using Simple Network Management Protocol (SNMP);
4. Remotely, using International Datacasting's NetManager, via the Network Control Channel (NCC).

Each of these methods is described in detail in this chapter.

Controlling the Receiver with the Terminal Interface

The Terminal Interface allows an installer who does not have a computer with an Ethernet port, or the capability of running a web browser, access to enough receiver functions to install the unit and acquire lock to a DVB Carrier. Simply connect an RS-232 null modem (cross-over) cable between the COM port on a PC and the TERMINAL port (see rear panel figures in Chapter 2) of the receiver and run a terminal interface program, such as Hyperterm under Windows®. The communications parameters are 9600 baud, 8 data bits, no parity and one stop bit.

The Terminal Interface is designed to be a simple interface that is compatible with most terminal equipment. A basic TTY-type terminal is supported. Generally, most commands do not support other terminal types and the interface will not generate or accept ANSI control codes unless specifically documented for each command below. Since most terminal devices connected to the receiver will probably be DOS/Windows based, the interface sends both carriage return and line feed characters at the end of each line.

NOTE:

Terminal Interface commands are case sensitive. Commands can be entered exactly as shown, or all in lower case. However, all command parameters must be entered exactly as shown.

To initiate a terminal session, enter the username **monitor** or **admin** and the appropriate password.

After processing an input line (or after return is pressed on a blank line), the interface will display the '#' prompt on the terminal.

The terminal interface will remain active until an exit command is issued to logout.

The supported terminal commands are described below, along with their parameter lists. Typing in a command with the wrong parameter list will cause a short usage help message to be displayed.

Help

Usage: **Help**

This command displays a list of available commands. This list will also be displayed if an unrecognized command is entered. This list may include some useful Linux shell commands as well.

exit

Usage: **exit**

Log off the system so that a username and password will be required before any further actions can be performed. This command takes no parameters.

NOTE:

Parameters shown in square brackets are optional and do not have to be entered. If they are not entered, they will remain unchanged, unless defined otherwise. However, if all parameters are shown as optional, at least one has to be entered.

SetCarrier

Usage: **SetCarrier [-A/-B] [-f <frequency>] [-s <symbol rate>] [-m {q/b}] [-v <Viterbi rate>] [-n <NCC Pid>] [-t {e/d}] [-p {h/v}] [-d <description>]**

Note that this command is available only to the **admin** user.

This command enters the DVB Carrier definitions (A or B, or both) and facilitates setting of the receiver's tuner/demodulator to the specified DVB Carrier (A). The absence of -A or -B will apply the definition to both carriers. The individual parameters are defined below:

- A** Applies the command to DVB Carrier A
- B** Applies the command to DVB Carrier B
- f** Is the frequency of the carrier in Hz, in the numeric range **950000000** - **2150000000** Hz.
- s** Is the symbol rate of the carrier in symbols per second, in the numeric range **1000000** - **45000000** S/s.
- m** Is the modulation scheme, using one of the options: **q** for QPSK; **b** for BPSK.

- v Is the Viterbi rate of the carrier, using one of the options: **Auto**, **1/2**, **2/3**, **3/4**, **5/6**, **7/8**.
- n Is the PID number of the NCC PID (in hex), in the numeric range **0x20** to **0x1FFE**. Specifying **0** disables the NCC PID.
- t Enables or disables the 22 kHz tone to the LNB, using one of the options: **e** for enable, **d** for disable.
- p Is the polarization of the LNB, and sets the output DC voltage from the receiver to the LNB, using one of the options: **h** for horizontal (18VDC standard or 15 VDC optional) and **v** for vertical (13VDC standard or 11 VDC optional). Note that the SetLNB command enables or disables the output voltage.
- d Is a short description (up to 31 characters) of the DVB Carrier.

GetCarrier

Usage: **GetCarrier**

This command displays the DVB Carrier definitions that currently exist in the receiver. This command takes no parameters. The output is formatted as follows (with appropriate values substituted):

Carrier A

Description: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
 Frequency: xxxxxxxx Hz
 Symbol Rate: xxxxxxx S/s
 Modulation Type: QPSK/BPSK
 FEC Rate: x/y or Auto
 NCC PID: 0 or xxxx (hex)
 22 kHz tone: ON/OFF
 Polarization: Horizontal/Vertical

Carrier B

Description: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
 Frequency: xxxxxxxx Hz
 Symbol Rate: xxxxxxx S/s
 Modulation Type: QPSK or BPSK
 FEC Rate: x/y or Auto
 NCC PID: 0 or xxxx (hex)
 22 kHz tone: ON/OFF
 Polarization: Horizontal/Vertical

The receiver is LOCKED TO CARRIER A or LOCKED
 TO CARRIER B or NOT LOCKED

SetLNB

Usage: **SetLNB** [-r <minimum AFC range>] [-p {e/d}] [-o {f/p}] [-f {ON/OFF}]

Note that this command is available only to the **admin** user.

This command sets the LNB characteristics applicable to both carriers (A & B) of the receiver. The individual parameters are defined below:

- r** Is the minimum AFC range in Hz, in the numeric range **0** to **2000000** Hz. If this parameter is not provided, an AFC range of 10% of the carrier symbol rate is default.
- p** Enables or disables the LNB power supply, which supplies DC voltage to the LNB from the L-Band connector on the rear panel. The options are: **e** for enable (on), **d** for disable (off). When enabled, the voltage output will be determined by the polarization setting in the SetCarrier command.
- o** Is the AGC optimization type, using one of the options: **p** for performance mode, **f** for fast acquisition mode.

Selecting performance mode optimization forces the receiver to step through individual gain stages in the Digital Filter to determine the best Bit Error Rate (BER) performance. This feature should only be used if there are large adjacent carriers to the DVB Carrier of interest.

Selecting fast acquisition mode forces the receiver to select a default Digital Filter that performs well under most conditions.

- f** Enables or disables LNB frequency reversal, using one of the options: **ON** or **OFF**. If the parameter is not provided, OFF is default.

Frequency reversal permits the use of other LNB variants that may use low side Local Oscillators (LOs) instead of high side LOs (the use of LNBs such as older C-Band type with low side LOs can cause spectral inversion, and this feature can make the LNB appear “normal” when setting the L-Band frequency of the DVB Carrier using the SetCarrier command).

GetLNB

Usage: **GetLNB**

This command displays the current LNB settings (i.e. those that can be set through the SetLNB command). This command takes no parameters. The output is formatted as follows (with appropriate values substituted):

Minimum AFC Range: xxxxxxx Hz

LNB power: Enabled/Disabled
 AGC Optimization: Performance/Fast Acquisition
 Frequency reversal: ON/OFF

GetLNBOffset

Usage: **GetLNBOffset**

This command displays the current LNB frequency offset in the receiver, calculated as a result of LNB drift tracking. The receiver applies this offset to the frequency of the DVB Carrier, to obtain the actual tuning frequency for the receiver, thus compensating for LNB's whose output frequency drift due to temperature or aging. The receiver tracks this drift every time it acquires lock to a DVB Carrier. This command takes no parameters. The output is formatted as follows (with appropriate values substituted):

LNB Offset: 0 or \pm xxxxxxx Hz

ResetLNBOffset

Usage: **ResetLNBOffset**

Note that this command is available only to the **admin** user.

This command resets the current LNB frequency offset in the receiver back to zero. This command takes no parameters.

GetRFMetrics

Usage: **GetRFMetrics [-r n]**

This command displays the current RF metrics information. The optional **-r n** parameter indicates repeat mode. In this mode, the metrics information will be output continuously (every **n** seconds) until a key is pressed on the controlling terminal. If this parameter is omitted, the RF metrics information will be displayed only once. The following information is displayed (all zeros or numeric values substituted):

If the receiver is NOT locked to a DVB Carrier:

Signal Level: 0 %
 Signal Quality: 0 %
 RS Uncorrected Packets: 0
 Carrier to Noise: 0.0 dB
 Eb/No: 0.0 dB
 Viterbi BER: 0.0

If the receiver IS locked to a DVB Carrier:

Signal Level: xxx %
 Signal Quality: xxx %

RS Uncorrected Packets: xxxxx
 Carrier to Noise: x.y dB
 Eb/No: x.y dB
 Viterbi BER: x.y E-zz

ClearRS

Usage: **ClearRS**

Note that this command is available only to the **admin** user.

This command clears to zero, the Reed-Solomon Uncorrected Packets counter that is displayed in GetRFMetrics. This command is useful when the RS Uncorrected counter is incrementing rapidly, particularly when the DVB Carrier is received in high noise situations. Once the counter reaches 32767, it remains there and has to be reset to begin counting again. There are no parameters with this command.

SetIP

Usage: **SetIP -i <Interface Name> [-a <IP address>] [-n <netmask>] [-d {e/d}]**

Note that this command is available only to the **admin** user.

This command sets the IP characteristics of a network interface on the receiver. Even though IP Address, netmask, and DHCP are options, one must be entered. If any parameter is not specified, its value will not change. The individual parameters are defined below:

- i** Selects which network interface will be set with this command, using one of the options: **net1** (first Ethernet port eth0), **net2** (second Ethernet port eth1), or **sat** (satellite receiver interface sat0).
- a** Indicates the IP address of the receiver in dotted decimal notation (e.g. 192.168.0.1)
- n** Indicates the Net Mask of the receiver in dotted decimal notation (e.g. 255.255.255.0)
- d** Indicates whether DHCP is enabled or disabled, using one the options: **e** for enabled, **d** for disabled.

GetIP

Usage: **GetIP**

This command displays the IP characteristics of all known interfaces in the receiver. This command takes no parameters. The output is formatted as follows (with appropriate values substituted):

NOTE:

The SetIP command will be one of the first commands you will need to use to setup the proper IP address so that you can access the Web GUI of the receiver.

Found 3 interfaces.

Interface: Net1 (eth0)
 DHCP: Disabled/Enabled
 IP Address: aaa.bbb.ccc.ddd
 Netmask: aaa.bbb.ccc.ddd

Interface: Net2 (eth1)
 DHCP: Disabled/Enabled
 IP Address: aaa.bbb.ccc.ddd
 Netmask: aaa.bbb.ccc.ddd

Interface: Satellite (sat0)
 DHCP: Disabled/Enabled
 IP Address: aaa.bbb.ccc.ddd
 Netmask: aaa.bbb.ccc.ddd

AddRoute

Usage: **AddRoute** [-i <Interface Name>] -a <destination IP address> -g <gateway IP address> -n <netmask>

Note that this command is available only to the **admin** user.

This command enters a static route into the receiver routing table. A route can be applied independently of network interface, or with respect to a network interface. The individual parameters are defined below:

- i Optional parameter - selects which network interface will be applicable to this route, using one of the options: **net1** (first Ethernet port eth0), **net2** (second Ethernet port eth1), or **sat** (satellite receiver interface sat0).
- a Indicates the Destination IP Address for the route (e.g. 192.168.0.1)
- g Indicates the Gateway IP Address for the route (e.g. 192.168.0.254). This gateway address must be on the same subnet as the Destination IP Address.
- n Indicates the Net Mask for the route, in dotted decimal notation (e.g. 255.255.255.0)

DeleteRoute

Usage: **DeleteRoute** [-i <Interface Name>] -a <destination IP address> -g <gateway IP address> -n <netmask>

Note that this command is available only to the **admin** user.

This command deletes a static route from the receiver routing table, which was added by the AddRoute command. The same parameters as used for the AddRoute command apply to this command.

GetRoutingTable

Usage: **GetRoutingTable**

This command displays the content of the current static routing table for all known interfaces. This command takes no parameters. The output is formatted as follows (with appropriate values substituted):

Found n routes.

Interface	Destination Address	Gateway	Netmask
*(see below)	aaa.bbb.ccc.ddd	aaa.bbb.ccc.ddd	aaa.bbb.ccc.ddd

(...and so on for n routes)

*can be one of: auto, Net1(eth0), Net2(eth1), or sat (sat0)

SetSNMPConfig

Usage: **SetSNMPConfig** [-r <read-only community name>] [-w <read-write community name>]

Note that this command is available only to the **admin** user.

This command sets the SNMP community names to a new value, which can be string up to 31 characters. The individual parameters are defined below:

-r Sets the SNMP community name for read-only (get) access.

-w Sets the SNMP community name for read/write (get/set) access.

ResetSNMPConfig

Usage: **ResetSNMPConfig**

Note that this command is available only to the **admin** user.

This command resets the SNMP community names back to their default values of “private” for sets and “public” for gets. This command is useful if the community names have been forgotten. There are no parameters with this command.

ResetFirewall

Usage: **ResetFirewall**

Note that this command is available only to the **admin** user.

This command resets the Firewall table in the receiver. This command is useful if the firewall table configuration has been entered incorrectly and there is a problem with receiving or transmitting data from the receiver. There are no parameters with this command. Once this command is executed, the Firewall table is cleared and you will need to re-enter all the correct rules from the Web GUI again.

GetInfo

Usage: **GetInfo**

This command displays the current identity and front panel status information for the receiver. This command takes no parameters and the display is only provided once. The output is formatted as follows (with appropriate values substituted):

```
Receiver Name: xxxxxxxxxxxxxxxxxxxx
Receiver Description: xxxxxxxxxxxxxxxxxxxx
Satellite (sat0) MAC Address: 00:10:de:xx:xx:xx
Net1 (eth0) MAC Address: 00:xx:xx:xx:xx:xx
Net2 (eth1) MAC Address: 00:xx:xx:xx:xx:xx
Device Type: SRA2100xx or SFX2100xx
```

LED States:

```
Lock LED: OFF/RED/GREEN
Status LED: OFF/RED/GREEN/ORANGE
Control LED: OFF/GREEN
Sync LED: OFF/GREEN
Async LED: OFF/GREEN
Net LED: OFF/GREEN
Option LED: OFF/GREEN
```

```
ASI:          DISABLED/ENABLED
Cyphercast:   DISABLED/ENABLED
CAS:          DISABLED/ENABLED
Modem/PPP:    DISABLED/ENABLED
<and so on for any other options>
```

```
Firmware Version: xxx.xx
```

GetDebug

Usage: **GetDebug [-a]**

This command displays the current packet debug counters for a defined PID in the receiver. If there are no PIDs defined, no information will be displayed. The output is formatted as follows (with appropriate values substituted):

PID Number	Total DVB Packets	Completed Data Sets	Missed Data Sets	Short Data Sets
xxxx	N/A or xxxx	N/A or xxxx	N/A or xxxx	N/A or xxxx

The individual counters are explained in Chapter 4 under Metrics. Completed Data Sets are equivalent to Total IP Packets. Information for Sync, Async and Other PID types (see Chapter 4 PIDs and Ports) displays the data set counters as N/A.

The output is displayed in a table, 22 lines at a time. You must press Enter to get to the next screen. The **-a** is an optional parameter which, when specified, gives you the full debug list all at once.

For example, if you had 50 PIDs defined and you issue a '**GetDebug**' then you would see the first 22 PIDs, press Enter and you would see the next 22 and so on. If you issue a '**GetDebug -a**' then you would see all 50 PIDs. The latter case can be used on terminal programs that allow scrolling.

ClearDebug

Usage: **ClearDebug**

Note that this command is available only to the **admin** user.

This command resets all debug counters returned by the GetDebug command back to zero. This command takes no parameters.

GetHealth

Usage: **GetHealth**

This command displays the current internal health of the receiver. It is an easy way to identify current temperature and whether or not the fans are functioning properly. Fans running at low RPM (e.g. less than 3000) could signal a problem. The output is formatted as follows (with appropriate values substituted):

```
CPU Temperature:  xx.x Degrees Celsius
CPU Fan Speed:    xxxx RPM
Chassis Fan Speed: xxxx RPM
```

ConfigEth

Usage: **configeth** **[[**-c** {10h/10f/100h/100f/auto}] **-i** <interface>] **[-h] [-m]****

Note that this command is available only to the **admin** user.

This command sets the hardware parameters of the host's Ethernet interfaces. The individual parameters are defined below:

-c Sets the speed and duplex of the Ethernet port. Allowable values are:

- 10h – 10 Mbps, half duplex
- 10f – 10 Mbps, full duplex
- 100h – 100 Mbps, half duplex
- 100f – 100 Mbps, full duplex
- auto – autonegotiate speed and duplex

Normally, interfaces should be set to autonegotiate. If **-c** is not specified, this command displays the current settings of the selected Ethernet interface.

-i Specifies the Ethernet interface to apply this command. The <interface> name must be either "eth0" or "eth1".

-h Displays a usage message.

-m Causes **configeth** to display its output in a machine friendly (rather than a human-friendly format). This option is not generally used by interactive users.

RestoreFactorySettings

Usage: **RestoreFactorySettings**

RestoreFactorySettings is only available to the **admin** user and only on the SRA2100 family of receivers.

This command resets all configuration items that can be manipulated by the "Set" commands described in this section back to their defaults. This command should be used with extreme caution as it will cause satellite carrier settings and IP addresses to be lost. The host must be rebooted immediately after this command is issued. This command takes no parameters.

SetPassword

Usage: **SetPassword**

This command changes the password of the account that is currently logged in. When this command is run, the user is prompted to enter the new password twice. Passwords that are too simple will be rejected.

Ping

Usage: **ping <host>**

This command sends a series of ICMP Ping packets to the specified host and is useful for verifying network connectivity. On the SRA family of receivers, <host> must be the IP address of the intended target, in dotted decimal notation(192.168.0.2, for example). On the SFX receivers, host may be the actual name of a host machine.

This command will ping the specified host repeatedly at 1 second intervals. Press Control-C to terminate the ping command.

Controlling the Receiver with the Web GUI

All accessible functions within the SRA/SFX series satellite receiver can be controlled using the Web Graphical User Interface (GUI). The receiver acts as a web server in this case, serving out GUI pages to a PC with a browser. Communications between the browser PC and the receiver is via a LAN connection to one of the Ethernet ports on the rear panel, using the http protocol.

The Web GUI is compatible with the following web browsers:

1. Internet Explorer V5.0 or later, running under Windows® '95, '98, 2000 or Windows NT or XP.
2. Mozilla V0.98 or later, running under Linux.

The Web GUI is best used with browsers that are displayed at a resolution of 1024 x 768 or greater, although 800 x 600 resolution is sufficient. However, at 800 x 600 resolution, you may need to use the scroll bars more often.

Typically, an Ethernet crossover cable is used in the field when the receiver is being aligned to the satellite signal and a point-to-point connection is required between the receiver and the browser PC. To communicate between the satellite receiver and the browser PC, it is necessary that the IP address of the customer's computer be set to the same subnet as the receiver. The factory default IP address of the Net1 (eth0) interface is 192.168.0.1 and the Net2 (eth1) interface is 192.168.1.1. Typically, you will have to use the SetIP command in the Terminal Interface to set the IP address to another value. If you do not know the IP address of the receiver, you can discover it by using the GetIP command in the Terminal Interface.

When the browser PC and the receiver are connected together via a hub or switch in a LAN configuration (typically using Ethernet "straight through" cables), the same rule as above, applies.

If the browser PC and the receiver are on different LAN's connected by the Internet, communications between the two can only be made if the receiver IP address is known. Typically, the satellite receiver would be set up on its LAN with a gateway to the Internet.

Once the receiver is set up with an IP address that is known, you can access the receiver by typing the IP address in the Address line of the browser. The Web GUI uses port 80, so only the IP address is required in the Address line. In the SFX, this port is generally forwarded through port 2100. If access is successful, you will be required to login to the receiver, as shown in the example Internet Explorer login page in Figure 3-1.

NOTE:

Continuous operation of the Web GUI from a local or remote node will cause additional utilization on the host SRA or SFX CPU. This may not be desirable if other SRA or SFX applications that require intensive CPU utilization need to run. CPU loading should always be a consideration when running the Web GUI.

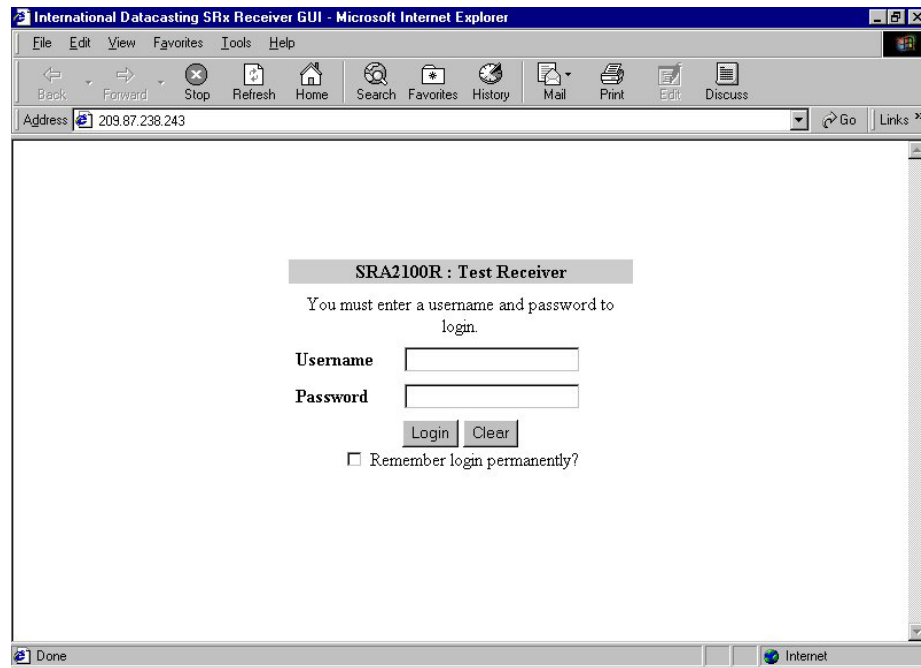


Figure 3-1 Web GUI Login Page

Provided you know the password, login is available at the following levels:

1. SRA and SFX: Monitor status only – login as username **monitor**
2. SRA only: Monitor status and allow limited control of receiver functions – login as username **user**
3. SRA and SFX: Monitor status and allow full control of all receiver functions – login as username **admin**

Should you enter an incorrect username and/or password, the login page will report an error, as shown in the example in Figure 3-2.

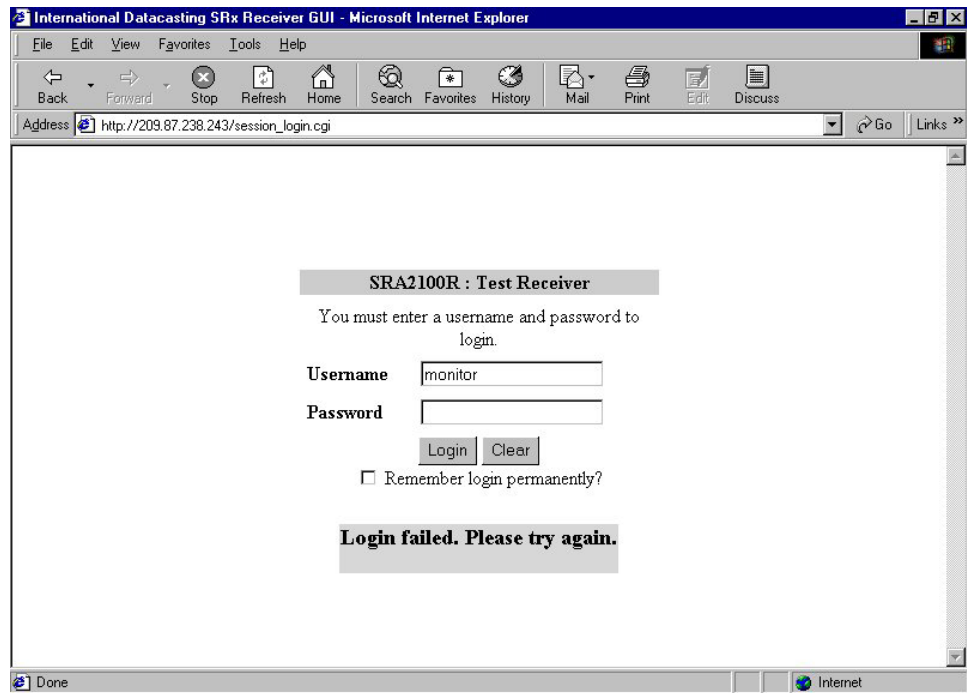


Figure 3-2 Login Page – Error Condition

Once you have successfully logged in, the Main Menu page will appear and you are connected to an operational Web GUI. An example of the Main Menu page is shown in Figure 3-3 for the SRA and Figure 3-4 for the SFX. Please proceed to Chapter 4 for details on navigating through this page and other elements of the Web GUI.

Depending on the configuration of the default page for the SFX2100, you will either enter the Main Menu page of the Cockpit, as shown in Figure 3-4, or to a web page, which will allow you to access the Main Menu page of the Cockpit via a link. The default local or remote page can be set under the Utilities menu item (see Chapter 4 for more detail). If a web page is specified as a default, then port 80 must be used for access.

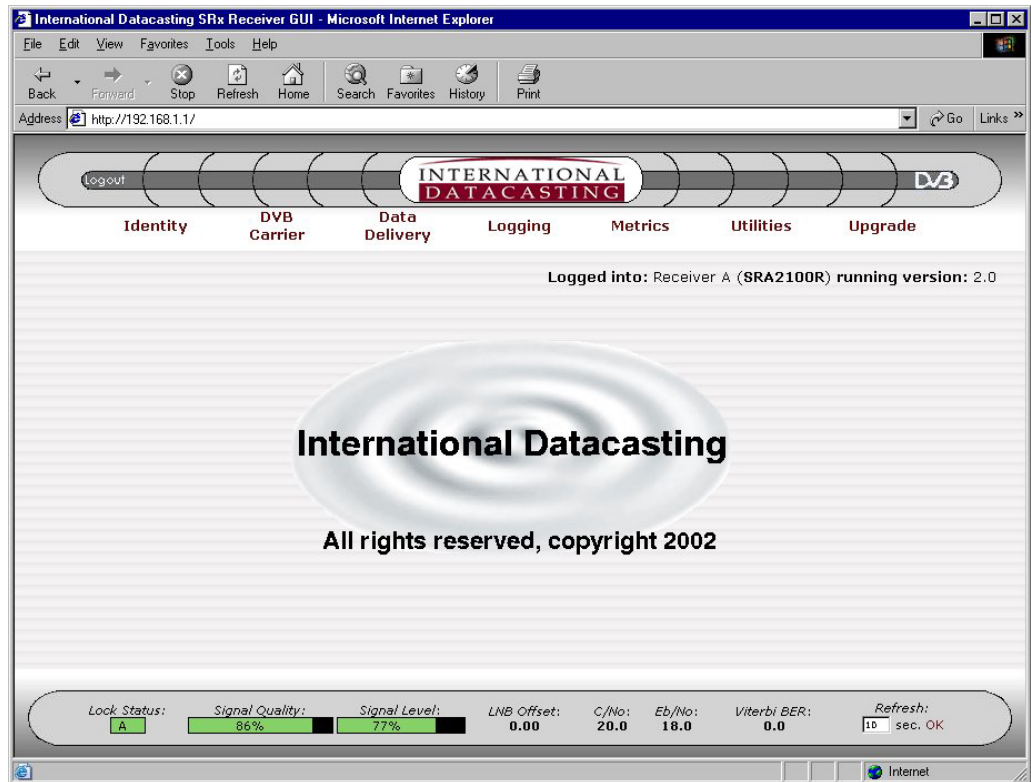


Figure 3-3 Web GUI Main Menu Page (SRA)

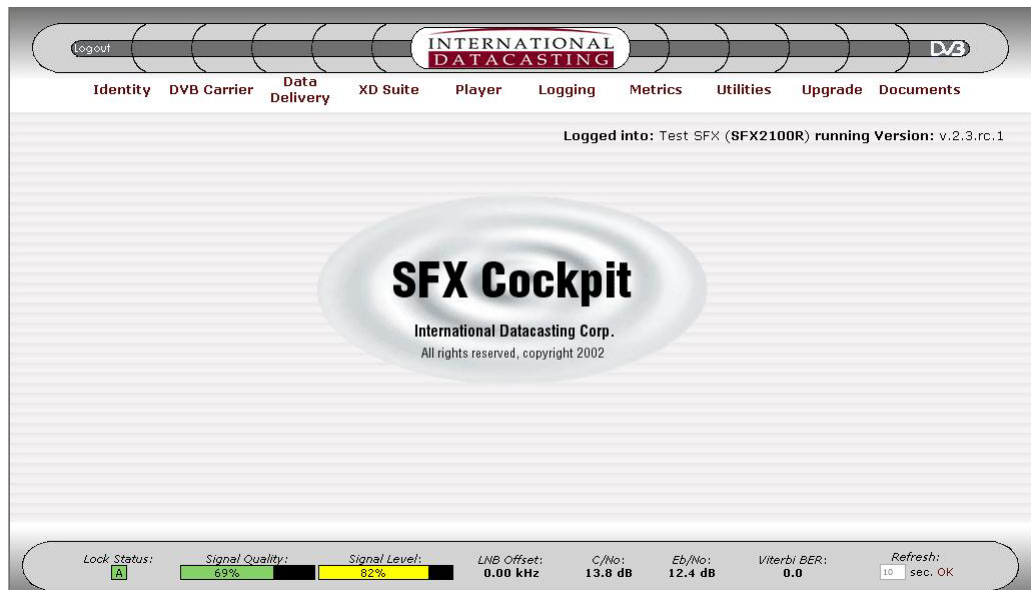


Figure 3-4 Web GUI Cockpit Main Menu Page (SFX)

Controlling the Receiver with SNMP

The Simple Network Management Protocol (SNMP) is a set of protocols for managing complex networks. SNMP works by sending messages, called Protocol Data Units (PDU's), to different parts of a network, providing a standard mechanism for network control and monitoring. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIB's) and return this data to the SNMP requestor.

The advantage of using SNMP is that its design is simple, hence it is easy to implement on a large network. It does not take a long time to set up, puts very little stress on a network and is easy for users to program. Its' simple design also allows it to be easily updated so that it can expand for future network requirements.

SNMP has been implemented in the SRA/SFX series satellite receivers to provide users with flexibility in network management.

SNMP can be used to monitor the status, and control the configuration, of a receiver through SNMP get and set requests. SNMP values are organized in a tree structure called a Management Information Base (MIB). International Datacasting uses a Private Enterprise Number of 3602 - this is the root node for SuperFlex receivers under the Enterprise node of the MIB tree, and the number is 1.3.6.1.4.1.3602. In addition to these values the receiver also supports the IP branch of MIB-II (1.3.6.1.2.1.3) except for the IP Address Translation table.

A separate International Datacasting application note is provided with details on the content of the MIB. Please proceed to Chapter 5 for more information on obtaining application notes.

Controlling the Receiver with NetManager

Many accessible functions within the SRA/SFX series satellite receiver can also be controlled over the satellite link, using International Datacasting's NetManager system. This is a secure remote control system that allows the network provider to remotely control functions of the receiver using the Network Control Channel (NCC) that can be controlled over the satellite link. There is potentially one NCC PID stream per DVB Carrier, and you can configure DVB Carriers using the Terminal Interface or Web GUI, so that NetManager control can be brought online. Not all functions can be remotely controlled via NetManager over the satellite, as they could be site-specific configurations. Therefore, these types of functions must be controlled locally over the LAN interfaces, using one of the other means previously described. Please contact International Datacasting Sales or Customer Support for more information on NetManager.



Chapter 4

Web GUI Operation

This chapter will provide detailed information on the meaning and operation of the various pages and menu options available on the Web GUI, for the SRA and Base SFX family of receivers.

Main Menu Page

As stated in the previous chapter, once you have successfully logged in to the Web GUI, you will be presented with the Main Menu page, as shown in the example in Figure 4-1. There are various areas of interest on this page, which will be described in this section.

Logout Icon

The “logout” icon is always present, at all menu levels. By clicking on the icon, you can quickly logout of the receiver Web GUI. To login again, follow the procedure outlined in Chapter 3.

IDC Logo

The IDC logo is always present, at all menu levels. By clicking on the logo icon, you can reach the International Datacasting website at www.intldata.ca, if your receiver is connected to a gateway to the Internet. (This link is also available if you click in the area where the copyright notice appears in the center of the page— see Figure 4-1).

Receiver Identity

The Receiver Identity is displayed only on the Main Menu page, after you have successfully logged into the receiver Web GUI. It provides the name given to the receiver, the type of receiver (e.g. SRA2100 or SFX2100) and the version of the main firmware application running in the unit. The name given to the receiver can be set using the Identity main menu tool bar item.

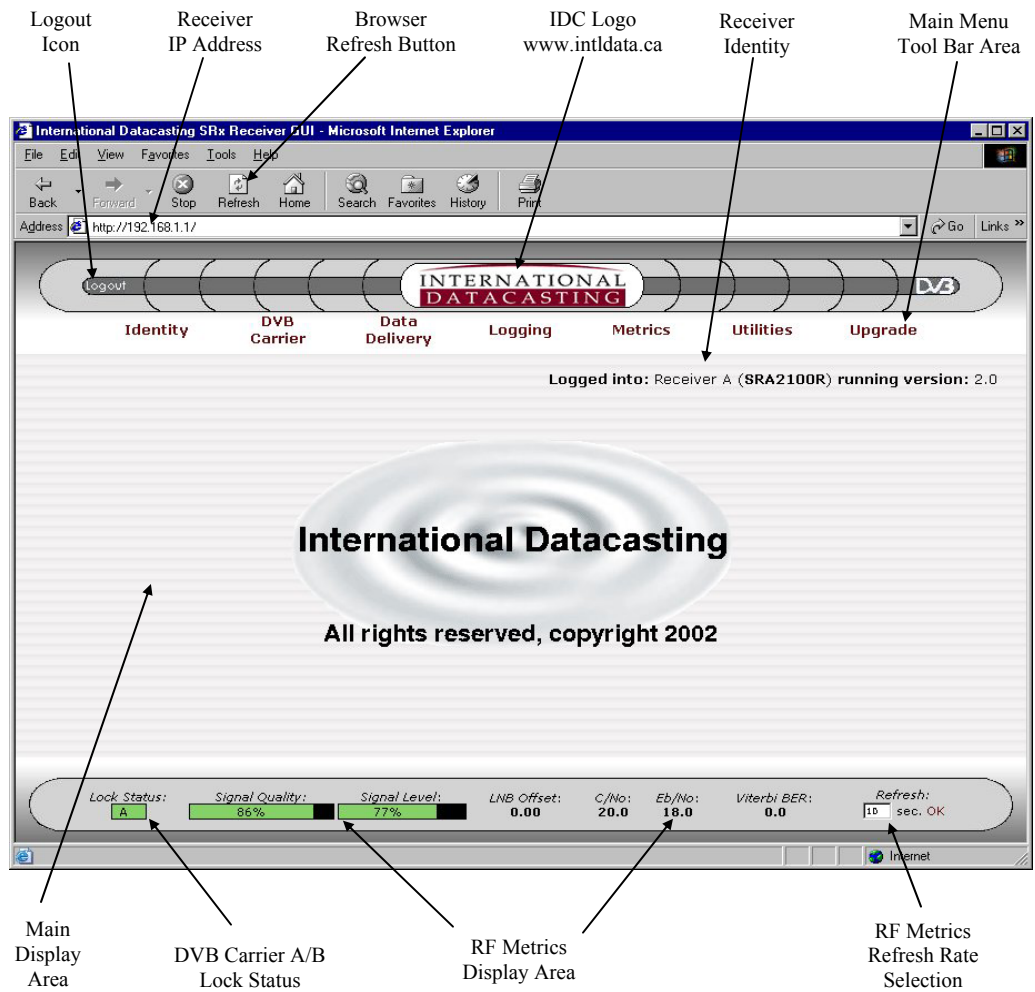


Figure 4-1 Main Menu Page with Identified Areas

Main Menu Tool Bar Area

The Main Menu Tool Bar presents all the main menu options available with this receiver. This area remains displayed at all times and you can click on any of the tool bar options at any time to return to a known location in the menu structure. The following main options are available:

Tool Bar Option	Description
Identity	Items associated with displaying and/or editing the identity of the receiver, including name, MAC Addresses, IP addresses, DHCP enable, etc.
DVB Carrier	Items associated with the RF tuner/demodulator setup of the satellite receiver, including DVB Carrier A/B setup and LNB

Tool Bar Option	Description
	attributes.
Data Delivery	Items associated with all data delivery to/from the receiver, including PID definitions, multicast and unicast routing, NAT, IGMP, Firewalling, etc.
XD Suite (SFX only)	Items associated with the configuration of the XD client application in the SFX2100.
Player (SFX only)	Items associated with the configuration of the video/audio streaming and file player applications in the SFX2100.
Logging	Items associated with local and remote status logging of receiver events, including RF status and faults.
Metrics	Items associated with RF and data metrics displays.
Utilities	Items associated with peripheral utilities required to properly operate the receiver in your network, including Date/Time, Passwords, Ping, etc.
Upgrade	Items associated with the upgrade of application firmware and other software applications required to properly operate the receiver.
Documents (SFX only)	Area where the online User documentation can be stored on an SFX2100.

Each of these options with their associated submenu items will be described in detail later in this chapter.

Main Display Area

NOTE:

Displays updates in the Main Display Area are not affected by the RF Metrics Refresh Rate. If you wish to update content in this area at any time, you must use the Browser Refresh Button.

The Main Display Area provides all the dynamic display information for a given menu option. All submenu items and associated status displays, tables, and edit pages are displayed in this area. Best viewing is achieved with a browser running on a PC set for 1024 x 768 resolution or higher. The lowest resolution is 800 x 600, and all Web GUI pages have been designed to display all possible submenu options with this resolution, however, you may find that you will need to use scroll bars more often than when the resolution is set higher.

DVB Carrier A/B Lock Status

The DVB Carrier A/B Lock Status provides an updated lock status of the DVB carrier being currently received. This area remains displayed at all times and indicates that the receiver is locked to carrier A or B using a green square with the A or B letter inside. If the receiver is not locked to a carrier, the lock status will be indicated with a red square. This display area is updated at the periodic refresh rate set by the RF Metrics Refresh Rate (in seconds).

RF Metrics Display Area

The RF Metrics Display Area presents an updated RF status of the DVB carrier being currently received. This area remains displayed at all times and metrics information presented here is only valid if the DVB Carrier A/B Lock Status indicates that the receiver is locked to carrier A or B (green square). This display area is updated at the periodic refresh rate set by the RF Metrics Refresh Rate (in seconds). The following metrics are displayed:

Metric	Description
Signal Quality	<p>This display gives an indication of the Quality of the incoming data stream. This feature is useful to evaluate the quality of the incoming RF signal. A value from 0% to 100% is shown within the display. The higher the percentage, the better the Carrier To Noise (C/No) or quality of the digital carrier. This display is based on an estimation of incoming noise by the receiver front end and is accurate to $\pm 10\%$.</p> <p>The display bar changes colour, according to the following:</p> <p>Black – receiver is not locked to a carrier. Red – signal quality is too low (1% to 24%). Green – signal quality is in acceptable operating range (25% to 100%).</p>
Signal Level	<p>This display provides a percentage of the signal strength of the DVB carrier that is being received at the L-Band input to the receiver.</p> <p>The display bar changes colour, according to the following:</p> <p>Black – receiver is not locked to a carrier. Red – signal level is too low (1% to 19%) or too high (90% to 100%). Yellow – signal level is marginally too low (20% to 29%) or marginally too high (80% to 89%). Green – signal level is in the acceptable AGC operating range (30% to 80%).</p>
LNB Offset	<p>This indicates what the current LNB offset is, based on the automatic LNB drift tracking mechanism of the receiver. This value is added or subtracted from the set frequency in the DVB Carrier definition to tune to the carrier.</p>
C/No	<p>This value represents the estimated carrier to noise ratio (in dB) at the L-Band input to the receiver. The format of this value is x.y dB.</p>
Eb/No	<p>This value represents the calculated Eb/No (in dB) at the input to the receiver. This value is derived from the C/No value, with compensation for modulation scheme, reed-solomon FEC, viterbi FEC rate, and symbol rate of the carrier.</p>
Viterbi BER	<p>This is the number of bit errors encountered during a fixed frame length of incoming data. This data is obtained from the receiver</p>

Metric	Description
	demodulator chip, and is converted to a BER value in the form x.y E -z.

The accuracy of the values reported for C/No and Eb/No are typically ± 1 dB up to a C/No of 15 dB (BER of 1×10^{-12}). With C/No values higher than 15 dB, the accuracy degrades. (A DVB signal can be considered error free at greater than 7 dB Eb/No at 7/8 Viterbi, 4 dB Eb/No at 1/2 Viterbi).

All RF metrics are accurate to the above-mentioned limits, when AFC is set to Fast Acquisition mode. Performance Mode is recommended for use when large adjacent carriers are present. The presence of these adjacent carriers affects the C/No estimation circuitry, with the result that the accuracy of the RF metrics may change. Since the presence, type and strength of adjacent carriers are site specific, it is not possible to provide accurate C/No and Eb/No estimation in a general way. It is also difficult to determine what accuracy there would be with adjacent carriers present, or whether the accuracy would be any less than that stated above.

RF Metrics Refresh Rate Selection

This area allows you to specify what the refresh rate will be in seconds, for updates to the metrics displayed in the RF Metrics Display Area. Enter a value between 1 and 99, and click on the OK word to the right. This will cause the Web GUI to immediately provide the RF Metrics information to the browser at the specified period in seconds.

Main Menu Tool Bar

The Main Menu Tool Bar provides the top-level menu access for all functions that can be monitored and controlled in the receiver. The remainder of this chapter will describe these functions, as organized by menu items, shown in the following menu hierarchy:

Main Menu	Identity		Show Edit ----- Back to Main Cancel Changes Send Update -----
	DVB Carrier	DVB Carriers	Carrier Status Edit Carrier A Edit Carrier B ----- Back to Main Cancel Changes Send Update -----
		LNB Attributes	Show Attributes Edit Reset LNB Offset ----- Back to Main Cancel Changes Send Update -----
	Data Delivery	PIDs and Ports	NET PIDs ASYNC PIDs SYNC PIDs Other PIDs -----

		Edit Selected Add New PID Definition Delete Selected Delete ALL Back to Main Cancel Changes Send Update
	IGMP	Show IGMP Net1 (eth0) Show IGMP Net2 (eth1) Edit IGMP Net1 (eth0) Edit IGMP Net2 (eth1) Restore Net1 (eth0) defaults Restore Net2 (eth1) defaults Back to Main Cancel Changes Send Update
	Static Routing	Show Table Edit Table Back to Main Cancel Changes Send Update
	Multicast Routing	Show Table Edit Default Route Edit Table Back to Main Cancel Changes Send Update
	Source NAT	Show SNAT Table Edit Default Rule Edit SNAT Table Back to Main Cancel Changes Send Update
	Destination NAT	Show DNAT Table Edit Default Rule Edit DNAT Table Back to Main Cancel Changes Send Update
	Filtering	Show Filtering Table Edit Default Rule Edit Filtering Table Back to Main Cancel Changes Send Update
	Firewall	Show Firewall Table Edit Default Rule Edit Firewall Table Back to Main Cancel Changes Send Update
	TTL Translation	Show TTL Table Edit TTL Table Back to Main Cancel Changes Send Update
	Logging	Show Log Edit Back to Main Cancel Changes Send Update

Metrics		Show RF & PID Metrics Show System Health Metrics Show Interface Metrics Show Filtering Metrics Edit Refresh Interval Edit RF Metrics Logging Interval Back to Main Cancel Changes Send Update
Utilities	Date and Time	Show Edit Back to Main Cancel Changes Send Update
	Password Manager	User: admin User: user User: monitor Back to Main Cancel Changes Change Password
	Ping Utility	Back to Main Cancel Changes PING
	Restart Receiver	Back to Main RESTART
	GUI Server Setup	Show Server Configuration Edit Server Configuration Back to Main Cancel Changes Send Update
Upgrade		Back to Main Cancel Changes Upgrade

The Action of the Mouse

A standard web browser interface is used for most of the pages and tables in the Web GUI. In general, moving the mouse over an active icon or menu item and clicking the left mouse button will select that item. In the case of data entry into tables, etc., simply place the mouse cursor in the field you wish to edit and left click to select the field for data entry.

Common Menu Items

Referring to the menu hierarchy in the previous section, you can see at the lowest level that there are three menu items that basically repeat themselves throughout. These three items perform the following:

Menu Item	Description
Back to Main	No matter where you are, selecting this button will always return you back to the Main Menu page, as shown in Figure 4-1.
Cancel Changes	When working in an edit page, selecting this button will cancel any edits that have been made on that edit page and return you back to the display page.

Menu Item	Description
Send Update (or an action)	This third button is always an action button associated with sending of updates/edits to the receiver. Selecting this button will always result in some immediate action taken by the receiver. Usually, the action will be an update to the receiver's configuration.

Drop-down Selection Boxes

Many edit pages utilize drop-down selection boxes, as shown in the example in Figure 4-2. Clicking on the arrow to the right of the current selection in the box causes the current selection, and all other available items to be shown. The dotted line is used to separate the current selection from all items available. If you move the mouse over the item you are interested in and click the left mouse button, the item will be selected as the new current selection. Clicking on the current selection or the dotted line always keeps the current selection. If the dotted line is selected, it will be shown in the box, but the current selection will still be valid (ie. no change in the current selection).

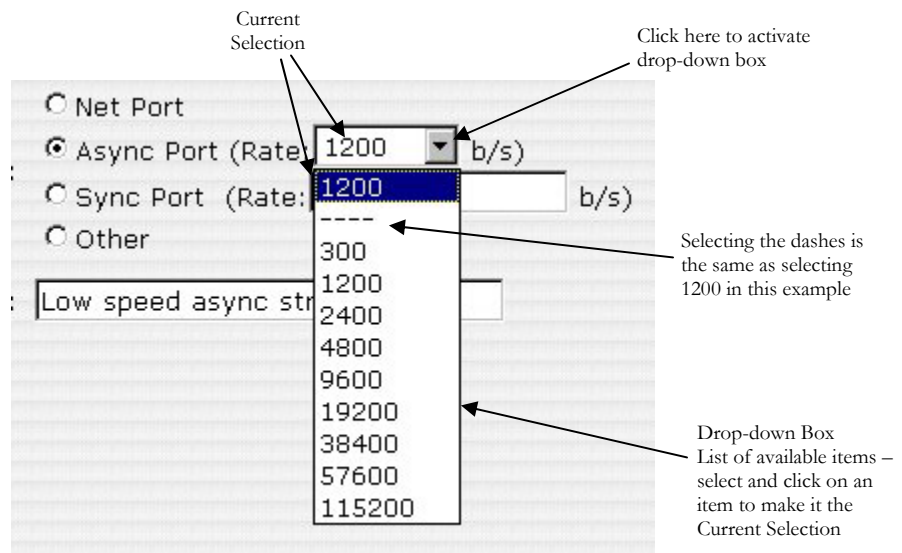


Figure 4-2 Drop-down Selection Box

Identity

When the Identity Main Menu Tool Bar item is selected, the Identity page is displayed, which provides information relating to the identification of the receiver on the network, as well as the current running version of the receiver application firmware and any deviations (patches) to the firmware and options installed. A sample page is shown in Figure 4-3.

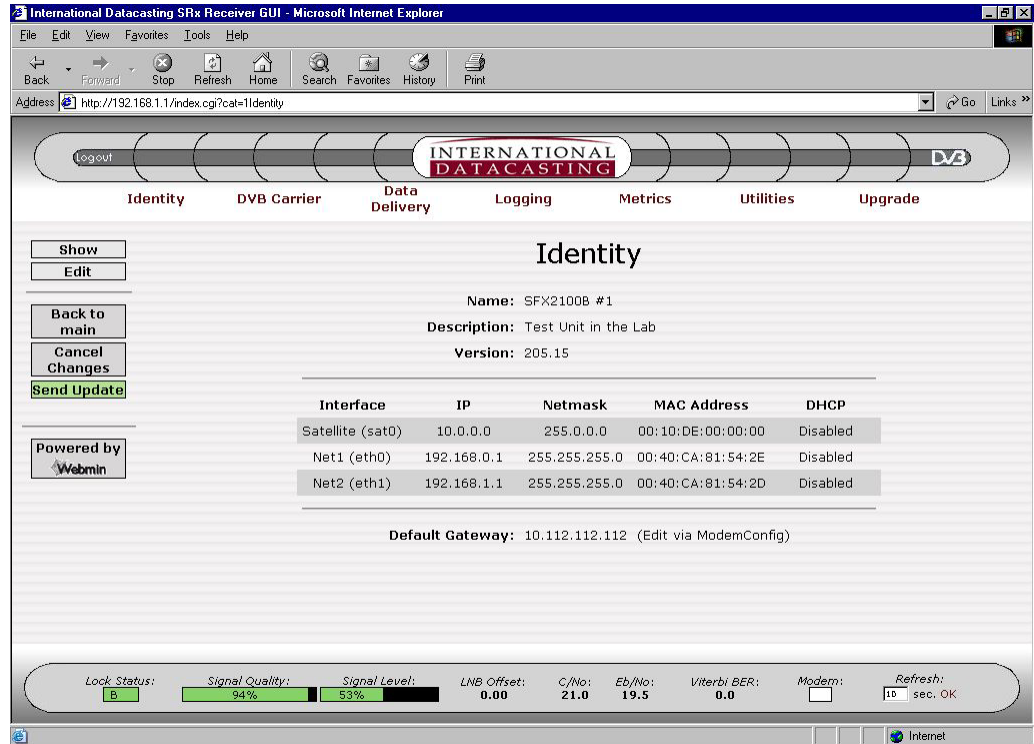


Figure 4-3 Identity Page

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show	Selecting this button will always return you back to the Identity page, as shown in Figure 4-3.
Edit	Selecting this button will enter the Identity Edit page, as shown in Figure 4-4.

When the Edit menu item is selected, the Identity Edit page will be displayed, as shown by the sample page in Figure 4-4. Each edit field is described after the figure.

logout INTERNATIONAL DATACASTING DVB

Identity DVB Carrier Data Delivery XD Suite Logging Metrics Utilities Upgrade Documents

Show Edit

Back to main Cancel Changes Send Update

Powered by Webmin

Edit Identity

Name: SFX2100R

Description:

Interface	IP	Netmask	MAC Address	DHCP
Satellite (sat0)	10.0.38.162	255.0.0.0	00:10:DE:00:26:A2	<input type="checkbox"/> Enable
Net1 (eth0)	192.168.0.1	255.255.255.0	00:40:CA:81:31:9A	<input type="checkbox"/> Enable
Net2 (eth1)	192.168.2.146	255.255.255.0	00:40:CA:81:31:99	<input type="checkbox"/> Enable

Default Gateway:

DNS: 192.168.2.254

Figure 4-4 Identity Edit Page

The following fields can be edited on the Identity Edit page:

NOTE:

The MAC Address of each network interface is factory set and cannot be changed.

Edit Field	Description
Name	A meaningful name for the receiver can be entered in this field. Up to 31 characters can be entered. This name will appear on the Main Menu page in the Receiver Identity area, as well as on the login page.
Description	A meaningful description of the receiver can be entered in this field. Up to 31 characters can be entered. This description information supplements the name given to the receiver, and only appears when the Identity page is displayed.
IP (Address)	<p>The IP address of the associated network interface, in dotted decimal notation (e.g. 192.168.0.1). Each IP address must be unique and should be on a different subnet.</p> <p>The network interface can be one of net1 (first Ethernet port eth0), net2 (second Ethernet port eth1), or sat (satellite receiver interface sat0).</p> <p>Unless default IP addresses have been specifically requested, the factory default IP addresses are: 192.168.0.1 for the Net1 (eth0) interface, 192.168.1.1 for the Net2 (eth1) interface, and aa.bb.cc.dd for the satellite (sat0) interface.</p>
Netmask	The Netmask of the receiver in dotted decimal notation (e.g. 255.255.255.0).

Edit Field	Description
	The factory default netmask is 255.255.255.0.
DHCP	<p data-bbox="695 331 1263 363">Indicates whether DHCP is enabled or disabled.</p> <p data-bbox="695 384 1461 562">Dynamic Host Configuration Protocol (DHCP – RFC 2131) is a communications protocol that allows Network Administrators to centrally manage and automate the assignment of Internet Protocol (IP) configuration, including IP address, subnet mask and default gateway (see Static Routing menu item) for Local Area Network (LAN) hosts in an organization's LAN.</p> <p data-bbox="695 594 1461 835">In order for a host, such as an SRA or SFX receiver, to connect to an organization's LAN, a unique IP address must be assigned to it. Without DHCP, the IP configuration must be manually entered using the edit fields described above. However, if a host has moved to another point on the network, a new IP configuration may have to be assigned. DHCP lets a Network Administrator distribute IP configuration from a central point and automatically reconfigures a host when it is plugged into a different network.</p> <p data-bbox="695 867 1461 930">If DHCP has been enabled for a network interface, the IP and Netmask fields will be ignored.</p>
Default Gateway DNS	If required, the IP address of the associated default gateway and the Domain Name Server (DNS), in dotted decimal notation (e.g. 192.168.0.1)

DVB Carrier

When the DVB Carrier Menu Tool Bar item is selected, a submenu page appears which provides menu items relating to the setup and maintenance of the incoming satellite feed (RF carriers and LNB). These are described in the following sections.

DVB Carrier Definitions

This submenu allows you to set the parameters for the 2 DVB Carriers, which can be received by the RF front end. The DVB Carrier Status page similar to Figure 4-5 will be displayed when the DVB Carrier Definitions submenu item is selected. The meaning of each carrier parameter is explained under the Carrier Edit page. In this example, the receiver is locked to the 8.57 Ms/s QPSK Carrier A at 1350 MHz.

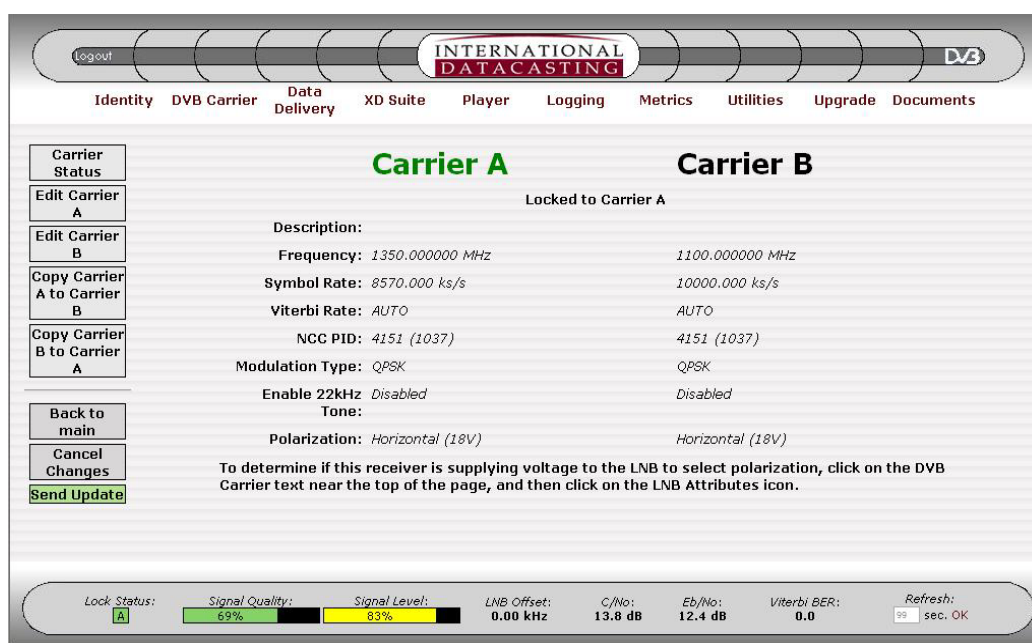


Figure 4-5 DVB Carrier Status Page

Aside from the Common Menu Items, the following menu items are available:

NOTE:

The carrier lock status is not automatically updated on the status page. You must use the refresh button on your browser to update the lock status.

Menu Item	Description
Carrier Status	Selecting this button will always return you back to the DVB Carrier Status page, as shown in Figure 4-5. The current status of both carrier A and B will always be displayed. The carrier that the receiver is locked to will have its title displayed in green letters and a message below the title will appear (see example in Figure 4-4).
Edit Carrier <X>	Selecting this button will enter the Carrier Edit page for the DVB Carrier selected, as shown in Figure 4-6.
Copy Carrier <X>	These buttons allow you to copy the entire configuration of

NOTE:

If only one carrier is being used in the network, both Carrier A and B should be set to that carrier. This will reduce the lock time because the receiver does not have to check for two different carriers.

Menu Item	Description
to Carrier <Y>	Carrier to Carrier B, or visa versa. Pressing these buttons saves you the time of having to enter the same information twice.

When the Edit Carrier <X> menu item is selected, the Carrier Edit page will be displayed, as shown by the sample page in Figure 4-6 for Carrier B. Each edit field is described after the figure.

The screenshot shows the 'Carrier Edit Page (Carrier B)' interface. At the top, there is a navigation bar with icons for 'Logout', 'Identity', 'DVB Carrier', 'Data Delivery', 'Logging', 'Metrics', 'Utilities', and 'Upgrade'. The 'DVB Carrier' icon is highlighted. Below the navigation bar, the page title is 'Carrier B'. On the left side, there are buttons for 'Carrier Status', 'Edit Carrier A', 'Edit Carrier B', 'Back to main', 'Cancel Changes', and 'Send Update'. The main area contains the following fields:

- Description: Test Carrier B
- Frequency(950.000000 - 2150.000000): 970.000000 MHz
- Symbol Rate: 2000.00 ks/s
- Viterbi Rate: AUTO
- NCC PID: 100 (Decimal) or Hexadecimal
- Modulation Type: QPSK
- Enable 22kHz Tone: Disabled
- Polarization: Horizontal (18V)

Below these fields, there is a note: 'To determine if this receiver is supplying voltage to the LNB to select polarization, click on the DVB Carrier text near the top of the page, and then click on the LNB Attributes icon.'

At the bottom, there is a status bar with the following information:

- Lock Status: A
- Signal Quality: 99%
- Signal Level: 45%
- LNB Offset: 0.00 kHz
- C/No: 21.1 dB
- Eb/No: 21.4 dB
- Viterbi BER: 0.0
- Refresh: 85 sec. OK

Figure 4-6 Carrier Edit Page (Carrier B)

The following fields can be edited on the Carrier Edit page:

Edit Field	Description
Description	A meaningful name or description for the carrier can be entered in this field. Up to 31 characters can be entered. This name will appear on the DVB Carrier page where the carrier status is provided. If a description is not specified, the word Empty will be displayed on the DVB Carrier page.
Frequency	Is the L-Band receive frequency of the carrier in Hz, in the numeric range 950000000 - 2150000000 Hz.
Symbol Rate	Is the symbol rate of the carrier in symbols per second, in the numeric range 1000000 - 45000000 S/s for earlier models of receivers, and 256000 - 45000000 S/s for later models.

NOTE:

The carrier symbol rate includes all applied FEC and must be an exact value.

Edit Field	Description
Viterbi Rate	<p>Select the Viterbi FEC rate of the carrier, using one of the options: Auto, 1/2, 2/3, 3/4, 5/6, 7/8, 8/9 (if 8PSK/16QAM option is used).</p> <p>The following Viterbi FEC/Modulation Type combinations are possible (in accordance with DVB specifications):</p> <ol style="list-style-type: none"> 1. Auto Detect (all Modulation Types) 2. 1/2 (QPSK, BPSK only) 3. 2/3 (QPSK, BPSK, 8PSK only) 4. 3/4 (QPSK, BPSK, 16QAM only) 5. 5/6 (QPSK, BPSK, 8PSK only) 6. 7/8 (QPSK, BPSK, 16QAM only) 7. 8/9 (8PSK only)
NCC PID	Is the PID number of the NCC PID (in hex), in the numeric range 0x20 to 0xFFE. Specifying 0 disables the NCC PID.
Modulation Type	Select the modulation type, using one of the options: QPSK; or BPSK, or 8PSK and 16QAM if your model is equipped with this option.
Enable 22kHz Tone	Enables or disables the 22 kHz tone to the LNB. The 22 kHz tone is used to select the L-Band frequency band for output by the LNB, where Disabled (off) selects 950 to 1950 MHz, and Enabled (on) selects 1100 MHz to 2150 MHz.
Polarization	Is the polarization of the LNB, and sets the output DC voltage from the receiver to the LNB, using one of the options: h for horizontal (18VDC standard or 15 VDC optional) and v for vertical (13VDC standard or 11 VDC optional).

NOTE:

The Polarization only selects the LNB output voltage. To turn the LNB power on or off, you must use the Supply Select item, under the LNB Attributes submenu.

LNB Attributes

This submenu allows you to set the parameters for controlling the LNB. All LNB attributes are common to both DVB Carriers. The LNB Attributes page similar to Figure 4-7 will be displayed when the LNB Attributes submenu item is selected. The meaning of each attribute is explained under the Edit LNB Attributes page.

(The LNB Offset)

On the LNB Attributes page, the LNB offset is updated to the current value whenever the page is updated (either through menu selection or browser refresh). The LNB Offset that is displayed is the stored frequency offset in kHz between the frequency set by the user (in the DVB Carrier Definitions) and the actual frequency that the receiver is locked to. Every 10 seconds, the receiver calculates the difference between the set frequency and the frequency being used by the RF front-end demodulator when it acquired lock. If the difference is greater than five percent of the symbol rate, this difference is added to the accumulated drift. If the accumulated drift is greater than 1.5 MHz (1500 kHz), it is stored as a positive or negative LNB Offset, which is then displayed on the GUI on both the metrics area at the bottom of the screen, and the LNB Attributes page on refresh. On startup or during carrier lock, the receiver is tuned at the set frequency plus this LNB offset. This LNB Offset can be reset to 0.0.

NOTE:

The LNB Offset is not automatically updated on the LNB Attributes page. You must use the refresh button on your browser to update the LNB Offset.

The screenshot displays the 'LNB Attributes' page. At the top, a navigation bar includes 'logout', 'Identity', 'DVB Carrier', 'Data Delivery', 'Logging', 'Metrics', 'Utilities', and 'Upgrade'. The 'LNB Attributes' title is centered. On the left, a sidebar contains buttons: 'Show Attributes', 'Edit', 'Reset LNB Offset', 'Back to main', 'Cancel Changes', and 'Send Update'. The main area lists the following attributes:

- LNB Offset: 0.00
- Frequency Reversal: Off
- Supply Select: Disabled
- AGC Optimization Type: Fast Acquisition
- AFC Range: +/- 2000.0 kHz Max:(0-2000.0 kHz)

At the bottom, a status bar provides real-time data:

Lock Status:	Signal Quality:	Signal Level:	LNB Offset:	C/No:	Eb/No:	Viterbi BER:	Refresh:
A	99%	45%	0.00 kHz	21.1 dB	21.4 dB	0.0	55 sec. OK

Figure 4-7 LNB Attributes Page

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show Attributes	Selecting this button will always return you back to the LNB Attributes page, as shown in Figure 4-7. The current LNB offset value in kHz is displayed, as calculated by the receiver as it compensates for LNB drift.
Edit	Selecting this button will enter the Edit LNB Attributes page, as shown in Figure 4-8.
Reset LNB Offset	This will reset the receiver's internal LNB drift tracking offset frequency back to 0.0 kHz.

NOTE:

The LNB Attributes are applicable to both DVB Carriers.

Figure 4-8 Edit LNB Attributes Page

The following fields can be edited on the Edit LNB Attributes page:

Edit Field	Description
Frequency Reversal	Enables or disables LNB frequency reversal. Off is the default. Frequency reversal permits the use of other LNB variants that may use low side Local Oscillators (LOs) instead of high side LOs. The use of LNBs such as older C-Band type with low side LOs can cause spectral inversion, and this feature can make the LNB appear

NOTE:

Supply Select turns on or off the LNB power supply only. The voltage actually being output is determined by the Polarization setting in the DVB Carrier Edit page.

Edit Field	Description
	“normal” when setting the L-Band frequency of the DVB Carrier using the Carrier Edit <X> page (see previous section).
Supply Select	Enables or disables the LNB power supply, which supplies DC voltage to the LNB from the L-Band connector on the rear panel. When enabled, the DC voltage output will be determined by the polarization setting from the Carrier Edit <X> page (see previous section).
AGC Optimization Type	<p>The AGC optimization type, using one of the options: performance mode or fast acquisition mode.</p> <p><u>Performance Mode</u> – this mode forces the receiver to step through individual gain stages in the Digital Filter to determine the best Bit Error Rate (BER) performance. This feature should only be used if there are large adjacent carriers to the DVB Carrier of interest. Lock acquisition will generally be slower if this mode is selected.</p> <p><u>Fast Acquisition Mode</u> – this mode forces the receiver to select a default Digital Filter that performs well under most conditions. This is the default mode and provides the fastest lock acquisition time.</p>
AFC Range	The AFC range in Hz, in the numeric range 0 to 2000.0 kHz (0 to 2 MHz), in steps of 0.1 kHz. If this field is not edited, an AFC range of 10% of the carrier symbol rate is default.

Data Delivery

When the Data Delivery Tool Bar item is selected, a submenu page appears which provides menu items relating to the routing, filtering, firewalling, address translation and output of data on the receiver interfaces. These are described in the following sections.

In order to understand how the various data delivery functions work, you should understand the path IP packets will take as they are processed by the receiver. This data flow is demonstrated in the Data Flow Diagram of Figure 4-9. In this flow, IP packets can originate from two primary sources: the satellite interface (sat0) after PID Filtering and MPE De-encapsulation, or the network (LAN) interfaces.

As shown in Figure 4-9, the receiver processes IP packets that enter, leave, and pass through it. Basically, there is a chain for each of these paths. Any packet entering the receiver goes through the PREROUTING and INPUT chains. Any packet that the receiver sends out to the network goes through the OUTPUT and POSTROUTING chains. Any packet that the receiver picks up on one network and sends to another goes through the FORWARD chain.

Many of the menu items available under Data Delivery maintain tables that allow you to set up certain rules in each of these chains that decide what happens to packets of data that pass through them. With every packet, the rules in the appropriate table in the chain are checked to see if any of them match. The first one that matches will decide the outcome of that packet. If none of the rules match, then the default rule or policy of the whole chain will be the final decision maker.

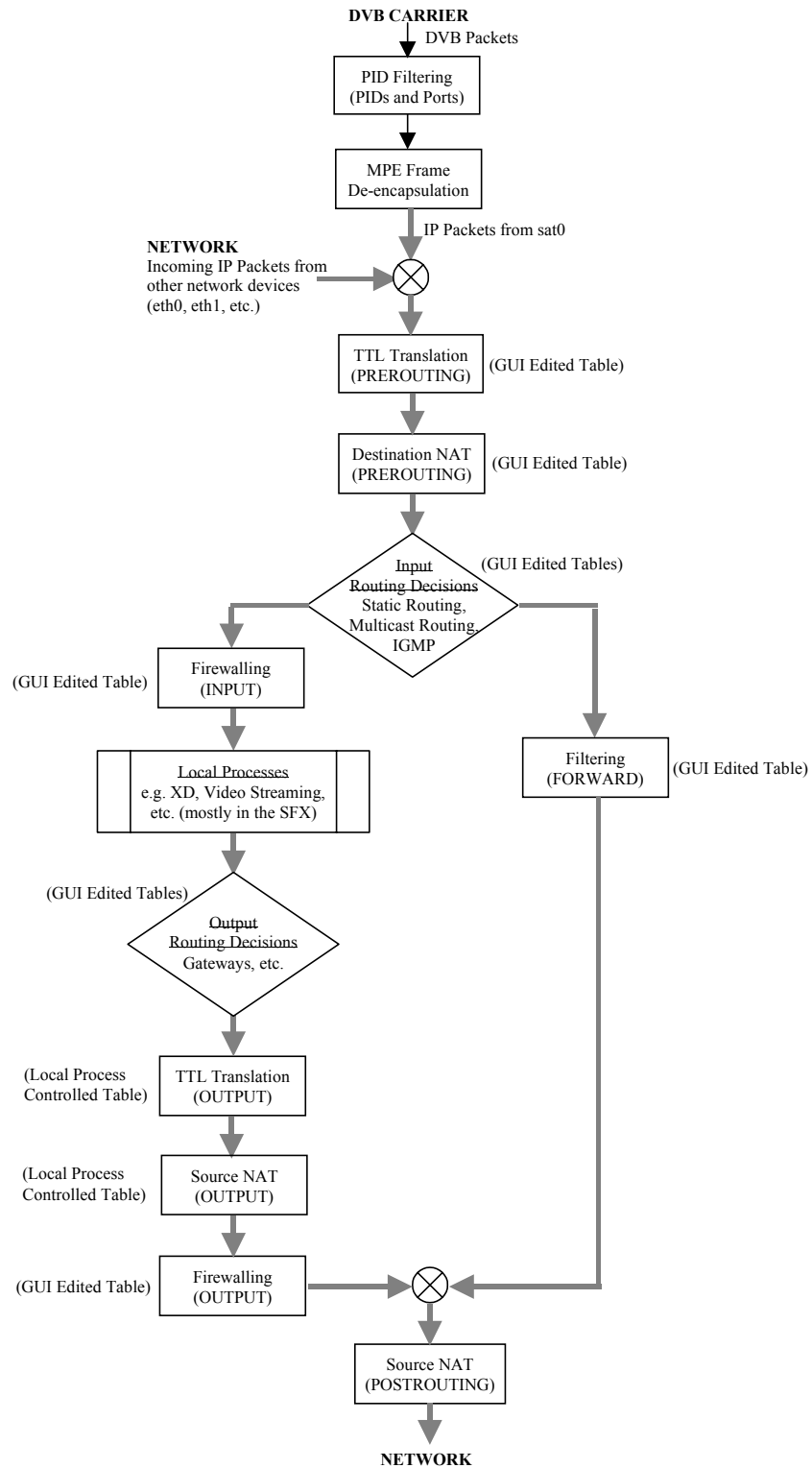


Figure 4-9 Data Flow Diagram

PIDs and Ports

This submenu provides all the functions that allow you to setup the PID filtering for all relevant data streams in the DVB Transport Stream.

(PID Filtering and PID Types)

Up to 250 PID streams can be filtered by the receiver, regardless of type, however, there are restrictions on how many PIDs of a type can be assigned to a port. Aside from special types such as the NetManager NCC PID, there are four types of PIDs, as organized by four distinct PID Lists:

NOTE:

Up to 250 PID streams can be filtered by the receiver, regardless of type, however, there are restrictions on how many PIDs of a type can be assigned to a port. Whenever a PID is inserted into a PID list, it will use one PID filter in the receiver, whether that PID is enabled for output or not.

1. Net PIDs – these are the IP network data streams that are processed by the IP Stack in the receiver and forwarded either to internal applications that use IP data, or for output on a network device, such as an Ethernet port. All data in Net PIDs are encapsulated using Multi-Protocol Encapsulation (MPE). Up to 250 PIDs can be assigned to the Net PID List, and enabled for output on the network device port(s), depending on routing, filtering, firewall rules, etc..

If the Cyphercast option is installed in your receiver, then the ECM/EMM PID required by Cyphercast must be assigned in the Net PID List. This can be done either directly here, under PIDs and Ports, or in the Cyphercast configuration page.

The Network Control Channel PID is an MPE encapsulated Net type PID as well, however, it is a special PID, used internally by the receiver to decode NetManager control commands. It is setup in the DVB Carrier Definitions, and will not appear in the Net PID List. However, it will use one of the 250 available PID filters, if enabled.

2. Async PIDs – these are the data streams that are available for output on the ASYNC (RS-232) port. All data in an Async PID is encapsulated using MPE as well. Up to 250 PIDs can be assigned to the Async PID List, but only one PID can be enabled for output to the ASYNC port at a time.
3. Sync PIDs - these are the data streams that are available for output on the SYNC (RS-422) port. All data in a sync PID is encapsulated using a proprietary method specific to IDC MX series encapsulators. Up to 250 PIDs can be assigned to the Sync PID List, but only one PID can be enabled for output to the SYNC port at a time.
4. Other PIDs – these are PIDs that are filtered and may be used for other applications, such as the ASI Output option. These PIDs do not conform to any one of the types and rules above and are not routed to one of the standard output ports.

When the PIDs and Ports submenu item is selected, a PID List is displayed on a page similar to Figures 4-10 to 4-13. Generally, the Net PID List (Figure 4-10) will be displayed by default. You can select any other PID list by pressing one of the PID type buttons on the left of the page (i.e. one of NET PIDs, ASYNC PIDs, SYNC PIDs, and Other PIDs).

INTERNATIONAL DATACASTING

Logout Identity DVB Carrier Data Delivery Logging Metrics Utilities Upgrade

NET PID List

☒ NET port(s) enabled.

PID#	Enabled	Description
<input checked="" type="radio"/> 1234 (402)	<input type="checkbox"/>	Multicast Data Stream 1
<input type="radio"/> 2251 (8CB)	<input type="checkbox"/>	Multicast Data Stream 2

Edit Selected
 Add New PID Definition
 Delete Selected
 Delete ALL
 Back to main
 Cancel Changes
 Send Update

Lock Status: A
 Signal Quality: 99%
 Signal Level: 45%
 LNB Offset: 0.00 kHz
 C/No: 21.1 dB
 Eb/No: 21.4 dB
 Viterbi BER: 0.0
 Refresh: 85 sec. OK

Figure 4-10 Net PID List Page

The display fields and columns in the Net PID List (Figure 4-10) have the following meaning:

Column/Field	Description
NET port(s) enabled	This is a check box, which is used to enable or disable all network devices that are capable of IP data output. Generally, this will affect data output at the Ethernet (NET1/eth0 and NET2/eth1) ports.
Radio Buttons	Clicking on the radio button will select a PID in the list. Once selected, you can use the Edit Selected button to edit the PID definition, or Delete Selected to delete the PID from the list. Only one PID can be selected at a time.
PID #	This is the numeric value for the PID, displayed in decimal and hexadecimal in brackets.
Enabled	These check boxes authorize each individual PID for output. Overall, the NET Port(s) enabled check box (see above) has to be turned on for these check boxes to have any effect.
Description	This is a text description of the PID, as entered when the PID was defined using the Add New PID Definition or Edit Selected menu items.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
NET PIDs	Selecting this button will always return you back to the Net PID List page, as shown in the example in Figure 4-10. All PIDs currently assigned as type Net will be displayed, whether they are enabled for output on a network device (port) or not.
ASYNCR PIDs	Selecting this button will always return you back to the Async PID List, as shown in the example in Figure 4-11. All PIDs currently assigned as type Async will be displayed, whether they are enabled for output on the Async port or not.
SYNC PIDs	Selecting this button will always return you back to the Sync PID List, as shown in the example in Figure 4-12. All PIDs currently assigned as type Sync will be displayed, whether they are enabled for output on the Sync port or not.
Other PIDs	Selecting this button will always return you back to the Other PID List, as shown in the example in Figure 4-13. All PIDs currently assigned as type Other will be displayed, whether they are enabled for output or not.
Edit Selected	Selecting this button will enter the Edit PID Definition page (see example in Figure 4-15) for the PID selected in the list (using the radio button on the left hand side of the list).
Add New PID Definition	Selecting this button will enter the Add New PID Definition page, as shown in Figure 4-14. This will add a new PID to the list, so no selection is required.
Delete Selected	Selecting this button will remove a selected PID (using the radio button on the left hand side of the list) from the PID list. PIDs are deleted whether they are enabled or not.
Delete ALL	Selecting this button will remove all PIDs from the PID list. All PIDs will be deleted whether they were enabled or not.

NOTE:

When you select the Delete Selected or Delete ALL buttons, you will be disabling data services at the output of the receiver, if the PID(s) and port are enabled.

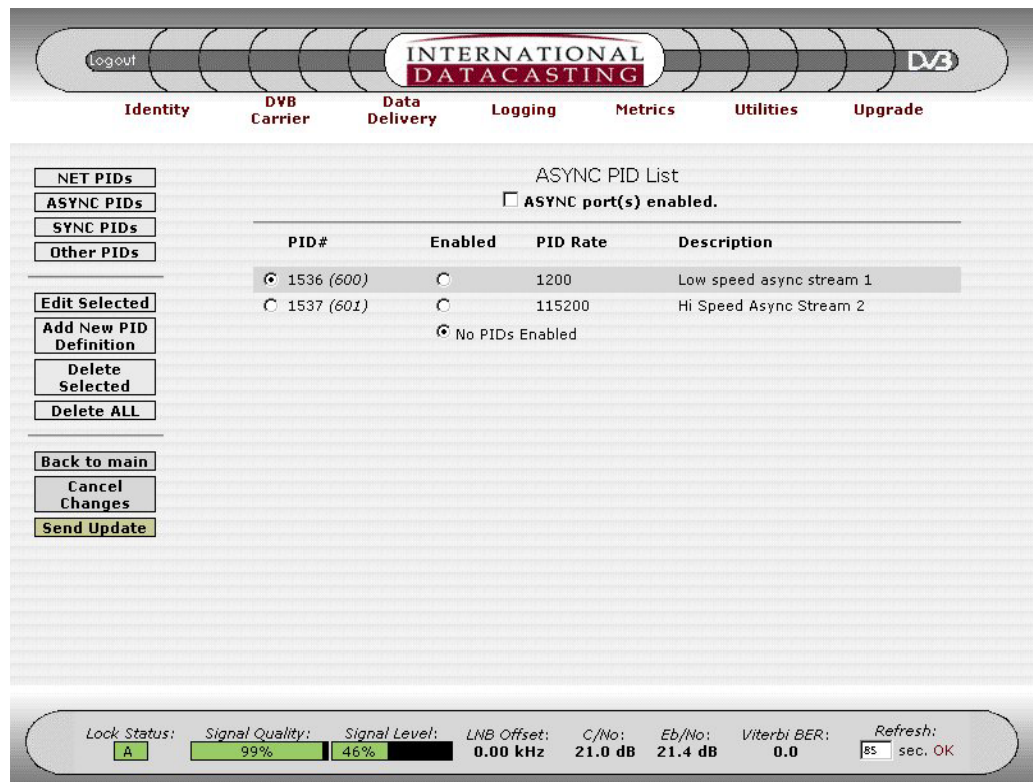


Figure 4-11 Async PID List Page

The display fields and columns in the Async PID List (Figure 4-11) have a similar meaning to the Net PID List fields and columns, with following exceptions:

Column/Field	Description
PID Rate	This is the baud rate (bps) that the Async Port will be set to when the data is output from this PID. Effectively, this is the maximum data rate for the data received from this PID – it could be received from the satellite at a slower rate, but will be output from the Async Port at the baud rate shown.
No PIDs Enabled	Since only one PID can be assigned to the Async Port at any one time, the enable column was implemented using radio buttons instead of check boxes. Radio buttons force a single selection to be made, so the valid selection of No PIDs Enabled has to be provided, which means no PIDs are authorized for output on the async port.

INTERNATIONAL DATACASTING

Identity DVB Carrier Data Delivery Logging Metrics Utilities Upgrade

NET PIDs
ASYNC PIDs
SYNC PIDs
Other PIDs

Edit Selected
Add New PID Definition
Delete Selected
Delete ALL

Back to main
Cancel Changes
Send Update

SYNC PID List
☒ SYNC port(s) enabled.
☐ Inverted X21 mode.

PID#	Enabled	PID Rate	Description
<input checked="" type="radio"/> 2048 (800)	<input type="radio"/>	1000	Legacy sync stream 1
<input type="radio"/> 4097 (1001)	<input type="radio"/>	10000000	Hi speed sync stream 2
<input checked="" type="radio"/> No PIDs Enabled			

Lock Status: A Signal Quality: 99% Signal Level: 46% LNB Offset: 0.00 kHz C/No: 21.0 dB Eb/No: 21.4 dB Viterbi BER: 0.0 Refresh: 85 sec. OK

Figure 4-12 Sync PID List Page

The display fields and columns in the Sync PID List (Figure 4-12) have a similar meaning to the Async PID List fields and columns, with following exceptions:

Column/Field	Description
Inverted X.21 Mode	This selects normal X.21 balanced signals, or inverted X.21 balanced signals for countries where X.21 signals are reversed.
PID Rate	This field specifies the output clocking rate of the Sync Port in bits per second. Allowable values are between 1 and 10000000 bps inclusive. The actual output rate of the sync port may vary around this value by up to 10 parts per million to compensate for jitter in the incoming data.

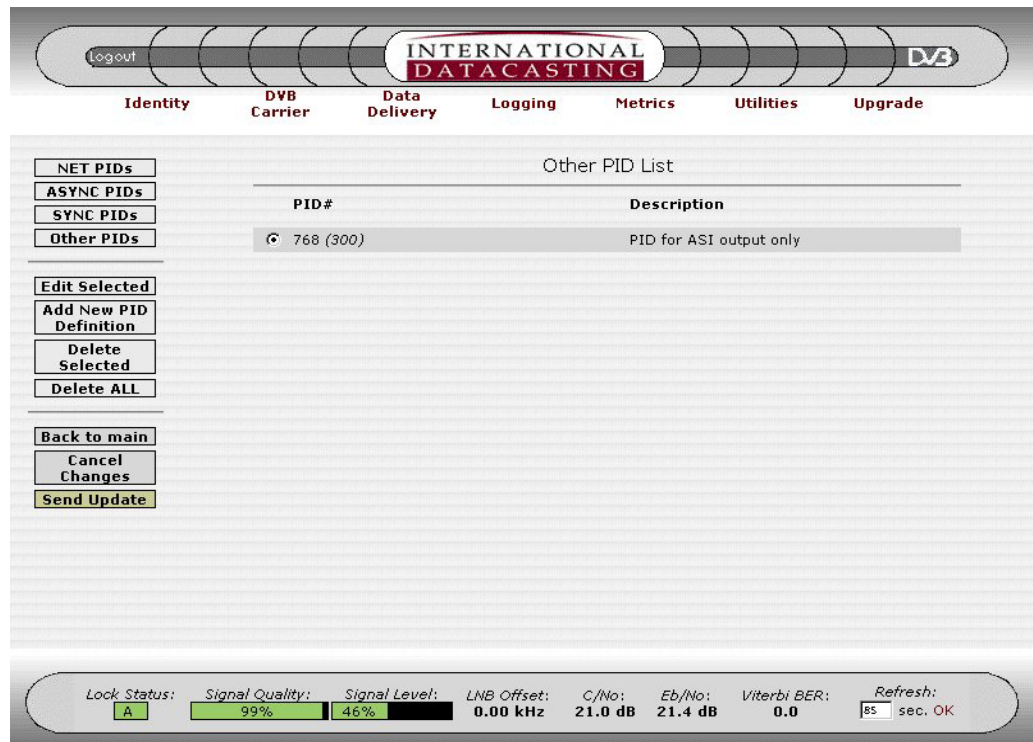


Figure 4-13 Other PID List Page

The display fields and columns in the Other PID List (Figure 4-13) have a similar meaning to the Net PID List fields and columns, except these are PIDs with no specific port assignment. Additional columns are added when the ASI Output option is installed, for example. See the ASI Option appendix for more information.

Figure 4-14 Add New PID Definition Page

The Add New PID Definition page allows you to define a new PID, of any type based on the destination port (Net, Async, Sync, Other). Once the Send Update has occurred, the PID will be placed in appropriate PID List, based on its type. The following fields can be edited on the Add New PID Definition page:

NOTE:

For ports where only 1 PID can be output at a time (e.g. Async and Sync), use caution when enabling a new PID and pressing Send Update. Doing so will disable any PID already enabled for that port.

Edit Field	Description
PID #	The PID number in the decimal range 32 to 8190, or hexadecimal range 0x20 to 0x1FFE, must be entered here.
Enabled	Selecting this check box will enable or disable the PID for output.
PID Type	<p>The radio buttons allow you to select one type, based on the desired destination port for data output. This selection determines which PID List will “own” the PID.</p> <p>The Async Port and Sync Port require a data rate to be entered:</p> <ul style="list-style-type: none"> Async data rates are the standard RS-232 port baud rates: 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bps. Sync data rates can be entered in the range 1 to 10000000 bps.

Edit Field	Description
Description	A meaningful name or description for the PID can be entered in this field. Up to 31 characters can be entered. This name will appear on the PID List page where the PID information is provided. If a description is not specified, the field will display nothing.

INTERNATIONAL DATACASTING

Logout Identity DVB Carrier Data Delivery Logging Metrics Utilities Upgrade

NET PIDs
ASYNC PIDs
SYNC PIDs
Other PIDs

Edit Selected
Add New PID Definition
Delete Selected
Delete ALL

Back to main
Cancel Changes
Send Update

Edit PID Definition

PID#: ☒ 1234 Decimal
☐ 4D2 Hexadecimal

Enabled: ☐

Pid Type: ☒ Net Port
☐ Async Port (Rate: b/s)
☐ Sync Port (Rate: b/s)
☐ Other

Description:

Lock Status: ☒ A Signal Quality: 99% Signal Level: 45% LNB Offset: 0.00 kHz C/No: 21.0 dB Eb/No: 21.4 dB Viterbi BER: 0.0 Refresh: 85 sec. OK

Figure 4-15 Edit PID Definition Page

The Edit PID Definition page (example in Figure 4-15) allows you to edit a current PID definition, of a PID selected from one of the PID Lists (Net, Async, Sync, Other). The fields have the same meaning as the Add New PID Definition page. Once the Send Update has occurred, the PID will be updated in appropriate PID List, based on its type. You can change a PID type from this page. Doing so will move the PID from its current PID List to a new PID List.

IGMP

The Internet Group Management Protocol (IGMP V2 – RFC 2236) is an Internet Protocol that provides the means for a computer to report its multicast group membership to adjacent routers, allowing it to “tune-in” to multicast transmissions destined for that group.

IP Multicasting allows a host receiver to send content to one or more other computers that have identified themselves as being interested in receiving that content, known as a multicast group. Multicasting can be used for such applications as broadcasting streaming media, sending course content in distance learning applications, or delivering financial information to branch offices in enterprise applications.

IGMP operates in networks where the receiver is directly connected to the subnet. The receiver issues IGMP queries and receives IGMP membership reports directly.

When the IGMP submenu item is selected under Data Delivery, the IGMP page is displayed for a selected Ethernet network interface. A sample page is shown in Figure 4-16 for the Net1 (eth0) Ethernet interface.

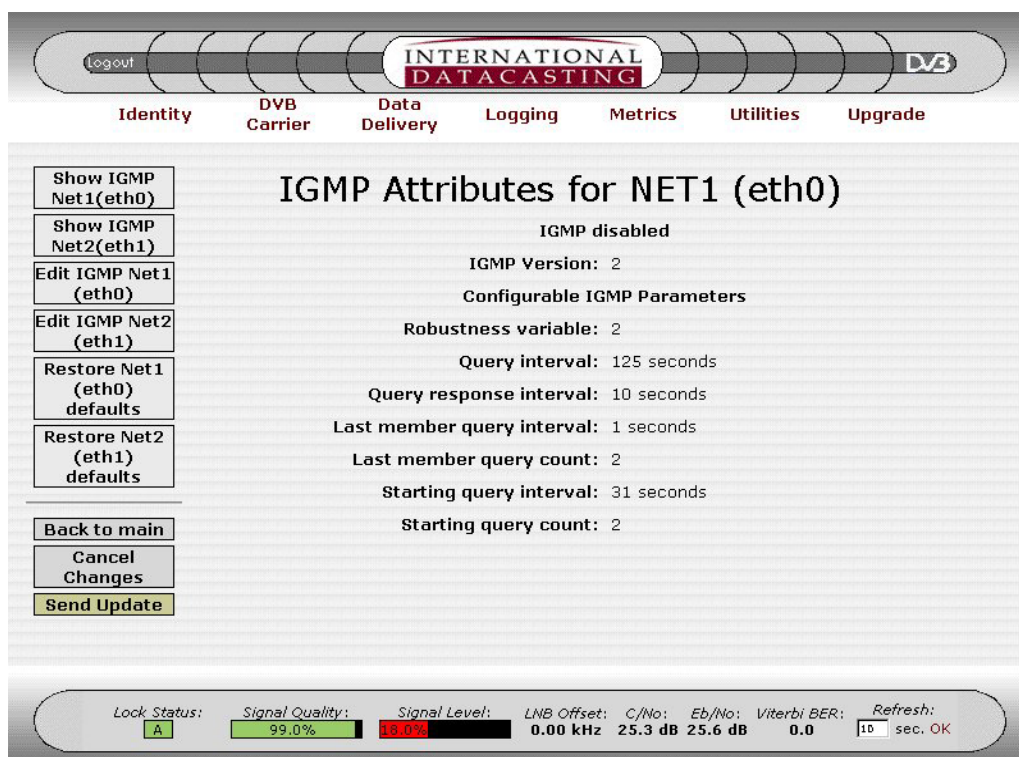


Figure 4-16 IGMP Page for Net1

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show IGMP <interface>	Selecting this button will always return you back to the IGMP page for the selected Ethernet network interface, as shown in Figure 4-16.

Menu Item	Description
Edit IGMP <interface>	Selecting this button will enter the IGMP Edit page, as shown in Figure 4-17, for the selected Ethernet network interface.
Restore <interface> Defaults	Selecting this button will enter the IGMP Edit page, but with factory default values inserted into the edit fields automatically. You may then wish to edit these values, in the same manner used when the Edit IGMP buttons were pressed. The following default values are inserted: IGMP Disabled (pass all multicast packets out the network interface) Robustness Variable = 2. Query Interval = 125 seconds. Query Response Interval = 10 seconds. Last Member Query Interval = 1 seconds. Last Member Query Count = 2. Starting Query Interval = 31 seconds. Starting Query Count = 2.

The individual IGMP variables displayed are explained with the IGMP Edit page. When the Edit menu item is selected, the IGMP Edit page will be displayed, as shown by the sample page in Figure 4-17. Each edit field is described after the figure.

The screenshot shows the receiver's main menu at the top with options: Logout, Identity, DVB Carrier, Data Delivery, Logging, Metrics, Utilities, Upgrade, and DVB. The 'Data Delivery' menu is selected, leading to the 'IGMP Attributes for NET1 (eth0)' page.

On the left side of the page, there is a vertical list of buttons: Show IGMP Net1(eth0), Show IGMP Net2(eth1), Edit IGMP Net1(eth0), Edit IGMP Net2(eth1), Restore Net1(eth0) defaults, Restore Net2(eth1) defaults, Back to main, Cancel Changes, and Send Update.

The main area of the page is titled 'IGMP Attributes for NET1 (eth0)' and contains the following settings:

- ☐ IGMP Enabled
- IGMP Version: 2
- Configure IGMP parameters
 - Robustness variable: 2
 - Query interval: 125 seconds
 - Query response interval: 10 seconds
 - Last member query interval: 1 seconds
 - Last member query count: 2
 - Starting query interval: 31 seconds
 - Starting query count: 2

At the bottom of the screen, there is a status bar with the following information:

- Lock Status: A
- Signal Quality: 99.0%
- Signal Level: 15.0%
- LNB Offset: 0.00 kHz
- C/No: 24.4 dB
- Eb/No: 24.7 dB
- Viterbi BER: 0.0
- Refresh: 10 sec. OK

Figure 4-17 IGMP Edit Page

The following fields can be edited on the IGMP Edit page:

Edit Field	Description
IGMP Enabled	A check in this field enables or disables IGMP support. If IGMP is disabled, the receiver outputs all multicast packets.
Robustness Variable	This field is related to the expected packet loss on the subnet. IGMP is robust to (Robustness Variable – 1) packet losses. The default value is 2.
Query Interval	This field sets the frequency at which General Queries are sent out on the LAN, via the Ethernet interface. The default value is 125 seconds.
Query Response Interval	This field sets the amount of time a node on the LAN has to respond to an IGMP query. The default value is 10 seconds.
Last Member Query Interval	This field sets the maximum response time to a Group-Specific Query that is sent after a Leave Group Message is received from a node on the LAN. The default value is 1 second.
Last Member Query Count	This field sets the number of Group-Specific Queries that are sent out in response to a Leave Group Message. The default value is equal to the Robustness Variable value.
Startup Query Interval	This field sets the frequency at which queries are sent out on startup of a multicast transmission. The default value is ¼ of the Query Interval.
Startup Query Count	This field sets the number of queries sent out on startup, using the Startup Query Interval. The default value is equal to the Robustness Variable.

Static Routing

The Static Routing submenu maintains the static routing table associated with the receiver. Each receiver can support up to 32 static routes. The routing subsystem determines where outgoing unicast IP packets are sent and applies to all IP packets, regardless of the network interface they originated from.

Static unicast routing is done using the Linux **Route** facility. Additional information can be obtained online with the manual at sites such as <http://www.linuxcentral.com> (Linux Man Pages, Administrative and Privileged commands). Additionally, you can contact IDC Customer Service for additional information (see Chapter 5).

Packets are routed according to the following rules:

1. IP packets can originate from any of the available network interfaces and are processed by the receiver in accordance with the data flow in Figure 4-9.
2. Routes may be entered in any order and allow IP packets to be routed out a gateway, according to the destination address and netmask.
3. Packets addressed to a device on a receiver subnet are sent out on the applicable physical network to which the receiver is attached.
4. Packets addressed to the global (i.e. limited) broadcast address are sent out on all the applicable physical networks to which the receiver is attached.
5. Packets addressed to the receiver's subnet broadcast address are sent out on the applicable physical network to which the receiver is attached.
6. Multicast packets are sent out on the physical network in accordance with the Multicast Routing rules (see *Multicast Routing* section).
7. Packets addressed to other subnets are sent to the appropriate gateway as defined in the routing table.
8. All packets that cannot be sent out using the rules described above (1-7) are discarded by the receiver.
9. An entry that has its Network Address and Netmask both set to 0.0.0.0 will represent a Default Gateway, and only one such entry will be allowed in the receiver. This Default Gateway will be the same as the Default Gateway displayed on the Identity page (see Figure 4-3).
10. The Destination Address, Netmask, and Gateway entries must be expressed in dotted decimal notation.
11. The Gateway Address cannot be a loopback, broadcast, or multicast address and must be on the same subnet as the receiver. However, it cannot be the receiver's IP address.
12. The Network Address cannot be a loopback, broadcast or multicast address, and cannot be on the same subnet as the receiver.

When the Static Routing submenu item is selected under Data Delivery, the Static Routing page is displayed for all network interfaces, including the optional modem interface, if the Modem Option is installed. A sample Static Routing page is shown in Figure 4-18.

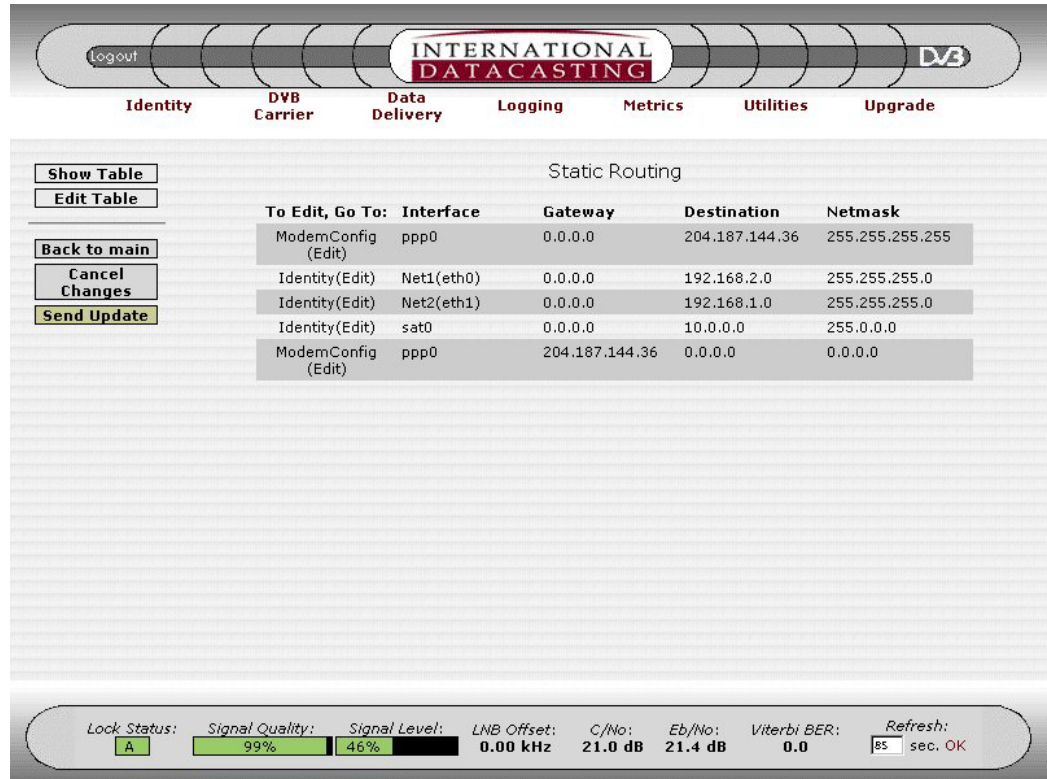


Figure 4-18 Static Routing Page

The columns in the Static Routing page are described under the Edit Routing Table page (Figure 4-19), with the following exceptions:

Column	Description
To Edit, Go To:	The routing table displays all static routes from all network interfaces in the receiver, including optional interfaces such as the modem/PPP interface. Some of the routes associated with these interfaces are configured with other GUI edit pages besides the Edit Table page here. This column tells you where you must edit the configuration. In the example in Figure 4-18, the second entry in the table is edited using the Identity Edit page (see Figure 4-4). The words “Edit Table” appear if the route can be edited locally.
Destination	For locally configured routes, this field corresponds to the Destination entered in the Routing Table Edit page (Figure 4-19). For routes established elsewhere (Identity Edit page for example), the destination is the subnet derived from the IP Address and Netmask of the associated network interface.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show Table	Selecting this button will always return you back to the Static Routing page, as shown in Figure 4-18.
Edit Table	Selecting this button will enter the Edit Routing Table page, as shown in Figure 4-19.

Figure 4-19 Edit Routing Table Page

The following fields can be edited on the Edit Routing Table page:

Edit Field	Description
Interface	This drop down box selects the network interface that is applicable to the route. In most typical routing configurations, you want this to remain on AutoSelect, which allows any interface to be applicable.
Gateway	A valid gateway address in dotted IP address notation is entered here, according to the rules above. An address of 0.0.0.0 implies that there is no gateway.

Edit Field	Description
Destination	Enter a destination IP Address in dotted decimal notation, according to the rules above.
Netmask	To define the applied network, enter a Netmask in dotted decimal notation, according to the rules above.

In addition to the edit fields there are four table row manipulation keys:

Key	Description
Add	Add the entered information above the table to the table as the last row.
Remove	Delete the selected (highlighted) row.
Up	If there is more than one row in the table, move the selected row up one row.
Down	If there is more than one row in the table, move the selected row down one row.

Multicast Routing

The Multicast Routing submenu maintains the multicasting routing table associated with the receiver. Each receiver can support up to 200 multicast routes. The multicast routing function is responsible for managing multicast packets that are traveling through the receiver (host), from external interface to external interface. It is not responsible for managing multicast packets that are delivered to an application running on the receiver, but the two functions are inter-related.

Multicast packets are routed through the host according to a multicast routing table that is maintained by the Linux kernel. Initially, this table is empty and incoming multicast packets are routed according to a default route.

Multicast Routing follows a number of rules, as described in the list below. Many rules are best described by examples. Many of these rules are more important in the SFX series receiver, where a number of local applications may be consuming multicast packets (e.g. streaming media decoder).

1. IP packets can originate from any of the available network interfaces and are processed by the receiver in accordance with the data flow in Figure 4-9.
2. Up to 200 routes may be entered in the Multicast Routing Table, and order doesn't matter, assuming that routes don't overlap.
3. For assigned routes, IGMP is supported.
4. Should the multicast routing function be terminated for any reason, all multicast routes are automatically erased by the Linux kernel.
5. If a multicast packet is received, whose source IP Address matches the IP Address of one of the receiver's network interfaces, that packet is discarded regardless of the current multicast routing rules. This happens because the receiver assumes it is involved in a multicast loop. For a normal device, this behaviour does not pose a problem, but in a satellite environment, care must be taken to ensure that the IP address of a multicast source at the head end does not match the IP address of any receiver interface.
6. Local Application Rule 1: A multicast route is not required in order for a local application program running on the receiver to receive multicast packets. However, a static route is needed so that the program can properly set up a receiving socket (e.g. XD in the SFX). For example, if a program needs to receive multicast data on 224.1.1.1 from the sat0 interface, the following static route must be entered (see *Static Routing* section of this manual):

```
Interface:    sat0
Gateway:     0.0.0.0
Destination: 224.1.1.1
Netmask:     255.255.255.255
```

or the more general route could be entered:

```
Interface:    sat0
```

```

Gateway:      0.0.0.0
Destination:  224.0.0.0
Netmask:      240.0.0.0

```

7. Local Application Rule 2: Suppose that multicast packets with a destination of 224.1.1.1:1234 are being received from **eth0** and are being forwarded to **eth1** via a multicast route. If there is no local application running, the packets will be routed through the system as expected. Now suppose that an application that listens to 224.1.1.1:1234 is started on the receiver (e.g. streaming video). As stated above, a static route is required for this application to bind to the receiving socket. If this static route is:

```

Interface:    eth0
Gateway:      0.0.0.0
Destination:  224.1.1.1
Netmask:      255.255.255.255

```

packets will be routed to **both** the application and eth1. However, if the static route is:

```

Interface:    eth1
Gateway:      0.0.0.0
Destination:  224.1.1.1
Netmask:      255.255.255.255

```

then the packets will be routed to the application, but **not** to eth1. If you stop the application, 224.1.1.1 packets will be output on eth1. If you then restart the application, output of 224.1.1.1 packets on eth1 will stop.

8. Local Application Rule 3: Suppose that multicast packets with a destination of 224.1.1.1:1234 are being received on **eth0** and are being forwarded to all interfaces (**eth0** and **eth1**) by a multicast route. Now suppose that an application that listens to 224.1.1.1:1234 is started on the receiver (e.g. XD). As stated above, a static route is required for this application to bind to the receiving socket. If this static route is:

```

Interface:    eth0
Gateway:      0.0.0.0
Destination:  224.1.1.1
Netmask:      255.255.255.255

```

then the application will get **two** copies of each packet. This anomaly occurs because Linux forwards one packet to the application immediately when it is received on the interface and another is received when the kernel routing subsystem bounces a copy of the packet back to the interface for transmission.

9. Local Application Rule 4: Suppose that multicast packets with a destination of 224.1.1.1:1234 are being received on **sat0** and are being forwarded to all interfaces (**eth0** and **eth1**) by a multicast route. Now suppose that an application

that listens to 224.1.1.1:1234 is started on the receiver (e.g. XD). A static route for this application is entered, to bind to the receiving socket:

```
Interface:    eth0
Gateway:      0.0.0.0
Destination:  224.1.1.1
Netmask:      255.255.255.255
```

From the previous Local Application Rule #2, we know that output of 224.1.1.1 on eth0 will stop. Output of 224.1.1.1 on eth1 will, however, continue. **Only if the incoming multicast IP packets are fragmented**, the application may see occasional packet loss. The loss will not be constant or periodic and no packets will be lost on the eth1 output. The rule in this case is to bind the static route to an interface that is not being used to output the multicast traffic (via a multicast route). So in the above example, you must change the static route to:

```
Interface:    sat0
Gateway:      0.0.0.0
Destination:  224.1.1.1
Netmask:      255.255.255.255
```

When the Multicast Routing submenu item is selected under Data Delivery, the Multicast Routing page is displayed for all network interfaces. A sample Multicast Routing page is shown in Figure 4-20.

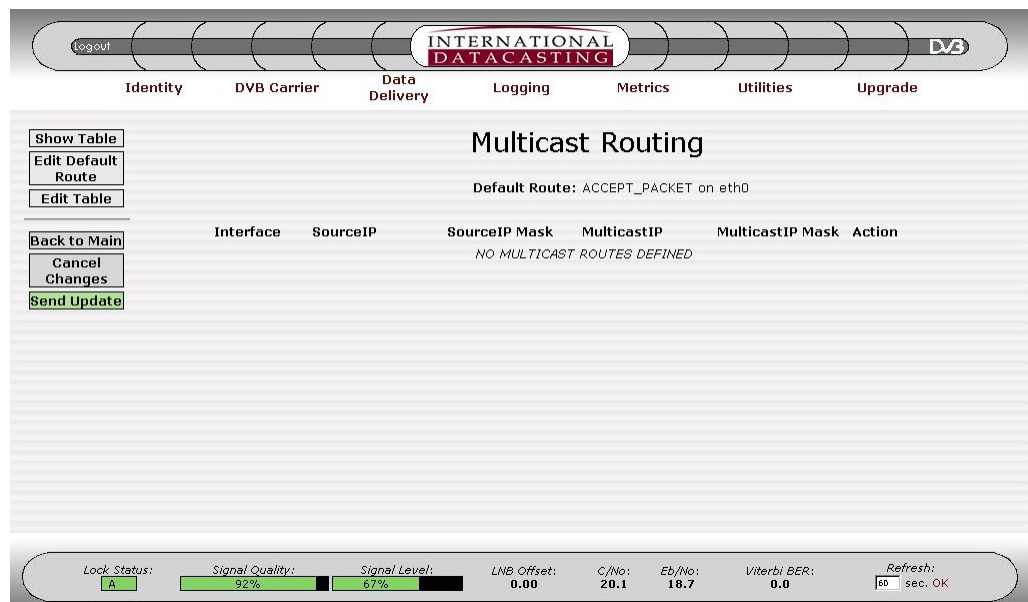


Figure 4-20 Multicast Routing Page

The columns in the Multicast Routing page are described under the Edit Default Route page (Figure 4-21) and Edit Multicast Routing Table page (Figure 4-22).

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show Table	Selecting this button will always return you back to the Multicast Routing page, as shown in Figure 4-20.
Edit Default Route	Selecting this button will enter the Edit Default Route page, as shown in Figure 4-21.
Edit Table	Selecting this button will enter the Edit Multicast Routing Table page, as shown in Figure 4-22.

Figure 4-21 Edit Default Route Page

The following fields can be edited on the Edit Default Route page:

Edit Field	Description
Interface	This drop down box selects the network interface that will be the destination of the routed multicast IP packets. This selection allows you to specify exactly where the multicast packets should be output, given the Action below specifying how they should be output. The following selections are available: NET1 (eth0) – output only on NET1 port. NET2 (eth1) – output only on NET2 port. NET1&2 (eth0&1) – output on both NET1 and NET2. ALL – output on all network interfaces.
Action	This drop down box selects the default action that will be taken

NOTE: There are limitations to the selection combinations of Interface and Action: "ALL" cannot be used with "ACCEPT PACKET", but must be used for "DISCARD PACKET" and "PASS TO IGMP". If "PASS TO IGMP" is used, make sure IGMP is enabled on the appropriate network interface(s).

Edit Field	Description
	on the multicast packet being routed. The following selections are available: ACCEPT_PACKET – accept packet and output according to Interface above. DISCARD_PACKET – throw away the packet. PASS_TO_IGMP – pass the packet on to for processing by the IGMP function, before being output on the Interface above.

Figure 4-22 Edit Multicast Routing Table Page

The following fields can be edited on the Edit Multicast Routing Table page:

Edit Field	Description
Interfaces	This drop down box selects the network interface that will be the destination of the routed multicast IP packets. This selection allows you to specify exactly where the multicast packets should be output. The selections available are the same as the Interface in the Edit Default Route.
!	Clicking on the "not" (!) check box negates the logic for the immediate edit field to the right of the check box. For example, ! 224.1.1.1 for the Source IP would mean all IP addresses whose source IP address is not 224.1.1.1.
SourceIP	Enter a source IP Address in dotted decimal notation, here if you wish. "Any" is implied if no Source IP is entered.

NOTE: The SourceIP fields are optional, and "Any" is the implied default value.

NOTE: The same limitations apply for Interfaces and Action as in the previous note.

Edit Field	Description
SourceIP Mask	Enter a netmask for the source IP address. This field is optional and 255.255.255.255 is implied if no SourceIP mask is entered.
MulticastIP	Enter a multicast destination IP Address in dotted decimal notation. You must enter a valid multicast address in this field.
MulticastIP Mask	Enter a netmask for the multicast IP address. This field is optional and 255.255.255.255 is the default if you do not enter a mask.
Action	Select an action to be taken on the multicast IP packet being routed. The selections available are the same as the Action in the Edit Default Rule.

In addition to the edit fields there are four table row manipulation keys:

Key	Description
Add	Add the entered information above the table to the table as the last row.
Remove	Delete the selected (highlighted) row.
Up	If there is more than one row in the table, move the selected row up one row.
Down	If there is more than one row in the table, move the selected row down one row.

Source NAT

The Source Network Address Translation (SNAT) submenu is responsible for maintenance of source IP address translation, which forms part of the IP packet Filtering Function in the receiver. This table defines up to 25 rules that can be used to filter on various IP packet headers and perform a source address translation or masquerading function. The rules in the Source NAT Table are applied to IP packets, typically independent of the network interface they originated from.

Source NAT is done using options within the Linux *iptables* facility. More information on *iptables* can be obtained from the manual or tutorial online at sites such as <http://www.redhat.com>. Additionally, you can contact IDC Customer Service for a copy of the *iptables* tutorial (see Chapter 5). The *iptables* facility under Linux is extensive and complex; and Source NAT is only one part of this facility. The Source NAT submenu is intended to make configuration of this function more user friendly.

Source NAT of incoming IP packets is performed by the receiver according to the following rules:

1. IP packets can originate from any of the available network interfaces and are processed by the receiver in accordance with the data flow in Figure 4-9.
2. Up to 25 rules can be maintained by the Source NAT table. Rules are executed from the first rule to the last rule, in sequence. Order matters; the first rule that is applicable to the incoming packet is applied. Subsequent rules after that are ignored.
3. If there is no applicable rule in the Source NAT table, the default rule is applied to the incoming packet.
4. Packets can be filtered by Source IP Address/Port or Destination IP Address/Port, or both. Ports can only be specified if UDP or TCP protocols are selected.
5. Two types of actions can be taken on the incoming packet where a rule applies:
 - a) Source Network Address Translation (SNAT) – the source IP address/port on the incoming packet is replaced with a new source address/port, as specified in the rule; or
 - b) Masquerading (MASQ) – the source IP address on the incoming packet is replaced with the IP address of the network interface of the receiver, which will be used to output the packet onto the LAN (e.g. NET1/eth0 IP address if the packet is going out the NET1/eth0 interface).
6. Provision is made in the rule table for additional *iptables* options, allowing for maximum flexibility. However, extreme care should be taken when using additional options, and the *iptables* manual must be consulted in this case. (One example of an option usage could be to specify a source network interface for the incoming packets.)

When the Source NAT submenu item is selected under Data Delivery, the Source NAT Table page is displayed for all applicable source address translation rules. A sample Source NAT Table page is shown in Figure 4-23.

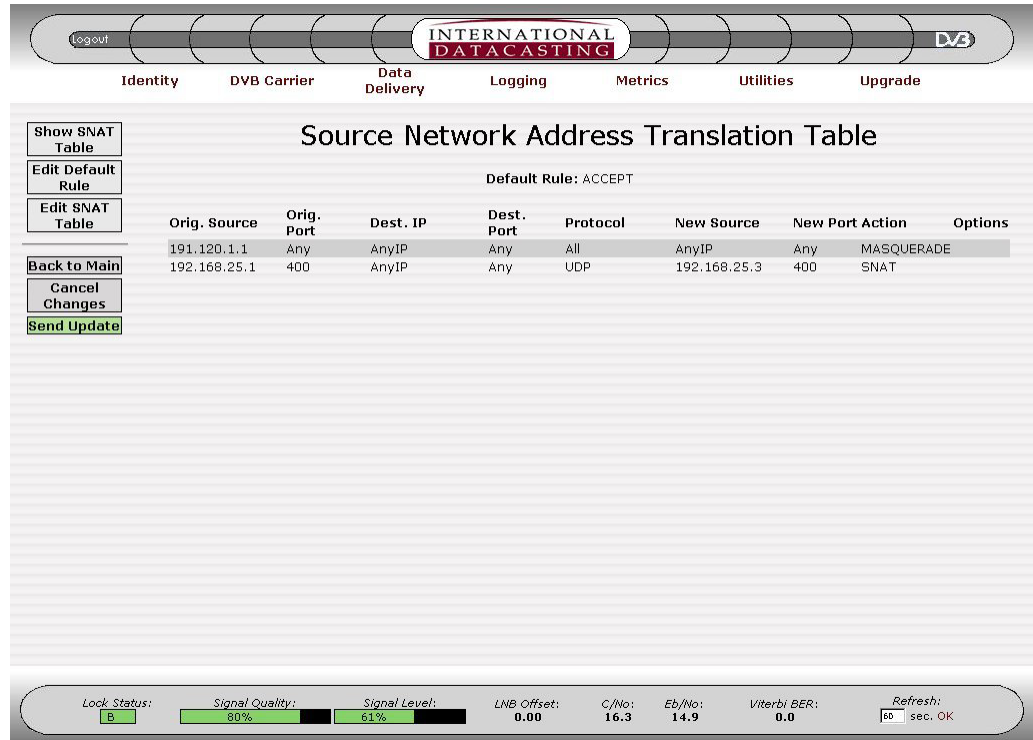


Figure 4-23 Source NAT Table Page

The columns in the Source NAT Table page are described under the Edit Source NAT Default Rule page (Figure 4-24) and Edit Source NAT Table page (Figure 4-25).

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show SNAT Table	Selecting this button will always return you back to the Source NAT Table page, as shown in Figure 4-23.
Edit Default Rule	Selecting this button will enter the Edit Source NAT Default Rule page, as shown in Figure 4-24.
Edit SNAT Table	Selecting this button will enter the Edit Source NAT Table page, as shown in Figure 4-25.

NOTE: The Default Rule should always be set to ACCEPT. DROP should only be used under certain circumstances and may cause all packets not to be forwarded for further processing.

Figure 4-24 Edit Source NAT Default Rule Page

The following fields can be edited on the Edit Source NAT Default Rule page:

Edit Field	Description
Rule Status	<p>This drop down box selects the default action that will be taken on an incoming IP packet if there was no rule match in the SNAT Table. The following selections are available:</p> <p>ACCEPT – accept packet and continue processing and output.</p> <p>DROP – throw away the packet.</p>

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Show SNAT Table
Edit Default Rule
Edit SNAT Table
Back to Main
Cancel Changes
Send Update

Edit Source Network Address Translation Table

Original Source	Port	Destination IP	Port
<input type="checkbox"/> 239.1.1.2	<input type="checkbox"/> 3000	<input type="checkbox"/>	<input type="checkbox"/>
New Source	Port	Protocol	Action
192.168.4.2	1000	<input type="checkbox"/> TCP	SNAT

Options

Add Remove Up Down

Original IP:Port (New Source:Port)<->Destination IP:Port ,Protocol, Action,
239.1.1.1: 3000 (192.168.4.1: 1000) <-> AnyIP : Any , UDP , SNAT ,
239.1.1.2: 3000 (192.168.4.2: 1000) <-> AnyIP : Any , TCP , SNAT ,

Lock Status: A Signal Quality: 92% Signal Level: 67% LNB Offset: 0.00 C/No: 20.1 Eb/No: 18.7 Viterbi BER: 0.0 Refresh: 60 sec. OK

Figure 4-25 Edit Source NAT Table Page

The following fields can be edited on the Edit SNAT Table page:

Edit Field	Description
!	Clicking on the “not” (!) check box negates the logic for the immediate edit field to the right of the check box. For example, !224.1.1.1 for the Source IP would mean all IP packets whose source IP address is not 224.1.1.1.
Original Source	Enter a source IP Address in dotted decimal notation, here if you wish to filter IP packets on their original source address.
Port (Original Source, Destination IP, & New Source)	Enter a TCP or UDP Port number in any of the three port fields, if you wish. If a port is specified, you must select a specific protocol (TCP or UDP).
Destination IP	Enter a Destination IP Address in dotted decimal notation, here if you wish to filter IP packets on their destination IP address.
New Source	Enter a New Source IP address that will replace the Original Source IP address, if using SNAT as the action.
Protocol	Enter the IP packet protocol. Options are Any Protocol (default), UDP/IP Protocol, or TCP/IP Protocol. If port numbers are specified in a rule, you must select UDP or TCP.

NOTE: The Original Source IP/Port and Destination IP/Port fields are optional, and “Any” is the implied default value.

NOTE: *New SNAT rules committed to the table (when Send Update is pressed) may not take immediate effect if the applicable IP data stream is in progress. A suitable period of no data activity for that IP stream (as determined by Linux) may need to take place first before the new rule applies.*

Edit Field	Description
Action	<p>Select an action to be taken for source address translation. The two selections are:</p> <p>SNAT – replace Original Source IP/port with New Source IP/Port and continue processing the packet.</p> <p>MASQ – Masquerade – replace Original Source IP with the IP address of the network interface where the IP packet is output. NOTE: A new Port number is selected by the receiver.</p>
Options	<p>This field is available for “power users”, who wish to enter additional <i>iptables</i> options. Care must be taken in doing so, and order may matter on entry of options. Some combinations may not be possible. Consult the Linux <i>iptables</i> manual or tutorial for more information.</p>

In addition to the edit fields there are four table row manipulation keys:

Key	Description
Add	Add the entered information above the table to the table as the last row.
Remove	Delete the selected (highlighted) row.
Up	If there is more than one row in the table, move the selected row up one row.
Down	If there is more than one row in the table, move the selected row down one row.

Destination NAT

The Destination Network Address Translation (DNAT) submenu is responsible for maintenance of destination IP address translation, which forms part of the IP packet Filtering Function in the receiver. This table defines up to 25 rules that can be used to filter on various IP packet headers and perform a destination address translation. The rules in the Destination NAT Table are applied on incoming IP data, typically independent of the network interface the packet originated from.

Destination NAT is done using options within the Linux *iptables* facility. More information on *iptables* can be obtained from the manual or tutorial online at sites such as <http://www.redhat.com>. Additionally, you can contact IDC Customer Service for a copy of the *iptables* tutorial (see Chapter 5). The *iptables* facility under Linux is extensive and complex; and Destination NAT is only one part of this facility. The Destination NAT submenu is intended to make configuration of this function more user friendly.

Destination NAT of incoming IP packets is performed by the receiver according to the following rules:

1. IP packets can originate from any of the available network interfaces and are processed by the receiver in accordance with the data flow in Figure 4-9.
2. Up to 25 rules can be maintained by the Destination NAT table. Rules are executed from the first rule to the last rule, in sequence. Order matters; the first rule that is applicable to the incoming packet is applied. Subsequent rules after that are ignored.
3. If there is no applicable rule in the Destination NAT table, the default rule is applied to the incoming packet.
4. Packets can be filtered by Source IP Address/Port or Destination IP Address/Port, or both. Ports can only be specified if UDP or TCP protocols are selected.
5. Where a rule applies to a packet, Destination Network Address Translation (DNAT) will be performed every time – the destination IP address/port on the incoming packet is replaced with a new destination address/port, as specified in the rule.
6. Provision is made in the rule table for additional *iptables* options, allowing for maximum flexibility. However, extreme care should be taken when using additional options, and the *iptables* manual must be consulted in this case. (One example of an option usage could be to specify a source network interface for the incoming packets.)

When the Destination NAT submenu item is selected under Data Delivery, the Destination NAT Table page is displayed for all applicable destination address translation rules. A sample Destination NAT Table page is shown in Figure 4-26. (One example of an option usage could be to specify a source network interface for the incoming packets.)

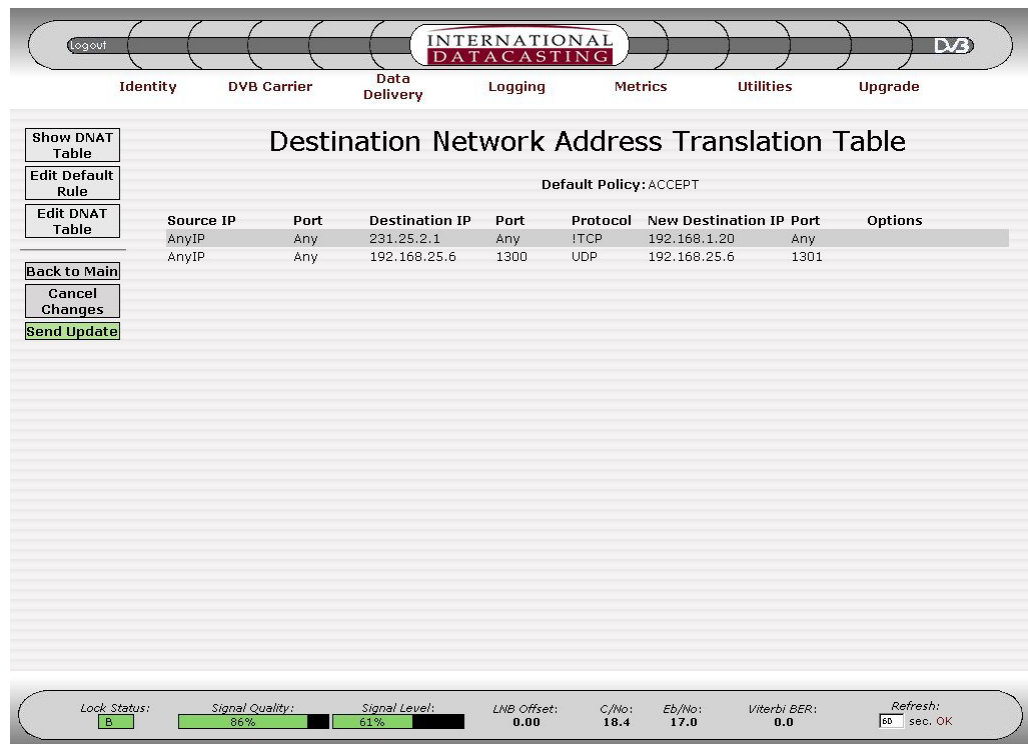


Figure 4-26 Destination NAT Table Page

The columns in the Destination NAT Table page are described under the Edit Destination NAT Default Rule page (Figure 4-27) and Edit Destination NAT Table page (Figure 4-28).

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show DNAT Table	Selecting this button will always return you back to the Destination NAT Table page, as shown in Figure 4-26.
Edit Default Rule	Selecting this button will enter the Edit Destination NAT Default Rule page, as shown in Figure 4-27.
Edit DNAT Table	Selecting this button will enter the Edit Destination NAT Table page, as shown in Figure 4-28.

NOTE: The Default Rule should always be set to ACCEPT. DROP should only be used under certain circumstances and may cause all packets not to be forwarded for further processing.

Figure 4-27 Edit Destination NAT Default Rule Page

The following fields can be edited on the Edit Destination NAT Default Rule page:

Edit Field	Description
Rule Status	<p>This drop down box selects the default action that will be taken on an incoming IP packet if there was no rule match in the DNAT Table. The following selections are available:</p> <p>ACCEPT – accept packet and continue processing and output.</p> <p>DROP – throw away the packet.</p>

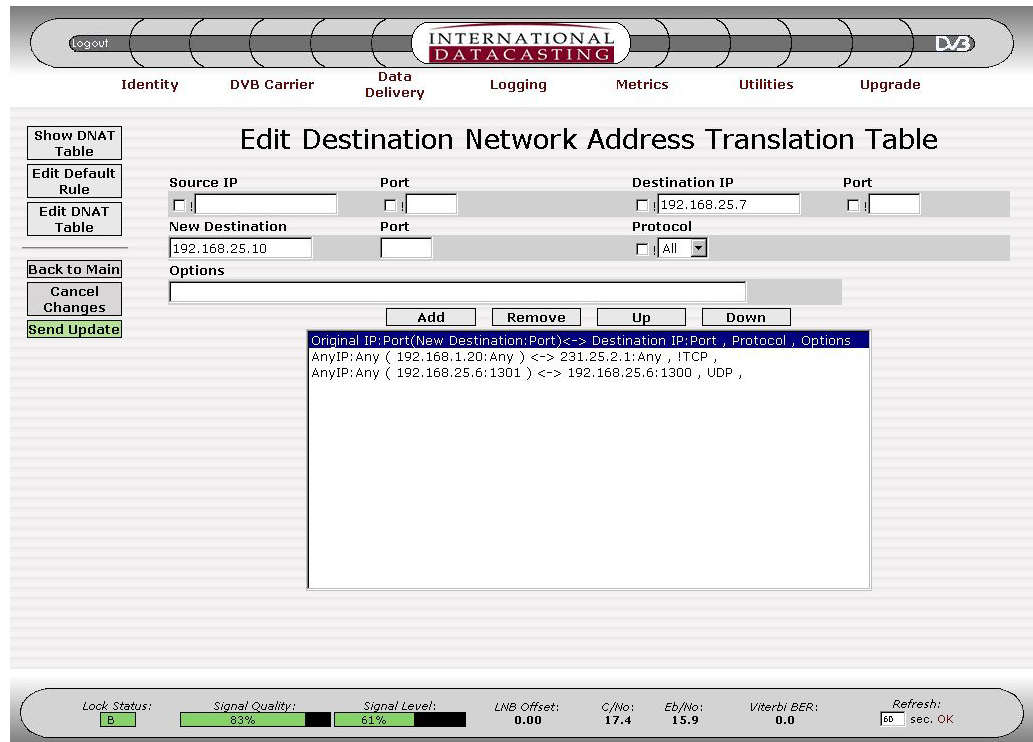


Figure 4-28 Edit Destination NAT Table Page

The following fields can be edited on the Edit DNAT Table page:

Edit Field	Description
!	Clicking on the “not” (!) check box negates the logic for the immediate edit field to the right of the check box. For example, !224.1.1.1 for the Source IP would mean all IP packets whose source IP address is not 224.1.1.1.
Source IP	Enter a source IP Address in dotted decimal notation, here if you wish to filter IP packets on their source address.
Port (Source IP, Destination IP, & New Destination)	Enter a TCP or UDP Port number in any of the three port fields, if you wish. If a port is specified, you must select a specific protocol (TCP or UDP).
Destination IP	Enter a Destination IP Address in dotted decimal notation, here if you wish to filter IP packets on their destination IP address.
New Destination	Enter a New Destination IP address that will replace the original Destination IP address.
Protocol	Enter the IP packet protocol. Options are Any Protocol (default), UDP/IP Protocol, or TCP/IP Protocol. If port numbers are specified in a rule, you must select UDP or TCP.

NOTE: The Source IP/Port and Destination IP/Port fields are optional, and “Any” is the implied default value.

NOTE: New DNAT rules committed to the table (when Send Update is pressed) may not take immediate effect if the applicable IP data stream is in progress. A suitable period of no data activity for that IP stream (as determined by Linux) may need to take place first before the new rule applies.

Edit Field	Description
Options	This field is available for “power users”, who wish to enter additional <i>iptables</i> options. Care must be taken in doing so, and order may matter on entry of options. Some combinations may not be possible. Consult the Linux <i>iptables</i> manual or tutorial for more information.

In addition to the edit fields there are four table row manipulation keys:

Key	Description
Add	Add the entered information above the table to the table as the last row.
Remove	Delete the selected (highlighted) row.
Up	If there is more than one row in the table, move the selected row up one row.
Down	If there is more than one row in the table, move the selected row down one row.

Filtering

The Filtering submenu is responsible for maintenance of the Filtering Table in the receiver. This table defines up to 25 rules that can be used to filter on various IP packets, either by IP header or MAC address criteria. Filtering is performed on incoming IP data, regardless of the network interface the packet originated from.

Filtering is done using options within the Linux *iptables* facility. More information on *iptables* can be obtained from the manual or tutorial online at sites such as <http://www.redhat.com>. Additionally, you can contact IDC Customer Service for a copy of the *iptables* tutorial (see Chapter 5). The *iptables* facility under Linux is extensive and complex; and Filtering is only one part of this facility. The Filtering submenu is intended to make configuration of this function more user friendly.

Filtering of incoming IP packets is performed by the receiver according to the following rules:

1. IP packets can originate from any of the available network interfaces and are processed by the receiver in accordance with the data flow in Figure 4-9.
2. Up to 25 filtering rules can be maintained by the table. Rules are executed from the first rule to the last rule, in sequence. Order matters; the first rule that is applicable to the incoming packet is applied. Subsequent rules after that are ignored.
3. If there is no applicable rule in the Filtering table, the default rule is applied to the incoming packet.
4. Packets can be filtered by Source IP Address/Port or Destination IP Address/Port, or both. Ports can only be specified if UDP or TCP protocols are selected.
5. Provision is made in the rule table for additional *iptables* options, allowing for maximum flexibility. However, extreme care should be taken when using additional options, and the *iptables* tutorial must be consulted in this case. (One example of an option usage is for MAC Address Filtering, using options like: “*-m mac -mac-source xx:xx:xx:xx:xx:xx*”.)

When the Filtering submenu item is selected under Data Delivery, the Filtering Table page is displayed for all applicable filtering rules. A sample Filtering Table page is shown in Figure 4-29.

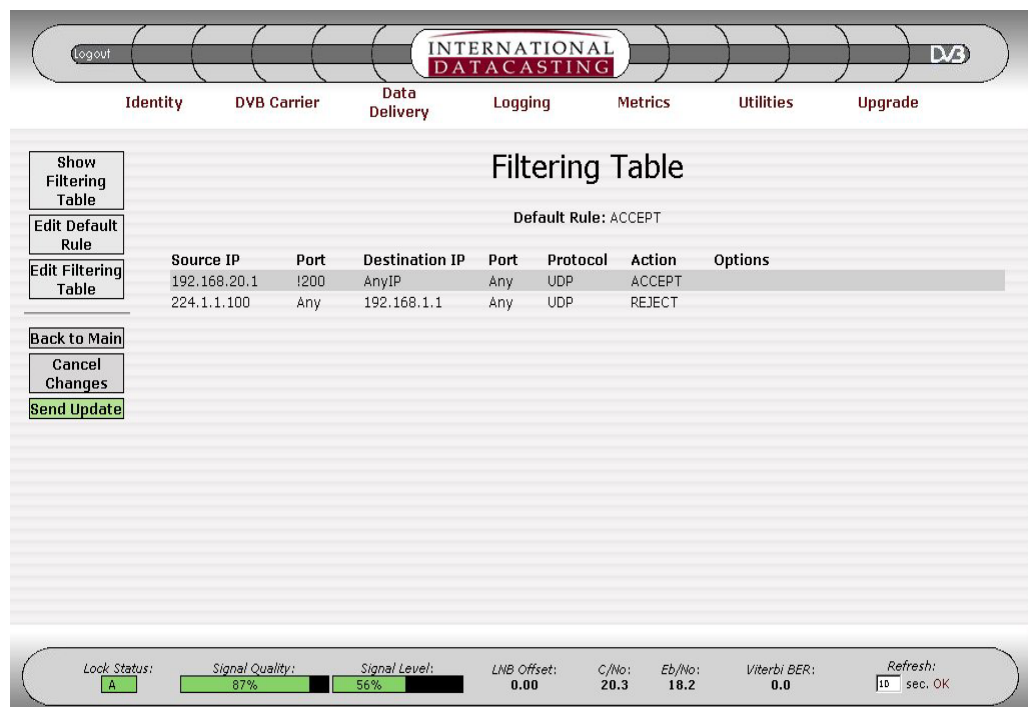
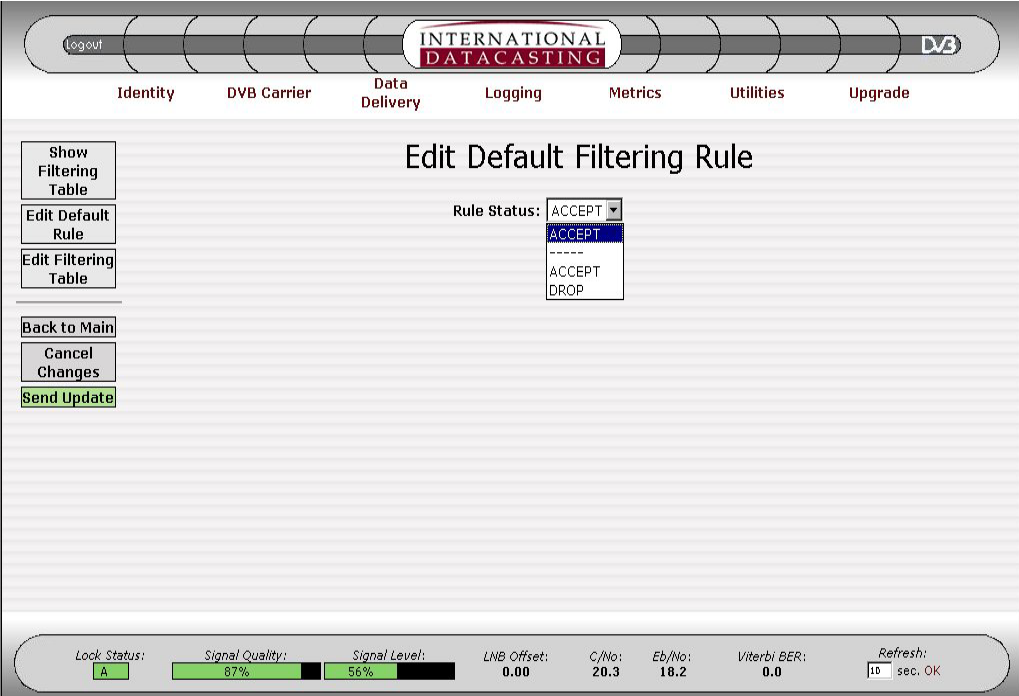


Figure 4-29 Filtering Table Page

The columns in the Filtering Table page are described under the Edit Default Filtering Rule page (Figure 4-30) and Edit Filtering Table page (Figure 4-31).

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show Filtering Table	Selecting this button will always return you back to the Filtering Table page, as shown in Figure 4-29.
Edit Default Rule	Selecting this button will enter the Edit Default Filtering Rule page, as shown in Figure 4-30.
Edit Filtering Table	Selecting this button will enter the Edit Filtering Table page, as shown in Figure 4-31.



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Show Filtering Table

Edit Default Rule

Edit Filtering Table

Back to Main

Cancel Changes

Send Update

Edit Default Filtering Rule

Rule Status:

ACCEPT

ACCEPT
DROP

Lock Status: A Signal Quality: 87% Signal Level: 56% LNB Offset: 0.00 C/No: 20.3 Eb/No: 18.2 Viterbi BER: 0.0 Refresh: 10 sec. OK

Figure 4-30 Edit Default Filtering Rule Page

The following fields can be edited on the Edit Default Filtering Rule page:

Edit Field	Description
Rule Status	<p>This drop down box selects the default action that will be taken on an incoming IP packet if there was no rule match in the Filtering Table. The following selections are available:</p> <p>ACCEPT – accept packet and continue processing and output.</p> <p>DROP – throw away the packet.</p>

Figure 4-31 Edit Filtering Table Page

The following fields can be edited on the Edit Filtering Table page:

Edit Field	Description
!	Clicking on the “not” (!) check box negates the logic for the immediate edit field to the right of the check box. For example, !224.1.1.1 for the Source IP would mean all IP packets whose source IP address is not 224.1.1.1.
Source IP	Enter a source IP Address in dotted decimal notation, here if you wish to filter IP packets on their source IP address.
Port (Source IP, Destination IP)	Enter a TCP or UDP Port number in any of the two port fields, if you wish. If a port is specified, you must select a specific protocol (TCP or UDP).
Destination IP	Enter a Destination IP Address in dotted decimal notation, here if you wish to filter IP packets on their destination IP address.
Protocol	Enter the IP packet protocol. Options are Any Protocol (default), UDP/IP Protocol, or TCP/IP Protocol. If port numbers are specified in a rule, you must select UDP or TCP.
Action	Select an action to be taken for the filtering operation. The three selections are:

NOTE: The Source IP/Port and Destination IP/Port fields are optional, and “Any” is the implied default value.

Edit Field	Description
	<p>ACCEPT – accept packet and continue processing and output.</p> <p>REJECT – throw away the packet, but send an ICMP Destination Unreachable message back on the originating host network interface. This is useful for eth0 and eth1 originating packets. If the packets originated on the sat0 interface, the ICMP message will be thrown away.</p> <p>DROP – throw away the packet.</p>
Options	This field is available for “power users”, who wish to enter additional <i>iptables</i> options. Care must be taken in doing so, and order may matter on entry of options. Some combinations may not be possible. Consult the Linux <i>iptables</i> manual or tutorial for more information.

In addition to the edit fields there are four table row manipulation keys:

Key	Description
Add	Add the entered information above the table to the table as the last row.
Remove	Delete the selected (highlighted) row.
Up	If there is more than one row in the table, move the selected row up one row.
Down	If there is more than one row in the table, move the selected row down one row.

Firewall

The Firewall submenu is responsible for maintenance of the Firewall Tables in the receiver and is really a more advanced filtering mechanism. There are two tables: one for the input chain and one for the output chain, and up to 25 rules can be used to filter on various IP packets, either by IP header or MAC address criteria in each table. Firewall tables are used to filter on incoming IP data, regardless of the network interface the packet originated from.

Firewalling is done using options within the Linux *iptables* facility. More information on *iptables* can be obtained from the manual or tutorial online at sites such as <http://www.redhat.com>. Additionally, you can contact IDC Customer Service for a copy of the *iptables* tutorial (see Chapter 5). The *iptables* facility under Linux is extensive and complex; and Firewalling is only one part of this facility. The Firewall submenu is intended to make configuration of this function more user friendly.

Firewalling is performed by the receiver according to the following rules:

1. IP packets can originate from any of the available network interfaces and are processed by the receiver in accordance with the data flow in Figure 4-9.
2. Up to 50 filtering rules can be entered in the editable table – 25 for INPUT and 25 for OUTPUT. Rules are executed from the first rule to the last rule, in sequence. Order matters; the first rule that is applicable to the incoming packet is applied. Subsequent rules after that are ignored.
3. If there is no applicable rule in the appropriate Firewall table, the corresponding Input or Output default rule is applied to the packet.
4. Packets can be filtered by Source IP Address/Port or Destination IP Address/Port, or both. Ports can only be specified if UDP or TCP protocols are selected.
5. Provision is made in the rule table for additional *iptables* options, allowing for maximum flexibility. However, extreme care should be taken when using additional options, and the *iptables* manual must be consulted in this case. (One example of an option usage is for MAC Address Filtering, using options like: “*-m mac -mac-source xx:xx:xx:xx:xx:xx*”.)

When the Firewalling submenu item is selected under Data Delivery, the Firewall Table page is displayed for all applicable firewalling rules. A sample Firewall Table page is shown in Figure 4-32.

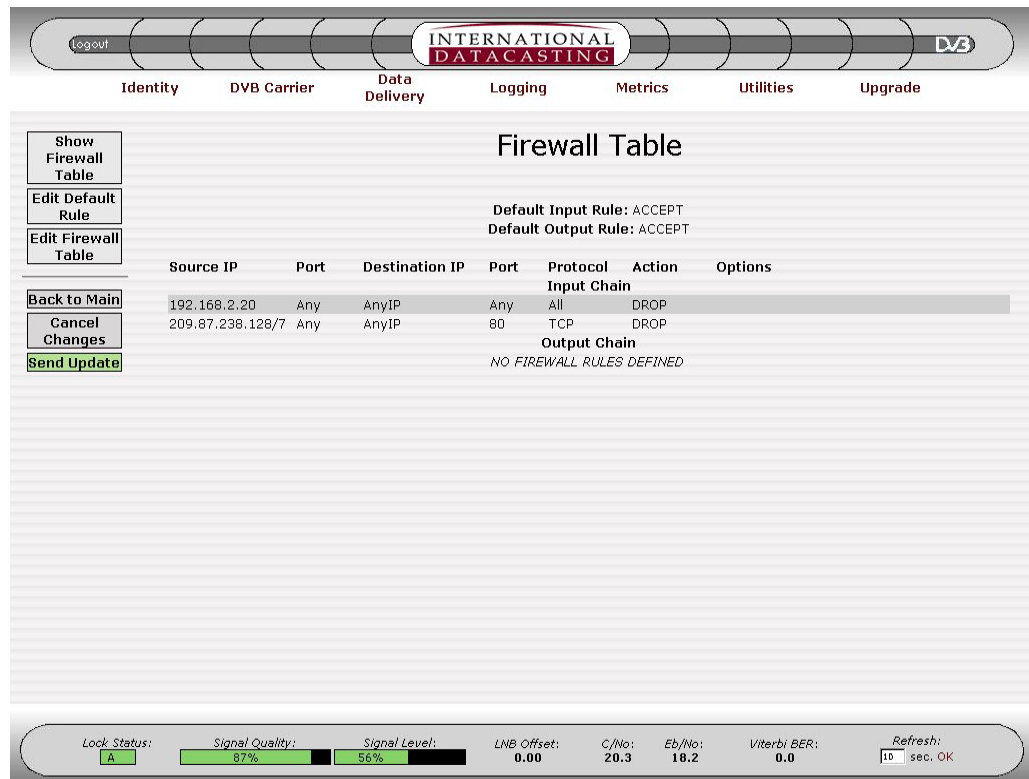


Figure 4-32 Firewall Table Page

The columns in the Firewall Table page are described under the Edit Default Firewall Rule page (Figure 4-33) and Edit Firewall Table page (Figure 4-34). There are two independent tables displayed: one for the Input Chain and one for Output Chain. In the example in Figure 4-32, some rules have been defined for the Input Chain, but none for the Output Chain.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show Firewall Table	Selecting this button will always return you back to the Firewall Table page, as shown in Figure 4-32.
Edit Default Rule	Selecting this button will enter the Edit Default Firewall Rule page, as shown in Figure 4-33.
Edit Firewall Table	Selecting this button will enter the Edit Firewall Table page, as shown in Figure 4-34.

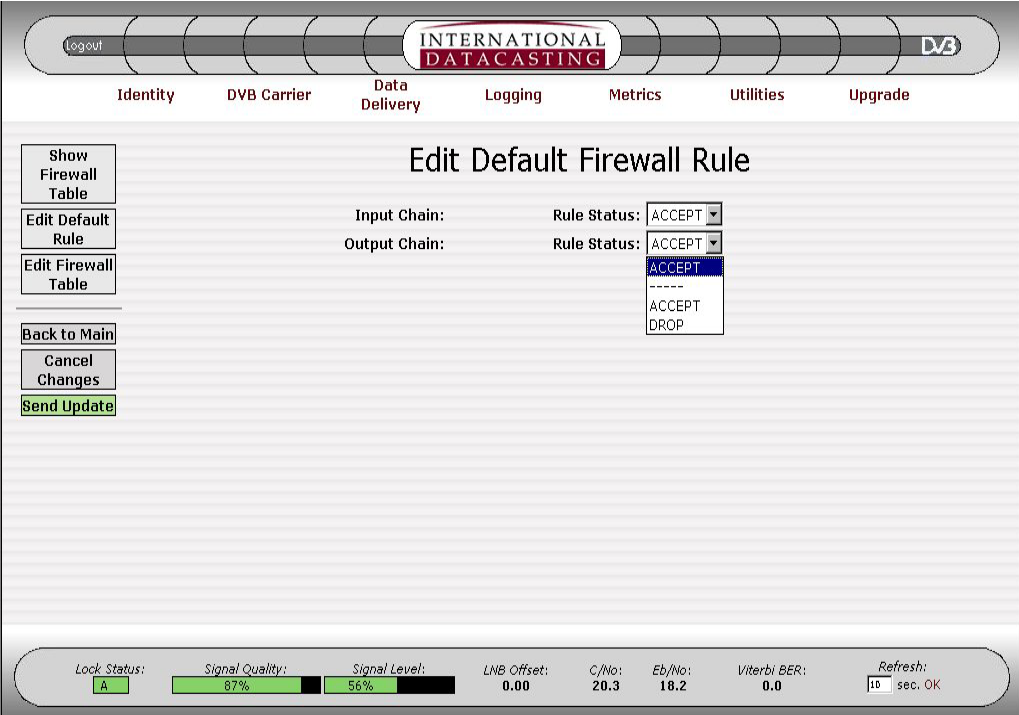


Figure 4-33 Edit Default Firewall Rule Page

The following fields can be edited on the Edit Default Firewall Rule page:

Edit Field	Description
Input Chain Rule Status	<p>This drop down box selects the default action that will be taken on an IP packet processed at the Input Chain, if there was no rule match in the Firewall Table (INPUT rules). The following selections are available:</p> <p>ACCEPT – accept packet and continue processing.</p> <p>DROP – throw away the packet.</p>
Output Chain Rule Status	<p>This drop down box selects the default action that will be taken on an IP packet processed at the Output Chain, if there was no rule match in the Firewall Table (OUTPUT rules). The following selections are available:</p> <p>ACCEPT – accept packet and continue processing and output.</p> <p>DROP – throw away the packet.</p>

The screenshot displays the 'Edit Firewall Table' interface. On the left, a sidebar contains buttons: 'Show Firewall Table', 'Edit Default Rule', 'Edit Firewall Table', 'Back to Main', 'Cancel Changes', and 'Send Update'. The main area is titled 'Edit Firewall Table' and contains several input fields: 'Source IP' with a '!' checkbox, 'Port', 'Destination IP' with a '!' checkbox, 'Chain' (set to 'INPUT'), 'Protocol' (set to 'All'), and 'Action' (set to 'ACCEPT'). Below these fields are 'Add', 'Remove', 'Up', and 'Down' buttons. A table lists the current rule: 'Chain, Source IP:Port->Destination IP:Port, Protocol, Action, Options' followed by 'INPUT, 209.87.238.128/7: Any <-> AnyIP: 80, TCP, DROP'. The bottom status bar shows: Lock Status: A, Signal Quality: 87%, Signal Level: 56%, LNB Offset: 0.00, C/No: 20.2, Eb/No: 18.2, Viterbi BER: 0.0, and Refresh: 10 sec. OK.

Figure 4-34 Edit Firewall Table Page

The following fields can be edited on the Edit Filtering Table page:

Edit Field	Description
!	Clicking on the “not” (!) check box negates the logic for the immediate edit field to the right of the check box. For example, !224.1.1.1 for the Source IP would mean all IP packets whose source IP address is not 224.1.1.1.
Source IP	Enter a source IP Address in dotted decimal notation, here if you wish to filter IP packets on their source IP address.
Port (Source IP, Destination IP)	Enter a TCP or UDP Port number in any of the two port fields, if you wish. If a port is specified, you must select a specific protocol (TCP or UDP).
Destination IP	Enter a Destination IP Address in dotted decimal notation, here if you wish to filter IP packets on their destination IP address.
Chain	Select the Input or Output Chain. You can have 25 rules for the input chain and 25 rules for the output chain.
Protocol	Enter the IP packet protocol. Options are Any Protocol (default), UDP/IP Protocol, or TCP/IP Protocol. If port numbers are specified in a rule, you must select UDP or TCP.

NOTE: The Source IP/Port and Destination IP/Port fields are optional, and “Any” is the implied default value.

Edit Field	Description
Action	<p>Select an action to be taken for the firewall operation. The three selections are:</p> <p>ACCEPT – accept packet and continue processing and output.</p> <p>REJECT – throw away the packet, but send an ICMP Destination Unreachable message back on the originating host network interface. This is useful for eth0 and eth1 originating packets. If the packets originated on the sat0 interface, the ICMP message will be thrown away.</p> <p>DROP – throw away the packet.</p>
Options	<p>This field is available for “power users”, who wish to enter additional <i>iptables</i> options. Care must be taken in doing so, and order may matter on entry of options. Some combinations may not be possible. Consult the Linux <i>iptables</i> manual or tutorial for more information.</p>

In addition to the edit fields there are four table row manipulation keys:

Key	Description
Add	Add the entered information above the table to the table as the last row.
Remove	Delete the selected (highlighted) row.
Up	If there is more than one row in the table, move the selected row up one row.
Down	If there is more than one row in the table, move the selected row down one row.

TTL Translation

The Time-To-Live (TTL) Translation submenu is responsible for maintenance of the TTL Translation Table. This table defines up to 25 rules that can be used to modify the value of the TTL parameter in the header of an IP packet being processed by the receiver, regardless of the network interface the packet originated from.

TTL Translation to incoming IP packets is performed by the receiver according to the following rules:

1. Up to 25 rules can be maintained by the table. Rules are executed from the first rule to the last rule, in sequence. All rules are executed for every packet.
2. IP packets can originate from any of the available network interfaces and are processed by the receiver in accordance with the data flow in Figure 4-9.
3. The TTL value of an incoming packet can never be less than 1.
4. The TTL value of an outgoing packet must be greater than 0.
5. The TTL Translation Table rules are applied before the incoming packet is further processed by the IP Stack (routing and so on). Multiple rules in the table can be applied to the same incoming packet, if they are applicable, and the effect will be cumulative.
6. The operating system always decrements the TTL value of the incoming packet by 1, after the TTL Translation Table rules have been applied.
7. If an incoming packet has a TTL of 1 when it arrives, and no TTL Translation rules cause the TTL value to change, it will be decremented to 0. Therefore, it will not be output on any network device, however, it is still available if an internal application requires it. If not, the packet is discarded.
8. The legal range of TTL values is 1 to 255. Any TTL SET, INC (increment), or DEC (decrement) operation will be clamped at 1 or 255, if the operation causes a TTL value to occur outside the legal range.

When the TTL Translation submenu item is selected under Data Delivery, the TTL Translation Table page is displayed for all applicable TTL Translation rules. A sample TTL Translation Table page is shown in Figure 4-35.

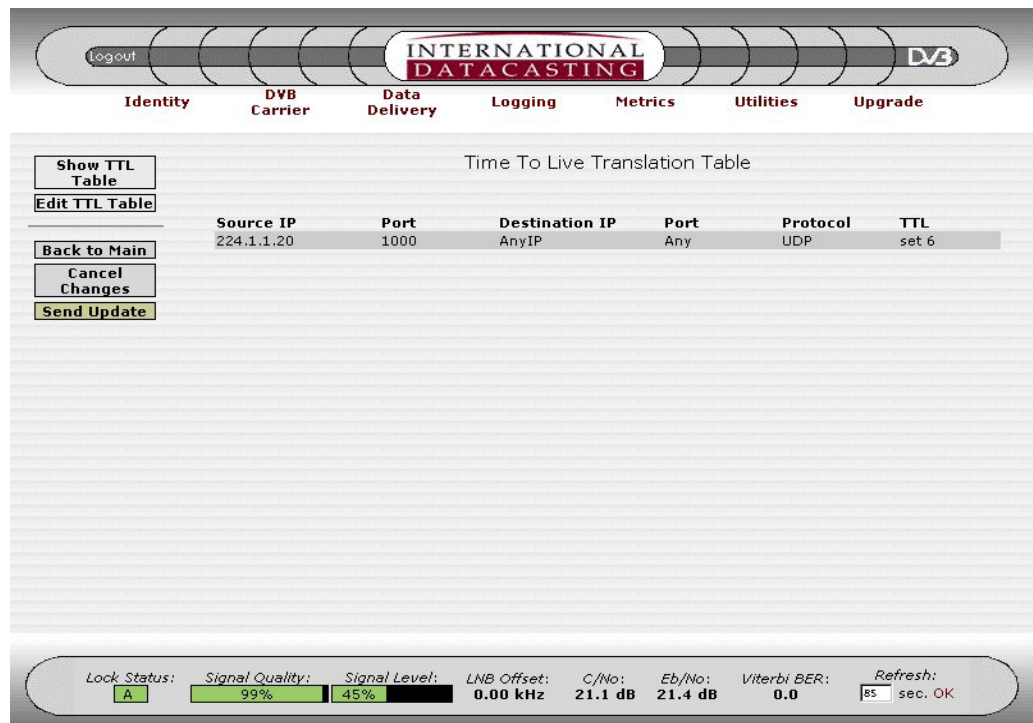


Figure 4-35 TTL Translation Table Page

The columns in the table are described under the Edit TTL Translation Table page.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show TTL Table	Selecting this button will always return you back to the TTL Translation Table page, as shown in the example in Figure 4-35.
Edit TTL Table	Selecting this button will enter the Edit TTL Translation Table page, as shown in the example in Figure 4-36.

Figure 4-36 Edit TTL Translation Table Page

The following fields can be edited on the Edit TTL Translation Table page:

Edit Field	Description
!	Clicking on the “not” (!) check box negates the logic for the immediate edit field to the right of the check box. For example, ! 224.1.1.1 for the Source IP would mean all IP packets whose source IP address is not 224.1.1.1.
Source IP	Enter a source IP Address in dotted decimal notation, here if you wish to select IP packets on their source IP address.
(Source) Port	Enter a source Port number here if you wish. If a port is specified, you must select a specific protocol.
Destination IP	Enter a destination IP Address in dotted decimal notation, here if you wish to select IP packets on their destination IP address.
(Destination) Port	Enter a destination Port number here if you wish. If a port is specified, you must select a specific protocol.
Protocol	Enter the IP packet protocol. Options are Any Protocol (default), UDP/IP Protocol, or TCP/IP Protocol.

NOTE: If an IP Address or Port number field is left blank, “Any” is the implied default value.

Edit Field	Description
Time To Live	You must enter a TTL value operation in this field. Operations can be SET, INC (increment) and DEC (decrement). TTL values must be between 1 and 255. All TTL operations follow the rules above.

In addition to the edit fields there are four table row manipulation keys:

Key	Description
Add	Add the entered information above the table to the table as the last row.
Remove	Delete the selected (highlighted) row.
Up	If there is more than one row in the table, move the selected row up one row.
Down	If there is more than one row in the table, move the selected row down one row.

XD Suite (SFX only)

When the XD Suite Main Menu Tool Bar item is selected, the XD Suite submenu page is displayed, which provides submenu items used to configure the XD client application within the SFX2100. The following submenus are available (with sample pages in the referenced Figures):

1. Windows File Sharing (Figure 4-37) – Samba file sharing configuration, controlling how files placed on the SFX hard drive can be shared over the LAN to Windows based nodes.
2. XD Monitor (Figure 4-38) – local status monitor function for real time XD client status display.
3. XD Client (Figure 4-39 & 4-40) – configuration and logging for the XD Client
4. XD Retriever (Figure 4-41 & 4-42) – configuration and logging for the XD Retriever
5. XD Dataman (Figure 4-43 & 4-44) – configuration and logging for the XD Data Manager

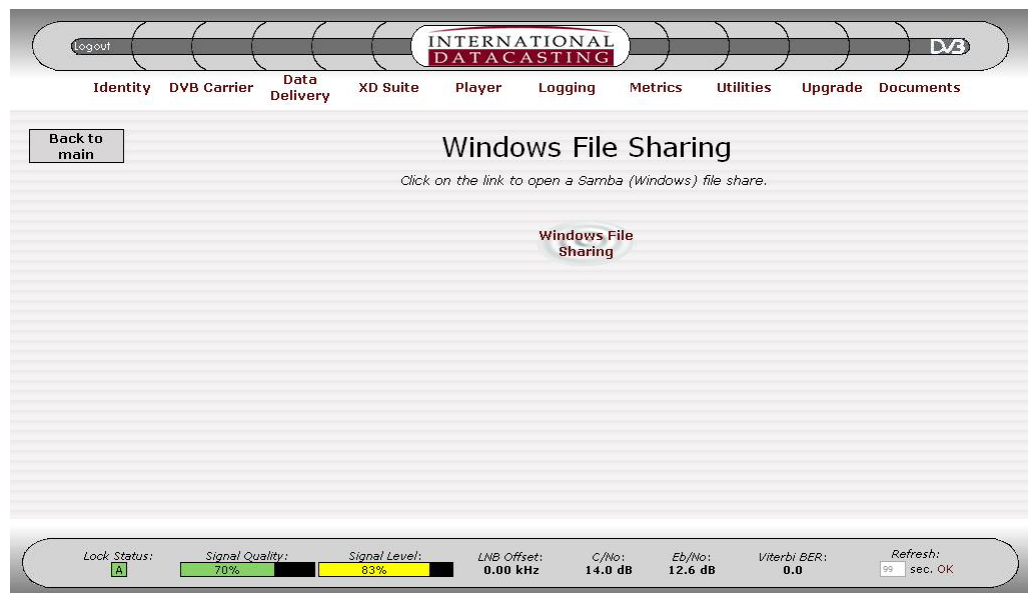


Figure 4-37 Windows File Sharing Page

By clicking on the Windows Files Sharing puddle, you can establish a network file sharing connection between a Windows PC and the SFX. Once this connection is established, you will be able to access (view, add, delete, rename) the data file contents of the SFX remotely from your Windows PC.

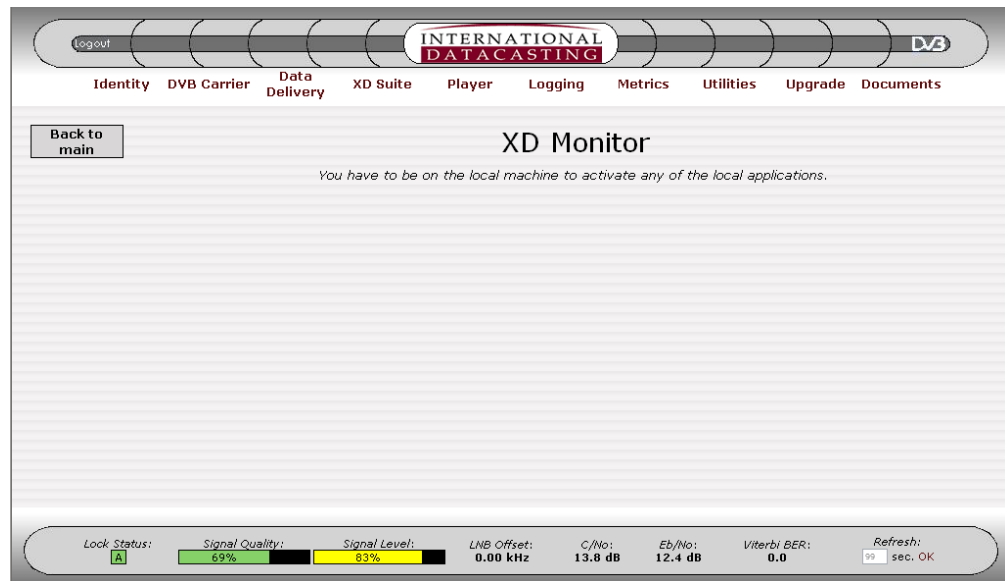


Figure 4-38 XD Monitor Page

The XD Monitor page is only available locally on the host SFX, not from a remote browser, as shown in Figure 4-38. On the Local Web GUI, you can click on the XD Monitor puddle and you will be able to activate an XD Monitor tool which will allow you to view real time status of the XD client.

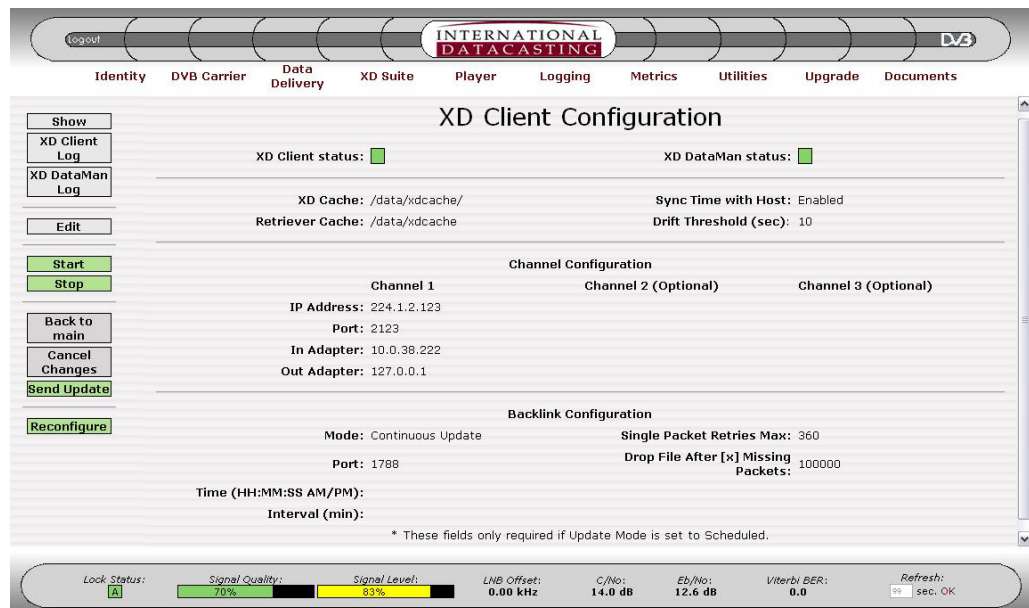


Figure 4-39 XD Client Configuration Page

The XD Client is a file reception application that runs on the SFX. It also has an optional backlink channel for confirmed delivery and status feedback. The active status of this application is reported by a green (active) or red (not active) box. Similarly, Dataman is an Application which will allow you to upload SFX received content to an FTP Server and its status is also shown.

The remaining headings in the XD Client Configuration table are described under the Edit XD Client Configuration page.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show	Selecting this button will always return you back to the XD Client Configuration page, as shown in the example in Figure 4-39.
XD Client Log	Selecting this button will allow you to easily view the XD Client log file.
XD Dataman Log	Selecting this button will allow you to easily view the XD Dataman log file.
Edit	Selecting this button will enter the Edit XD Client Configuration page, as shown in the example in Figure 4-40.
Start	Selecting this button will “start” the XD Client application.
Stop	Selecting this button will “stop” the XD Client application.
Reconfigure	Selecting this button will allow you to apply XD Client configuration changes.

NOTE: When changing the XD Client configuration it is necessary to click the “Reconfigure” button to apply changes.

Figure 4-40 Edit XD Client Configuration Page

The following fields can be edited on the Edit XD Client Configuration page:

NOTE: Do not activate the Sync Time with Host option without consulting your service provider as it may conflict with other forms of time synchronization (e.g. NTP)!

Edit Field	Description
(XD) Cache	This is the default location where received files are stored by the XD Client.
Retriever Cache	This is the default location where received files are stored by XD Retriever. (This is specified in the XD Retriever Configuration page.)
Sync Time with Host	This allows the SFX to sync its clock to the same time as the XD Host (the File Broadcast Application at the head end).
Drift Threshold (sec)	This is the threshold for clock drift in which to apply "Sync Time with Host" clock changes.

Channel Configuration:

IP Address	Enter a source IP Address in dotted decimal notation. This is the IP address the XD Host at the head end is transmitting the XD data on.
Port	This is the IP port the XD Host is transmitting XD data on.
In Adapter	This is the network adapter interface the XD data is being received on.

Edit Field	Description
Out Adapter	This is the network adapter interface the XD Client will use to communicate with the XD Host.
Backlink Configuration:	
Update Mode	XD Backlink can be configured as follows: <ul style="list-style-type: none"> • Disabled • Continuous Update • Scheduled Update
Port	This is the port address the Backlink will use to communicate with the XD Host Backlink Server at the head end.
Time	This is the Time you can schedule Backlink to communicate with the head end. (This is only applicable if Backlink is configured for "Scheduled Update").
Interval	This is the interval time between Backlink connections to the head end, in relationship to the scheduled time. (This is only applicable if Backlink is configured for "Scheduled Update").
Single Packet Retries Max.	This is the maximum times Backlink will try to recover a missed XD packet.
Drop File After [x] Missing Packets	This is the maximum number of missed XD Packets that Backlink will try to recover from.

The screenshot shows the 'XD Retriever Configuration' page. At the top, there is a navigation bar with tabs: Logout, Identity, DVB Carrier, Data Delivery, XD Suite, Player, Logging, Metrics, Utilities, Upgrade, and Documents. The 'XD Suite' tab is active. Below the navigation bar, the page title 'XD Retriever Configuration' is displayed. On the left side, there is a sidebar with buttons: Show, XD Retriever Log, Edit, Start, Stop, Back to main, Cancel Changes, Send Update, and Reconfigure. The main content area shows the 'XD Retriever status' as 'On' (indicated by a red square). Below this, the configuration parameters are listed: Retriever Cache: /data/xdcache, XD Cache: /data/xdcache/, Concurrent Threads: 3, Kilobits Per Second Throttle: 1000, Refresh Server IP Address: (blank), Refresh Server Port: 8000, Refresh Rate (sec): 60, and Adapter: localhost: 127.0.0.1. At the bottom, there is a status bar with various indicators: Lock Status: [A], Signal Quality: 68%, Signal Level: 83%, LNB Offset: 0.00 kHz, C/No: 13.5 dB, Eb/No: 12.1 dB, Viterbi BER: 0.0, and Refresh: 55 sec. OK.

Figure 4-41 XD Retriever Configuration Page

XD Retriever is an Application that will allow you to retrieve (pull) files from an XD Host. This application requires a two-way channel (e.g. Internet or modem) from the SFX to the XD Host.

The XD Retriever status shows the active (green) or inactive (red) status of the application. The remaining headings in the XD Retriever Configuration page are described under the Edit XD Retriever Configuration page.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show	Selecting this button will always return you back to the XD Retriever Configuration page, as shown in the example in Figure 4-41.
XD Retriever Log	Selecting this button will allow you to easily view the XD Retriever log file.
Edit	Selecting this button will enter the Edit XD Retriever Configuration page, as shown in the example in Figure 4-42.
Start	Selecting this button will “start” the XD Retriever application.
Stop	Selecting this button will “stop” the XD Retriever application.
Reconfigure	Selecting this button will allow you to apply XD Retriever configuration changes.

NOTE: When changing the XD Retriever configuration it is necessary to click the “Reconfigure” button to apply changes.

The screenshot shows the 'XD Retriever Configuration' page. On the left is a sidebar with buttons: Show, XD Retriever Log, Edit, Start, Stop, Back to main, Cancel Changes, Send Update, and Reconfigure. The main area contains the following configuration fields:

- Retriever Cache: /data/xdcache
- XD Cache: /data/xdcache/
- Concurrent Threads: 3
- Kilobits Per Second Throttle: 1000
- Refresh Server IP Address: (empty field)
- Refresh Server Port: 8000
- Refresh Rate (sec): 60
- Adapter: Net1 (eth0): 192.168.0.1

At the bottom, a status bar shows: Lock Status: A, Signal Quality: 68%, Signal Level: 83%, LNB Offset: 0.00 kHz, C/No: 13.5 dB, Eb/No: 12.1 dB, Viterbi BER: 0.0, and Refresh: 99 sec. OK.

Figure 4-42 Edit XD Retriever Configuration Page

The following fields can be edited on the Edit XD Retriever Configuration page:

Edit Field	Description
Retriever Cache	Default location where received files are stored by XD Retriever.
XD Cache	Default location where received files are stored by the XD Client (This is specified on the XD Client configuration page).
Concurrent Threads	This field is the maximum number simultaneous connections.
Kilobits per Second Throttle	This field is the maximum data transfer rate (throttle) in (kb/s).
Refresh Server IP Address	IP Address of the Server (Contact Service Provider for this information).
Refresh Server Port	IP Port of the Server (Contact Service Provider for this information).
Refresh Rate (sec)	This field is the server polling interval.
Adapter	This is the network adapter interface the XD Retriever data is being received on.

Figure 4-43 XD Dataman Configuration Page

Dataman is an Application which will allow you upload SFX received content to an FTP Server. Similar to the other configuration pages, its active status is displayed on the page.

The remaining headings in the XD Dataman Configuration page are described under the Edit XD Dataman Configuration page.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show	Selecting this button will always return you back to the XD Dataman Configuration page, as shown in the example in Figure 4-43.
XD Dataman Log	Selecting this button will allow you to easily view the XD Dataman log file.
Edit	Selecting this button will enter the Edit XD Dataman Configuration page, as shown in the example in Figure 4-44.
Start	Selecting this button will “start” the XD Dataman application.
Stop	Selecting this button will “stop” the XD Dataman application.
Reconfigure	Selecting this button will allow you to apply XD Dataman configuration changes.

NOTE: When changing the XD Dataman configuration it is necessary to click the “Reconfigure” button to apply changes.

Edit XD DataMan Configuration

Throttle: 20000 kbs

Retry Maximum: 60

Retry Delay: 60 seconds

Purge Files: ☒ Enabled ☐ Disabled

Purge Delay: 600 seconds

Directory Cleanup: ☐ Enabled ☒ Disabled

Type: Other

Default FTP Server Settings. They can be overwritten by Relay.XML for specific sites.

Server Address: :

User Name:

Password:

Type: Other

Lock Status: [A] Signal Quality: 69% Signal Level: 83% LNB Offset: 0.00 kHz C/No: 13.8 dB Eb/No: 12.4 dB Viterbi BER: 0.0 Refresh: 10 sec. OK

Figure 4-44 Edit XD Dataman Configuration Page

The following fields can be edited on the Edit XD Dataman Configuration page:

Edit Field	Description
Throttle	This is the maximum output data rate of XD Dataman. This is an important parameter when considering LAN utilization.
Retry Maximum	This is the number of times XD Dataman will retry to upload a file to an FTP Server, if it not successful the first time.
Retry Delay	This specifies the interval between upload retries.
Purge Files	This specifies whether or not files are removed from the SFX after upload to FTP Server.
Purge Delay	If file purging is enabled, this specifies the time interval after files have been uploaded to FTP Server before file is removed from the SFX hard drive.
Directory Cleanup	If this option is enabled, any created directories will be removed after all contained files are removed.
Type	This field specifies the type of FTP Server (Other /Pinnacle).
FTP Server Settings:	
Server Address	This is the IP Address of the FTP Server that data will be sent to (site specific information).
User Name	This is the login User Name of the FTP Server.
Password	This is login FTP Server Password.
Type	This field specifies the type of FTP Server (Other /Pinnacle).

Player (SFX only)

When the Player Main Menu Tool Bar item is selected, a series of XD Player related configuration and playlist submenus can be selected, which provide monitor and control of the optional SFX2100 audio/video player and playlist application. The following submenus are available:

1. Player – XD Player and playlist configuration, controlling how multimedia files placed on the SFX hard drive can be played out in a playlist, and which destination will be used to play or stream them out of the SFX2100.
2. Text Message – video text messaging configuration, controlling how text can be scrolled across a video image as it is playing out of the SFX2100.

Logging

NOTE: On the SFX2100, the Logging page is Webmin based and allows access to more application logs than the SRA2100. This section addresses the primary satellite receiver logging function, which is referred to as the “SLiRF” log on the SFX2100.

When the Logging Main Menu Tool Bar item is selected, the Logging page is displayed, which displays a list of logged events of interest, relating to receiver operation and fault conditions. Events may be logged either locally (to a buffer in shared memory and optionally written to the internal storage device) or to another network node via remote UDP/IP connection, or to both locations. The receiver logging facility makes use of the Linux *syslogd* components, as well as its own custom components.

Five levels of log messages are supported. From lowest to highest priority, these are:

1. Debug Messages (mostly from 3rd party applications),
2. Informational Messages,
3. Warnings,
4. Errors,
5. Critical Errors.

The log can be filtered on these levels so that only messages at a desired priority and above are actually logged. A time stamp, originator identifier (unit name on the network) and logged message are provided for each event logged. The message source can be one of:

1. the Linux Operating System,
2. the “SLiRF” receiver core application software (SRA2100 or SFX2100),
3. any internal software applications (e.g. XD, Cyphercast) or 3rd party applications (applicable to the SFX2100 series mostly).

Additional details on the logging features can be found in the descriptions for the Edit Fields below. A sample logging page is shown in Figure 4-45.

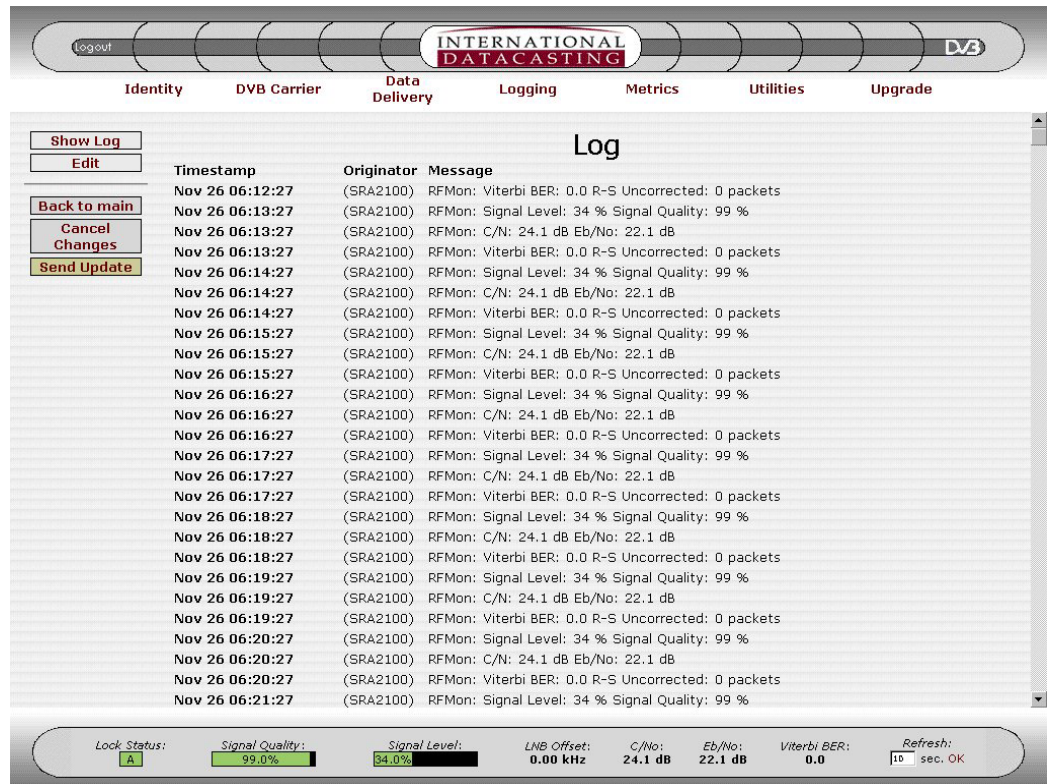


Figure 4-45 Logging Page

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show Log	Selecting this button will always return you back to the Logging page, as shown in Figure 4-45.
Edit	Selecting this button will enter the Logging Preferences Edit page, as shown in Figure 4-46.

When the Edit menu item is selected, the Logging Preferences Edit page will be displayed, as shown by the sample page in Figure 4-46. Each edit field is described after the figure.

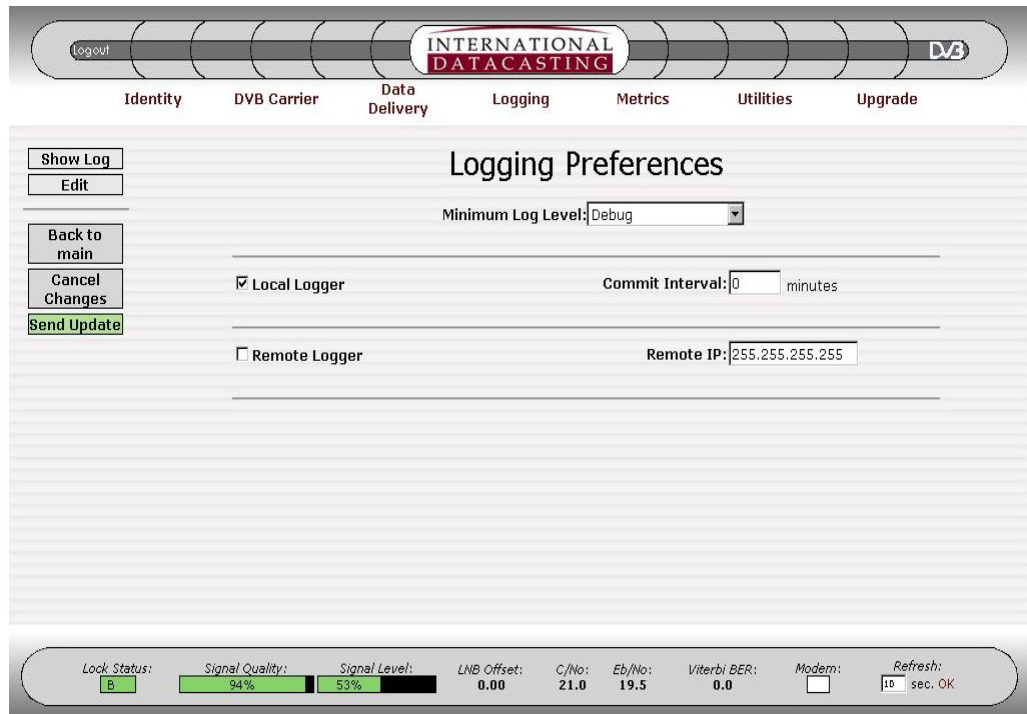


Figure 4-46 Logging Preferences Edit Page

The following fields can be edited on the Logging Preferences Edit page:

Edit Field	Description
Minimum Log Level	<p>This field selects the type of events that are to be logged, according to the following 5 priority levels (from lowest to highest):</p> <p><u>Debug</u> – debug level messages that come primarily from 3rd party applications that are installed on the receiver. This level is also very useful for debugging PPP scripts if the modem option is installed.</p> <p><u>Info</u> – informational messages, including the RF metrics information, which is shown at the bottom of the screen. The update rate can be configured through the Web GUI, under the <i>Metrics</i> section.</p> <p><u>Warning</u> – operational warning messages, including receiver in and out of lock conditions.</p> <p><u>Error</u> – error messages caused by fault conditions, including system shutdown and startup/boot.</p> <p><u>Critical</u> – critical error conditions, which caused a restart/reboot of the receiver, including hardware failures.</p> <p>Only messages at the desired priority level and above will be actually logged.</p>

Edit Field	Description
Local Logger	<p>If this check box is enabled, local logging mode is turned on and events are written to an internal (64k) buffer (approximately 1200 messages). New log entries are always written to the buffer, regardless of commit interval (see below). This buffer is circular so that when it fills up, new log entries overwrite the oldest ones.</p>
Commit Interval	<p>When local logger is selected, the commit interval can be used to periodically force a flush of the internal logging buffer to a logging file on disk. The commit interval is specified in minutes. A write to the log file on disk is only done if the buffer being flushed has new entries in it, since the last write to the file. The file on disk is overwritten at each commit interval.</p> <p>Specifying 0 disables the commit interval feature.</p> <p>This feature is useful, because the logger reads the disk file on each power up, so that log messages that were made prior to the last shutdown will be available for viewing.</p>
Remote Logger	<p>If this check box is enabled, remote logging mode is turned on and the <i>syslogd</i> daemon on the receiver forwards log messages to the <i>syslogd</i> daemon on a remote host over UDP/IP, at the IP address specified (see below). These messages are then processed according to the remote host's <i>syslog.conf</i> file.</p>
Remote IP	<p>For remote logging, the IP address of the remote <i>syslogd</i> daemon can be specified here, in dotted decimal notation (e.g. 192.168.0.1). The default remote IP address is the global broadcast address (all 255), thus allowing all remote <i>syslogd</i> daemons on the LAN to record the logging output.</p>

Metrics

When the Metrics Main Menu Tool Bar item is selected, the Metrics page is displayed, which provides advanced metrics information relating to all aspects of the performance of the receiver on the network, as follows:

1. Satellite Interface Metrics (SRA2100 and SFX2100) – metrics relating to all aspects of the core satellite receiver/router operation. See example Figure 4-47.
2. Apache Metrics (SFX2100 only) – metrics/statistics relating to the web traffic of the apache server. See example Figure 4-48.
3. Multi Router Traffic Grapher (MRTG) Metrics (SFX2100 only) – key metrics displayed in graphic form using the MRTG real time graphing tool. See example Figure 4-49.

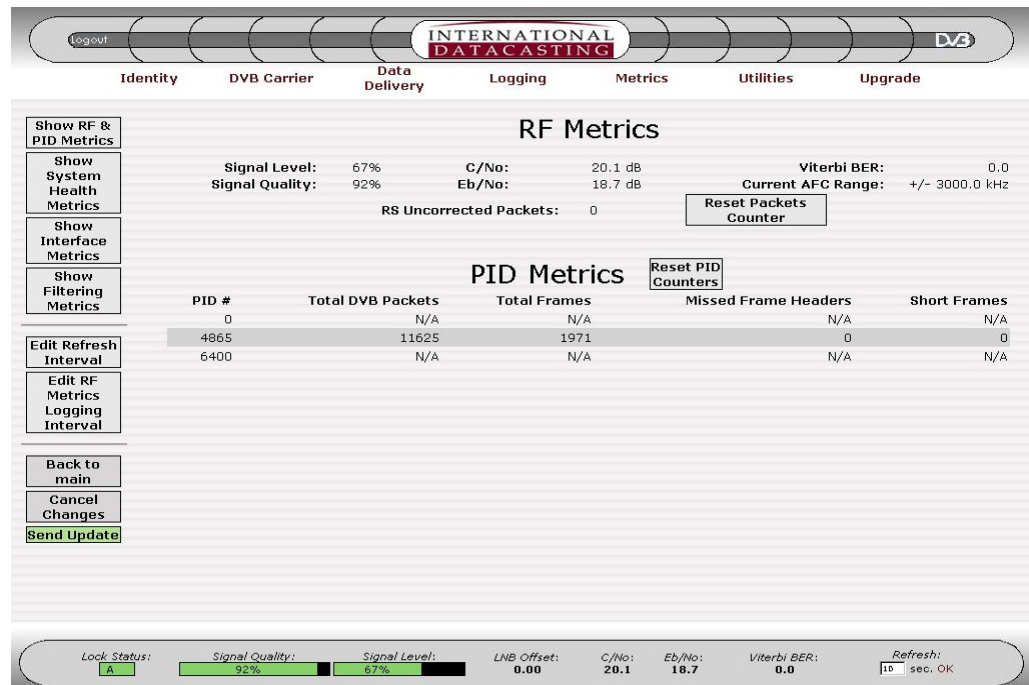


Figure 4-47 Satellite Interface RF and PID Metrics Page

SRA/SFX2100 SERIES SATELLITE RECEIVER

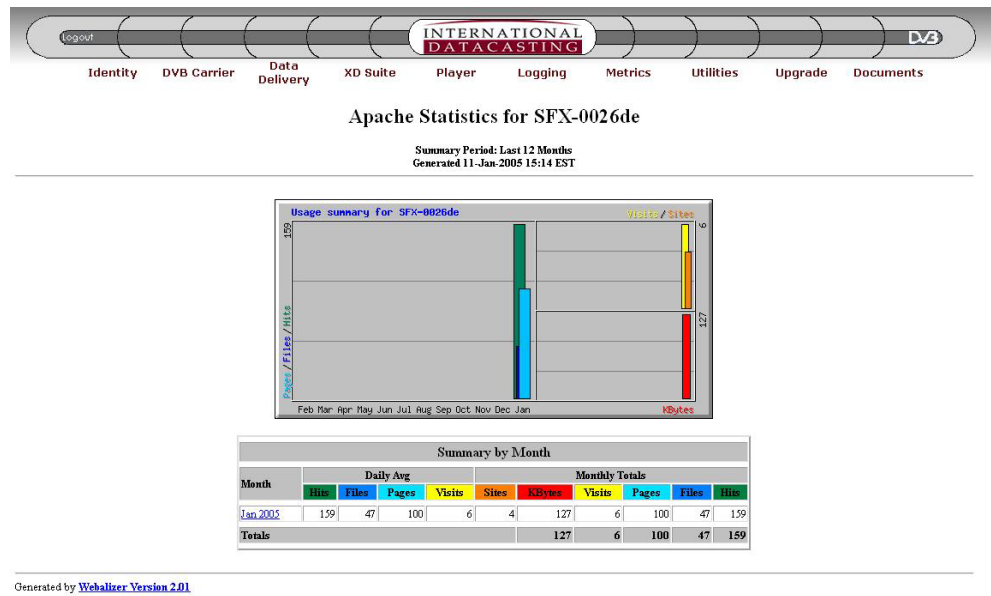


Figure 4-48 Apache Metrics Page

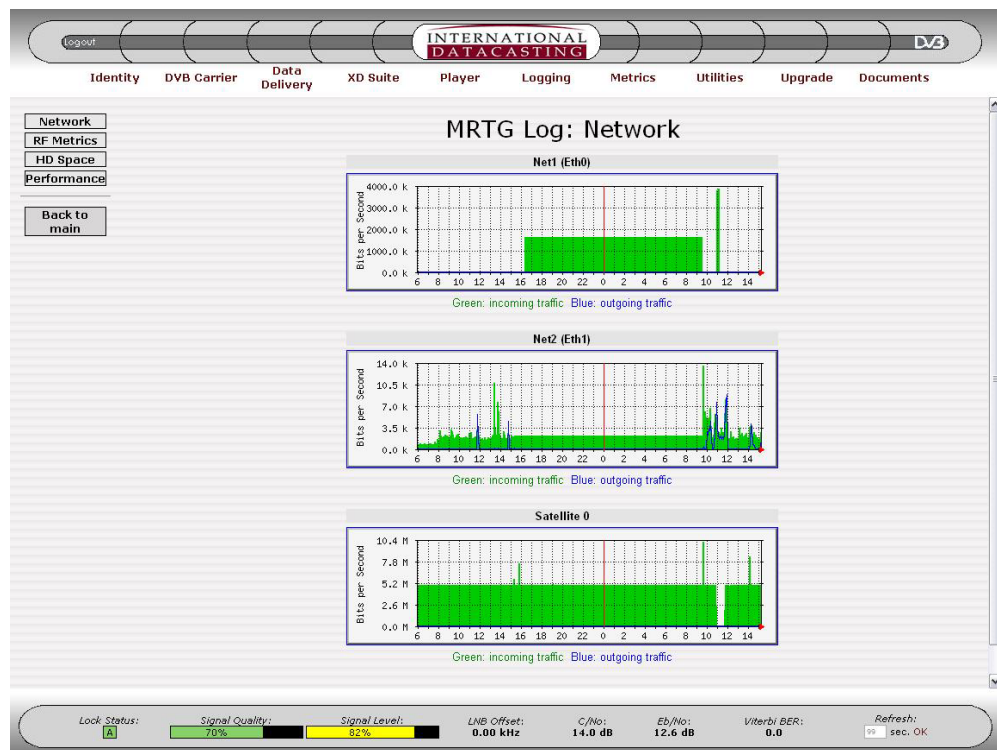


Figure 4-49 MRTG Metrics Page (Network)

Satellite Interface Metrics

The Metrics that are displayed can be automatically refreshed by setting the metrics Refresh Interval. For remote site debugging, the RF Metrics can also be committed periodically to a log file, so that the RF performance can be monitored over a period of time.

The metrics are divided into the following pages:

1. RF & PID Metrics – as shown in the sample page in Figure 4-47.


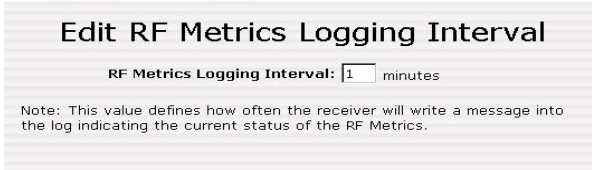
There are two main areas to this page:

- a. RF Metrics – this area provides essentially a copy of the RF Metrics that are captured at the bottom of the screen, with two additions: the current AFC range (from the LNB Attributes) and Reed-Solomon Uncorrected Packets (from 0 to 32767).
 - b. PID Metrics – this area provides information relating to the MPEG2 Transport Stream, and specifically, data captured and output from specific PIDs being filtered and de-encapsulated from MPE frames. MPE PID data is applicable to the net ports and the async port.
2. System Health Metrics – as shown in the sample page in Figure 4-50. This page displays information relating to the operation of the internal components. At the present time, metrics relating to the fan speed and CPU temperature are provided.
 3. Interface Metrics – as shown in the sample pages in Figures 4-51 and 4-52. This page displays detailed information about all operating network devices in the receiver. Usually there is too much information for one page, and the scroll bars on the right side need to be used.
 4. Filtering Metrics – as shown in the sample pages in Figures 4-53 and 4-54. This page displays all information relating to the operation of Filtering, Firewalling, NAT, and TTL Translation. Usually there is too much information for one page, and the scroll bars on the right side need to be used.

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show RF & PID Metrics	Selecting this button will always display the RF and PID Metrics Page, as shown in Figure 4-47.
Show System Health Metrics	Selecting this button will always display the System Health Metrics page, as shown in Figure 4-50.
Show Interface Metrics	Selecting this button will always show the Interface Metrics page, as shown in Figures 4-51 & 4-52.
Show Filtering Metrics	Selecting this button will always show the Filtering Metrics page, as shown in Figures 4-53 & 4-54.
Edit Refresh	Selecting this button will allow you to edit the Refresh Interval,

NOTE: The Refresh Interval that you can edit in this menu is independent of the refresh interval for the RF Metrics Display Area at the bottom of the Main page.

Menu Item	Description
Interval	<p>which affects the refresh rate of whatever metrics page is being displayed. This refresh interval is independent of the refresh interval for the RF Metrics Display Area at the bottom of the Main page. The range for the Refresh Interval is 10 to 1000 seconds.</p> 
Edit RF Metrics Logging Interval	<p>Selecting this button will allow you to edit the RF Metrics Logging Interval, which is the interval used to write the current RF Metrics only to the main system log (see section on <i>Logging</i>). The range for this interval is 1 to 60 minutes.</p> 

NOTE: In order to see the RF Metrics being written to the system log, you must set the Minimum Log Level to 'Debug' or 'Info'.

The RF Metrics were described at the beginning of this Chapter, under the Main Menu page, *RF Metrics Display Area*. Please note the important points in that section, regarding accuracy of the RF Metrics. In addition to those RF metrics, three additional metrics/menu items are provided as part of the RF Metrics:

RF Metric/Menu Item	Description
Current AFC Range	This displays the current AFC range in kHz.
RS Uncorrected Packets	This displays the number of DVB packets that could not be corrected by the Reed-Solomon FEC. Once the counter reaches 32767 (16 bits), it remains there and has to be reset using the Reset Packets Counter button, to begin counting again.
Reset Packets Counter	Selecting this button will cause the RS Uncorrected Packets counter to reset back to zero (0). This command is useful when the RS Uncorrected Packets counter is incrementing rapidly, particularly when the DVB Carrier is received in high noise situations or at lock threshold.

The individual metrics/menu items relating to the PID Metrics are described below:

PID Metric	Description
PID #	This is list of PIDs that are currently assigned to the Net Port. Selecting a PID from the list will display the associated Net Port metrics (Continuity Errors, Bad IP Checksum, IP Packets Sent). Only one PID can be selected at a time.
Total DVB Packets	This is a count of the total number of DVB packets received from the PID stream without error, since the last time the receiver acquired lock or rebooted.
Total IP Packets	This is a count of the total number of IP packets decoded from the PID's MPE stream without error, and sent to the IP stack for further processing/routing.
Missed Frame Headers	This is the PID's total number of DVB packets, where the Payload Unit Start Indicator bit was set to 0 and the packets were discarded due to a missed start of an MPE frame (i.e. the next expected DVB packet should have had the Payload Unit Start Indicator bit set to 1, which indicates the start of the next MPE frame). This value is reset to 0 when the receiver reboots. Furthermore, the number of missed starts for an individual PID is reset to 0 when the PID is disabled.
Short Frames	This is the PID's total number of incoming MPE frames that were incomplete. This value is reset to 0 when the receiver reboots. Furthermore, the number of short frames for an individual PID is reset to 0 when the PID is disabled.
Reset PID Counters	Selecting this button will reset all counters in the Total DVB Packets, Total IP Packets, Missed Frame Headers, and Short Frames columns back to zero (0).

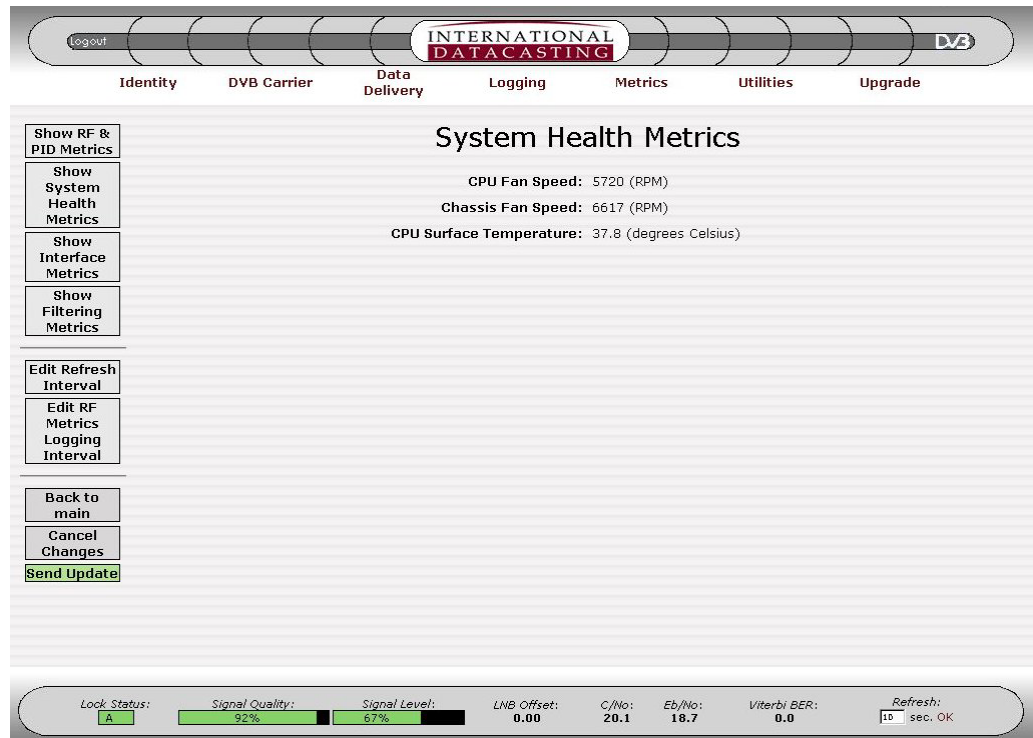
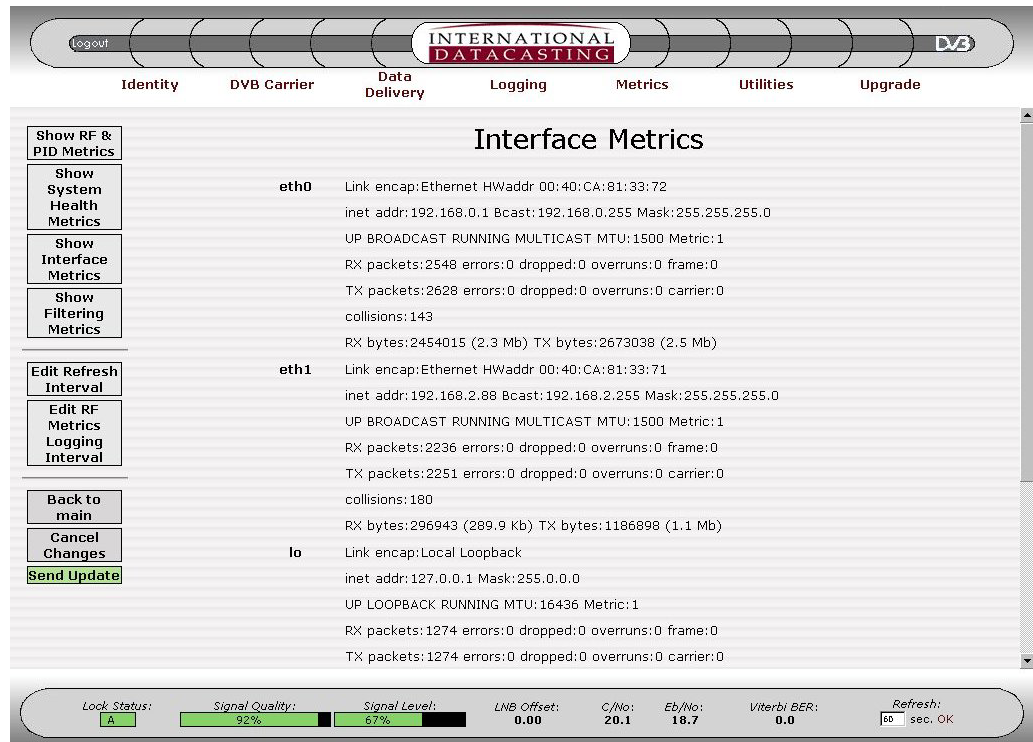


Figure 4-50 System Health Metrics Page

The following metrics are displayed by the System Health Metrics page:

Health Metric	Description
CPU Fan Speed	This is the speed of the fan that is mounted on the CPU heat sink, in Revolutions Per Minute (RPM). If the RPM lowers over time, this may indicate that the fan is getting dirty or needs replacement.
Chassis Fan Speed	This is the speed of the fan (in RPM) that is mounted on the right side ventilation holes on the 1U chassis (when viewing from the front of the receiver), or the rear panel (larger) fan on the cube chassis.
CPU Surface Temperature	This is the surface temperature in degrees Celsius of the CPU chip.



NOTE: On metrics displays with scroll bars, the refresh of the display will always return the display back to the beginning of the page.

Figure 4-51 Interface Metrics Page (scrolled to the beginning)

The following metrics are displayed by the Interface Metrics page (Figures 4-51 and 4-52):

Health Metric	Description
eth0	This provides network, interface, and IP packet metrics relating to the operation of the net1 (eth0) device.
eth1	This provides network, interface, and IP packet metrics relating to the operation of the net2 (eth1) device.
lo	This provides network and IP packet metrics relating to the operation of the local loopback device at 127.0.0.1.
sat0	This provides network, interface, and IP packet metrics relating to the operation of the satellite receiver (sat0) device.
ppp0	This provides network, interface, and IP packet metrics relating to the operation of the optional modem device, if this option has been installed.

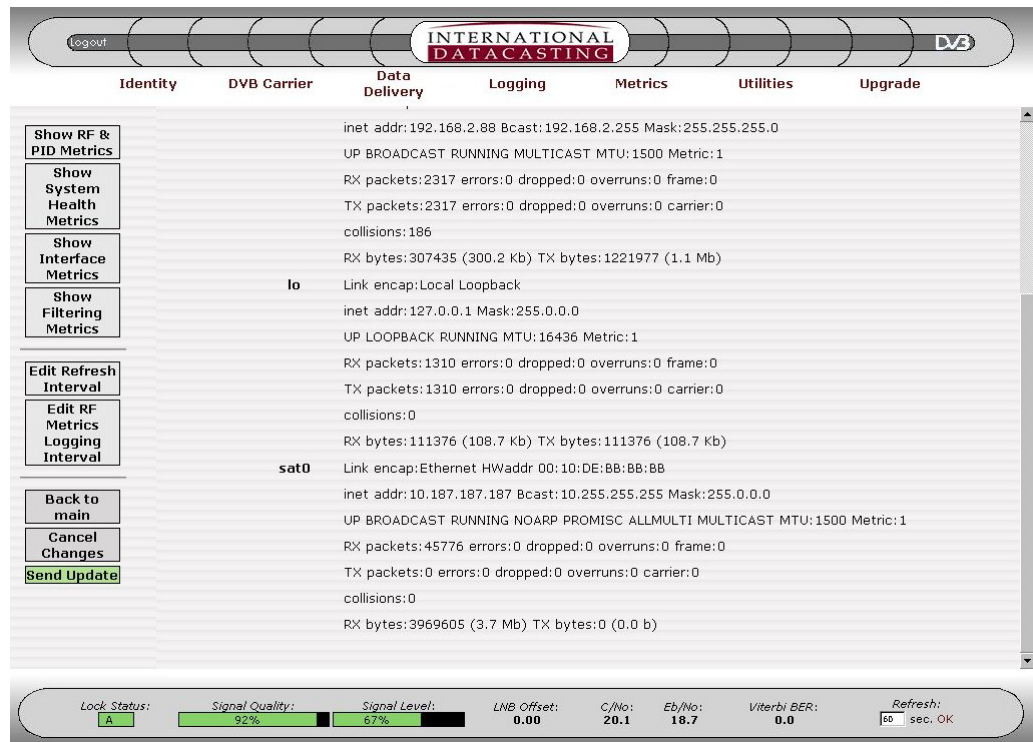
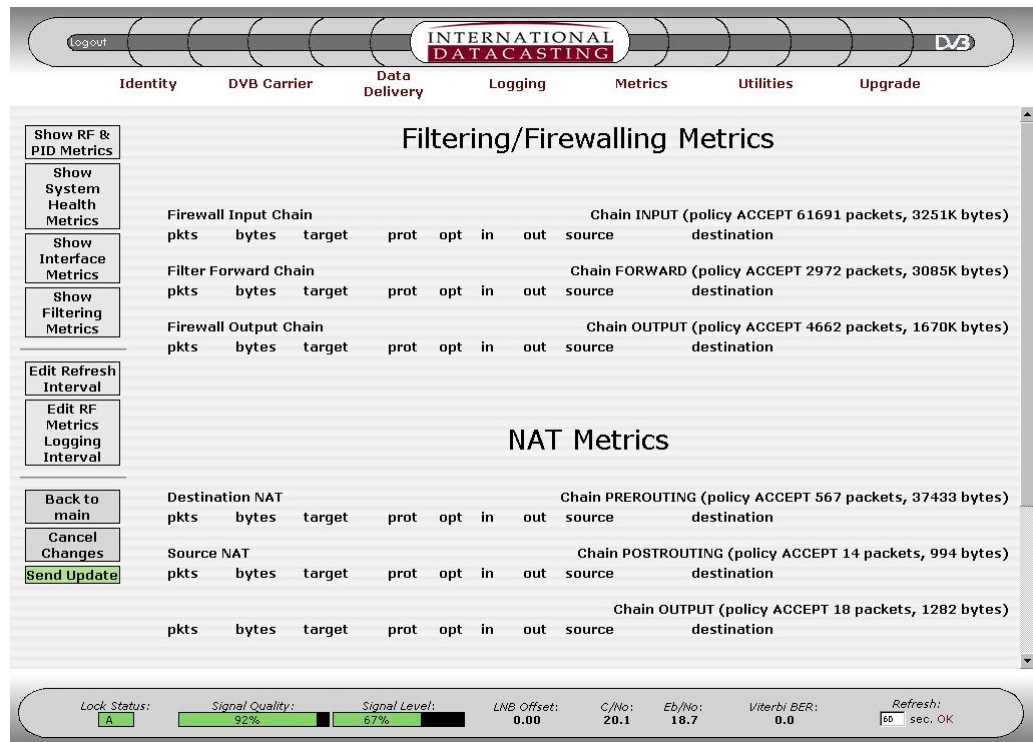


Figure 4-52 Interface Metrics Page (scrolled to the end)

Figure 4-51 and 4-52 are the complete display (scrolling from top to bottom) of the Interface Metrics for all known network devices. If the modem option is installed, its metrics (device ppp0) would be displayed here as well.



NOTE: On metrics displays with scroll bars, the refresh of the display will always return the display back to the beginning of the page.

Figure 4-53 Filtering Metrics Page (scrolled to the beginning)

The following metrics are displayed by the Filtering/Firewalling Metrics page (Figures 4-53 and 4-54):

Health Metric	Description
Filtering/Firewalling Metrics	This provides metrics relating to the Filtering/Firewall tables on the Input Chain, Forward Chain, and Output Chain of the data flow (see Figure 4-9). The metric for the default rule or policy for each applicable table is shown as well.
NAT Metrics	This provides metrics relating to the SNAT and DNAT tables on the Prerouting, Postrouting, and Output Chain of the data flow (see Figure 4-9). The metric for the default rule or policy for each applicable table is shown as well.
TTL Metrics	This provides metrics relating to the TTL Translation table on the Prerouting and Output Chain of the data flow (see Figure 4-9). The metric for the default rule or policy for each applicable table is shown as well.

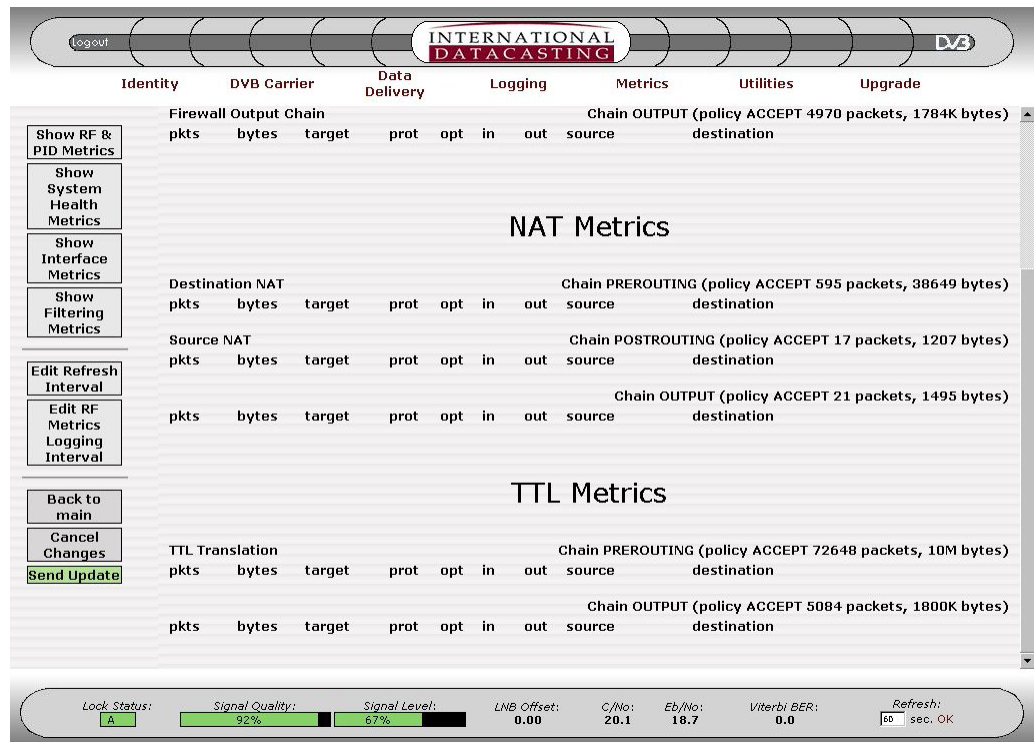


Figure 4-54 Filtering Metrics Page (scrolled to the end)

Figure 4-53 and 4-54 are the complete display (scrolling from top to bottom) of the Filtering Metrics for the filtering tables (Filtering, Firewall, NAT, and TTL).

Utilities

When the Utilities Menu Tool Bar item is selected, a submenu page appears which provides menu items relating to utility functions and special features within the receiver. These are described in the following sections. Note that some submenu items will only appear on the SFX2100 or the SRA2100, and also when the appropriate special feature or option is purchased and installed (e.g. Cyphercast).

In each of the submenus, there are the Common Menu Items, and typically the Show and Edit menu items for those areas where configuration changes can be made. The Show item displays the current configuration and the Edit item allows you to edit certain fields in the configuration. In the Utilities such as Traceroute and PING, a menu item is provided which allows you to execute the specific utility command, given the parameters that have been setup on the page.

Apache Webserver (SFX2100 only)

This submenu allows you to configure the Apache Webserver. You must have a thorough understanding of the Apache Webserver to use this submenu.

Ethernet Configuration

This submenu allows you to configure the physical 10/100 Base-T Ethernet ports, so that they initialize on power up to a certain speed and duplex combination. This is sometimes required for interfacing with certain network equipment. Figure 4-55 will be displayed when the Edit submenu item is selected.

NOTE:

You must power cycle or reboot the receiver in order for the new Ethernet configuration to take effect.

The screenshot displays the 'Edit Ethernet Configuration' page. At the top, there is a navigation bar with tabs: Identity, DVB Carrier, Data Delivery, XD Suite, Player, Logging, Metrics, Utilities, Upgrade, and Documents. Below this, on the left, are buttons for 'Show', 'Edit', 'Back to main', 'Cancel Changes', and 'Send Update'. The main area contains a table with the following columns: Interface, Auto Sense, 10BaseT half duplex, 10BaseT full duplex, 100BaseTx half duplex, and 100BaseTx full duplex. The table has two rows: Net1 (eth0) and Net2 (eth1). Below the table, a message states: 'You must reboot the receiver in order for these changes to take affect.' At the bottom, a status bar shows: Lock Status: [A], Signal Quality: 71%, Signal Level: 83%, LNB Offset: 0.00 kHz, C/No: 14.3 dB, Eb/No: 12.9 dB, Viterbi BER: 0.0, and a Refresh button.

Interface	Auto Sense	10BaseT half duplex	10BaseT full duplex	100BaseTx half duplex	100BaseTx full duplex
Net1 (eth0)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Net2 (eth1)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

You must reboot the receiver in order for these changes to take affect.

Lock Status: [A] Signal Quality: 71% Signal Level: 83% LNB Offset: 0.00 kHz C/No: 14.3 dB Eb/No: 12.9 dB Viterbi BER: 0.0 Refresh: [X] sec. OK

Figure 4-55 Ethernet Configuration (Edit) Page

SFX Home Page (SFX2100 only)

This submenu allows you to set the default Web GUI page that will be displayed either on the Web browser on the SFX2100 local console (via localhost loopback), or on a remote node. This default home page is applicable to the port 80 interface only. Port 2100 on the SFX2100 is always linked to the Cockpit.

This default home page on Port 80 can be one of the following:

1. SFX Cockpit – displays the Main Menu page from the Cockpit Web GUI.
2. XD Enterprise – display the main web page for XD Enterprise, allowing you to view live content or local file content, configured via Enterprise containers sent from the XD Host.
3. WWW Home – display the user or customer defined web page, which usually will contain a link to the Cockpit Web GUI Main Menu page.

You can set the SFX Default Home Page using the Edit function similar to Figure 4-56.

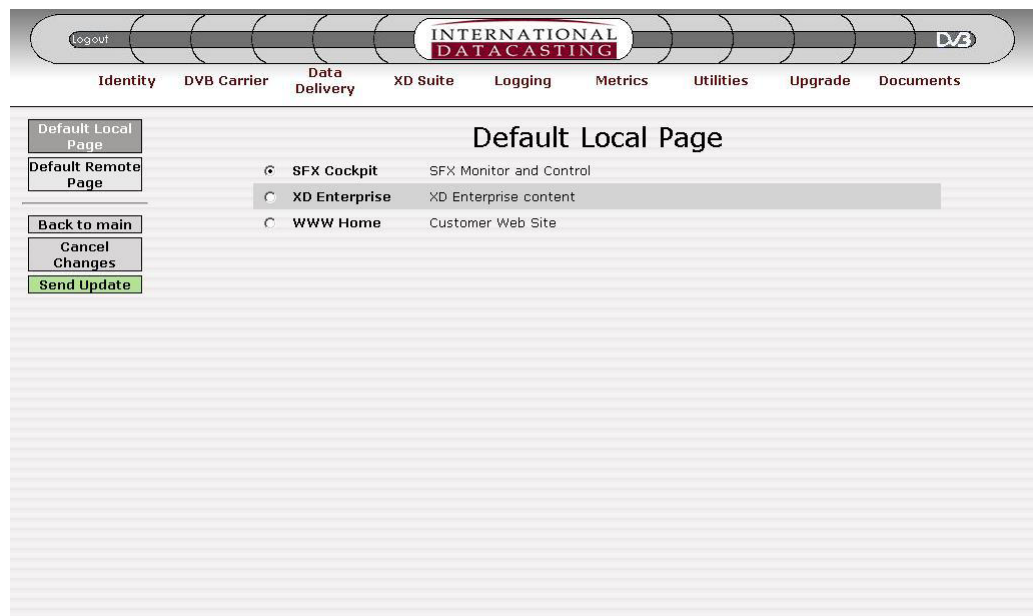


Figure 4-56 SFX Default Home Page Edit

Local Applications (SFX2100 only)

This submenu, which is only available locally on the SFX2100 console, allows you to run local applications, such as the audio mixer or a terminal window.

TCP Dump Utility

This submenu allows you a convenient way to locally or remotely run the built-in TCP Dump utility. TCP Dump allows you to examine the header or content of each IP packet flowing over a network interface or data link. More information on TCP Dump is readily available on the Internet. This submenu uses a limited number of TCP Dump options.

A Get Packets page similar to Figure 4-57 will be displayed when a TCP Dump request is made for a certain number of packets to receive (see area near bottom of Figure where request was made).

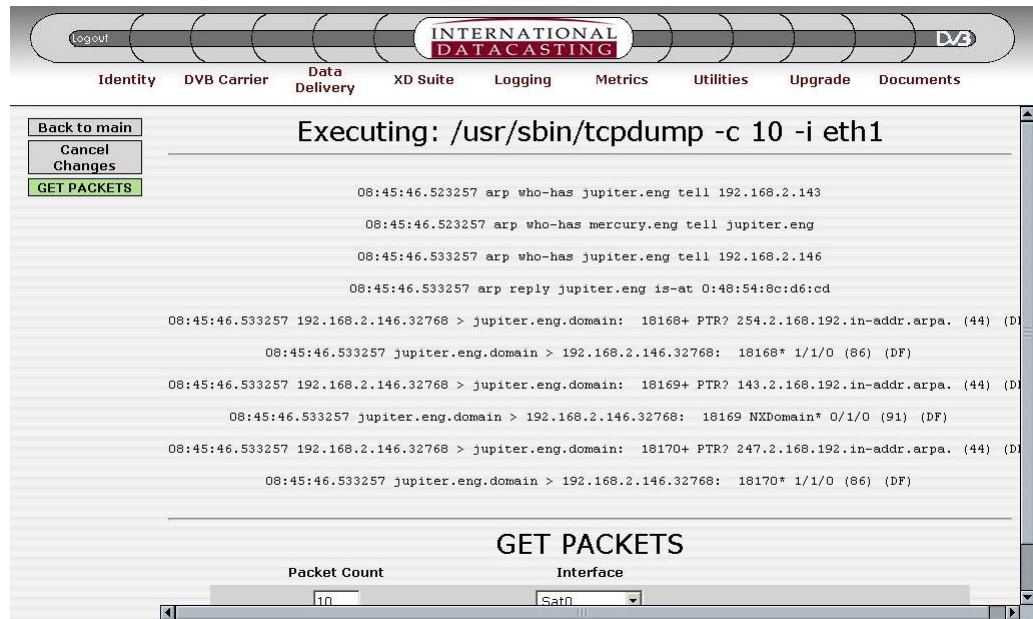


Figure 4-57 TCP Dump Get Packets Page

Traceroute Utility

This submenu allows you a convenient way to locally or remotely run the built-in Traceroute Utility. Traceroute is a utility which allows you to determine the route packets take to a network host. More information on Traceroute is readily available on the Internet.

A Traceroute page similar to Figure 4-58 will be displayed when a Traceroute request is made for a certain host.

Logout INTERNATIONAL DATACASTING DVB

Identity DVB Carrier Data Delivery XD Suite Logging Metrics Utilities Upgrade Documents

[Back to main](#)

Traceroute

Stop Traceroute

Executing: /usr/sbin/traceroute 192.168.0.2 120

traceroute to 192.168.0.2 (192.168.0.2), 30 hops max, 120 byte packets

1	192.168.0.2 (192.168.0.2)	1.269 ms	0.347 ms	0.174 ms
---	---------------------------	----------	----------	----------

Traceroute

Host	Flags	Packet Size
<input type="text"/>	<input type="text"/>	<input type="text"/> bytes

(If flags left blank, no additional flags will be passed to traceroute.)

Figure 4-58 Traceroute Page

Date and Time

This submenu allows you to set the system date and time within the receiver. This is particularly useful for maintaining correct timestamps on logged events. The Date and Time Edit Page similar to Figure 4-59 allows you to do this.

NOTE:

Changing the date and time ahead may cause the receiver to log you out of your Web GUI session, because your inactivity timeout expired. You may be required to login again.

Set Date and Time

Year (yyyy):

Month (mm):

Day (dd):

Hour (hh):

Minute (mm):

Second (ss):

(You may have to login again after changing the time.)

Lock Status: A Signal Quality: 99.0% Signal Level: 34.0% LNB Offset: 0.00 kHz C/No: 24.1 dB Eb/No: 22.1 dB Viterbi BER: 0.0 Refresh: sec. OK

Figure 4-59 Date and Time Edit Page

Password Manager

This submenu allows you to set the password for accounts managed by the receiver. The Password Edit page similar to Figure 4-60 will be displayed based on the User selected. The number of User passwords that can be set will vary between the SRA2100 and the SFX2100 (see Chapter 3).

Logout Identity DVB Carrier Data Delivery Logging Metrics Utilities Upgrade

INTERNATIONAL DATACASTING DVB

User: admin
User: user
User: monitor

Back to main
Cancel Changes
Change Password

Change Password for user:
admin

New Password:
New Password again:

Lock Status: A Signal Quality: 82.0% Signal Level: 45.0% LNB Offset: 0.00 kHz C/No: 18.8 dB Eb/No: 16.7 dB Viterbi BER: 0.0 Refresh: 15 sec, OK

Figure 4-60 Password Edit Page

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
User: <name>	Depending on what username you logged in as (see Chapter 3), you will have the appropriate level of access to passwords at that level or below. The appropriate number of buttons will appear, based on the level of access available.

To enter a new password for a selected account, enter it twice under the two edit fields available on the page. When completed, select Change Password to update the password immediately in the receiver.

Ping Utility

This submenu allows you to determine the presence of another host on the network. The host can be accessible from any of the network interfaces. This is particularly useful for testing network connectivity and packet round trip times. Ping is really the implementation of the Echo and Echo Reply messages within the Internet Control Message Protocol (ICMP – RFC 792). In most if not all operating systems, ICMP is implemented directly in the IP Stack, and no special applications are required in order for a host to respond to ICMP messages. A Ping page similar to Figure 4-61 will be displayed when the submenu item is selected.

Figure 4-61 Ping Page

The Ping command is assembled right on the Ping page, by entering the following information:

Ping Field	Description
Packet Count	The number of ping packets to transmit to the host. If this field is left blank, the receiver will send out 10 packets.
Packet Size	This is the size of the ping packet, in bytes. Up to 1600 byte packets can be transmitted. The lower limit is 8 bytes for the SRA series, and 1 byte for SFX series.
Host IP	The IP address of the host on the network that you wish to ping. The address is in dotted decimal notation (e.g. 192.168.0.1).

Once the Ping command has been assembled using the fields above, it can be sent out, by selecting the PING button. This effectively sends an ICMP Echo message of size set by Packet Size to the Host IP, for the number of times set in the Packet Count field. Packets returned from the host, if accessible on the network, will be in the form of ICMP Echo Reply messages. A display similar to Figure 4-62 will show the results of the Ping operation. After the results have been displayed, the provision is made for you to enter another Ping command right away.

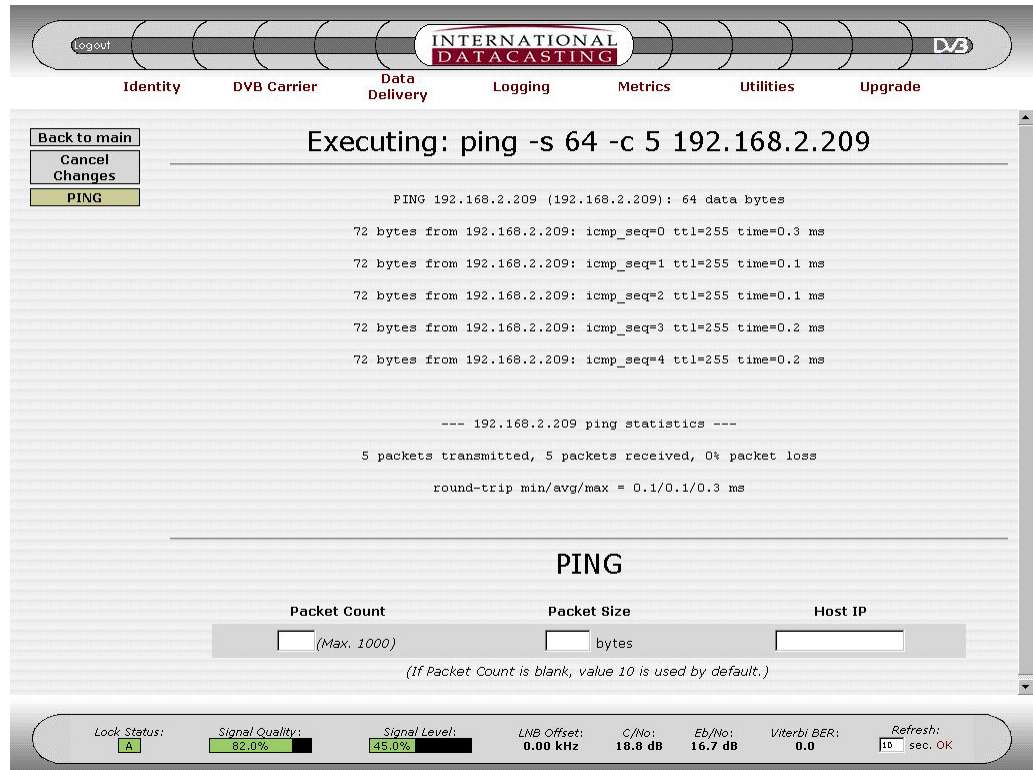


Figure 4-62 Ping Page with Results

Restart Receiver

This submenu allows you to perform a warm reboot/restart of the receiver. The Restart Receiver page similar to Figure 4-63 will be displayed when the submenu item is selected. Instructions and warnings are provided on the page.

NOTE:

Use the Restart Receiver function with care. Data services in progress will be interrupted.



Figure 4-63 Restart Receiver Page

GUI Server Setup

This submenu allows you to configure the Web GUI's network access parameters. This is useful for remote sites where the receiver may be connected to the Internet. The GUI Server Setup page similar to Figure 4-64 will be displayed when the submenu item is selected.

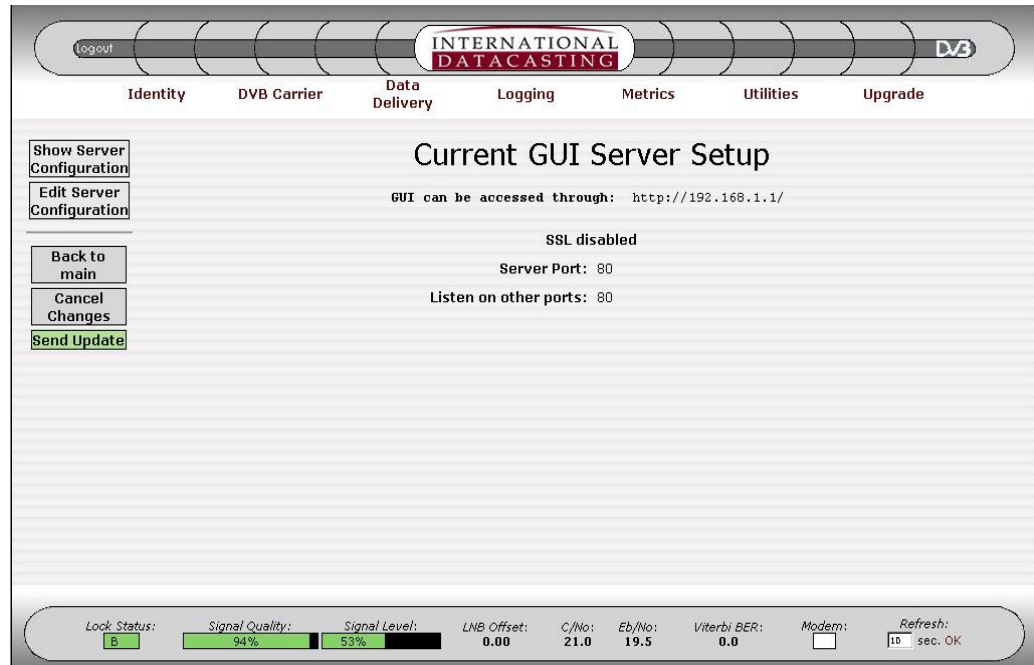


Figure 4-64 GUI Server Setup Page

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show Server Configuration	Selecting this button will always return you back to the GUI Server Setup page, as shown in Figure 4-64. The current GUI Server Setup parameters will always be displayed here.
Edit Server Configuration	Selecting this button will enter the GUI Server Edit page, as shown in Figure 4-65. The edit fields on this page are described below the figure.

Figure 4-65 GUI Server Edit Page

NOTE:

After you Send Update, you must restart the receiver in order for the new GUI Server Setup parameters to take effect.

The following fields can be edited on the GUI Server Edit page:

Edit Field	Description
SSL Enabled	A check in this box will enable Secure Sockets Layer (SSL). SSL is a commonly used protocol for managing the security of a message transmission on the Internet.
Server Port	Enter a port number for access to the web GUI server. Port 80 is the default well-known port for non-secure connections and 443 is the default port when SSL is enabled.
Listen on other Ports	This field allows you to enter an alternative port number for accessing the web GUI server. At the present time, this port number should be set to the same value as the Server Port.

Samba Windows File Sharing (SFX2100 only)

This submenu allows you to setup the Windows file sharing configuration for the SFX2100.

Backup and Restore (SFX2100 only)

This submenu allows you to backup and restore the configuration of the SFX2100 receiver, as set by the Cockpit Web GUI. This can be useful if you wish to restore to factory settings.

DHCPd Configuration (SFX2100 only)

This submenu allows you to configure the DHCP Daemon within the SFX2100. This DHCP Daemon acts as a DHCP Server. You must have a thorough knowledge of the DHCP server function to use this submenu

Upgrade

When the Upgrade Main Menu Tool Bar item is selected, the Upgrade page is displayed, which provides a means to perform a firmware upgrade of the receiver on the network. Firmware upgrades can comprise application executables and data files, as well as elements of the Linux operating system kernel and support files. Although the application firmware specific files are more likely to be upgraded, any file that the receiver requires can be upgraded. Typically, a valid upgrade file provided by International Datacasting will only contain the specific files that need to be updated. Such files will be collected into a single Linux *tarball* upgrade file. Upgrade *tarballs* may also be further compressed with *gzip* to further improve upload times.

A sample Upgrade page is shown in Figure 4-66.

A detailed description of the upgrade process is provided on the Upgrade page. Should there be any questions or doubts with respect to performing an upgrade, or what versions of upgrades to use, please contact your Network Service Provider, or International Datacasting Customer Service (see Chapter 5).

There are some important rules to consider when performing an upgrade:

1. The file format for the upgrade must be compatible with International Datacasting specifications for upgrade files. This includes a digital signature, which is contained within the file for high security upgrades. Generally, upgrades will be supplied to you either by your Network Service Provider, or via the International Datacasting Customer Service web site.
2. The version number of the upgrade cannot be the same as the current version of firmware in the receiver. The current version is displayed on the Upgrade page for convenience.
3. An internal record of the oldest compatible version number is maintained in the receiver and determines what minimum version number of firmware can be upgraded into this receiver. The version number of the upgrade cannot be older than that version.
4. The upgrade file must be for the correct model of receiver being upgraded (e.g. SRA2100R, SFX2100B, etc.).

Upgrade

Current version of Firmware in the Receiver is : 111.20

File to Upload:

Click on the Browse button to locate the file to upload from your system, or enter the path and name of the file.

When the Upgrade button is "clicked", the file transfer begins. When the receiver has a complete copy, it will verify the file contains a different version of firmware than is currently running on the receiver. Once verified, the receiver **WILL Reboot** and update itself. The current browser session is interrupted when the receiver is rebooting.

To verify that the upgrade was successful, wait for the file transfer to complete, and the receiver to reboot. Then login to the receiver and obtain the new version number for the firmware. (Note: boot up times are greater than 1 minute).

Warning: Data services will be interrupted when the receiver reboots.

Lock Status: A Signal Quality: 99.0% Signal Level: 34.0% LNB Offset: 0.00 kHz C/No: 24.1 dB Eb/No: 22.1 dB Viterbi BER: 0.0 Refresh: 10 sec. OK

NOTE:

After a successful Upgrade, the receiver will reboot. This will disrupt any data services in progress.

Figure 4-66 Upgrade Page

The Upgrade Page only contains the Common Menu Items, with the Upgrade button used to initiate the firmware upgrade process. The current version of the application firmware running on the target receiver is provided for convenience.

Use the Browse button to locate the upgrade file on your PC. Once you have selected a the file, select and click on the Upgrade button to the left of the page. This will immediately initiate the upgrade process, in accordance with the steps described on the Upgrade page. As the file upload progresses, status indicator bars will appear on the screen, as shown in the example in Figure 4-67. A status box is added to the bar when 20 upgrade packets have been transferred, which equates to approximately 20K bytes. When the file upload is completed, the receiver will reboot, thus disconnecting your browser connection from the receiver. You will need to login again, after waiting for a period of time for the reboot to complete.

Source file for upgrade is: C:\sra2100R_Upgrade_from_105.29_to_2.0.idc.

File Transfer Complete, System will re-boot. The connection to the receiver will be lost. Wait approximately 1 minute, then **login** again

Figure 4-67 Upgrade Status Bars

Documents (SFX only)

When the Documents Main Menu Tool Bar item is selected on the SFX2100 Cockpit, you have access to any available online documentation. This would typically be the latest Data Sheet and User's Guide for the SFX2100.

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Chapter 5

Troubleshooting, Warranty and Contact Information

Troubleshooting

The following are some recommended procedures to follow if your satellite receiver does not operate properly. These procedures should be followed when a system interruption occurs and no obvious cause is immediately apparent, or when experiencing difficulties during installation. This investigation is a general one and implementation may vary from one installation to another.

Preventative Maintenance

The following actions should be carried out on a routine basis to ensure your satellite receiver remains in serviceable condition.

 **WARNING**
DO NOT OPEN
your satellite
receiver for any
reason as this
may VOID your
warranty!

- Always allow adequate air circulation, especially around the ventilation holes, to prevent any overheating of the receiver.
- Clean your receiver chassis with a dry soft cloth or a soft cloth lightly dampened with a mild cleansing solution. Do not clean the receiver with any type of harsh solution, such as alcohol, and this may damage the finish.
- Ensure cable connections are secure. Check for loose or poor connections.
- Do not allow your cables to become kinked or twisted. Cables are to be connected and secured in such a manner that they will not become subject to constant shifting or accidental disconnection.
- Check your cables for cracks, breaks or abrasions and replace any such cables found.

- Ensure your receiver is on a surface that is stable, or if rack mounted, ensure your unit is properly fastened in the rack.

Troubleshooting Procedures

The quickest indication of a possible problem will be evident from the front panel indicators. Refer back to Chapter 2 on the meaning of the indicators and their associated colours.

If more detail is required, and the unit is powered, you can use the metrics information in the Web GUI to determine what the problem might be. Refer to Chapter 4 for operation of the metrics in the Web GUI.

If the Web GUI is not accessible, you may wish to use the Terminal Interface to ensure that basic installation parameters and operational status are correct. Refer to Chapter 3 for more information on the commands available with the Terminal Interface.

Record the nature of the problem and power cycle the unit. If this does not correct the problem or at least make one of the above procedures possible, then proceed to the steps below.

Contacting Your Supplier

If you have determined that your satellite receiver is malfunctioning, **DO NOT ATTEMPT TO ALTER OR REPAIR THE UNIT.**

Please contact either your Network Service Provider (NSP) or an IDC Customer Service Representative. The problem may be solvable over the telephone or by e-mail.

Prior to requesting assistance, record the history of the problem. Your NSP or IDC Customer Service Representative will be able to provide more efficient and accurate assistance if you have a complete problem description, including:

- The nature and duration of the problem;
- When the problem occurs;
- Any particular application that, when used, appears to create the problem or make it worse;
- The model and serial number of your unit.

Shipping & Packaging

If you need to transport or ship your satellite receiver:

1. Package the unit carefully. We recommend that you keep and re-use the original container.
2. Prior to shipping your unit for repair or return, contact your NSP who will in turn call an IDC Customer Service Representative for a Return Material Authorization (RMA) number. If you are returning the unit, you should include everything you

received with the unit. Also, please ensure the following items are identified in your shipping documentation:

- The serial and part number of the unit being returned;
 - The original cost of the unit;
 - Specify "Made In Canada" on your paper work.
3. Ensure your RMA number is clearly printed on the exterior of your shipping container.

Contact information for an IDC Customer Service Representative is available in Chapter 5 (Warranty Policy).

Warranty & Service

International Datacasting Corporation (Seller) warrants the items manufactured and sold by the Seller to be free of defects in material and workmanship for a period of one (1) year from date of shipment. The Seller's obligation under its warranty is limited in accordance with the period of time and all other conditions stated in all provisions of this warranty.

This warranty applies only to defects in material and workmanship in products manufactured by the Seller. The Seller makes no warranty whatsoever concerning products or accessories not of its manufacture. Repair, or at the Seller's option, replacement of products or defective parts therein shall be the sole and exclusive remedy for all valid warranty claims.

Warranty Period

The applicable warranty period shall commence on the date of shipment from the Seller's facility to the original purchaser and extend for the stated period following the date of shipment. Upon beginning of the applicable warranty period, all customers' remedies shall be governed by the terms stated or referenced in this warranty. In-warranty repaired or replacement products or parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced products or parts. Repair or replacement of products or parts under warranty does not extend the original warranty period.

Warranty Coverage Limitations

The following are expressly NOT COVERED under warranty:

- Any loss, damage and/or malfunction relating in any way to shipping, storage, accident, abuse, alteration, misuse, neglect, failure to use products under normal operating conditions, failure to use products according to any operating instructions provided by the Seller, lack of routine care and maintenance as indicated in any operating maintenance instructions, or failure to use or take any proper precautions under the circumstances.

- Products, items, parts, accessories, subassemblies or components, which are expendable in normal use or are of limited life, such as but not limited to bulbs, fuses, lamps, glassware, etc. The Seller reserves the right to revise the foregoing list of what is covered under this warranty.

Warranty Replacement & Adjustment

The Seller will not make warranty adjustments for failures of products or parts which occur after the specified maximum adjustment period. Unless otherwise agreed, failure shall be deemed to have occurred no more than seven (7) working days before the first date on which notice of failure is received by the Seller. Under no circumstances shall any warranty exceed the period stated above unless expressly agreed to in writing by the Seller.

Liability Limitations

This warranty is expressly in lieu of and excludes all other expressed and implied warranties, including but not limited to warranties of merchantability and of fitness for particular purpose, use or applications, and all other obligations or liabilities on the part of the Seller, unless such other warranties, obligations or liabilities are expressly agreed upon to in writing by the Seller.

All obligations of the Seller under this warranty shall cease in the event of its products or parts thereof have been subject to accident, abuse, alteration, misuse or neglect, or which have not been operated and maintained in accordance with proper operating instructions.

In no event shall the Seller be liable for incidental, consequential, special or resulting loss or damage of any kind howsoever caused. The Seller's responsibility for damages shall not exceed the payment, if any, received by the Seller for the unit or product or service furnished or to be furnished, as the case may be, which is the subject of claim or dispute.

Statements made by any person, including representatives of International Datacasting, which are inconsistent or in conflict with the terms of this warranty, shall not be binding upon International Datacasting unless reduced to writing and approved by an officer of the Corporation.

Warranty Repair Return Procedure

Before any warranty repair can be accomplished, a Return Material Authorization (RMA) number must be received. It is at this time, that the Seller will authorize the product or part to be returned to the Seller's facility. The RMA number may be requested by contacting an International Datacasting Customer Service Representative at:

International Datacasting Corporation
2680 Queensview Drive
Ottawa, Ontario, CANADA K2B 8H6

Attn: Customer Service

Tel: 613-596-4120 | Fax: 613-596-4863

Email: service@intldata.ca

Any product returned to the Seller for examination must be sent prepaid via the means of transportation indicated as acceptable to the Seller. The RMA number must be clearly marked on the shipping label. Returned products or parts should be carefully packaged in the original container, if possible, and shipped to the above address.

Non-Warranty Repair

When a product is returned for any reason, the Customer and its shipping agency shall be responsible for all damage resulting from improper packing and handling, and for loss in transit, notwithstanding any defect or nonconformity in the product. By returning a product, the owner grants the Seller permission to open and disassemble the product as required for evaluation. In all cases, the Seller has the sole responsibility for determining the cause and nature of failure, and the Seller's determination with regard thereto shall be final.

Contacting IDC for More Information

Detailed technical Application Notes and Manuals are available from International Datacasting, including information required to use SNMP and advanced SFX2100 applications such as XD.

To obtain copies of these Application Notes, please contact:

Customer Service Department
International Datacasting Corporation
Tel: (613) 596-4120 Fax: (613) 596-9208
Email: service@intldata.ca

or

Sales Department
International Datacasting Corporation
Tel: (613) 596-4120 Fax: (613) 596-4863
Email: sales@intldata.ca

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Appendix A

SRA2100 Series Specifications

The following Appendix contains the specifications and features for the model SRA2100 series satellite receivers.



Available Models in this Series

The SRA2100 receiver comes in many models, with associated part numbers. These are listed in the following table.

Model Name	Part Number	Description
QPSK/BPSK Series		
SRA2100R (1U)	90076870	SRA 1U Rack Mount (QPSK/BPSK (Q/B) with CompactFlash (CF), SmartCard (SC))
SRA2100R-ASI (1U)	90076871	SRA 1U Rack Mount (Q/B with ASI option, CF, SC)
SRA2100R (Cube)	90076890	SRA Cube (Q/B with CF, SC)
SRA2100R-ASI (Cube)	90076891	SRA Cube (Q/B with ASI option, CF, SC)
SRA2100B (1U)	90077470	SRA 1U Rack Mount (Q/B with CF, DVB CAS)
SRA2100B-ASI (1U)	90077471	SRA 1U Rack Mount (Q/B with ASI option, CF, DVB CAS)
SRA2100B (Cube)	90077500	SRA Cube (Q/B with CF, DVB CAS)
SRA2100B-ASI (Cube)	90077501	SRA Cube (Q/B with ASI option, CF, DVB CAS)
QPSK/8PSK/16QAM Series		
SRA2100MR (1U)	90077450	SRA 1U Rack Mount (QPSK/8PSK/16QAM (Q/8/16) with CF, SC)
SRA2100MR-ASI (1U)	90077451	SRA 1U Rack Mount (Q/8/16 with ASI option, CF, SC)
SRA2100MR (Cube)	90077490	SRA Cube (Q/8/16 with CF, SC)
SRA2100MR-ASI (Cube)	90077491	SRA Cube (Q/8/16 with ASI option, CF, SC)
SRA2100MB (1U)	90077830	SRA 1U Rack Mount (Q/8/16 with CF, DVB CAS)
SRA2100MB-ASI (1U)	90077831	SRA 1U Rack Mount (Q/8/16 with ASI option, CF, DVB CAS)
SRA2100MB (Cube)	90077840	SRA Cube (Q/8/16 with CF, DVB CAS)
SRA2100MB-ASI (Cube)	90077841	SRA Cube (Q/8/16 with ASI option, CF, DVB CAS)

Specifications

RF Subsystem

Applicable DVB Standards:	DVB-S ETS 300 421 (QPSK) TR 101 198 (BPSK) EN 301 210 (8PSK/16QAM).
Modulation:	BPSK/QPSK or QPSK/8PSK/16QAM, depending on model.
Carrier Rate:	1 Ms/s to 45 Ms/s
L-Band Frequency Range:	950 to 2150 MHz (BPSK/QPSK/8PSK) 950 to 1750 MHz (16QAM)
Frequency Tuning Resolution:	1 Hz
Tuning Control:	Browser based Web GUI, head-end control (NetManager), Terminal Interface (RS-232) or SNMP.
AFC Range (Drift tracking):	Below 20 Ms/s, selectable from 10% of symbol rate to ± 2 MHz 20 Ms/s or above, fixed at $\pm 10\%$ of the symbol rate.
Carrier Input Level:	-35 to -65 dBm
RF Connector:	Type-F, female, 75 Ω unbalanced.

LNB DC Power:	+18 VDC at 350 mA maximum (horizontal polarity), or +13 VDC at 350 mA (vertical polarity), center conductor positive, short circuit protected. Optional voltages available: +15 VDC at 350 mA (horizontal) and +11 VDC at 350 mA (vertical).
LNB Requirement:	DRO type for data rates above 5 Ms/s, except for: PLL type for rates below 5 Ms/s (BPSK/QPSK), 22 Ms/s (8PSK), and 6 Ms/s (16QAM).
LNB Control:	22 kHz 650 mV, OFF selects 950 to 1950 MHz and ON selects 1100 to 2150 MHz.
FEC Type:	DVB concatenated Viterbi and Reed-Solomon (Reed-Solomon at 204/188).
Viterbi FEC Rates:	1/2, 2/3, 3/4, 5/6, 7/8 (BPSK/QPSK), 2/3, 5/6, 8/9 (8PSK), 3/4, 7/8 (16QAM).
Alpha Factor:	0.35 DVB (BPSK/QPSK), 0.25 DVB (8PSK/16QAM).

Front Panel Indicators

LOCK:	Indicates RF locked or unlocked to DVB carrier.
STATUS:	Indicates normal operation or fault.
R/W:	Indicates storage (CompactFlash) reads & writes.
CONTROL:	Indicates receiver control channel (NetManager) activity.
SYNC:	Indicates authorization and data activity status for sync port.
ASYN:	Indicates authorization and data activity status for async port.
NETWORK:	Indicates authorization and data activity status for all network devices.
OPTIONS:	Indicates status of conditional access option.

Synchronous Port

Connector Type:	DA-15S
Electrical Interface:	X.21 (RS-422 levels)
Synchronous Rate:	1200 b/s to 10 Mb/s

Asynchronous Port

Connector Type:	DE-9P
Electrical Interface:	RS-232
Asynchronous Rate:	300 b/s to 115.2 kb/s

Net Ports (#1 and 2)

Connector Type:	RJ-45
Electrical Interface:	Ethernet
IP Data Rate:	Up to 70 Mb/s (both ports combined) with optimally sized UDP/IP packets, no encryption. (This rate was tested using QPSK modulation.)

Terminal Port (for Terminal Interface)

Connector Type:	DE-9P
Electrical Interface:	RS-232
Asynchronous Rate:	9600 b/s

Status & Control

Terminal Interface:	RS-232 port interface, for easy installation and setting of RF parameters and IP configuration.
Web Browser Interface:	Primary Status and Control GUI available for setting all configuration parameters and monitoring all metrics.
SNMP:	Enterprise MIB and portions of MIB-II for status & control. More information on the SNMP MIB is available in a separate IDC Application Note.
Remote Network Control:	Management of all receivers in the network available through NetManager, over the satellite Network Control Channel (NCC).

Physical (1U Rackmount Unit)

Supply Voltage:	100 to 240 VAC \pm 10%, 50 or 60 Hz
Power Supply Type:	Universal Switching Type, auto sensing
Power Consumption:	80 Watts
Dimensions:	4 cm H x 36 cm D x 48 cm W
Weight:	Less than 7 kg

Environmental Considerations

Operating Temperature:	0 °C to 50 °C
Storage Temperature:	-20 °C to 70 °C
Humidity:	Maximum 90% relative humidity, non-condensing.

Certification

Safety (Pending):	CSA Worldwide Safety (CB) to IEC950
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Emissions/Immunity (1U): FCC Part 15 Class A
(CE) EN50081-1 and EN50082-1 Class A

Options

See applicable models for each option in the table at the beginning of this appendix.

ASI Port

Connector Type: BNC
Electrical Interface: per EN50083-9
Data Rate: Selected PIDs or full transport stream up to full speed.
Transport stream packets are 188 bytes long.

DVB Conditional Access System (CAS)

Option Slot: Single DVB Common Interface (CI) slot
Interface: per EN50221

Irdeto Cyphercast

Option Slot: Single Irdeto Smart Card slot
Interface: per ISO 7816
Smart Card Protocol: T=0

Other Options

Modem PCI Card (for phone access return channel)

Physical (Cube Unit)

Supply Voltage: 100 to 240 VAC $\pm 10\%$, 50 or 60 Hz
Power Supply Type: Universal Switching Type, auto sensing
Power Consumption: 80 Watts
Dimensions: 17 cm H x 29 cm D x 19 cm W
Weight: Less than 5 kg

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Appendix B

SFX2100 Series Specifications

The following Appendix contains the specifications and features for the BASE model SFX2100 series satellite receivers.



Rack Unit

Cube Unit (Optional)

Available Models in this Series

The SFX2100 receiver comes in many models, with associated part numbers. These are listed in the following table.

Model Name	Part Number	Description
QPSK/BPSK Series		
SFX2100R (1U)	90076880	SFX 1U Rack Mount (Q/B with 40 GB Hard Disk Drive (HDD), SmartCard (SC))
SFX2100R-ASI (1U)	90076881	SFX 1U Rack Mount (Q/B with ASI option, HDD, SC)
SFX2100R (Cube)	90076900	SFX Cube (Q/B with HDD, SC)
SFX2100R-ASI (Cube)	90076901	SFX Cube (Q/B with ASI option, HDD, SC)
SFX2100B (1U)	90077480	SFX 1U Rack Mount (Q/B with HDD, DVB CAS)
SFX2100B-ASI (1U)	90077481	SFX 1U Rack Mount (Q/B with ASI option, HDD, DVB CAS)
SFX2100B (Cube)	90077520	SFX Cube (Q/B with HDD, DVB CAS)
SFX2100B-ASI (Cube)	90077521	SFX Cube (Q/B with ASI option, HDD, DVB CAS)
QPSK/8PSK/16QAM Series		
SFX2100MR (1U)	90077460	SFX 1U Rack Mount (Q/8/16 with HDD, SC)
SFX2100MR-ASI (1U)	90077461	SFX 1U Rack Mount (Q/8/16 with ASI option, HDD, SC)
SFX2100MR (Cube)	90077510	SFX Cube (Q/8/16 with HDD, SC)
SFX2100MR-ASI (Cube)	90077511	SFX Cube (Q/8/16 with ASI option, HDD, SC)
SFX2100MB (1U)	90077850	SFX 1U Rack Mount (Q/8/16 with HDD, DVB CAS)
SFX2100MB-ASI (1U)	90077851	SFX 1U Rack Mount (Q/8/16 with ASI option, HDD, DVB CAS)
SFX2100MB (Cube)	90077860	SFX Cube (Q/8/16 with HDD, DVB CAS)
SFX2100MB-ASI (Cube)	90077861	SFX Cube (Q/8/16 with ASI option, HDD, DVB CAS)

Specifications

RF Subsystem

Applicable DVB Standards:	DVB-S ETS 300 421 (QPSK) TR 101 198 (BPSK) EN 301 210 (8PSK/16QAM).
Modulation:	BPSK/QPSK or QPSK/8PSK/16QAM, depending on model.
Carrier Rate:	1 Ms/s to 45 Ms/s
L-Band Frequency Range:	950 to 2150 MHz (BPSK/QPSK/8PSK) 950 to 1750 MHz (16QAM)
Frequency Tuning Resolution:	1 Hz
Tuning Control:	Browser based Web GUI, head-end control (NetManager), Terminal Interface (RS-232) or SNMP.
AFC Range (Drift tracking):	Below 20 Ms/s, selectable from 10% of symbol rate to ± 2 MHz 20 Ms/s or above, fixed at $\pm 10\%$ of the symbol rate.
Carrier Input Level:	-35 to -65 dBm
RF Connector:	Type-F, female, 75 Ω unbalanced.

LNB DC Power:	+18 VDC at 350 mA maximum (horizontal polarity), or +13 VDC at 350 mA (vertical polarity), center conductor positive, short circuit protected. Optional voltages available: +15 VDC at 350 mA (horizontal) and +11 VDC at 350 mA (vertical).
LNB Requirement:	DRO type for data rates above 5 Ms/s, except for: PLL type for rates below 5 Ms/s (BPSK/QPSK), 22 Ms/s (8PSK), and 6 Ms/s (16QAM).
LNB Control:	22 kHz 650 mV, OFF selects 950 to 1950 MHz and ON selects 1100 to 2150 MHz.
FEC Type:	DVB concatenated Viterbi and Reed-Solomon (Reed-Solomon at 204/188).
Viterbi FEC Rates:	1/2, 2/3, 3/4, 5/6, 7/8 (BPSK/QPSK), 2/3, 5/6, 8/9 (8PSK), 3/4, 7/8 (16QAM).
Alpha Factor:	0.35 DVB (BPSK/QPSK), 0.25 DVB (8PSK/16QAM).

Front Panel Indicators

LOCK:	Indicates RF locked or unlocked to DVB carrier.
STATUS:	Indicates normal operation or fault.
R/W:	Indicates storage (hard drive) reads & writes.
CONTROL:	Indicates receiver control channel (NetManager) activity.
SYNC:	Indicates authorization and data activity status for sync port.
ASync:	Indicates authorization and data activity status for async port.
NETWORK:	Indicates authorization and data activity status for all network devices.
OPTIONS:	Indicates status of conditional access option.

Synchronous Port

Connector Type:	DA-15S
Electrical Interface:	X.21 (RS-422 levels)
Synchronous Rate:	1200 b/s to 10 Mb/s

Asynchronous Port

Connector Type:	DE-9P
Electrical Interface:	RS-232
Asynchronous Rate:	300 b/s to 115.2 kb/s

Net Ports (#1 and 2)

Connector Type:	RJ-45
Electrical Interface:	Ethernet
IP Data Rate:	Up to 70 Mb/s (both ports combined) with optimally sized UDP/IP packets, no encryption. (This rate was tested using QPSK modulation.)

Terminal Port (for Terminal Interface)

Connector Type:	DE-9P
Electrical Interface:	RS-232
Asynchronous Rate:	9600 b/s

Status & Control

Terminal Interface:	RS-232 port interface, for easy installation and setting of RF parameters and IP configuration.
Web Browser Interface:	Primary Status and Control GUI available for setting all configuration parameters and monitoring all metrics.
SNMP:	Enterprise MIB and portions of MIB-II for status & control. More information on the SNMP MIB is available in a separate IDC Application Note.
Remote Network Control:	Management of all receivers in the network available through NetManager, over the satellite Network Control Channel (NCC).

Storage

Hard Drive:	40 GB capacity.
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Physical (1U Rackmount Unit)

Supply Voltage:	100 to 240 VAC $\pm 10\%$, 50 or 60 Hz
Power Supply Type:	Universal Switching Type, auto sensing
Power Consumption:	80 Watts
Dimensions:	4 cm H x 36 cm D x 48 cm W
Weight:	Less than 7 kg

Environmental Considerations

Operating Temperature:	0 °C to 50 °C
Storage Temperature:	-20 °C to 70 °C
Humidity:	Maximum 90% relative humidity, non-condensing.

Certification

Safety (Pending):	CSA Worldwide Safety (CB) to IEC950
Emissions/Immunity (1U):	FCC Part 15 Class A (CE) EN50081-1 and EN50082-1 Class A

Options

See applicable models for each option in the table at the beginning of this appendix.

ASI Port

Connector Type:	BNC
Electrical Interface:	per EN50083-9
Data Rate:	Selected PIDs or full transport stream up to full speed. Transport stream packets are 188 bytes long.

DVB Conditional Access System (CAS)

Option Slot:	Single DVB Common Interface (CI) slot
Interface:	per EN50221

Irdeto Cyphercast

Option Slot:	Single Irdeto Smart Card slot
Interface:	per ISO 7816
Smart Card Protocol:	T=0

Other Options

Modem PCI Card (for phone access return channel)

MPEG Video Accelerator PCI Card

Physical (Cube Unit)

Supply Voltage:	100 to 240 VAC $\pm 10\%$, 50 or 60 Hz
Power Supply Type:	Universal Switching Type, auto sensing
Power Consumption:	80 Watts
Dimensions:	17 cm H x 29 cm D x 19 cm W
Weight:	Less than 5 kg

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Appendix C

Important EMI & Safety Certification Information

Read these safety and operating instructions before operating your SRA/SFX series satellite receiver. Follow instructions and heed all warnings on your unit and in this manual.

CAUTION:

Earth connection is essential before connecting supply. Connect your system to a grounded AC outlet only.



Receiver Installation

- Operate from a power source indicated on your receiver or in this manual.
- The AC inlet is the main power disconnect. The socket outlet shall be near the equipment and shall be easily accessible. The power requirements for this equipment are quite flexible with an acceptable power range of 100 to 240 VAC at 50 or 60 Hz. The fuse is part of the power supply. Replacement can only be accomplished by a qualified technician.
- Protect and route power cords so they will not be stepped on or pinched by anything placed on or against them. Be especially careful at plug-ins, convenience receptacles or cord exit points from the equipment. Frayed power cords or damaged plugs are hazardous. Have them replaced by a qualified service technician. Overloaded wall outlets and extension cords may cause fire or electrical shock.
- Always ensure there is adequate ventilation when installing the equipment. Do not cover or block ventilation holes. Doing so may damage the unit or cause a fire.

- Avoid excessive humidity, sudden temperature changes or temperature extremes. Dew may form inside your unit.
- To avoid costly damage or injury, place your unit on a solid, stable surface or mount in a rack free from vibrations. Do not place any heavy objects on top.

Exterior Equipment Installation

Refer to Figure C-1 while reading the instructions below.

- Grounding the dish provides protection against static voltage build-up, which may damage equipment. Grounding also provides some protection against surges induced by nearby lightning strikes. Any coax cable that may be exposed to lightning or power conductors must have its outer shield grounded. There may be additional grounding regulations in your area. It is important for you to consult and follow all the codes and regulations in your area as you install your system.
- The best method of grounding the outer shield of a coax cable is to use a ground block. This block is a barrel connector to which you can install a ground conductor, such as a terminal, or a drilled hole and setscrew. The terminal is where the outer conductor of the coax cable is attached to the grounding electrode. When installed, the grounding block passes the LNB signal and DC voltages straight through while grounding the outer conductor of the coax. One factor determining the ground block location is the location of an acceptable ground electrode. The grounding conductor (the wire that runs between the ground block and the ground electrode) must be in a straight line, if possible from the ground block to the grounding electrode. Also, splices in the conductor between the electrode and the grounding block are prohibited.
- Where coaxial cable is exposed to lightning, the cable shall be connected to the grounding system of the building, as close to the point of cable entry as practical. This can be either inside or outside the building. Therefore, when selecting a location for the grounding block, try to make the ground close to where the cable enters your building.
- The size of the grounding conductor that connects to the ground electrode is to be at least No. 10 copper wire or No. 8 aluminum wire. Insulation over the conductor wire is not required. As with any cable, the grounding connector must be securely fastened to a surface to protect it from physical damage. If the conductor cannot be protected from damage, the size of the wire should be increased to withstand any physical strain placed on it.
- Acceptable ground electrodes are: Grounding Interior Metal Water Piping (cold water), Grounding Rod (must be driven at least 2.44 meters (8 feet) into the ground) and Grounded Metallic Service Raceway.
- The outdoor antenna to be earthed in accordance with National Standards.

Operating & Cleaning

- The unit should be placed in a sheltered location away from sources of water, heat, extreme cold, vibration and electromagnetic interference.

- Use only accessories recommended by the manufacturer to avoid fire, shock or other hazards.
- If your unit has been exposed to rain, moisture or a strong impact, unplug the equipment and have it inspected by a qualified service technician before resuming use.
- Unplug your equipment and disconnect it from the antenna system during a lightning storm or an extended period of discontinued use.
- Unplug your unit before cleaning. Use a damp cloth. Do not use cleaning fluids, alcohol or aerosols, which could enter the unit and cause damage, fire or electrical shock. These substances may also mar the finish of your unit.
- Keep all liquids and foreign objects away from your unit. Never operate the unit if any liquid or foreign object has entered the unit. Electrical shorts could result and possibly cause fire or shock hazards. Unplug your unit immediately and have it inspected by a qualified service technician.
- Never open or remove covers or make any adjustments not described in this manual. Attempting to do so could expose you to dangerous electrical shock or other hazards. It may also void your warranty.

Service

- Do not attempt to service this equipment yourself. Instead, unplug the unit and contact an International Datacasting Customer Service Technician.
- The International Datacasting Customer Service Technician uses only authorized replacement parts or their equivalents. Unauthorized parts may cause fire, electrical shock or other hazards.
- Following any service or repair, the International Datacasting Customer Service Technician performs safety checks to certify that your equipment is in safe operating order.

EMI/EMC Certification

This equipment has been tested and found to comply with the limits for a 'Class A' digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off or on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for assistance.
- Changes or modifications not expressly approved by International Datacasting could void your authority to operate the equipment.

This Class 'A', digital apparatus meets all requirements of the Canadian Interference-causing equipment regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du règlement sur la matériel brouilleur du Canada.

This device also meets the requirements of the CE symbol, in accordance with EN50081-1 and EN50082-1 Class A.

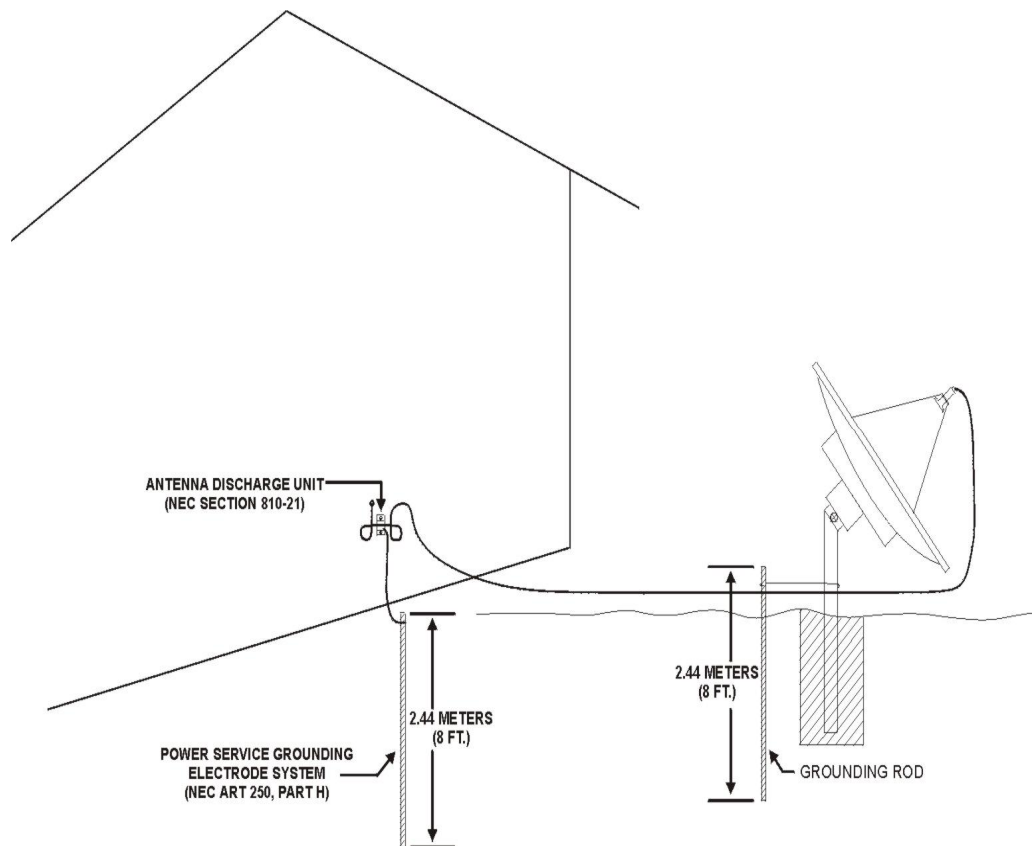


Figure C-1 – Exterior Equipment Installation

Appendix D

ASI Output Option

Web GUI Operation

If your receiver has the ASI option installed, there will be some additional menu items and display items (see Figure D-1) provided on the PID List display and edit pages. Notably, the ASI Port button is added on the left hand menu item list. This selects the ASI Port page (Figure D-2).

NOTE:
When the ASI Option is installed, an addition menu item, "ASI Port" is provided and an additional column appears in all PID Lists, called "Route to ASI".

PID#	Enabled	Route to ASI	Description
0 (0)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1 (1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2 (2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3 (3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4 (4)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
5 (5)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
6 (6)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
7 (7)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
8 (8)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9 (9)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
16 (10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
17 (11)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
20 (14)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
32 (20)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
33 (21)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
34 (22)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Lock Status: A Signal Quality: 99.0% Signal Level: 15.0% LNB Offset: 0.00 kHz C/No: 25.3 dB Eb/No: 25.6 dB Viterbi BER: 0.0 Refresh: 10 sec. OK

Figure D-1 Other PID List Page when ASI Option Installed

The display fields and columns in this Other PID List (Figure D-1) have a similar meaning to the standard Other PID List fields and columns (examples shown in Chapter 4), with following exceptions:

Column/Field	Description
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Route to ASI	Check boxes in this column can be used to enable PIDs to be routed out to the ASI Port. From none to all PIDs can be selected. Any check in a box for a PID in this list will cause that PID to appear in the list on the ASI Port page (see Figure D-2).
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The "Route to ASI" column is also provided in the Net, Async and Sync PID Lists, as well as the Add New PID Definition and Edit PID Definition pages. The same rules as above apply to those areas as well.

INTERNATIONAL DATACASTING

Logout Identity DVB Carrier Data Delivery Logging Metrics Utilities Upgrade

ASI Port

☒ ASI port(s) enabled.
☒ PID mode. ☐ Transport Stream Mode.

Pid Type	PID#	Enabled	Route to ASI	PID Rate	Description
<input checked="" type="radio"/> Other	2 (2)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	3 (3)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	4 (4)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	5 (5)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	6 (6)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	7 (7)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	8 (8)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	9 (9)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	36 (24)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	1024 (400)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	1104 (450)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	1105 (451)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	1106 (452)	Enabled	<input checked="" type="checkbox"/>		
<input type="radio"/> Other	1107 (453)	Enabled	<input checked="" type="checkbox"/>		

Lock Status: A Signal Quality: 99.0% Signal Level: 13.02 LNB Offset: 0.00 kHz C/No: 25.3 dB Eb/No: 25.6 dB Viterbi BER: 0.0 Refresh: 10 sec. OK

NOTE:

The NCC PID(s) defined in the DVB Carrier definitions and reserved PIDs 0x0 to 0x20 are a special type and cannot be routed out the ASI Port in PID Mode. These can only be routed out in Transport Stream Mode.

Figure D-2 ASI Port Page when ASI Option Installed

You can route PIDs of any type to the ASI Port. Therefore, the ASI Port Page functions in a similar fashion to a standard PID List page, but also provides information on all PIDs that are routed to the ASI Port, as shown in the example in Figure D-2. The additional columns and exceptions to note are described below:

Column/Field	Description
PID Mode	Selecting this mode allows only the PID(s) listed to be output on the ASI Port. Typically, this PID List would be some subset of the whole MPEG2 Transport Stream (TS). If this mode is selected, Transport Stream Mode cannot be selected, hence the radio button. For example, this mode would be very useful for connecting external video decoding equipment.
Transport Stream Mode	Selecting this mode allows the whole MPEG2 TS, as received from the satellite carrier, to be output on the ASI Port. If this mode is selected, all the individual PID information in the list is not used, because all PIDs in the TS are being output. For example, this mode would be useful for multi-hop applications where the whole TS has to be broadcast onto another satellite.
PID Type	This column displays the type of PID, based on which PID List it is located in, whether that is Net, Async, Sync, Other. Remember that the Cyphercast (option) ECM/EMM PID stream is of type Net PID.
Enabled	This column displays the enable/disable status of each PID, as setup under the appropriate PID List elsewhere.
Route to ASI	Check boxes in this column indicate that the PID(s) are being routed to the ASI port. In this list, all PIDs should have this box checked, otherwise they wouldn't appear in the list. This column is mainly provided as a means to remove PIDs from being routed to the ASI Port. However, doing so does not remove the PID altogether from its corresponding PID List (based on type). You can go back to the appropriate PID List and reroute the PID to the ASI Port.
PID Rate	This column displays the bit rate of the PID, if it is of type Async or Sync.

NOTE:

Deleting a PID from the ASI Port List using Delete Selected and Send Update for example, will also remove the PID permanently from its corresponding PID List (based on type).

INTERNATIONAL DATACASTING

logout DVB

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NET PIDs
ASYNc PIDs
SYNc PIDs
Other PIDs

ASI Port

Edit Selected
Add New PID Definition
Delete Selected
Delete ALL

Back to main
Cancel Changes
Send Update

Add New PID Definition

PID#: ☐ Decimal ☐ Hexadecimal

Enabled: ☐

Route to ASI: ☐

Pid Type: ☒ Net Port
☐ Async Port (Rate: b/s)
☐ Sync Port (Rate: b/s)
☐ Other

Description:

Lock Status: **A** Signal Quality: **99.0%** Signal Level: **13.0%** LNB Offset: **0.00 kHz** C/No: **25.3 dB** Eb/No: **25.6 dB** Viterbi BER: **0.0** Refresh: **10 sec. OK**

Figure D-3 Add New PID Definition when ASI Option Installed

Figure D-3 shows an example of the Add New PID Definition page, where the additional “Route to ASI” check box is provided. This is only displayed with the ASI Option.

A light blue oval graphic with a subtle gradient and a slight shadow, containing the text "Appendix E" in a large, bold, black sans-serif font.

Appendix E

Irdeto Cyphercast Option

If you have the Cyphercast Option installed in your Sxx2100R or Sxx2100MR receiver, then this Appendix describes the procedure for inserting an Irdeto Cyphercast Smart Card (SC), and the related Web GUI operation.

Pre-installation Procedure

Prior to inserting a SC into the slot on the rear panel of your receiver; please take note of the following precautions:

- Do not bend or twist the card.
- Keep the card out of direct sunlight or other heat sources.
- Do not remove/insert the card repeatedly into the slot.
- Clean the card only with a soft dry tissue. Do not use liquids or detergents to clean the card.
- Record the card number for future reference in case the card is damaged or lost. If the card is damaged or lost, contact your service provider for a replacement.
- Use caution when inserting the SC. The size of the slot opening is quite small. Ensure that the SC has been aligned correctly with the connector inside the receiver.

Inserting The Irdeto Smart Card

There is one slot on the rear panel of an Sxx2100R or MR series receiver that provides a location to insert an Irdeto Cyphercast compliant Smart Card. To access this opening, you must remove the rear panel option plate, by unscrewing the 3 Philips type screws, as shown in Figure E-1.

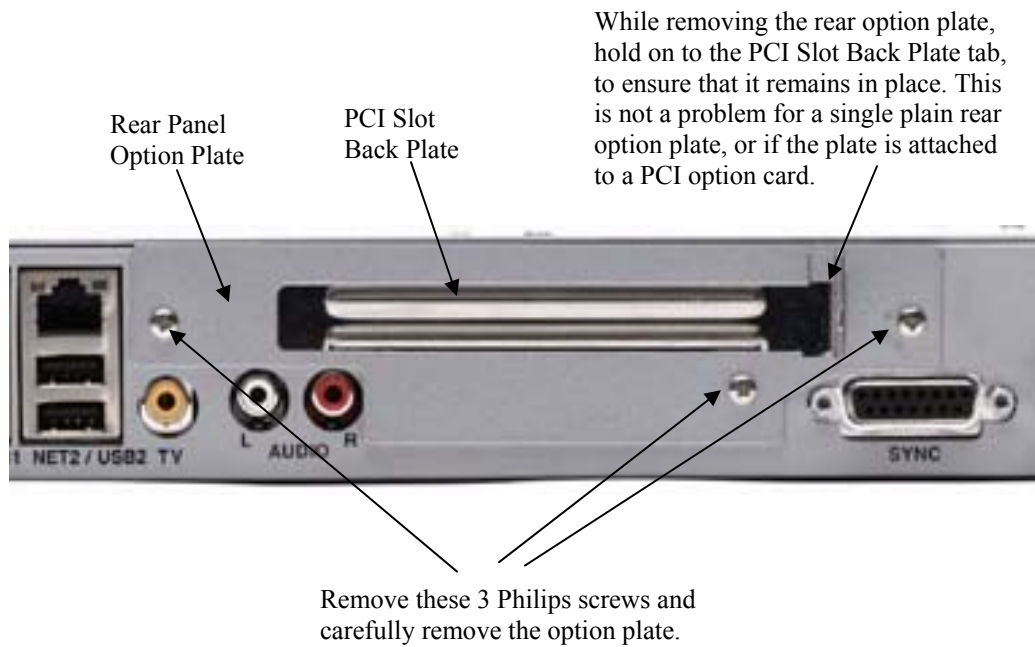


Figure E-1: Removing the Rear Panel Option Plate

Once removed, you can insert the Smart Card as shown in Figures E-2 and E-3. Note orientation of card (gold contacts are on the bottom, closest to the chassis). Please use all necessary precautions as outlined above. Once completed, secure the rear plate back onto the unit.



Figure E-2 Cyphercast Smart Card Insertion



Figure E-3 Fully Inserted Cyphercast Smart Card

Web GUI Operation

If your receiver has the Cyphercast Option installed, there will be some additional menu items and display pages provided. These are accessed via the Utilities Menu, submenu item called Cyphercast Configuration. Selecting this submenu displays the Cyphercast Configuration Page, as shown in the example in Figure E-4.

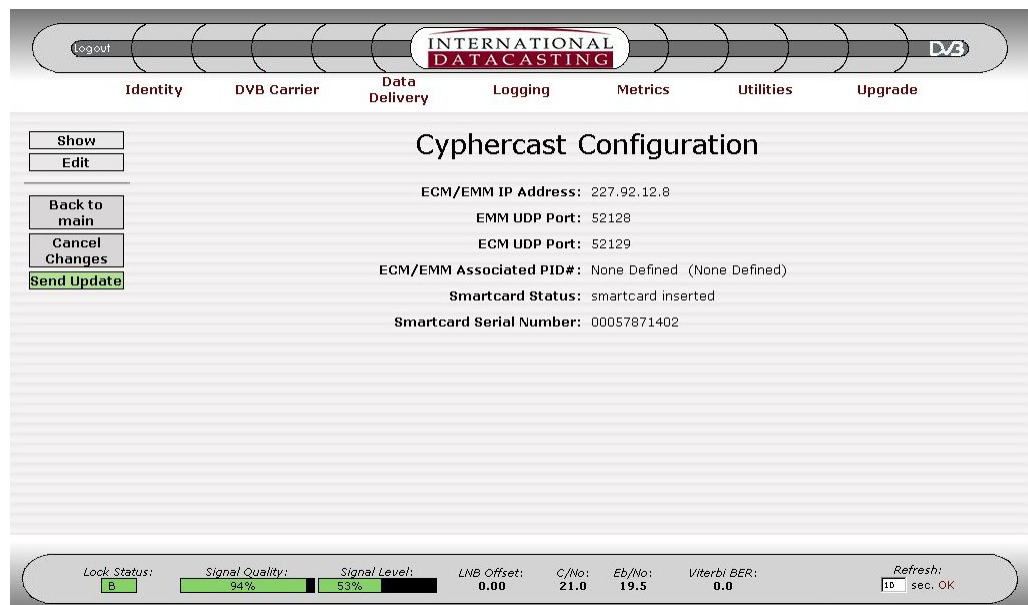


Figure E-4 Cyphercast Configuration Page

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show	Selecting this button will always return you back to the Cyphercast Configuration page, as shown in Figure E-4. The current configuration as entered under the configuration edit page is always displayed here, along with the current status of the Cyphercast Smart Card that is inserted in your receiver.
Edit	Selecting this button will enter the Cyphercast Configuration Edit page, as shown in Figure E-5. The edit fields on this page are explained below the page. Note the warning message on the page - Send Update will cause the receiver to reboot, thus interrupting data services.

NOTE:

Please note the warnings that are printed on the Cyphercast Configuration Edit Page.

NOTE:

The ECM/EMM PID is of type Net PID (see Chapter 4 PIDs and Ports). Once the PID is entered here, it will appear on the Net PID list automatically. You can also do the reverse, by adding the ECM/EMM PID in the Net PID list, in which case it won't appear here and only the IP address/port number are relevant.

Figure E-5 Cyphercast Configuration Edit Page

The following fields can be edited on the Cyphercast Configuration Edit page:

Edit Field	Description
ECM/EMM IP Address	Enter the valid multicast IP address in dotted decimal notation. This address and the UDP Port are configured for receiving the ECM/EMM data, and must match the configuration of the Cyphercast/M-crypt head end.
EMM UDP Port	Enter a valid UDP port number for EMM stream. The ECM port number cannot be entered, as it is always 1 more than the EMM port number. Again, this port number is required, and must match the Cyphercast/M-crypt head end configuration.

NOTE:

When you Send Update with the new Cyphercast Configuration, the multicast ECM/EMM stream configured here becomes a non-editable static route in the static routing table, with the interface as sat0.


Edit Field	Description
ECM/EMM Associated PID #	Enter a PID number in decimal or hexadecimal, for the PID stream that contains the ECM/EMM data. Note that this PID is of type Net PID and will be displayed in the Net PID list also.

Front Panel LED Indications

When the Cyphercast Option is installed, certain indicators on the front panel will behave differently and provide additional status information, as follows:

OPTIONS	<p>Purpose: provides status of the Cyphercast conditional access operation.</p> <p>Colour: off/green, where:</p> <p>Solid Green – conditional access option is installed.</p> <p>Flashing Off/Green – EMM/ECM packets are being received.</p> <p>Off – the Cyphercast option is not installed.</p>
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Appendix F

DVB Conditional Access System (CAS) Option

The following Appendix describes the procedure for inserting a DVB Conditional Access (CA) Module and Smart Card (SC) into an Sxx2100B or Sxx2100MB series receiver, and the related Web GUI operation. You will need to be certain that your model of receiver can accommodate the appropriate type of CA Module and/or SC, depending on the DVB CAS being used in your network.

Pre-installation Procedure

Prior to inserting a CA Module and/or SC into the slot on the rear panel of your receiver; please take note of the following precautions:

- Do not bend or twist the card.
- Keep the card out of direct sunlight or other heat sources.
- Do not remove/insert the card repeatedly into the slot.
- Clean the card only with a soft dry tissue. Do not use liquids or detergents to clean the card.
- Record the card number for future reference in case the card is damaged or lost. If the card is damaged or lost, contact your service provider for a replacement.
- Use caution when inserting the CA Module and/or SC. The size of the slot opening is quite small. Ensure that the CA Module or SC has been aligned correctly with the connector inside the receiver.

Inserting The CA Module

There is one slot on the rear panel of an Sxx2100B or MB series receiver that provides a location to insert a DVB Common Interface compliant CA Module and Smart Card

combination. To access this opening, you must remove the rear panel option plate, by unscrewing the 3 Philips type screws, as shown in Figure F-1.

NOTE:

Turn off the power to the receiver when inserting and removing CA components. **Caution** should be taken when removing the Rear Panel Option Plate, to ensure that the PCI Slot Back Plate does not fall into the receiver.

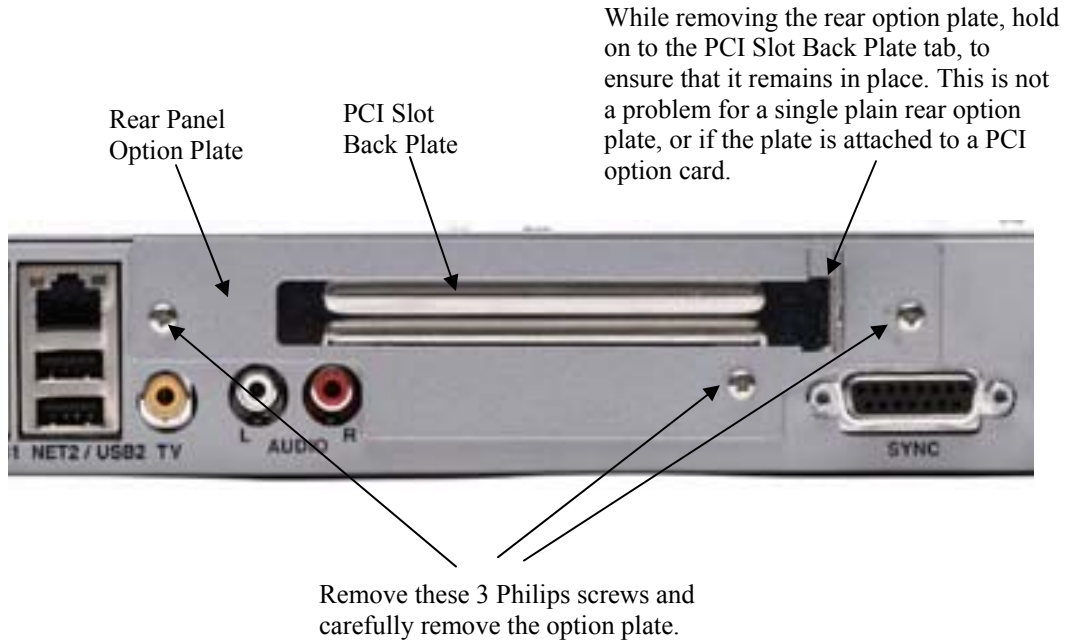


Figure F-1: Removing the Rear Panel Option Plate

When facing the front of the CA Module, where the SC is inserted, you will notice a difference in size (thickness) of the slot opening (refer to Figure F-2). Always ensure that the thickest side of the SC opening faces the top. Generally this is the same side as the service provider's label.



Figure F-2 Front View of a CA Module

Referring to Figure F-3, insert your SC into the CA Module. Ensure that the card is inserted all the way into the CA Module slot with the gold contacts on the card facing up and pointing towards the CA Module, as shown. Then, carefully insert the whole assembly into the rear

panel CA slot on the receiver. Once the whole assembly has been inserted, you can close the slot again with the Rear Panel Option Plate.

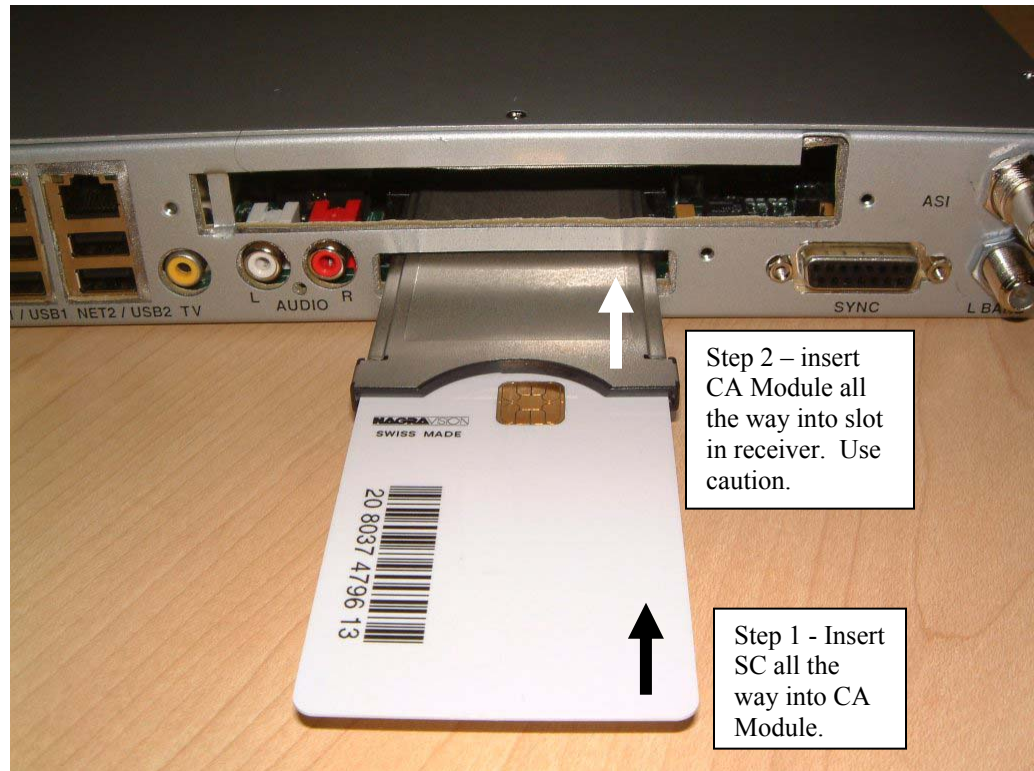


Figure F-3 Smart Card and CA Module Insertion

Web GUI Operation

If your receiver has the DVB CAS Option installed, there will be some additional menu items and display pages provided. These are accessed via the Carriers Menu, submenu item called Conditional Access Configuration. Selecting this submenu displays the Conditional Access Configuration page, as shown in the example in Figure F-4.

A compliant DVB CAS data service comprises 2 PID streams: one containing the data, and the other containing Entitlement Control Messages (ECMs). In addition, there is a third PID containing Entitlement Management Messages (EMMs). The ECMs are used by the inserted CA Module and Smart Card to derive a key for descrambling the data PID stream in the service. EMMs are used by the CAS subscriber management system to authorize the Smart Cards.

The Program Association Table (PAT) on PID 0 is used to obtain the PID of the Program Map Table (PMT), for the program number containing the data services. The receiver then reads the PMT on the specified PID and determines the data and ECM PID pairs for each data service. When a data PID is selected for output on the Net Port, for example, and a CA Module/Smart Card are inserted, descrambling will begin, using the corresponding ECM PID. For special DVB systems, an alternate PID for the PAT can be specified, but generally, PID 0 is used.

The EMM PID number is derived from the Conditional Access Table (CAT) on PID 1. The CAT is always on PID number 1.

Figure F-4 Conditional Access Configuration Page

Aside from the Common Menu Items, the following menu items are available:

Menu Item	Description
Show	Selecting this button will always return you back to the Conditional Access Configuration page, as shown in Figure F-4. The current configuration as entered under the configuration edit page is always displayed here.
Edit	Selecting this button will enter the Conditional Access Configuration Edit page, as shown in Figure F-5. The edit fields on this page are explained below the page. Note the warning message on the page - Send Update will cause the receiver to reconfigure the CA Module accordingly, thus interrupting data services.

Conditional Access Configuration

Program #: decimal
 hexadecimal

PAT PID # (default value is 0): decimal
 hexadecimal

Warning: Any changes made here and sent to the receiver by pressing the "Send Update" button **will** cause the interruption of data.

Lock Status: A Signal Quality: 92% Signal Level: 67% LNB Offset: 0.00 C/No: 20.1 Eb/No: 18.7 Viterbi BER: 0.0 Refresh: 60 sec. OK

NOTE:

Please note the warnings that are printed on the Conditional Access Configuration Edit Page.

Figure F-5 Conditional Access Configuration Edit Page

The following fields can be edited on the Conditional Access Configuration Edit page:

Edit Field	Description
Program #	Enter the valid program number within the PAT as a decimal or hexadecimal number. This will be used to index into the PAT to determine the PID number of the PMT.
PAT PID #	For special DVB systems and for added flexibility, you may need to enter a PID number for the PAT that is something other than PID 0. This field is provided for that purpose and if left untouched, will default to 0.

Front Panel LED Indications

When the DVB CAS Option is installed, certain indicators on the front panel will behave differently and provide additional status information, as follows:

OPTIONS	Purpose: provides status of the CAS operation. Colour: off/green, where: Solid Green – CAS option is installed. Flashing Off/Green – PAT/PMT tables are being received. Off – the CAS option is not installed.
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NETWORK

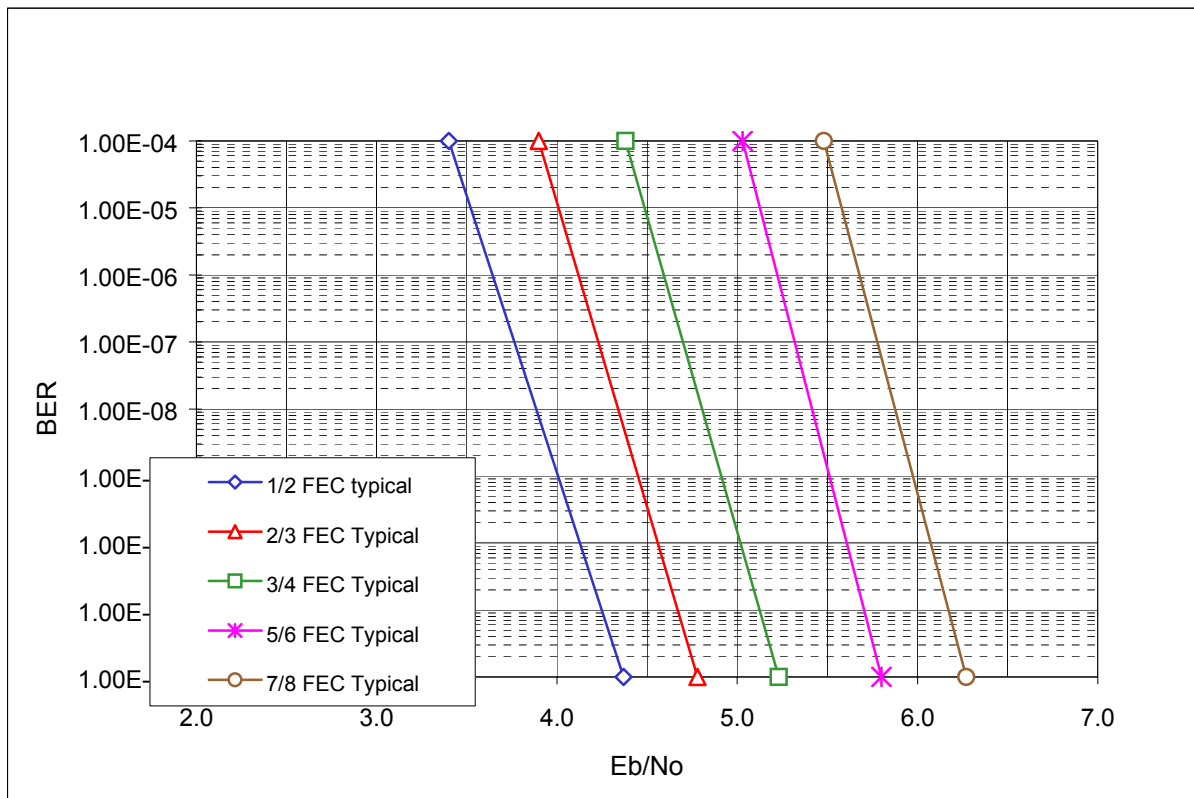
Indicator colours are enhanced as follows:

Flashing Off/Green – satellite network interface is authorized and there is data activity on one or more of the selected MPE PIDs (see Chapter 4). If the CAS option is installed, this also indicates that the data is being decrypted.

Flashing Off/Orange – CAS option is installed, satellite network interface is authorized and there is data activity on one or more of the selected MPE PIDs (see Chapter 4). However, the data is not being decrypted.

Appendix G


Performance Graphs



Note: Typical BER Performance values based on measured BER results between 10^{-2} and 10^{-8} for 10 MSym/S at FEC rate 1/2 and 7/8 at 1190MHz at Co -100dBm/Hz . Rates 2/3, 3/4, and 5/6 interpolated. BER performance below 10^{-8} are extrapolated.

Figure G-1 SRA/SFX2100 BER Performance (QPSK)

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A graphic of a light blue oval with concentric circles inside, resembling a ripple in water.

Appendix H

Glossary

This Appendix lists the terms, acronyms and abbreviations used in this manual:

AC	Alternating Current
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
ANSI	American National Standards Institute
NAT	Network Address Translation
Bandwidth	A measure of spectrum (frequency) use or capacity.
BER	Bit Error Rate
BPSK	Binary Phase Shift Keying
CA	Conditional Access
Carrier	The center frequency transmit signal on which data signals (DVB stream) are sent.
CAS	Conditional Access System
CAT	Conditional Access Table
CF	Compact Flash (memory device)
CI	Common Interface
DC	Direct Current
DHCP	Dynamic Host Configuration Protocol
DVB	Digital Video Broadcasting
ECM	Entitlement Control Message
EMM	Entitlement Management Message
EMI	Electromagnetic Interference
FEC	Forward Error Correction
FPGA	Field Programmable Gate Array

GND	Ground
GUI	Graphical User Interface
Hz	Hertz
HDD	Hard Disk Drive
ICMP	Internet Control Message Protocol
ID	Identification
IDC	International Datacasting Corporation
IEC	International Electro-technical Commission
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPE	IP Encapsulator
ISO	International Standards Organization
Kb/s	Kilo-bits Per Second
Ks/s	Kilo-Symbols per Second
LAN	Local Area Network
LED	Light Emitting Diode
LNB	Low Noise Block-downconverter
LO	Local Oscillator
mA	Milliampere
MHz	Megahertz
MIB	Management Information Base
MPE	Multi-Protocol Encapsulation
MPEG	Motion Picture Experts Group
Ms/s	Mega-Symbols per Second
MUX	A device used to allow many different data feeds to transmit over a single circuit, in this case a DVB transport stream.
NCC	Network Control Channel. A data stream generated by NetManager and transmitted on a data PID, used to control the SuperFlex receivers in the network.
NSP	Network Service Provider
PAT	Program Association Table. A DVB table generally carried on PID 0, indicating the link between a program number and the PID of the associated PMT.
PID	Packet Identifier. A single data stream within the DVB transport stream, encapsulated in packets of 188 bytes each.
PMT	Program Map Table. A DVB table transmitted on a user defined PID, indicating the PIDs of the data and associated ECM, if the program is

scrambled. There is one PMT table for each program.

QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RAM	Random Access Memory
RF	Radio Frequency
RMA	Return Material Authorization
ROM	Read Only Memory. Memory in a computer where the processor can only read from.
SAT	Source Address Translation
SC	Smart Card
SNMP	Simple Network Management Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
UDP	User Datagram Protocol
VAC	Volts Alternating Current
VDC	Volts Direct Current

international headquarters
2680 Queensview Drive
Ottawa, Ontario CANADA K2B 8H6
tel: 613-596-4120 | fax: 613-596-4863
www.intldata.ca
email: sales@intldata.ca

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