RD5000

Multiformat MPEG-4 Receiver

User Manual

(Release 7.2)

Edition 0

KEMA

Affiliate with the N.V. KEMA in The Netherlands

CERTIFICATE

Certificate Number: 510040.001
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Including its implementation, meets the requirements of the standard:

ISO 9001:2008

Scope:
The design, manufacture and support of video and audio hardware and software products and related systems.

This Certificate is valid until: June 14, 2012
This Certificate is valid as of: June 14, 2009
Certified for the first time: June 14, 2000

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FCC Class A Information

The RD5000 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 when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits.

⚠***Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.***

Registered Trademarks

Dolby and the double-D symbol are registered trademarks of Dolby laboratories.

As regards the broadcasting of televised programmes, MPEG-4 licences are unlike MPEG-2 ones in that they are linked to services and not devices (Encoders and Decoders). Content providers or operators are therefore requested to familiarise themselves with the licensing conditions for MPEG4-AVC technology and to obtain the rights from the relevant bodies before broadcasting programmes in MPEG-4.

WARNING 

PLEASE OBSERVE THESE SAFETY PRECAUTIONS

There is always a danger present when using electronic equipment.

Unexpected high voltages can be present at unusual locations in defective equipment and signal distribution systems. Become familiar with the equipment that you are working with and observe the following safety precautions.

- Every precaution has been taken in the design of your RD5000 to ensure that it is as safe as possible. However, safe operation depends on you the operator.

- Always be sure your equipment is in good working order. Ensure that all points of connection are secure to the chassis and that protective covers are in place and secured with fasteners.

- Never work alone when working in hazardous conditions. Always have another person close by in case of an accident.

- Always refer to the manual for safe operation. If you have a question about the application or operation call Grass Valley for assistance.

- Never allow your equipment to be exposed to water or high moisture environments. If exposed to a liquid, remove power safely (at the breaker) and send your equipment to be serviced by a qualified technician.

Contents

Ordering references

References	Name	Description
NRD50000AA	**RD5000**	Base unit : 1RU chassis MPEG2/MPEG4 SD&HD 4:2:0 decoder, AC Power Supply 2 stereo audio channel Common interface support Without Input module / Output module
NRD00H06AA	**SD/HD SDI**	Hardware Option. SD/HD SDI output and analogue output
NRD00H08AA	**SD/ SDI**	Hardware Option. 2xSD SDI output and 1xComposite video output
NRD00H09AA	**Analogue video**	Hardware Option. 1xRGB/YPrPb, 1xComposite video output
NRD00H02AA	**IRDM ASI in/out**	Hardware Option. ASI input/output (DVB-ASI or SMPTE310M selectable)
NRD00H11AB	**IRDM DVB-S2 in**	Hardware Option. DVB-S/DVB-S2 input interface
NRD00H04AA	**IRDM COFDM**	COFDM input interface
NRD00HA0AA	**IRDM audio outputs**	Hardware Option. Audio outputs (AES digital, analog) & Dolby E pass-through
NRD00HC2AA	**Audio break out cable**	Hardware Option. Audio break out cable SubD HD15 to 4 XLR and 1 BNC
NRD00HCSAA	**IRDM 8VSB**	Hardware Option. 8 VSB input interface
NRD00H05AA	**MPEGoIP**	Hardware Option. MPEG over IP input with FEC, and output over 2xGiga interfaces
NRD00H10AA	**GPIO**	Hardware Option. General Purpose In and Out
NRD00H07AA	**4 audios**	Harware Option. Up to 4 audios channels on RD5000
NRD00S01AA	**SCTE35 =>104**	Sofware Option. Conversion from SCTE35 to SCTE104

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Section 1 – Getting Started

Introduction

This section includes the following topics:

1.1 Installation

Cooling

The RD5000 is cooled via forced induction through the front of the unit and exhausted through the vents on either side. The RD5000 is equipped with a temperature controlled status indicator. If the temperature in the inside of the unit exceeds 70° C the red "Error" LED will illuminate and a description of the error will appear in the "Error List."

Rack Information

The RD5000 is intended to be mounted in a standard 19" rack. It occupies 1U of rack space and the connections are all on the rear of the unit.

Rack Installation

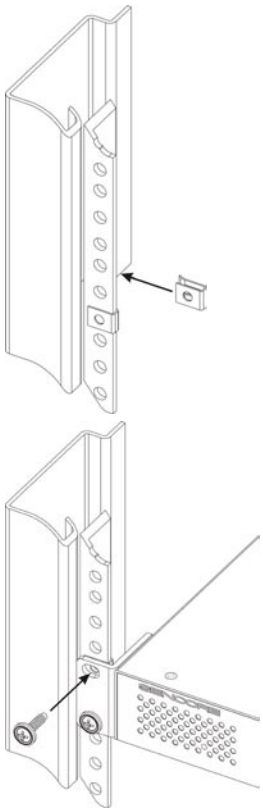
To install the RD5000 into a rack use the following steps:

1. Determine the desired position in the rack for the RD5000 making sure that the air intake on the front of the unit and the exhausts on the sides of the unit will not be obstructed.

2. Insert the rack mount clips into place over the mounting holes in the rack.

3. Slide the RD5000 into position in the rack.

4. Secure the RD5000 to the rack by installing the four supplied screws through the front mounting holes and tightening.



Power Connection

Using the proper power connections is vital to the safe operation of the RD5000. Only use the supplied 3-prong power connector or one with equal specifications. NEVER tamper with or remove the 3rd – prong grounding pin. This could cause damage to the RD5000, personnel, or property.

AC Power Connection

The RD5000 is intended for use on either 120V or 240V systems. The power supply will automatically detect the system it is connected to. To hook up the power use the following steps:

1. Locate the AC power cord that was included with the RD5000.
2. Plug the female end of the power cord (end with no prongs) into the back of the unit.
3. Locate a protected outlet (usually inside of the rack) to plug the male end of the power cable into.

1.2 Quick Start Guide

Quick Start

To get the RD5000 up and running there is a few things that need to be done.

1. Select the desired input as active.
2. Setup the decoder with the proper PIDs.
3. Setup the desired output(s).

The easiest way to set these options up is to refer to *Section 4*. At the beginning of *Section 4* is a table that shows the specific cards included in that section. Find the desired card in the table, then navigate to the corresponding page number and follow the step-by-step instructions.

1.3 Maintenance

The RD5000 is virtually a maintenance-free piece of equipment. There are no user serviceable parts on the inside of the unit however it is recommended that the user cleans the intake filter on the front right side of the unit on a regular basis to ensure the unit has an unobstructed cool air intake. This filter is removed easily, for cleaning, by opening the door on the front right side of the unit and removing the filter.

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Section 2 – Controls and Configuration

Introduction

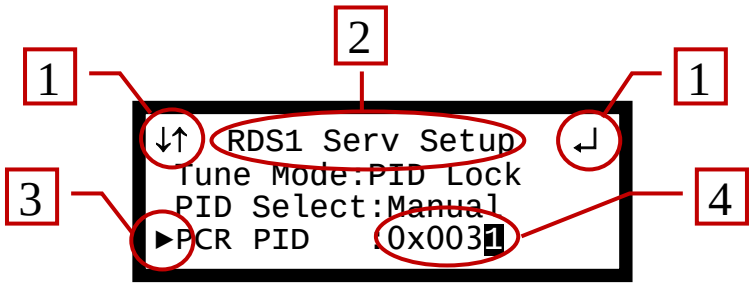
This section includes an overview of the RD5000.

2.1 Front of Unit

2.2 Rear of Unit

2.3 Front Panel Display Layout

The following figure shows a typical screen on the front panel. Several important features have been circled and noted below. These features are common to all screens and assist when navigating, viewing and editing unit information. The HOME button will return the user to the home level while in any screen. In order to edit a selected parameter, the ENTER button must be pressed. Once a parameter has been changed, the ENTER button must be pressed again before the change takes effect on the unit. Pressing the EXIT button will leave an edit mode without changes taking effect.



1. Icons indicate which control buttons are currently valid for entry.
2. Screen title.
3. Cursor shows which line is active.
4. When editing, active character or item is highlighted.

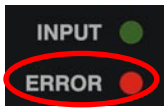
2.4 Front Panel Indicators

The RD5000 has four internal error parameters: INPUT, DECODER, FAN and TEMPERATURE. These parameters can be monitored locally or remotely. Locally the unit's status can be checked by visually looking at the INPUT LED and the ERROR LED on the front panel, then use the "Error List" under the MENU button to pinpoint the error. Remotely, the unit's

status can be checked by using the web client and looking at the status icons on the top of the main window. To see a detailed list of errors, click on the Unit tab from the web client.

The INPUT LED indicates the presence of a stream at the user-selected input. "Stream present" is represented by a green INPUT LED while "stream NOT present" is represented by a dark INPUT LED.

The ERROR LED represents the combined status of the unit's error indicators. If INPUT, DECODER, TEMP, or FAN status is in the error state, the LED will be red. If all error indicators are good, the LED will be dark.



2.5 Input Error Logic

The input status is based on the selected input card's status and the transport error indicator bit in the transport stream being decoded. For example if the current input is VSB, the input status is based on: VSB receiver lock, RF channel level, and the MER level. The RF channel and MER thresholds can be set by the user. If the unit detects the presence of the transport error bit in a transport packet header, the input status will be an error for 0.5 seconds each time the TS error bit is set. The system must detect a constant cadence of sync bytes (0x47h) every 188 bytes and detect a valid PAT at least every 500 ms in order for the INPUT LED to illuminate.

2.6 Decoder Error Logic

The decoder error indicator is based on the decoder's ability to decode what the user has requested. The input status will be alarmed differently depending on the current decoding mode:

In "Auto Mode," the decoder status will be good unless the Video or Audio decoders cannot decode a stream. For example: a stream defines program 4 to have video on PID 52. If PID 52 is not actually present in the stream, or is un-decodable, the decoder status will be in the error state. This is true for all modes.

In "PID Lock Mode," the decoder status will be good if all of the PIDs entered by the user, for video and audio, are being decoded by the unit. If the user wants nothing to be decoded, they can set a PID to 0. If the user enters a PID which is not present or cannot be decoded the decoder status will be in the error state.

In "Program Priority Mode," the decoder status will be good if any priority is currently active and the Audio and Video represented by that priority are being decoded. If the PMT for a selected program lists a video or audio PID, but the decoder cannot decode that PID, the indicator will be in the error state. If the user enters an index for a priority that does not exist in the PMT, the indicator will still be good because the decoder will be set to decode nothing on that audio output.

2.7 Temperature Error Logic

The temperature error indicator is based on the correct operation of the unit. If the unit's temperature exceeds 70 degrees C, the temperature status will be in the error state.

2.8 Fan Error Logic

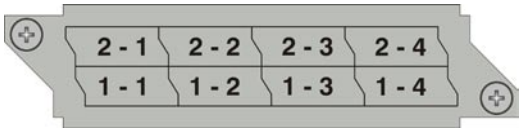
If the fan in the unit fails, the fan status will be in the error state. The fan status will be good as long as the fan is spinning at the proper RPM.

2.9 SNMP Traps

The unit contains separate SNMP Traps for Fan Status, Temperature Status, Decoder Status, Input Status, and IP Receive Group. Whenever any item changes state, a trap is sent to the configured host.

2.10 Input/Output Slot Organization

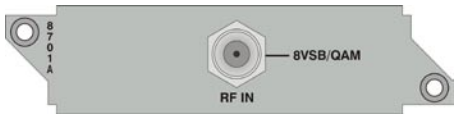
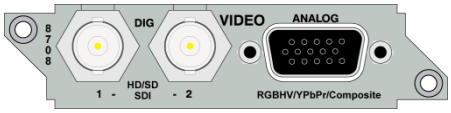
The RD5000's modular design allows many different input/output configurations. An indexing system is used to identify module slots for configuration and monitoring reference. The bottom row of slots is numbered 1-1 through 1-4 (left to right). The top row is numbered 2-1 through 2-4 as shown.

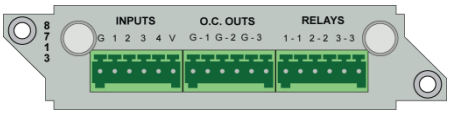


Section 3 – Options Overview

Introduction

This section includes a brief overview of the different options that are available for the RD5000. There are descriptions of each card as well as pictures of the various inputs and outputs for each card.

3.1 8VSB/QAM Receiver Option **NRD00HCSAA**	
3.2 Serial Transport Stream I/O (DVB-ASI/SMPTE 310M) Option **NRD00H02AA**	
3.3 Video Output (2 SD/HD-SDI, 1RGBHV/YPbPr/Composite) Option **NRD00H06AA**	
3.4 Video Output (1 RGBHV/YPbPr, 1 Composite) Option **NRD00H09AA**	
3.5 Video Output (2 SD-SDI, 1 Composite) Option **NRD00H08AA**	
3.6 Audio Output (Dolby E, AES Digital, Analog) Option **NRD00HA0AA**	
3.7 Up 4 audio channels Option **NRD00H07AA**	
3.8 Dual MPEG over IP Input/ UDP Output with FEC Option **NRD00H05AA**	
3.9 Dual Input DVB-S/DVB-S2 Receiver Option **NRD00H11AB**	
3.10 Dual Input COFDM Receiver Option **NRD00H04AA**	

3.11 GPIO Option **NRD00H10AA**	
3.12 SCTE35 to SCTE104 Option **NRD00S01AA**	Software option
3.13 CAM Decryption Basic feature	

3.1 8VSB/QAM Receiver – Option NRD00HCSAA

This card will receive a TS that is demodulated from an 8VSB signal or it will demodulate a QAM64B or QAM256B RF input. With an 8VSB input, the card will tune to channels 2 – 69. With a QAM input, the card will tune to channels 2 – 134 in three cable frequency bands (FCC, IRC, HRC). The RD5000 will show a valid input if the following conditions are met: the receiver equalizer and the FEC are locked. If the RF level is lower than the "Low Warning Setting" or the MER is lower than the "Low MER Warning Setting," the red "Error" LED will illuminate on the front panel and there will be an error recorded in the Error List.

3.2 Serial Transport Stream I/O (DVB-ASI/SMPTE 310M) – Option NRD00H02AA

This card will receive a TS from either a DVB-ASI input or a SMPTE 310M input. Only one format may be selected at a time. For an ASI input, the bitrate of the TS must be between 1.5Mb/s and 160Mb/s. For a SMPTE 310M input, the bitrate of the TS must be 19.392658Mb/s. The selected input format will also be the output format. The NRD00H02AA card can also be used as a TS output for any of the other input cards.

3.3 Video Output (2 SD/HD-SDI, 1 RGBHV/YPbPr/Composite) – Option NRD00H06AA

A versatile video output card. It provides two user selectable serial digital (SMPTE 259M, or SMPTE 292M) outputs and one component RGBHV or YPbPr/Composite NTSC & PAL output. Four pairs of audio can be embedded into the serial output on group 1, and 2 (see note [a]). Closed captioning found within the transport (608/708B) can be embedded into the serial video output. NTSC closed caption, detected in the transport stream, can be inserted on line 21.

3.4 Video Output (1 RGBHV/YPbPr, 1 Composite) – Option NRD00H09AA

An analog only video output card that can output either high definition or standard definition formats. Two outputs are on the card: one BNC for composite (NTSC & PAL) and one 15-pin D-sub for component (RGBHV or YPbPr). The card outputs an SD or HD signal, one at a time. Closed caption (NTSC), detected in the transport stream, can be inserted on line 21 of the composite (NTSC video) output

3.5 Video Output (2 SD-SDI, 1 Composite) – Option NRD00H08AA

A standard definition video output card. It provides two mirrored serial digital (SMPTE 259M) outputs and one composite NTSC & PAL output. Four pairs of audio can be embedded into the serial output on group 1 and 2 (see note [a]). Closed captioning found within the transport (608/708B) can be embedded into the serial video output. NTSC closed caption, detected in the transport stream, can be inserted on line 21.

3.6 Audio Output (Dolby E, AES Digital, Analog) – Option NRD00HA0AA

This card allows the output of both Digital-AES and analog audio. Each digital audio output can be set to either Raw or PCM. In Raw, the compressed audio for the selected PID is passed through to the digital output. Typically this setting is used to pass-through the Dolby AC-3

compressed digital signal. When the digital audio output is set to PCM, two-channel linear coded PCM AES/EBU audio is output to the digital output. The analog output provides two-channel (L, R) decoded analog audio from the selected audio processor. The two audio processors on the decoder board, feeding the two digital outputs, can process or decode Dolby AC-3, MPEG Layer 1, or MPEG Layer 2 formats. The audio processor will self-sense which type of audio is in the TS. The NRD00HA0AA also has a Dolby E parsing feature.

3.7 Up 4 audio channels – Option NRD00H07AA

This option allows to decode 2 additional audio PID. The maximum number of decoded audio PID is then of 4 (without option the RD5000 can decode 2 audio PID). The decoded audios can be embedded in SDI signal (see note [a]) or can be processed via 2 optional audio cards (NRD00HA0AA), each optional audio card being able to process 2 audio channels.

3.8 Dual MPEG over IP Input with FEC and 2 Giga Output – Option NRD00H05AA

This card is a dual purpose card in that it can receive and/or transmit from the internal TS bus, MPEG over IP. It has two physical connectors that can be configured independently. Up to two multicasts can be subscribed to, allowing for a backup multicast to be chosen and two UDP mirrored unicasts can be transmitted to allow for redundancy.

Example Configurations:

"Leave" IGMP V2 & V3 Multicast/Unicast
Filter Mode: Include
IP list: *empty*

"Join" IGMP V2 & V3 Multicast/Unicast
Filter Mode: Exclude
IP list: *empty*

"Join Filtered" IGMP V3 Multicast/Unicast
Filter Mode: Include
IP: X.X.X.X
Or
Filter Mode: Exclude
IP: X.X.X.X

IP Address Selection

Unicast: X.X.X.X – 223.255.255.255
Multicast: 224.X.X.X – 239.255.255.255
Suggested Multicast Range: 239.192.X.X

Suggested Port Selection

- Choose a port number of 5000 or more
- Choose even numbered ports
- If using FEC the following example applies
  - Destination port = 5000
  - Column FEC = 5002
  - Row REC = 5004
  - Next available multicast port = 5006

3.9 Dual Input DVB-S/DVB-S2 Receiver – Option NRD00H11AB

This card will input a satellite L-band (950MHz – 2150MHz) signal for demodulation of KU-band or C-band DVB-S QPSK signals or DVB-S2 QPSK/8PSK signals. The symbol rate ranges from 1MSym/s to 45MSym/s for DVB-S and 10-30MSym/s for DVB-S2. This card does not provide any power to the dish LNB. The "Input" LED will only illuminate if the card detects frequency, symbol rate, FEC lock (Carrier Lock), and TS sync (Sync Lock). The card provides A and B inputs, which may be independently configured, but only one may be active at a time.

3.10 Dual Input COFDM Receiver – Option NRD00H04AA

This card will input a (49 – 861Mhz) COFDM signal for use in electronic news gathering (U.S.) or any COFDM Terrestrial Broadcast (DVB-T, European) applications. The card provides A and B inputs, which may be independently configured, but only one may be active at a time.

3.11 GPIO – Option NRD00H10AA

This module is considered a global unit option. In other words, the inputs and outputs of a single installed module can be accessed by functions associated with general system features, or RDS specific features. Only one GPIO module can be installed in a unit.

3.12 SCTE35 to SCTE104 – Option NRD00S01AA

This software option allows the conversion from SCTE35 to SCTE104

3.13 CAM Decryption – Basic feature

This is a factory installed slot that will allow for up two CAM cards to be installed at a time, giving the RD5000 the ability to decrypt Conditional Access transport streams and to descramble Biss mode 1&E.

Note [a] The maximum number of embedded audios is twice the maximum number of decoded audio PIDs. The same audio can be embedded twice or embedded once as pass-through and once as PCM.

Section 4 – Using the Front Panel to Configure the RD5000

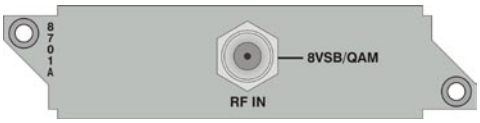
Introduction

This section describes how to navigate through the configuration menus on the front panel of the RD5000.

Note: All instructions in this manual are based on the unit software versions 7.2.X. Newer versions of software, when released, may operate slightly different in regards to menus and configuration.

4.1 8VSB/QAM Receiver – Option NRD00HCSAA

General Information



Install Location: Any slot *except* 1-1 and 2-1.
I/O: (1) 75Ω Female F Connector
Supported Formats: 8VSB, QAM64B, QAM256B
Description: This card provides demodulation of 8VSB or QAM. For 8VSB the card is able to tune to channels 2-69 on UHF/VHF and channels 2-134 on the cable channel bands of FCC cable, IRC, and HRC. For QAM, the card is able to receive both QAM64B and QAM256B and is able to tune to channels 2-134 in the cable bands of FCC cable, IRC, and HRC.

Input Control

To enable this card as an input use the following steps:

1. Press the INPUT button.
2. Use the △ and ▽ buttons to move the cursor to the "VSB/QAM" card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
3. Press the ENTER button once to display the Status screen for the VSB/QAM card.
4. Press the ENTER button again to display the Edit screen for the VSB/QAM card.
5. Use the △ and ▽ buttons to move the cursor to "Selected I/O:" then press the ENTER button.
6. Use the △ and ▽ buttons to change the selection to, "yes," then press the ENTER button.

```
↓↑    Input          ↵
 ASI+ 1-3
►VSB/QAM 1-4
 ASI/310M 2-3
```

```
↓↑     VSB/QAM 1-4    ↵
►Selected I/O:no
 Chan:__
 Modulation:8VSB
```

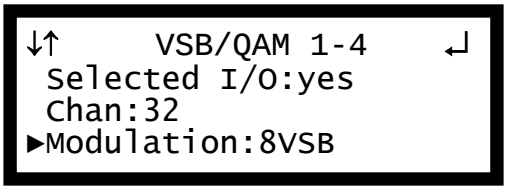
Channel

1. Use the △ and ▽ buttons to move the cursor to, "Chan:" then press the ENTER button.
2. Use the △ and ▽ buttons to tune to the specific RF channel of interest (2-134), then press the ENTER button to save the selection.

```
↓↑     VSB/QAM 1-4    ↵
 Selected I/O:yes
►Chan:32
 Modulation:8VSB
```

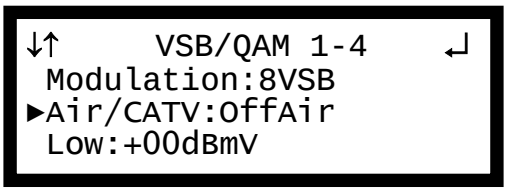
Modulation

1. Use the △ and ▽ buttons to move the cursor to, "Modulation:" then press the ENTER button.
2. Use the △ and ▽ buttons to choose the appropriate modulation type (`8VSB, QAM64B, QAM256B`), then press the ENTER button to save the selection.



Channel Bands

1. Use the △ and ▽ buttons to move the cursor to, "`Air/CATV:`" then press the ENTER button.
2. Use the △ and ▽ buttons to choose the appropriate channel band (`OffAir, Cable-FCC, Cable-HRC, Cable-IRC`), then press the ENTER button to save the selection.



Set Low Signal and MER Error Levels

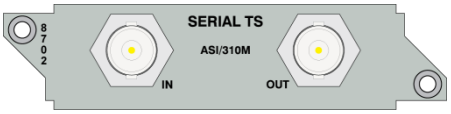
These two values are user defined threshold levels for the signal level and MER level. Once these values are set, if the input levels drops below the defined value, an error will be triggered which will cause the red "Error" LED to illuminate on the front panel, a description of the error will be shown in the "`Active Errors`" menu under the MENU button, and an entry will be logged in the event log.

1. Use the △ and ▽ buttons to move the cursor to, "`Low:`" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the value of the low signal alarm threshold (`-30dBmV - +40dBmV`), then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to move the cursor to, "`MER:`" then press the ENTER button.
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the value of the low MER alarm threshold

(0dB – 40dB), then press the ENTER button to save the selection.

4.2 Serial Transport Stream Input/Output (DVB-ASI/SMPTE 310M) – Option NRD00H02AA

General Information



Install Location: Any slot *except* 1-1 and 2-1.

I/O: (1) 75Ω Female BNC Input, (1) 75Ω Female BNC Output

Supported Formats: DVB-ASI, 310M

Description: This card provides either DVB-ASI or 310M input and output. The card will provide 310M output only if the input TS is 19.39Mb/sec. When the card is in ASI mode, the TS bitrate for both the input and output is from 1.5Mb/sec – 160Mb/sec. When the card is in SMPTE 310M mode, the bitrate for both input and output must be 19.39Mb/sec. The output jack on this card is an active loop-through (i.e. a re-serialized TS). The output will be the same type that the input is set for (e.g. 310M or ASI). The card can be used to provide an ASI TS output from another type of input on the unit (e.g. 8VSB).

Input Control

To enable this card as an input use the following steps.

1. Press the INPUT button.
2. Select "Active Input", then press the ENTER button.
3. Press ENTER twice to change the active input and use the △ and ▽ buttons to select the input to make active, and press the ENTER button to save the changes.

```
↓↑        Input        ↵
▶Active Input
 Backup Mode
 Input Modules
```

```
↓↑    Active Input     ↵
 Active Input:
▶   ASI/310M 2-3
```

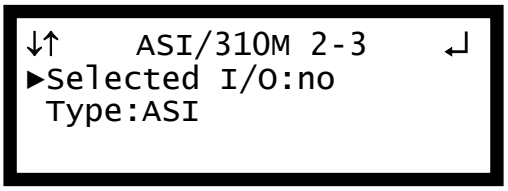
Configure Input

1. Press the INPUT button.
2. Select "Input Modules", and press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to the "ASI/310M" card of the specific slot (e.g. 2-3). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.

```
↓↑        Input        ↵
 Active Input
 Backup Mode
▶Input Modules
```

```
↓↑   Input    ↵
 ASI+ 1-3
 VSB/QAM 1-4
▶ASI/310M 2-3
```

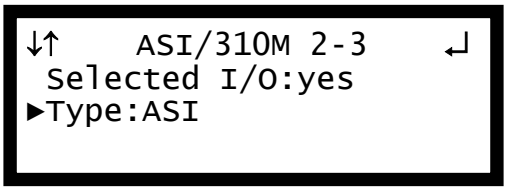
4. Press the ENTER button once to display the Status screen for the ASI/310M card.
5. Press the ENTER button again to display the Edit screen for the ASI/310M card.
6. Use the △ and ▽ buttons to move the cursor to, "`Selected I/O:`" then press the ENTER button.



7. Use the △ and ▽ buttons to change the selection to, "`yes`," then press the ENTER button.

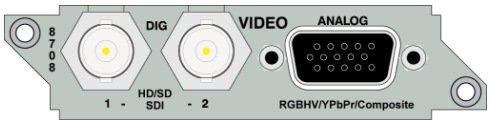
Input Type

1. Use the △ and ▽ buttons to move the cursor to, "`Type:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate input (`ASI, 310M`), then press the ENTER button to save the selection.



4.3 Video Output (2 SD/HD-SDI, 1RGBHV/YPbPr/Composite) – Option NRD00H06AA

General Information



Install Location: 1-1

I/O: (2) 75Ω HD-SDI Female BNC outputs, (1) 15-pin D-sub Female analog output

Supported Formats: HD-SDI, SD-SDI, YPbPr, RGBHV, and Composite

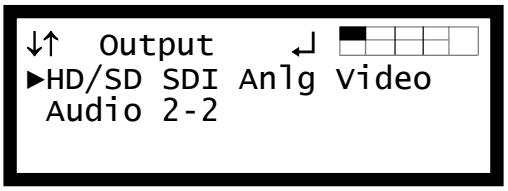
Description: This card provides three mirrored outputs from any of the available input option cards. Two of the outputs are either both HD-SDI or both SD-SDI and one is analog YPbPr/RGBHV/Composite.

It is possible to set one SDI output in SD and one in HD but only one output will deliver a signal, depending on the video format.

The composite output will deliver a signal only when the video format is SD.

Output Control

1. Press the OUTPUT button.
2. Use the △ and ▽ buttons to move the cursor to the "`HD/SD SDI Anlg Video`" card of the specific slot (e.g. 2-1). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.



Video Settings

1. Use the △ and ▽ buttons to move the cursor to, "`Video`," then press the ENTER button to display the Video Status screen for the video output card.
2. Press the ENTER button again to display the Edit screen for the video output card.

Select Format Setting

When in "Auto" mode, the unit will automatically pick the format which is closest to the native format of the decoded video in the elementary stream. When in "Manual" mode, the format may be selected from the list of available output formats listed under "Video Format" below.

1. Use the △ and ▽ buttons to move the cursor to, "`Select Format:`" then press the ENTER button.

2. Use the △ and ▽ buttons to select either auto or manual mode, then press the ENTER button to save the selection.

```
↓↑ SDI Anlg Video 2-1 ↵
▶Select Format: manual
 Format: 1920x1080i
         16x9 29.97
```

Video Format

Note: This menu is only available if the "Select Format" option is set to "manual."

1. Use the △ and ▽ button to move the cursor to, "`Format:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format, then press the ENTER button to save the selection.

```
↓↑ SDI Anlg Video 2-1 ↵
 Select Format: manual
▶Format: 1920x1080i
         16x9 29.97
```

```
720x 480i  16x9  29.97
720x 480i  4x3   29.97
720x 576i  4x3   25.00
720x 576i  16x9  25.00
1280x720p  16x9  60.00
1280x720p  16x9  59.94
1280x720p  16x9  50.00
1920x1080i 16x9  25.00
1920x1080i 16x9  29.97
```

```
1920x1080i      16x9  30.00
1920x1080psF    16x9  23.98
1920x1080psF    16x9  24.00
1920x1080p      16x9  23.98
1920x1080p      16x9  24.00
1920x1080p      16x9  25.00
1920x1080p      16x9  29.97
1920x1080p      16x9  30.00
```

SDI Output Setup

Follow the steps in this section to set the outputs to SD-SDI and HD-SDI.

1. Use the △ and ▽ button to move the cursor to, "`Output A:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format (`SD or HD`), then press the ENTER button to save the selection.

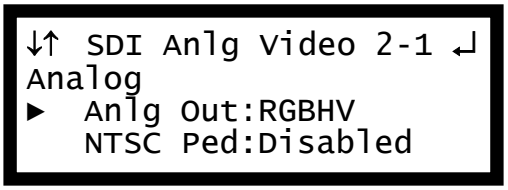
```
↓↑ SDI Anlg Video 2-1 ↵
 SDI
▶  Output A:SD
   Output B:HD
```

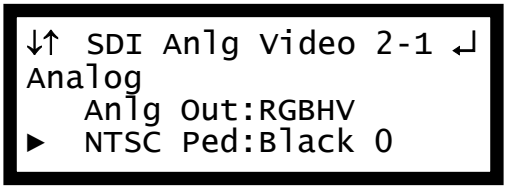
Note: Repeat the steps above to change to the desired output setting for "Output B:"

Analog Output Format

Note: If this setting is set incorrectly when using an RGB monitor, the image will appear green. If this setting is set incorrectly when using a Component monitor, there will be no video on the monitor.

1. Use the △ and ▽ buttons to move the cursor to, "`Anlg Out:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format (`RGBHV, YPbPr, RGB SoG`), then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to move the cursor to, "`NTSC Ped:`" then press the ENTER button.
4. Use the △ and ▽ buttons to change the "`NTSC Ped:`" to either "Black 0" or "Black 7.5", then press the ENTER button to save the selection.

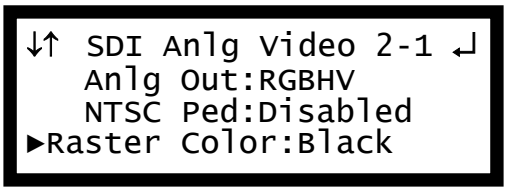




Raster Color

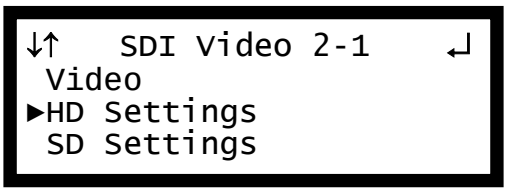
This setting determines the color of the raster that is output by the decoder when input is lost.

1. Use the △ and ▽ buttons to move the cursor to, "`Raster Color:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired raster color (`Black, White, Yellow, Cyan, Green, Magenta, Red, Blue`), then press the ENTER button to save the selection.



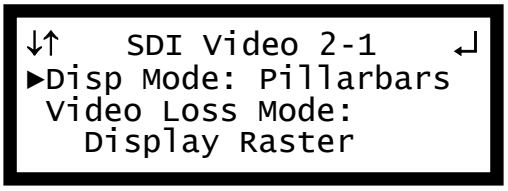
HD Settings

1. Use the △ and ▽ buttons to move the cursor to, "`HD Settings`," then press the ENTER button to display the Status screen for the HD video output settings.
2. Press the ENTER button again to display the Edit screen for the HD video output settings.



Display Mode

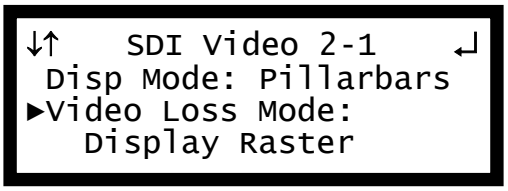
1. Use the △ and ▽ buttons to move the cursor to, "`Disp Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the



desired output size (`Pillarbars, Cropped`), then press the ENTER button to save the selection.

Video Loss Mode

1. Use the △ and ▽ buttons to move the cursor to, "`Video Loss Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to choose between (`Display Raster, Disable Output`), then press the ENTER button to save the selection.



Auto AFD

1. Use the △ and ▽ buttons to move the cursor to, "`Auto AFD:`" then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable AFD, then press the ENTER button to save the selection.

SDI VANC Assignment

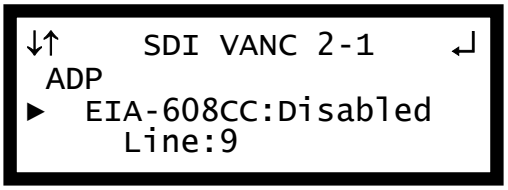
To edit the SDI VANC Assignment, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to, "SDI VANC Assign" then press the ENTER button to display the status screen for the VANC.
2. Press the ENTER button once more to enter the Edit screen.

ADP

To enable items in the VANC and assign a line for each item, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to the desired type of closed captioning (`EIA-608CC, EIA-708CC, TTX S2031M, Source ID, or 127 S2031M`), then press the ENTER button.
2. Use the △ and ▽ buttons to choose "`Enabled or Disabled`" then select



the "Line" on which to embed. Press the ENTER button to save the selection.

Note: Repeat steps 1-4 above to change EIA-708CC, TTX S2031M, Source ID, and 127 S2031M.

SD Settings

1. Use the △ and ▽ buttons to move the cursor to, "`SD Settings`," then press the ENTER button to display the Status screen for the SD video output settings.
2. Press the ENTER button again to display the Edit screen for the SD video output settings.

Display Mode

1. Use the △ and ▽ buttons to move the cursor to, "`Disp Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output size (`Letterbox, Anamorph, or Cropped`), then press the ENTER button to save the selection.

Video Loss Mode

1. Use the △ and ▽ buttons to move the cursor to, "`Video Loss Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to choose between (`Display Raster, Disable Output`), then press the ENTER button to save the selection.

Auto AFD

1. Use the △ and ▽ buttons to move the cursor to, "`Auto AFD:`" then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable AFD, then press the ENTER button to save the selection.

SDI VANC Assignment

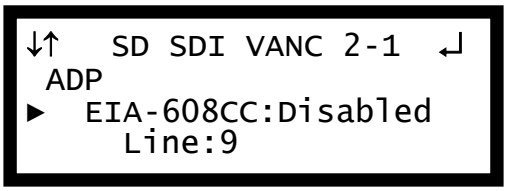
To edit the SDI VANC Assignment, use the following steps.

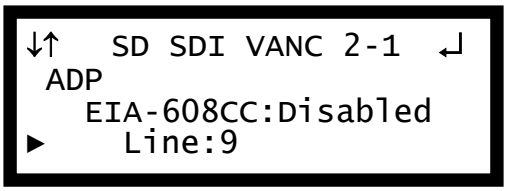
1. Use the △ and ▽ buttons to move the cursor to, "SDI VANC Assign" then press the ENTER button to display the status screen for the VANC.
2. Press the ENTER button once more to enter the Edit screen.

ADP

To enable items in the VANC and assign a line for each item, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to the desired type of closed captioning (`EIA-608CC, EIA-708CC, TTX S2031M, Source ID, or 127 S2031M`), then press the ENTER button.
2. Use the △ and ▽ buttons to choose "`Enabled or Disabled`" then select the "Line" on which to embed. Press the ENTER button to save the selection.





Note: Repeat steps 1-4 above to change EIA-708CC, TTX S2031M, Source ID, and 127 S2031M.

NTSC Waveforms

To enable NTSC items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to, "`Line21CC:`" then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable "Line21CC", then press the ENTER button to save the selection.

Note: Repeat steps 1-2 above to change AMOL, and TVG2x.

PAL Waveforms

To enable PAL items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to, "TTX:" then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable "TTX", then press the ENTER button to save the selection.

Note: Repeat steps 1-2 above to change VPS, and WSS.

Composite VBI Assignment

To edit the Composite VBI Assignment, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to, "Cmpst VBI Assignment" then press the ENTER button to display the status screen for the VBI.
2. Press the ENTER button once more to enter the Edit screen.

NTSC Waveforms

To enable NTSC items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to, "Line21CC:" then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable "Line21CC", then press the ENTER button to save the selection.

Note: Repeat steps 1-2 above to change AMOL, and TVG2x.

PAL Waveforms

To enable PAL items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to, "TTX:" then press the ENTER button.

2. Use the △ and ▽ buttons to enable or disable "TTX", then press the ENTER button to save the selection.

Note: Repeat steps 1-2 above to change VPS, and WSS.

4.4 Video Output (1 RGBHV/YPbPr, 1 Composite) – Option NRD00H09AA

General Information

Install Location: 1-1

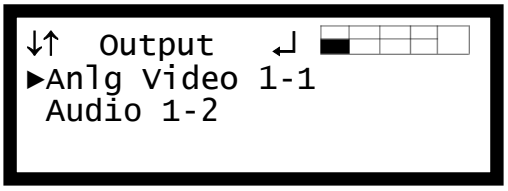
I/O: (1) 75Ω Female BNC NTSC/PAL Composite output, (1) 15-pin D-sub Female analog output

Supported Formats: NTSC/PAL Composite, YPbPr, RGBHV

Description: Analog only, video output card that can output either high definition or standard definition formats. There are two outputs on the card. One BNC for composite and one 15-pin D-sub for composite

Output Control

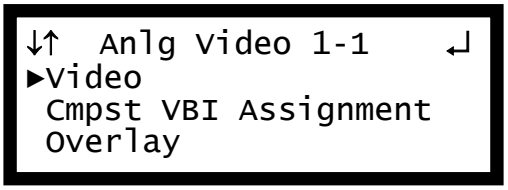
1. Press the OUTPUT button.



2. Use the △ and ▽ buttons to move the cursor to the "Anlg Video" card of the specific slot (e.g. 1-1), then press the ENTER button. Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.

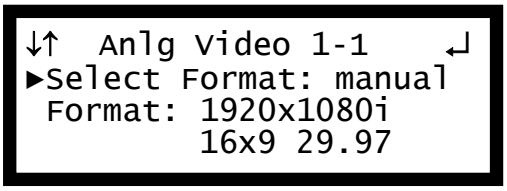
Video Settings

1. Use the △ and ▽ buttons to move the cursor to, "Video," then press the ENTER button to display the Video status screen for the video output card.
2. Press the ENTER button again to display the Edit screen for the video output card.



Select Format Setting

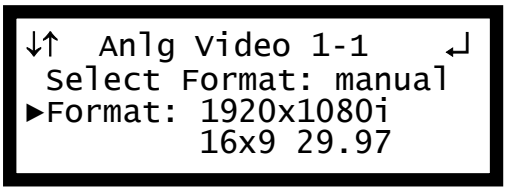
When in "Auto" mode, the unit will automatically pick the format which is closest to the native format of the decoded video in the elementary stream. When in "Manual" mode, the format may be selected from the list of available output formats listed under "Video Format" below.



1. Use the △ and ▽ buttons to move the cursor to, "`Select Format:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select either auto or manual mode, then press the ENTER button to save the selection.

Video Format

Note: This menu is only available if the "Select Format" option is set to "manual."

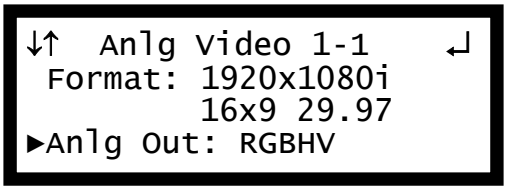


1. Use the △ and ▽ buttons to move the cursor to, "`Format:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate output format, then press the ENTER button to save the selection.

720x480i	16x9	29.97	1280x720p	16x9	59.94
720x480i	4x3	29.97	1280x720p	16x9	60.00
720x576i	16x9	25.00	1920x1080i	16x9	25.00
720x576i	4x3	25.00	1920x1080i	16x9	29.97
1280x720p	16x9	50.00	1920x1080i	16x9	30.00

Analog Output Format

Note: If this setting is set incorrectly when using an RGB monitor, the image will appear green. If this setting is set incorrectly when using a Component monitor, there will be no video on the monitor.

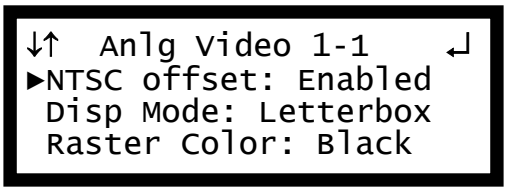


1. Use the △ and ▽ buttons to move the cursor to, "`Anlg Out:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format (`RGBHV, YPbPr`), then press the ENTER button to save the selection.

NTSC Ped

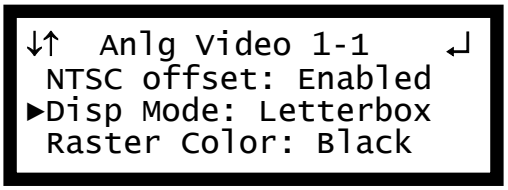
When the NTSC Ped is enabled it applies a 7.5IRE offset to the black level of the Composite video output.

1. Use the △ and ▽ buttons to move the cursor to, "`Format:`" then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable the NTSC offset, then press the ENTER button to save the selection.



Display Mode

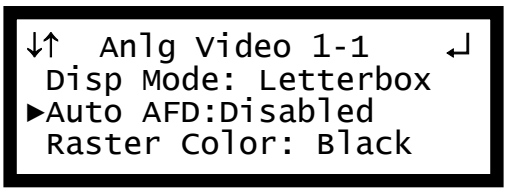
1. Use the △ and ▽ buttons to move the cursor to, "`Disp Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select either (`Letterbox, Cropped`), then press the ENTER button to save the selection.



Auto AFD

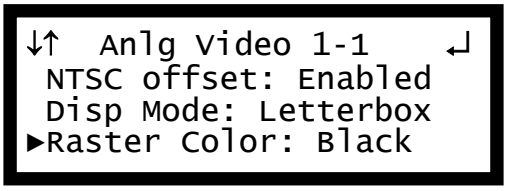
AFD or Active Format Description, is a standard set of codes that if sent in the MPEG transport stream is interpreted by the RD5000 into a certain aspect ratio and active picture characteristics.

1. Use △ the ▽ and buttons to move the cursor to, "`Auto AFD:`" then press the ENTER button.
2. Use △ the ▽ and buttons to select the appropriate mode (`Enabled` or `Disabled`), then press the ENTER button to save the selection.



Raster Color

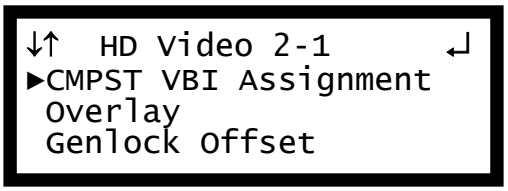
1. Use the △ and ▽ buttons to move the cursor to, "`Raster Color:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired raster color (`Black, White, Yellow, Cyan, Green, Magenta, Red, Blue`), then press the ENTER button to save the selection.

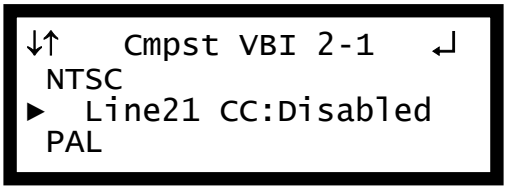


Composite VBI Assignment

To setup Line 21 Closed Captions, Teletext, etc… on the Composite output of this card use the following steps:

1. Use the △ and ▽ buttons to move the cursor to, "`Cmpst VBI Assignment`," then press the ENTER button.
2. To Enable or Disable any of the options (`Line 21 CC`, `TTX`, `VPS`, or `WSS`) press the ENTER button on the selected option.
3. Then use the △ and ▽ buttons to toggle between `Enabled` and `Disabled`.
4. Press the ENTER button to save changes.

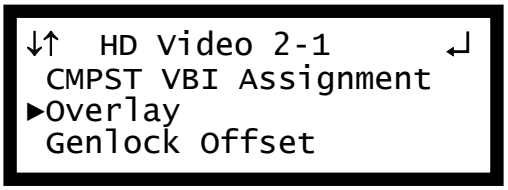




Overlay Settings

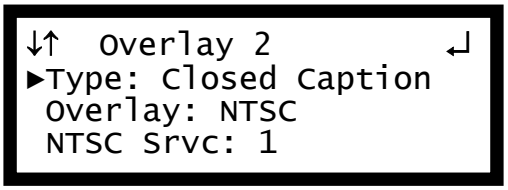
CAUTION: If Info (PSI/PSIP) data is turned on, the overlay will appear on downstream video. The same is true if Closed Caption overlay is turned on.

1. Use the △ and ▽ buttons to move the cursor to, "`Overlay`," then press the ENTER button.



Type of Overlay

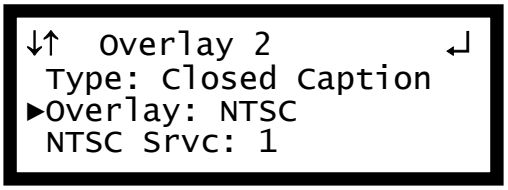
1. Use the △ and ▽ buttons to move the cursor to, "`Type:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select which overlay to display (`Table, Closed Caption, Service, OFF`), then press the ENTER button to save the selection.



Overlay (Closed Caption)

Note: This menu changes depending on which overlay is set in "Type of Overlay" above.

1. Use the △ and ▽ buttons to move the cursor to, "`Overlay:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate type of overlay (`NTSC, DTVCC`),



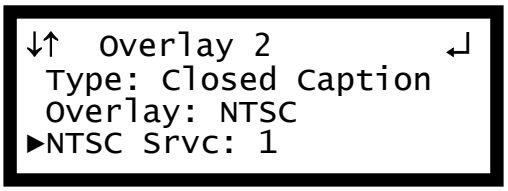
then press the ENTER button to save the selection.

Closed Caption Number

NTSC

Note: This option will only be available if the TYPE of overlay is set to, "Closed Caption" and the OVERLAY is set to "NTSC."

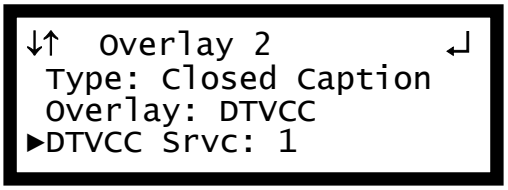
1. Use the △ and ▽ buttons to move the cursor to, "`NTSC Srvc:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired number of closed caption to view (`1-4`), then press the ENTER button to save the selection.



DTVCC

Note: This option will only be available if the TYPE of overlay is set to, "Closed Caption" and the OVERLAY is set to "DTVCC."

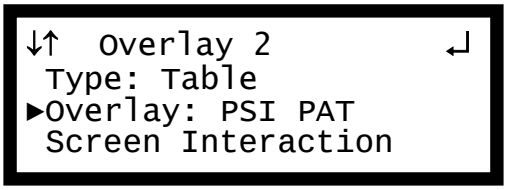
1. Use the △ and ▽ buttons to move the cursor to, "`DTVCC Srvc:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired number of closed caption to view (`1-7`), then press the ENTER button to save the selection.



Overlay (Table)

Note: This menu changes depending on which overlay is set in "Overlay".

1. Use the △ and ▽ buttons to move the cursor to, "`Overlay:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate type of overlay (`PSI PAT, PSI PMT, PSIP MGT, PSIP STT,`



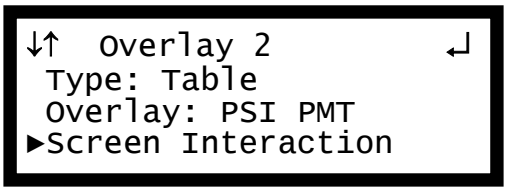
PSIP TVCT, PSIP EIT, PSIP EPG), then press the ENTER button to save the selection.

Screen Interaction

This mode allows the user to page through the on-screen PSI/PSIP tables.

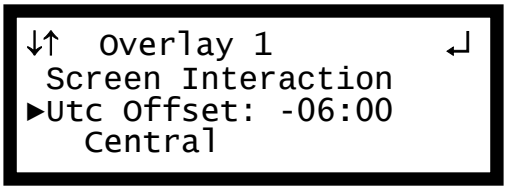
Note: This option will only be available if the type of overlay is set to, "Table"

1. Use the △ and ▽ buttons to move the cursor to, "Screen Interaction," then press the ENTER button.
2. While this mode is enabled, the △, ▽, ◁, and ▷ buttons will control the on-screen PSI/PSIP tables. To exit the, "Screen Interaction" mode press the EXIT button.



Coordinated Universal Time Offset

1. Use the △ and ▽ buttons to move the cursor to, "Utc Offset:" then press the ENTER button.
2. Use the △ and ▽ buttons to change to the appropriate offset, then press the ENTER button to save the selection.



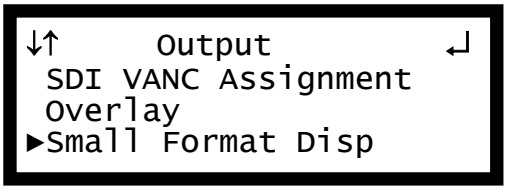
Overlay (Service)

Note: This option only displays the Service Info.

Small Format Display

To setup the RD5000 to output a "Small Format Display," use the following steps:

1. Use the △ and ▽ buttons to move the cursor to "Small Format Disp," then press the ENTER

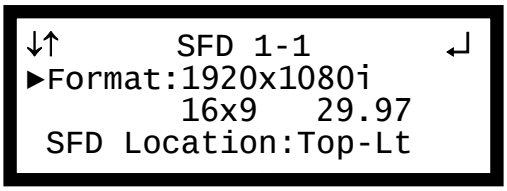


button.

2. Press the ENTER button again to change the settings.

Format

1. While the cursor is on "Format:" press the ENTER button to change the display format.
2. Use the △ and ▽ buttons to change from any of the following settings:



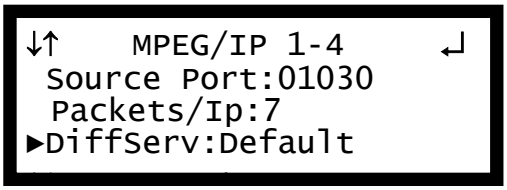
720x480i 16x9 29.97	1920x1080i 16x9 25.00
720x480i 4x3 29.97	1920x1080i 16x9 29.97
720x576i 16x9 25.00	1920x1080i 16x9 30.00
720x576i 4x3 25.00	1920x1080p 16x9 23.98
1280x720p 16x9 50.00	1920x1080p 16x9 24.00
1280x720p 16x9 59.94	1920x1080p 16x9 25.00
1280x720p 16x9 60.00	1920x1080p 16x9 29.97
	1920x1080p 16x9 30.00

Note: "If either 480i or 576i video format is used the HD-SDI outputs are turned off and only the analog output is enabled.

3. Press the ENTER button to save the settings.

SFD Location

1. Use the △ and ▽ button to move the cursor to "SFD Location:" and then press the ENTER button.
2. Use the △ and ▽ buttons to select one of the following options:

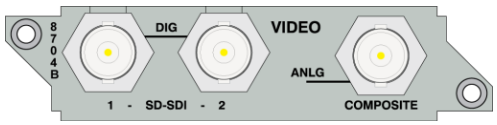


Top-Lt	Mid-Lt	Btm-Lt
Top-Rt	Mid-Rt	Btm-Rt
Top-Ctr	Mid-Ctr	Btm-Ctr

3. Press the ENTER button to save the settings.

4.5 Video Output (2 SD-SDI, 1 Composite) – Option NRD00H08AA

General Information



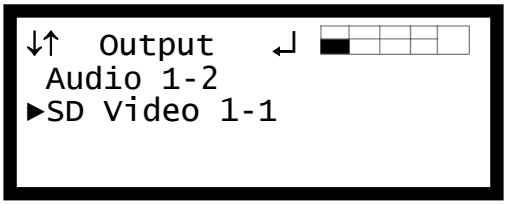
Install Location: 1-1
I/O: (2) 75Ω Female BNC SD-SDI outputs, (1) 75Ω Female BNC NTSC/PAL Composite output
Supported Formats: SD-SDI, NTSC/PAL Composite
Description: This card provides three mirrored outputs from any of the available input option cards. Two of the outputs are SD-SDI and one is NTSC Composite.

Output Control

1. Press the OUTPUT button.

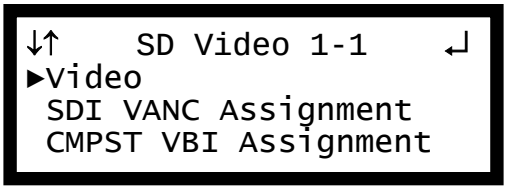
Note: Select RDS1 then press ENTER.

2. Use the △ and ▽ buttons to move the cursor to the "SD Video" card of the specific slot (e.g. 1-1). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.



Video Settings

1. Use the △ and ▽ buttons to move the cursor to, "Video," then press the ENTER button to display the Video Status screen for the video output card.
2. Press the ENTER button again to display the Edit screen for the video output card.



NTSC Pedestal

When the NTSC Ped is enabled it applies a 7.5IRE pedestal to the black level of the Composite video output.

1. Use the △ and ▽ buttons to move the cursor to, "NTSC Ped:" then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable the pedestal, then press the ENTER button to save the selection.

SDI Clock

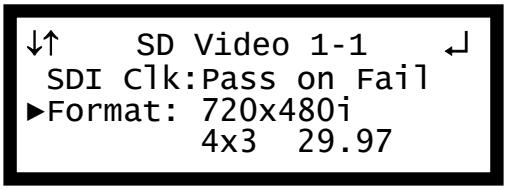
This option sets how the SDI clock behaves upon input failure. Pass on Fail will continue to send the SDI clock and show the selected raster color on the SDI outputs. Squelch will stop the SDI clock and any equipment down the line will lose SDI input.

1. Use the △ and ▽ buttons to move the cursor to, "`SDI Clk:`" then press the ENTER button.
2. Use the △ and ▽ buttons to set the desired SDI clock mode (`Pass on Fail`, `Squelch`), then press the ENTER button to save the selection.

Video Format

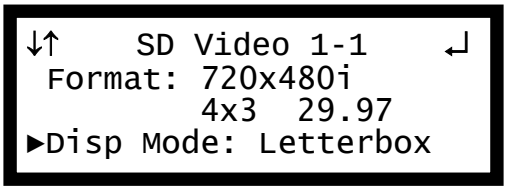
1. Use the △ and ▽ buttons to move the cursor to, "`Format:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate format, then press the ENTER button to save the selection.

```
720x480i   4x3   29.97
720x480i   16x9  29.97
720x576i   16x9  25.00
720x576i   4x3   25.00
```



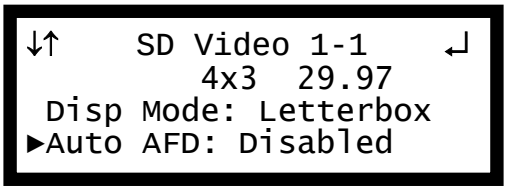
Display Mode

1. Use the △ and ▽ buttons to move the cursor to, "`Disp Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate display mode (`Letterbox`, `Cropped`, `Anamorph`), then press the ENTER button to save the selection.



Auto AFD

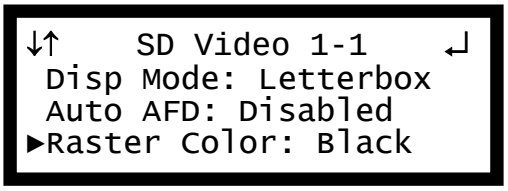
1. Use the △ and ▽ buttons to move the cursor to, "`Auto AFD:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate mode (`Enabled or Disabled`), then press the ENTER button to save the selection.



Raster Color

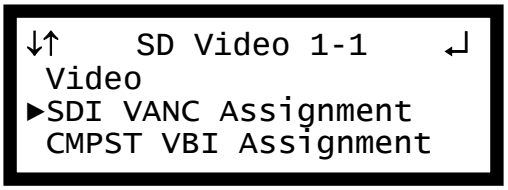
This setting determines the color of the raster that is output by the decoder when input is lost.

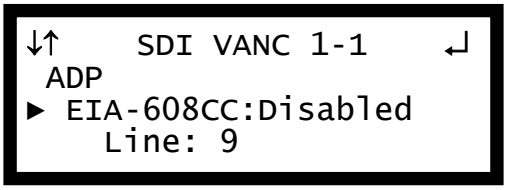
1. Use the △ and ▽ buttons to move the cursor to, "`Raster Color:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired raster color (`Black, White, Yellow, Cyan, Green, Magenta, Red, Blue`), then press the ENTER button to save the selection.

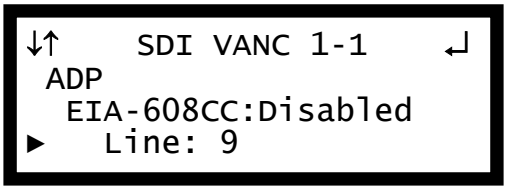


VANC Embedding

1. Use the △ and ▽ buttons to move the cursor to, "`SDI VANC Assignment`," then press the ENTER button to view the Status screen.
2. Press the ENTER button once more to display the edit menu.
3. Use the △ and ▽ buttons to move the cursor to the desired ancillary data type, then press the ENTER button.
4. Use the △ and ▽ buttons to choose (`Enabled or Disabled`), then press the ENTER button to save the selection.
5. Use the △ and ▽ buttons to select "Line:" and press the ENTER button.
6. Use the △ and ▽ buttons to change the line number in which the ancillary data will be located.





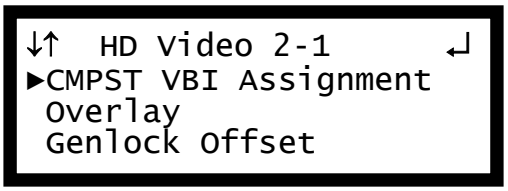


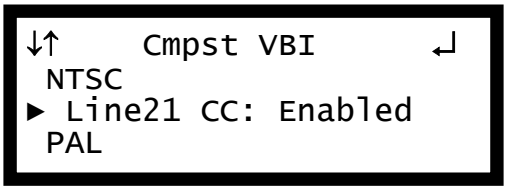
Note: Use the above steps 3-6 to embed other components on other lines.

Composite VBI Assignment

To setup Line 21 Closed Captions, Teletext, etc… on the Composite output of this card use the following steps:

1. Use the △ and ▽ buttons to move the cursor to, "`Cmpst VBI Assignment`," then press the ENTER button.
2. To Enable or Disable any of the options (`Line 21 CC`, `TTX`, `VPS`, or `WSS`) press the ENTER button on the selected option.
3. Then use the △ and ▽ buttons to toggle between `Enabled` and `Disabled`.
4. Press the ENTER button to save changes.



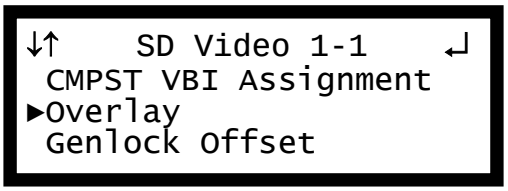


Overlay Settings

Overlays provide an easy to use OSD to help troubleshoot problems, monitor stream characteristics, or decode closed captioning.

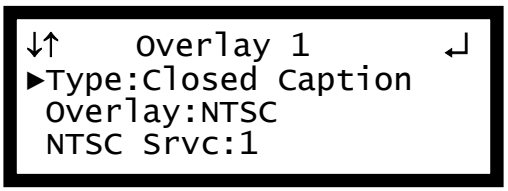
CAUTION: All overlays will appear on the downstream video.

Use the △ and ▽ buttons to move the cursor to, "`Overlay`," then press the ENTER button.



Type of Overlay

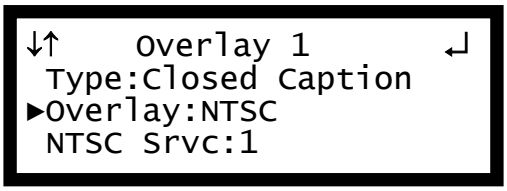
1. Use the △ and ▽ buttons to move the cursor to, "`Type:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select which overlay to display (`Table, Closed Caption, Service, Off`), then press the ENTER button to save the selection.



Overlay (Closed Caption)

Note: This menu changes depending upon which overlay is set in "Type of Overlay" above.

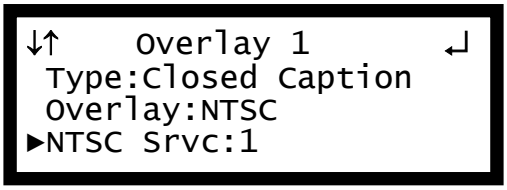
1. Use the △ and ▽ buttons to move the cursor to, "Overlay:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate type of overlay (NTSC, DTVCC), then press the ENTER button to save the selection.



NTSC Service

Note: This menu is only available when the "Overlay" setting is set to NTSC.

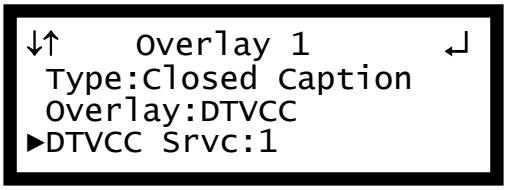
1. Use the △ and ▽ buttons to move the cursor to, "NTSC Srvc:" then press the ENTER button.
2. Use the △ and ▽ buttons to select which NTSC CC Srvc to display on the overlay (1-4), then press the ENTER button to save the selection.



DTVCC Service

Note: This menu is only available when the "Overlay" setting is set to DTVCC.

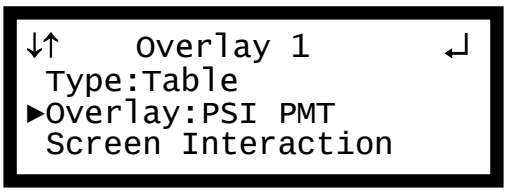
1. Use the △ and ▽ buttons to move the cursor to, "DTVCC Srvc:" then press the ENTER button.
2. Use the △ and ▽ buttons to select which DTVCC Srvc to display on the overlay (1-7), then press the ENTER button to save the selection.



Overlay (Table)

Note: This menu changes depending on which overlay is set in "Type of Overlay" above.

1. Use the △ and ▽ buttons to move the cursor to, "Overlay:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate type of overlay (PSI PAT, PSI PMT, PSIP MGT, PSIP STT, PSIP



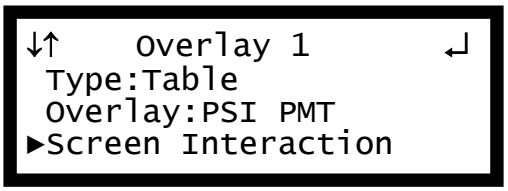
TVCT, PSIP EIT, PSIP EPG), then press the ENTER button to save the selection.

Screen Interaction

This mode allows the user to page through the OSD PSI/PSIP tables.

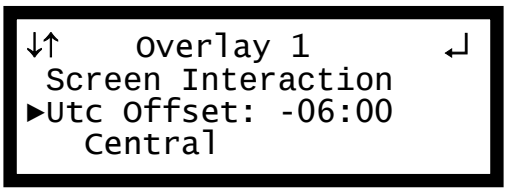
Note: This option will only be available if the type of overlay is set to, "Table."

1. Use the △ and ▽ buttons to move the cursor to, "Screen Interaction," then press the ENTER button.
2. While this mode is enabled, the △, ▽, ◁, and ▷ buttons will control the on-screen PSI/PSIP tables. To exit the, "Screen Interaction" mode press the EXIT button.



Coordinated Universal Time Offset

1. Use the △ and ▽ buttons to move the cursor to, "Utc Offset:" then press the ENTER button.
2. Use the △ and ▽ buttons to change to the appropriate offset, then press the ENTER button to save the selection.
   See Appendix E for UTC values



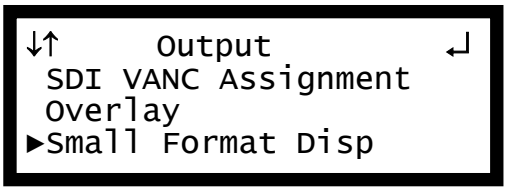
Overlay (Service)

Note: This option only displays the Service Info.

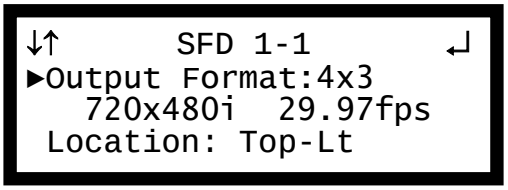
Small Format Display

To setup the RD5000 to output a "Small Format Display," use the following steps:

1. Use the △ and ▽ buttons to move the cursor to "Small Format Disp," then press the ENTER button.
2. Press the ENTER button again to change the settings.



Format

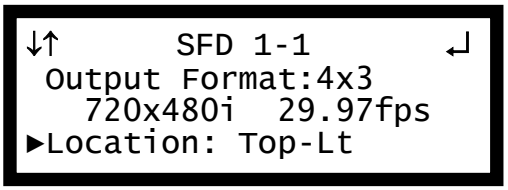


1. While the cursor is on "`Output Format:`" press the ENTER button to change the display format.
2. Use the △ and ▽ buttons to change from any of the following settings:

```
720x480i 4x3 29.97
720x480i 16x9 29.97
720x576i 16x9 25.00
720x576i 4x3 25.00
```

3. Press the ENTER button to save the settings.

SFD Location



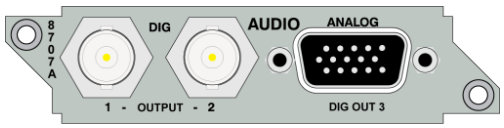
1. Use the △ and ▽ button to move the cursor to "`Location:`" and then press the ENTER button.
2. Use the △ and ▽ buttons to select one of the following options:

```
Top-Lt      Mid-Lt      Btm-Lt
Top-Rt      Mid-Rt      Btm-Rt
Top-Ctr     Mid-Ctr     Btm-Ctr
```

3. Press the ENTER button to save the settings.

4.6 Audio Output (DolbyE, AES Digital, Analog) – Option NRD00HA0AA

General Information



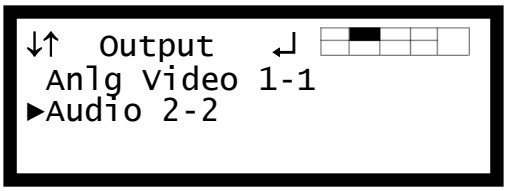
Install Location: Any slot *except* 1-1 and 2-1.
I/O: (2) 75Ω Female BNC digital outputs, (1) 15-pin D-sub Male analog output
Supported Formats: Raw, PCM, Dolby E
Description: This card provides parsed DolbyE compressed audio, two digital audio outputs, and two analog audio pair outputs. It provides the audio from two audio decoder processors. Two cards can be installed to provide Raw and PCM digital audio outputs from four audio decoder if the NRD00H07AA option is installed.

Output Control

1. Press the OUTPUT button.

Note: Select RDS then press ENTER.

2. Use the △ and ▽ buttons to move the cursor to the "Audio" card of the specific slot (e.g. 2-2), then press the ENTER button. Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.



3. Press the ENTER button one more time to move from the Status screen to the Edit screen.

Digital Audio Settings

1. Use the △ and ▽ buttons to move the cursor to, "Digital Audio: Out1:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the audio decoder and output format desired (Audio X, Raw, PCM), then press the ENTER button to save the selection.

Note: The above steps apply to "Digital Audio: Out2:" as well.

Note: The "X" of "Audio X," in the step above, will be (1, 2, Off) for a Configuration 1 Single Decoder unit and it will be (1, 2, 3, 4, Off) for a Configuration 1 Dual Decoder unit.

Analog Audio Settings

1. Use the △ and ▽ buttons to move the cursor to, "`Analog Audio: Ch1:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired audio to output (`Audio X`), then press the ENTER button to save the selection.

Note: The "X" of "Audio X," in the step above, will be (1, 2, Off) for a Configuration 1 Single Decoder and it will be (1, 2, 3, 4, Off) for a Configuration 1 Dual Decoder unit.

Note: The above steps apply to "Analog Audio: Ch2:" as well.

Output Level

1. Use the △ and ▽ buttons to move the cursor to, "`Level:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired level (`1-9`), then press ENTER to save the selection.

Note: The level 7 is approx. 0 Db and each number increment is approx. 2.5 Db.

4.7 Up to 4 audio channels – Option NRD00H07AA

General Information

Install Location: Factory installed feature.

Description: This option enables the RD5000 to decode up to 4 audio PID. Without this option the RD5000 can decode only up to 2 audio PID.

The features of the two additional audio PID are the same as the two basic audio PID (audio formats, audio embedding, etc …).

If separate audio outputs are required, up to two audio output boards (NRD00HA0AA) can be installed. One board will output audio 1 and 2 and the second board will output audio 3 and 4.

4.8 Dual MPEG over IP Input/ UDP Output – Option NRD00H05AA

General Information

Install Location: Installs in 1-2 through 1-4 and/or 2-2 through 2-4.
I/O: (2) 10/100/1000 Auto-negotiating Base-T RJ-45 Ethernet Port
Supported Formats: Receive: UDP or RTP Multicasts and Unicasts. Transmit: UDP only
Description: This card encapsulates the TS from the bus and will transmit IP streams. It can also take in IP streams and place them on the bus for an ASI/310M card and/or a decoder. Up to two multicasts can be subscribed to, allowing for a backup multicast to be chosen and two mirrored unicasts can be transmitted to allow for redundancy. The two physical connectors can be configured independently.

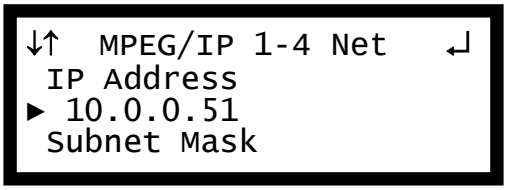
Menu Control

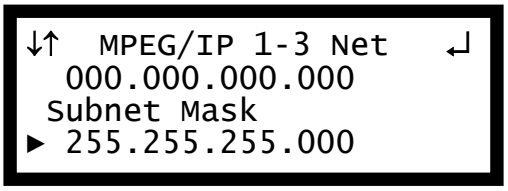
This menu is used to setup the IP address, Subnet Mask, and Gateway for the MPEG/IP card. These settings need to be set to proper values for the network that the RD5000 is being used on. These values can usually be obtained from the local network administrator.

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to, "MPEG/IP NetCfg," then press the ENTER button.
3. Select "Port 1" or "Port 2" and then press the ENTER button.

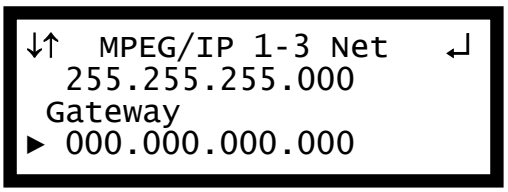
IP Address/Subnet Mask/Gateway

1. Use the △ and ▽ buttons to move the cursor to, "IP Address," then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.
3. The cursor will now be on, "Subnet Mask".
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Subnet Mask, then press the ENTER button to save the selection.
5. The cursor will now be on, "Gateway."





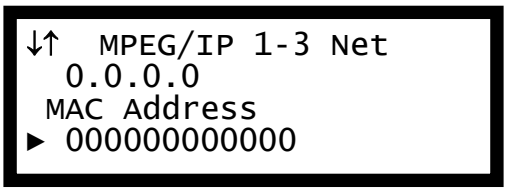
6. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Gateway, then press the ENTER button to save the selection.



MAC Address

This option will show the physical MAC Address of the MPEG/IP card.

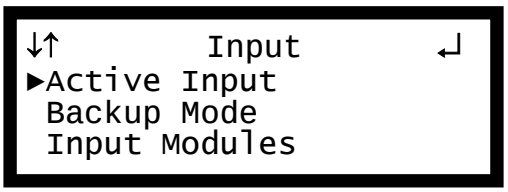
1. Use the △ and ▽ buttons to move the cursor to, "MAC Address" to view the MPEG/IP card's physical MAC Address.

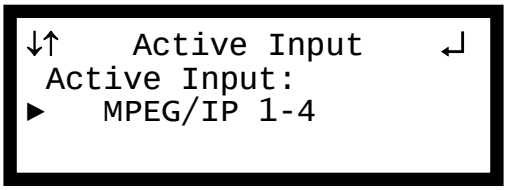


Input Control

To enable this card as an input use the following steps.

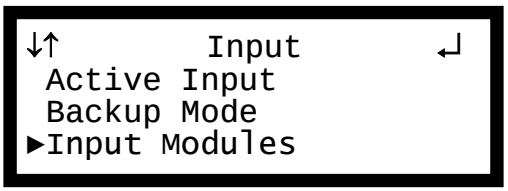
1. Press the INPUT button.
2. Select "Active Input", then press the ENTER button.
3. Press ENTER twice to change the active input and use the △ and ▽ buttons to select the input to make active, and press the ENTER button to save the changes.

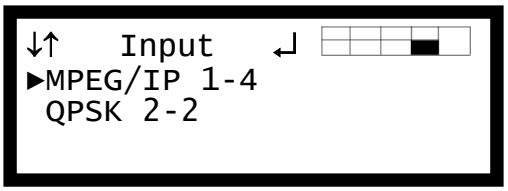


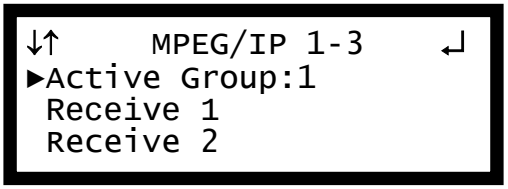


Configure Input

1. Press the INPUT button.
2. Select "Input Modules", and press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to the "MPEG/IP" card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
4. Press the ENTER button once to display the Status screen for the MPEG/IP card.
5. Press the ENTER button again to display the Edit screen for the MPEG/IP card.
6. Use the △ and ▽ buttons to move the cursor to, "Active Group:" then press the ENTER button.
7. Use the △ and ▽ buttons to change the selection to, "Auto, 1 or 2," (this relates to the



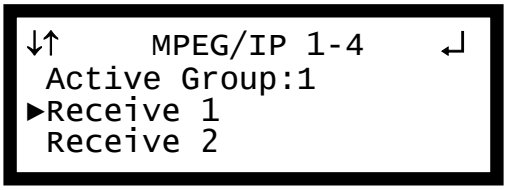




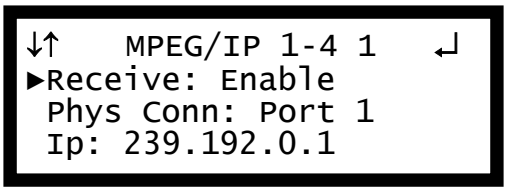
physical connector on the card), then press the ENTER button to save the selection.

Receive 1

This section allows the user to setup the receive function of the first receive group.



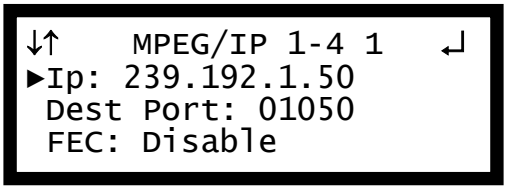
1. Use the △ and ▽ buttons to move the cursor to, "Receive 1" then press the ENTER button.
2. Use the △ and ▽ buttons to move the cursor to, "Receive:" then press the ENTER button.



3. Use the △ and ▽ buttons to Enable or Disable "Receive," then press the ENTER button to save the selection.
4. Choose the physical connector, "Port1" or "Port 2" then press the ENTER button.

IP

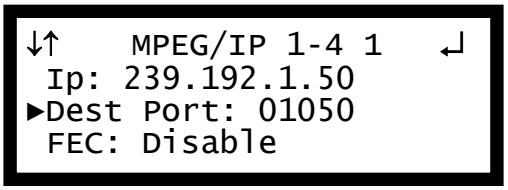
1. Use the △ and ▽ buttons to move the cursor to, "IP:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.



Note: A Unicast or Multicast IP address may be chosen.
Unicast: X.X.X.X – 223.255.255.255
Multicast: 224.0.0.0 – 239.255.255.255
Suggested Multicast Range: 239.192.X.X

Destination Port

1. Use the △ and ▽ buttons to move the cursor to, "Dest Port:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the port (1025 –

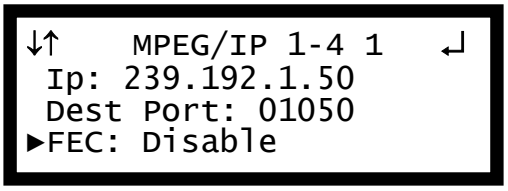


65536), then press the ENTER button to save the selection.

Forward Error Correction

This setting lets the decoder know if it should be expecting FEC data with the active receive group. If no FEC data is expected, this setting can be disabled to allow multicasts closer together on the same IP.

1. Use the △ and ▽ buttons to move the cursor to, "FEC:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "enable" or "disable", then press the ENTER button to save the selection.



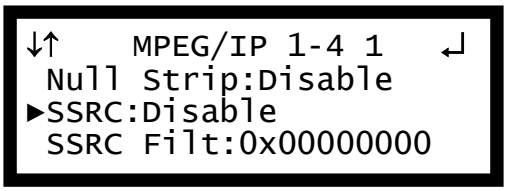
Null Stripped

This setting is used to allow the RD5000 to receive a null stripped IP stream.

1. Use the △ and ▽ buttons to move the cursor to, "Null Strip:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "enable" or "disable", then press the ENTER button to save the selection.

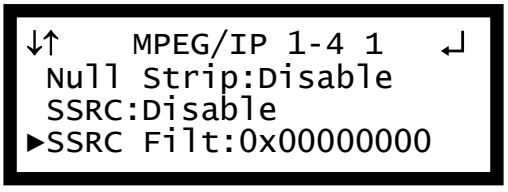
Synchronized Source Setup

1. Use the △ and ▽ buttons to move the cursor to, "SSRC:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "enable" or "disable", then press the ENTER button to save the selection.



Synchronized Source Setup Filter

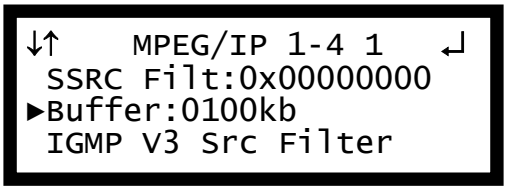
1. Use the △ and ▽ buttons to move the cursor to, "SSRC Filt:" then press the ENTER button.



2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the SSRC Filter, then press the ENTER button to save the selection.

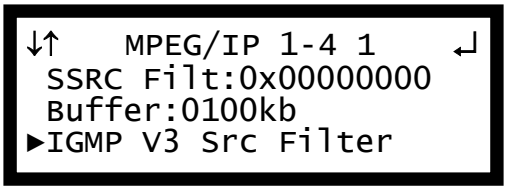
Buffer

1. Use the △ and ▽ buttons to move the cursor to, "Buffer:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Buffer, then press the ENTER button to save the selection.



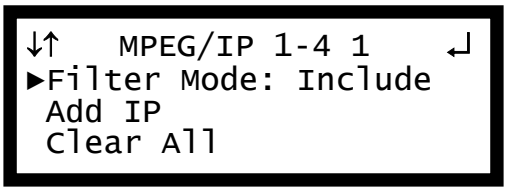
IGMP V3 Source Filter

1. Use the △ and ▽ buttons to move the cursor to, "IGMP V3 Src Filter," then press the ENTER button to access the Edit screen.



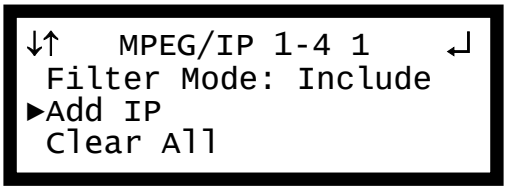
Filter Mode

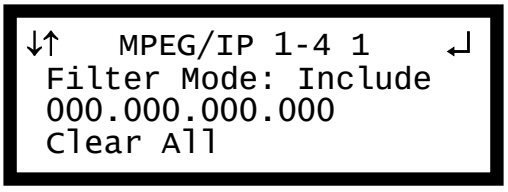
1. Use the △ and ▽ buttons to move the cursor to, "Filter Mode:" then press the ENTER button.
2. Use the △ and ▽ buttons to select either Include or Exclude, then press the ENTER button to save the selection.



Add IP

1. Use the △ and ▽ buttons to move the cursor to, "Add IP," then press the ENTER button.
2. Press the ENTER button again to add an IP address to the list.
3. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP address, then press the ENTER button to save the selection.



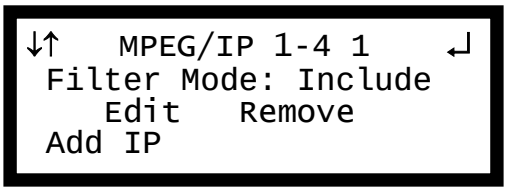


Note: A maximum of 64 IP addresses may be

added to the list.

Edit/Remove an IP

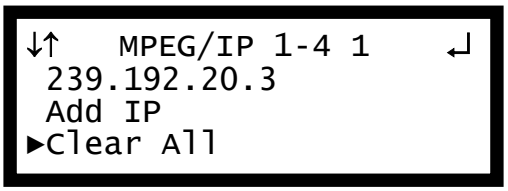
1. Use the △ and ▽ buttons to move the cursor to the desired IP address to edit, then press the ENTER button.
2. Use the ◁ and ▷ buttons to select either Edit or Remove, then press the ENTER button.



Clear All

This option will clear all IP addresses in the filter list.

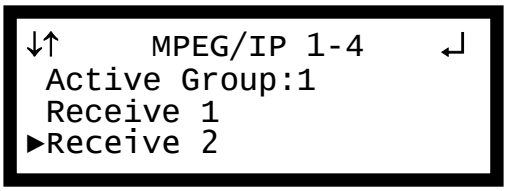
1. Use the △ and ▽ buttons to move the cursor to, "Clear All," then press the ENTER button.
2. Press the ENTER button one more time to clear all the IP addresses in the list.

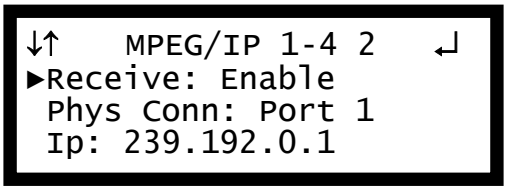


Receive 2

This section allows the user to setup the receive function of the second receive group.

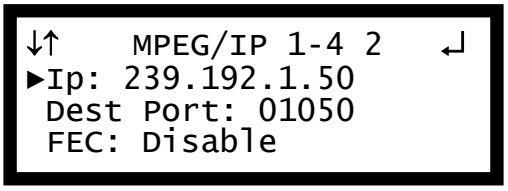
1. Use the △ and ▽ buttons to move the cursor to, "Receive 2" then press the ENTER button.
2. Use the △ and ▽ buttons to move the cursor to, "Receive:" then press the ENTER button.
3. Use the △ and ▽ buttons to Enable or Disable "Receive," then press the ENTER button to save the selection.
4. Choose the physical connector, "Port1" or "Port 2" then press the ENTER button.





IP

1. Use the △ and ▽ buttons to move the cursor to, "IP:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press

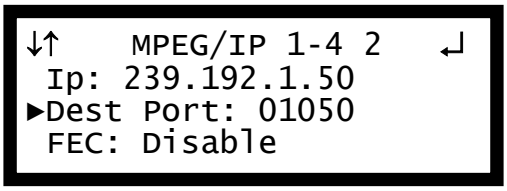


the ENTER button to save the selection.

Note: A Unicast or Multicast IP address may be chosen.
Unicast: X.X.X.X – 223.255.255.255
Multicast: 224.0.0.0 – 239.255.255.255
Suggested Multicast Range: 239.192.X.X

Destination Port

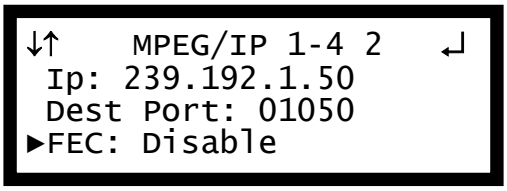
1. Use the △ and ▽ buttons to move the cursor to, "Dest Port:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the port (1025 – 65536), then press the ENTER button to save the selection.



Forward Error Correction

This setting lets the decoder know if it should be expecting FEC data with the active receive group. If no FEC data is expected, this setting can be disabled to allow multicasts closer together on the same IP.

1. Use the △ and ▽ buttons to move the cursor to, "FEC:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "enable" or "disable", then press the ENTER button to save the selection.



Null Stripped

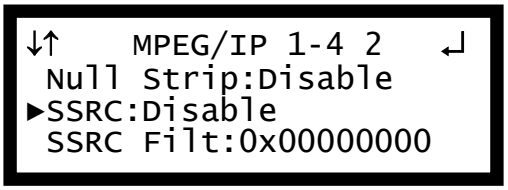
This setting is used to allow the RD5000 to receive a null stripped IP stream.

1. Use the △ and ▽ buttons to move the cursor to, "Null Strip:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "enable" or "disable", then press the

ENTER btton to save the selection.

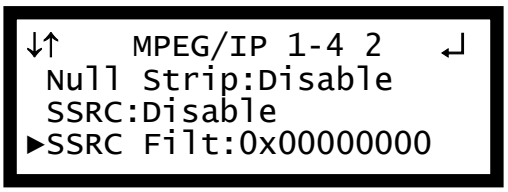
Synchronized Source Setup

1. Use the △ and ▽ buttons to move the cursor to, “SSRC:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “enable” or “disable”, then press the ENTER button to save the selection.



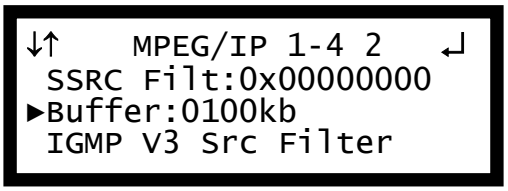
Synchronized Source Setup Filter

1. Use the △ and ▽ buttons to move the cursor to, “SSRC Filt:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the SSRC Filter, then press the ENTER button to save the selection.



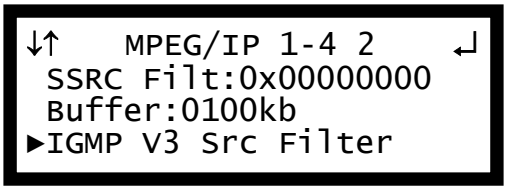
Buffer

1. Use the △ and ▽ buttons to move the cursor to, “Buffer:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Buffer, then press the ENTER button to save the selection.



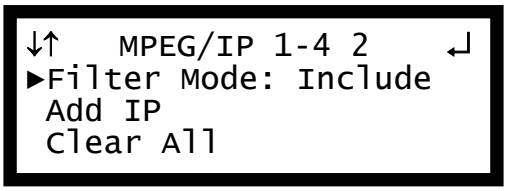
IGMP V3 Source Filter

1. Use the △ and ▽ buttons to move the cursor to, “IGMP V3 Src Filter,” then press the ENTER button to access the Edit screen.



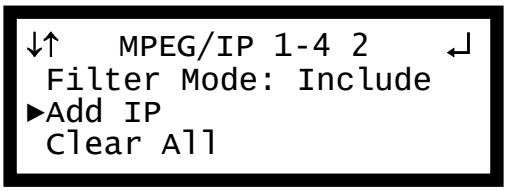
Filter Mode

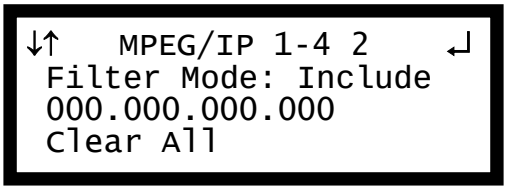
1. Use the △ and ▽ buttons to move the cursor to, “Filter Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either Include or Exclude, then press the ENTER button to save the selection.



Add IP

1. Use the △ and ▽ buttons to move the cursor to, “Add IP,” then press the ENTER button.
2. Press the ENTER button again to add an IP address to the list.
3. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP address, then press the ENTER button to save the selection.

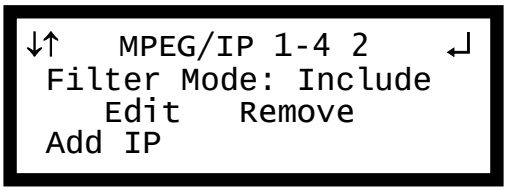




Note: A maximum of 64 IP addresses may be added to the list.

Edit/Remove an IP

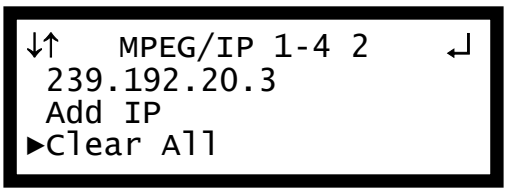
1. Use the △ and ▽ buttons to move the cursor to the desired IP address to edit, then press the ENTER button.
2. Use the ◁ and ▷ buttons to select either Edit or Remove, then press the ENTER button.



Clear All

This option will clear all IP addresses in the filter list.

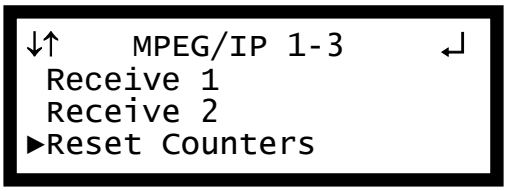
1. Use the △ and ▽ buttons to move the cursor to, “Clear All,” then press the ENTER button.
2. Press the ENTER button one more time to clear all the IP addresses in the list.



Reset Counters

This option will reset the counters on the status screen for the MPEG/IP card.

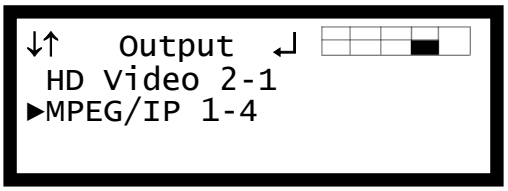
1. Use the △ and ▽ buttons to move the cursor to, “Reset Counters,” then press the ENTER button.
2. Press the ENTER button again to reset the counters.



Output Control

To configure this card as an output use the following steps:

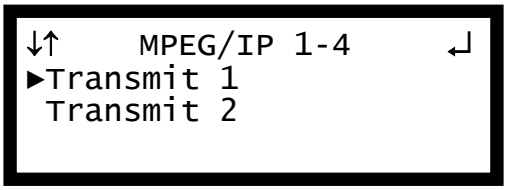
1. Press the OUTPUT button.
2. Use the △ and ▽ buttons to move the cursor to the “MPEG/IP” card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
3. Press the ENTER button once to display the selection screen for “Transmit 1” and “Transmit 2” of the MPEG/IP card.

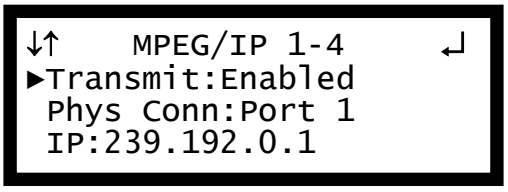


Transmit 1

To enable “Transmit 1” as an output use the following steps:

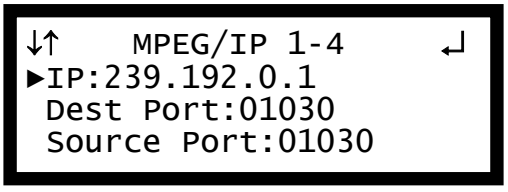
1. Use the △ and ▽ buttons to move the cursor to, “Transmit 1,” then press the ENTER button.
2. Press the ENTER button one more time to get to the Edit screen.
3. Use the △ and ▽ buttons to move the cursor to, “Transmit:” then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection to, “Enabled,” then press the ENTER button to save the selection.
5. Choose the physical connector, “Port1” or “Port 2” then press the ENTER button.





IP

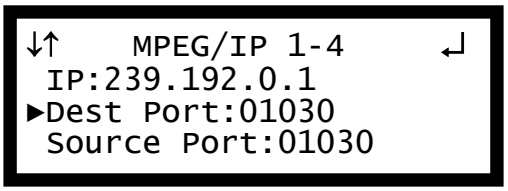
1. Use the △ and ▽ buttons to move the cursor to, “IP:” then press the ENTER button.



2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.

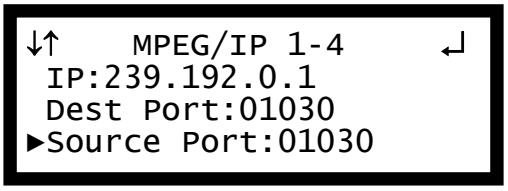
Destination Port

1. Use the △ and ▽ buttons to move the cursor to, "Dest Port:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



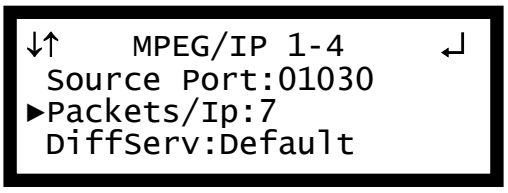
Source Port

1. Use the △ and ▽ buttons to move the cursor to, "Source Port:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



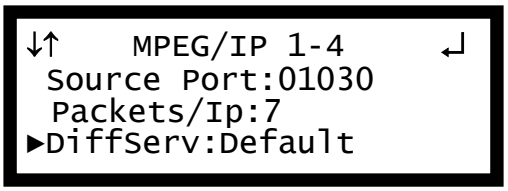
Packets Per Frame

1. Use the △ and ▽ buttons to move the cursor to, "Packets/Ip:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of packets per frame (1 –7), then press the ENTER button to save the selection.



Differentiated Services

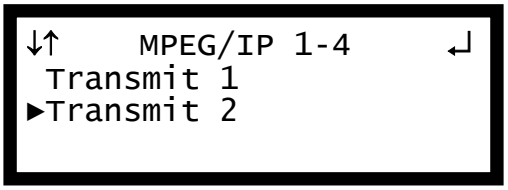
1. Use the △ and ▽ buttons to move the cursor to, “DiffServ:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change between (Default, AF11, AF12, AF13, AF21, AF22, AF23, AF31, AF32, AF33, AF41, AF42, AF43, EF), then press the ENTER button to save the selection.

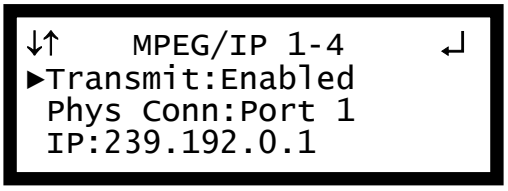


Transmit 2

To enable “Transmit 2” as an output use the following steps:

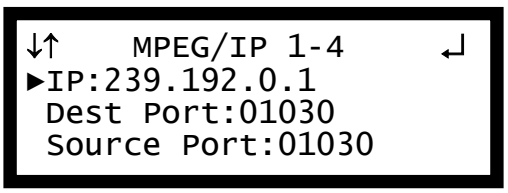
1. Use the △ and ▽ buttons to move the cursor to, “Transmit 2,” then press the ENTER button.
2. Press the ENTER button one more time to get to the Edit screen.
3. Use the △ and ▽ buttons to move the cursor to, “Transmit:” then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection to, “Enabled,” then press the ENTER button to save the selection.
5. Choose the physical connector, “Port1” or “Port 2” then press the ENTER button.





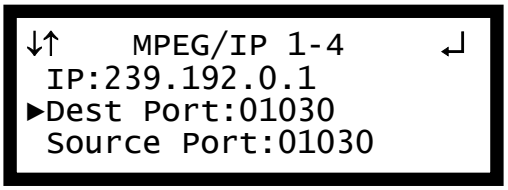
IP

1. Use the △ and ▽ buttons to move the cursor to, “IP:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.



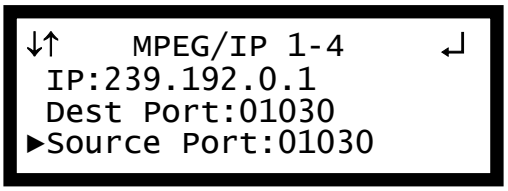
Destination Port

1. Use the △ and ▽ buttons to move the cursor to, “Dest Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



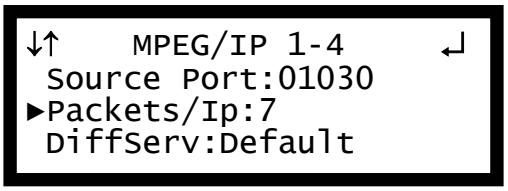
Source Port

1. Use the △ and ▽ buttons to move the cursor to, “Source Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



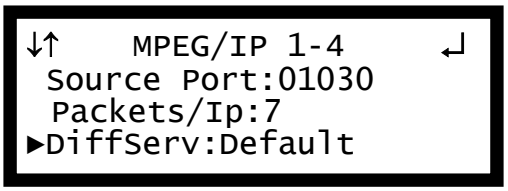
Packets Per Frame

1. Use the △ and ▽ buttons to move the cursor to, “Packets/Ip:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of packets per frame (1 –7), then press the ENTER button to save the selection.



Differentiated Services

1. Use the △ and ▽ buttons to move the cursor to, “DiffServ:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the desired differentiated services (Default, AF11, AF12, AF13, AF21, AF22, AF23, AF31, AF32, AF33, AF41, AF42, AF43, EF), then press the ENTER button to save the selection.



4.9 Dual Input DVB-S/DVB-S2 Receiver – Option NRD00H11AB

General Information

Install Location: Any slot *except* 1-1 or 2-1.
I/O: (2) 75Ω Female F Connectors
Supported Formats: DVB-S/DVB-S2
Description: This card will input a satellite L-band (950MHz – 2150MHz) signal for demodulation of KU-band or C-band DVB-S QPSK signals or DVB-S2 QPSK/8PSK signals. The symbol rate ranges from 1MSym/s to 45MSym/s for DVB-S and 10-30MSym/s for DVB-S2. This card does not provide any power to the dish LNB. The "Input" LED will only illuminate if the card detects frequency, symbol rate, FEC lock (Carrier Lock), and TS sync (Sync Lock). The card provides A and B inputs, which may be independently configured, but only one may be used at a time.

Note: This card does not provide power to the dish LNB

Input Control

To enable this card as an input use the following steps.

1. Press the INPUT button.
2. Use the △ and ▽ buttons to move the cursor to the "DVB-S/S2" card of the specific slot (e.g. 2-2). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
3. Press the ENTER button once to display the Status screen for the DVB-S/S2 card.
4. Press the ENTER button again to display the Edit screen for the DVB-S/S2 card.
5. Use the △ and ▽ buttons to move the cursor to, "Selected I/O:" then press the ENTER button.
6. Use the △ and ▽ buttons to change the selection to, "yes," then press the ENTER button.

```
↓↑      Input          ↵
 MPEG/IP 1-3
▶DVB-S/S2 2-2
```

```
↓↑    DVB-S/S2 2-2     ↵
▶Selected I/O: no
 Source: A
 Input A
```

Source

This option will select which input, on the back of the card, will be active.

1. Use the △ and ▽ buttons to move the cursor to, "Source:" then press the ENTER button.
2. Use the △ and ▽ buttons to select which

```
↓↑    DVB-S/S2 2-2     ↵
 Selected I/O: yes
▶Source: A
 Input A
```

input to be active (`A, B`), then press the ENTER button to save the selection.

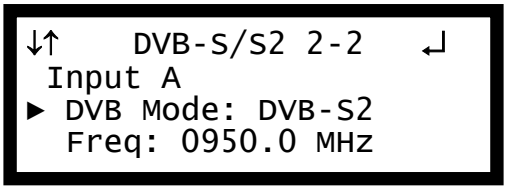
Input A

These settings correspond to the input on "Source A."

DVB Mode

The DVB-S/S2 card can receive either DVB-S or DVB-S2 transmission.

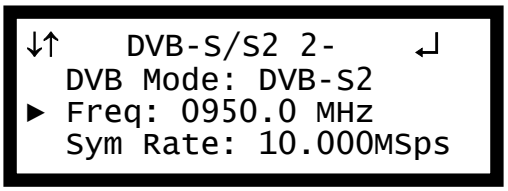
1. Use the △ and ▽ buttons to move the cursor to, "`DVB Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select either (`DVB-S, DVB-S2`), then press the ENTER button to save the selection.



Frequency A

The DVB-S/S2 card tunes by the L-band frequency rather than the transponder frequency or local oscillator value. The L-band frequency is the difference between the downlink transponder frequency and the LNB local oscillator frequency.

1. Use the △ and ▽ buttons to move the cursor to, "`Freq:`" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the frequency (`950MHz – 2150MHz`), then press the ENTER button to save the selection.

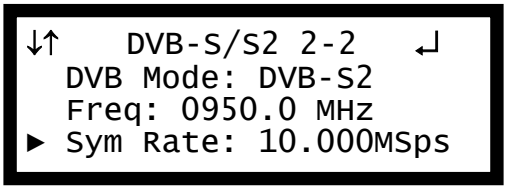


Symbol Rate A

1. Use the △ and ▽ buttons to move the cursor to, "`Sym Rate:`" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the symbol rate.

Note: 1 – 45MSymbols/s for DVB-S, and 10 – 30MSymbols/s for DVB-S2.

3. Then press the ENTER button to save the selection.



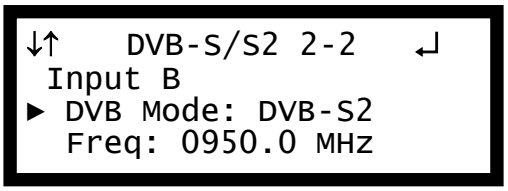
Input B

These settings correspond to the input on "Source B."

DVB Mode

The DVB-S/S2 card can receive either DVB-S or DVB-S2 transmission.

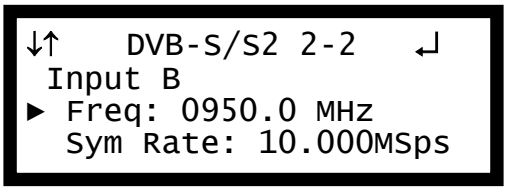
1. Use the △ and ▽ buttons to move the cursor to, "`DVB Mode:`" then press the ENTER button.
2. Use the △ and ▽ buttons to select either (`DVB-S, DVB-S2`), then press the ENTER button to save the selection.



Frequency B

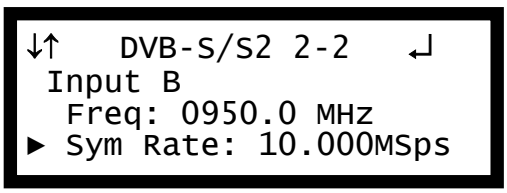
The DVB-S/S2 card tunes by the L-band frequency rather than the transponder frequency or local oscillator value. The L-band frequency is the difference between the downlink transponder frequency and the LNB local oscillator frequency.

1. Use the △ and ▽ buttons to move the cursor to, "`Freq:`" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the frequency (`950MHz – 2150MHz`), then press the ENTER button to save the selection.



Symbol Rate B

1. Use the △ and ▽ buttons to move the cursor to, "`Sym Rate:`" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the symbol rate.

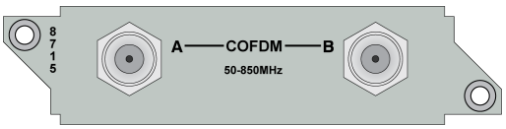


Note: 1 – 45MSymbols/s for DVB-S, and 10 – 30MSymbols/s for DVB-S2.

3. Then press the ENTER button to save the selection.

4.10 Dual Input COFDM Receiver – Option NRD00H04AA

General Information

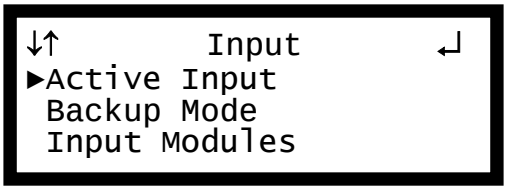


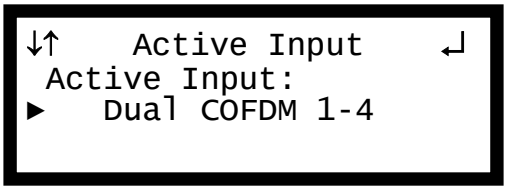
Install Location: Any slot *except* 1-1 or 2-1.
I/O: (2) 75Ω Female F Connectors
Supported Formats: COFDM
Description: This card will allow the RD5000 to receive a COFDM signal for use in electronic news gathering (U.S.) or any COFDM Terrestrial Broadcast (DVB-T, European) applications. Only one input may be selected at a time.

Input Control

To enable this card as an input use the following steps.

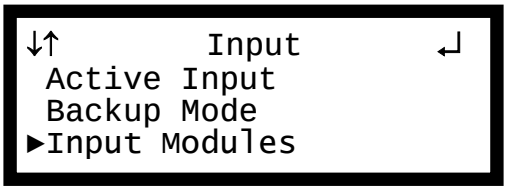
1. Press the INPUT button.
2. Select "Active Input", then press the ENTER button.
3. Press ENTER twice to change the active input and use the △ and ▽ buttons to select the input to make active, and press the ENTER button to save the changes.

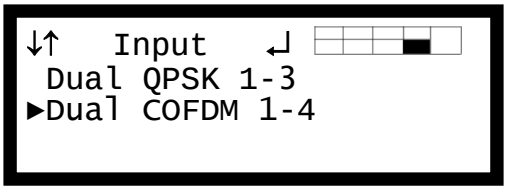


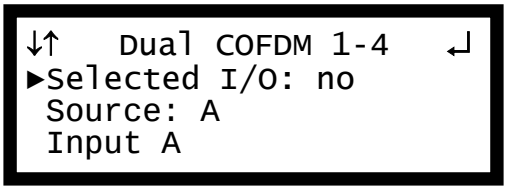


Configure Input

1. Press the INPUT button.
2. Select "Input Modules", and press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "Dual COFDM" card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
4. Press the ENTER button once to display the Status screen for the COFDM card.
5. Press the ENTER button again to display the Edit screen for the COFDM card.
6. Use the △ and ▽ buttons to move the cursor to, "Selected I/O:" then press the ENTER button.





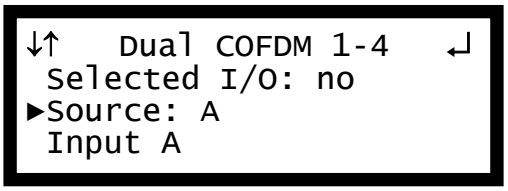


7. Use the △ and ▽ buttons to change the selection to, "yes," then press the ENTER button.

Source

This option will select which input, on the back of the card, will be active.

1. Use the △ and ▽ buttons to move the cursor to, "Source:" then press the ENTER button.
2. Use the △ and ▽ buttons to select which input to be active (A, B), then press the ENTER button to save the selection.



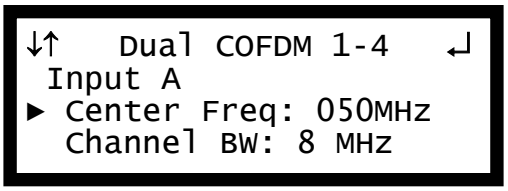
Input A

These settings correspond to the input on "Source A."

Center Frequency A

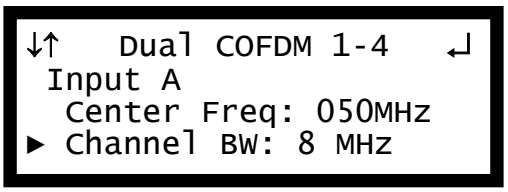
The COFDM card tunes to the center frequency of the channel to tune to.

1. Use the △ and ▽ buttons to move the cursor to, "Center Freq:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the center frequency (49MHz – 861MHz), then press the ENTER button to save the selection.



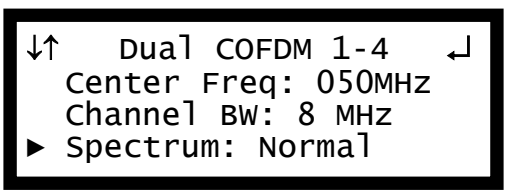
Channel Bandwidth A

1. Use the △ and ▽ buttons to move the cursor to, "Channel BW:" then press the ENTER button.
2. Use the △ and ▽ buttons to change the channel bandwidth (6MHz, 7MHz, 8MHz), then press the ENTER button to save the selection.



Spectrum

1. Use the △ and ▽ buttons to move the cursor to, "Spectrum:" then press the ENTER button.



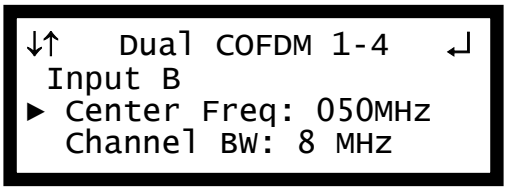
2. Use the △ and ▽ buttons to change the spectrum (`Normal, Inverted`), then press the ENTER button to save the selection.

Input B

These settings correspond to the input on "Source B."

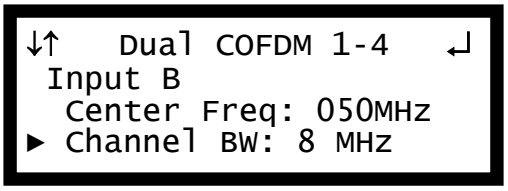
Center Frequency B

The COFDM card tunes to the center frequency of the channel to tune to.



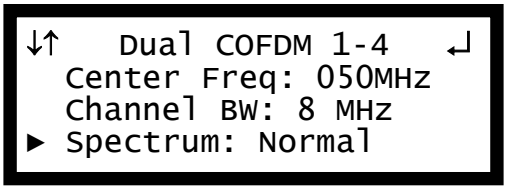
1. Use the △ and ▽ buttons to move the cursor to, "`Center Freq:`" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the center frequency (`49MHz – 861MHz`), then press the ENTER button to save the selection.

Channel Bandwidth B



1. Use the △ and ▽ buttons to move the cursor to, "`Channel BW:`" then press the ENTER button.
2. Use the △ and ▽ buttons to change the channel bandwidth (`6MHz, 7MHz, 8MHz`), then press the ENTER button to save the selection.

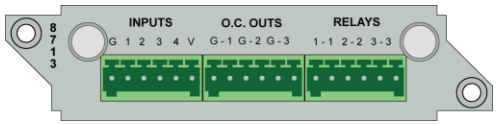
Spectrum



1. Use the △ and ▽ buttons to move the cursor to, "`Spectrum:`" then press the ENTER button.
2. Use the △ and ▽ buttons to change the spectrum (Normal, Inverted), then press the ENTER button to save the selection.

4.11 GPIO – Option NRD00H10AA

General Information



Install Location: Any slot *except* 1-1 and 2-1.
I/O: Logic Input, Open-Collector, and Relay Contact
Description: This module is considered a global unit option. In other words, the inputs and outputs of a single installed module can be accessed by functions associated with general system features, or RDS specific features in any unit configuration. Only one GPIO module can be installed in a unit.

DTMF Tones

To setup the RD5000 to interpret a contact closure from a receiver (getting DTMF analog cue tones) and output an embedded SCTE104 message in the SDI output, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to, "`GPIO Module`", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to, "`Input 1`", then press the ENTER button.
4. Use the △ and ▽ buttons to move the cursor to, "`Input 1`", then press the ENTER button.
5. Use the △ and ▽ buttons to select the SCTE104 message that is to be inserted, then press the ENTER button to save the selection.

   Ex: SCTE104 RDS1 1 refers to splice request 1 that will be output on RDS1. All other options follow the same convention.

6. Use the △ and ▽ buttons to move the cursor to, "`Active State`", then press ENTER button.
7. Use the △ and ▽ buttons to select the state in which the input will be considered active, then press the ENTER button to save the selection.

```
↓↑       Menu          ↵
 Event Log
▶GPIO Module
 Splice Req. Setup
```

```
↓↑   GPIO Module 2-4   ↵
▶Input 1:None
 Input 2:None
 Input 3:None
```

```
↓↑ GPIO Module 2-4 1   ↵
▶Input 1:SCTE104 RDS1 1
 Active State:High
```

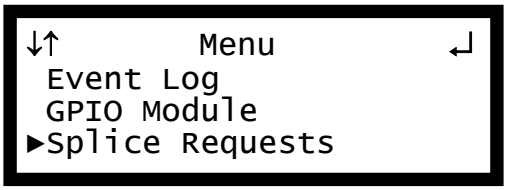
```
↓↑ GPIO Module 2-4 1   ↵
 Input 1:SCTE104 RDS1 1
▶Active State:High
```

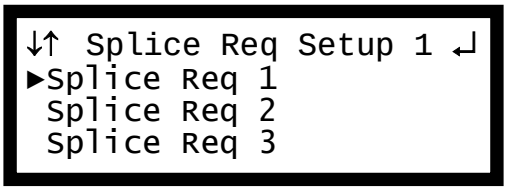
Note: The aforementioned steps apply to the configuration of "Inputs 1-4, Outputs 1-3, and Relays 1-3" as well.

Splice Request Setup

Once the Input is setup the outgoing SCTE104 messages need to be configured. Use the following steps to configure the outgoing SCTE104 messages:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to, "`Splice Requests`", and then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to, "`Splice Req 1`", and then press the ENTER button.
4. Use the △ and ▽ buttons to move the cursor to the desired field to edit, and then press the ENTER button to edit.
5. Use the △ and ▽ buttons to choose the desired values, and then press the ENTER button to save the selection.





Note: Use steps 4-5 to edit all "Splice Req" variables

Note: The aforementioned steps apply to the configuration of "Splice Req 2-4" as well.

Pinout

1	GND
2	Logic Input #1
3	Logic Input #2
4	Logic Input #3
5	Logic Input #4
6	+Vcc
7	GND
8	Open-Collector Output #1
9	GND
10	Open-Collector Output #2
11	GND
12	Open-Collector Output #3
13	Relay Contact #1
14	Relay Contact #1
15	Relay Contact #2

16 Relay Contact #2
17 Relay Contact #3
18 Relay Contact #3

4.12 CA Decryption – Basic feature

General Information

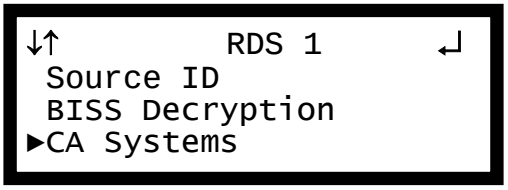
Install Location: Factory Installed feature
I/O: Two external slots in the front of the unit. The transport stream is input and output through the various other option cards
Description: The RD5000 can be configured with this feature to be able to decrypt a Conditional Access transport stream. The dual CAM functionality can be used to decrypt multiple services to send out ASI, essentially looping the stream through the RD5000 for decryption.

Note: the dual CAM functionality is only available when the CAS mode is set to manual.

CAM Setup

To setup the RD5000 to decrypt Conditional Access Streams use the following steps.

1. Press the HOME button to bring the display back to the RDS status screen.
2. Press the ◁ button to access the RDS 1 Decoder Menu.



3. Use the △ and ▽ buttons to move the cursor to, “CA Systems,” then press the ENTER button.
4. Use the △ and ▽ buttons to move the cursor to, “CA Mode,” then press the ENTER button.
5. Use the △ and ▽ buttons to change the mode (Automatic or Manual), then press the ENTER button to save the selection.

Note: Depending on the mode selection, the menus below the mode options will have changed.

Automatic

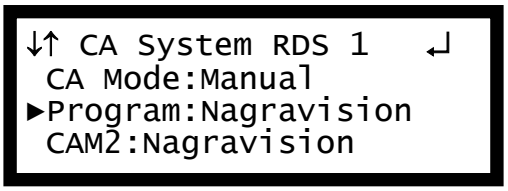
Once CA Mode has been set to Automatic, the CAM will decrypt only one program no matter how many programs the CAM is capable of decrypting (i.e. Even if the CAM can decrypt 4 programs, only 1 program will be decrypted by the CAM).

Manual

Once CA Mode has been set to Manual, use the following steps to configure your RD5000 to decrypt selected programs.

Note: It is only possible to decrypt more than one program at a time, if the CAM module supports multiple program decrypting.

1. Use the △ and ▽ buttons to move the cursor to, "Program," then press the ENTER button.
2. Use the △ and ▽ buttons to select the CAM, then press the ENTER button to save the selection.
3. To change the program to decrypt, select "Program1:" then press the ENTER button.
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to enter the Program number, then press the ENTER button to save the selection.



Note: The status of the stream will be listed below the program number.

4.13 BISS Decryption – Basic feature

General Information

Install Location: Factory Installed feature

I/O: No external I/O connections. The transport stream is input and output through the various other option cards

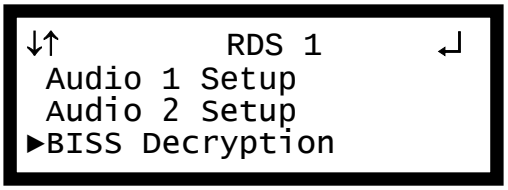
Supported Formats: BISS Mode 1 and Mode E

Description: The RD5000 can be configured with this feature to be able to decrypt a BISS Mode 1 and Mode E encrypted transport stream. *The RD5000 will not do buried ID in BISS Mode E.*

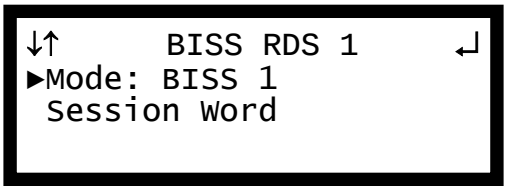
BISS Setup

To setup the RD5000 to be able to decrypt a BISS encrypted transport stream use the following steps:

1. Press the HOME button to bring the display back to the RDS status screen.
2. Press the ◁ button to access the RDS 1 Decoder Menu.



3. Use the △ and ▽ buttons to move the cursor to, "BISS Decryption," then press the ENTER button.
4. Use the △ and ▽ buttons to move the cursor to, "Mode," then press the ENTER button.
5. Use the △ and ▽ buttons to change the mode (Mode 1 or Mode E), then press the ENTER button to save the selection.

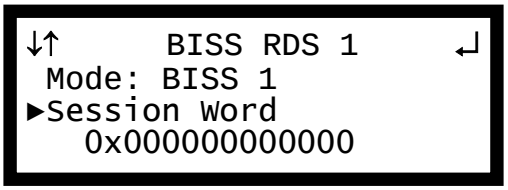


Note: Depending on the mode selection, the menus below the mode options will have changed.

Mode 1

Once the RD5000 has been set to use Mode 1, use the following steps to enter the "Session Word:"

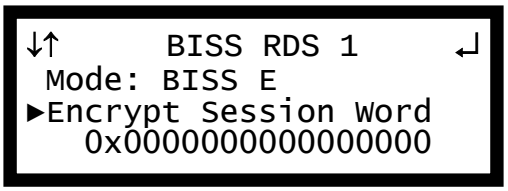
1. Use the △ and ▽ buttons to move the cursor to, "Session Word," then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to enter the session word, then press the ENTER button to save the selection.

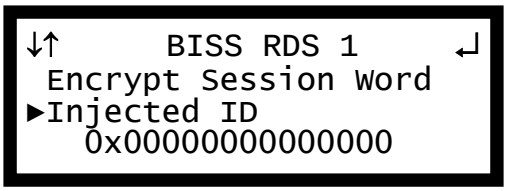


Mode E

Once the RD5000 has been set to use Mode E, use the following steps to enter the "Encrypted Session Word" and "Injected ID:"

1. Use the △ and ▽ buttons to move the cursor to, "Encrypt Session Word," then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to enter the encrypted session word, then press the ENTER button to save the selection.
3. The cursor should now be on "Injected ID," press the ENTER button to select "Injected ID."
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to enter the injected ID, then press the ENTER button to save the selection.





4.14 MPEG-2/MPEG-4 Decoder with Genlock (1 Video, 2 Audio)

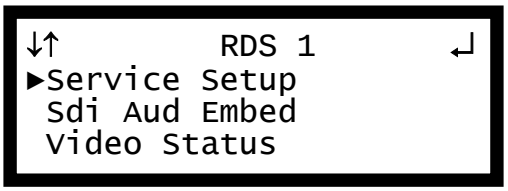
General Information

Install Location: Factory Installed feature
I/O: The input and output is done through the various other I/O cards. (e.g. NRD00HCSAA)
Description: Decodes MPEG2, MPEG4, video and audio. The basic decoder decodes up to 2 audio PID. With option NRD00H07AA the decoder can decode up to 4 audio PID. Genlock is supported.

Decoder Setup

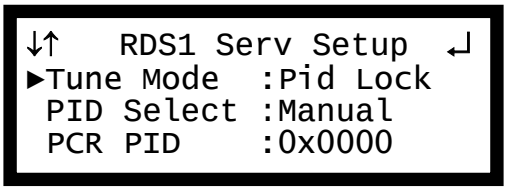
To setup the RD5000 to be able to decode the incoming audio and video use the following steps.

1. Press the HOME button to bring the display back to the RDS status screen.
2. Press the ◁ button to access the RDS 1 Decoder Menu.
3. Use the △ and ▽ buttons to move the cursor to, "Service Setup," then press the ENTER button.
4. Press the ENTER button again to display the Edit screen for the RDS 1 Decoder.



Tune Mode

1. Use the △ and ▽ buttons to move the cursor to, "Tune Mode:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired mode (Auto, No PSI, PID Lock, Priority), then press the ENTER button to save the selection.



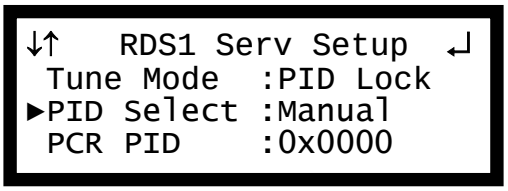
PID Lock Mode

This mode is the most desirable and will produce the most consistent output. If possible this mode should *always* be used.

PID Select

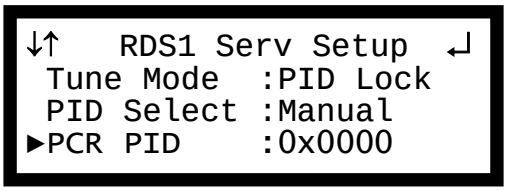
PID Select determines how the PID will be entered during the following steps. "Manual" mode allows *any* PID to be entered. In "List" mode, the RD5000 will only allow the PIDs to be entered that are in the PMT. In the following steps, only the △ and ▽ buttons are needed to change the PID if this option is set to "List."

1. Use the △ and ▽ buttons to move the cursor to, "PID Select:" then press the ENTER button.
2. Use the △ and ▽ buttons to select either "Manual" or "List," then press the ENTER button to save the selection.



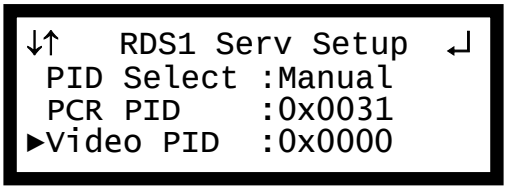
PCR

1. Use the △ and ▽ buttons to move the cursor to, "PCR PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



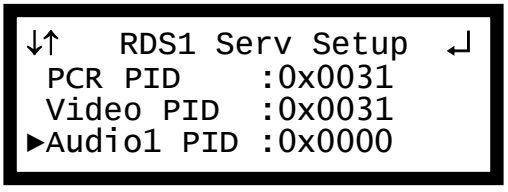
Video

1. Use the △ and ▽ buttons to move the cursor to, "Video PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



Audio 1 PID

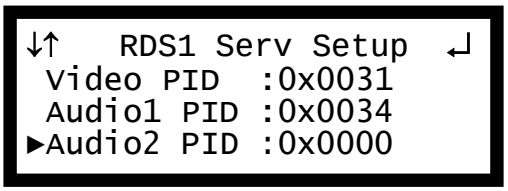
1. Use the △ and ▽ buttons to move the cursor to, "Audio1 PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to



select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.

Audio 2 PID

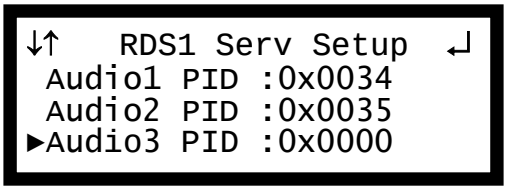
1. Use the △ and ▽ buttons to move the cursor to, "Audio2 PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



Audio 3 PID

Note: This menu is only available if the unit is equipped with option NRD00H07AA.

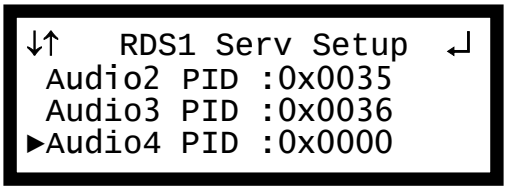
1. Use the △ and ▽ buttons to move the cursor to, "Audio3 PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



Audio 4 PID

Note: This menu is only available if the unit is equipped with option NRDH007AA.

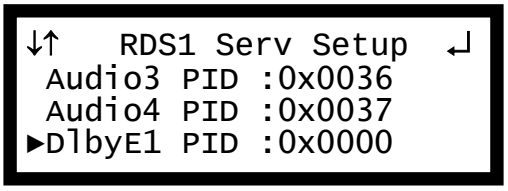
1. Use the △ and ▽ buttons to move the cursor to, "Audio4 PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



DolbyE 1

Note: This option is only available if there is an NRD00HA0AA audio output card installed.

1. Use the △ and ▽ buttons to move the cursor to, “DlbyE1 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.

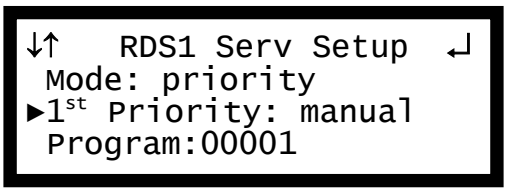


Priority Mode

This mode is generally used with two identical streams for redundancy.

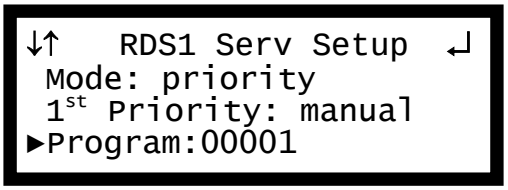
1st Priority

1. Use the △ and ▽ buttons to move the cursor to, “1st Priority:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either “manual” or “list,” then press the ENTER button to save the selection.



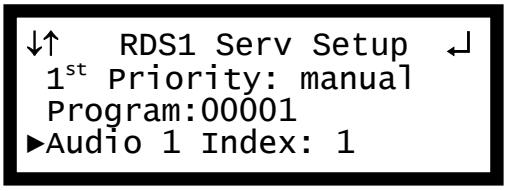
Program

1. Use the △ and ▽ buttons to move the cursor to, “Program:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to select the program, then press the ENTER button to save the selection.



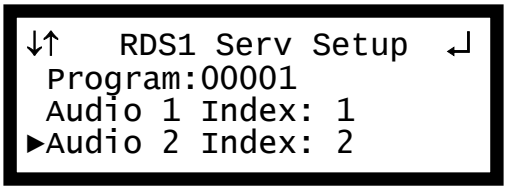
Audio 1 Index

1. Use the △ and ▽ buttons to move the cursor to, “Audio 1 Index:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired audio, then press the ENTER button to save the selection.



Audio 2 Index

1. Use the △ and ▽ buttons to move the cursor to, "Audio 2 Index:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired audio, then press the ENTER button to save the selection.



Note: Use the previous steps to setup the 2nd Priority as well.

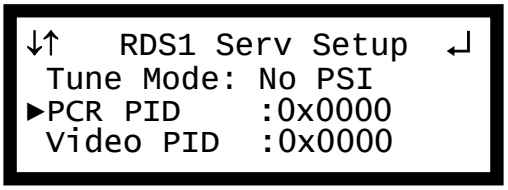
No PSI Mode

This mode should only be used if both the PID information and audio/video formats are known about the stream.

PCR PID

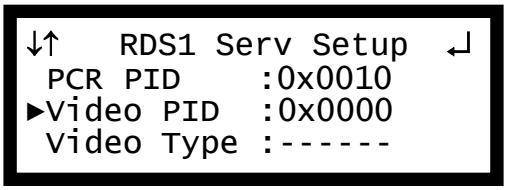
Note: This menu is only available if the "Tune Mode" is set to "No PSI".

1. Use the △ and ▽ buttons to move the cursor to, "No PSI" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired PCR PID in the stream, then press the ENTER button to save the PID.



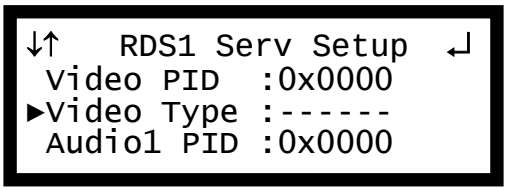
Video PID

1. Use the △ and ▽ buttons to move the cursor to, "Video PID" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired Video PID in the stream, then press the ENTER button to save the PID.



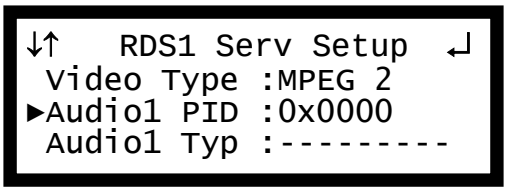
Video Type

1. Use the △ and ▽ buttons to move the cursor to, “Video Type” then press the ENTER button.
2. Use the △ and ▽ buttons to select the video type on the PID chosen above, then press the ENTER button.



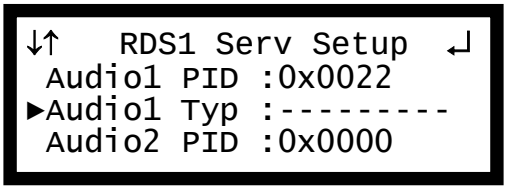
Audio 1 PID

1. Use the △ and ▽ buttons to move the cursor to, “Audio1 PID” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired Audio PID in the stream, then press the ENTER button to save the PID.



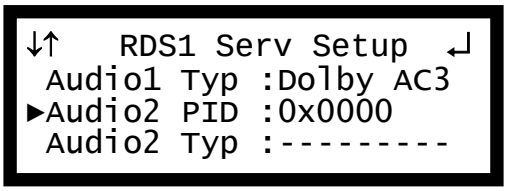
Audio 1 Type

1. Use the △ and ▽ buttons to move the cursor to, “Audio1 Typ” then press the ENTER button.
2. Use the △ and ▽ buttons to select the audio type on the PID chosen above, then press the ENTER button.



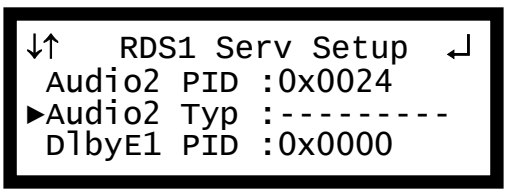
Audio 2 PID

1. Use the △ and ▽ buttons to move the cursor to, “Audio2 PID” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired Audio PID in the stream, then press the ENTER button to save the PID.



Audio 2 Type

1. Use the △ and ▽ buttons to move the cursor to, “Audio2 Typ” then press the ENTER button.

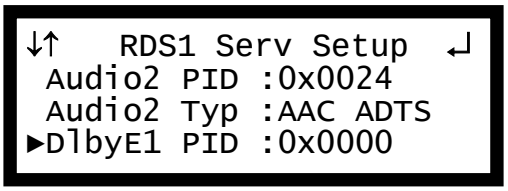


2. Use the △ and ▽ buttons to select the audio type on the PID chosen above, then press the ENTER button.

DolbyE 1

Note: This option is only available if there is an NRD00HA0AA audio output card installed.

1. Use the △ and ▽ buttons to move the cursor to, "DlbyE1 PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the DlbyE1, then press the ENTER button to save the selection.



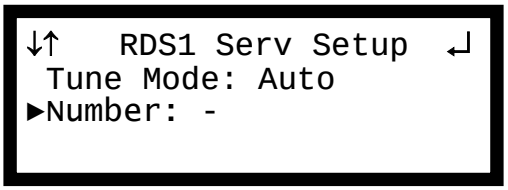
Auto Mode

This mode should only be used if no PID information is known about the stream.

Auto Program

Note: This menu is only available if the "Tune Mode" is set to "Auto".

1. Use the △ and ▽ buttons to move the cursor to, "Auto" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired program number in the stream, then press the ENTER button to save the selection.

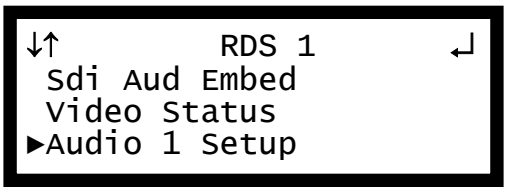


Audio 1 Setup

The following menus are used to setup the audio downmix settings.

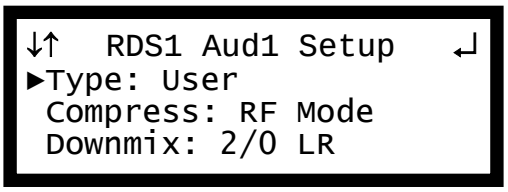
Note: Use the following instructions to setup Audio 1-4 (if equipped).

1. Use the △ and ▽ buttons to move the cursor to, "Audio 1 Setup" then press the ENTER button.
2. The current screen shows the status of the audio downmix settings, press the ENTER button again to display the Edit screen.

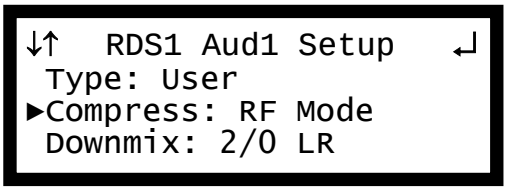


Type

1. Use the △ and ▽ buttons to move the cursor to, "Type:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired downmix type (User, Monitor, Transmission) then press the ENTER button to save the selection.



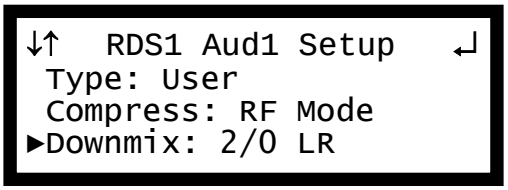
Compression



1. Use the △ and ▽ buttons to move the cursor to, "Compress:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired compression (RF Mode, Line Mode, Custom 0, Custom 1) then press the ENTER button to save the selection.

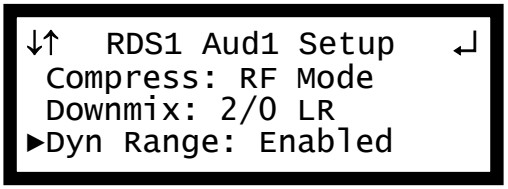
Downmix

Note: This menu is only user configurable if the Type is set to "User."



1. Use the △ and ▽ buttons to move the cursor to, "Downmix:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired downmix (2/0 LR, 2/0 LtRt, Mono Chan1, Mono Chan2) then press the ENTER button to save the selection.

Dynamic Range



1. Use the △ and ▽ buttons to move the cursor to, "Dyn Range:" then press the ENTER button.
2. Use the △ and ▽ buttons to Enable or Disable Dynamic Range then press the ENTER button to save the selection.

RD5000 Audio Explanation

Audio Setup

There are three primary modes of audio down mix operation for the RD5000 decoder. These settings only affect the signal if the digital output is set to "PCM." It will also affect those embedded audio channels that are set to a PCM Downmix as well as analog audio.

Note: There are no gain changes if the digital or embedded outputs are set to Raw.

The modes are "Monitor" (the default setting), "Transmission", and "User."

The first mode is "Transmission." It allows no changes by the customer. It is intended to provide a limited dynamic range signal to drive a set top box or a transmitter. The "Transmission" mode does respond to dialog normalization data. It provides a gain boost of 11 dB and has compression to prevent the signal from overdriving a modulator. The 11dB gain boost is applied to the analog outputs, AES digital outputs set to PCM, and any embedded outputs set to PCM.

Note: It will not affect the gain of digital outputs or embedded outputs set to Raw.

It is intended to provide a similar audio level as a broadcast TV station signal through an RF modulator. The down mix includes the "center" and "surround" channels if they are present, and is represented as Lt/Rt. (left total/right total)

The second mode is "Monitor." It has moderate processing, no gain boost and its down mix involves left and right channels only (L/R). The compression setting is "Line" mode as the default, but may be changed to "RF", "Custom 0" or "Custom 1." In "Line" mode, the Dolby dialog normalization data is followed. No other parameters may set by the customer. It is intended for monitoring of sources with only some peak limiting protection. Selecting "RF" as the compression setting will add 11 dB of gain and the same processing as the "Transmission" mode to the analog outputs, AES digital outputs set to PCM, and any embedded outputs set to PCM. The down mix is L/R (left only/right only)

The third mode available is "User." It allows all parameters to be set by the operator. The compression choices are "RF", "Line Mode", "Custom 0", and "Custom 1." RF and "Line Mode" essentially duplicate the first two modes of audio down mix described above. The "Custom 0" and "Custom 1" modes have no audio processing or gain boost. "Custom 1" does enable gain changes called for by the dialog normalization data. It allows the operator to enable or disable the dynamic range (peak limiting) and select the channels to down mix "Lt/Rt", "L/R", "Mono L", and "Mono R". Mono left or Mono right applies that signal to both left and right channels of the digital service, left and right channels of the analog outputs, and left and right channels of any embedded stream set to PCM. "Custom 0" disregards the Dolby dialog normalization data and runs at a fixed gain. Choosing "RF" as the compression mode will increase the gain by 11dB for the analog outputs, AES digital outputs set to PCM, and any embedded outputs set to PCM.

If you want to run with no processing, then set "*User* / *Custom 1* / *L/R* / *Disabled.*" This will still allow gain changes called for in the Dolby metadata.

Audio Output Settings

The digital audio services may be set to "PCM" (AES) or "Raw" as an output. This applies to all available sources. The "PCM" setting will pass an AES stream, or automatically down mix an AC-3 Dolby stream to two channels. "Raw" simply passes thru the Dolby AC-3 data stream to be decoded by an external decoder such as the Dolby 569. The analog channels can be assigned to any of the digital services. The analog gain may be adjusted for the desired level. The gain setting does not affect the level of either the embedded audio or the digital services. A setting of 7 provides an output of approximately 0dBu for a digital signal level of -20 dBFS. To check the audio output level, set "*User* / *Custom1* / *L/R* / *Disabled.*" This will remove any signal processing in the down mix. Set the digital service to be measured to "PCM." A test stream of -20dBFS will output from the digital services as -

20dBFS. If the analog channels are set to a gain setting of 7, the output should be -0.7 dBu plus or minus 0.5 dBu. Each gain number increments or decrements approximately 2.5 dBu per step. When you are setting the output levels it is suggested that an AC-3 stereo tone (2.0) be used as the source. Do not use a Dolby AC-3 5.1 tone source as your test signal. The five channels of equal tones will down mix such that one channel will be more than twenty dB greater than the other.

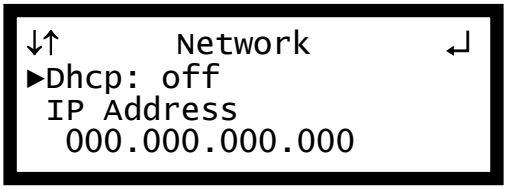
4.15 Network Setup

Description: The RD5000 can be setup on a network connection to allow remote management and SNMP configuration. For these features to work, the network settings for the RD5000 must first be configured properly for the network it is connected to.

Static IP Address

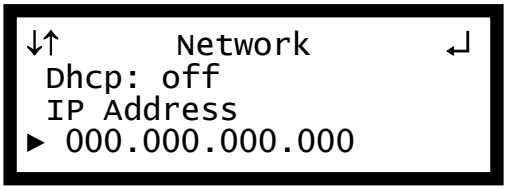
To setup the RD5000 with a static IP address, use the following steps:

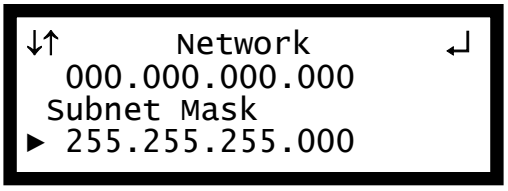
1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Network," then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to, "DHCP:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection to, "off," then press the ENTER button to save the selection.

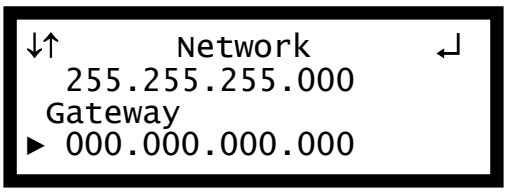


IP Address/Subnet Mask/Gateway

1. Use the △ and ▽ buttons to move the cursor to, "IP Address," then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.
3. The cursor will now be on, "Subnet Mask."
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Subnet Mask, then press the ENTER button to save the selection.
5. The cursor will now be on, "Gateway."
6. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Gateway, then press the ENTER button to save the selection.



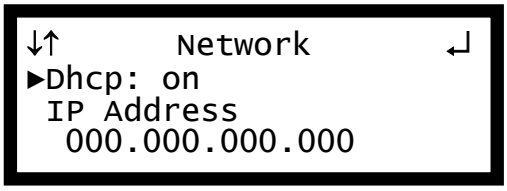




DHCP

The RD5000 can be configured to use DHCP to obtain an IP address/Subnet Mask/Gateway.

1. Use the △ and ▽ buttons to move the cursor to, “Dhcp:” then press the ENTER button.
2. Use the △ and ▽ buttons to change the selection to, “on,” then press the ENTER button to save the selection.



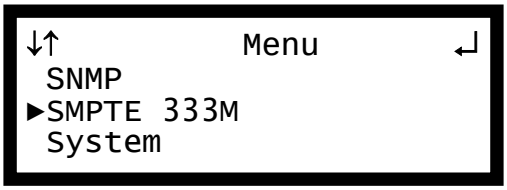
Note: It may take up to a minute for the RD5000 to obtain an IP address. During this time the unit will display a “busy” message next to DHCP.

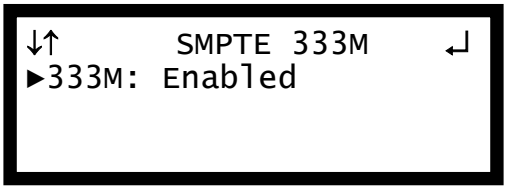
4.16 SMPTE 333M Configuration

Description: The RD5000 can be configured to output SMPTE 333M Closed Caption signals from the SMPTE 333M port on the back of the unit.

Configuration

1. Press the MENU button.
2. Use the △ and ▽ button to move the cursor to, "SMPTE 333M," then press the ENTER button.
3. Press the ENTER button one more time to edit, "333M:"
4. Use the △ and ▽ buttons to enable or disable SMPTE 333M, then press the ENTER button to save the selection.





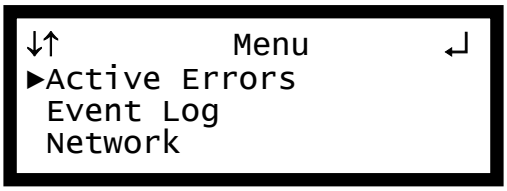
4.17 Active Errors

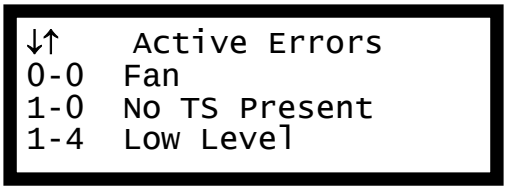
Description: Whenever an error occurs on any of the four internal status indicators in the RD5000, the Error LED will illuminate on the front panel and the details of the error will be listed in the Active Errors. An extensive listing of errors and their definitions is included in *Appendix B.*

Active Errors Display

To display the current errors on the unit use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to, "`Active Errors`," then press the ENTER button.
3. Use the △ and ▽ buttons to scroll through the list of errors. The number in front of the error indicates which card the error is on (e.g. "`1-4 Low Level`" = RDS1, Card 4 has dropped below the user defined RF level threshold).



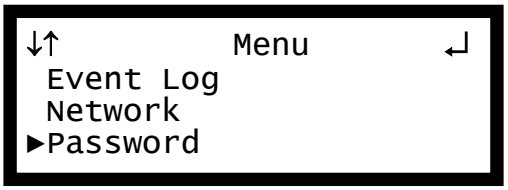


4.18 Password

Description: The RD5000 has the option to lock out the front panel with a user defined password. Follow the steps below to set the password in the RD5000.

Configuration

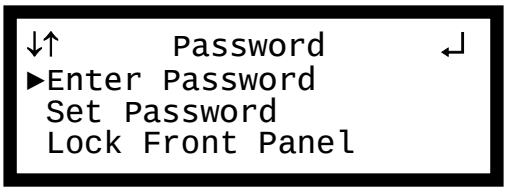
1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to, "`Password`," then press the ENTER button.

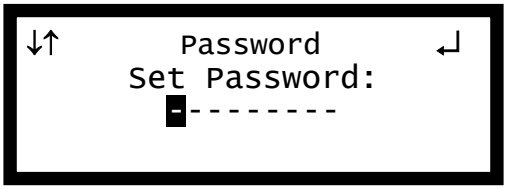


Set Password

To set a password, use the following steps:

4. Press the ENTER key, when the cursor is on "`Set Password`".
5. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to move to the next character.
6. Press the ENTER button when finished, to save the password.

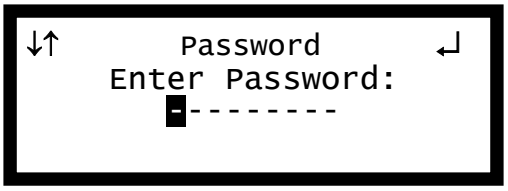




Enter Password

To enter the password, after it has been set, follow the steps below.

7. Move the cursor to "`Enter Password`," then press the ENTER button.
8. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to move to the next character.
9. Press the ENTER button when finished, to save the password.



Lock Front Panel

To lock the front panel, after a password has been set, follow the steps below.

10. Press the ENTER button, when the cursor is on "`Lock Front Panel`."
11. Press the ENTER button again to confirm, or press the EXIT button to cancel.

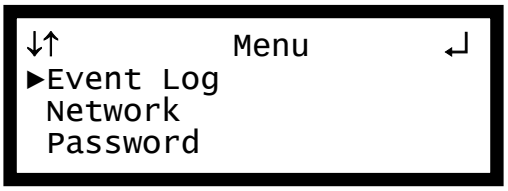
4.19 Event Log

Description: The RD5000 has user selectable event logging that it stores to a list. The list includes the date and time of each event, a short description of the event, and which card was affected by the event. To configure the RD5000 to log specific events from a predefined list, use the steps below.

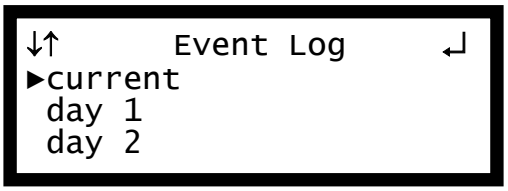
Error List Display

To display the current events or view past events on the unit use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to, "`Event Log`," then press the ENTER button.

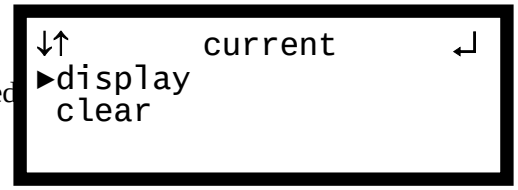


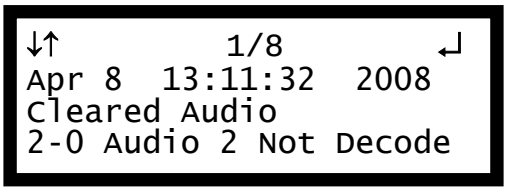
3. Use the △ and ▽ buttons to select "`current, day 1 log, day 2 log,` etc…"



Display

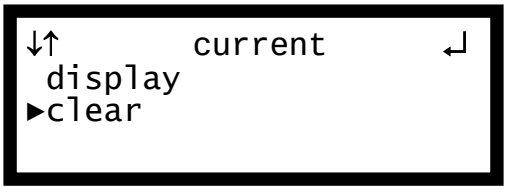
1. Press the ENTER button while the cursor is on "Display" to view the events for the selected time.
2. Use the △ and ▽ buttons to view the entire event and the ◁ and ▷ buttons to view the next event.
3. The log currently shown in the front panel is specified by the top line "`1/8`" meaning event 1 out of 8.





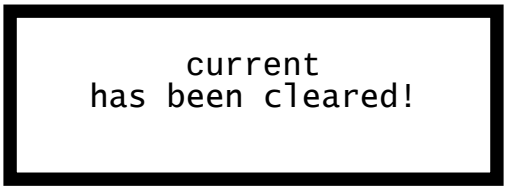
Clear

1. While the cursor is on "clear," press the ENTER button to clear that log.



CAUTION: If "`clear`" is selected, all of the events that have been logged under the time selected will be erased from memory, and cannot be recovered.

2. The log selected will be listed followed by "has been cleared!"



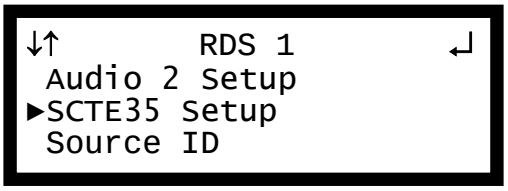
4.20 SCTE35 to SCTE104 Setup

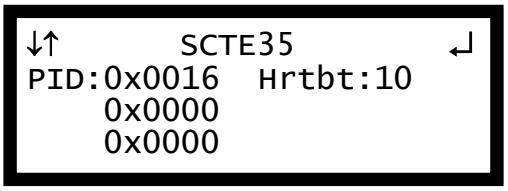
Use the following steps to setup SCTE35 to SCTE104 conversion.

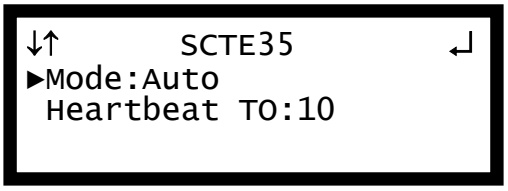
SCTE35 PID

There are two modes that the SCTE35 PID(s) can be entered in, Auto or Manual. In Auto mode the unit attempts to discover the SCTE35 PID(s) as they are signaled in the stream. In Manual mode the user must enter the PID(s) manually using each PID's HEX PID number. To setup the SCTE35 PID(s) use the following steps.

1. Start out at the home screen (where it shows the TS bit rate).
2. Press the ◁ button.
3. Use the △ and ▽ buttons to move the cursor to "SCTE35 Setup," then press the ENTER button.
4. Press the ENTER button again to get to the edit screen.
5. Use the △ and ▽ buttons to move the cursor to "Mode," then press the ENTER button.
6. Use the △ and ▽ buttons to select the desired mode of operation (Auto or Manual), then press the ENTER button to save the selection.

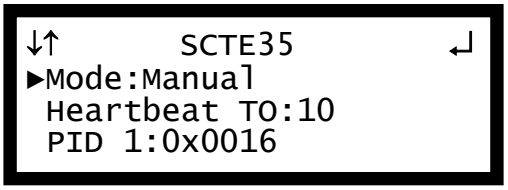




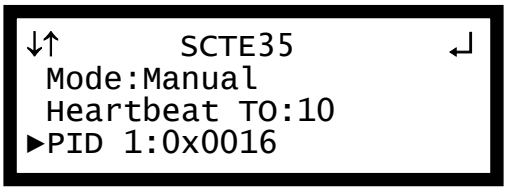


The following steps are only applicable to "Manual" mode.

7. Use the △ and ▽ button to select "PID 1:" then press the ENTER button.
8. Use the ◁ and ▷ arrows to select the column to edit and use the △ and ▽ arrows to enter the PID, then press the ENTER button to save the selection.

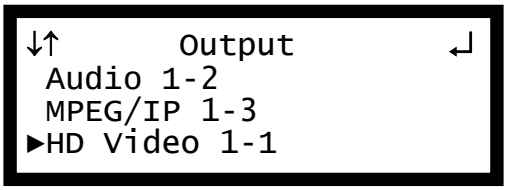


Note: Use steps 1 and 2 above to enter the SCTE35 PIDs for fields "PID 2:" and PID 3:" if applicable.

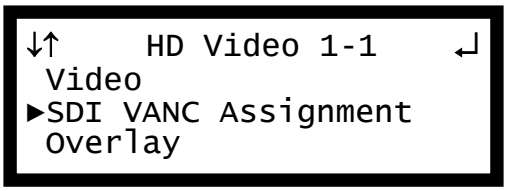


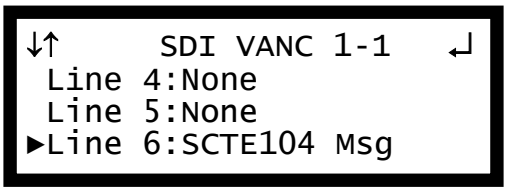
SCTE104 VANC Embedding

To setup the RD5000 to embed the SCTE104 message into the SDI VANC use the following steps:



1. Press the OUTPUT button.
2. Use the △ and ▽ buttons to move the cursor to, “HD Video”, then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to, “SDI VANC Assignment”, then press the ENTER button.
4. Press the ENTER button again to display the edit menu.
5. Use the △ and ▽ buttons to move the cursor to the desired line, then press the ENTER button.
6. Use the △ and ▽ buttons to change the available option to “SCTE104 Msg”, then press the ENTER button to save the selection.





Section 5 – Using the Web Client to Configure the RD5000

Introduction

This section describes how to navigate through the configuration menus on the web client of the RD5000.

Note: All instructions in this manual are based on unit software 7.2.X. Newer versions of software, when released, may operate slightly different in regards to menus and configuration.

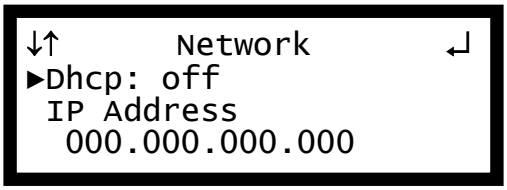
5.1 Login

To login to the remote web client for the RD5000, use the following steps:

1. Open an Internet Explorer browser window or a Firefox browser window, then type the IP address of the RD5000 into the address box and press ENTER.

Note: The IP address of the RD5000 can be found by using the following steps:

1. *Press the* MENU *button.*
2. *Use the* △ *and* ▽ *buttons to move the cursor to "Network," then press the* ENTER *button.*
3. *This screen will show the IP address for the RD5000. It will also give the option to set a static IP address or leave it as DHCP. Refer to section 4.16 for more information.*

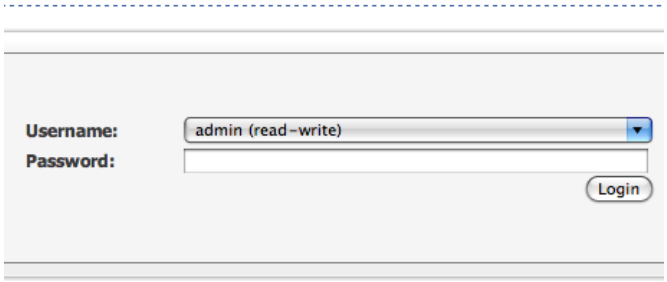


2. Pick the username from the drop-down menu.
3. Enter the password then click the Login button.

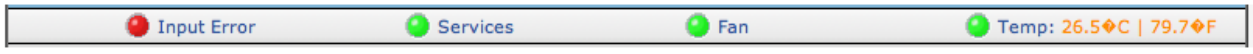
Note: By default there is no password.

Note: If the password was changed it can be recorded in the provided space below.

*Password:*_____



5.2 Status Indicators



Once logged into the web client, there are many things to take note of. The first things are the four status indicators along the top of the screen.

These indicators directly reflect the two status LEDs on the front panel. A green LED means the status of that object is good and a red LED means that status of that object is in error. If any of

the indicators are red, a more detailed explanation is provided by clicking on the Unit tab and looking under the first section, "Error List."
Refer to Appendix B for a more detailed explanation of the individual errors.

5.3 Configuration

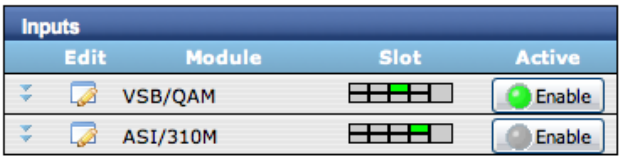
When setting up the RD5000 using the web client, some of the same things apply as the front panel. To setup the Input, Services, and Output use the following steps:

5.3.1 Input Setup

To set the desired input as active use the following steps:

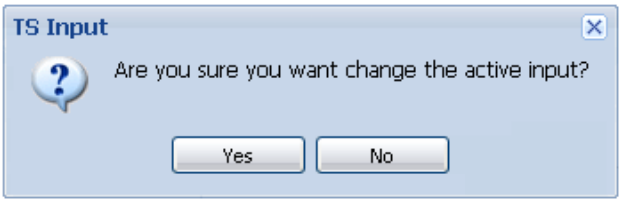
1. Click on the RDS 1 tab.

2. Click the Enable button on the same line as the input you wish to make active.

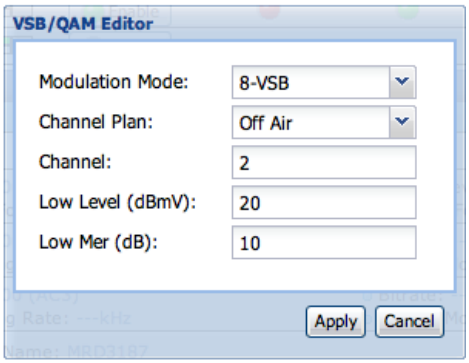


Note: The input is already active if the button looks like this: Enable

3. A dialog box will appear asking "Are you sure you want to change the active input?" Click Yes to approve the action.



Once the desired input had been set to active, the specific options of that input card can be set by clicking on the icon next to the active input. When the icon is clicked, an edit window will appear with the specific options for that card. Use the drop down menus and input boxes to complete the edit form. Click the Apply button at the bottom of the form to save the settings. The current settings for any of the input cards can be verified by clicking on the button next to the desired input.



5.3.2 Services Setup

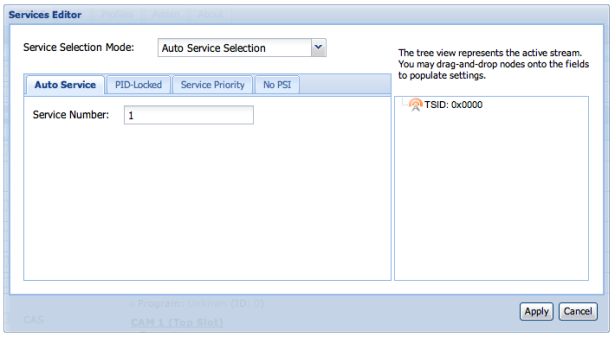
After the desired input has been selected and configured, now the session needs to be setup.

All of the following options can be found under the "Services" heading.

5.3.2.1 Services

The "Services" edit menu defines which program is going to be decoded. These can be setup in four different ways depending upon the application. The four different setup options are: "Auto," "PID-Locked," "Priority," and "No PSI." Auto mode should *only* be used if nothing is known about the PIDs in the TS. Priority mode is primarily used for redundancy. PID-Locked mode should *always* be used unless one of the above conditions is true. No PSI mode should only be used for streams that do not contain any PSI information. To setup these decoder settings use the following steps:

1. Click on the RDS 1.
2. Under the *"Services"* heading, click on the button next to *"Services."*
3. A new window should pop up in the middle of the screen. Use the drop down menu at the top to choose the appropriate setup type.



PID-Locked Mode

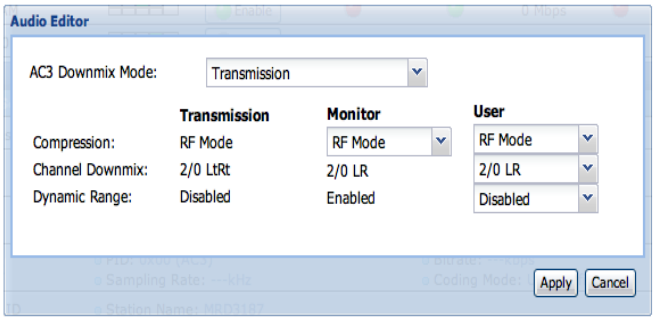
1. In the section on the right, there is a list of services detected in the stream and a ⊞ button to the left of each service.
2. Click the ⊞ button to view the contents of each service.
3. You can then drag and drop the PID values by simply clicking and holding them as you drag the PID value to the appropriate box in the section on the left.
4. Fill in the remaining input boxes then click the Apply button to save the settings.

Note: In PID-Locked mode, all of the entries should be entered as PIDs.
Note: In Auto mode, the program number should be entered as the number of the program in the TS.
Note: In Priority mode, the service number is entered and the audio entries should be entered as the number they are indexed by, in the TS.
Note: In No PSI mode, all of the entries should be entered as PIDs with their corresponding data type.

5.3.2.2 Audio Status and Downmix Settings

The audio downmix settings have three different configuration settings. These three are: transmission, monitor, and user. To configure the audio downmix setting, use the following steps:

1. Click on the RDS 1 tab.
2. Under the *"Services"* heading, click on the button next to the corresponding audio to configure.
3. A new window should pop up in the middle of the screen. Use the drop down menu at the top to choose the appropriate audio downmix configuration.
4. Depending on the chosen configuration, use the remaining drop down menus to finish the setup.
5. Click the Apply button to save the settings.

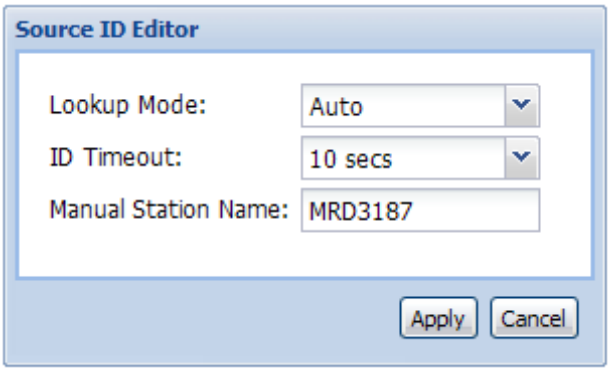


Note: Use the previous steps to setup the other audio dowmixes as well.

5.3.2.3 Source ID

To setup the Source ID, use the following steps:

1. Click on the RDS 1 tab.
2. Under the *"Services"* heading, click on the button next to the Source ID option.
3. A new window will pop up in the middle of the screen. Use the drop down menu at the top to choose the *"Lookup Mode."*
4. Then use the next drop down box to choose the desired *"ID Timeout"* (in seconds).
5. Enter a *"Manual Station Name:"* and then click the Apply button to save the changes.

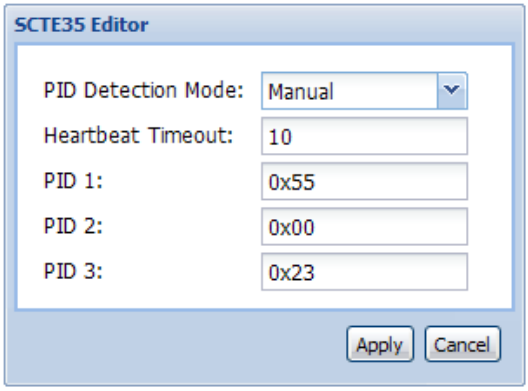


Note: If no source is found in the allotted time the "Manual Station Name:" is displayed.

5.3.2.4 SCTE35

To select the PIDs for SCTE35 follow the steps below.

1. Click on the RDS 1 tab.
2. Under the *"Services"* heading, click on the button next to the *"SCTE35"* option.
3. Set the *"PID Detection Mode"* to either *"Auto, or Manual."*



Note: If "Manual" PID Detection Mode is selected the following boxes become available to configure: "PID 1, PID 2, and PID 3."

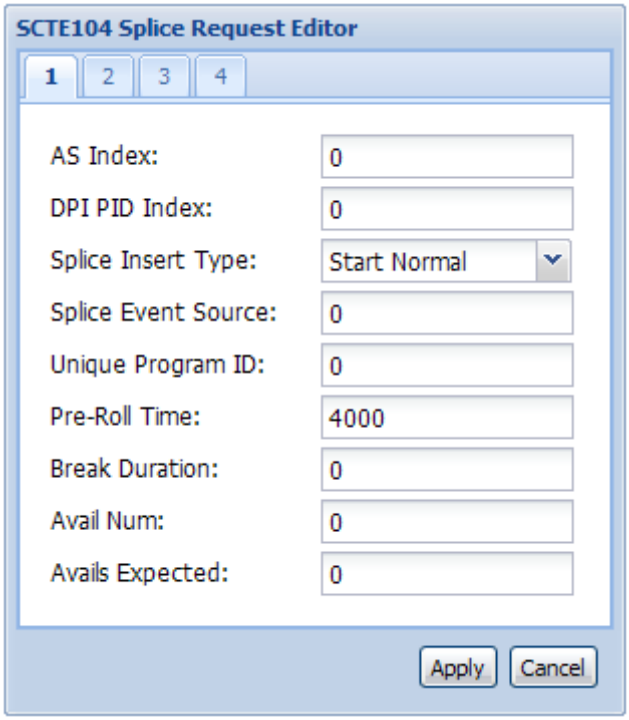
Note: If "Auto" mode is selected the RD5000 will pick the first three DPI PIDs in the PMT's registration descriptor to monitor for SCTE35 events.

4. Next, enter the *"Heartbeat Timeout:"* in minutes.
5. If *"Manual"* is selected in the above drop down box, *"PID 1, PID 2, and PID 3"* can be set as the PIDs that the RD5000 will monitor for SCTE35 events.

5.3.2.5 SCTE104 Splice Requests

To setup SCTE104 Splice Requests follow the steps below.

Note: Up to 4 SCTE104 Splice Requests can be set up at one time. Use the tabs at the top of the editor to configure a different Splice Request.



1. Click on the RDS 1 tab.
2. Under the *"Services"* heading, click on the button next to the *"SCTE104 Splice Requests"* option.
3. Next, enter the *"AS Index"* if one is present, otherwise leave blank.

Note: The "AS Index" ranges from 0 to 255 and uniquely identifies the source of the message.

4. Enter the *"DPI PID Index"* to specify the index to the DPI PID that will carry the splice_info_sections.

Note: The "DPI PID Index" ranges from 0 to 65535 and is important when there are multiple DPI PIDs referenced by the PMT of one MPEG program.

5. Use the drop down menu to select either *"Start Normal, Start Immediate, End Normal, End Immediate, or Cancel."*
6. Next is the *"Splice Event Source."* This is a user assigned value for the source of the cue message.
7. In the next box, enter the *"Unique Program ID:"*

Note: The "Unique Program ID" ranges from 0 to 65535 and is a unique identification for a viewing event in the service.

8. In the box to the right of *"Pre-Roll Time"* enter the desired amount of time, in milliseconds, after being processed that the action will occur.
9. Then insert the *"Break Duration"* in tenths of seconds.

Note: The "Break Duration" ranges from 0 65535. If the default, 0, is chosen the Injector will not set a duration. This value is ignored if "Splice Insert Type" is anything other than "Start Normal" or "Start Immediate."

10. Next is the *"Avail Num"* which is a field that gives an authentication for a specific *avail* in the current *"Unique Program ID."*

Note: The "Avail Num" ranges from 0 to 255. If left at default, 0, non-usage will be assumed.

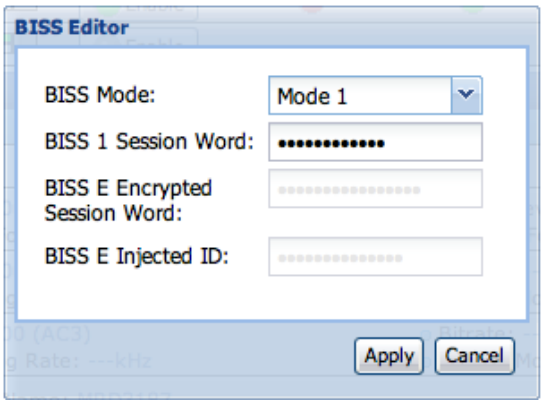
11. Finally the *"Avails Expected"* box is the last parameter to configure. This box indicates the specific number of individual *Avails* expected within the current viewing event.

Note: The "Avails Expected" ranges from 0 to 255. If left at its default, 0, "Avail Num" is assumed to have no meaning.

5.3.2.6 BISS

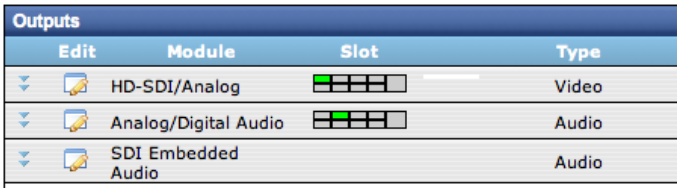
To setup BISS decryption, use the following steps:

1. Click on the RDS 1 .
2. Under the *"Services"* heading, click on the button next to the *"BISS"* option.
3. A new window should pop up in the middle of the screen. Use the drop down menu at the top to choose the appropriate BISS mode then fill in the remaining boxes below, depending on the BISS mode of choice.
4. Click the Apply button to save the settings.



5.3.3 Output Setup

All of the installed output option cards are listed under the "Outputs" heading. This section includes the options for the installed output cards (e.g. Video, Audio).



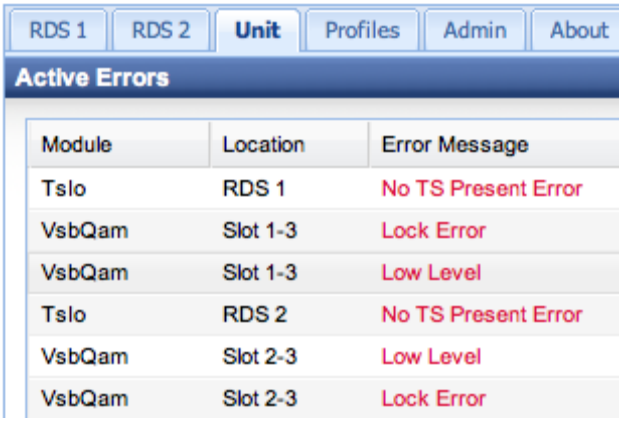
Each output card can be configured by clicking on the button that is next to it. When the button is clicked it will bring up another window, in the middle of the screen, with the specific options for that card. Use the drop down menus and input boxes to complete the edit form. Click the Apply button, at the bottom of the form, to save the settings. The current settings for any of the output cards can be verified by clicking on the button next to the desired output.

5.3.4 PSIP Information

To view the PSIP information for the applied TS, click the View PSI Tables button which is located right next to the "Inputs" heading towards the top of the page. This will open a new window that displays all of the PSIP information for the applied TS. Click the tabs at the top of the window to view the corresponding PSIP data ex. PMT, PAT, MGT, etc.

5.4 Unit

This section will describe what information is included under the Unit tab.

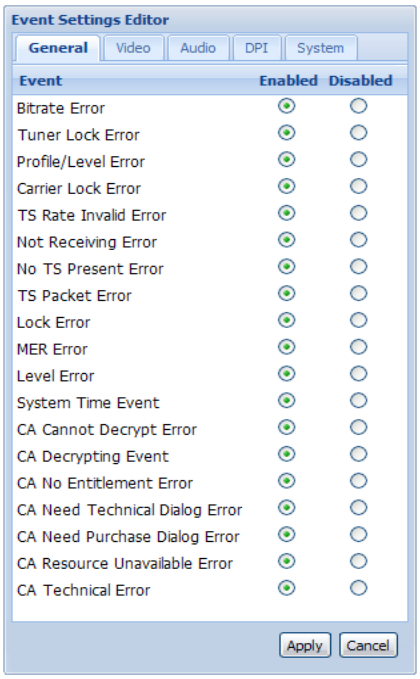


5.4.1 Active Errors

The first thing under this tab is the "Active Errors." If any of the status indicators across the top of the web client are indicating an error (i.e. red circle) this section will give a more detailed description of the specific error along with the location of the item that is producing the error.

5.4.2 Event Logging

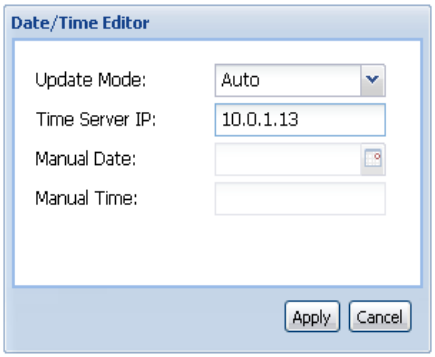
Just below the "Active Errors" is the "Event Logging" section. This section shows all the possible events that the RD5000 will log. Follow the steps below to either enable or disable an event.



1. Click the button under the "Event Logging" heading. This will bring up a new edit form in the middle of the screen.
2. Choose either the "General, Video, Audio, DPI, or System" tab to enable or disable events under those headings.
3. Then click the Apply button, at the bottom of the form, to save the settings.

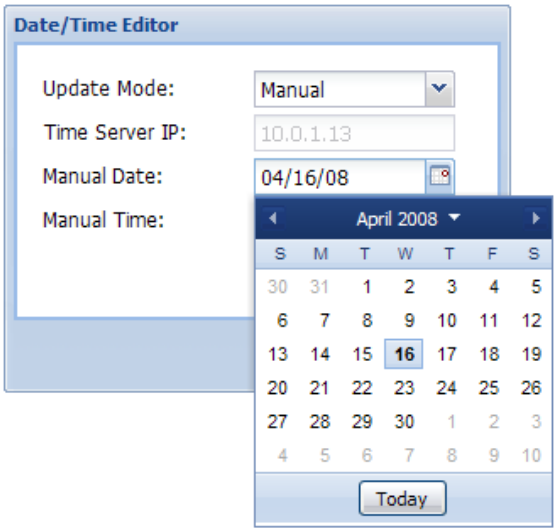
5.4.3 Unit Date/Time

The next section is the "Unit Date/Time" section. This section gives an overview of how to configure the date and time of the unit.



1. Click the button under the "Unit Date/Time" heading. This will bring up a new edit form in the middle of the screen.
2. Use the drop down menu to select either "Auto, or Manual."

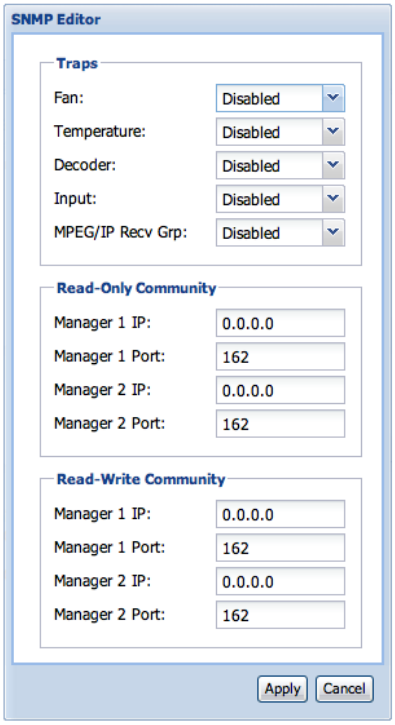
3. If “Auto” is selected, the option to use a time server is available. Enter the IP address of the Time Server in the space provided.
4. Then click the Apply button to save the changes.
5. If “Manual” is selected, click the button to choose the date.
6. Then enter the time manually in the space provided.
7. Click the Apply button to save the changes.



5.4.4 SNMP Settings

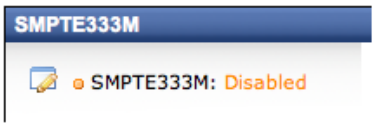
The next section is the SNMP settings. This section gives an overview of all the SNMP settings as well as the configuration of SNMP. To edit the SNMP settings use the following steps:

1. Click the button under the “SNMP Settings” heading. This will bring up a new edit form in the middle of the screen.
2. Use the drop down menus and input boxes to configure SNMP to the desired settings.
3. At the top of the edit form there are five drop down menus for enabling or disabling five separate SNMP traps as well.
4. When all of the settings have been configured, click the Apply button, at the bottom of the form, to save the settings.

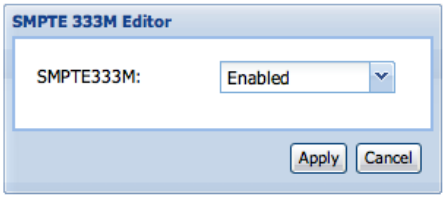


5.4.5 SMPTE333M

To enable SMPTE333M, use the following steps:



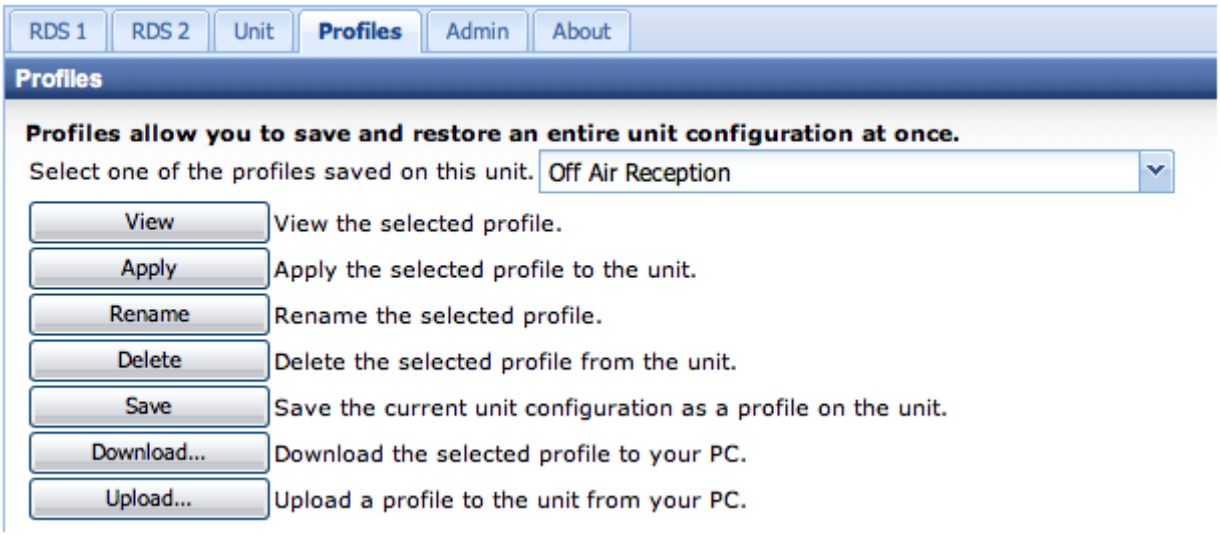
1. Click the button next to the SMPTE333M title. This will bring up a new edit form in the middle of the screen.
2. Use the drop down menu to enable or disable SMPTE333M.
3. Click the Apply button, at the bottom of the form, to save the settings.



5.5 Profiles

Profiles are the means for saving and applying a group of settings on an RD5000 for a particular use. By applying a particular profile, the user can recall the settings of the RD5000 for different demodulation and decoding needs.

Up to 24 different profiles can be stored on an RD5000. New profiles can be added to the unit by configuring the various settings of the RD5000, then "saving" this profile and giving it a name. New profiles can also be added to an RD5000 by transferring them from a PC via the web client interface. Profiles can be deleted, by name, to make room for others. To configure profiles, first click on the Admin tab to display the profiles section.

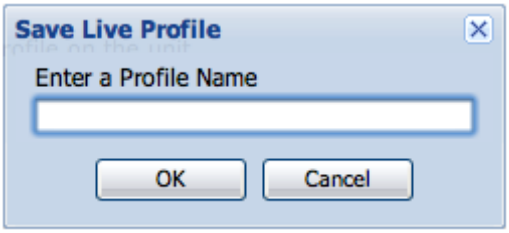


5.5.1 Saving a Profile

Once the RD5000 is configured as required for a specific use and environment, the settings can be saved to the RD5000 by a named profile. To save a profile, use the following steps:

1. Click the Save button.
2. Enter a name for the profile.

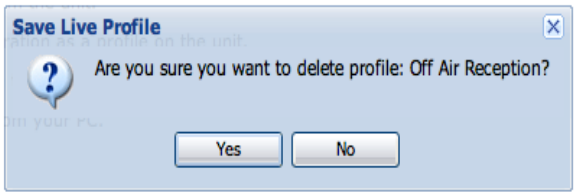
Note: The profile name should be no more than 15 characters long.



3. Click the OK button to save the profile.
4. Click the Close button after the profile has been successfully saved.

5.5.2 Deleting a Profile

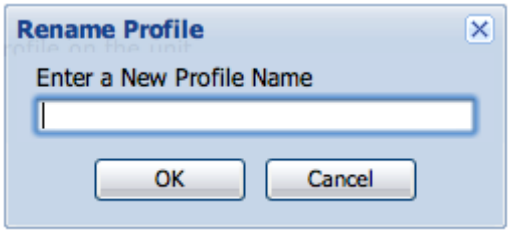
If a given profile is no longer needed or more space is needed on the RD5000 for more profiles, it may be necessary to delete a profile. To delete a profile, use the following steps:



1. Use the drop down menu to select the profile to be deleted.
2. Click the Delete button.
3. A dialog box will appear and ask, "Are you sure you want to delete this profile?" Be sure to check the profile name in the dropdown box because that is the profile that will be deleted.
4. Click the Yes button in the dialog box to confirm the delete.
5. After the profile has been deleted, click the Close button to close the dialog box.

5.5.3 Renaming a Profile

If a particular profile's name needs to be changed for one reason or another, use the following steps to change the name of the profile:



1. Use the drop down menu to select the profile to be renamed.
2. Click the Rename button.
3. A dialog box will appear that has the current name of the profile in it. Type a new name for the profile in the input box.
4. Click the OK button in the dialog box to confirm the rename.
5. After the profile has been renamed, click the Close button to close the dialog box.

5.5.4 Applying a Saved Profile

Once one or more profiles have been saved in the RD5000 it is possible to apply any of the saved profiles. When the selected profile is applied, the settings that were saved in that profile will now be applied. To apply a saved profile, use the following steps:

1. Choose the desired profile from the drop down menu.

2. Click the Apply button.
3. It may take up to a minute to apply the new profile. When the profile has been successfully loaded click the Close button to close the dialog box.

5.5.5 Viewing a Saved Profile

To view the settings contained in a saved profile choose the desired profile from the drop down list then click the View button. A new window will appear with all of the settings contained in that profile.

5.5.6 Downloading a Saved Profile

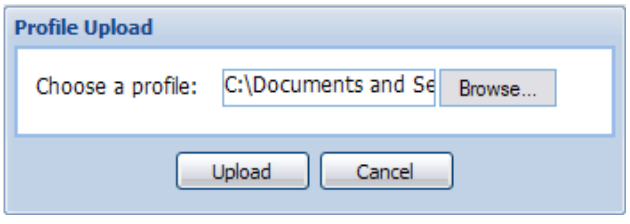
The RD5000 is capable of downloading a saved profile to a local computer. This option can be extremely useful if more than 24 profiles are needed. Since only 24 profiles can be stored on the RD5000, new profiles can be created on the unit and then downloaded to the local computer. To download a profile from the RD5000, use the following steps:

1. Choose the desired profile from the drop down menu.
2. Click the Download... button.
3. A new dialog box will appear and ask what to do with the file. Click the Save button and then point to a location on the local computer.
4. Click the Save button again.

5.5.7 Uploading a Saved Profile

When a saved profile on a local computer is needed, it is necessary to upload that profile back to the RD5000. To upload a profile, from a local computer, back to the RD5000, use the following steps:

1. Click the Upload... button.
2. A new window will appear with a space to provide the path of the profile to upload. Click the Browse... button and navigate to the location of the profile on the local computer. Select the file and then click Open.
3. The file path box should now be filled in with the location of the profile. Click the Upload button.



5.6 Web Passwords

The password on the web client for the admin account and user account should be changed to something other than the default passwords. The process is the same for both the admin account and the user account, just click on the button next to the account of the password to change. To change either the admin account password or the user account password, use the following steps:

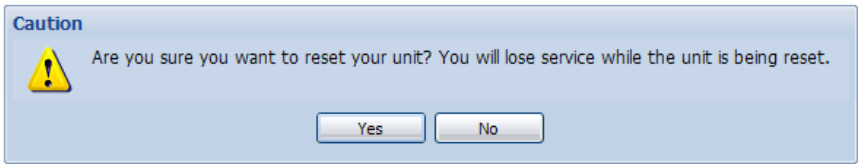
1. Click on the button next to the account to edit.
2. A new window will appear in the middle of the screen. Type the new password in both of the fields and then click the Apply button to save the new password.

5.7 Reset Unit

If a problem should ever arise where the RD5000 has locked up, or malfunctioned in some manner, it is possible to perform a soft reset from the web client. A soft reset will reboot the RD5000 and hopefully take care of any previous problems the unit was exhibiting. A soft reset will not change any setting. To perform a soft reset, use the following steps:

1. Click the "Reset Unit" hyperlink under the "Reset Unit" heading.
2. A new page will appear. Click the Reset Unit button.
3. A new dialog box will appear asking "Are you sure that you want to reset the unit?" Click the Yes button to reset the unit.

Caution: Resetting the unit is a service affecting event and service will be interrupted while the unit is rebooting.



4. A progress bar will appear on the screen as the unit is resetting. It may take up to 5 minutes for the RD5000 to restart depending on the configuration.
5. Once the unit has restarted the web client will be redirected back to the login page for the RD5000.

5.8 SNMP MIB Modules

In order to control the RD5000 using SNMP, the MIB modules need to be downloaded. The Grass Valley specific MIB modules are displayed under the "SNMP MIB Modules" heading. The generic MIB modules can be viewed and downloaded by clicking on the "View All MIB Modules…" hyperlink. That will bring up a new window displaying all the generic MIB modules. To download these, right-click on the desired MIB module under the "SNMP MIB Modules" heading and select "Save Target As…"

5.9 Software Updates

Occasionally Grass Valley will release new software for the RD5000 to provide new features and bug fixes. **NEVER PERFORM A SOFTWARE UPDATE UNLESS INSTRUCTED TO DO SO BY A GRASS VALLEY REPRESENTATIVE.** If an update is warranted, the representative will provide the software and instructions for the update.

5.10 Diagnostics

5.10.1 Processes

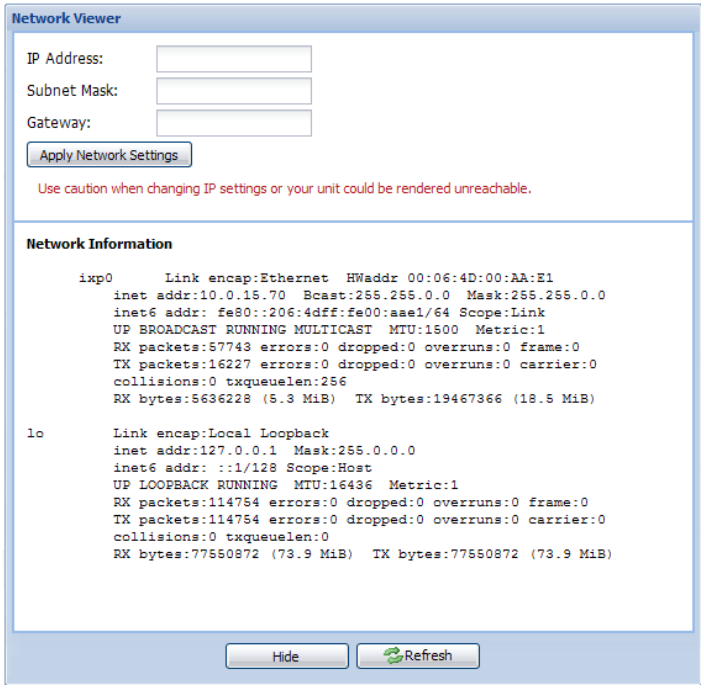
This section is primarily used by a Grass Valley representative to aid in troubleshooting a problem. By clicking on the "View Processes Window…" hyperlink, under the "Diagnostics" heading, it will bring up a new window that shows all the running processes of the RD5000's operating system. *There are no user-definable parameters under this menu.*

5.10.2 Network Interface Information

This section displays detailed information about the network portion of the RD5000. It also allows a new IP address to be set in the unit. To set a new IP address, use the following steps:

⚠ ***Warning: Use caution when changing IP settings or the unit may be rendered unreachable.***

1. Click the "View Network Interface Window…" hyperlink, under the "Diagnostics" heading.
2. A new window will appear in the middle of the screen. This new windows will give all of the details for the network interface of the RD5000, as well as contain three input boxes to set a new IP address.
3. Fill in the three fields, "IP Address," "Subnet Mask," and "Gateway."
4. Click the Apply Network Settings button to save the network settings.



5.11 About

Under the About tab, there are no user definable parameters but there is information about how to contact Grass Valley, as well as information about the software versions on the unit, and which option cards are installed.

Section 6 – Using Simple Network Management Protocol (SNMP) to Configure the RD5000

Introduction

This section describes how to configure, control, and manage the RD5000 through the use of SNMP commands.

Note: All instructions in this manual are based on the unit software versions 7.2.X. Newer versions of software, when released, may operate slightly different in regards to menus and configuration.

6.1 SNMP Configuration

Description: The RD5000 can be controlled, configured, and monitored by SNMP via the RJ45 Ethernet port or the RS232 port on the back of the unit. Additionally, there are five separate SNMP traps that can be set to trigger by various error conditions.

RD5000 MIB Modules

The MIBs needed for SNMP configuration are included on the RD5000 itself. To access and download the MIB files use the following steps:

1. Open a web browser of choice on a local computer and type the IP address of the RD5000 into the address bar then press enter.
2. Log into the RD5000 remotely.

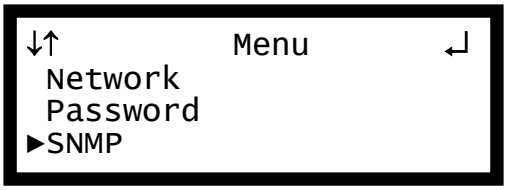
Note: By default there is no password.

3. Click on the Admin tab.
4. Scroll down until the "SNMP MIB Modules" section is in view.
5. Right click on the desired MIB module and click "Save Target As…"
6. Now use the desired SNMP manager to configure the RD5000.

Configure SNMP Manager Addresses

Two SNMP communities exist on the RD5000, a "Read Only" Community and a "Read Write" Community. Each one of these can be managed by two different host addresses. To set these up use the following steps:

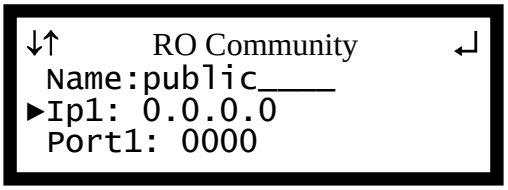
1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to, "SNMP," then press the ENTER button
3. Use the △ and ▽ buttons to move the cursor to either, "RO Community" or "RW Community," then press the ENTER button.



Note: The setup instructions for the "RO Community" and the "RW Community" are the same from this point on.

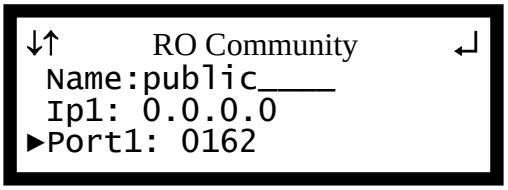
IP Address 1

1. Use the △ and ▽ buttons to move the cursor to, "IP1:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the IP, then press the ENTER button to save the selection.



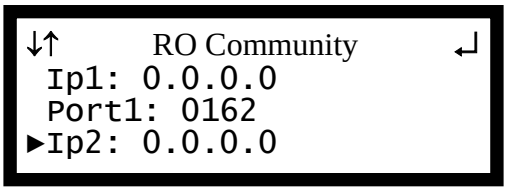
Port 1

1. Use the △ and ▽ buttons to move the cursor to, "Port1:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the port, then press the ENTER button to save the selection.



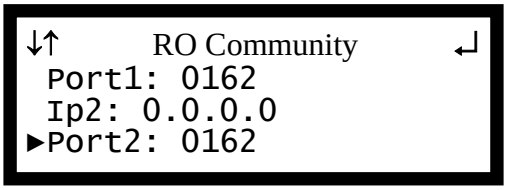
IP Address 2

1. Use the △ and ▽ buttons to move the cursor to, "IP2:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the IP, then press the ENTER button to save the selection.



Port 2

1. Use the △ and ▽ buttons to move the cursor to, "Port2:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the port, then press the ENTER button to save the selection.



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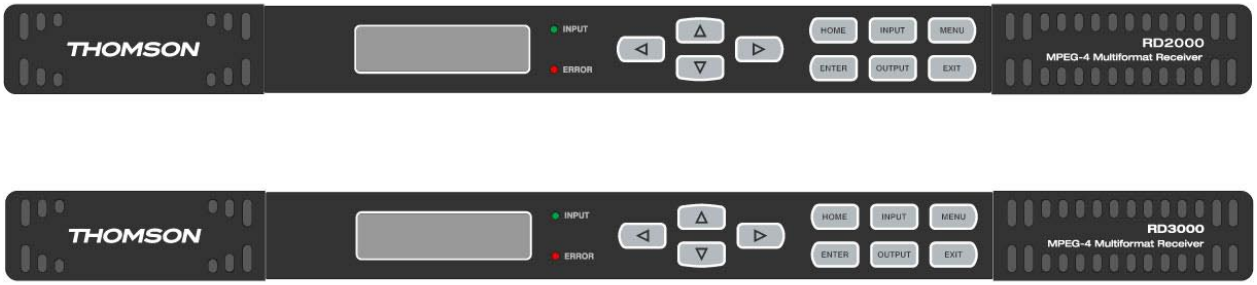
Appendices



Introduction

This section includes the following appendices.

Appendix A – Acronyms and Glossary

8VSB: Vestigial sideband modulation with 8 discrete amplitude levels.

16VSB: Vestigial sideband modulation with 16 discrete amplitude levels.

AC-3: Also known as Dolby Digital

AAC: Advanced Audio Coding

AES: Audio Engineering Society

ASI: Asynchronous Serial Interface

ATSC: Advanced Television Systems Committee

AV: Audio Video

BISS: Basic Interoperable Scrambling System

Bit Rate: The rate at which the compressed bit stream is delivered from the channel to the input of a decoder.

BNC: British Naval Connector

BPS: Bits per second.

CAT: Conditional Access Table

CAT6: Category 6 – Cable standard for gigabit Ethernet

CC: Closed Caption

CoP: Code of Practice

CRC: Cyclic Redundancy Check

CVCT: Cable Virtual Channel Table

DHCP: Dynamic Host Configuration Protocol

DTVCC: Digital Television Closed Captioning

DVB: Digital Video Broadcasting

EBU: European Broadcasting Union

EIA: Electronic Industries Alliance

EIT: Event Information Table

EPG: Electronic Program Guide

ETM: Extended Text Message

ETT: Extended Text Table

Event: An event is defined as a collection of elementary streams with a common time base, an associated start time, and an associated end time.

FCC: Federal Communications Commission

FEC: Forward Error Correction

Field: For an interlaced video signal, a "field" is the assembly of alternate lines of a frame. Therefore, an interlaced frame is composed of two fields, a top field and a bottom field.

Frame: A frame contains lines of spatial information of a video signal. For progressive video, these lines contain samples starting from one time instant and continuing through successive lines to the bottom of the frame. For interlaced video a frame consists of two fields, a top field and a bottom field. One of these fields will commence one field later than the other.

HANC: Horizontal Ancillary

HD: High Definition

High level: A range of allowed picture parameters defined by the MPEG-2 video coding specification which corresponds to high definition television.

I/O: Input/Output

IP: Internet Protocol

LED: Light Emitting Diode

LNB: Low-Noise Block

MAC: Medium Access Control

Main level: A range of allowed picture parameters defined by the MPEG-2 video coding specification with maximum resolution equivalent to ITU-R Recommendation 601.

Main profile: A subset of the syntax of the MPEG-2 video coding specification that is expected to be supported over a large range of applications.

Mbps: 1,000,000 bits per second.

MER: Modulation Error Ratio

MGT: Master Guide Table

MIB: Management Information Base

MP@HL: Main profile at high level.

MP@ML: Main profile at main level.

MPEG: Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, *Moving Picture Experts Group.* MPEG may also refer to the Group.

MPEG-2: Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), 13818-4

MPTS: Multiprogram Transport Stream

RD: Receiver Decoder

NTSC: National Television System Committee

OSD: On Screen Display

PAL: Phase-Alternating Line

PAT: Program Association Table

PCM: Pulse-Code Modulation

PCR: Program Clock Reference

PID: Packet Identifier. A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.

PMT: Program Map Table

Profile: A defined subset of the syntax specified in the MPEG-2 video coding specification

Program specific information (PSI): PSI consists of normative data which is necessary for the demultiplexing of transport streams and the successful regeneration of programs.

Program: A program is a collection of program elements. Program elements may be elementary streams. Program elements need not have any defined time base; those that do have a common time base and are intended for synchronized presentation.

PTS: Presentation Time Stamp

QAM: Quadrature Amplitude Modulation

QPSK: Quadrature Phase-Shift Keying

RDS: Receiver Decoder System

RF: Radio Frequency

RGBHV: Red, Green, Blue, Horizontal, Vertical

RO: Read Only

RPM: Revolutions Per Minute

RRT: Rating Region Table

RS-232: Recommended Standard. A standard for serial binary data interconnection.

RU: Rack Unit

RW: Read/Write

SD: Standard Definition

SDI: Serial Digital Interface

SFP: Small Form-Factor Pluggable

SI: System Information

SMPTE: Society of Motion Pictures and Television Engineers

SNMP: Simple Network Management Protocol

SSRC: Synchronization Source

STD input buffer: A first-in, first-out buffer at the input of a system target decoder for storage of compressed data from elementary streams before decoding.

STD: System Target Decoder. A hypothetical reference model of a decoding process used to describe the semantics of the Digital Television Standard multiplexed bit stream.

STT: System Time Table

TS: Transport Stream

TVCT: Terrestrial Virtual Channel Table

UTC: Coordinated Universal Time

VANC: Vertical Ancillary

VCT: Virtual Channel Table. Used in reference to either TVCT or CVCT.

XLR: Cannon “X” series connector, with a Latch, and Rubber around the contacts.

YPbPr: Component Red, Green, Blue

Appendix B – Error List

General

- **Bitrate Error -** The TS bitrate is not within 100 bps of 19.392 Mbps while using the 310M card, or it is greater than 160 Mbps while using ASI.
- **Tuner Lock Error** – The FEC is not synchronized. Data on carrier is not synchronized.
- **Video Unsupported Profile/Level** - The video is not of a supported profile/level.
- **Carrier Lock Error** - Cannot detect the carrier signal.
- **TS Rate Invalid -** A burst of packets caused the receive FIFO to overflow.
- **Not Receiving Packets** - The card is not receiving IP packets within 1 FEC period (1 second).
- **No TS Present Error** - There is no sync byte (0x47) found in a 1 second period.
- **Transport Packet Error** - There was an error in the transport stream.
- **Lock Error** - A carrier cannot be found.
- **Low MER** - The MER is lower than the threshold set by the user.
- **Low Level** - The signal level is lower than the threshold set by the user.
- **System Time Event –** If the unit is powered on/off, the time is manually updated, or the time server is invalid, this event will be triggered.
- **CA No Entitlement Error-** The user has no entitlement for the program, or the user does not want to buy the program.
- **CA Need Technical Dialog Error-** The application has to enter into a technical dialogue with the user before being able to descramble (e.g. ask the user to select fewer elementary streams because the descrambling capabilities are limited).
- **CA Need Purchase Dialog Error-** The application has to enter into a purchase dialogue with the user before being able to descramble (e.g. pay per view programs).
- **CA Resource Unavailable Error-** There is not a CAS card available to descramble the stream.
- **CA Technical Error-** The application cannot descramble the elementary stream for technical reasons (e.g. all descrambling capabilities are already in use).

Video

- **Video Not Decoding Error –** The decoder didn't receive a new video frame within 3 seconds.
- **Video Type Error-** Selected video stream format is not supported by the decoder.
- **Video Unknown Error** – Video Decoder does not recognize the video stream.
- **Video Conversion Error-** The video stream cannot be converted.
- **Invalid Output Format Error** - The output format selected is invalid for the combination of incoming stream and output card.
- **Incompatible Genlock Error** - The Genlock Reference selected by the user is incompatible with the incoming stream format.
- **Genlock Reference Error** - The Genlock reference is set but there is no reference signal detected.

Audio

- **DolbyE Not Decoding Error** - The DolbyE PID has been set but is not being decoded.
- **Audio (N) Not Decoding Error** - Audio Decoder (N) didn't receive a new audio frame within 3 seconds.
- **Audio (N) Unknown Error** - Audio Decoder (N) does not recognize the audio stream.

System

- **Fan Error** - The fan is spinning at less than 500 RPM.
- **Temperature Error** - The temperature has exceeded 70 Celsius.
- **DPI Stream Type Locked Error-** User is not licensed to decode the selected stream.

DPI

- **SCTE104 GPI Event-** I2C failed to write to the splice request data to the decoder.
- **SCTE104 LAN Event-** I2C failed to write to the splice request data to the decoder.
- **SCTE35 Event-** Parsed transport stream and event was fired.

- **SCTE35 GPO Event-** Relay configured by user to have an SCTE35 trigger and an SCTE35 splice_insert message was received.
- **SCTE35 to SCTE104 Event-** Although a number of things can trigger this event, one example is: The decoder received an SCTE104 splice_request_data message but failed to embedded it in the VANC because either an embedder was not available or the ADP packet was too large for the number of available lines.
- **SCTE35 Heartbeat Event-** Have not received an SCTE35 message for a user specified period of time (default 10min).

Appendix C – Specifications

RD5000 – base unit

Includes:	Display, keypad, embedded controller, Chassis/case, Power Supply/line cord
System –	
Display Type:	VFD (Vacuum Fluorescent Display)
Display Configuration:	4 lines x 20 characters
Keypad:	Membrane switches
Front Panel Lockout:	Password control, up to 10 alpha-numeric characters (no punctuations or spaces allowed)
Rear panel:	Eight available slots
Remote Operation/Update Interface –	
Type:	Ethernet, 10/100
Rear panel indicators:	Link (Green LED), Activity (Amber LED)
Connector:	RJ45
Serial Remote operation interface –	
Type:	RS232
Protocol:	115, 8, N, 1
Connector:	9-pin D-sub, male
Front Panel Indicators –	
Input LED:	Green indicates valid input on selected input, Off indicates no valid signal on the selected input Constant Blinking Green for Configuration 2 units indicates one valid input and one invalid input
Error LED:	Red indicates error is occurring, OFF indicates no errors detected
AC Power –	
Operating Voltage:	95-135 VAC or 180-265 VAC
Current Draw/Power:	
Typical 1 Decoder with 4 option cards:	0.40A / 50W
Typical 2 Decoders with 8 option cards:	0.60A / 70W
Frequency:	47-63Hz
Line Cord:	Detachable, 3-prong
DC Power –	
Operating Voltage:	40 - 60 VDC
Max Current Draw/Power:	4.17A / 200W (at 48VDC)
Current Draw/Power:	
Typical 1 Decoder with 4 option cards:	1.04A / 50W
Typical 2 Decoders with 8 option cards:	1.46A / 70W
Line Cord:	Detachable, 3-prong connector (+, -, Earth Ground)
General –	
RoHS Compliant:	Yes
Operating Temperature:	0 to 45 degrees C
Operating Humidity:	<95% Non-Condensing
Cooling:	Forced air, front intake, rear exhaust
Temperature monitor:	Fan failure, internal temperature sensor
Size:	Height = 1RU ($1^3/_4$"), Width = 19", Depth = 19" 19 in. rack mountable, removable ears Rack clips and screws included
Weight:	9.5 lbs. (base unit), 12.75 lbs. (Fully Loaded)
Pollution Degree:	2
Installation Category:	II
Grounding Post:	On chassis

Specifications are subject to change without notice.

MPEG-2/MPEG-4 Decoder with Genlock (1 Video, 2 Audio) – Basic feature

General –		
RoHS Compliant:		Yes
TS Data Rate:		1-160 Mb/s
Video Decoder –		
Compatibility Standard:		MPEG-2 4:2:0 MP@HL & MP@ML MPEG-4 H.264 MP@4.1 & HP@4
Video Bit Rate:		MPEG-2 1-80 Mbps (dependent on profile) MPEG-4 H.264 1-50 Mbps (dependent on profile)
Primary Video Formats:		1080i@ 25Hz, 29.97Hz, 30Hz 720p@ 50Hz, 59.94Hz, 60Hz 480p@ 59.94Hz 480i@ 29.97Hz 576i@ 25Hz
Format Scaling:		Output Format Selectable
Display Modes:		Letterbox, Cropped, & Anamorphic
Aspect Ratio:		16x9, 4x3 (Selectable - format dependent)
Audio Decoder –		
Output Formats:		IEC-60958 (uncompressed) IEC-61937 (compressed) PCM Downmix
Allowed MPEG-2 PES Formats:		MPEG-2, MPEG-1, AC-3, HE-AAC, DolbyE (With NRD00HA0AA), MPEG-2 AAC ADTS, MPEG-4 AAC ADTS & LOAS
Service Source:		MRD Configuration 1 Opt 1/3 (2 services)
PCM Downmix (selectable):		L/R (Stereo), Lt/Rt (Surround), Mono1, Mono2
Modes (selectable):		User defined, Monitor, Transmission
Genlock Capability -		Includes Genlock capability for NRD00H08AA and NRD00H09AA video output cards. (No Color burst phase adjust on NTSC outputs) HD – Adjustment of pixels and lines. Max number dependent on video mode SD – Adjustment of Color burst phase, pixels, and lines.
Genlock Reference -	Video 1080i @ 25 fps	– Ref 1080i tri-level sync @ 25 fps – Ref NTSC “black and burst”
	Video 1080i @ 29.97	– Ref 1080i tri-level sync @ 29.97 fps
	Video 1080i @ 30 fps	– Ref NTSC1080i tri-level sync @ 30 fps
	Video 720p @ 50 fps	– Ref 720p tri-level sync @ 50 fps – Ref 720p tri-level sync @ 25 fps
	Video 720p @ 59.94 fps	– Ref 720p tri-level sync @ 59.94 fps – Ref 720p tri-level sync @ 29.97 fps – Ref NTSC “black and burst”
	Video 720p @ 60 fps	– Ref 720p tri-level sync @ 60 fps – Ref 720p tri-level sync @ 30 fps
	Video 480i @ 29.97	– Ref NTSC “black and burst”

Specifications are subject to change without notice.

8VSB/QAM Receiver – Option NRD00HCSAA

RF Input -

RoHS Compliant:	Yes
Frequency Range:	50M-850MHz VHF/UHF (Ch2 – Ch69) CATV (Ch2 – Ch134)
CATV Offsets:	FCC, IRC, HRC
Sensitivity:	–15dBmV
Dynamic Range:	>35dB
Modulation:	8VSB, QAM-B
Connector:	F-81 Type, panel mount, female
Impedance:	75 ohms
MER:	Accuracy: +/- 1dB Range: 0 – 35dB – 38dB (QAM 256) Low limit flag: User defined
Input Level Flag:	Range: –15dBmV to +20dBmV Accuracy: +/-5dB Low flag limit: User defined

QAM -

Standard:	ITU-T, Annex B (SCTE DVS-031)
QAM Mode:	64 and 256
De-interleaver:	I=1-128, J=128/1
Nyquist Roll Off (Alpha):	12%, 18%

8VSB -

Standard:	ATSC A/53E
Decoding Levels:	8
Nyquist Roll Off (Alpha):	11.5%

Specifications are subject to change without notice.

Serial TS Input/Output (DVB-ASI /SMPTE 310M) – Option NRD00H02AA

General –

RoHS Compliant:	Yes
Configuration:	ASI or 310M, selectable (Not simultaneously)
Connector:	(2) BNC, female
Impedance:	75ohms

ASI Serial TS Input/Output -

Number of ASI Inputs:	1
Number of ASI Outputs:	1 (non loop-through)
Standard:	EN50083-9 (V2:3/98) DVB ASI
Data Bit Rate:	270Mbps
Max TS Rate Supported:	160Mbps (Dependant on configuration)

310M Serial TS Input/Output -

Number of 310M Inputs:	1
Number of 310M Outputs:	1 (non loop-through)
Standard:	SMPTE 310M
Data Bit Rate:	19.39Mbps, synchronous

Specifications are subject to change without notice.

Video Output (2 SD-SDI, 1 Composite) – Option NRD00H08AA

SDI (Serial Digital Interface, Standard definition) –

RoHS Compliant:	Yes
Standard:	ITU-BT.601/SMPTE 259M
Data Bit Rate:	270Mbps
Number of Serial Video Outputs:	2 (Isolated)
Display Modes:	Letterbox, cropped, anamorphic
Embedded Audio Format:	SMPTE272M
Sample Rates Supported:	48KHz
Sample Rate Out:	48KHz
Output Squelch:	Enable, (Output muted if no input detected) Disable, selectable
Number of Embedded Audio Channel Pairs:	4 (2 complete audio groups)
Audio Types Supported:	DolbyE, AC3, MPEG2 layer 1 and 2, or PCM
Embedded Audio Control:	Selectable – "type"/disable (each pair independently controlled)
Audio Type Standard:	Compressed (IEC 60958) Uncompressed (IEC 61937)
Closed Captions:	Embedded - EIA-708B or EIA-608B Line21 – Enable/Disable (selectable) SDI and Composite controlled simultaneously.
Connector:	(2) Female BNC
Impedance:	75ohms

Composite Video Out –

Number of Outputs:	1 (NTSC/PAL)
Connector:	BNC, female
Impedance:	75ohms, +/-10%
Return Loss:	>25dB
Frequency Response:	DC to 6.0MHz
Amplitude:	140 IRE (1.0Vpp), +/-2 IRE
Display Modes:	Letterbox, cropped, anamorphic
NTSC -	
Standard:	ANSI/SMPTE 170M-1994; CCIR656
Format, Frame rate:	525lines, 29.97Hz (Interlaced)
Setup (pedestal):	On/Off, selectable
Closed Caption:	Enable/Disable, selectable
CC Standard:	EIA-608B
PAL -	
Standard:	ITU.R.BT.470-6
Format, Frame rate:	625lines, 25.00Hz (Interlaced)

Genlock –

SDI:	Line and Pixel Adjustment
Composite:	Line, Pixel, Color Phase Adjustment

Specifications are subject to change without notice.

Video Output (1 RGBHV/YPbPr, 1 Composite) – Option NRD00H09AA

Analog Video General –

RoHS Compliant:	Yes
Video Standards:	SMPTE274M (1080i) SMPTE296M (720p) SMPTE253M (480p) SMPTE170M (480i) (Reference: EIA 770.2 and 770.3)
Output Formats:	1920 x 1080 Interlaced (1080i) 1280 x 720 Progressive (720p) 720 x 576 Interlaced (576i) 720 x 480 Interlaced (480i)
Frame Rates:	1080i@ 25.00Hz, 29.97Hz, 30.00Hz 720p@ 50.00Hz, 59.94Hz, 60.00Hz 576i@ 25.00Hz 480i@ 29.97Hz
Aspect Ratio:	16x9 (fixed: 1080i, 720p) 16x9, 4x3 (selectable: 576i, 480i)
Display Modes:	HD: Letterbox, Cropped SD: Letterbox, Cropped

Composite General –

Standard:	ANSI/SMPTE 170M-1994 CCIR656 PAL Standard
Output Formats:	
NTSC:	480 Interlaced
PAL:	576 Interlaced

Note: Simultaneous RGB/YPbPr and Composite operation in 480i29.97Hz format only.

Analog Video –

Number of Outputs:	1 (shared: RGBHV and YPbPr)
Connector:	High Density 15-pin D-sub, female
Impedance:	75ohms, +/-10%; 1kohm for syncs
Return Loss:	>20dB, 30KHz – 30MHz
Frequency Response:	Y = 30KHz - 30MHz, +/-0.2dB ripple PbPr = 30KHz – 15MHz, +/-0.2dB ripple
H/V Sync:	4Vpp into 1Mohm, negative polarity

Video Output (1 RGBHV/YPbPr, 1 Composite) – Option NRD00H09AA (Continued)

Composite Video Out –

Number of Outputs:	1 (NTSC/PAL)
Connector:	BNC, female
Impedance:	75ohms, +/-10%
Return Loss:	>25dB
Frequency Response:	DC to 6.0MHz
Amplitude:	140 IRE (1.0Vpp), +/-2 IRE
NTSC -	
Standard:	ANSI/SMPTE 170M-1994; CCIR656
Format, Frame rate	525lines, 29.97Hz (480i)
Setup (pedestal):	On/Off, selectable
Closed Caption:	Enable/Disable, selectable
CC Standard:	EIA-608B
PAL -	
Standard:	ITU-R.BT.470-6
Format, Frame rate:	625lines, 25.00Hz

Genlock -

- Line and Pixel Adjustment
- Color Phase Adjustment

Specifications are subject to change without notice.

Dual Input MPEG over IP Receiver/UDP Output – Option NRD00H05AA

General –	
RoHS Compliant:	Yes
Connector:	2 – 10/100/1000 Auto-negotiating Base-T RJ-45 Ethernet Port
FEC Receive:	Licensed - Pro MPEG CoP3 SMPTE 2022 Range: L*D<100 1<L<20 4<D<20 Annex B
Multicast Filtering:	Filters based on IP address (Avoids Problematic 30IP – 1 MAC)
Receive –	
Input Format:	UDP, RTP, and RTP with extension headers Multicast and Unicast CBR, VBR, Null Stripped
Receive Capability:	2 simultaneous MPEG over IP transport streams with automatic failover
Buffer size:	5 user configurable settings
Bitrate Range:	1 – 160Mbps
Packets/IP Frame:	1-7 MPEG Packets/IP Frame
IGMP Compatibility:	Version 1, 2, and 3
Transmit –	
Output Format:	UDP
Bitrate Range:	1 – 160Mbps
Packets/IP Frame:	1-7 MPEG Packets/IP Frame
Number of Outputs:	2 Mirrored TS – Unicast

Specifications are subject to change without notice.

Dual Video Output (2 SD/HD SDI, 1 RGBHV/YPbPr/Composite) – Option NRD00H06AA

General –

RoHS Compliant:	Yes
Connector:	(2) Female BNC
Impedance:	75ohms +/- 10%
Output Connectors:	2 –SDI, 1 – RGBHV/YPbPr/Composite (Composite/YPbPr output with breakout cable only)
Genlock -	
SDI:	Line and Pixel Adjustment
Composite:	Line, Pixel, Color Phase Adjustment

SDI (Serial Digital Interface) Video Out –

HD-SDI Standard:	SMPTE 292M SMPTE 274M (1080I, 29.97Hz) SMPTE 296M (720P, 59.94Hz)
SD-SDI Standard:	ITU-BT.601/SMPTE 259M
Data Bit Rate:	SD-SDI = 270Mbps HD-SDI = 1.485Gbps
Display Modes:	Letterbox, cropped, anamorphic
Embedded Audio Format:	SD-SDI = SMPTE272M HD-SDI = SMPTE 299M
Sample Rates Supported:	48KHz
Sample Rate Out:	48KHz
Output Squelch:	Selectable – Enable or Disable (if Enabled, and no input is detected, then the output is muted)
Number of Embedded Audio Channel Pairs:	4 (2 complete audio groups)
Audio Types Supported:	AC-3, MPEG2 layer 1 and 2, or PCM DolbyE (With *NRD00HA0AA*)
Embedded Audio Control:	Selectable – "type"/disable (Each pair independently controlled)
Audio Type Standard:	Compressed (IEC 60958) Uncompressed (IEC 61937)
Closed Captions:	Embedded - EIA-708B or EIA-608B Line21 – Enable/Disable (selectable) SDI and Composite controlled simultaneously.

Analog Video –

Video Format Standards:	SMPTE274M (1080i) SMPTE 296M (720p) SMPTE 253M (480p, 480i) (Reference: EIA 770.2 and 770.3)
Number of Analog Outputs:	1 (shared: RGBHV or YPbPr/Composite via breakout cable)
Connector:	High Density 15-pin D-sub, female
Impedance:	75 ohms, +/-10%, 1kohm for syncs
Return Loss:	>20dB, 30KHz – 30MHz
Frequency Response:	Y = 30KHz - 30MHz, +/-0.2dB ripple PbPr = 30KHz – 15MHz, +/-0.2dB ripple
H/V Sync:	4Vpp into 1 M ohm, positive polarity

Options available –

NRD00HC2AA Opt 1:	Analog video breakout cable
Connectors:	(5) BNC, male; R, G, B, Horizontal Sync, Vertical Sync or Pr, Y, Pb, --, Composite (1) High density 15-pin D-sub, male
Length:	48 inches

Specifications are subject to change without notice.

Audio Output (DolbyE, AES Digital, Analog) – Option NRD00HA0AA

General –

RoHS Compliant:	Yes
Audio Source:	Selected Audio Services 1-4
# Of Services:	2 supported per NRD00HA0AA option card
Service Source:	Decoder Configuration 1 Opt 1/3 (2 services) Decoder Configuration 1 Opt 2/4 (4 services) (Requires 2 – NRD00HA0AA cards)
Modes:	User defined, Monitor, Transmission
DolbyE PID:	DolbyE extracted digital data output provides extracted DolbyE for embedding

Digital Audio Out –

DolbyE:	Available with breakout cable on 15-pin D-sub Connector
Digital Output format:	S/PDIF/AES3id (Unbalanced)
Type (selectable):	Raw (native – AC3, MPEG, etc.), PCM (uncompressed Ch1 and 2),
Standard:	IEC 60958-3 AC-3 (consumer), MPEG-1/2, layers 1 and 2 AES3id (IEC 60958-4/61937), Ch1/2 (professional)
Connector:	(2) BNC, female
Impedance:	75ohms

Analog Audio Out -

Output Type:	Balanced, 2 channel pairs (+/-, L/R)
Source:	Same as selected Digital PCM above
Conditions:	Load=600ohms, –20dBFS encoded TS source when gain set to “7”
Amplitude:	0dBu Adjustable to +4dBu
Max Output:	27dBu
THD+N:	<0.01%
Crosstalk:	<-85dB
Frequency Response:	20Hz to 20KHz < +/-0.1dBu
Connector:	High density 15-pin D-sub, male
Impedance:	600ohms nominal 50ohms min.

Options available –

NRD00HC2AA Opt 1:	Audio breakout cable with XLR and DolbyE BNC
Connectors:	(4) XLR, male; Chan 1 – L,R Chan 2 – L,R (1) BNC, male; DolbyE (1) High density 15-pin D-sub, female
Length:	14 inches

Specifications are subject to change without notice.

Dual Input DVB-S2 Receiver – Option NRD00H11AB

General –

RoHS Compliant:	Yes
Frequency Range:	950MHz – 2150MHz
Number of inputs:	2 (A and B)
Connector:	F-81 Type, Female (2)
Impedance:	75 Ohms
Return Loss:	>9dB
Separation:	>65dB
Legacy DVB-S Modulation:	QPSK
DVB-S2 Modulation:	QPSK, 8PSK
Packet size:	188 bytes
Modulation/Coding supported:	CCM (ACM & VCM not supported)
Transport Stream:	Up to 81Mbps
Nyquist root filter roll-off factors:	.20, .25, .35
RF Input Level	-25 dBm to -65 dBm
Input RF Spectrum	Normal/Inverted Auto Detect

DVB-S –

Standard:	EN 300 421
FEC Code:	Conv. + Reed-Solomon
Viterbi soft decoder rate:	1/2
Code rates:	1/2, 2/3, 3/4, 5/6, 7/8
QPSK Symbol rate:	1-45Msym/s

DVB-S2 –

Standard:	EN 302 307
Decoding type:	LDPC and BCH
FEC Framing Type	Normal Frames
QPSK supported rates:	1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
8PSK supported rates:	3/5, 2/3, 3/4, 5/6, 8/9, 9/10
QPSK Symbol rate:	10-30Msym/s
8PSK Symbol rate:	10-30Msym/s
Carrier Loop capture range:	+/-5MHz
Pilot:	On/Off Auto Detect

Specifications are subject to change without notice.

Dual Input COFDM Receiver – Option NRD00H04AA

General –

RoHS Compliant:	Yes
Compatibility Standard:	EN 300 744
Spectrum:	Normal or Inverted
Frequency range:	49MHz – 861MHz
Channel bandwidth:	6MHz, 7MHz, 8MHz
Guard interval:	1/4, 1/8, 1/16, 1/32
FFT size:	2K, 8K
Code rate:	1/2, 2/3, 3/4, 5/6, 7/8
Constellation:	QPSK, QAM16, QAM64
Connector:	2-F-81 Type, panel mount, female
Impedance:	75 Ohms
Return Loss:	>9dB

Specifications are subject to change without notice.

GPIO Module – Option NRD00H10AA

General –

RoHS Compliant:	Yes
Remote Interfaces:	Web GUI and SNMP
+Vcc Voltage Level:	+5V @ 800mA
Relay Type:	High-cycle, High-reliability
Contact Ratings:	>30vdc @ 500mA
Event Types:	OON and RTN (Out-Of-Network and Return-To-Network)
Suggested Connector Type:	Phoenix 2.5mm Pluggable Terminal Block

I/O –

Logic Input:	Provides four logic inputs
Logic Outputs:	Provides three open-collector outputs
Voltage Range:	5 - 24Volts logic switching and current limiting
Short circuit protection:	Yes
Relay Contact:	Provides three relay contact outputs

Specifications are subject to change without notice.

Conditional Access – Basic feature

General –

RoHS Compliant:	Yes
Compatibility Standard:	DVB-CI
Supported CAMs:	NDS NagraVision NagraStar Irdeto Viaccess (SCM and Aston) Crypto Works
Max number of Programs at once:	Based on individual CAMs

Specifications are subject to change without notice.

BISS Decryption – Basic feature

General –

RoHS Compliant:	Yes
Compatibility Standard:	DVB-CSA
Supported Modes:	Mode 1 and Mode E (Injected ID only No Buried ID)
Max TS Bit Rate:	120Mbps total

Specifications are subject to change without notice.

Appendix D – Pinout of NRD00H09AA, NRD00H06AA and NRD00HA0AA

NRD00H09AA
DB-15 (RGB / YPbPr)

Pin	RGB	YPbPr
1	Red	Pr
2	Green	Y
3	Blue	Pb
4		
5		
6	Ground	Ground
7	Ground	Ground
8	Ground	Ground
9		
10	Ground	Ground
11		
12		
13	Horizontal Sync	
14	Vertical Sync	
15		

NRD00H06AA
DB-15 (RGB/YPbPr/Composite)

Pin	RGB	YPbPr	Comp
1	Red	Pr	
2	Green	Y	
3	Blue	Pb	
4			
5	Ground	Ground	Ground
6	Ground	Ground	Ground
7	Ground	Ground	Ground
8	Ground	Ground	Ground
9			Composite
10	Ground	Ground	Ground
11			
12			
13	Horizontal Sync		
14	Vertical Sync		
15			

NRD00HA0AA
DB-15 (Audio)

Pin	Function
1	Chan 1 (Left) +
2	Chan 1 (Right) +
3	Chan 2 (Left) +
4	Chan 2 (Right) +
5	Dolby E data (Digital Output 3)
6	Chan 1 (Left) –
7	Chan 1 (Right) –
8	Chan 2 (Left) –
9	Chan 2 (Right) –
10	NC
11	Ground
12	Ground
13	Ground
14	Ground
15	Dolby E Ground

Appendix E – Coordinated Universal Time

-12:00 Eniwetok
-11:00 Midway
-10:00 Hawaii
-09:00 Alaska
-08:00 Pacific
-07:00 Mountain
-06:00 Central
-05:00 Eastern
-04:00 Atlantic
-03:30 Newfoundland
-03:00 Greenland
-02:00 Mid-Atlantic
-01:00 Azores
00:00 Greenwich
01:00 Amsterdam
02:00 Athens
03:00 Baghdad
03:30 Tehran
04:00 Abu Dhabi
04:30 Kabul
05:00 Ekaterinburg
05:30 Calcutta
05:45 Kathmandu
06:00 Amaty
06:30 Rangoon
07:00 Bangkok
08:00 Beijing
09:00 Osaka
09:30 Adelaide
10:00 Brisbane
11:00 Magadan
12:00 Auckland
13:00 Nuku

Appendix F – Open Source Software

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- coreutils 5.9.7
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- curl 7.16.2
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- newlib 1.15.0
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- xerces –c –src 2.7.0
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Appendix G – How to Return Faulty Parts

Before Returning an Item:

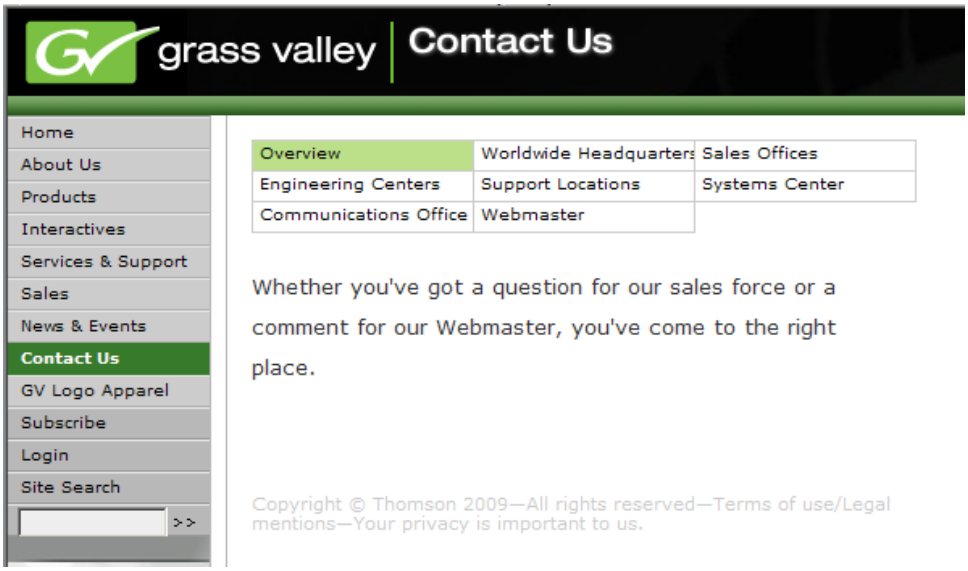
Request an RMA (Return Merchandise Authorization) tracking number from your local distributor.

Grass Valley Support will assign the number; this must accompany the item being returned and will be referred to in all correspondence.

Send the item to Grass Valley with the number included in the accompanying documentation (shipping and customs forms).

Customer Support Contact Information

Visit our Web site to know the Grass Valley Customer Support representative nearest you:



Grass Valley Web site: http://www.thomsongrassvalley.com/contact/