

SuperFlex

**SR2000pro Series Satellite
Audio Appliance**



INTERNATIONAL
DATACASTING

User's Guide

Preface

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**SR2000pro Series SuperFlex Satellite Audio Appliance
International Datacasting Corporation Part No. 90078450-50**

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Chapter 1

Introduction

International Datacasting Corporation (IDC) would like to thank you for purchasing the SR2000pro SuperFlex DVB Satellite Audio 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 SR2000pro is an important leap forward in Digital Audio performance and functionality. These products combine IDC's experience of more than 15 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 SR2000pro SuperFlex Satellite Audio Appliance will be referred to as simply the "SR2000pro". This chapter provides a brief overview of the SR2000pro.

SR2000pro Product Overview

The **SR2000pro** is the newest addition to IDC's bestselling family of DVB/IP edge receivers and audio appliances. We have taken the reliability and functionality of our most popular SR2000 and SR2000plus models and added exciting new features to create the SR2000pro.

The **SR2000pro** operates on carriers ranging anywhere from **256ks/s to 45Ms/s**. For use on DVB shared service uplinks, and/or simple enough to operate your own. At 256ks/s (the lowest in the industry) it's easy to save on the cost of bandwidth—the most expensive component of any data network—and grow as your business grows.

The **SR2000pro** now features IDC's own built-in **FlexKey** decryption, a more affordable alternative to high-end encryption and conditional access systems. FlexKey is a flexible key encryption system—this means that the keys can be changed over the

satellite, providing superior security and reduced cost of ownership compared to low-end receivers that use only fixed key encryption.

The SR2000pro supports a web browser based status and control GUI, allowing configuration of satellite carrier frequency, data and audio rates, port authorization and other operating functions to be set locally or remotely. A front panel LCD and RS-232 Terminal Interface are also provided to facilitate easy local installation.

The SR2000pro can also be remotely controlled using IDC's NetManager2 via the satellite network, either individually, in groups or globally, and/or using SNMP via terrestrial networks for monitoring and control.

The SR2000pro comes complete with built-in high quality dual stereo MPEG digital audio decoders. This makes it ideal for in-store advertising, background music, digital signage, civil and emergency alert systems, and even radio networks. The SR2000pro is also ideal for hybrid networks combining DVB digital audio, IP digital audio streaming and content or data delivery. It provides all of the advantages of DVB multi channel per carrier (MCPC) operation in a receiver designed to accommodate the needs of audio networks.

The SR2000pro also supports the display and output of audio channel associated meta data and Form-C relays for external device control. These features can be remotely controlled on a per channel basis from the head end by IDC's **EventManager**.

Standard Features

- DVB transport format compatible ISO/IEC 13818 with filtering up to 32 PIDs
- QPSK DVB compliant demodulator, 256 ks/s to 45 Ms/s
- Embedded Linux operating system for maximum performance and reliability
- 10/100 Base-T Ethernet port for multicasting and unicasting output
- 2 built-in audio decoders (channels), each with balanced stereo outputs and digital output
- 2 sets of 4 Form-C contact closure relays for external device control, one for each audio channel
- 2 meta data channels, one for each audio channel
- Light weight one rack unit-high model
- 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.
- Secure background firmware/software downloading – the SR2000pro always has most current code
- Front panel LCD display for easy installation and status display
- Additional LED indicators for Lock, Status, Control and audio data traffic
- Fully interoperable with IDC's family of SuperFlex DVB products
- Optional FlexKey system decryption for data security

Mechanical Packaging

The SR2000pro is available as a light weight, low-profile 1RU high model for rack mount installations. The SR2000pro comes with an easy to read front panel LCD display and LED indicators and a full suite of industry standard rear panel interfaces, for ease of implementing standard and custom-defined audio and network configurations.

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Chapter 2

Installation

This chapter provides information to familiarize you with the SR2000pro, 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 SR2000pro. 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.

Varying levels of Status and Control for configuration of the SR2000pro are available through one of the following: locally using the front panel LCD display and keyboard, the Terminal Interface, locally or remotely using the Web based Graphical User Interface (GUI), remotely using SNMP, or remotely using NetManager2. 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) SR2000pro satellite audio appliance unit;
- One (1) portable power supply unit with 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 SR2000pro from the box, please familiarize yourself with the front panel. Refer to Figure 2-1 for the location of the indicators and LCD. These are described in the table under the figures.

SR2000PRO SATELLITE AUDIO APPLIANCE

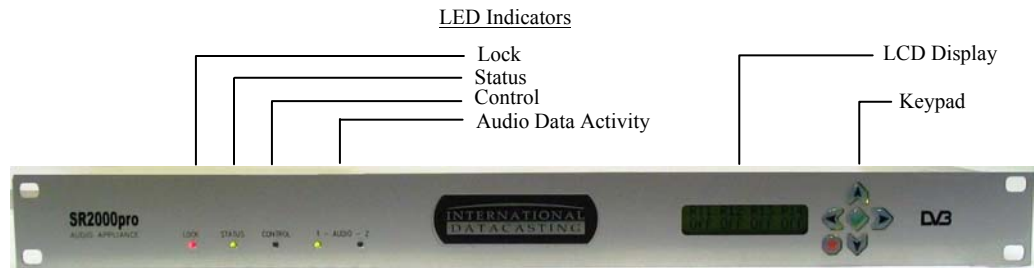


Figure 2-1 SR2000pro Front Panel

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"> 1. the LNB is being powered by the receiver; current draw is between 50 and 350 mA; or 2. 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"> 1. during the boot, start-up and initialization of the receiver application firmware, remains red until

Indicator	Description
	<p>startup is 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 (NetManager2 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>
1 – AUDIO - 2	<p>Purpose: provides indication of the authorization and data activity on the audio channels 1 & 2.</p> <p>Colour: off/green, where:</p> <p>Solid Green – audio channel is authorized (enabled), but there is no data activity.</p> <p>Flashing Off/Green – audio channel is authorized and there is data activity. If the FlexKey decryption option is installed, this also indicates that the data is being decrypted.</p> <p>Off – audio channel is not authorized.</p>
LCD Display and Keypad	<p>Purpose: this is the Front Panel LCD/Keypad Interface that provides operational status indication and allows you to configure the basic functions of the unit, so that it can lock to an RF carrier and receive audio and/or data. It also allows you to setup the IP configuration so that the unit can be accessed on the LAN with a Web browser.</p> <p>Sections later on in this User's Guide will describe the operation of this interface.</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 Figure 2-2. A description of each of the visible connectors on the rear panel is provided in the table after the figure.

SR2000PRO SATELLITE AUDIO APPLIANCE

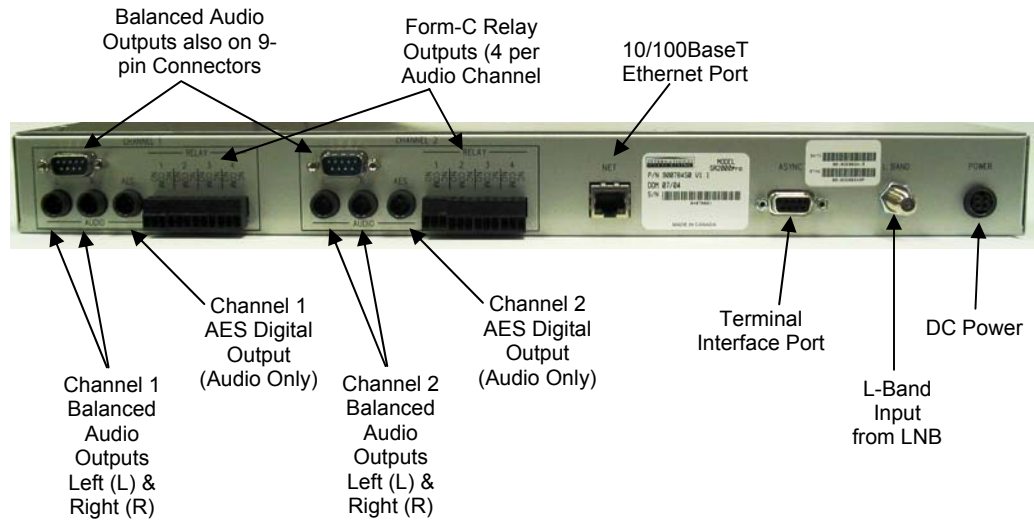


Figure 2-2 SR2000pro Rear Panel Connectors

Connector	Description									
DC Power	<p>The Direct Current (DC) inlet is the main low voltage power disconnect. The locking DC power connector on the external power supply is connected to this point on the rear panel. Note that the DC power connector is a locking connector and you must pull back on the connector case to unlock it.</p> <p>The main AC power cord is connected to the external power supply. This is the main AC power disconnect. The power requirements for the external power supply are quite flexible, with an acceptable power range of 100 to 240 VAC at 50 or 60 Hz.</p>									
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>									
ASYNC Terminal Interface Port	<p>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 as follows:</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>Acronym</th> <th>Reference</th> </tr> </thead> <tbody> <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> </tbody> </table>	PIN	Acronym	Reference	1	DCD	Data Carrier Detect	2	RD	Receive Data
PIN	Acronym	Reference								
1	DCD	Data Carrier Detect								
2	RD	Receive Data								

Connector	Description		
	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

10/100 Base-T Ethernet Port

This is a bi-directional RJ-45 8-wire (female) connector, with a 10/100Base-T auto sensing Ethernet interface. Two indicators are provided immediately above the RJ-45 connector:

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.

The pinouts for this port is as follows:

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

Form-C Relay Outputs (one set per audio channel)

For each Audio Channel there is a corresponding set of four (4) Form-C relays, each with screw terminals for NO, COM, NC, that can be used for controlling external devices in the receive site. These relays are associated with the audio stream being received by the corresponding audio decoder, and are controlled at the Head End by IDC's **EventManager**.

AES Digital Audio Outputs

Digital audio output for each Audio Channel, providing audio data only.

The pinouts for this port is as follows:

PIN	Acronym	Reference
1	GND	Ground
2	T+	Transmit Data +
3	T-	Transmit Data -

Connector	Description																														
L & R Balanced AUDIO Outputs	<p>Balanced audio output for each Audio Channel, level +18 dBu at clipping point, impedance <100 ohms.</p> <p>The pinouts for this connector are as follows:</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>Acronym</th> <th>Reference</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>GND</td> <td>Ground</td> </tr> <tr> <td>2</td> <td>A+</td> <td>Audio Out +</td> </tr> <tr> <td>3</td> <td>A-</td> <td>Audio Out -</td> </tr> </tbody> </table>	PIN	Acronym	Reference	1	GND	Ground	2	A+	Audio Out +	3	A-	Audio Out -																		
PIN	Acronym	Reference																													
1	GND	Ground																													
2	A+	Audio Out +																													
3	A-	Audio Out -																													
Balanced Audio Outputs on 9-pin Connectors	<p>For each Audio Channel, both Left and Right balanced audio outputs are provided on a single 9-pin D type connector.</p> <p>The pinouts for this connector are as follows:</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>Acronym</th> <th>Reference</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>L-</td> <td>Left Audio -</td> </tr> <tr> <td>2</td> <td>L+</td> <td>Left Audio +</td> </tr> <tr> <td>3</td> <td></td> <td>Unused</td> </tr> <tr> <td>4</td> <td>R-</td> <td>Right Audio -</td> </tr> <tr> <td>5</td> <td>R+</td> <td>Right Audio +</td> </tr> <tr> <td>6</td> <td>GND</td> <td>Analog Ground</td> </tr> <tr> <td>7</td> <td></td> <td>Unused</td> </tr> <tr> <td>8</td> <td></td> <td>Unused</td> </tr> <tr> <td>9</td> <td>GND</td> <td>Analog Ground</td> </tr> </tbody> </table>	PIN	Acronym	Reference	1	L-	Left Audio -	2	L+	Left Audio +	3		Unused	4	R-	Right Audio -	5	R+	Right Audio +	6	GND	Analog Ground	7		Unused	8		Unused	9	GND	Analog Ground
PIN	Acronym	Reference																													
1	L-	Left Audio -																													
2	L+	Left Audio +																													
3		Unused																													
4	R-	Right Audio -																													
5	R+	Right Audio +																													
6	GND	Analog Ground																													
7		Unused																													
8		Unused																													
9	GND	Analog Ground																													

Equipment Installation

The following points and precautions should be considered when planning the installation of your SR2000pro.

- The unit 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 unit (either liquid or solid), unplug it immediately and have a qualified technician examine the unit prior to further operation.
- The unit should be placed on a stable surface or rack mounted, as applicable.

To install your SR2000pro, 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 are not planning to use the front panel LCD interface. If you wish to use the Web GUI, the minimum platform would consist of a Pentium 133 MHz computer with an installed Local Area Network (LAN) card and Microsoft™ Internet Explorer Version 5.0 or later. Later Chapters in this guide provide further information on the LCD and Terminal Interface, and the 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 SR2000pro is operational after shipment. To do this, simply plug the supplied AC power cord into the external power supply and plug the DC power connector into the rear panel of the unit. Note that the DC power connector is a locking connector and you must pull back on the connector case to unlock it. If you now turn the unit around so that you are facing the front panel, you should notice the STATUS LED is illuminated and may change colour after some period of time. Furthermore, the LCD display should be backlit and should be displaying "International Datacasting" and then an operational message. At this point, ignore the colour of any of the other indicators, as this is just an indication that the receiver has power and is commencing operation.

If the LCD or indicators have not illuminated, power cycle the unit once to make sure, and if there is still a problem, please proceed to Chapter 4 (Troubleshooting).

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Chapter 3

Getting Started

Status and Control of the Satellite Receiver

As previously mentioned, varying levels of status and control of the SR2000pro can be accomplished by one of the following:

1. Locally, using the Terminal Interface;
2. Locally, using the Front Panel LCD/Keypad Interface;
3. Locally or remotely, using the Web based Graphical User Interface (GUI);
4. Remotely, using Simple Network Management Protocol (SNMP);
5. Remotely, using International Datacasting's NetManager2, via the Network Control Channel (NCC).

Each of these methods is described in detail in the following chapters.

Controlling the SR2000pro 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 an SNMP manager, access to enough receiver functions to install the unit, acquire lock to a DVB Carrier, and obtain data and/or audio output. Simply connect an RS-232 straight through DB-9 male to female cable between the COM port on a PC and the ASYNC 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.

On the SR2000pro, the rear panel ASYNC port is used for the Terminal Interface. To activate the ASCII Terminal Interface, you can type any ASCII character (for example, press Enter). At the username prompt, login using the **admin** account and enter the appropriate password and then proceed to use the terminal commands. The password for the **admin** account can be obtained from IDC Customer Service (see Chapter 4).

Once logged in, this password can be changed using the **passwd** command, however, the password must then be remembered.

The session remains in effect until either an **Exit** command is issued (see below), or there has been no activity on the ASYNC port for 5 minutes, or 3 illegal passwords were entered in a row. If the session terminates, you must reactivate the Terminal Interface by entering any ASCII character (e.g. Enter key).

Terminal Interface commands are also available if you logon using **telnet**, via the LAN connection, provided that the **telnet** option is enabled in the unit.

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

STANDARD TERMINAL COMMANDS

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.

SetCarrier

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

This command sets the receiver's demodulator to the specified carrier, where:

- **-A** applies all the parameters following this apply to carrier A.
- **-B** applies all the parameters following this apply to carrier B.
- **-f** is the frequency of the carrier in Hz (between 950000000 - 2150000000 Hz).

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.

Commands with one optional parameter only can be entered without any parameter.

- **-s** is the symbol rate of the carrier in symbols per second (between 256000 - 45000000 S/s).
- **-v** is the Viterbi rate of the carrier (Auto, 1/2, 2/3, 3/4, 5/6, 7/8).
- **-n** is the PID number of the NCC PID (in hex) (between 0x20 and 0x1FFE, 0 to disable NCC PID).
- **-m** is the Modulation Scheme (q=QPSK).
- **-t** enables or disables the 22 kHz tone to the LNB (e=enable, d=disable).
- **-p** sets the LNB polarization (v=vertical (13V), h=horizontal (18V)).
- **-d** is a short descriptive name for the carrier.

Note1: if neither **-A** nor **-B** appear on the command line, all values specified will be applied to both carriers.

Note2: if either **-A** or **-B** are entered, at least one other parameter must be specified.

Note3: order is somewhat sensitive here, in that any parameters following the [-A] will pertain to carrier A and any parameters following [-B] will pertain to carrier B. Therefore, the **-A** or **-B**, if used, should be the first parameter.

GetCarrier

Usage: **GetCarrier**

This command displays the carrier(s) that the receiver is currently set to receive. This command takes no parameters. The output will be formatted as follows:

Carrier A:

Description: xxxxxxxxxxxx
 Frequency: xxxxxxxxxxxx Hz
 Data Rate: xxxxx s/s
 Viterbi: x/y or Auto
 NCC PID: xxxx (hex)
 Modulation Scheme: QPSK
 22 kHz: On / Off
 Voltage: 18V / 13V

Carrier B:

Description: xxxxxxxxxxxx
 Frequency: xxxxxxxxxxxx Hz
 Data Rate: xxxxx s/s
 Viterbi: x/y or Auto
 NCC PID: xxxx (hex)
 Modulation Scheme: QPSK
 22 kHz: On / Off
 Voltage: 18V / 13V

Currently locked to Carrier (A or B) or Not Locked.

SetLNB

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

This command sets the LNB characteristics of the receiver where:

- **-f** indicates LNB frequency reversal (ON or OFF). If this parameter is omitted, frequency reversal = OFF is the default.
- **-p** indicates the LNB supply voltage is enabled or disabled (e=enabled, d=disabled). The voltage output on the LNB interface is determined by the **SetCarrier** command **-p** option.
- **-r** is the minimum AFC range in Hz (between 0 and 2000000 Hz).

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 will be formatted as follows:

```
Minimum AFC Range: xxxxxx Hz
Frequency Reversal: On/Off
LNB Power: Enable/Disable
AFC Range: xxxxxxxx Hz
```

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 ±xxxxxxx Hz
```

ResetLNBOffset

Usage: **ResetLNBOffset**

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

GetDemod

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

This command displays the current demodulator status information.

The **-r n** optional parameter indicates repeat mode. In this mode, **GetDemod** will repeat its output continuously (every **n** seconds) until Ctrl-C is pressed on the controlling terminal. If **-r** is omitted, the demod status information will be displayed only once. The following information is displayed:

DVB Lock
Signal Quality
Signal Level

The DVB Lock status will be displayed as an A or B (if locked to carrier A or B) or NO (if not locked).

The Signal Quality will be displayed as bar graph of 20 character positions delimited by '[' and ']'. The 20 character positions will be filled with '*' from left to right to indicate signal quality (each character position is equivalent to 5%). Unused character positions will contain the '-' character. The percent signal quality will be printed as a decimal number following this display. For example:

[*****-----] 50%

The Signal Level display will use a bar graph identical to that used for the Signal Quality display. Following this graph will be one of "LOW" "NOMINAL" or "HIGH" to indicate signal level. For example:

[***-----] LOW

The output will be formatted as follows:

If the receiver is not locked, the following string only will be displayed:

DVB Lock: No

If the receiver is locked, all three fields will be displayed on one line as follows:

DVB Lock: A (or B) Quality: [***-----] 50% Level: [*****-----] HIGH**

GetRF

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

This command displays detailed metrics information about the receiver demodulator circuitry, where **-r** indicates repeat mode display for the RF parameters, the display happening every **n** seconds until Ctrl-C is pressed.

The following values will be displayed:

Lock Status, displayed as a 0 (receiver not locked) or a 1 (receiver locked)

Note: if the receiver is unlocked (i.e. Lock Status: 0) then the remaining metrics below will not be displayed.

Signal Level, displayed as a percentage;
Signal Quality, displayed as a percentage;
R-S Uncorrectable Errors, displayed as a value 0..32767.
C/N, displayed as a value 0..30 dB in 0.1 dB steps;
Eb/No, displayed as a value <0, 0..25, >25 dB, in 1 dB steps;
Viterbi BER, displayed as a value x.y E -z;

On the terminal, the output of **GetRF** will be displayed as follows:

```
Lock Status: 0 or 1
Level: xxx%
Qual: xxx%
VBER: x.y E-z
C/N: xx.x dB
Eb/No: xx dB
RSUncor: xxxxx
```

If repeat mode is specified, the terminal's display will be cleared immediately before the output is written. The clearing of the terminal display will be accomplished by writing the ANSI control codes to clear the display (ESC [H ESC [J) to the terminal. This will require that the attached terminal be ANSI or VT100 compliant.

ClearRS

Usage: **ClearRS**

This command clears to zero, the Reed-Solomon Uncorrected Packets counter that is displayed in **GetRF**. 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>]**

This command sets the IP characteristics of a receiver network device, where:

- **-i** indicates the interface name ((sat or sat0) or (Net1 or eth0), default is (Net1 or eth0)
- **-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)

GetIP

Usage: **GetIP [-A]**

This command displays the currently configured IP Address and Net Mask for all available network interfaces. For example:

```
Found 2 interfaces.

Net1(eth0):
IP Address: 192.168.0.1
```

Netmask: 255.255.255.0

Satellite(sat0):
 IP Address: 10.0.0.170
 Netmask: 255.0.0.0

Note: Specifying **-A** will give you all the underlying Linux interfaces.

AddRoute

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

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** is an optional parameter - selects which network interface will be applicable to this route, using one of the options: (Net1 or eth0 for the Ethernet port) or (sat or sat0 for the satellite receiver interface).
- **-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>

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** [-A]

This command displays the content of the current static routing table for all known interfaces. 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), or sat (sat0)
```

Note: Specifying **-A** will give you all the underlying Linux routes.

SetSNMPConfig

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

This command configures the community names for SNMP SET (read-write) and GET (read-only) commands. The parameters are:

- **-r** <read-only community name> sets the SNMP community name for GET (max. 31 characters)
- **-w** <read-write community name> sets the SNMP community name for SET (max. 31 characters)

Note: at least one parameter is required.

ResetSNMPConfig

Usage: **ResetSNMPConfig**

This command resets the SNMP community names back to their default values of "Public" for read-only access, and "Private" for read-write access.

GetInfo

Usage: **GetInfo**

This command displays the current identity information for the receiver and all enabled options (e.g. Async Processor, Audio, etc.). This command takes no parameters and the display is only provided once. The display will be formatted as follows:

```
Receiver Name: xxxxxxxxxxxxxxxxxxxxxx
Receiver Description: xxxxxxxxxxxxxxxxxxxxxx

Satellite (sat0) MAC Address: 00:10:de:xx:xx:xx
Net1 (eth0) MAC Address: 00:10:de:xx:xx:xx
Device Type: SR2000Pro

Async Processor: ENABLED or DISABLED
Audio: ENABLED or DISABLED
Binary Terminal: ENABLED or DISABLED
Decryption: ENABLED or DISABLED
Telnet: ENABLED or DISABLED

LED States: (displays LED colours)

Firmware Version: xxx.xx (e.g. 1.2)
Boot Loader Version: xxx.xx (e.g. 1.0)
```

SetDescription

Usage: **SetDescription** -n 'Receiver Name' -d 'Receiver Description'

This command is used to set the receiver name and description fields, as displayed by the **GetInfo** command, where:

- **-n** is the identifying name for the receiver.
- **-d** is a short meaningful description of the receiver.

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 (N/A substituted for numbers). The output is formatted as follows (with appropriate values substituted):

PID	DVB Packets	Data Sets	Missed Starts	Short Data Sets	Dropped Packets
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx

DMA FIFO Overflows: 0

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 for all PIDs, all at once.

Note1: PID numbers are shown in decimal notation.

Note2: Data Sets are equivalent to Total IP Packets. Missed Starts, Short Data Sets, or Dropped Packets indicate that the total IP packet(s) could not be properly decoded from the DVB transport stream. Under normal operation, these values should be 0. DMA FIFO Overflows should be 0 – a value other than 0 could indicate excessive burstiness or overspeed in the PID stream.

ClearDebug

Usage: **ClearDebug**

This command clears the debug counters that are provided for each PID displayed in the **GetDebug** display. This command takes no parameters and displays no statistics.

SetPortAuthorization

Usage: **SetPortAuthorization -p {n|a|1|2} -a {a|d}**

This command sets the authorization for each port in the receiver. The format is dependent on which features are enabled (e.g. Async Processor or Audio feature - see the **GetInfo** command). The individual parameters are defined below:

- **-p** is the port that is to be authorized (n=Net (Ethernet) port, a=async port, if Async Processor is enabled, and 1 or 2 are audio 1 port or audio 2 port, if the Audio is enabled)
- **-a** sets whether the port is authorized or not for PID data processing and output (a=authorized, d=deauthorized)

Note: one port can only be authorized at a time with this command.

GetPortAuthorization

Usage: **GetPortAuthorization**

This command displays the authorization status of the known ports in the receiver (depending on enabled features), as follows:

Net Port: Authorized or Deauthorized (always displayed)
 Audio 1 Port: Authorized or Deauthorized (if Audio feature enabled)
 Audio 2 Port: Authorized or Deauthorized (if Audio feature enabled)
 Async Port: Authorized or Deauthorized (if Async Processor feature enabled)

AddPID

Usage: **AddPID -p <PID> -s {e|d} [-d <description>]**

This command adds a PID to the PID List in the receiver. Most PIDs will be Net type PIDs, meaning that the IP packets are decoded from the PID and placed on the IP Stack and then output on the Ethernet port. Async PIDs are also possible, providing the Async Processor option is enabled (see **GetInfo** command). If the audio option is enabled, audio data authorized for an audio port will be of Net type and can be routed out the Ethernet port as well. Parameters are as follows:

- **-p** specifies the PID number in hex format (between 0x20 and 0x1FFE)
- **-s** is the PID status (e=enabled or d=disabled)
- **-d** is a short description of the PID

If the Async Processor feature is enabled, then the command can take the following form:

AddPID -t {n|a} -p <PID> -s {e|d} -r <rate> [-d <description>]

Where

- **-t** specifies the type of PID as (a=Async or n=Net), with a default of Net
- **-r <rate>** specifies the baud rate in bps for the PID data. Valid rates are: 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.

RemovePID

Usage: **RemovePID -p <PID>**

This command is used to remove a PID from the PID list. Output will stop when the PID is removed. Parameters are as follows:

- **-p** specifies the PID number in hex format (between 0x20 and 0x1FFE)

GetPIDList

Usage: **GetPIDList**

This command displays the list of PIDs that are in the PID List, whether they are enabled or not. PID numbers are shown in decimal and hexadecimal notation. An example list is shown below:

```
Found 3 PIDs.
PID Number   Status   Type   Rate   Description
=====
1301(0x515 ) Enabled
1501(0x5dd ) Enabled
1502(0x5de ) Enabled
```

Note: if the Async Processor option is enabled, then an additional Type column will appear before the Description column. It will display the type of PID as NET or ASYNC.

GetLog

Usage: **GetLog**

This command provides a listing of entries in the log. For example,

```
Jan 1 00:00:19 SR2000pro Core: System Startup
```

If there are no messages in the log, then the following message will appear:

```
No messages in log.
```

GetLogConfig

Usage: **GetLogConfig**

This command displays the current logging configuration, as set by the **SetLogConfig** command. For example,

```
Logging Type(s):
Remote Syslogd (Remote IP = aaa.bbb.ccc.ddd) or
Local (Commit to non-volatile storage disabled) or (Commit Interval = xx minutes)
Minimum log level: (one of: Debug, Info, Warning, Error, Critical Error)
```

SetLogConfig

Usage: **SetLogConfig [-l|-s|-b] [-m <minimum level>] [-c <commit interval>]... [-r <remote ip>]**

This command is used to configure the logging function in the receiver. The parameters define levels of logging as well as the destination of the log. Parameters are as follows:

- **-l** indicates that the logger should run in local mode.
- **-s** indicates that the logger should run in remote *syslogd* mode.
- **-b** indicates that the logger should run in both local and remote modes.

- **-m** specifies the minimum message level that will be logged, and must be one of **i**, **w**, **e**, **c**, **d** where:
 - i** = informational messages
 - w** = warning messages
 - e** = error messages
 - c** = critical error messages
 - d** = debug messages
- **-c** is the time in minutes between writes of the log buffer to disk. This value is only used if **-l** is specified.
- **-r** is the IP address (in dotted decimal notation) of a remote Linux *syslogd* server. This value is only used if **-s** is specified.

Note: any parameters not specified will remain unchanged.

AUDIO OPTION COMMANDS

SetAudioConfig

Usage: **SetAudioConfig -s {1|2} [-a <multicast address>] [-p <port number>]... [-d <data rate>] [-i <Interface Name>] [-m <mode>] [-o {a|d}]**

If the Audio option is enabled (see the **GetInfo** command), this command will assign an incoming IP stream to an audio stream. Note that an audio IP stream can also be forwarded out the Ethernet port in parallel to the audio decoding. Parameters are defined as follows:

- **-s** indicates which audio stream is to be configured (1 or 2).
- **-a** specifies a valid multicast address for the audio stream, in dotted decimal notation (e.g. 224.1.1.1).
- **-p** specifies a valid UDP port number.
- **-d** specifies a valid encoded data rate for the audio stream (supported rates are: 8000, 16000, 24000, 32000, 40000, 48000, 56000, 64000, 80000, 96000, 112000, 128000, 144000, 160000, 192000, 224000, 256000, 320000, and 384000 bps).
- **-i** is an optional parameter and selects which network interface is the source for the audio stream, using one of the options: (net1 or eth0 for the Ethernet port) or (sat or sat0 for the satellite receiver interface); default is sat0.
- **-m** is the audio encapsulation mode (Raw or RTP); default is Raw.
- **-o** specifies the audio packet output option (a=allow the audio stream packets to be forwarded out the Ethernet port (eth0), d=discard packets).

Note1: Any parameters not set will remain unchanged.

Note2: Only one audio port can be configured at a time with this command.

Note3: If an audio stream originates from the (sat or sat0) interface, then the incoming IP stream must originate from a PID in the PID List.

Note4: Audio stream 1 is routed to Audio 1 Port and Audio stream 2 is routed to Audio 2 Port. If Audio stream 1 originates from a different network interface than Audio stream 2, then the multicast IP addresses must be unique.

GetAudioConfig

Usage: **GetAudioConfig**

This command displays the current configuration of the audio ports. For example,

```
Audio Stream 1
Multicast Address: 225.3.3.5
Port Number: 1026
Data Rate: 32000 bps
Interface Name: eth0
Mode: RTP
Packet Routing: packets will be sent out the ethernet port
```

```
Audio Stream 2
Multicast Address: 225.3.3.4
Port Number: 1234
Data Rate: 32000 bps
Interface Name: sat0
Mode: RTP
Packet Routing: packets will not be sent out the ethernet port
```

In the example above, audio stream 1 originates from the Ethernet interface, and audio stream 2 originates from the satellite receiver interface.

DECRYPTION OPTION COMMANDS

SetDecryption

Usage: **SetDecryption** [-a <multicast address>] [-u <UDP port>]

This command configures the FlexKey decryption option in the receiver, assuming that a net type PID has been defined which will carry the ECM data. Parameters are defined as follows:

- **-a** specifies the IP multicast address to which ECM/EMM data is being sent
- **-u** specifies the UDP port number to which ECM/EMM data is being sent

Note: At least one parameter must be specified.

GetDecryption

Usage: **GetDecryption**

This command returns the current configuration of the decryption, as set by the **SetDecryption** command. If the decryption option is not enabled, the following message appears:

The Decryption option is not available on this unit.

GetSD

Usage: **GetSD**

This command returns the status of the Security Device (SD), if the Decryption feature is enabled (see **GetInfo** command). If the decryption option is not enabled, the following message appears:

The Decryption option is not available on this unit.

Otherwise the status of security device will be displayed, as follows:

Security Device inserted
Serial Number: xxxxxx

Or, if the security device cannot be accessed, then the following message appears:

Security Device not inserted

Controlling the SR2000pro with the Front Panel LCD Display/Keypad Interface

The Front Panel LCD/Keypad Interface provides the most convenient way to configure the SR2000pro when it first comes out of the box, and later on if other means of control are not available. For example, it can provide a quick means to setup IP addresses in order to gain further access with the Web GUI. It also provides essential real time metrics information.

NOTE:

The LCD Display/Keypad interface will remember the last menu item you accessed and will always start there the next time you enter the menu item group from the display item group. The same is true in reverse – it will remember the last display item when you return from the menu item group.

Basically, the front panel interface is divided into two groups of items: display items and menu items. Display items are used to provide real-time metrics information. Menu items are used to configure the unit, through the individual editing of configuration parameters.

Table 3-1 lists the items belonging to the display item group and Table 3-2 lists the items belonging to the menu item group. Display item 1 or 2 will generally be displayed during normal operation. From there, you can press the arrow keys to navigate around the various other display items, or enter the menu item group, as shown in the table by the item number references and notes for each of the arrow keys.

Pressing the check mark button is generally the same as pressing Enter on a keyboard and commits an action or selection. Pressing the X button is generally the same as pressing Esc on a keyboard and aborts an action or selection. The X button is also used to exit from the menu item group back to the display item group. When you are in the display item group, you can press X twice to return to display item 1.

When you are in the menu item group, you will be able to cycle through the configuration parameters of the SR2000pro that can be edited or changed, using the vertical arrow keys. When power is applied to the unit, you will always start the cycle at menu item 1. Menu items contain one or more configurable parameters, as shown by angle brackets (< >). To cycle through the parameters, use the horizontal arrow keys. If you then wish to edit a parameter, you use the vertical arrow keys again. To commit your changes, you must

press the check mark button. A * beside a displayed selection indicates that this is the current configured value being used by the SR2000pro.

Table 3-1 Display Item Group

Display Item		Action on Arrow Keypress (goto item #)			
Item #	Displayed Information	←	→	↑	↓
1	Eb/No C/N (*Out of Lock* or real values)	7	2	Last accessed menu item	Last accessed menu item
2	RS Viterbi (*Out of Lock* or real values)	1	3	Last accessed menu item	Last accessed menu item
3	R11 R12 R13 R14 Off Off Off Off	2	4	Last accessed menu item	Last accessed menu item
4	R21 R22 R23 R24 Off Off Off Off	3	5	Last accessed menu item	Last accessed menu item
5	Meta Data 1 (scrolling text)	4	6	Last accessed menu item	Last accessed menu item
6	Meta Data 2 (scrolling text)	5	7	Last accessed menu item	Last accessed menu item
7	Firmware Version (firmware version number)	6	1	Last accessed menu item	Last accessed menu item

Table 3-2 Menu Item Group

Menu Item		Action on Arrow Keypress (goto item #)			
Item #	Menu Information	←	→	↑	↓
1	Carrier A < >	Editable parameter list: Frequency (MHz) Rate (ksym/sec) Viterbi Rate Modulation Type NCCPID Polarization 22 KHz Tone Copy to B		12	2
2	Carrier B < >	Editable parameter list: Frequency (MHz) Rate (ksym/sec) Viterbi Rate Modulation Type NCCPID Polarization 22 KHz Tone Copy to A		1	3
3	LNB < >	Editable parameter list: Power Supply Freq. Reversal AFC Range (Hz)		2	4
4	Eth 0 Interface < >	Editable parameter list: IP Address Netmask		3	5
5	Sat 0 Interface < >	Editable parameter list: IP Address Netmask		4	6
6	Routing	Editable parameter list:		5	7

Menu Item		Action on Arrow Keypress (goto item #)			
Item #	Menu Information	←	→	↑	↓
	< >	Default Gateway			
7	Audio Ch 1 < >	Editable parameter list: Multicast Addr UDP Port Data Rate Audio Mode Audio Latency Input Interface Forward Packets Authorize Port		6	8
8	Audio Ch 2 < >	Editable parameter list: Multicast Addr UDP Port Data Rate Audio Mode Audio Latency Input Interface Forward Packets Authorize Port		7	9
9	Configuration < >	Editable parameter list: Back Light Contrast		8	10
10	PID List < >	13	13	9	11
11	Ports < >	Editable parameter list: Net Port Async Port		10	12
12	NTP < >	Editable parameter list: Status		11	1
13	Add PID < >	Editable parameter list: PID Number PID Status PID Type		Use X key to return to item 10	

Controlling the SR2000pro with the Web GUI

All accessible functions within the SR2000pro can be controlled using the Web Graphical User Interface (GUI). The SR2000pro 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 SR2000pro is done via a LAN connection to the Ethernet port 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, NT and XP.
2. Mozilla V0.98 or later, running under Linux or Windows.

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 SR2000pro is being aligned to the satellite signal and a point-to-point connection is required between the unit and the browser PC. To communicate between the SR2000pro and the browser PC, it is necessary that the IP address of the customer's computer be set to the same subnet as the SR2000pro. The factory default IP address of the Net1 (eth0) interface is 192.168.0.1. Typically, you will have to use the Front Panel LCD/keypad or 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 SR2000pro, you can discover it by using the **GetIP** command in the Terminal Interface or from the Front Panel LCD/Keypad 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 SR2000pro would be set up on its LAN with a gateway to the Internet.

Once the SR2000pro is set up with an IP address that is known, you can access it by typing the IP address in the Address line of the browser (e.g. **http://192.168.0.1**). The Web GUI uses port 80, so only the IP address is required in the Address line. If access is successful, you will be required to login, as shown in the example in Figure 3-1. At the username prompt, login using the **admin** account and enter the appropriate password. The password for the **admin** account can be obtained from IDC Customer Service (see Chapter 4).

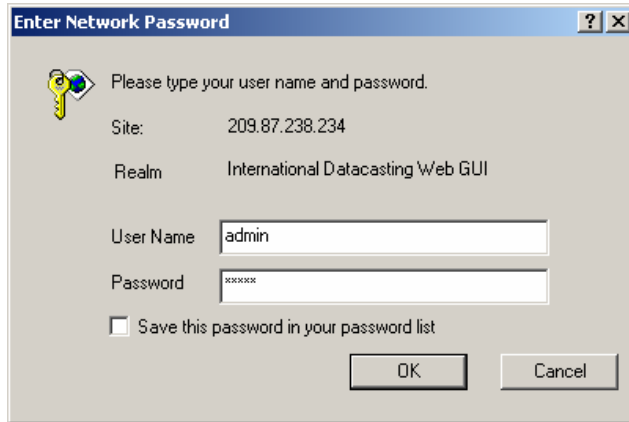


Figure 3-1 Web GUI Login Page

Once you have entered the user name and password, select OK and you will enter into the Main Menu Page of the GUI, as shown in Figure 3-2. From the main menu are sub menus, listed as Identity, DVB Carrier, Data Delivery, Logging, Metrics, Utilities and Upgrade. The Main Menu Page also provides an updated RF metrics area along the bottom of the page.

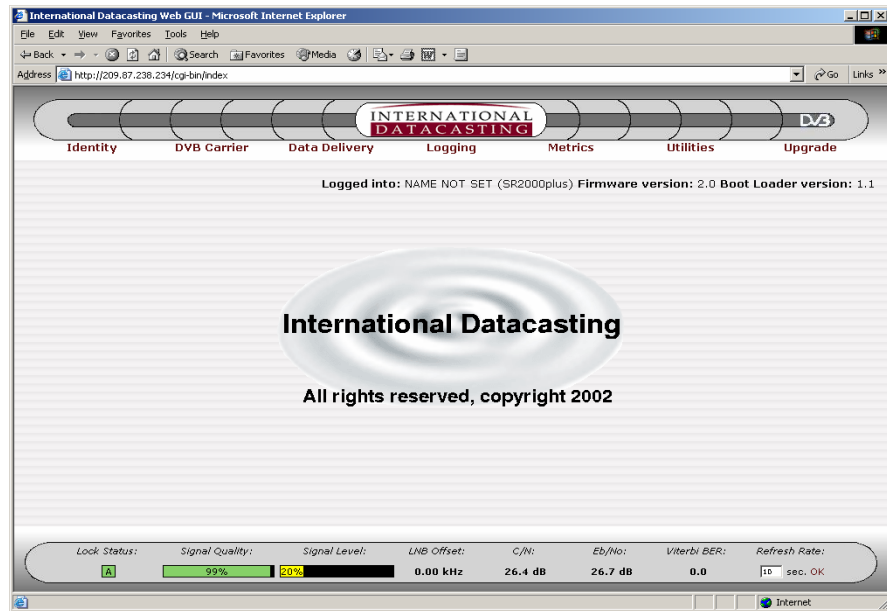


Figure 3-2 Web GUI Main Menu Page

Identity Submenu

To change the IP configuration of the Ethernet port Net1 (eth0), simply enter into the Identity Submenu, as shown in Figure 3-3. Select the Edit menu to make the network changes, as shown in Figure 3-4. Once changes have been made, you must update the stored configuration of the SR2000pro by clicking on the **Send Changes** button.

NOTE:

Only a subset of the available menu options and display screens is provided in this manual, so that you may understand the concept of the menu structures and navigation through the Web GUI.

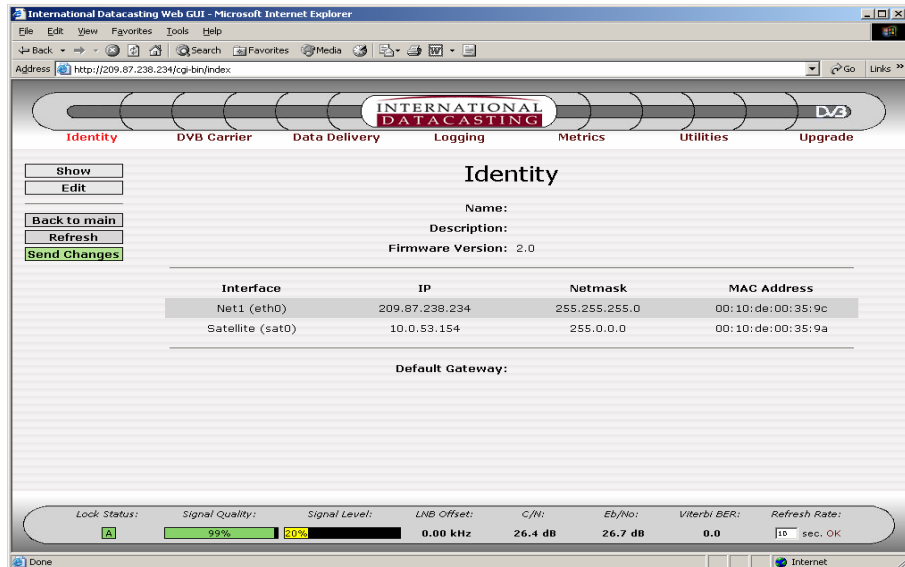


Figure 3-2 Web GUI Identity Page

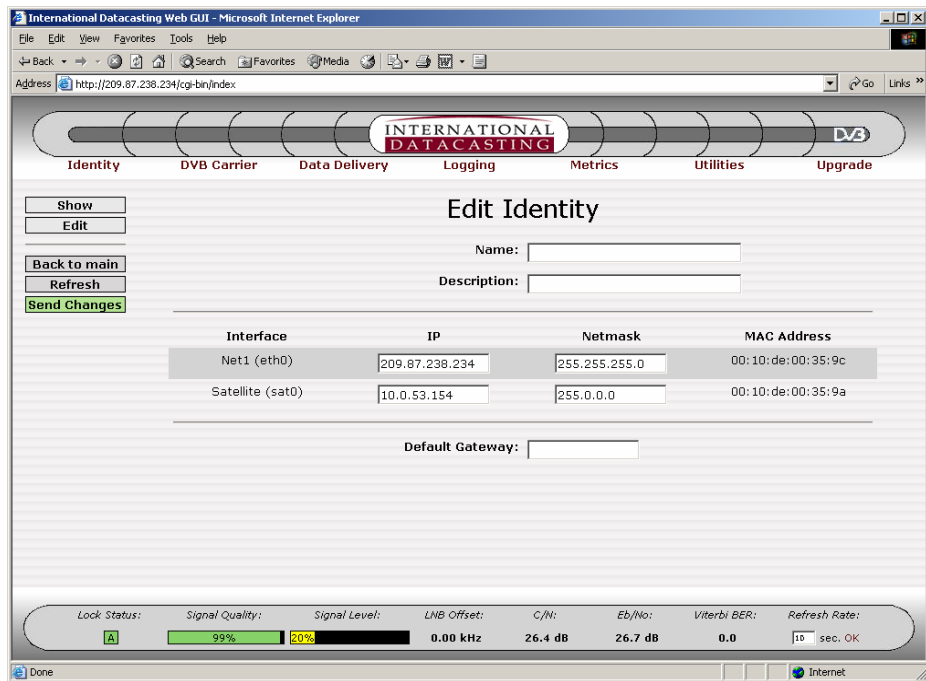


Figure 3-3 Web GUI Identity Edit Page

DVB Carrier Submenu

To configure the RF parameters of the SR2000pro, simply select the DVB Carrier submenu as shown in Figure 3-3. From here you can configure your LNB (e.g. provide DC voltage) and/or set the DVB RF carrier parameters of the SR2000pro.

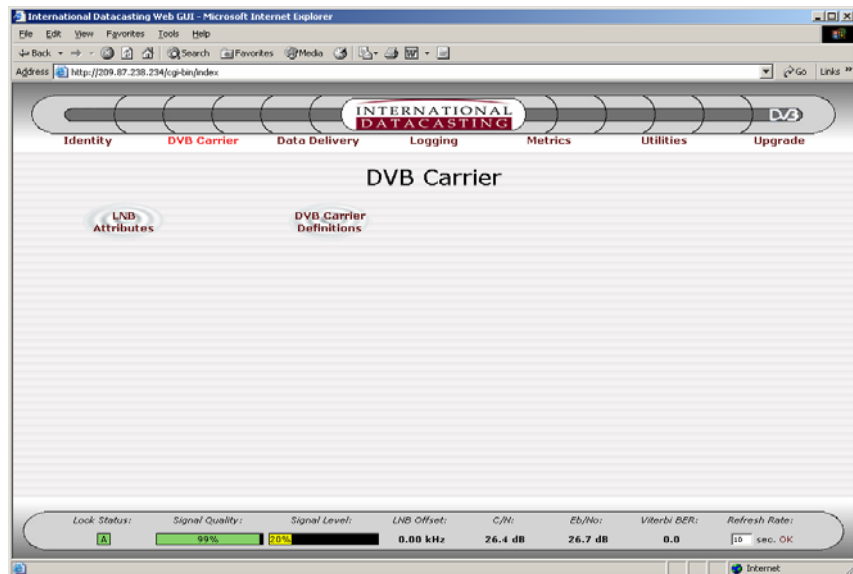


Figure 3-3 Web GUI DVB Carrier Page

Selecting LNB Attributes allows you to enable or disable the DC voltage (see Figure 3-4). When enabled, the supply voltage will provide +18 VDC at the rear panel L Band F connector. The AFC range of the receiver can be adjusted to accommodate older types of DRO LNBs. Maximum range is +/- 2.0 MHz. Changes in this submenu should be followed up by clicking on the **Send Changes** button.

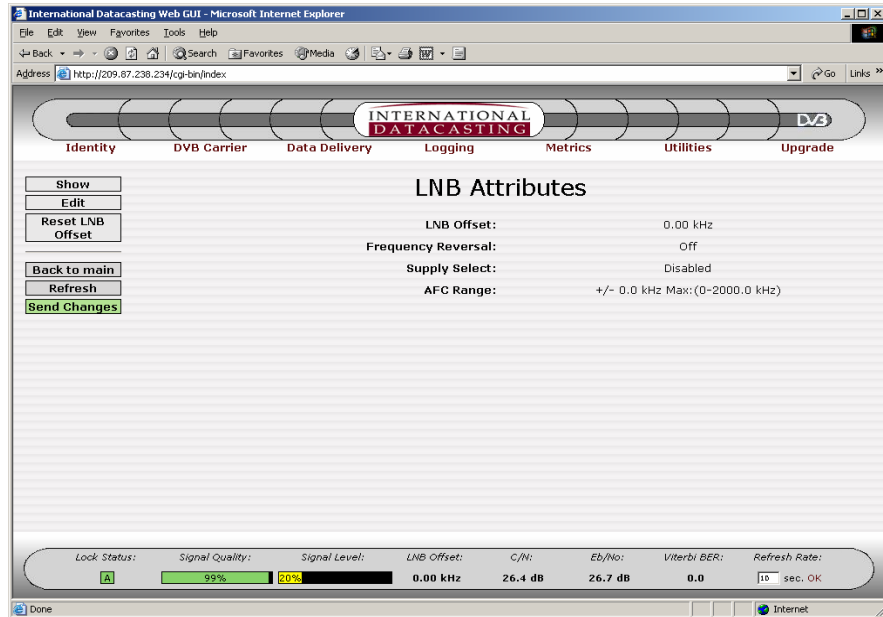


Figure 3-4 Web GUI LNB Attributes Page

Selecting DVB Carrier Definitions submenu (see Figure 3-5) allows you to set the L-band frequency, Symbol rate, FEC, modulation. By selecting Edit Carrier A you will then be prompted to set these parameters. Once again, changes take effect when you click on **Send Changes**.

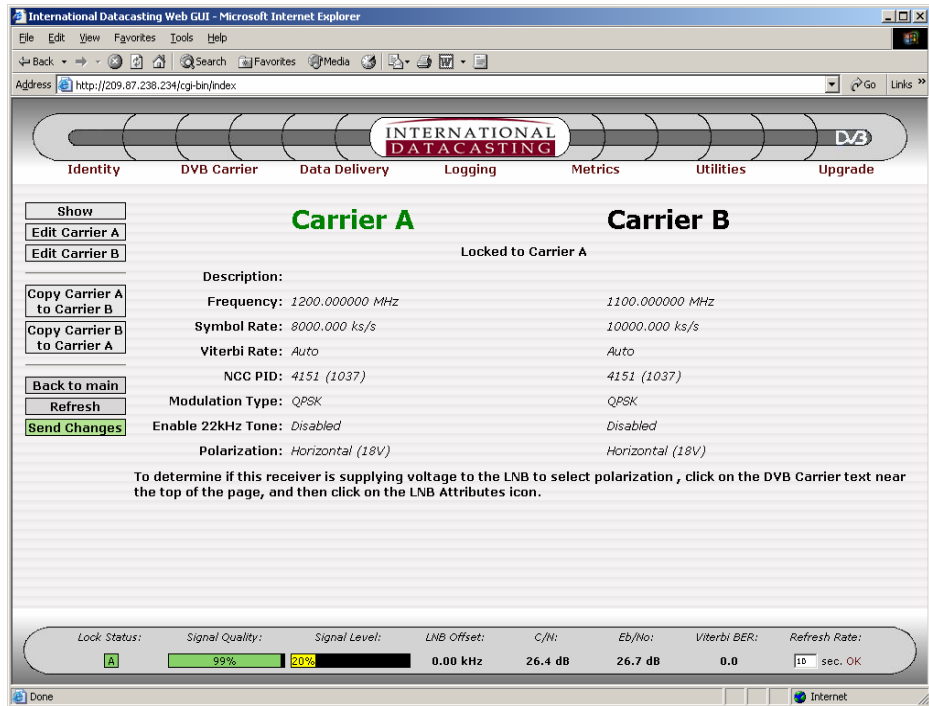


Figure 3-5 Web GUI Carrier Definitions Page

Data Delivery Submenu

To enter the PID for receiving data, simply select the Data Delivery menu, shown in Figure 3-6. Under PIDs and Ports, you can enter the desired PID in Decimal or Hexadecimal and assign the PID to a port, as shown in the example in Figure 3-7.

This section outlines one example of how to use the Web GUI menu structure to accomplish a task, in this case, assigning a PID and enabling the Net Port for data output. Many of the other submenus operate in a similar fashion.

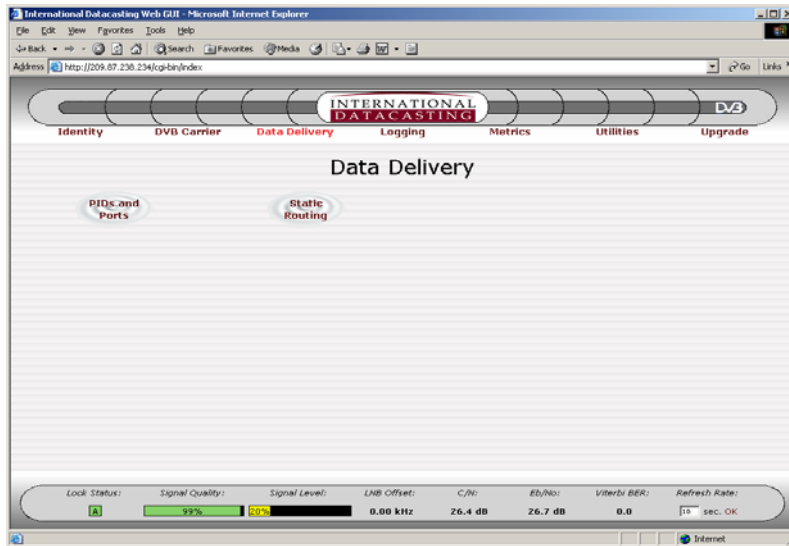


Figure 3-6 Web GUI Data Delivery Submenu

Important, once you have entered your PID it is important that you enable the Net PID. This is shown in Figure 3-8 by checking off the appropriate box in the Net PID List. Once information is entered update your receiver by performing a **Send Changes** command.

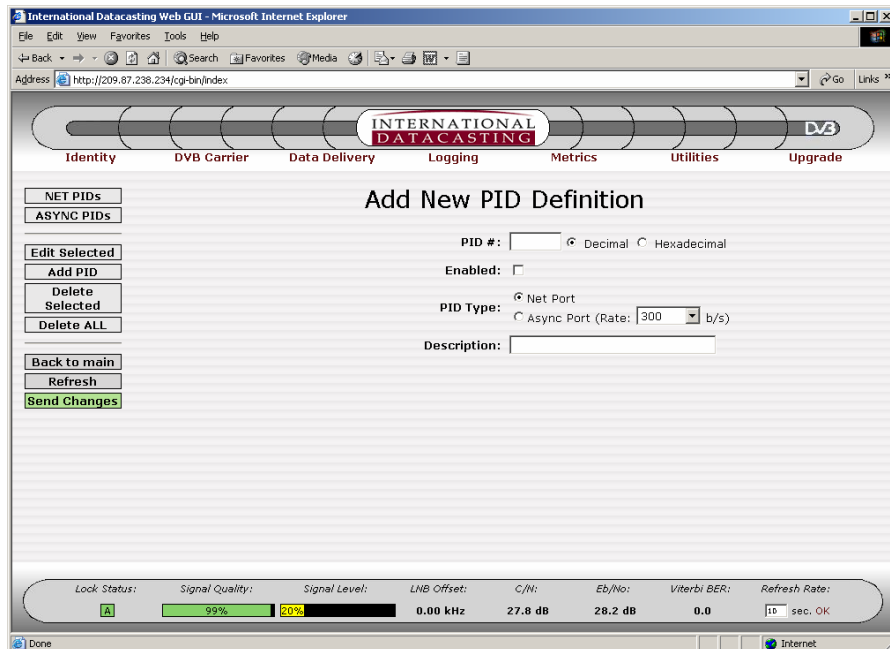


Figure 3-7 Web GUI Data Delivery Submenu

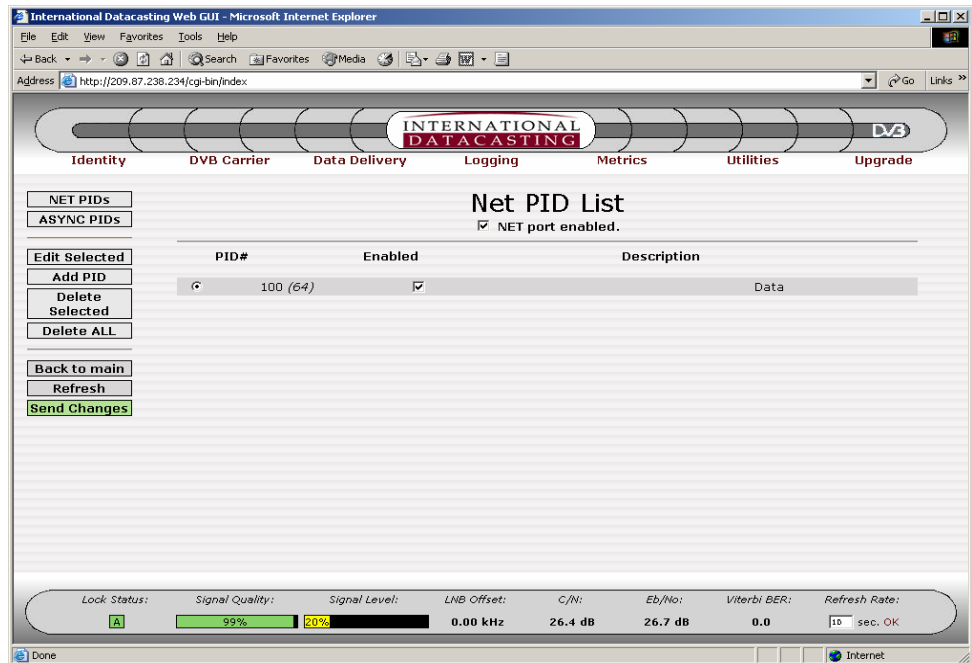


Figure 3-7 Web GUI Data Delivery Net PID List

Controlling the SR2000pro 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 SR2000pro to provide users with flexibility in network management.

SNMP can be used to monitor the status, and control the configuration, of a SR2000pro unit 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 4 for more information on obtaining application notes.

Controlling the Receiver with NetManager2

Many accessible functions within the SR2000pro can also be controlled over the satellite link, using International Datacasting's NetManager2 system. This is a secure remote control system that allows the network provider to remotely control functions of the unit using the Network Control Channel (NCC) 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 Front Panel LCD/Keypad, so that NetManager2 control can be brought online. Not all functions can be remotely controlled via NetManager2 over the satellite, as they could be site-specific configurations. Therefore, these types of functions must be controlled locally, using one of the other means previously described. Please contact International Datacasting Sales or Customer Support for more information on NetManager2.



Chapter 4

Troubleshooting, Warranty and Contact Information

Troubleshooting

The following are some recommended procedures to follow if your SR2000pro unit 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 unit 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 Terminal Interface or Front Panel LCD display to determine what the problem might be. Refer to Chapter 3 for operation of these user interfaces.

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 unit 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 unit:

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 provided below.

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 other advanced options.


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

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
Carrier	The center frequency transmit signal on which data signals (DVB stream) are sent.
CAS	Conditional Access System
CF	Compact Flash (memory device)
DC	Direct Current
DHCP	Dynamic Host Configuration Protocol
DRO	Digital Receive Only
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
LCD	Liquid Crystal Display
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
PDU	Protocol Data Unit(s)
PID	Packet Identifier. A single data stream within the DVB transport stream, encapsulated in packets of 188 bytes each.
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

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Appendix B

Enabling IGMP & Multicast Routing

This Appendix provides additional information required to operate the IGMP and multicast routing feature in the SR2000pro.

IGMP and multicast routing are not enabled by default on the SR2000pro with firmware V1.2 and below. To enable the IGMP-related commands, the following lines must be typed at the terminal interface prompt.

```
IDC> /bin/ln -s/opt/harmony//terminal/terminal /opt/harmonyterminal/getigmp
```

```
IDC> /bin/ln -s/opt/harmony//terminal/terminal /opt/harmonyterminal/setigmp
```

```
IDC> /bin/ln -s/opt/harmony//terminal/terminal /opt/harmonyterminal/getmroutetable
```

```
IDC> /bin/ln -s/opt/harmony//terminal/terminal /opt/harmonyterminal/setmroute
```

```
IDC> /bin/ln -s/opt/harmony//terminal/terminal /opt/harmonyterminal/setdefaultmrout
```

```
IDC> /bin/ln -s/opt/harmony//terminal/terminal /opt/harmonyterminal/deletemroute
```

Note that is necessary to type in these commands only once per each SR2000pro unit.

IGMP and Multicast Routing Commands

getigmp

Description:

This command returns the current IGMP settings for all IGMP-capable network interfaces.

Usage:

```
getigmp
```

```
IDC>getigmp
```

setigmp**Description:**

This command allows the user to configure IGMP-capable network interfaces.

Usage:

```
setigmp -i <interface name> [-d] [-e] [-v <igmp version>] [-r <robustness variable>] [-qi <query interval>] [-qri <query response interval>] [-lmqi <last member query interval>] [-lmqc <last member query count>] [-sqi <startup query interval>] [-sqc <startup query count>]
```

where:

- **<interface name>** is the name of the network interface whose IGMP parameters should be modified (eg. Net1). This parameter must be specified first.
- **-d** indicates that IGMP should be disabled on the specified interface.
- **-e** indicates that IGMP should be enabled on the specified interface.
- **<igmp version>** specifies the IGMP version number, 1 or 2. An IGMP version of 2 is the default.

The applicable IGMP RFCs should be consulted for a detailed description of the remaining parameters. In most systems, these parameters should be left at their default values.

getmroutetable**Description:**

This command displays the multicast routing table.

Usage:

```
getmroutetable
```

setmroute**Description:**

This command allows the user to add entries to the multicast routing table.

Usage:

```
setmroute -m <multicast address> [-nm <multicast netmask>] [-s <source address>] [-ns <source netmask>] [-A|-D|-I] [-~m] [-~s] [-i <interface name>] [-r <row>]
```

where:

- **<multicast address>** is the multicast address (in dotted decimal notation) that this rule applies to.
- **<multicast netmask>** is an optional netmask that applies to the multicast address.
- **<source address>** is the source IP address of multicast packets (in dotted decimal notation) that match this rule. If this parameter is omitted, the source address will not be considered when matching this rule.
- **<source netmask>** is an optional netmask that applies to the source address.
- **-A, -D, -I** are the actions to take if an incoming multicast packet matches this rule (-A = ACCEPT, -D = DISCARD, -I = USE_IGMP). The default is DISCARD.
- **~m** indicates that the sense of the multicast address and netmask should be inverted.
- **~s** indicates that the sense of the source address and netmask should be inverted.
- **<interface name>** is the name of the interface (eg. Net1) to which packets that are accepted by this rule should be sent. If this parameter is omitted such packets will be sent to all bi-directional interfaces. It is possible to specify multiple interfaces by specifying multiple -i parameters.
- **<row>** is the row number of the multicast routing table (starting at 1) at which this new route should be placed. If this value is omitted or set to 0, the route is added to the end of the table.

Note:

If **-D** or **-I** are specified, then the interface parameter is ignored.

setdefaultmroute

Description:

This command allows the user to set the default multicast route. This is the route that applies to all packets that do not match any routes added with the setmroute command.

Usage:

```
setdefaultmroute [{-A|-D|-I}] [-i <Interface Name>]
```

where:

- **-A** indicates multicast packets that match only the default rule should be send to <Interface Name>.
- **-D** indicates multicast packets that match only the default rule should be discarded.
- **-I** indicates multicast packets that match only the default rule should be forwarded to the IGMP subsystem for further processing/routing.
- **<Interface Name>** is a string representing the interface (eg. Net1). This parameter is only required when -A is specified. If no interface is specified, then all interfaces are assumed. Multiple interfaces may be specified with multiple -i options.

Note:

If none of -A, -D or -I are specified, -D is assumed. If -D or -I are specified then the interface parameter is ignored.

deletemroute**Description:**

This command allows the user to delete a multicast route previously entered using the setmroute command.

Usage:

```
deletemroute -r <row>
```

where:

<row> The row number in the multicast routing table (starting at 1) of the route to delete.

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