RX8000 Integrated Receiver/Decoders

Software Version 8.22.0

REFERENCE GUIDE

ENGLISH (UK) - READ THIS FIRST!

If you do not understand the contents of this manual. DO NOT OPERATE THIS EQUIPMENT. Also, translation into any EC official language of this manual can be made available, at your cost.

ITALIANO - LEGGERE QUESTO AVVISO PER PRIMO!

Se non si capisce il contenuto del presente manuale. NON UTILIZZARE L'APPARECCHIATURA.. È anche disponibile la versione italiana di questo manuale, ma il costo

SVENSKA - LÄS DETTA FÖRST!

Om Ni inte förstår informationen i denna handbok. ARBETA DÅ INTE MED DENNA UTRUSTNING. En översättning till detta språk av denna handbok kan också anskaffas, på Er bekostnad.

NEDERLANDS - LEES DIT EERST!

Als u de inhoud van deze handleiding niet begrijpt. STEL DEZE APPARATUUR DAN NIET IN WERKING. U kunt tevens, op eigen kosten, een vertaling van deze handleiding krijgen.

PORTUGUÊS - LEIA O TEXTO ABAIXO ANTES DE MAIS NADA!

Se não compreende o texto deste manual. NÃO UTILIZE O EQUIPAMENTO. O utilizador poderá também obter uma tradução do manual para o português à própria custa.

SUOMI - LUE ENNEN KÄYTTÖÄ!

Jos et ymmärrä käsikirjan sisältöä. ÄLÄ KÄYTÄ LAITETTA. Käsikirja voidaan myös suomentaa asiakkaan kustannuksella.

FRANÇAIS - AVANT TOUT, LISEZ CE QUI SUIT!

Si vous ne comprenez pas les instructions contenues dans ce manuel. NE FAITES PAS FONCTIONNER CET APPAREIL. En outre, nous pouvons vous proposer, à vos frais, une version

DANSK - LÆS DETTE FØRST!

Udstyret må ikke betjenes. MEDMINDRE DE TIL FULDE FORSTÅR INDHOLDET AF DENNE HÅNDBOG. Vi kan også for Deres regning levere en dansk oversættelse af denne håndbog.

DEUTSCH - LESEN SIE ZUERST DIESEN HINWEIS!

Sollte Ihnen der Inhalf dieses Handbuches nicht klar verständlich sein, dann. BEDIENEN SIE DIESE GERÄTE NICHT! Eine Übersetzung des Handbuches in diese Sprache ist gegen

ΕΛΛΗΝΙΚΑ - ΔΙΑΒΑΣΤΕ ΠΡΩΤΑ ΑΥΤΟ!

Αν δεν καταλάβετε το περιεχόμενο αυτού του βοηθήματος/εγχειριδίου. ΜΗΝ ΛΕΙΤΟΥΡΓΗΣΕΤΕ ΑΥΤΟΝ ΤΟΝ ΕΞΟΠΛΙΣΜΟ. Επίσης, αυτό το εγχειρίδιο είναι διαθέσιμο σε μετάφραση σε αυτή τη γλώσσα και μπορείτε να το αγοράσετε.

ESPAÑOL - LEA ESTE AVISO PRIMERO!

Si no entiende el contenido de este manual. NO OPERE ESTE EQUIPO. Podemos asimismo suministrarle una traducción de este manual al (idioma) previo pago de una cantidad adicional que deberá abonar usted mismo.

Contents

Introduction

This Reference Guide provides instructions and information for the installation and operation of the RX8000 Integrated Receivers/Decoders.

This Reference Guide should be kept in a safe place for reference for the life of the equipment. It is not intended that this Reference Guide will be amended by the issue of individual pages. Any revision will be by a complete reissue. Further copies of this Reference Guide can be ordered from the address listed in Customer Services. If passing the equipment to a third party, also pass the relevant documentation.

Revision History

Issues of this Reference Guide are listed below:

Issue	Date	Software Version	Comments
A	March 2011	4.3.2	Allocation of Document identity and rebrand completion.
B	Dec 2012	5.12.0	Major revision of manual: Section 1: Update to include all RX8000 models. Section 3: Complete rewrite and inclusion of RX8252. Annex B: Update to include technical specifications of all added options.
C	Feb 2014	7.2.0	Major revision of manual: Section 3: Update of additional functionality introduced since the previous issue.
D	April 2015	7.14.0	Major revision of manual: Section 3: Update of new input cards and additional functionality introduced.
E	Sept 2015	7.18.0	Update to Add Cue Tone Splicing functionality.
F	Jan 2016	7.21.0	Update to include support for HEVC decoding, SDP Field Insertion and subtitle alarm descriptions.
G	July 2016	8.0.0	Update to web interface control with introduction of new Dashboard View mode.
H	Feb 2017	8.8.0	Director CA, Event ID Filtering examples and SMPTE 2022-7 Seamless Protection Switching.
J	Dec 2017	8.16.0	Major revision of manual: Section 3: New functionality for Input Redundancy Mode; Addressable DPI (SCTE-35). Updated information on existing functionality.
K	Feb 2019	8.22.0	Major revision of manual: Rebrand of document Removal of RX8252, RX8305 & RX8330C models

Associated Documents

The following manuals/guides are also associated with this equipment:

MediaKind Document Identity	Title
174 02-FGB 101 348	Installation, Safety and Compliance Information Generic Product Information - Reference Guide.

Useful Links:

https://www.mediakind.com

https://mediakind.service-now.com/csp

Trademarks

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Dolby®/AC-3®	Registered trademarks of Dolby Laboratories Licensing Corporation.
Dolby® Digital	Registered trademark of Dolby Laboratories Licensing Corporation.

Macrovision

This product incorporates copyright protection technology that is protected by U.S. patents and other intellectual property rights. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless authorized by Macrovision. Reverse engineering or disassembly is prohibited.

Warnings, Cautions and Notes

Heed Warnings

All warnings on the product and in the operating instructions should be adhered to. The manufacturer can not be held responsible for injuries or damage where warnings and cautions have been ignored or taken lightly.

Read Instructions

All the safety and operating instructions should be read before this product is operated.

Follow Instructions

All operating and use instructions should be followed.

Retain Instructions

The safety and operating instructions should be retained for future reference.

WARNING: Warnings give information which, if strictly observed, will prevent personal injury or death, or damage to property or the environment. They are highlighted for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires them.

CAUTION: Cautions give information which, if strictly followed, will prevent damage to equipment or other goods. They are highlighted for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires them.

NOTE: Notes provide supplementary information. They are highlighted for emphasis, as in this example, and are placed immediately after the relevant text.

EMC Compliance

This equipment is certified to the EMC requirements detailed in Annex B, Technical Specification. To maintain this certification, only use the leads supplied or if in doubt contact Customer Services.

Contact Information

Support Services

MediaKind understands that our products are "mission-critical", providing services that influence customer perception and impact your revenue. Our objective is to ensure that you realize maximum utility and achieve the highest levels of availability from our products. To realize that objective, we offer a variety of Service Level Agreements designed to meet your business needs and budget.

Warranty

All MediaKind products and systems are designed and built to the highest standards and are covered under a comprehensive 12-month warranty.

Service Level Agreements

Customers may choose one of several Support packages, either as an enhancement during the standard 12-month warranty or as an extension after the warranty has expired.

For standalone equipment, customers may choose either MediaKind's Extended Hardware Warranty or Secure Basic Support. Extended Hardware Warranty provides hardware repair of covered equipment after the expiration of the standard warranty. Secure Basic Support provides hardware repair, remote diagnostics and support, and 24x7x365 remote support for emergencies.

For systems, along with Secure Basic Support, customers have the option of either Secure Advanced Support or Secure Superior Support. These support packages provide higher committed response and resolution times, onsite support where necessary, service performance review and a host of other proactive services to help you get the maximum return on your investment in MediaKind solutions.

Call MediaKind Sales for more details.

Customer Services

Europe, Middle East and Africa	Tel:	+44 (0) 23 8048 4455	
	Fax:	+44 (0) 23 8048 4467	
	Email:	tvsupportemea@MediaKind.com	
Americas	Tel:	+1 888 671 1268	US and Canada
	Tel:	+1 678 812 6255	International
	Fax:	+1 678 812 6263	
	Email:	tvsupportamericas@MediaKind.com	
Asia	Tel:	+852 2590 3820	Hong Kong
	Fax:	+852 2590 9550	Hong Kong
	Email:	tvsupportapac@MediaKind.com	
Australia and New Zealand	Tel:	+61 (0) 2 9111 4080	
	Fax:	+61 (0) 2 9111 4949	
	Email:	tvsupportanz@MediaKind.com	
Internet Address	www.MediaKind.com		

Technical Training

MediaKind provides a wide range of training courses on the operation and maintenance of our products and on their supporting technologies. MediaKind can provide both regularly scheduled courses and training tailored to individual needs. Courses can be run either at your premises or at one of our dedicated training facilities.

International	Tel:	+44 (0) 23 8048 4229
	Fax:	+44 (0) 23 8048 4161
	Email:	tvglobaltraining@MediaKind.com

Postal Address

MediaKind
Unit 2
Strategic Park
Comines Way
Hedge End
Southampton
Hampshire
SO30 4DA
United Kingdom

Return of Equipment

If you need to return equipment for repair please contact your local MediaKind Customer Services Department. Please refer to the Customer Services Contact Information on Page vii

You will then be directed to return the faulty equipment to a repair centre with the appropriate facilities for that equipment. A tracking number will be issued that should be used if you need to enquire about the progress of the repair. The equipment should be properly packed and the tracking number should be clearly marked on the outside of the packaging.

1. Introduction

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1.1. Introduction

1.1.1. Who Should Use this Reference Guide

This Reference Guide is written for operators/users of the RX8000 Integrated Receiver/Decoders (IRD). It describes the units' functions and operation. The Reference Guide is written to assist in the installation and day-to-day care and operation of the unit. Maintenance information requiring the covers to be removed is not included.

WARNING: Do not remove the covers of this equipment. Hazardous voltages are present within this equipment and may be exposed if the covers are removed. Only MediaKind trained and approved service engineers are permitted to service this equipment.

CAUTION: Unauthorized maintenance or the use of non-approved replacements may affect the equipment specification and invalidate any warranties.

1.1.2. Equipment Covered by this Reference Guide

This Reference Guide covers the functions of the equipment listed below:

Table 1.1 Equipment Model Descriptions

Model Number	Marketing Code	Price Object Number	Supply Object Number	Description
RX8200	RX8200/BAS RX8200/BAS/A RX8200/BAS/TROP/A RX8200/BAS/B RX8200/BAS/TROP/B	FAZ 101 0113/1 FAZ 101 0113/177 FAZ 101 0113/239 FAZ 101 0113/248 FAZ 101 0113/295	KDU 137 639/1 KDU 137 639/7 KDU 137 639/10 KDU 137 639/12 KDU 137 639/13	**Advanced Modular Receiver** MPEG-2/MPEG-4 HD/SD, AC Power Supply.
	RX8200/BAS/2	FAZ 101 0113/2	KDU 137 639/2	**Advanced Modular Receiver** MPEG-2/MPEG-4 4:2:2, AC Power Supply
	RX8200/BAS/J2K	FAZ 101 0113/141	KDU 137 639/5	**Advanced Modular Receiver JPEG2000** AC Power Supply
	RX8200/BAS/BSKYB RX8200/BAS/BSKYB/A RX8200/BAS/BSKYB/B	FAZ 101 0113/71 FAZ 101 0113/178 FAZ 101 0113/296	KDU 137 639/3 KDU 137 639/8 KDU 137 639/14	**Advanced Modular Receiver** NDS BSkyB Descrambler, AC Power Supply
	RX8200/BAS/SKIT RX8200/BAS/SKIT/A RX8200/BAS/SKIT/B	FAZ 101 0113/72 FAZ 101 0113/179 FAZ 101 0113/297	KDU 137 639/4 KDU 137 639/9 KDU 137 639/15	**Advanced Modular Receiver** NDS Sky Italia Descrambler, AC Power Supply
RX8310	RX8310/BAS	FAZ101 0108/18	KDU137620/1	**Distribution Receiver**. DVB-S2, Director CA, AC Power Supply.
RX8315	RX8315/BAS	FAZ 101 0108/19	KDU137599/1	**Distribution Receiver**. DVB-S2, Common

Model Number	Marketing Code	Price Object Number	Supply Object Number	Description
				Interface CA, Director CA, AC Power Supply.
RX8320	RX8320/BAS	FAZ 101 0108/20	KDU137619/1	**ATSC Broadcast Receiver**. 8-VSB, MPEG-2 Decode, AC-3, AC Power Supply.
RX8330	RX8330/BAS RX8330/BAS/A	FAZ 101 0108/1 FAZ 101 0108/52	KDU 137 337/1 KDU 137 337/2	**Distribution Receiver**. DVB-S2, Common Interface CA, Director CA, SDI Output, AC Power Supply.
	RX8330/BAS/RSECAM/A	FAZ 101 0108/53	KDU 137 337/3	**Distribution Receiver** DVB-S2, Common Interface CA, Director CA, SDI Output, Russian SECAM Output, AC Power Supply.
	RX8330/BAS/IPOUT/A	FAZ 101 0108/54	KDU 137 337/4	**Distribution Receiver** DVB-S2, Common Interface CA, Director CA, SDI Output, IP Output, AC Power Supply.

1.1.3. Software Versions Covered by this Reference Guide

This Reference Guide covers the functions of software listed below:

Table 1.2 Software Versions Covered

Model Number	Software Version
RX8200	Advanced Modular Receiver. 8.22.0 and later
RX8310	Distribution Receiver. 8.22.0 and later
RX8315	Distribution Receiver. 8.22.0 and later
RX8320	ATSC Broadcast Receiver. 8.22.0 and later
RX8330	Distribution Receiver. 8.22.0 and later

To verify the installed version either:

- Access the front panel System Menu (Menu 1.2.1) or
- Access the Web Browser screens and select the About button.

1.1.4. Equipment Hardware and Software Options

The following sections list the various hardware and software options available to each equipment type that is covered by this Reference Guide.

1.1.4.1. RX8200 Hardware and Software Options

Table 1.3 RX8200 Hardware Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX8200/HWO/DVBS2	FAZ 101 0113/5	ROA 128 3757	DVB-S2 Input Card
RX8200/HWO/DVBS2/2 RX8200/HWO/S2/2/A RX8200/HWO/S2/2/B	FAZ 101 0113/6 FAZ 101 0113/183 FAZ 101 0113/277	ROA 128 3762 ROA 128 5922 ROA 128 6425	2nd Gen DVB-S & DVB-S2 Satellite Input Option
RX8200/HWO/DVBS2/IP RX8200/HWO/S2/IP/A RX8200/HWO/S2/IP/B	FAZ 101 0113/70 FAZ 101 0113/187 FAZ 101 0113/299	ROA 128 4958 ROA 128 5925 ROA 128 6559	Combined DVB-S & DVB-S2 Satellite & IP Input Option
RX8200/HWO/DVBS2X/A RX8200/HWO/S2X/B	FAZ 101 0113/207 FAZ 101 0113/278	ROA 128 5975 ROA 128 6458	DVB-S2X Capable Satellite Demodulator
RX8200/HWO/IP/GIGE RX8200/HWO/IP/GE/A RX8200/HWO/IP/GE/B	FAZ 101 0113/12 FAZ 101 0113/184 FAZ 101 0113/298	ROA 128 3761 ROA 128 5923 ROA 128 6558	100/1000BaseT Ethernet IP Input
RX8200/HWO/G703 RX8200/HWO/G703/B	FAZ 101 0113/8 FAZ 101 0113/280	ROA 128 3763 ROA 128 6456	G.703 ATM Input Card
RX8200/HWO/OFDM RX8200/HWO/OFDM/A RX8200/HWO/OFDM/B	FAZ 101 0113/16 FAZ 101 0113/185 FAZ 101 0113/279	ROA 128 4200 ROA 128 5924 ROA 128 6457	DVB-T/T2 Input Option
RX8200/HWO/MP2/422	FAZ 101 0113/15	ROA 128 3765	MPEG-2 4:2:2 Decode Card with only SD Decode Enabled
RX8200/HWO/J2K/MP24	FAZ 101 0113/157	ROA 128 5738	Multi-format 4:2:2 Decode Card
RX8200/HWO/HEVC RX8200/HWO/HEVC/B	FAZ 101 0113/218 FAZ 101 0113/284	ROA 128 6207 ROA 128 6462	Enhanced multi-format (HEVC 4:2:2 1080p) Decode Card
RX8200/HWO/IP/OUT RX8200/HWO/IP/OUT/A	FAZ 101 0113/14 FAZ 101 0113/189	ROA 128 3756 ROA 128 5927	Dual Gigabit IP Transport Stream Output Card
RX8200/HWO/IP/IO/A RX8200/HWO/IP/I/O/B	FAZ 101 0113/13 FAZ 101 0113/281	ROA 128 4202 ROA 128 6459	Dual Gigabit IP Transport Stream Bi-directional Card
RX8200/HWO/SD	FAZ 101 0113/18	ROA 128 3758	SD Video Output and ASI Output Card with 2x CVBS, 2x Connectors for ASI / SDI

Marketing Code	Price Object Number	Supply Object Number	Description
RX8200/HWO/HD	FAZ 101 0113/9	ROA 128/2768	HD and SD Video Output and ASI Output Card with 3 x HDSDI / SDI / ASI connectors, 1 x CVBS, 1 x VGA
RX8200/HWO/HD/3G	FAZ 101 0113/10	ROA 128 3768	HD and SD Video Output and ASI Output Card with 3 x 3GSDI / HDSDI / SDI / ASI connectors, 1 x CVBS, 1 x VGA
RX8200/HWO/RS232 RX8200/HWO/RS232/B	FAZ 101 0113/17 FAZ 101 0113/283	ROA 128 4207 ROA 128 6460	Remote Data Card
RX8200/BAS/BSKYB	FAZ 101 0113/71	KDU 137 639/3	NDS BSKYB CA Card (Note this is a different base unit)
RX8200/BAS/SKIT	FAZ 101 0113/72	U 137 639/3	NDS SKIT CA Card (Note this is a different base unit)
RX8200/HWO/BAL/AUD RX8200/HWO/AUD/B	FAZ 101 0113/3 FAZ 101 0113/282	ROA 128 3760 ROA 128 6461	Balanced Analogue and Digital Audio Output Providing 2 Stereo Pairs of Audio
RX8200/HWO/HQDCONV RX8200/HWO/HQCONV/A RX8200/HWO/HQCONV/B	FAZ 101 0113/60 FAZ 101 0113/188 FAZ 101 0113/285	ROA 128 4419 ROA 128 5926 ROA 128 6463	High-Quality Down-Conversion
RX8XXX/CABLE/XLR	FAZ 101 0108/24	RPM 901 364	XLR Terminal Audio Break-out Cable
RX8XXX/CABLE/SCRTRM	FAZ 101 0108/23	RPM 901 365	Screw Terminal Audio Break-out Cable

Table 1.4 RX8200 Software Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX8200/SWO/DVBS2/QPSK	FAZ 101 0113/32	FAT 102 0151	DVB-S2 QPSK License Key
RX8200/SWO/DVBS2/8PSK	FAZ 101 0113/30	FAT 102 0152	DVB-S2 8PSK License Key
RX8200/SWO/DVBS2/16APSK	FAZ 101 0113/29	FAT 102 0386	DVB-S2 16APSK License Key
RX8200/SWO/DVBS2/LSYM	FAZ 101 0113/31	FAR 102 0153	DVB-S2 Low Symbol Rate License Key
RX8200/SWO/DVBS2/VCM	FAZ 101 0113/56	FAT 102 0398	Enables DVB-S2 Multi-Transport Stream mode on RX8200 IRDs
RX8200/SWO/DVBS2X/32APSK	FAZ 101 0113/206	FAT 102 3037	DVB-S2X 32APSK License Key
RX8200/SWO/MPEG2/SD	FAZ 101 0113/45	FAT 102 0169	MPEG-2 SD Decoding
RX8200/SWO/MPEG2/HD	FAZ 101 0113/44	FAT 102 0170	MPEG-2 HD & SD Decoding
RX8200/SWO/MP2/MP4/SD	FAZ 101 0113/40	FAT 102 0171	MPEG-2 & MPEG-4 SD Decode
RX8200/SWO/MP2/MP4/SD/HD	FAZ 101 0113/41	FAT 102 0156	MPEG-2 & MPEG-4 HD and SD Decode
RX8200/SWO/SING/SERVFILT	FAZ 101 0113/53	FAT 102 0181	Single Service Filtering
RX8200/SWO/MULT/SERVFILT	FAZ 101 0113/47	FAT 102 0182	Multi-Service Filtering
RX8200/SWO/TTV	FAZ 101 0113/58	FAT 102 0168	Signal Protection Scrambling License
RX8200/SWO/IP/DATA	FAZ 101 0113/35	FAT 102 0183	High Speed Data Output
RX8200/SWO/PW	FAZ 101 0113/51	FAT 102 0154	Password Protection for Web Browser
RX8200/SWO/DIR5/MSD	FAZ 101 0113/28	FAT 102 0166	Director Multi-Service Descrambling
RX8200/SWO/CI	FAZ 101 0113/25	FAT 102 0162	Common Interface Descrambling
RX8200/SWO/MSD	FAZ 101 0113/46	FAT 102 0165	Common Interface Multi Service Descrambling
RX8200/SWO/AC3	FAZ 101 0113/22	FAT 102 0158	Dolby Digital Decoding / Down-mixing
RX8200/SWO/AAC	FAZ 101 0113/21	FAT 102 0179	AAC Decode
RX8200/SWO/NULL	FAZ 101 0113/48	FAT 102 0161	Null Packet TS License
RX8200/SWO/RAS	FAZ 101 0113/52	FAT 102 0164	RAS CA
RX8200/SWO/BISS	FAZ 101 0113/23	FAT 102 0163	BISS Mode 1 & E CA
RX8200/SWO/BISS/MSD	FAZ 101 0113/24	FAT 102 0167	BISS Multi-Service Descrambling
RX8200/SWO/IP/PROMPEG	FAZ 101 0113/37	FAT 102 0159	SMPTE ST 2022 ProMPEG FEC
RX8200/SWO/IP/IN/A	FAZ 101 0113/210	FAT 102 3069	IP Input License Key used with Dual Gigabit IP Transport Stream Bi-directional Card (RX8200/HWO/IP/I/O/A)
RX8200/SWO/DVBT2	FAZ 101 0113/69	FAT 102 0806	DVB-T2 License Key
RX8200/SWO/IP/SEAMLESS	FAZ 101 0113/241	FAT 102 3650	SMPTE ST 2022-7 Seamless Protection Switching
RX8200/SWO/HDSDI/3G	FAZ 101 0113/34	FAT 102 0176	1080p 50/60 Decoding
RX8200/SWO/MP2/422/SD	FAZ 101 0113/59	FAT 102 0387	MPEG-2 SD 4:2:2 Decoding
RX8200/SWO/MP2/HD/422	FAZ 101 0113/39	FAT 102 0172	MPEG-2 HD and SD 4:2:2 Decode
RX8200/SWO/MP4/422/SD	FAZ 101 0113/43	FAT 102 0178	MPEG-4 SD 4:2:2 Decoding
RX8200/SWO/MP4/422/HD	FAZ 101 0113/42	FAT 102 0177	MPEG-4 HD and SD 4:2:2 Decoding

Marketing Code	Price Object Number	Supply Object Number	Description
RX8200/SWO/DCONV	FAZ 101 0113/26	FAT 102 0157	Simultaneous Down-conversion of HD to SD
RX8200/SWO/UPCONV	FAZ 101 0113/54	FAT 102 0174	Up-conversion from SD to HD (to 1080i or 720p)
RX8200/SWO/XCONV	FAZ 101 0113/55	FAT 102 0175	Cross-conversion
RX8200/SWO/FSYNC	FAZ 101 0113/33	FAT 102 0160	Frame Sync
RX8200/SWO/4AUD RX8200/SWO/4AUD/A	FAZ 101 0113/20 FAZ 101 0113/216	FAT 102 0180 FAT 102 3218	4 x Audio Capacity
RX8200/SWO/LDELAY	FAZ 101 0113/38	FAT 102 0173	Low Latency Decode
RX8200/SWO/PAA	FAZ 101 0113/49	FAT 102 0402	Phase Aligned Audio
RX8200/SWO/J2K/SD/HD	FAZ 101 0113/182	FAT 102 1115	JPEG2000 HD and SD Decoding
RX8200/SWO/RADIO	FAZ 101 0113/56	FAT 102 1977	Pass Thru of Radio Services
RX8200/SWO/HEVC/SD/HD	FAZ 1010113/220	FAT 102 3296	HEVC HD and SD Decoding
RX8200/SWO/HEVC/422/SD/HD	FAZ 1010113/221	FAT 102 3297	HEVC HD and SD 4:2:2 Decoding
RX8200/SWO/AUD/PAIRED	FAZ 101 0113/146	FAT 102 1906	Paired Audio Decoder
RX8200/SWO/DASHBOARD	TBD	TBD	Simplified Dashboard Overlay

1.1.4.2. RX8310/8315 Hardware and Software Options

Table 1.5 RX8310/RX8315 Hardware Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX83XX/HWO/IP/OUT	FAZ 101 0108/22	ROA 128 3646	Dual Gigabit IP Transport Stream Output Card
RX8XXX/CABLE/XLR	FAZ 101 0108/24	RPM 901 364	XLR Terminal Audio Break-out Cable
RX8XXX/CABLE/SCRTRM	FAZ 101 0108/23	RPM 901 365	Screw Terminal Audio Break-out Cable

Table 1.6 RX8310/RX8315 Software Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX83XX/SWO/DVBS2/QPSK	FAZ 101 0108/6	FAT 102 0098	DVB-S2 QPSK License Key
RX83XX/SWO/DVBS2/8PSK	FAZ 101 0108/4	FAT 102 0102	DVB-S2 8PSK License Key
RX83XX/SWO/DVBS2/LSYM	FAZ 101 0108/5	FAT 102 0103	DVB-S2 Low Symbol Rate License Key
RX83XX/SWO/MPEG2/SD	FAZ 101 0108/10	FAT 102 0105	MPEG-2 SD Decoding
RX83XX/SWO/MPEG2/HD	FAZ 101 0108/9	FAT 102 0106	MPEG-2 HD & SD Decoding
RX83XX/SWO/AC3	FAZ 101 0108/28	FAT 102 0107	Dolby Digital Decoding / Down-mixing
RX83XX/SWO/PW	FAZ 101 0108/29	FAT 102 0110	Password Protection for Web Browser
RX83XX/SWO/AAC	FAZ 101 0108/2	FAT 102 0370	AAC Decode
RX83XX/SWO/SING/SERVFILT	FAZ 101 0108/15	FAT 102 0138	Single Service Filtering
RX83XX/SWO/MULT/SERVFILT	FAZ 101 0108/14	FAT 102 0137	Multi-Service Filtering
RX83XX/SWO/IP/DATA	FAZ 101 0108/7	FAT 102 0113	High Speed Data Output
RX83XX/SWO/MP2/MP4/SD	FAZ 101 0108/12	FAT 102 0111	MPEG-2/4 SD 4:2:0 Decoding
RX83XX/SWO/MP2/MP4/SD/HD	FAZ 101 0108/11	FAT 102 0112	MPEG-2/4 HD 4:2:0 Decoding
RX83XX/SWO/NULL	FAZ 101 0108/17	FAT 102 0114	Null Packet TS License
RX83XX/SWO/DIR5/MSD	FAZ 101 0108/3	FAT 102 0104	Director Multi-Service Descrambling
RX8XXX/SWO/DASHBOARD	TBD	TBD	Simplified Dashboard Overlay

1.1.4.3. RX8320 Hardware and Software Options

Table 1.7 RX8320 Hardware Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX8XXX/CABLE/XLR	FAZ 101 0108/24	RPM 901 364	XLR Terminal Audio Break-out Cable
RX8XXX/CABLE/SCRTRM	FAZ 101 0108/23	RPM 901 365	Screw Terminal Audio Break-out Cable

Table 1.8 RX8320 Software Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX83XX/SWO/AC3	FAZ 101 0108/28	FAT 102 0107	Dolby Digital Decoding / Down-mixing
RX83XX/SWO/PW	FAZ 101 0108/29	FAT 102 0110	Password Protection for Web Browser
RX83XX/SWO/AAC	FAZ 101 0108/2	FAT 102 0370	AAC Decode
RX83XX/SWO/SING/SERVFILT	FAZ 101 0108/15	FAT 102 0138	Single-Service Filtering
RX83XX/SWO/MULT/SERVFILT	FAZ 101 0108/14	FAT 102 0137	Multi-Service Filtering
RX83XX/SWO/IP/DATA	FAZ 101 0108/7	FAT 102 0113	High Speed Data Output
RX83XX/SWO/MP2/MP4/SD	FAZ 101 0108/12	FAT 102 0111	MPEG-2, MPEG-4 4:2:0 SD Decoding

Marketing Code	Price Object Number	Supply Object Number	Description
RX83XX/SWO/MP2/MP4/SD/HD	FAZ 101 0108/11	FAT 102 0112	MPEG-2, MPEG-4, 4:2:0 SD Decoding and HD Down-conversion
RX83XX/SWO/MPEG2/SD	FAZ 101 0108/10	FAT 102 0105	MPEG-2 SD Decoding
RX83XX/SWO/MPEG2/HD	FAZ 101 0108/9	FAT 102 0106	MPEG-2 HD & SD Decoding
RX83XX/SWO/NULL	FAZ 101 0108/17	FAT 102 0114	Null Packet TS License
RX8320/SWO/IP/OUT	FAZ 101 0108/25	FAT 102 0134	IP Transport Stream Out License Key
RX8320/UPG/IP/OUT	FAZ 101 0108/26	FAT 102 0135	IP Transport Stream Output
RX8320/SWO/IP/OUT/PROMPEG	FAZ 101 0108/8	FAT 102 0407	IP Transport Stream Output
RX8XXX/SWO/DASHBOARD	TBD	TBD	Simplified Dashboard Overlay

1.1.4.4. RX8330 Hardware and Software Options

Table 1.9 RX8330 Hardware Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX83XX/HWO/IP/OUT	FAZ 101 0108/22	ROA 128 3646	Dual Gigabit IP Transport Stream Output Card
RX83XX/HWO/RSECAM	FAZ 101 0108/33	ROA 128 4418	Russian SECAM Output Card
RX8XXX/CABLE/XLR	FAZ 101 0108/24	RPM 901 364	XLR Terminal Audio Break-out Cable
RX8XXX/CABLE/SCRTRM	FAZ 101 0108/23	RPM 901 365	Screw Terminal Audio Break-out Cable

Table 1.10 RX8330 Software Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX83XX/SWO/DVBS2/QPSK	FAZ 101 0108/6	FAT 102 0098	DVB-S2 QPSK License Key
RX83XX/SWO/DVBS2/8PSK	FAZ 101 0108/4	FAT 102 0102	DVB-S2 8PSK License Key
RX83XX/SWO/DVBS2/LSYM	FAZ 101 0108/5	FAT 102 0103	DVB-S2 Low Symbol Rate License Key
RX83XX/SWO/MPEG2/SD	FAZ 101 0108/10	FAT 102 0105	MPEG-2 SD Decoding
RX83XX/SWO/MPEG2/HD	FAZ 101 0108/9	FAT 102 0106	MPEG-2 HD & SD Decoding
RX83XX/SWO/AC3	FAZ 101 0108/28	FAT 102 0107	Dolby Digital Decoding / Down-mixing
RX83XX/SWO/PW	FAZ 101 0108/29	FAT 102 0110	Password Protection for Web Browser
RX83XX/SWO/AAC	FAZ 101 0108/2	FAT 102 0370	AAC Decode
RX83XX/SWO/SING/SERVFILT	FAZ 101 0108/15	FAT 102 0138	Single Service Filtering
RX83XX/SWO/MULT/SERVFILT	FAZ 101 0108/14	FAT 102 0137	Multi-Service Filtering
RX83XX/SWO/IP/DATA	FAZ 101 0108/7	FAT 102 0113	High Speed Data Output
RX83XX/SWO/MP2/MP4/SD	FAZ 101 0108/12	FAT 102 0111	MPEG-2/4 SD 4:2:0 Decoding
RX83XX/SWO/MP2/MP4/SD/HD	FAZ 101 0108/11	FAT 102 0112	MPEG-2/4 HD 4:2:0 Decoding
RX83XX/SWO/NULL	FAZ 101 0108/17	FAT 102 0114	Null Packet TS License

Marketing Code	Price Object Number	Supply Object Number	Description
RX83XX/SWO/BISS/MSD	FAZ 101 0108/16	FAT 102 0133	BISS Modes 1 and E Multi-Service Decryption
RX83XX/SWO/MSD	FAZ 101 0108/13	FAT 102 0125	Common Interface Multi-Service Descrambling
RX83XX/SWO/DIR5/MSD	FAZ 101 0108/3	FAT 102 0104	Director Multi-Service Descrambling
RX8300/SWO/RAS	FAZ 101 0108/31	FAT 102 0408	RAS Transport Stream Decryption
RX83XX/SWO/SDI	FAZ 101 0108/35	FAT 102 1163	SDI Output
RX83XX/SWO/DASHBOARD	TBD	TBD	Simplified Dashboard Overlay

1.2. Summary of Features

The RX8000 Receivers are single-service Decoders designed for the distribution of video services throughout a large network. They provide an advanced feature set combining maximum transmission efficiency with uncomplicated remote management. They provide all the essential functionality and connectivity options required to satisfy the requirements of cable, satellite and telco broadcast operations.

The RX8000 Receivers achieve up to three times the amount of content through a satellite transponder verses traditional satellite distribution solutions when used in combination with MediaKind's PREKOR™ dynamic pre-correction, MediaKind's MPEG-4 AVC compression encoders, and the additional 30% increase in channel capacity of DVB-S2 modulation.

1.2.1. RX8000 Receivers (Consists of Two Product Units)

The 2 basic units are:

- RX8300
- RX8200

There are a number of variants of both the RX8200 and RX8300 with different hardware and software capabilities based around these 2 hardware platforms, some of these capabilities are shared between both platforms whereas some are unique to the platform or model.

1.2.1.1. RX8000 Standard Base Features

- Full web server control via the 2 x 100 Mbps Ethernet control ports. This contains support for system configuration, monitor and upgrade.
- 2-line x 40-character back-lit dot-matrix LCD user interface with pushbuttons for Up, Down, Left, Right, Edit, and Save for front panel control.
- SNMP monitoring via the 2 x 100 Mbps Ethernet control ports.
- Status LED indicates input feed lock and general alarm conditions.
- Alarm handling via single configurable alarm relay and a date and time stamped alarm log.
- 1 x ASI Transport Stream input with 75 Ω BNC connector.
- 2 x ASI Transport Stream outputs with 75 Ω BNC connectors.
- Composite output test patterns including multiburst and color bars
- Simple local and remote unit software upgrade in the field.
- Service (program) selection by Service Name or Service ID from a list of all the available Services carried in the currently received input feed.
- 40 x preset service and component selections can be stored and recalled.
- Unit configurations can be saved, recalled and shared between units using XML.
- Unit SNMP MIB can be downloaded from the unit.

1.2.1.2. RX8200 Advanced Modular Receiver

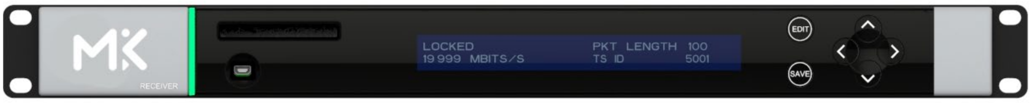
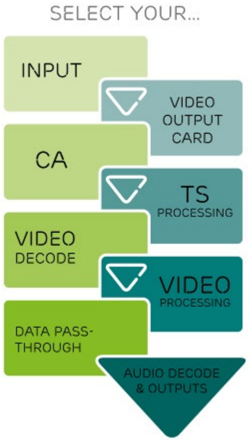


Figure 1.1 RX8200 Advanced Modular Receiver



The advanced modular design of the RX8200 enables many configuration possibilities allowing it to cover a broad range of applications. It can be tailored to your precise needs, resulting in a unit with only those features that are necessary without the additional expense of superfluous functionality or connectivity.

The RX8200 can be tailored to standard definition or high definition uses with MPEG-2, MPEG-4 or HEVC decode technology in both 4:2:0 and 4:2:2 modes as well as JPEG-2000. Connectivity into the receiver is achieved with DVB-S2 satellite, DVB-S2 Extensions (DVB-S2X), IP and ASI options.

The high powered processing capabilities of the RX8200 enable the unit to be simply and easily upgraded in the field with additional software options to increment the functionality at any point after initial installation.

1.2.2. RX8300 Distribution Receivers

The RX8300 Distribution Receivers provide off the shelf model functionality designed to provide a cost conscious unit to fit specific market areas / use case. For example the RX8320 is specifically designed for 8VSB distribution applications and offers a set of targeted features specifically for this market.

These basic market focused products can be customized to add extra functionality as required by the broadcaster, however they do not allow the same level of customization that is offered by the RX8200 flexible platform.

1.2.2.1. RX8310 Distribution Receiver

Figure 1.2 RX8310 Distribution Receiver

The RX8310 combines a DVB-S2 demodulator with MediaKind's Director secure content delivery and over-air receiver control solution as a standard feature.

The RX8310 provides the option to decrypt multiple services, allowing decryption of a complete multiplex of channels with a single unit.

Single-service decoding options for MPEG-2 and MPEG-4 AVC 4:2:0 SD video, and HD service down-conversion means the RX8310 can provide a simple and cost-effective route to hand-off video into an analog network or for service monitoring.

1.2.2.2. RX8315 Distribution Receiver

Figure 1.3 RX8315 Distribution Receiver

The RX8315 enables video distribution for both analog and digital networks.

The RX8315 provides compatibility with DVB Common Interface CA systems, offering both single service and multi-service decryption capability. Decrypted transport streams can be handed off into digital networks through a choice of ASI or IP output interfaces.

The RX8315 can optionally decode any MPEG-2 or MPEG-4 AVC 4:2:0 video standard, down-converting from HD to SD where necessary to provide an SD composite video output for interfacing to analog networks or for low cost monitoring.

1.2.2.3. RX8320 ATSC Broadcast Receiver

Figure 1.4 RX8320 ATSC Broadcast Receiver

The RX8320 is specifically designed to enable a simple, reliable solution to the ATSC broadcast transition for cable, telco or satellite operators who re-transmit the local broadcast channels.

The RX8320 provides both ASI and 8-VSB inputs for reception of the broadcast services over terrestrial or fiber links. It then provides a pass-thru capability so that operators can carry the digital signals all the way to a subscriber's home.

To support analog TV delivery, the RX8320 also provides video decode capability with high quality composite output and audio decode capability, including 5.1 multi-channel to stereo down-mixing, to allow easy interfacing into the existing infrastructure.

High Definition (HDTV) digital TV services can be down-converted for analog SD delivery. Automatic picture aspect ratio conversion is performed based on any active format description (AFD) and bar data present on the incoming digital TV service.

Legal and regulatory requirements are also fulfilled by the RX8320 for the transition of ATSC broadcast services into analog TV delivery, with the extraction and insertion of Closed Captions, Nielsen data, TV Guide data, and V-Chip program rating information into the analog video outputs.

1.2.2.4. RX8330 Distribution Receiver

Figure 1.5 RX8330 Distribution Receiver

The RX8330 provides feature-rich multi-format standard definition (SD) decoding capability with high quality SDI output for video distribution applications.

The RX8330 gives the user access to the latest compression and transmission technologies to allow for the most cost-effective and bandwidth transmissions possible while ensuring the highest standards of reliability and video quality.

The RX8330 offers both ASI and DVB-S2 satellite input interfaces.

As security of content is always of paramount importance, compatibility with popular CA systems including DVB Common Interface is provided.

The RX8330 allows multi-format decoding of all SD 4:2:0 video standards for high quality SDI digital video and analog video outputs. This capability is further enhanced by the RX8330's ability to receive, and down-convert HD video to SD providing an SD output for broadcast or monitoring.

Additionally, for systems that stay in the compressed domain, decrypted transport streams can be handed off into digital networks through a choice of both ASI or optional IP output interfaces.

1.3. Construction

The RX8000 Receiver is constructed using a screened self-ventilated modular system. All operational inputs and outputs are via rear-panel connectors. The unit may be operated freestanding or mounted in a 19-inch rack.

1.4. Front Panel

The user interface for the Front Panel consists of an alphanumeric Liquid Crystal Display, pushbuttons and a status LED that are used to set-up, control and monitor the unit.

Various menu screens can be navigated on the LCD using the pushbuttons, which allow you to select and modify key parameters and features of the unit.

Full details of the front panel menus and information on the use of these controls is given in *Chapter 3, Front Panel Control.*

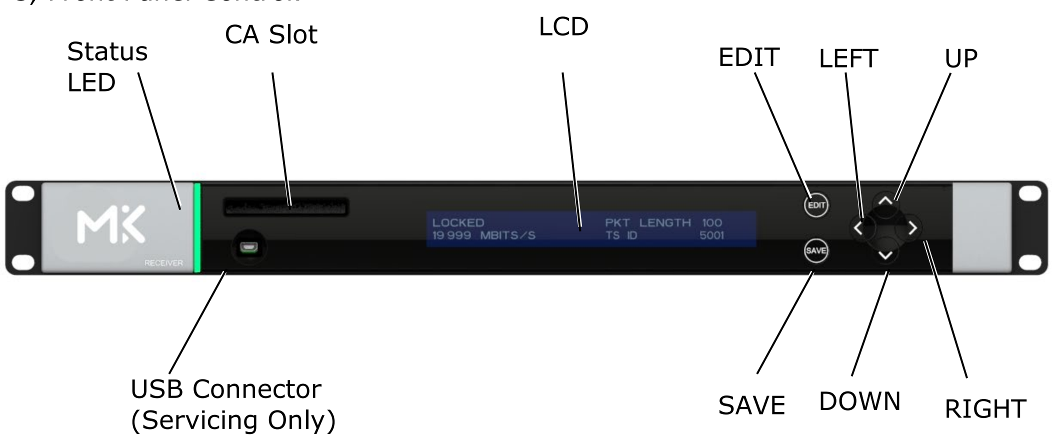


Figure 1.6 Front Panel Controls (RX8200)

Table 1.11 Front Panel Controls

Item	Color	Description
CA Slot	-	Conditional Access Slot. Located on front panel of RX8200 and rear panel of RX8315 and RX8330.
USB Connector	-	This connector is for factory / service use only.
Status LED	Red	**CRITICAL Error**. Indicates that a primary interface has lost lock with the Transport Stream.

	Amber	**MAJOR or MINOR Error**. Indicates that the unit is locked to a Transport Stream but an error has been detected signifying incorrect conditions or system functioning.
	Green	**NO Errors**. Indicates that the unit is locked to a Transport Stream and correct conditions and system functioning are detected.
LCD	-	2-line x 40-character back-lit dot-matrix Liquid Crystal Display (LCD).
Edit	-	This pushbutton enables you to edit the parameters on the selected LCD menu. Press again to exit without saving any changes. Integral LED lit when functional.
Save	-	This pushbutton enables you to save any modified parameters on the selected LCD menu. Integral LED lit when functional.
▲ Up ▼ Down ◀ Left (Back) ▶ Right (Forward)	-	Navigation pushbuttons for selecting relevant LCD menu or for incrementing / decrementing selected parameter values. Integral LED lit when functional.

1.5. Rear Panels

All inputs, outputs and control connections are taken via the rear panel. Due to the modular nature of these units, factory fitted hardware modules with different connections can be fitted to any unit and therefore only a typical (sample) rear panel images are shown below.

Full details of the connectors for ALL base models and options are given in *Chapter 2, Installing the Equipment.*

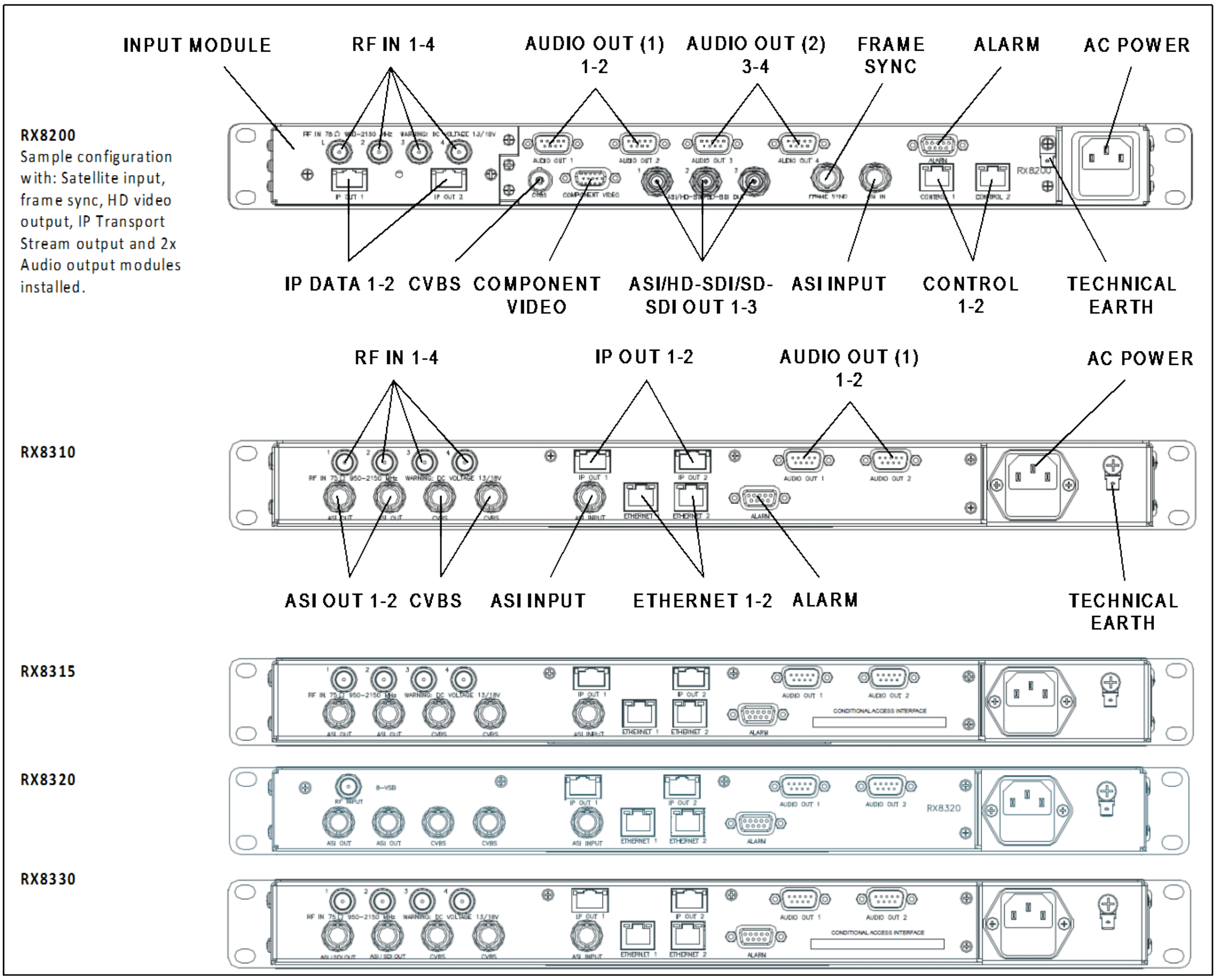


Figure 1.7 Rear Panels

Table 1.12 Rear Panels

Item	Type	Description
RF IN 1-4	F-type 75 Ω	Radio Frequency (L-band) input.
ASI OUT 1-2 ASI/SDI OUT ASI/HD-SDI/SD-SDI OUT ASI/3G-SDI/HD-SDI/SD-SDI OUT	BNC 75 Ω	ASI = Asynchronous Serial Interface. SDI = Serial Digital Interface. SD-SDI = Standard Definition SDI. HD-SDI = High Definition SDI. 3G-SDI = 2.970 Gbps serial link required for 1080P support.
CVBS	BNC 75 Ω	Composite Video output.
ASI INPUT	BNC 75 Ω	Asynchronous Serial Interface input. Streaming data format that carries the MPEG Transport Stream.
SVGA OUTPUT	15-way D-type	Component Video output (RGB/HV (SVGA) or YPrPb).
IP DATA 1-2	RJ-45	IP Output card supports 1000BaseT Ethernet transmission of encapsulated transport stream
ETHERNET 1-2 CONTROL 1-2	RJ-45	10-100BaseT control port for HTTP and FTP control of the RX8000.
ALARM ALARM RELAY	9-way D-type	A summary ALARM relay provides contact closure when the unit detects an alarm, or the power is switched off.
AUDIO OUT 1-2	9-way D-type	Each connector carries a single channel of a stereo pair in both analogue and balanced digital form.
CA INTERFACE	Card Slot	A single slot allows the insertion of a Conditional Access Module (CAM) for Common Interface support. On the RX8330C this will be replaced with a smartcard slot.
AC POWER	IEC	100-240 V AC power input.
TECHNICAL EARTH	Spade terminal	Unit earthing connector.

1.6. Serial Number Identification

Beginning in 2014, MediaKind began a process of transitioning from numeric serial numbers to an alphanumeric scheme. As part of this process, all receivers will display the serial number using the new format.

For further details on the serial number scheme used, contact MediaKind Customer Services.

1.6.1. Chassis Ident SN

The **Chassis Ident SN** can be found printed on the left side panel of the RX8000 unit towards the rear panel. It can also be found in the web browser interface under the Device Info Tab in the **Device Info > Unit Chassis Ident** section.

This uniquely identifies the RX8000 unit and is the serial number that should be used in all cases when communicating with MediaKind Customer Services so that it can be tracked. All components fitted to your RX8000 unit will be tied to the Chassis Ident SN.

Refer to *Chapter 3* on how to use the web browser interface.

1.6.2. Board Serial Number

The **Board Serial Number** can be found in the web browser interface under the Device Info Tab in the **Device Info > Modules** section. The Board Serial Number will be listed in the RX8000 row (Board Type 1900) under the Serial Number column.

Refer to *Chapter 3* on how to use the web browser interface.

1.6.3. Customization Serial Number

The **Customization Serial Number** can be found in the web browser interface under the Customization Tab in the **Customization > Parameters > Serial Number** section. This number should be used when Custom Keys or License Keys need to be activated.

Refer to *Chapter 3* on how to use the web browser interface.

1.6.4. Unique Hardware ID

The **Unique Hardware ID** is a unique identifier used for addressing the receiver in an MediaKind Director system. It is the same as the *Customization Serial Number* described above.

2. Installing the Equipment

Contents

List of Figures

List of Tables

2.1. Read This First!

Please refer to the Installation, Safety and Compliance Information for MediaKind Compression Products Reference Guide supplied with your product for full details of installation requirements. This guide only contains additional product specific information where required.

2.2. Mounting and Ventilation

2.2.1. Fixing and Rack Mounting

The equipment is designed for fixed use only and has been shipped with fixing brackets suitable for a standard 19-inch rack. When installed in a rack, it should be secured using the fixing brackets. In addition, support shelves must be used to reduce the weight on the brackets. Ensure it is firmly and safely located and it has an adequate flow of free-air.

Slide the receiver onto the chassis supports and affix to the rack by means of an M6 x 18 mm Pan Head screw in each corner.

A freestanding unit should be installed on a secure horizontal surface where it is unlikely to be knocked or its connectors and leads disturbed.

2.2.2. Ventilation

2.2.2.1. Openings in the Covers

Side openings in the unit, as well as side-mounted cooling fans, are provided for ventilation. They ensure reliable operation of the product and protect it from overheating. The openings of the fans must not be blocked or covered.

Figure 2.1 Air-flow through the Equipment

2.3. Signal Connections

2.3.1. General

CAUTION: It is strongly recommended that the terminal marked at the rear panel of the equipment is connected to a site Technical Earth before any external connections are made and the equipment is powered. This limits the migration of stray charges.

All signal connections are made via the rear panel. A typical rear panel is shown in *Figure 2.2.* Full technical specifications for the connections are given in *Annex B*. The Receiver provides a flexible Transport Stream input interface. The status information appropriate to each input type is available to the User via the User Interface, and also via the remote control interfaces.

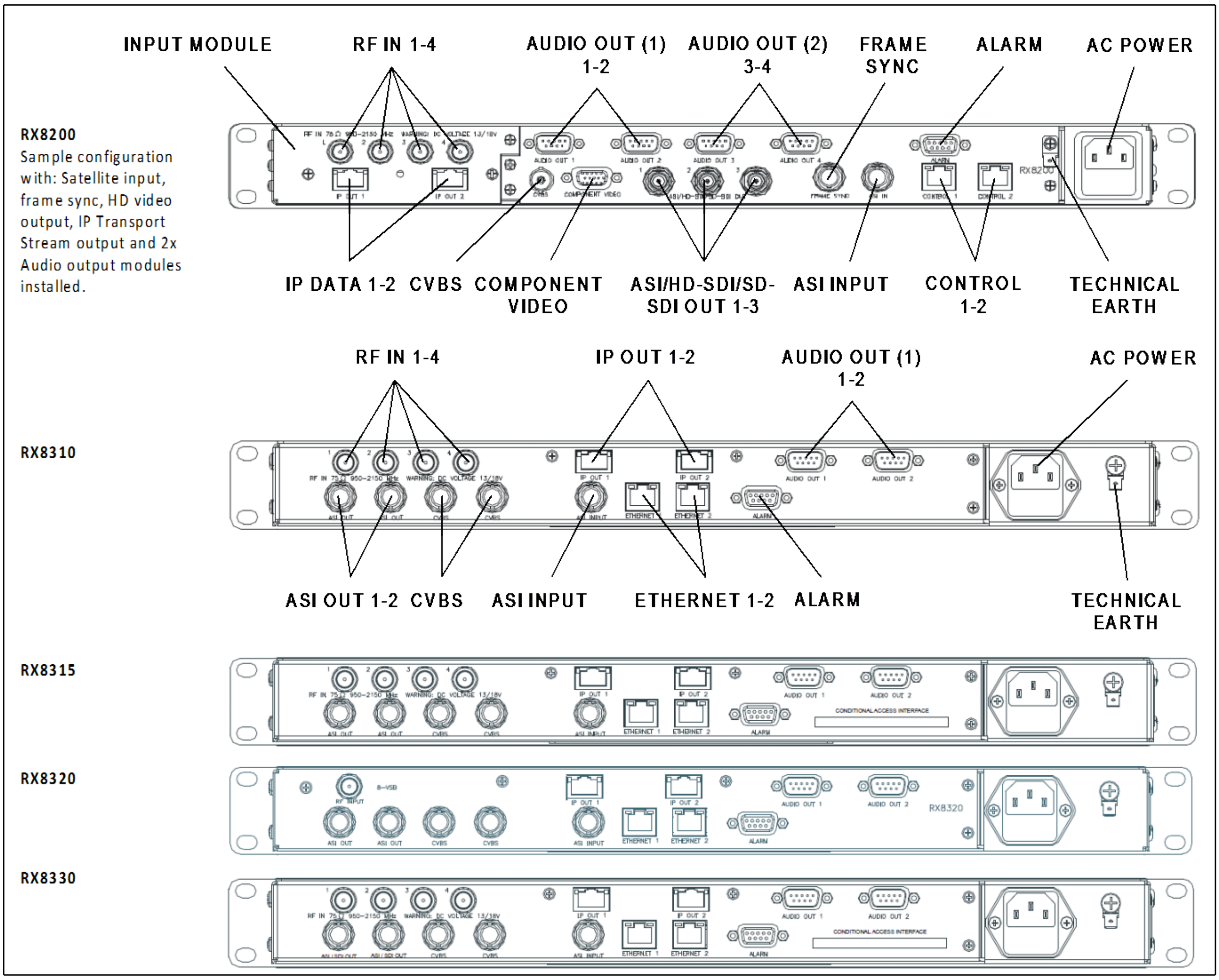


Figure 2.2 Rear Panels

2.3.2. RF IN Connector

Up to four RF inputs connect the L-band output of a suitable Low-Noise Block down-converter (LNB) to the unit either directly or via a suitable attenuator. The RF inputs may also be used to supply DC power to the LNB, if required.

CAUTION: The receiver provides DC power via the active L-band input connector to drive an LNB. Do not connect equipment other than an LNB to this connector.

Failure to do this may result in damage to the external equipment.

The F-type connector is not suitable for repeated connection and disconnection. When intended for use in this way, fit a sacrificial connector and connect to it.

Table 2-1 RF IN Connector

Item		Specification
Connector type		F-Type 75 Ω female socket
Connector designation		RF IN 1 RF IN 2 RF IN 3 RF IN 4
LNB power supply		See Caution above.
Pin-outs	Centre Shield	Input Ground/Chassis

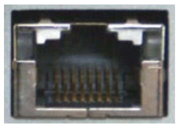
RF IN

2.3.3. IP IN Connector (RX8200 only)

Units can provide two input Ethernet data interfaces.

Table 2-2 IP IN Connector

Item	Specification	
Connector type	RJ-45	
Connector designation	IP IN 1 IP IN 2	
	Pin	
Pin-outs	Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8	Tx Out (+) Tx Out (-) Rx In (+) CMT CMT Rx In (-) CMT CMT



IP IN

2.3.4. G.703 Connector (RX8200 only)

The unit provides a single G.703 input connector.

Table 2-3 G.703 Connector

Item		Specification
Connector type		BNC 75 Ω female socket
Connector designation		G.703 E3/DS-3
Pin-outs	Centre Shield	Input Ground/Chassis

G.703 IN

2.3.5. DVB-T2 (OFDM) Connector (RX8200 only)

The unit provides a single DVB-T2 input connector.

Table 2-4 DVB-T2 Connector

Item		Specification
Connector type		F-Type 75 Ω female socket
Connector designation		DVT-T/T2
Pin-outs	Centre Shield	Input Ground/Chassis

T2 IN

2.3.6. ASI OUT Connector (RX8310/15/20 only)

The unit provides two coaxial ASI digital outputs depending on the user selectable configuration.

Table 2-5 ASI OUT Connector

Item		Specification
Connector type		BNC 75 Ω female socket
Connector designation		ASI OUT 1 ASI OUT 2
Pin-outs	Centre Shield	Output Ground/Chassis

ASI OUT

2.3.7. ASI/SDI OUT Connector

The unit provides two coaxial ASI/SDI outputs depending on the user selectable configuration.

Table 2-6 ASI/SDI OUT Connector

Item		Specification
Connector type		BNC 75 Ω female socket
Connector designation		ASI/SDI OUT 1 ASI/SDI OUT 2
Pin-outs	Centre Shield	Output Ground/Chassis

ASI/SDI OUT

2.3.8. ASI/HD-SDI/SD-SDI OUT Connector (RX8200 only)

The unit provides three coaxial ASI/HD-SDI/SD-SDI outputs depending on the user selectable configuration. Where applicable, these connectors are also used for 3G-SDI output.

Table 2-7 ASI/HD-SDI/SD-SDI OUT Connector

Item		Specification
Connector type		BNC 75 Ω female socket
Connector designation		ASI/HD-SDI/SD-SDI OUT 1 ASI/HD-SDI/SD-SDI OUT 2 ASI/HD-SDI/SD-SDI OUT 3
Pin-outs	Centre Shield	Output Ground/Chassis

ASI/HD-SDI/SD-SDI OUT

2.3.9. CVBS Connector

A coaxial socket provides composite video outputs supporting NTSC(M) (with and without pedestal) and PAL(B,D,H,I,M).

Table 2-8 CVBS Connector

Item		Specification
Connector type		BNC 75 Ω female socket
Connector designation		CVBS1 CVBS2 (RX83xx only)
Pin-outs	Centre Shield	Output Ground/Chassis

CVBS

2.3.10. AUDIO/AUDIO OUT Connector

All units provide a pair of connectors supplying two stereo channels. Each carries a single channel stereo pair in both analogue and balanced digital form.

Table 2-9 AUDIO/AUDIO OUT Connectors

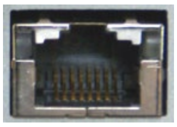
AUDIO/AUDIO OUT

Item	Specification	
Connector type	9-way D-type, male	
Connector designation	AUDIO OUT 1 AUDIO OUT 2 AUDIO 3 (RX8200 only) AUDIO 4 (RX8200 only)	
	Pin	
Pin-outs	Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8 Pin 9	Digital audio + Ground Left + Right + Ground Digital audio – Ground Left – Right –
Nominal output impedance	50 Ω	
Maximum data rate	3.072 Mbps	
Analogue Output level	+20 dBm nominal clipping level. Selectable in range 12 to +24 dBm.	
Load impedance	≥600 Ω balanced	

2.3.11. ETHERNET/CONTROL Connector

All units provide two Ethernet remote control interfaces for Web Browser Control.

Table 2-10 ETHERNET/CONTROL Connector



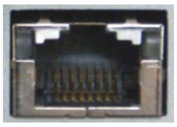
ETHERNET CONTROL

Item	Specification	
Connector type	RJ-45	
Connector designation	ETHERNET 1 or CONTROL 1 ETHERNET 2 or CONTROL 2	
	Pin	
Pin-outs	Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8	Tx Out (+) Tx Out (-) Rx In (+) NC NC Rx In (-) NC NC

2.3.12. IP DATA Connector

Units can provide two Ethernet data interfaces.

Table 2-11 IP DATA Connector



IP DATA

Item	Specification	
Connector type	RJ-45	
Connector designation	IP DATA 1 IP DATA 2	
	Pin	
Pin-outs	Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8	Tx Out (+) Tx Out (-) Rx In (+) CMT CMT Rx In (-) CMT CMT

2.3.13. ASI IN Connector

The unit provides an ASI input socket for detection of the transport stream lock on the ASI input.

Table 2-12 ASI IN Connector

ASI IN

Item		Specification
Connector type		BNC 75 Ω female socket
Connector designation		ASI IN
Pin-outs	Centre Shield	Input Ground/Chassis

2.3.14. COMPONENT VIDEO Connector (RX8200 only)

The equipment is equipped with a SVGA 15-pin D-type connector for video output monitoring in the standard configuration. The SVGA connector shall be set to RGB/HV (SVGA) or YPrPb under control of the User interface and remote control interfaces.

Table 2-13 COMPONENT VIDEO Connector

Item	Specification	
Connector type	15-way D-type, female	
Connector designation	COMPONENT VIDEO	
	Pin	
Pin-outs	Pin 1	Red / Pr, 75 Ω, 0,7Vt-t
	Pin 2	Green / Y, 75 Ω, 0,7Vt-t
	Pin 3	Blue / Pb, 75 Ω, 0,7Vt-t
	Pin 4	NC
	Pin 5	Video GND
	Pin 6	Red GND
	Pin 7	Green GND
	Pin 8	Blue GND
	Pin 9	NC
	Pin 10	Sync GND
	Pin 11	NC
	Pin 12	NC
	Pin 13	H-Sync
	Pin 14	V-Sync
	Pin 15	NC

COMPONENT VIDEO

2.3.15. DATA OUT Connector (RX8200 only)

A data output interface may be used with either RS232 or RS422 connector, as described below.

Table 2-14 DATA OUT Connector

Item	Specification		
Connector type	9-way, D-type, male		
Connector designation	DATA OUT		
	Pin	**RS232**	**RS485**
Pin-outs	Pin 1	NC	HSD_CLK_A
	Pin 2	TxD	NC
	Pin 3	RxD	NC
	Pin 4	NC	NC
	Pin 5	NC	NC
	Pin 6	NC	HSD_CLK_B
	Pin 7	CTS	NC
	Pin 8	(RTS)	HSD_DATA_A
	Pin 9	NC	HSD_DATA_B

DATA OUT

2.3.16. ALARM Connector

All units provide an alarm relay connector supplying a summary relay. Under user configuration, it is activated whenever the unit detects an alarm, or the power is switched off.

The table below shows the pin-out applicable to Software Version 5.12.0 onwards, or when the *Relay Mode* is set to **Revised** in Software Version 5.16.0 onwards.

Table 2-15 ALARM Connector

Item	Specification		
Connector type	9-way, D-type, female		
Connector designation	ALARM		
	Pin	Relay	Connection
Pin-outs	Pin 1	3	Normally Closed
	Pin 2	2	Common
	Pin 3	3	Common
	Pin 4	1	Common
	Pin 5	3	Normally Open
	Pin 6	2	Normally Closed-
	Pin 7	2	Normally Open
	Pin 8	1	Normally Closed (Closed on Alarm)
	Pin 9	1	Normally Open (Open On Alarm)

ALARM

2.3.17. RS232/RS485 REMOTE Connector (RX8200 only)

A remote control interface may be used with either RS232 or RS485 connector, as detailed below.

Table 2-16 RS232/RS485 REMOTE Connector

Item	Specification		
Connector type	9-way, D-type, male		
Connector designation	RS232/RS485 REMOTE		
	Pin	RS232	RS485
Pin-outs	Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8 Pin 9	DCD RxD TxD DTR Ground DSR RTS CTS RI	NC NC NC RxD+ NC TxD- TxD+ RXD- NC

RS232/RX485

3. Using the Equipment

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3.1. Introduction

This chapter describes the features and options provided by the RX8000 Integrated Receiver/Decoder (IRD).

3.2. Powering the Equipment

CAUTION: This equipment should not be operated unless the cooling fans are working and there is free-air flow around the unit.

1. Connect all signal and power cables to the rear panel of the unit. All connectors are described in *Chapter 2, Installing the Equipment.*

2. Switch on the AC power supply to the unit at the wall or rack outlet.

NOTE: The RX8000 IRDs do NOT contain a power on/off switch.

3. After a short period of initialization the following screen is displayed on the Front Panel:

```
INITIALIZING
8.22.0 (Bank 0)
```

4. During initialization, confirm that the **Status** LED is on and all **Up**, **Down**, **Left**, **Right**, **Edit** and **Save** pushbuttons are lit (where fitted).

3.3. Using the Front Panel

The user interface for the Front Panel consists of an alphanumeric Liquid Crystal Display, pushbuttons and a status LED that are used to set-up, control and monitor the unit.

Various menu screens can be navigated on the LCD using the pushbuttons, which allow you to select and modify key parameters and features of the unit.

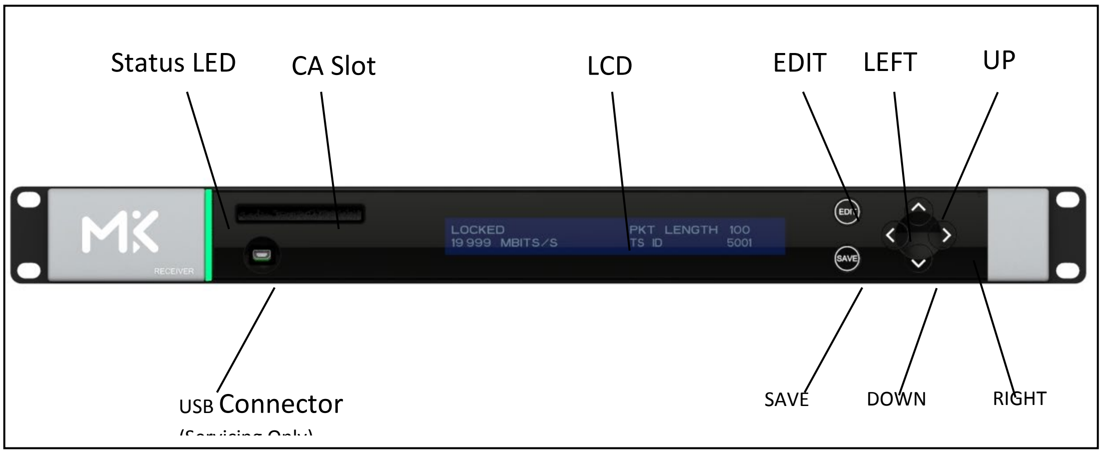


Figure 3-1 Front Panel Controls (RX8200)

3.3.1. USB Connector

This connector is for factory/service use only.

3.3.2. Status LED

This multi-colored LED provides a visual indication of the summary status of the unit. The LED can be any one of three colors:

- **Red (CRITICAL Error)** – Indicates that the unit has lost lock with the Transport Stream.
- **Amber (MAJOR or MINOR Error)** – Indicates that the unit is locked to a Transport Stream but an error has been detected signifying incorrect conditions or system functioning.
- **Green (NO Errors)** – Indicates that the unit is locked to a Transport Stream and correct conditions and system functioning are detected.

NOTE: To assist with unit identification, it is possible to configure the LED to flash on and off for a period of 20 minutes. Refer to section 3.9.2 Device Info

3.3.3. LCD

A 2-line x 40-character, back-lit, dot-matrix, Liquid Crystal Display (LCD) provides menus and settings that vary depending on which IRD model is being used and which options have been enabled through the purchase of a suitable license.

All menus are numbered to aid navigation.

3.3.4. Arrow Pushbuttons (Up, Down, Left, Right)

Four arrow pushbuttons (or keys) are used to navigate through the front panel menus. A pushbutton will be illuminated to indicate that a further choice or action is available by pressing that pushbutton.

▲ = Up

▼ = Down

◀ = Left (Back)

▶ = Right (Forward)

3.3.5. Edit and Save Pushbuttons

The **Edit** and **Save** pushbuttons (or keys) are used to modify and store user settings within the selected menu. The **Edit** pushbutton is illuminated when the current menu contains an editable setting. The **Save** pushbutton is illuminated when a change has been made that requires saving.

To edit a user setting within the selected menu:

5. Press the **Edit** key. A cursor appears (flashes) on the first line of the display.

6. If a numerical value is to be entered, use the ◀ (Back) and ▶ (Forward) keys to move the cursor along the line and select each digit in turn, and use the ▲ (Up) and ▼ (Down) keys to increment or decrement the digit.

7. If a non-numerical (mode or feature) menu item is to be selected, simply change the selection using the ▲ (Up) and ▼ (Down) keys.

8. Press the Save key to save the new setting or press the Edit key to abandon the operation and return to the original setting.

3.3.6. Menu Structure

The IRD's menu structure is divided into "section headings" for example: System, Alarms, Input, etc. Each of these is accessible by scrolling up and down the "root level" of the menu tree. The root level of the menu tree is accessed by selecting the ◀ (Back) key until the menu can go no further. At this root level the pages will be numbered 1, 2, 3, 4, etc.

Each of these section headings then has sub-menus which can be accessed by scrolling ▶ (Forward) and ▼ (Down). The further into the sub-menus, the longer the page number will get, e.g. 1, 1.1, 1.1.1, etc.

This structure is currently as follows:

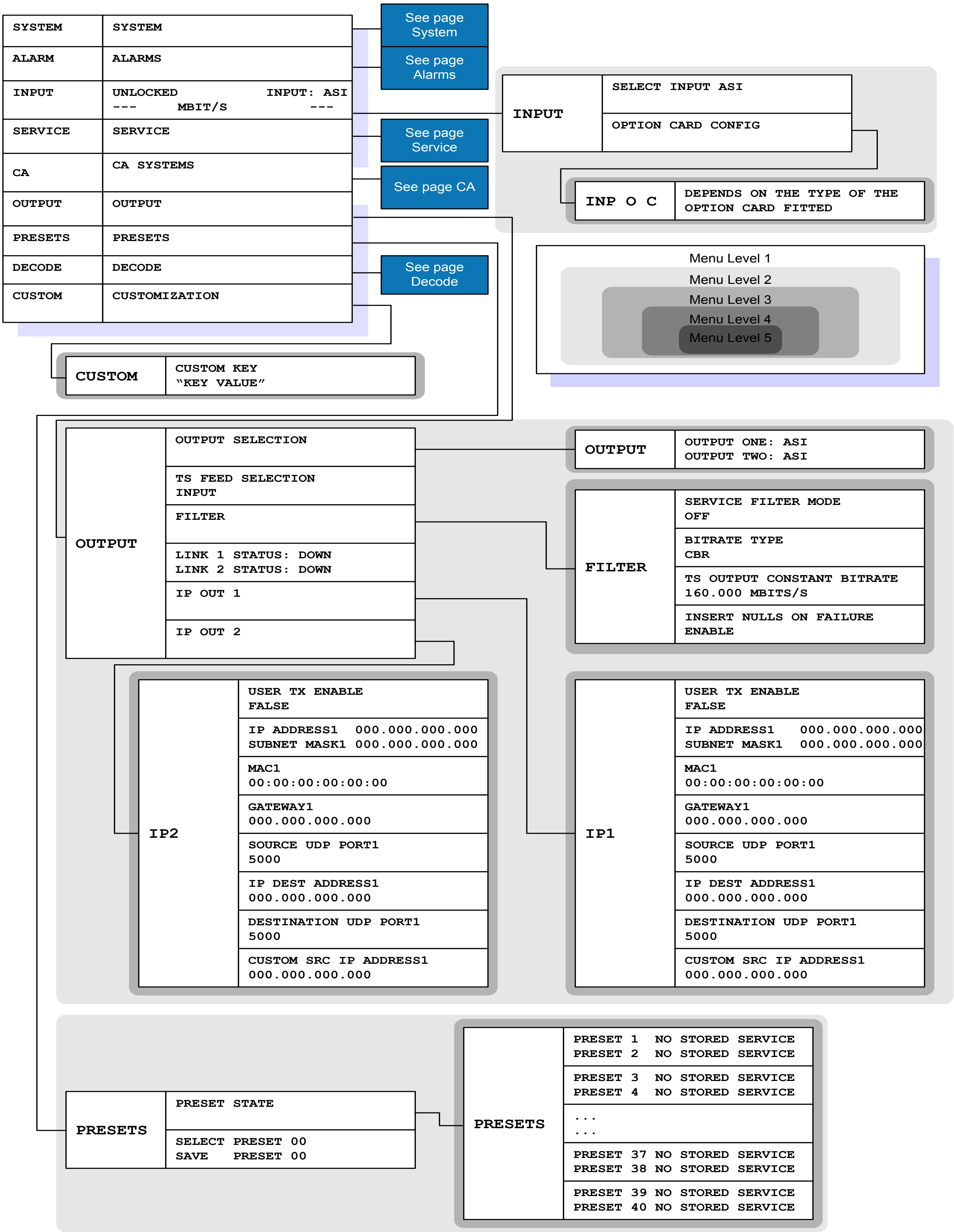


Figure 3-2 Front Panel Main Menu; Input, Output, Presets, Customization Sub-menus

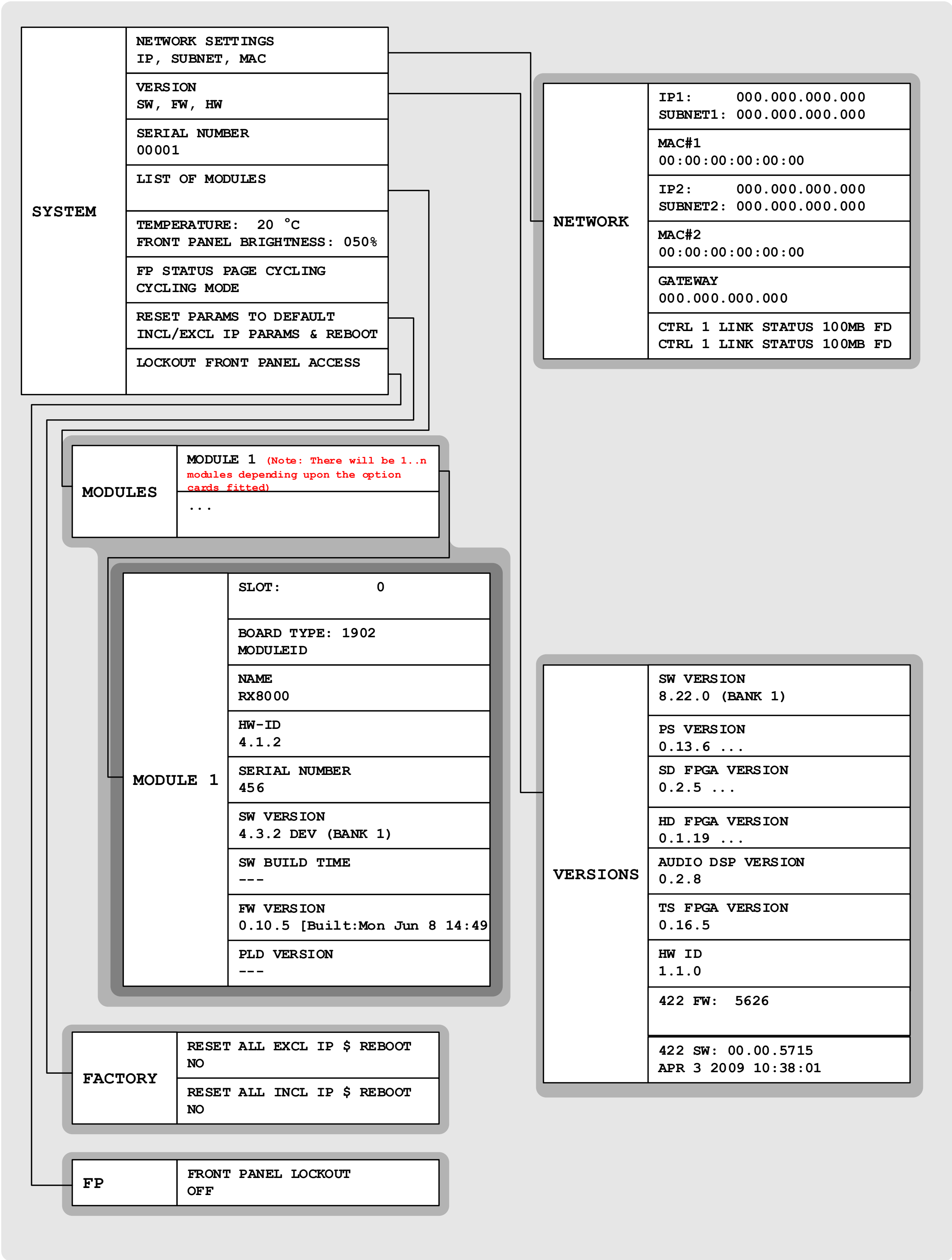


Figure 3-3 Sub-menu System

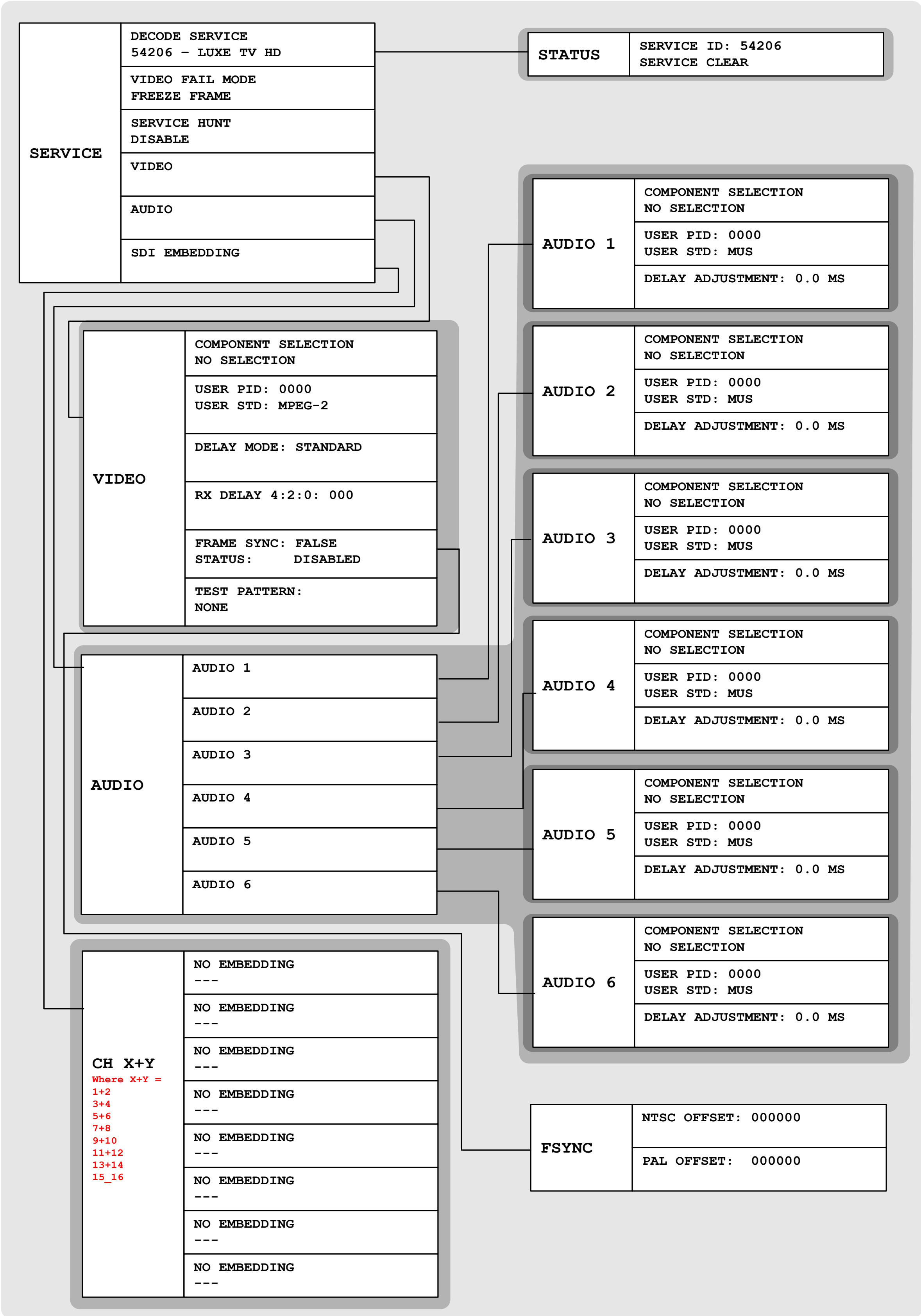


Figure 3-4 Sub-menu Service

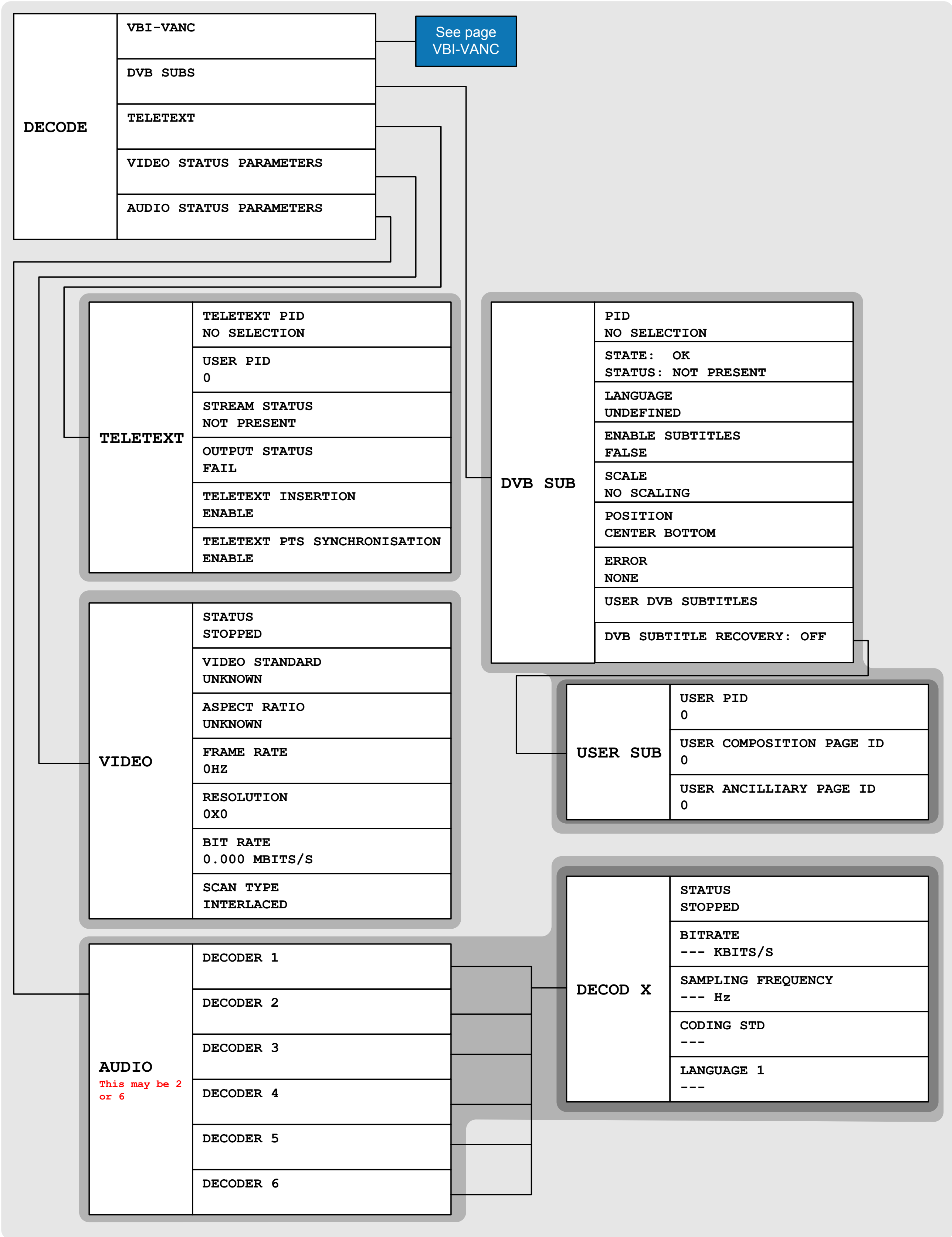


Figure 3-5 Sub-menu Decode

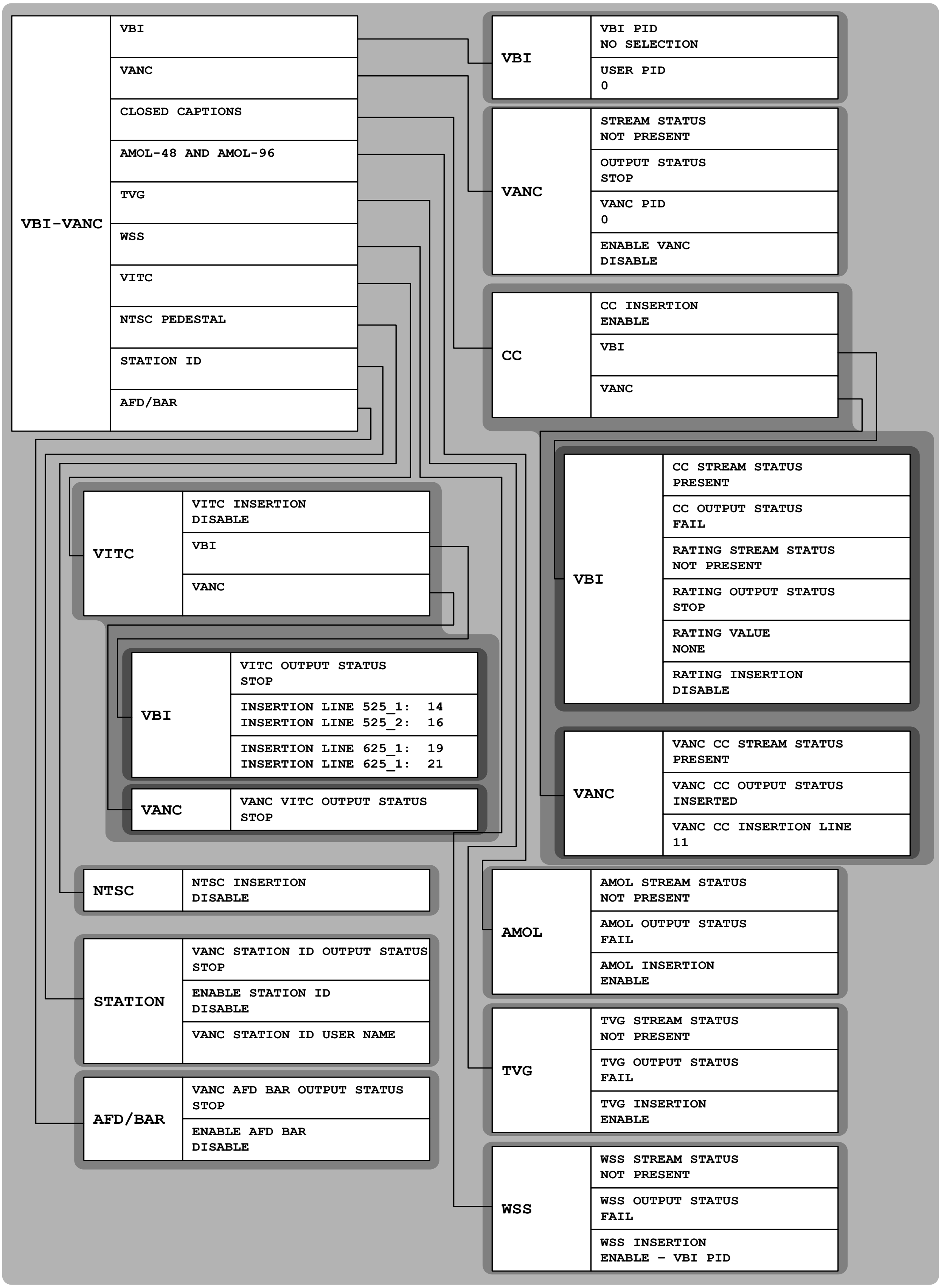


Figure 3-6 Sub-menu VBI-VANC of Decode

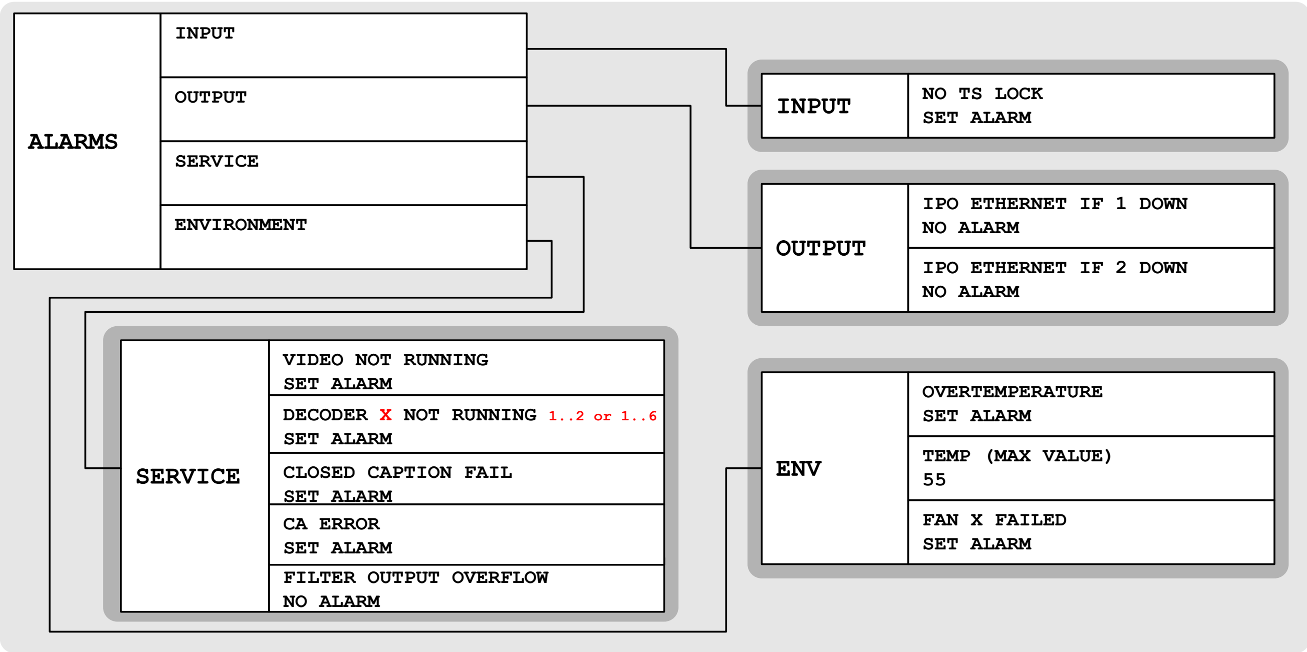


Figure 3-7 Sub-menu Alarms

NOTE: The detail of each front panel element is explained throughout this chapter.

3.4. Using the Web Browser

The Web Browser interface is available as a standard feature on all models of the IRD. As of software version 8.0.0, the IRD can be configured to present one of two web interface modes:

- **Dashboard View** – A simplified view showing the most common options on a single page that is compatible with most modern web browsers. This feature available when the RX8XXX/SWO/DASHBOARD license is enabled.
- **Advanced View** – The classic web interface that exposes all the options across a number of tab views. This mode is compatible with the browsers listed in *section 3.4.1*.

The Dashboard View will be presented by default but both modes have a button in the top right corner of the web interface to allow the user to switch between them.

3.4.1. Setting Up Web Browser Remote Control

A personal computer (PC) running a Web Browser can be used to configure, control and monitor the IRD remotely. The following web browsers have been tested:

- Microsoft Internet Explorer (This is the only browser supported by MediaKind)
- Mozilla Firefox (Functional but unsupported)
- Google Chrome (Functional but unsupported)

To set up Web Browser control:

1. Connect the PC to either of the two IP control interfaces on the rear of the IRD (labelled ETHERNET 1 / 2 or CONTROL 1 / 2).

2. Enter the settings for the relevant control port (IP Address, Subnet and Gateway) via the front panel Network Settings menu.

NOTE: If the IRD is connected to an existing network, or is not on the same subnet as the control PC, assistance from the network administrator may be required in modifying the network settings.

---

3. Open a Web Browser application on the PC.

4. Enter the IP address of the IRD into the address field of the Web Browser. The Status page from the Advanced View or the single page from the Dashboard View will appear in the Web Browser.

NOTE: To assist with troubleshooting, the IP control ports will respond to ICMP PING request messages.

3.4.2. XPO Password Protection

XPO Password Protection forces the user to enter a username and password in order access and configure the IRD through the web browser interface. If this feature has been enabled (RX8XXX/SWO/PW) then the user will be confronted with the following prompt.

Figure 3-8 Windows Security

The default settings from the factory are:

User Name: username

Password: password

When access has been granted for the first time, it is recommended that the XPO password is changed immediately. This can be changed by navigating to the **Device Info > XPO Password Protection** option from the Advanced View:

Figure 3-9 XPO Password Protection Settings

Enable/Disable Password Protection

- **Enable Password Protection** – This control overrides the password protection control. When enabled, the user must enter their password credentials every time a new web interface session is connected to the IRD device before being able to modify its configuration. When disabled (the default), anyone can gain access to the web interface and modify its configuration.

Change Password

- **User Name** – Used to enter the *new* desired user name.
- **Old Password** – Used to enter the *current* password.
- **New Password** – Used to enter the *new* desired password.
- **Confirm New Password** – Used to confirm the *new* desired password.

In order to change the XPO password, all four of these fields must be populated before clicking on **Apply Changes**.

NOTE: If the username or password has been forgotten then please contact MediaKind Customer Services for steps to reset the password.

3.4.3. Using the Web Browser Interface in Dashboard View

3.4.3.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
B	B	B	B	B

3.4.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items with this functionality			

3.4.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓			

3.4.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/DASHBOARD	Simplified Dashboard overlay	TBD	RX8XXX/SWO/DASHBOARD

3.4.3.5. Dashboard View

When in Dashboard View, the Web Browser Interface displays a simplified view with the most commonly used options accessible from a single page. The Dashboard View mode dynamically updates status information and current configuration options without the need to refresh the web browser.

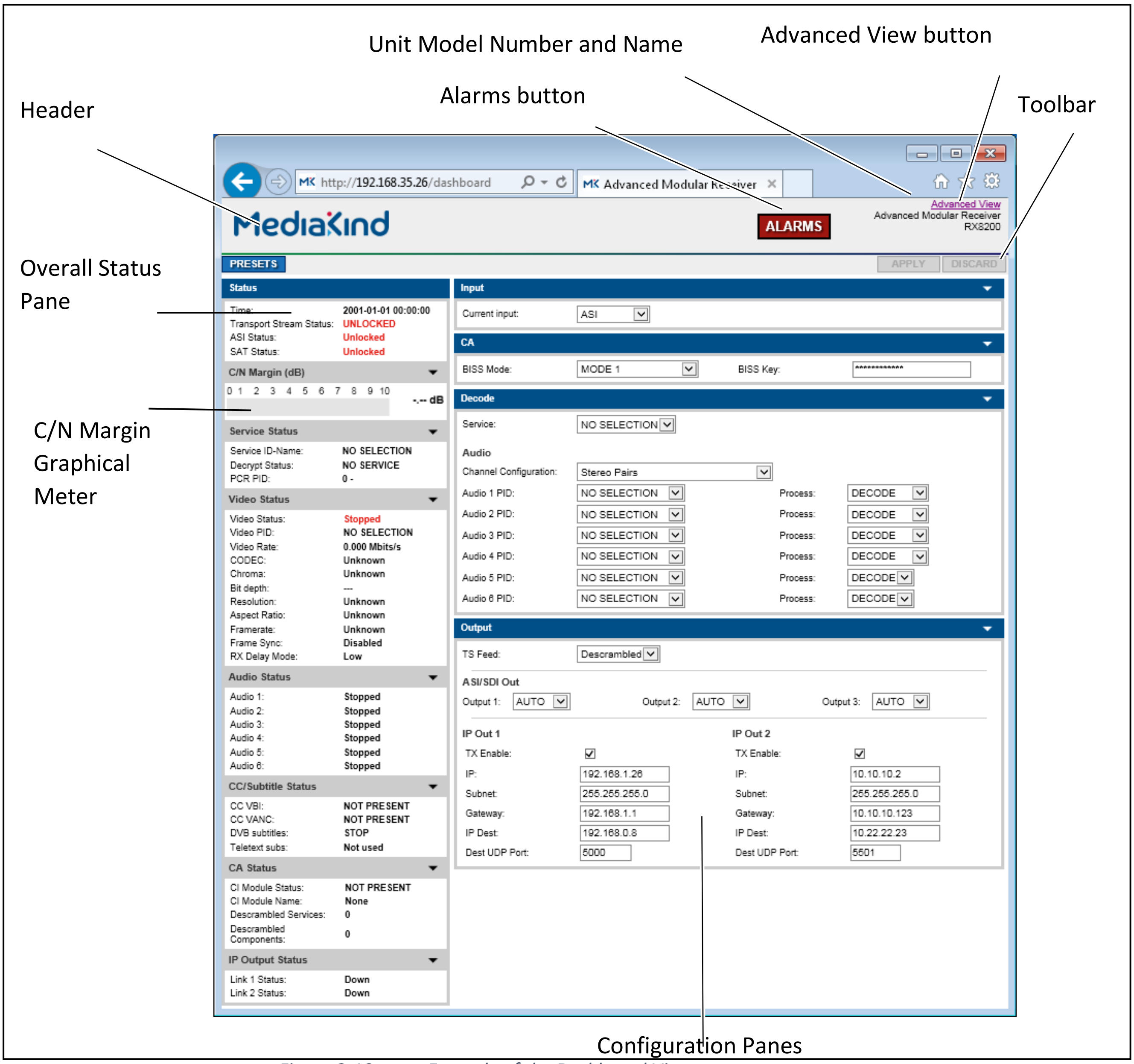


Figure 3-10 Example of the Dashboard View

- **Header** – The header of the web page displays the MediaKind logo and the unit model number/name.
- **Alarms Button** – This will open a window listing the currently active alarms reported by the unit.
- **Toolbar** – The simplified toolbar provides two buttons applicable to the Dashboard View: The **Apply** button will push any configuration changes to the unit. The **Discard** button will discard configuration changes that have not yet been applied.
- **Advanced View Button** – When in the Dashboard View mode, this button will switch the web interface to the Advanced View.
- **Overall Status Pane** – Contains a subset of sections to the left of the page that summarize the operating status of the

unit. These status values are updated dynamically by the Dashboard View.

- **Configuration Panes** – A simplified view of the most popular configuration settings to the right of the page that can be applied to the unit.
- **C/N Margin Graphical Meter** – If fitted with a satellite input card, the current C/N Margin for the locked satellite signal is reported and visually represented by a graphical meter.

The Dashboard View mode is available on most IRD variants and is enabled using the RX8200/SWO/DASHBOARD software option.

The following table lists the icons, buttons and other symbols used in this web interface mode.

Table 3-1 Web Page Icons, Buttons and Symbols in the Dashboard View

Item	Description
Navigation	
ALARMS	Click on this button to view the currently active alarms raised by the unit.
APPLY	Click on this button to push configuration changes to unit that will be applied immediately.
DISCARD	Click on this button to discard all configuration changes that have not yet been applied. Changes will revert to the active settings.
Advanced View	Switch from the Dashboard View mode to the Advanced View mode.
Parameter Presentation	
Input	The icon to the right of each pane is used to collapse or expand an individual pane and its contents: Pane is expanded, click to collapse. Pane is collapsed, click to expand.

3.4.3.6. Simplified Settings

The status and configuration settings exposed in the panes reflect the values and a subset of the options available in the Advanced View.

3.4.3.6.1. Status Pane

Displays live status information reported by the unit. It is broken down in to subset sections that are dependent on licenses and options fitted: overall Input Status; C/N Margin graphical meter; Service Status; Video Status; Audio Status; CC/Subtitle Status and CA Status.

3.4.3.6.2. C/N Margin (dB) Pane

The C/N Margin Pane is only shown if a Satellite Card is fitted to the unit. When the Satellite Card is locked to a satellite signal, the C/N Margin is reported in both numeric and graphical form. The red and green bar represents the C/N Margin value on the graphical meter.

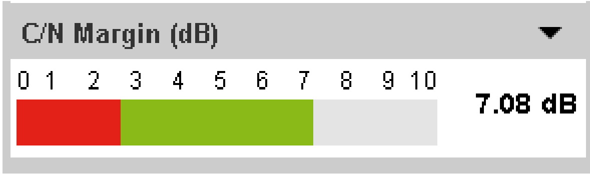


Figure 3-11 C/N Margin Status Pane

The **C/N Margin (Min Value)** is the threshold for the C/N Margin alarm that is configured in the Advanced View. The red part of the meter represents values below this threshold. The green part of the meter represents values above this threshold. The C/N Margin alarm remains cleared unless the measured C/N Margin value drops below this threshold at which point the C/N Margin alarm will be raised.

3.4.3.6.3. Input Pane

This exposes commonly used input configuration settings for the unit. Only ASI, IP and satellite settings are exposed here. For other input types such as DVB-T2 or G.703, it will be necessary to switch over to the Advanced View.

3.4.3.6.4. CA Pane

This exposes commonly used Conditional Access configuration settings for the unit. Only settings for BISS CA are exposed here. For other CA types such as Director or DVB-CI, it will be necessary to switch over to the Advanced View.

3.4.3.6.5. Decode Pane

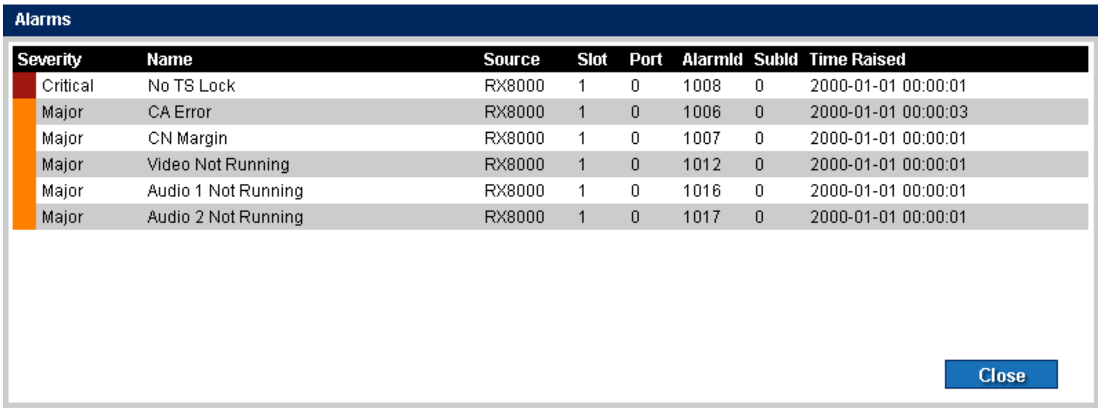
Decode settings such as service selection and audio component selection are exposed here. For other advanced settings, it will be necessary to switch over to the Advanced View.

3.4.3.6.6. Output Pane

The Output Pane provides access to common output configuration settings such as TS Feed and ASI or SDI control settings. For advanced settings such TS filtering settings, it will be necessary to switch over to the Advanced View.

3.4.3.6.7. Alarms Button

To view any currently active alarms from the Dashboard View, click on the **Alarms** button from the top of the web page. A pop-up window will appear similar to that shown below.



Alarms

Severity	Name	Source	Slot	Port	AlarmId	SubId	Time Raised
Critical	No TS Lock	RX8000	1	0	1008	0	2000-01-01 00:00:01
Major	CA Error	RX8000	1	0	1006	0	2000-01-01 00:00:03
Major	CN Margin	RX8000	1	0	1007	0	2000-01-01 00:00:01
Major	Video Not Running	RX8000	1	0	1012	0	2000-01-01 00:00:01
Major	Audio 1 Not Running	RX8000	1	0	1016	0	2000-01-01 00:00:01
Major	Audio 2 Not Running	RX8000	1	0	1017	0	2000-01-01 00:00:01

Close

Figure 3-12 Example of Active Alarms from the Dashboard View

3.4.4. Using the Web Browser Interface in Advanced View

3.4.4.1. Availability

● = Option B = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
B	B	B	B	B

3.4.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items with this functionality			

3.4.4.3. Control

Web	Front Panel	SNMP	Serial Remote
✓			

3.4.4.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys required for this feature			

3.4.4.5. Advanced View

When in Advanced View, the Web Browser Interface displays various web pages, corresponding to the different functions of the IRD, as shown in *Figure 3-13.*

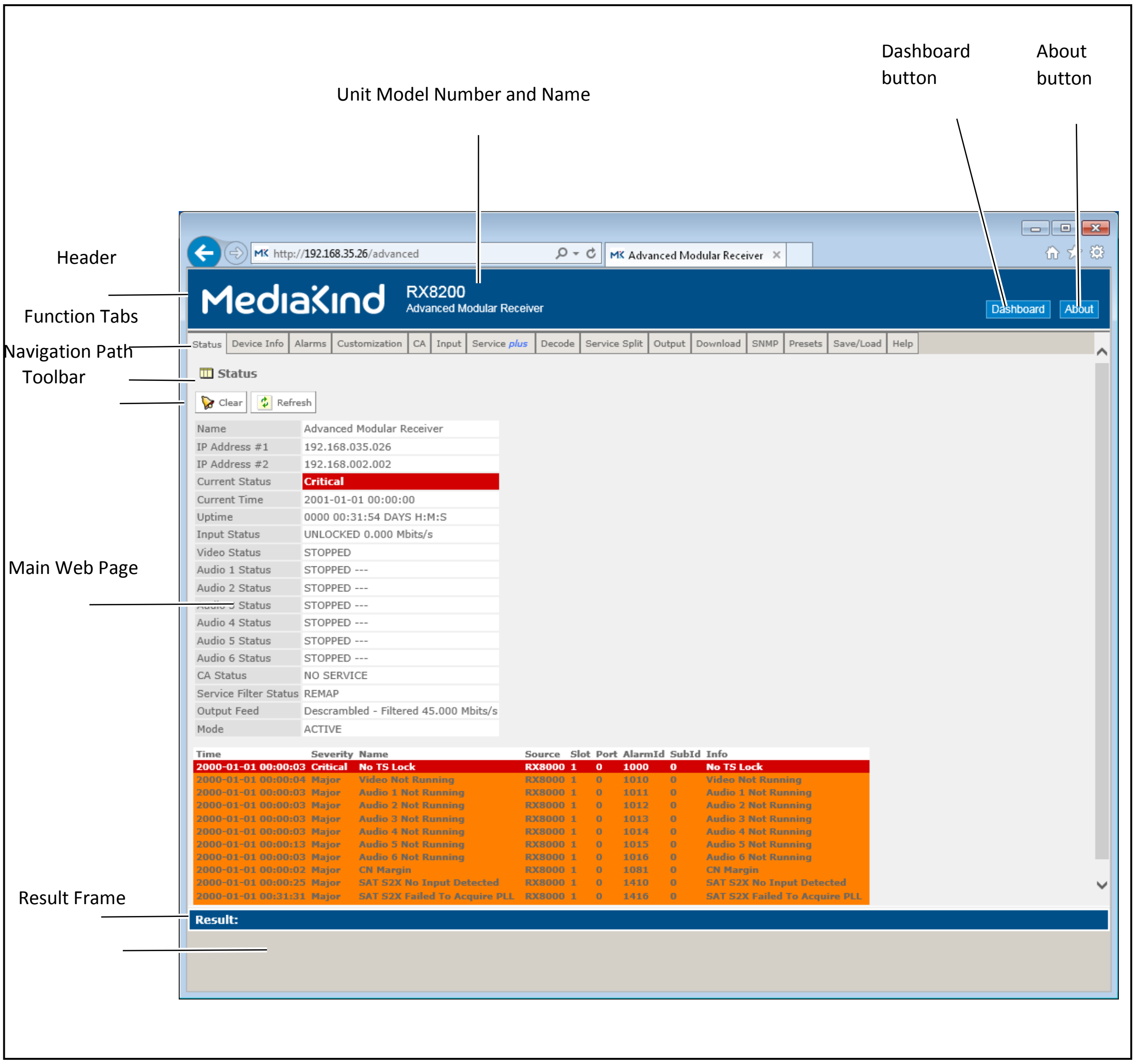


Figure 3-13 Web Page Overview in Advanced View

- **Header** – The header of the web page displays the MediaKind logo and the unit model number/name.
- **Dashboard Button** – When in Advanced View mode, this button will switch the web interface to the Dashboard View.
- **About** – When clicked, displays an information dialog about the unit, including the software version number. Click the **OK** button to close the dialog.

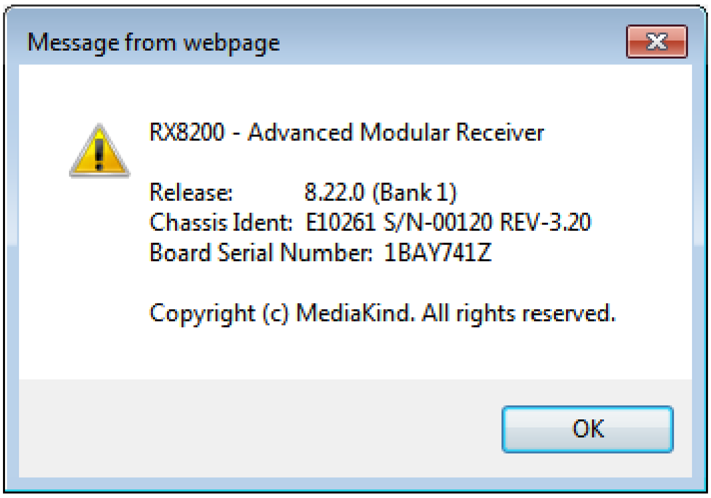


Figure 3-14 About Dialog

- **Function Tabs** – The web pages for control and monitoring of specific functions are accessed by selecting the appropriate function tab along the top of the web page. When you switch between tabs, the browser remembers the path within each tab.
- **Navigation Path** – The web pages are organized into a tree-like structure, like the directory on a computer. The current navigation path is always displayed at the top of the web page showing the route taken to the current page. To return to a higher level (parent) web page (folder), simply click on the relevant name link in the Navigation Path or click the Top Level Folder icon in the toolbar.
- **Toolbar** – The toolbar provides various tools/buttons depending on the web page selected.
- **Main Web Page** – The main content of the web page displays parameters and their current values. Some parameters can be modified by overtyping, selecting an option from a drop-down menu or by placing a tick in a checkbox as required. Any changes made will not be applied to the unit until the **Apply Changes** button is clicked in the Toolbar.
- **Result Frame** – The Result Frame at the bottom of the screen will feedback results of any command actions. **SUCCESS**, **SUCCESS with warnings** or **ERROR** may be displayed, with further details as appropriate for more complex actions.

The following table lists the various icons, buttons and other symbols used in these web pages.

Table 3-2 Web Page Icons, Buttons and Symbols

Item	Description
Navigation	
	Click on this icon to navigate one step up (to the parent folder) in the folder structure.
	Click on this icon to navigate back to the previous view. This icon typically appears when you are editing a single record in a table or a sub-table.

Item	Description
Apply Changes	Click on this button to apply the changes you have made to parameters in this web page. The result of your actions will be shown in the Result Frame.
Refresh	Click on this button to refresh the current screen. This may be useful if the screen contains read-only status parameters such as measured bit rates.
Parameter Presentation	
Build	The folder icon is used to represent a web page in the system. A folder is similar to a directory in a file system. The button shown left indicates that a further sub-folder or lower-level web page is available by clicking on the button.
	This icon is used to represent a table. A table normally consists of multiple items, where each item consists of several fields.
Reboot Unit	Click on this button to reboot the unit.
About	Click on this button to view the overall release version running on the unit.
Dashboard	Switch from the Advanced View mode to the Dashboard View mode.
Table Operations	
	These buttons are used to navigate a table of data when it is too large to fit into one screen. The symbols are: go to start previous screen next screen go to end
Add Item	Press this button to add a new item into the table. You will be taken to the "New item" screen in the table.
Delete Selected	Pres this button to delete selected items. You select items by clicking the checkboxes in front of each row.
Delete All	Press this button to delete all items in a table. Note that this will delete the entire table, not only the items you may see on the screen at any time.

3.5. SNMP

Simple Network Management Protocol (SNMP) is a network protocol used to monitor network-attached devices for conditions that warrant administrative attention. SNMP consists of a set of standards for network management, including an application layer protocol, a database schema, and a set of data objects.

The IRD supports SNMP Versions 2C and 3 as a standard feature.

3.5.1. Setting Up SNMP Remote Control

SNMP remote control is enabled by default.

To set up SNMP remote control:

1. Ensure the Web Browser Interface is connected and working and switch over to the Advanced View mode.

2. From the browser SNMP tab, select the version of SNMP required (V2C or V3).

3. Ensure the trap community, read-write community, and read-only community are configured as public or private in the same way as the MIB browse or SNMP application being used.

3.5.1.1. SNMP > Parameters

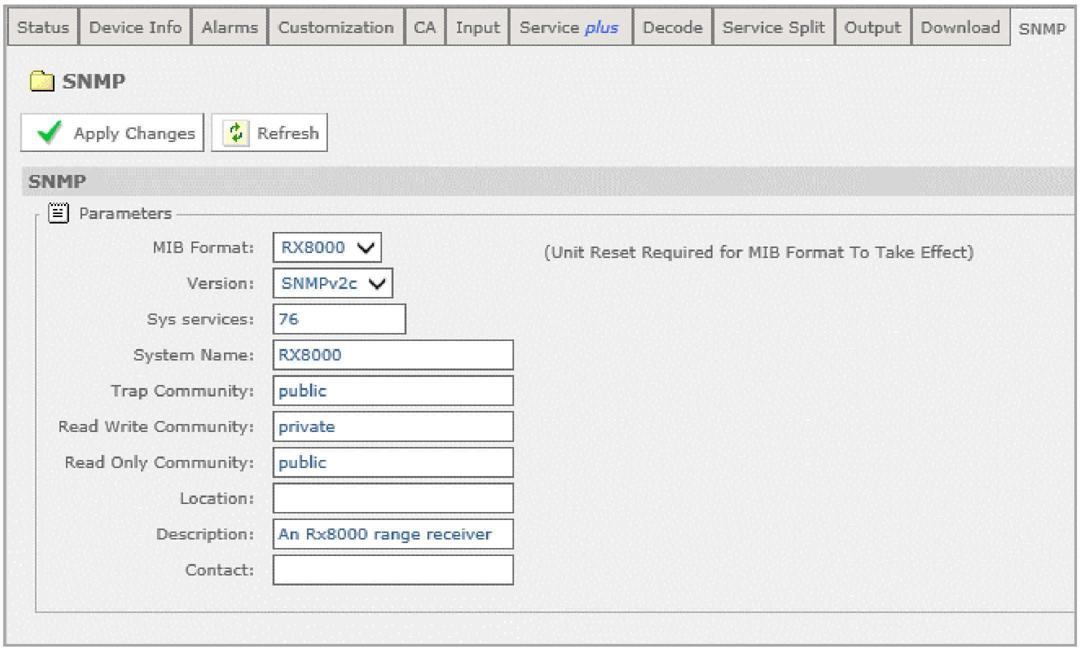


Figure 3-15 SNMP Web Page

- **MIB Format** – Selects between RX8000 (Default) and RX1290 mode. Setting to RX1290 mode causes the unit to respond to a subset of the RX1290's MIBs rather than the standard full RX8000 MIBs. For further information and advice regarding this setting contact MediaKind Customer Services

NOTE: The IRD must be reset for these changes to take effect.

- **Version** – Enables selection of the SNMP version from a drop-down menu.
- **Sys Services** – Enables input of a value for MIB-2 services that this device primarily offers (MIB-II RFC1213). See MIB-2 for definition.
- **System Name** – Enables input of a MIB-2 sys name, which should be an administratively-assigned name.
- **Trap Community** – Enables input of type of trap community.
- **Read Write Community** – Enables input of type of read write community.
- **Read Only Community** – Enables input of type of read only community.

- **Location** – Enables input of a MIB sys location which is the physical location of this node.
- **Description** – Enables input of a MIB sys description which should be a textual description of the entity.
- **Contact** – Enables input of a MIB sys contact which should be a textual identification of the person to be contacted.
- **Boot Count** – Displays the number of times the unit has been restarted.

3.5.2. Downloading the MIB

SNMP exposes management data in the form of variables on the managed systems, which describe the system configuration. The SNMP Management Information Base (MIB) stored on each unit defines which information (variables) should be monitored. The MIB may be downloaded from the unit as a zip file using the Web Browser interface. These variables can then be queried (and set) by managing applications.

Please refer to the managing application documentation for compiling third-party MIBs.

NOTE: The ZIP file is no longer password protected. If an older version of the ZIP file is downloaded, this may be protected with the password "Stoneham".

3.6. Director

MediaKind's Director Over-Air Control (OAC) system is available either as a standard feature or as an option on all of the RX8000 range IRDs, except for the RX8320 and RX8330C. OAC is a subset of the Director facility and is a remote control protocol which is used to access the units using MediaKind's nCompass Control System. An Over-Air Software Download facility is also provided which allows the IRD software to be upgraded without a network connection.

For more detailed information on MediaKind Director remote control, contact MediaKind.

3.6.1. Setting up Director Remote Control

For the unit to be controlled via OAC, the control mode of the IRD needs to be set to Director OAC control mode. This can be achieved either via:

- The front panel, using menu 5.2 DIRECTOR and sub-menus.
- The web interface using the CA tab page from the Advanced View mode.

3.6.2. Over-Air Control (OAC) Lockout

When the unit is in OAC control mode, it is possible for the remote control operator to issue a local lockout command to the IRD. This will effectively deny the local user access to configuring the unit.

However, if a situation occurs whereby the local user needs to regain control over the unit without a local lockout relinquish command being sent from the OAC control PC, a four-digit Personal Identification Number (PIN) may be entered through the front panel.

CAUTION: If the PIN is unknown it is possible to recover the PIN from the front panel. For more details on reseting the local lock out PIN, contact MediaKind.

The user creates the PIN at lockout time. To obtain the PIN, please consult the person responsible for the administration of the unit.

3.7. RS232/485 RCP

RS232/485 Remote Control Protocol (RCP) is only available as an option card on the RX8200 IRD.

This enables control of the unit through the RS232/485 serial connector on the rear panel of the unit, using MediaKind's proprietary remote control protocol. This feature allows customers, who may be upgrading their current systems to the RX8000 series, to continue using their current scripts for IRD control.

For more detailed information about RS232/485 RCP remote control protocols, contact MediaKind.

3.8. Local Control Lockout

Common for all control methods is that the equipment can still be controlled locally from the front panel interface unless the front panel is disabled. This can be achieved either:

- Locally using the front panel menu **1.8.1 FRONT PANEL LOCKOUT** to prevent local control from being re-established.
- Remotely using the appropriate remote command, depending on the remote control method being used.

When front panel lockout is set to ON / ENABLE, the user can still browse and navigate the front panel menus. However, none of the menu items can be edited (except for Menu 1.8.1 to enable/disable front panel lockout). The LCD will continue to display summary information screens.

3.9. General Web Browser Pages

The web interface served by the IRD will be one of two modes: the **Dashboard View** or the **Advanced View**.

All references to accessing the web interface throughout this manual are via the Advanced View only unless specified.

3.9.1. Status

Provided that the network is correctly configured, the following status page should be automatically loaded and displayed.

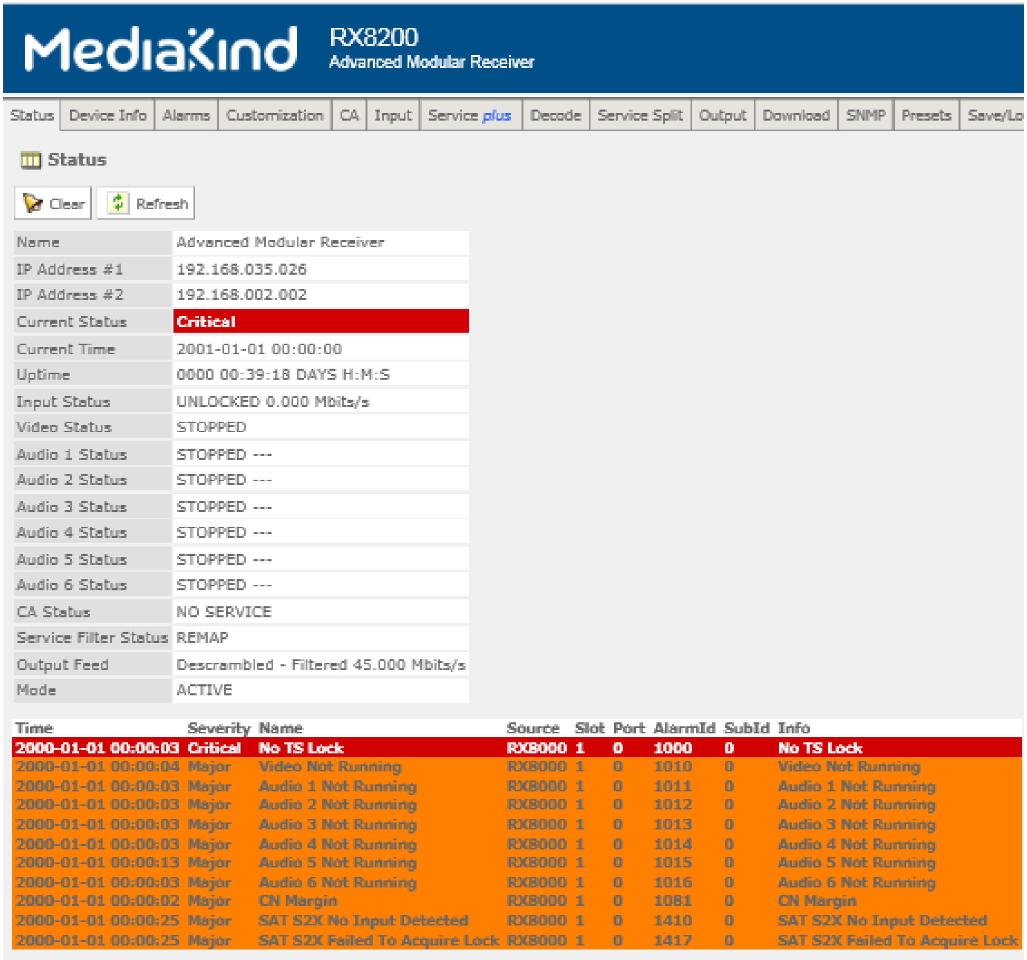


Figure 3-16 Status Web Page

This page provides a number of top-level status items:

- **Name** – Shows the configured device name for this IRD.
- **IP Address #1** – The configured IP address of the IRD’s Ethernet control port 1
- **IP Address #2** – The configured IP address of the IRD’s Ethernet control port 2
- **Current Status** – The current top level alarm status for the IRD. This reflects the highest level alarm active in the unit.
- **Current Time** – The current time reported is taken from the following (in priority order):
  - TDT (DVB) or STT (ATSC) extracted from the input Transport Stream
  - NTP server
  - Internal time with epoch of “2000-01-01 00:00:00”
- **Uptime** – The elapsed time since power-up.
- **Input Status** – The input TS lock status of the unit.
- **Video Status** – The decode status of the currently selected video decoder.

- **Audio Status** – The decode status of the currently selected audio decoders.
- **CA Status** – The status of the descrambler block within the IRD.
- **Service Filter Status** (shown if licensed) – Indicates the state of the service filter block.
- **Output Feed** – The status of the output Transport Stream feed.
- **Mode** – Indicates whether unit configuration is active or redundant.

A small window located at the bottom left of the Status Page will show events raised and all the necessary details of those events.

The **About** button, located on the top right-hand side of the Status page shows, when selected, details of the IRD such as software version and serial number.

The **Clear** button, located next to the **Refresh** button on the top left-hand side of the Status page, is used to clear the **Base Decoder Failure** alarm. For more information on this alarm, refer to section 3.9.3.9, Base Decoder Failure Alarm.

3.9.2. Device Info

The Device Info page provides access to system level settings of the IRD. To view this web page, select the **Device Info** tab from the top of the current web page.

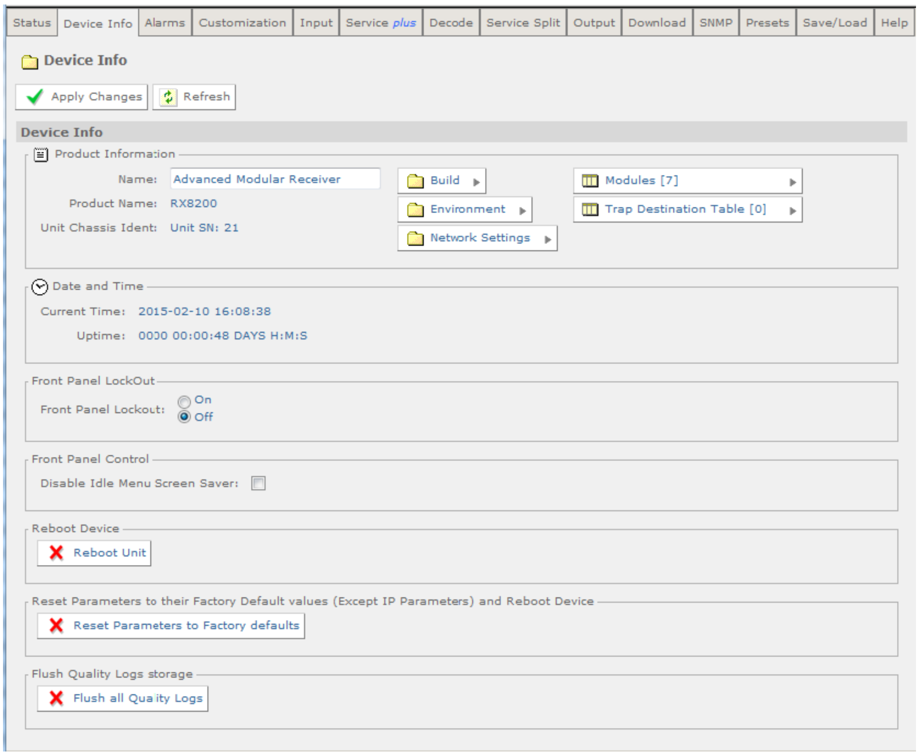


Figure 3-17 Device Info Web Page

Product Information

- **Name** – This field allows a descriptive name to be assigned to the IRD. The default name is the IRD model name.
- **Product Name** – The model of the product.
- **Unit Chassis Ident** – This is a unique identity value that matches the label printed on the side of the device chassis.
- Build/Environment/Network Settings/Modules/Trap Destination Table – These buttons access sub-menu pages, described below.

Date and Time

- **Current Time** – The current time reported is taken from the following (in priority order):
  - TDT (DVB) or STT (ATSC) extracted from the input Transport Stream
  - NTP server
  - Internal time with epoch of "2000-01-01 00:00:00"
- **Uptime** – The elapsed time since power-up.

Front Panel LockOut

- **Front Panel Lockout On/Off** – Indicates whether the front panel controls are active or inactive.

Front Panel Control

- **Disable Idle Menu Screen Saver** – Disables the front panel screen saver. The screen saver is activated if there is no navigation activity for more than 5 minutes.
- **Flash the front panel LED(20 mins duration)** – If set On, the front panel LED will flash on and off for approximately 20 minutes before resuming normal operation. This can be used to locate a particular unit if many IRDs are co-located.

Reboot Device

- **Reboot Unit** – Selecting this button will perform a hardware reset of the IRD.

Reset Parameters to their Factory Default values

- **Reset Parameters to Factory Defaults** – Selecting this button will set all parameters to their factory default values (except for the network IP parameters e.g. IP address and subnet mask) and perform a hardware reset of the IRD.

Flush Quality Logs storage

- **Flush all Quality Logs** – Selecting this button will flush all the quality logs.

A number of further web pages are accessible from the Device Info page and these are described in the following paragraphs.

3.9.2.1. Device Info > Build

This page gives details of the build and version information for the equipment. There are no fields on this page that may be edited by the user.

To view this page, select the **Build** button from the Device Info Page.

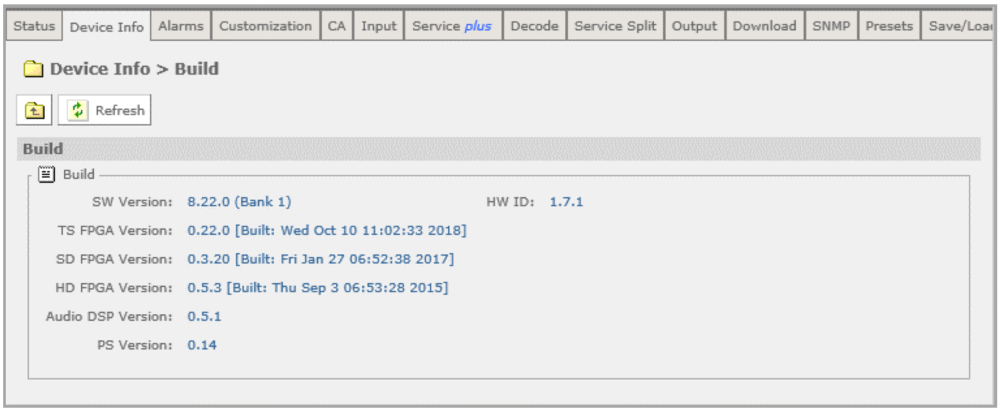


Figure 3-18 Device Info > Build Web Page

Build

- **SW Version** – Displays the software version and the currently selected software bank.
- **HW ID** – Displays the revision number of the base unit hardware.
- **TS FPGA Version** – Displays the version number and build date for the Transport Stream routing FPGA.
- **SD FPGA Version** – Displays the version number and build date for the SD video control and routing FPGA.
- **HD FPGA Version** – Displays version number and build date for the HD video (720P and above) control and routing FPGA.
- **Audio DSP Version** – Displays the version of the audio decoder DSP.
- **PS Version** – Displays the power sequence micro-controller version.

3.9.2.2. Device Info > Environment

This page gives details of the physical environment of the equipment i.e. temperature and fan speeds.

There are no fields on this page which may be edited by the user. Selecting the **Refresh** button will update the status values.

To view this page, select the **Environment** button from the Device Info Page.

Figure 3-19 Device Info > Environment Web Page

Environment

- **Temperature** – Displays the temperature measured inside the unit (°Celsius/°Fahrenheit).
- **Fan 1/2/3/4 Speed** – Displays the speed (revolutions per minute) of the fans fitted inside the unit.

3.9.2.3. Device Info > Network Settings

This page gives details of settings for the Ethernet Control ports. Fields on this page allow the user to configure Ethernet Control ports 1 and 2.

Any changes made to any of the settings will not be applied until the **Apply Changes** button is selected. Selecting the **Refresh** button will update current settings and status values.

To view this page, select the **Network Settings** button from the Device Info Page.

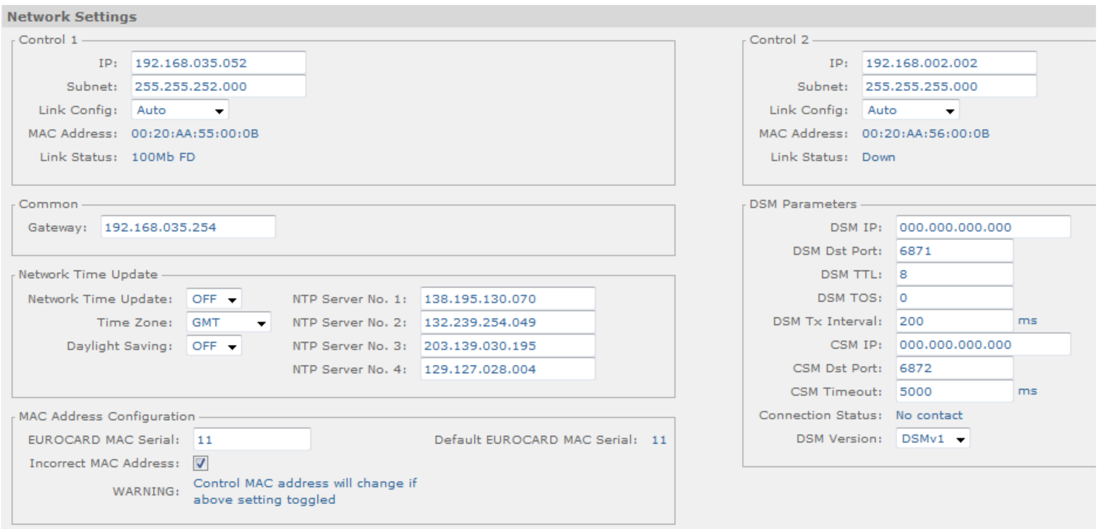


Figure 3-20 Device Info > Network Settings Web Page

3.9.2.3.1. Control 1/2

- **IP** – The IP address of this control port.
- **Subnet** – The Subnet address of this control port.

- **Link Config** – The link speed of the control port. This can be:
- 10 BaseT
- 10 BaseT Half Duplex
- 100 BaseT
- 100 BaseT Half Duplex
- Auto
- **MAC Address** – Displays the MAC address assigned to this control port (non-editable).
- **Link Status** – Displays the operating speed and mode of the established Control link (e.g. 100 Mb Full Duplex).

NOTE: If the IP address of Control 1 and Control 2 are set to the same value, the MAC Address of Control 2 will be automatically adjusted to match that of Control 1.

3.9.2.3.2. Common

- **Gateway** – The Gateway address common for both networks (Control 1 and 2).

3.9.2.3.3. Network Time Update

The implemented Simple Network Time Protocol (SNTP) client is able to synchronize the system time with second tier NTP servers.

Configuration is only possible via the web browser interface on the page **Device Info > Network Settings**.

- Network Time Update – ON/OFF.
- Time Zone – GMT + 12.
- Daylight Saving – ON/OFF.
- NTP Server No 1 – IP Address.
- NTP Server No 2 – IP Address.
- NTP Server No 3 – IP Address.
- NTP Server No 4 – IP Address.

NOTE: If the SNTP interface is not being used, its associated alarm should be masked.
If the input stream contains TDT, this will override the NTP server derived time.

3.9.2.3.4. DSM Parameters

Device Status Message (DSM) packets and Control Status Message (CSM) packets are an MediaKind proprietary protocol used within an nCC network to control redundancy. These packets are IP datagrams on specific IP addresses; they are used to provide the current health of the unit / network and to indicate whether the unit is 'spare' or 'live'. For more information about system redundancy within nCC please contact your system administrator.

The controls for this are:

- **DSM IP** – The IP address of the DSM IP packets to be placed on the network.
- **DSM Dest Port** – The destination port for the DSM packets.
- **DSM TTL** – User configuration for the time to live filed in the DSM packets.
- **DSM TOS** – User configuration of the type of service (differentiated services field) within the packet.
- **DSM TX Interval** – Interval in ms between each DSM packet placed onto the network.
- **CSM IP** – The IP address of the CSM packets within the network.
- **CSM Dest Port** – The destination port for the CSM packets.
- **CSM Timeout** – Timeout in ms before CSMs are considered to be absent from the network.
- **Connection Status** – Status of the unit within the redundancy network.
- **DSM Version** – There are several versions of CSM / DSM redundancy within nCC networks, for the correct version of redundancy for your system please contact your system administrator.

3.9.2.3.5. MAC Address Configuration

This permits the overriding of the MAC addresses used by the Control Ethernet ports and the IP Input Data Ethernet ports of the IP Input card (1914) and Combined Satellite/IP Input card (1931).

The first 3 octets of the MAC address are the MediaKind OUI, followed by 1 octet identifying the MediaKind product, and a final pair of octets derived from the serial number of the Base unit.

NOTE: It is recommended that these settings not be adjusted unless advised to do so by MediaKind Customer Services.

- **EUROCARD MAC Serial** - This allows the lower 2 octets of the IP Input card (1914) and Combined Satellite/IP Input card (1931), if fitted, to be changed to a manually specified value.
- **Default EUROCARD MAC Serial** - This is the default value that will be used for the EUROCARD MAC Serial.
- **Incorrect MAC Address** – This option is only exposed on some RX8300 variant IRDs where there was an issue with the assignment of MAC address to the Control Ethernet ports. **Changing this setting will result in the Control MAC address being changed, potentially causing a loss of connectivity to the receiver**.
- Clearing this tick box will mean the correct MAC address is calculated and applied to the Control Ethernet ports.

- Setting this tick box will mean the legacy MAC address is calculated and applied to the Control Ethernet ports.

3.9.2.4. Device Info > Remote Control

3.9.2.4.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●				

3.9.2.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
RS232 Remote Data Card	1927	FAZ 101 0113/17	RX8200/HWO/RS232

3.9.2.4.3. Functional Description

The RS232 Remote Data option card provides the following features:

- RS232 / RS485 Serial Remote Control
- Alarm Relay (the behavior is identical to the Alarm Relay interface on units that do not have the RS232 Remote Data card fitted)
- Low Speed Data (see section 0)

This option card enables the IRD to be controlled from a PC or similar device through a standard serial port that supports the MediaKind Serial Remote Control Protocol for RX8000 IRD.

The MediaKind protocol is based on the original System 3000/Alteia protocol and often referred to as the Alteia Remote Control protocol.

For command details on the MediaKind Serial Remote Protocol supported by the IRD, refer to the RX8000 Remote Control Protocol document. Please contact Customer Support for more information.

3.9.2.4.4. Configuration

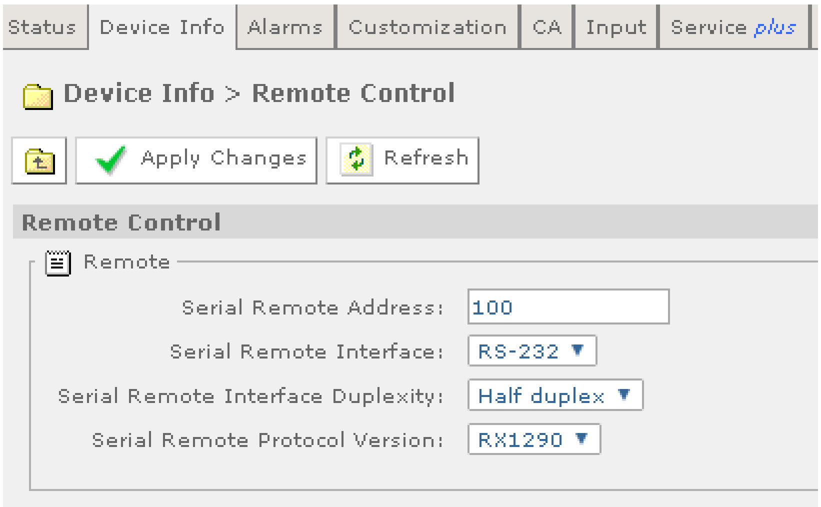


Figure 3-21 Device Info > Remote Control

- **Serial Remote Address** – This defines the Serial Remote Address assigned to the unit. When connected to a network that controls multiple IRDs, each address should be unique.
- **Serial Remote Interface** – Configures serial interface standard to apply to the Remote Control port:
- **RS-232** –This configures the Remote Control port to use RS-232 mode.
- **RS-485** – This configures the Remote Control port to use RS-485 mode and makes it possible to control multiple IRD from a single controller where the devices are connected to a common cable-rail.
- **Serial Remote Interface Duplexity** – Configures the duplex mode to apply to the Remote Control port:
- Half-Duplex
- Full-Duplex
- **Serial Remote Protocol Version** – This selects which of the serial remote protocol versions to use:
- **RX8000** –This is the default serial remote control protocol to use which controls most of the functionality available to the IRD.
- **RX1290** – This configures the IRD to follow the RX1290 serial remote control protocol where possible. Some of the RX1290 functionality may not be available on the IRD and the RX1290 protocol cannot access all of the features supported by the RX8000, so controlling the IRD using this protocol version will be limited.

3.9.2.5. Device Info > Modules

This page gives a list of all modules contained in the equipment chassis.

There are no fields on this page which may be edited by the user. Selecting the **Refresh** button will update current settings and status values.

To view this page, select the **Modules** button from the Device Info Page.

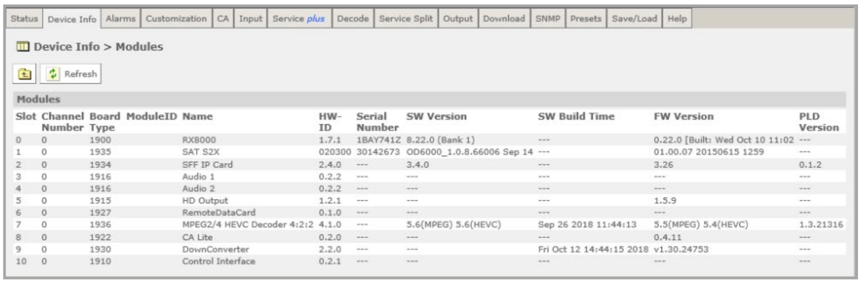


Figure 3-22 Device Info > Modules Web Page

The following modules are supported by the unit:

Table 3-3 Supported Modules

Board Type	Description
1900	RX8200 Motherboard
1901	RX8310/20 Motherboard
1902	RX8315/30 Motherboard
1910	Control Interface (RX8200 only)
1911	DVB S2 Input
1912	DVB S2 2nd Generation Input (RX8310B only)
1913	8VSB Terrestrial Input
1914	IP Input
1915	HD Video Output (RX8200 only)
1916	Analogue Audio Output
1918	IP Output (RX8200 only)
1919	IP Output (RX83xx only)
1920	MPEG 2 4:2:2 Decoder, 1st generation (RX8200 only)
1921	MPEG 2/4 AVC 4:2:2 Decoder, 2nd generation (RX8200 only)
1922	Common Interface Descrambler (RX8200 only)
1923	NDS Descrambler (RX8200 only)
1924	G.703 Input
1925	8VSB Terrestrial Input (RX8320 only)
1926	Russian SECAM Video Output (RX8330 only)
1927	Remote Data Card (RX8200 only)
1928	DVB S2 2nd Generation Input
1929	G.703 Input (RX8200 only)
1930	High Quality Down-converter (RX8200 only)
1931	DVB S2/IP Input (RX8200 only)
1932	DVB-T2 Input (RX8200 only)
1933	Multi Format 4:2:2 Decoder, 3rd generation (RX8200 only)
1934	Small Form Factor (SFF) Bi-directional IP Card
1935	DVB-S2X Input (RX8200 only)

Board Type	Description
1936	Enhanced Multi Format 4:2:2 Decoder, 4th generation (RX8200 only)

3.9.2.6. Device Info > Trap Destination Table

When an alarm occurs within the equipment, an SNMP Trap message is sent to all destinations and a list of these destinations is given in this web page.

NOTE: The SNMP alarm trap sent will contain sysUpTime. This is the elapsed time since the SNMP agent was reinitialized and this is not configurable on the IRD

To view this page, select the **Trap Destination** button from the Device Info page.

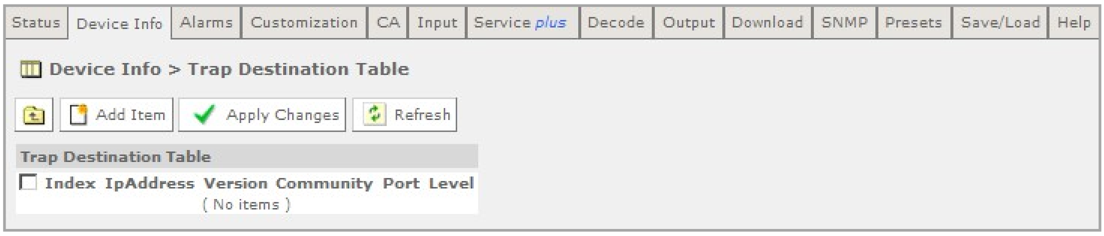


Figure 3-23 Device Info > Trap Destination Table Web Page

To add a new item to this page:

1. Select the **Add Item** button. The following page is displayed:

Figure 3-24 Trap Destination Table > Add Item Web Page

2. Enter the required values in the appropriate fields or select values from the drop-down menus.
3. Select the **Add** button to add the item to the Trap Destination table.
4. Select the **Back** button to return to the **Device Info > Trap Destination Table** web page. This will abort any unsaved changes.
5. Select the **Apply Changes** button to confirm changes.

Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

3.9.3. Alarms

The Alarms page provides access to the alarm settings for the IRD.

The content of this page is composed mainly of fields with drop-down menus which allow the setting or masking of various alarms and check boxes which can be used to activate relay mapping. Two of the alarm fields, namely **C/N Margin** and **Over Temperature** also have associated entry fields which allow the user to enter a threshold value which, if exceeded, will activate the alarm.

Setting an alarm property to **Set Alarm** will cause the following if an alarm event is raised:

- Activation of the front panel Alarm LED
- Raise of an alarm event in the main Status page and record it in the Alarm Log.
- If configured for relay mapping, the **Summary Alarm Relay** will be triggered.

Setting an alarm property to **No Alarm** masks an alarm event and therefore any of the behaviors described above. An alarm property can be mapped to the **Summary Alarm Relay** if the associated **Relay Mapping** check box is checked.

Any changes which are made to the alarm settings shown may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

To view this page, select the **Alarms** tab from the top of the current web page.

Figure 3-25 Configuring Alarm Behavior

3.9.3.1. Identifier Control

- **Alarm Mode** – Configures how the unique identifiers are assigned to each alarm type.
- **Dynamic:** The unique identifier value assigned to each alarm type is dynamically assigned during start-up based on the sequence when it is registered to the Alarm Manager. These identifiers can change depending on what hardware and software options are present.
- **Compatibility:** The unique identifier value assigned to each alarm type is fixed to the values listed in Appendix C.

NOTE: The IRD must be reset for these changes to take effect.

3.9.3.2. Relay Configuration

- **Relay Mode** – Change the behavior of the Summary Alarm Relay so that it is compatible across different IRD software releases.
- **Legacy:** This configures the behavior of the Summary Alarm Relay to match that of software versions before 5.12.0. Refer to *Table 3-4* for pin assignments.
- **Revised:** This configures the behavior of the Summary Alarm Relay to match that of software version 5.12.0 onwards. Refer to *Table 3-5* for pin assignments.

Table 3-4 Relay Assignment When Configured to Legacy Mode

Summary Alarm	Pin	Assignment	Alarm Behavior
Relay 1	4	Common	-
	8	Normally closed	Open on Alarm
	9	Normally open	Closed on Alarm

Table 3-5 Relay Assignment When Configured to Revised Mode

Summary Alarm	Pin	Assignment	Alarm Behavior
Relay 1	4	Common	-
	8	Normally closed	Closed on Alarm
	9	Normally open	Open on Alarm

3.9.3.3. Control Interface Alarms

Figure 3-26 Alarm settings for Control Interface section

- **No CSMs Received** – Select the alarm condition from the drop-down menu to be activated when no CSM packets are received (**Set Alarm /No Alarm**).
- **No CSMs Received (relay mapping)** – Place a check mark in the box to activate relay mapping when no CSM packets are received.
- **SNTP Sync Error** – Select the alarm condition from the drop-down menu to be activated when an SNTP time server cannot be found (**Set Alarm /No Alarm**).
- **SNTP Sync Error (relay mapping)** – Place a check mark in the box to activate relay mapping for SNTP sync error.

3.9.3.4. Input Alarms

3.9.3.4.1. Input > General Input Alarms

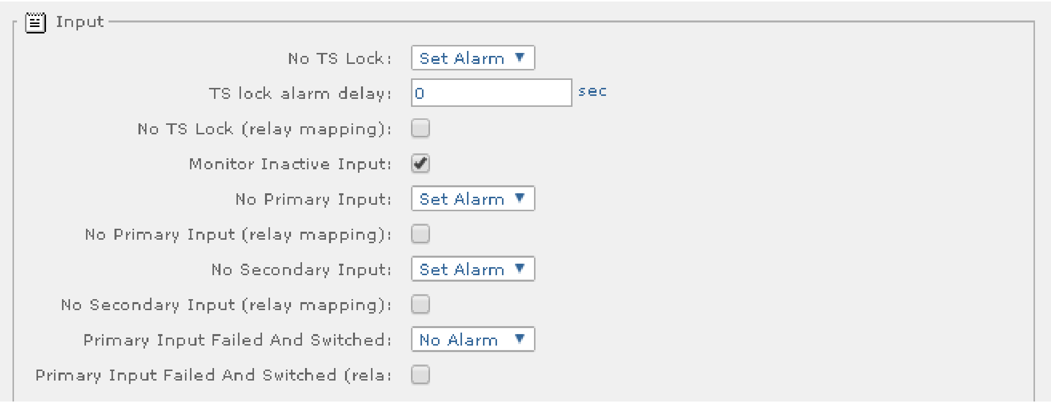


Figure 3-27 Alarm settings for the Input section

- **No TS Lock** – Select the alarm condition from the drop-down menu to be activated when Transport Stream loses lock (**Set Alarm /No Alarm**).
- **No TS Lock (relay mapping)** – Place a check mark in the box to activate relay mapping for Transport Stream loss of lock alarm.
- **Monitor Inactive Input** – Place a check mark in the box to activate an alarm when there is no signal present at the inactive Input.
- **No Primary Input Lock** – Select the alarm condition from the drop-down menu to be activated when Primary Input loses lock (**Set Alarm /No Alarm**).
- **No Primary Input Lock (relay mapping)** – Place a check mark in the box to activate relay mapping for Primary Input loss of lock alarm.
- **No Secondary Input Lock** – Select the alarm condition from the drop-down menu to be activated when Secondary Input loses lock (**Set Alarm /No Alarm**).
- **No Secondary Input Lock (relay mapping)** – Place a check mark in the box to activate relay mapping for Secondary Input loss of lock alarm.
- **Primary Input Failed And Switched** – Select the alarm condition from the drop-down menu to be activated when the Input Redundancy Mode is enabled and the current input is not the Primary Input (**Set Alarm /No Alarm**).
- **Primary Input Failed And Switched (relay mapping)** – Place a check mark in the box to activate relay mapping for the Primary Input Failed And Switched alarm.

3.9.3.4.2. Input > TS Monitor Alarms

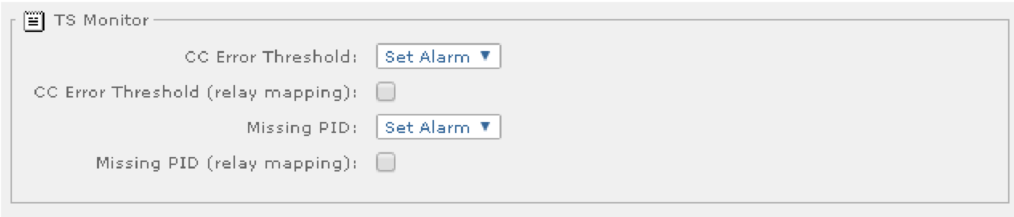


Figure 3-28 Alarm settings for the Input > TS Monitor section

- **CC Error Threshold** – Select the alarm condition from the drop-down menu to be activated when the TS Monitor is enabled and the PIDs of the selected services in the incoming transport stream are exhibiting continuity count errors above the configured threshold (**Set Alarm /No Alarm**).
- **CC Error Threshold (relay mapping)** – Place a check mark in the box to activate relay mapping for the CC Error Threshold alarm.
- **Missing PID** – Select the alarm condition from the drop-down menu to be activated when the TS Monitor is enabled and one or more of the PIDs from the selected services have not been detected within the configured period (**Set Alarm /No Alarm**).
- **Missing PID (relay mapping)** – Place a check mark in the box to activate relay mapping for the Missing PID alarm.

3.9.3.4.3. Input > Satellite Input Alarms (S2 and S2 ACM Input Card Types)

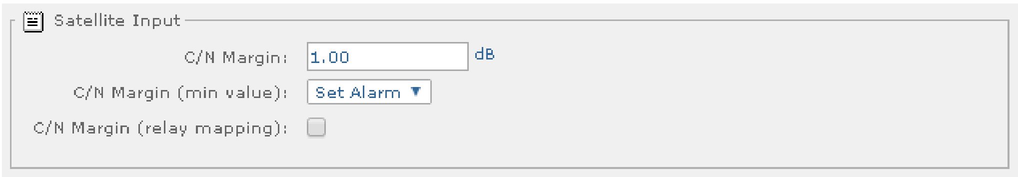


Figure 3-29 Alarm settings for the Input > Satellite Input section applicable to satellite board types 1911, 1928 and 1931

- **C/N Margin** – Select the alarm condition from the drop-down menu to be activated when the Carrier-to-Noise margin, set below, is exceeded (**Set Alarm /No Alarm**).
- **C/N Margin (min value)** – Enter the Carrier-to-Noise margin minimum value in decibels. This is used to trigger the alarm condition, set above, when exceeded.
- **C/N Margin (relay mapping)** – Place a check mark in the box to activate relay mapping for C/N Margin exceeded alarm.

3.9.3.5. Input > Satellite Input Alarms (S2X Input Card Type)

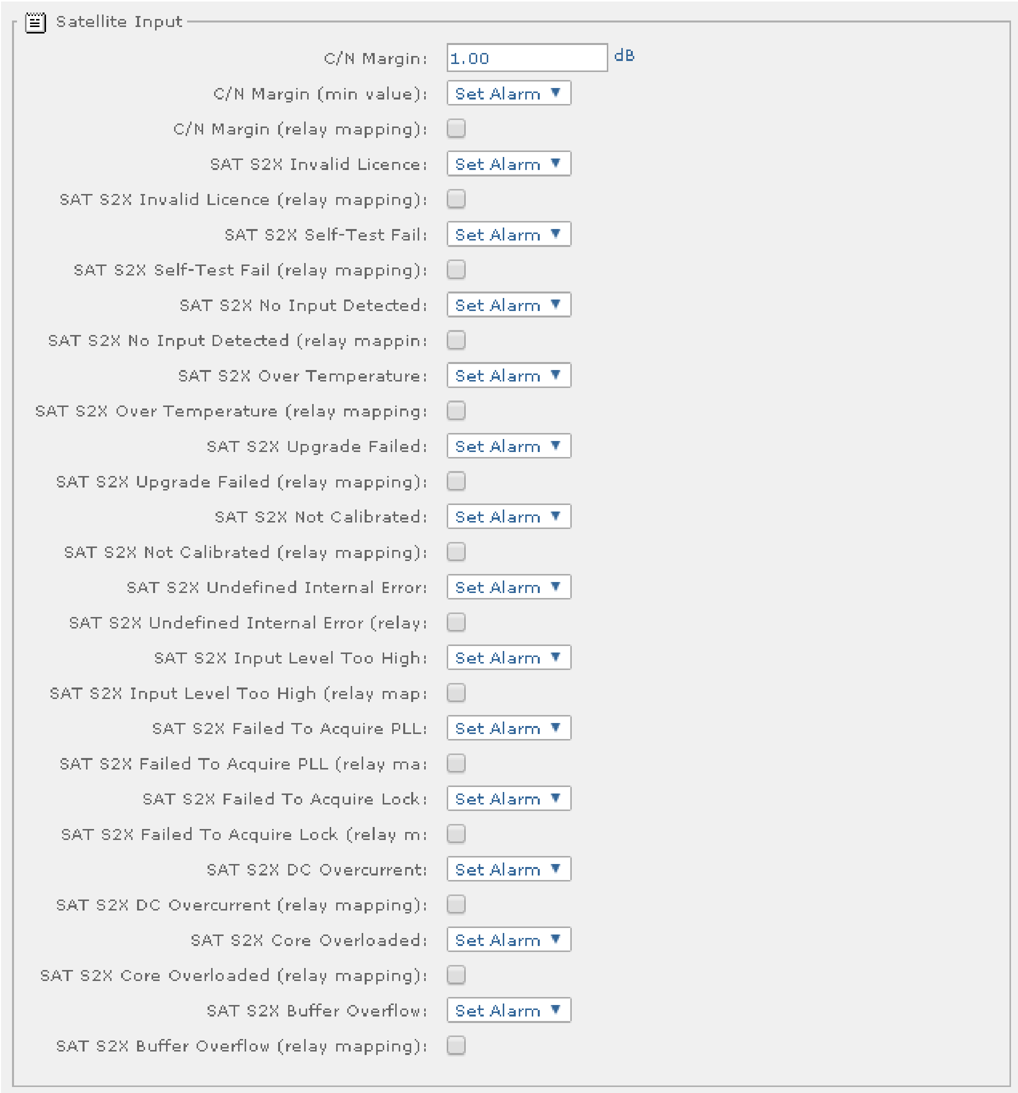


Figure 3-30 Alarm settings for the Input > Satellite Input section applicable to satellite board type 1935

- **C/N Margin** – Select the alarm condition from the drop-down menu to be activated when the Carrier-to-Noise margin, set below, is exceeded (**Set Alarm /No Alarm**).
- **C/N Margin (min value)** – Enter the Carrier-to-Noise margin minimum value in decibels. This is used to trigger the alarm condition, set above, when exceeded.
- **C/N Margin (relay mapping)** – Place a check mark in the box to activate relay mapping for C/N Margin exceeded alarm.
- **SAT S2X Invalid Licence** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised if there is a licence error reported by the DVB-S2X card (**Set Alarm /No Alarm**).
- **SAT S2X Invalid Licence (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.

- **SAT S2X Self-Test Fail** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. After power-on or reset, the DVB-S2X card performs an internal self-test. If this self-test fails it will trigger this alarm (**Set Alarm /No Alarm**).
- **SAT S2X Self-Test Fail (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X No Input Detected** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised if any one of the input related alarms on the DVB-S2X card are raised (**Set Alarm /No Alarm**).
- **SAT S2X No Input Detected (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Over Temperature** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised if the internal temperature of the DVB-S2X card is outside its operating specification (**Set Alarm /No Alarm**).
- **SAT S2X Over Temperature (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Upgrade Failed** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when a software upgrade of the DVB-S2X card has failed. The alarm can only be reset by executing a successful software upgrade (**Set Alarm /No Alarm**).
- **SAT S2X Upgrade Failed (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Not Calibrated** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised if there is a calibration error on the DVB-S2X card (**Set Alarm /No Alarm**).
- **SAT S2X Not Calibrated (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Undefined Internal Error** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when there an internal error reported by the DVB-S2X card (**Set Alarm /No Alarm**).
- **SAT S2X Undefined Internal Error (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Input Level Too High** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when the DVB-S2X card experiences an input level that is too high (**Set Alarm /No Alarm**).

- **SAT S2X Input Level Too High (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Failed To Acquire PLL** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when DVB-S2X card fails to acquire Physical Layer lock (not applicable for DVB-S) (**Set Alarm /No Alarm**).
- **SAT S2X Failed To Acquire PLL (relay mapping**) – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Failed To Acquire Lock** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when DVB-S2X card fails to acquire lock (**Set Alarm /No Alarm**).
- **SAT S2X Failed To Acquire Lock (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X DC Overcurrent** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when a DC overcurrent is detected on the input of the DVB-S2X card (**Set Alarm /No Alarm**).
- **SAT S2X DC Overcurrent (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Core Overloaded** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when the DVB-S2X card decoder core is too high loaded (**Set Alarm /No Alarm**).
- **SAT S2X Core Overloaded (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.
- **SAT S2X Buffer Overflow** – Select the alarm condition from the drop-down menu to be activated if this alarm is raised. This alarm is raised when a buffer mismatch occurs in the DVB-S2X card (**Set Alarm /No Alarm**).
- **SAT S2X Buffer Overflow (relay mapping)** – Place a check mark in the box to activate relay mapping when this alarm is raised.

3.9.3.5.1. Input > IP Input Alarms

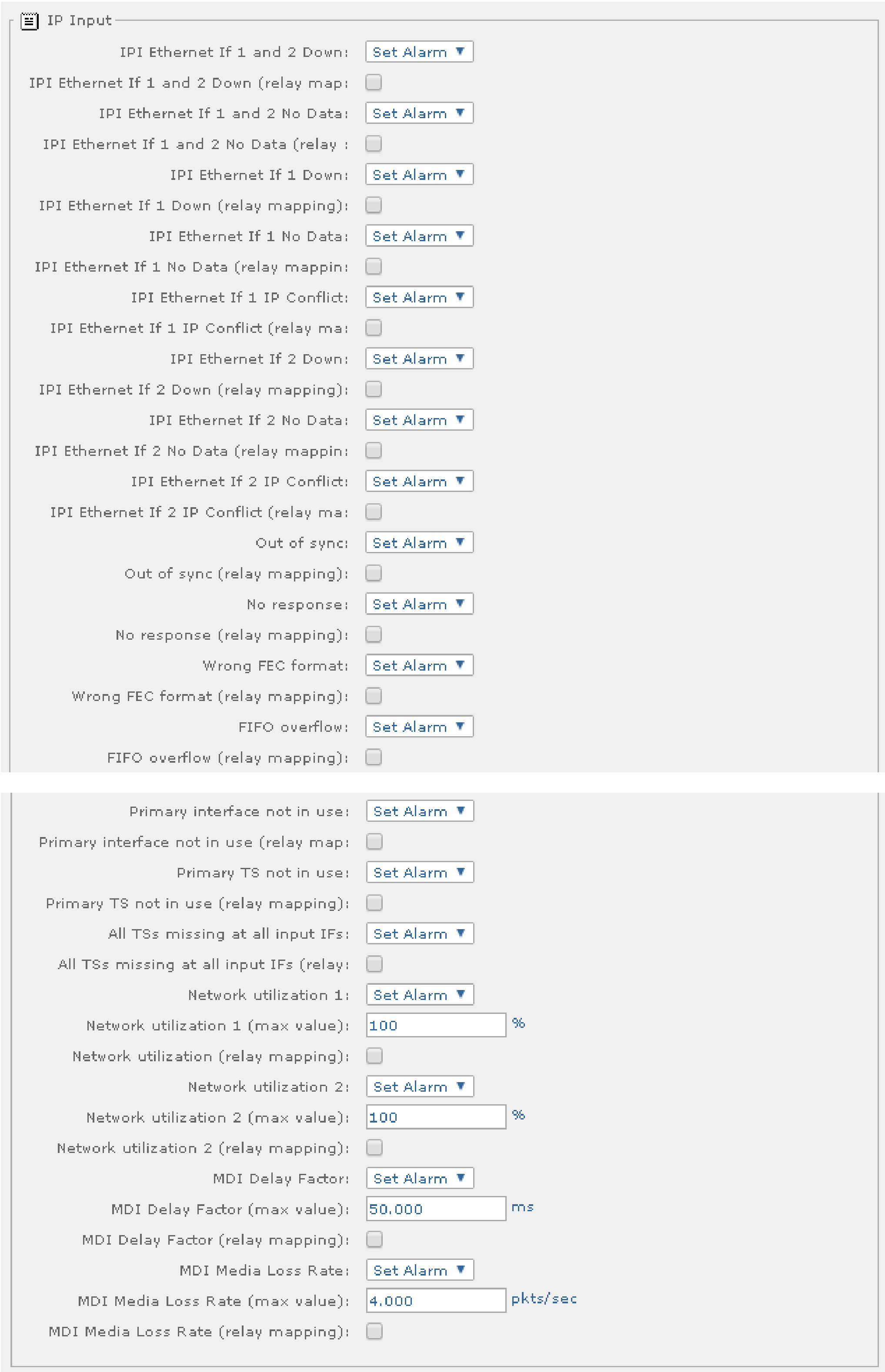


Figure 3-31 Alarm settings for the Input > IP Input section

- **IPI Ethernet IF 1 and 2 Down** – Select the alarm condition from the drop-down menu to be activated when both Ethernet inputs lose network connectivity (**Set Alarm /No Alarm**).

- **IPI Ethernet IF 1 and 2 Down (relay mapping)** – Place a check mark in the box to activate relay mapping for Ethernet 1 and 2 down.
- **IPI Ethernet If 1 and 2 No Data** – Select the alarm condition from the drop-down menu to be activated when both Ethernet Transport Stream inputs loose Transport Stream lock **(Set Alarm /No Alarm).**
- **IPI Ethernet If 1 and 2 No Data (relay mapping)** – Place a check mark in the box to activate relay mapping for Ethernet input 1 and 2 loss of Transport Stream alarm.
- **IPI Ethernet If 1 Down** – Select the alarm condition from the drop-down menu to be activated when Ethernet input port 1 loses network connectivity b.
- **IPI Ethernet If 1 Down (relay mapping)** – Place a check mark in the box to activate relay mapping for IPI Ethernet If 1 Down alarm.
- **IPI Ethernet If 1 No Data** – Select the alarm condition from the drop-down menu to be activated when Ethernet input port 1 loses Transport Stream data lock **(Set Alarm / No Alarm)**.
- **IPI Ethernet If 1 No Data (relay mapping)** – Place a check mark in the box to activate relay mapping IPI Ethernet IF 1 No Data alarm.
- **IPI Ethernet If 1 IP Conflict** – Select the alarm condition from the drop-down menu to be activated when Ethernet input port 1 senses a conflict of IP address with another device **(Set Alarm / No Alarm)**.
- **IPI Ethernet If 1 IP Conflict (relay mapping)** – Place a check mark in the box to activate relay mapping for IPI Ethernet If 1 IP Conflict alarm.
- **IPI Ethernet If 2 Down** – Select the alarm condition from the drop-down menu to be activated when Ethernet input port 2 loses network connectivity **(Set Alarm /No Alarm)**.
- **IPI Ethernet If 2 Down (relay mapping)** – Place a check mark in the box to activate relay mapping for Transport Stream loss of lock alarm.
- **IPI Ethernet If 2 No Data** – Select the alarm condition from the drop-down menu to be **activated** when Ethernet input port 2 loses Transport Stream data lock **(Set Alarm / No Alarm)**.
- **IPI Ethernet If 2 No Data (relay mapping)** – Place a check mark in the box to activate relay mapping for IPI Ethernet If 2 No Data alarm.
- **IPI Ethernet If 2 IP Conflict** – Select the alarm condition from the drop-down menu to be activated when Ethernet input port 2 senses a conflict of IP address with another device **(Set Alarm / No Alarm)**.
- **IPI Ethernet If 2 IP Conflict (relay mapping)** – Place a check mark in the box to **activate** relay mapping for IPI Ethernet If 2 IP Conflict alarm.
- **Out of sync** – Select the alarm condition from the drop-down menu to be activated when the Transport Stream de-

encapsulation from IP loses sync with the transport packets **(Set Alarm / No Alarm)**.

- **Out of sync (relay mapping)** – Place a check mark in the box to activate relay mapping **for** out of sync alarm.
- **No Response** – Select the alarm condition from the drop-down menu to be activated when the base unit cannot communicate with the IP input card **(Set Alarm / No Alarm)**.
- **No Response (relay mapping)** – Place a check mark in the box to activate relay mapping for no response alarm.
- **Wrong FEC format** – Select the alarm condition from the drop-down menu to be activated when the IP card detects that the incoming IP datagrams have the wrong FEC for the current configuration **(Set Alarm / No Alarm)**.
- **Wrong FEC format (relay mapping)** – Place a check mark in the box to activate relay mapping for wrong FEC format alarm.
- **FIFO overflow** – Select the alarm condition from the drop-down menu to be activated when the IP card 's input FIFO overflows **(Set Alarm / No Alarm)**.
- **FIFO overflow (relay mapping)** – Place a check mark in the box to activate relay mapping for input FIFO overflow alarm.
- **Primary interface not in use** – Select the alarm condition from the drop-down menu to be activated when due to redundancy switching the primary IP interface port is no longer being used **(Set Alarm / No Alarm)**.
- **Primary interface not in use (relay mapping)** – Place a check mark in the box to activate relay mapping for the primary interface not in use alarm.
- **Primary TS not in use –** Select the alarm condition from the drop-down menu to be activated when due to redundancy switching the IP inputs primary data connection (multicast address) is no longer being used **(Set Alarm / No Alarm)**.
- **Primary TS not in use (relay mapping)** – Place a check mark in the box to activate relay mapping for primary TS not in use alarm.
- **All TSs missing at all input IFs** – Select the alarm condition from the drop-down menu to be activated when all multicast streams (primary and secondary) are no longer supplying data **(Set Alarm / No Alarm)**.
- **All TSs missing at all input Ifs (relay mapping)** – Place a check mark in the box to activate relay mapping for TS missing at all input ifs alarm.
- **Network utilization 1** – Select the alarm condition from the drop-down menu to be activated when the network utilization percentage level on IP interface 1 exceeds the threshold set by the ***Network utilization 1 max value*** **(Set Alarm / No Alarm)**.
- **Network utilization 1 (max value)** – Enter the maximum allowable network utilization (0 to 100%). This is used to trigger the alarm condition, set above, when exceeded.

- **Network utilization 1 (relay mapping)** – Place a check mark in the box to activate relay mapping for the Network utilization 1 alarm.
- **Network utilization 2** – Select the alarm condition from the drop-down menu to be activated when the network utilization percentage level on IP interface 2 exceeds the threshold set by the ***Network utilization 2 max value*** **(Set Alarm / No Alarm)**.
- **Network utilization 2 (max value)** – Enter the maximum allowable network utilization (0 to 100%). This is used to trigger the alarm condition, set above, when exceeded.
- **Network utilization 2 (relay mapping)** – Place a check mark in the box to activate relay mapping for Network utilization 2 alarm.
- **MDI Delay Factor** – Select the alarm condition from the drop-down menu to be activated when the MDI Delay Factor on the current IP interface exceeds the threshold set by the ***MDI Delay Factor max value*** **(Set Alarm / No Alarm).**
- **MDI Delay Factor (max value)** – Enter the maximum allowable MDI delay factor This is used to trigger the alarm condition, set above, when exceeded.
- **MDI Delay Factor (relay mapping)** – Place a check mark in the box to activate relay mapping for the MDI Delay Factor alarm.
- **MDI Media Loss Rate** – Select the alarm condition from the drop-down menu to be activated when the MDI Media Loss Rate on the current IP interface exceeds the threshold set by the ***MDI Media Loss Rate max value*** **(Set Alarm / No Alarm)**.
- **MDI Media Loss Rate (max value)** – Enter the maximum allowable MDI loss rate This is used to trigger the alarm condition, set above, when exceeded.
- **MDI Media Loss Rate (relay mapping)** – Place a check mark in the box to activate relay mapping for the MDI Media Loss Rate alarm.

3.9.3.5.2. Input > IP Input Alarms (RX8200/SWO/IP/IN/SEAMLESS software option)

In addition to the alarms specified in *3.9.3.5.1 Input > IP Input Alarms*, the RX8200/SWO/IP/IN/SEAMLESS software option adds the following extra alarms.

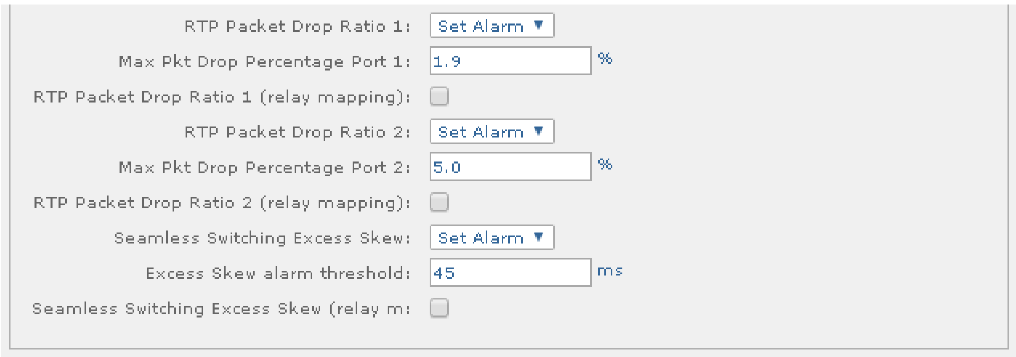


Figure 3-32 Alarm settings for the Input > IP Input section applicable when RX8200/SWO/IP/IN/SEAMLESS option present

- **Seamless Switching Sync Failure** – Select the alarm condition from the drop-down menu to be activated when the Seamless Protection Switching fails to synchronize. This indicates that one or both of the two input streams are NOT locked on the IP input OR the skew between the two IP inputs exceed the specified maximum of 50 ms. Note that the actual skew between the two IP inputs is displayed on the GUI – see "skew" under "seamless Protection Switching". **(Set Alarm / No Alarm)**.
- **RTP Packet Drop Ratio 1** – Select the alarm condition from the drop-down menu to be activated when Seamless Protection Switching mode is enabled and the ratio of RTP Packet sequence numbers missing over the number of RTP Packets entering the Seamless Protection block on IP interface Port 1 has exceeded the user defined alarm threshold ***Max Pkt Drop Percentage Port 1*** **(Set Alarm / No Alarm).**
- **Max Pkt Drop Percentage Port 1** – Enter the maximum allowable percentage of RTP packets dropped on IP interface Port 1. This is used to trigger the alarm condition, set above, when exceeded.
- **RTP Packet Drop Ratio 1 (relay mapping)** – Place a check mark in the box to activate relay mapping for the RTP Packet Drop Ratio 1 alarm.
- **RTP Packet Drop Ratio 2** – Select the alarm condition from the drop-down menu to be activated when Seamless Protection Switching mode is enabled and the ratio of RTP Packet sequence numbers missing over the number of RTP Packets entering the Seamless Protection block on IP interface Port 2 has exceeded the user defined alarm threshold ***Max Pkt Drop Percentage Port 2*** **(Set Alarm / No Alarm).**
- **Max Pkt Drop Percentage Port 2** – Enter the maximum allowable percentage of RTP packets dropped on IP interface Port 2. This is used to trigger the alarm condition, set above, when exceeded.
- **RTP Packet Drop Ratio 2 (relay mapping)** – Place a check mark in the box to activate relay mapping for the RTP Packet Drop Ratio 2 alarm.
- **Seamless Switching Excess Skew** – Select the alarm condition from the drop-down menu to be activated when Seamless Protection Switching mode is enabled and the measured skew between interface Port 1 and Port 2 has

exceeded the user defined alarm threshold ***Excess Skew alarm threshold*** **(Set Alarm / No Alarm).**

- **Excess Skew alarm threshold** – Enter the maximum allowable skew threshold in milliseconds. This is used to trigger the alarm condition, set above, when exceeded.
- **Seamless Switching Excess Skew (relay mapping)** – Place a check mark in the box to activate relay mapping for the Seamless Switching Excess Skew alarm.

3.9.3.5.3. Input > G.703 Input Alarms

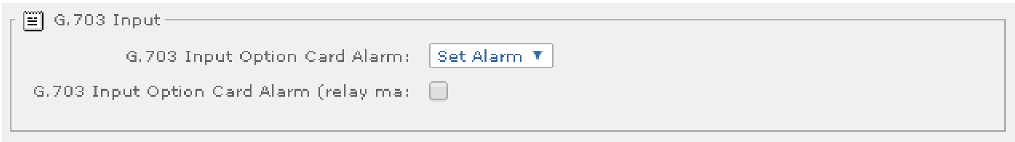


Figure 3-33 Alarm settings for the Input > G.703 Input section

- **G.703 Input Option Card Alarm** – Select the alarm condition from the drop-down menu to be activated when a failure condition is raised by the G.703 input card (**Set Alarm /No Alarm**).
- **G.703 Input Option Card Alarm (relay mapping)** – Place a check mark in the box to activate relay mapping for the G.703 Input Option Card Alarm.

3.9.3.5.4. Input > Terrestrial Input Alarms

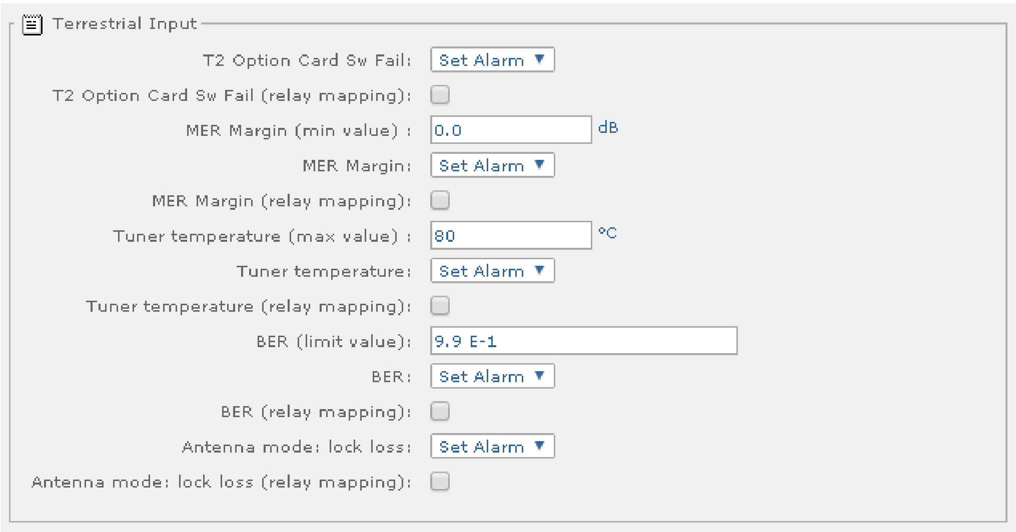


Figure 3-34 Alarm settings for the Input > Terrestrial Input section

- **T2 Option Card SW Fail** – Select the alarm condition from the drop-down menu to be activated when the T2 option card's software fails to boot **(Set Alarm / No Alarm).**
- **T2 Option Card SW Fail (relay mapping)** – Place a check mark in the box to activate relay mapping for SW fail.
- **MER Margin** – Select the alarm condition from the drop-down menu to be activated when the measured MER Margin from the

DVB-T2 input card exceeds the user defined threshold ***MER Margin (min value)*** **(Set Alarm / No Alarm).**

- **MER Margin (min value)** – Enter the minimum allowable MER Margin for the DVB-T2 transmission in dB (DVB-T2 card must be fitted). This is used to trigger the alarm condition, set above, when exceeded.
- **MER Margin (relay mapping)** – Place a check mark in the box to activate relay mapping for MER margin alarm.
- **Tuner Temperature** – Select the alarm condition from the drop-down menu to be activated when the tuner temperature measured from the DVB-T2 input card exceeds the user defined threshold ***Tuner Temperature (max value)*** **(Set Alarm / No Alarm).**
- **Tuner temperature (max value)** – Enter the maximum allowable tuner temperature for the DVB-T2 card (in °C) This is used to trigger the alarm condition, set above, when exceeded.
- **Tuner temperature (relay mapping)** – Place a check mark in the box to activate relay mapping for the Tuner Temperature alarm.
- **BER** – Select the alarm condition from the drop-down menu to be activated when the Bit Error Rate (BER) measured from the DVB-T2 input card exceeds the user defined threshold ***BER (limit value)*** **(Set Alarm / No Alarm).**
- **BER (limit value)** – Enter the maximum allowable bit error rate for the DVB-T2 card (in dB) This is used to trigger the alarm condition, set above, when exceeded.
- **BER (relay mapping)** – Place a check mark in the box to activate relay mapping for the BER alarm.
- **Antenna Mode: Lock Loss** – Select the alarm condition from the drop-down menu to be activated when the DVB-T2 input card is configured to measure the power level since this will disrupt the TS lock state. For more information, refer to section 3.10.6, DVB-T/T2 (OFDM). **(Set Alarm / No Alarm).**
- **Antenna Mode: Lock Loss (relay mapping)** – Place a check mark in the box to activate relay mapping for the Antenna Mode Lock Loss alarm.

3.9.3.5.5. Input > 8VSB Input Alarms

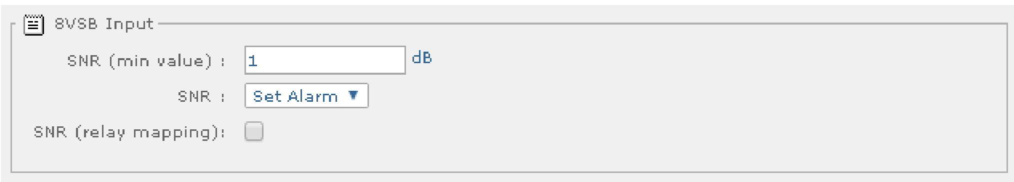


Figure 3-35 Alarm settings for the Input > 8VSB Input section

- **SNR** – Select the alarm condition from the drop-down menu to be activated when the Signal to Noise Ratio (SNR) measured from the 8VSB input card exceeds the user defined threshold ***SNR (min value)*** **(Set Alarm / No Alarm).**

- **SNR (min value)** – Enter the minimum Signal to Noise Ratio value in decibels (dB). This is used to trigger the alarm condition, set above, when exceeded
- **SNR (relay mapping)** – Place a check mark in the box to activate relay mapping for the SNR alarm.

3.9.3.6. Service Alarms

3.9.3.6.1. Service > Conditional Access Alarms

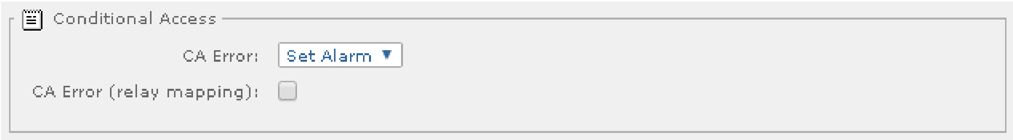


Figure 3-36 Alarm settings for the Service > Conditional Access section

- **CA Error** – Select the alarm condition from the drop-down menu to be activated when a Conditional Access error is detected. To determine the cause of the CA Error alarm, refer to Table 3-10 under section **Error! Reference source not found.** for **Error! Reference source not found.**. (**Set Alarm /No Alarm**).
- **CA Error (relay mapping)** – Place a check mark in the box to activate relay mapping for Conditional Access error.

3.9.3.6.2. Service > Video Alarms

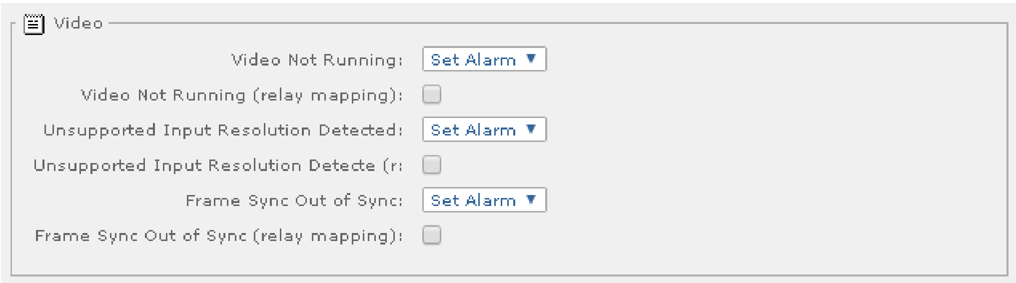


Figure 3-37 Alarm settings for the Service > Video section

- **Video Not Running** – Select the alarm condition from the drop-down menu to be activated when the attempted video decode is not running (**Set Alarm /No Alarm**).
- **Video Not Running (relay mapping)** – Place a check mark in the box to activate relay mapping for video not running.
- **Unsupported Video Resolution Detected** – Select the alarm condition from the
drop-down menu to be activated when the attempted video decode does not support the detected video resolution (**Set Alarm /No Alarm**).
- **Unsupported Video Resolution Detected (relay mapping)** – Place a check mark in the box to activate relay mapping for the Unsupported Video Resolution Detected alarm.

- **Frame Sync Out of Sync** – Select the alarm condition from the drop-down menu to be activated when Frame Sync is enabled but is not synchronized to the current video frame rate or no signal is detected (**Set Alarm /No Alarm**).
- **Frame Sync Out of Sync (relay mapping)** – Place a check mark in the box to activate relay mapping for the Frame Sync Out of Sync alarm.

3.9.3.6.3. Service > Audio Alarms

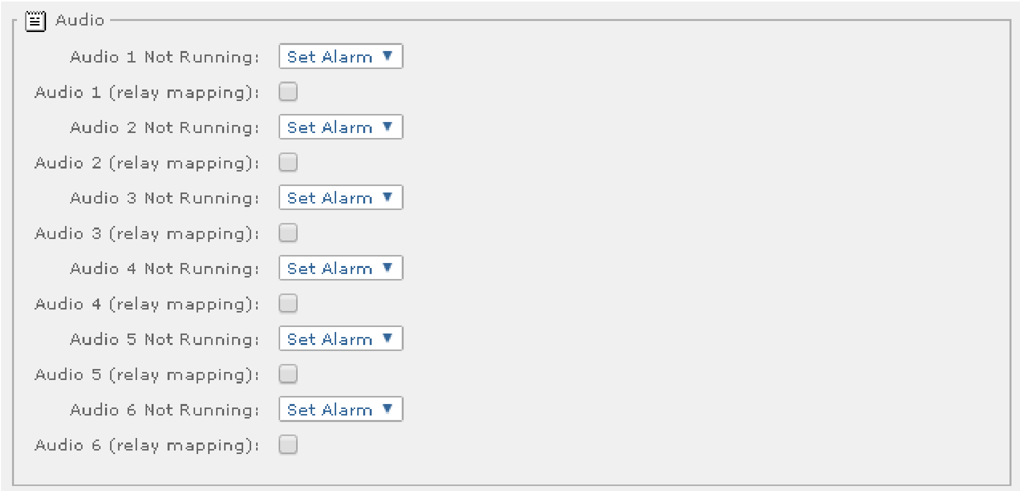


Figure 3-38 Alarm settings for the Service > Audio section

- **Audio Decoder 1/2/3/4/5/6** – Select the alarm condition from the drop-down menu to be activated when Audio Decoder 1/2/3/4/5/6 is not running (**Set Alarm /No Alarm**).
- **Audio Decoder 1/2/3/4/5/6 (relay mapping)** – Place a check mark in the box to activate relay mapping for Audio Decoder 1/2/3/4/5/6 not running.

3.9.3.6.4. Service > Auxiliary Data Alarms

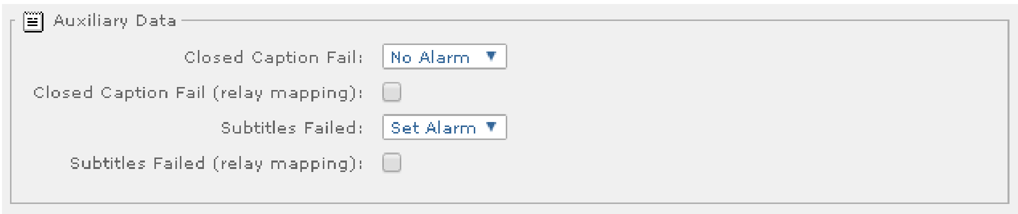


Figure 3-39 Alarm settings for the Service > Auxiliary Data section

- **Closed Caption Fail** – Select the alarm condition from the drop-down menu to be activated when closed caption fails (**Set Alarm /No Alarm**).
- **Closed Caption Fail (relay mapping)** – Place a check mark in the box to activate relay mapping for closed caption fails.
- **Subtitles Failed** - Select the alarm condition from the drop-down menu to be activated when DVB or Teletext subtitles fails **(Set Alarm /No Alarm).**

- **Subtitles Failed (relay mapping)** – Place a check mark in the box to activate relay mapping for subtitle fails.

3.9.3.6.5. Service > 422 Decoder Card Alarms

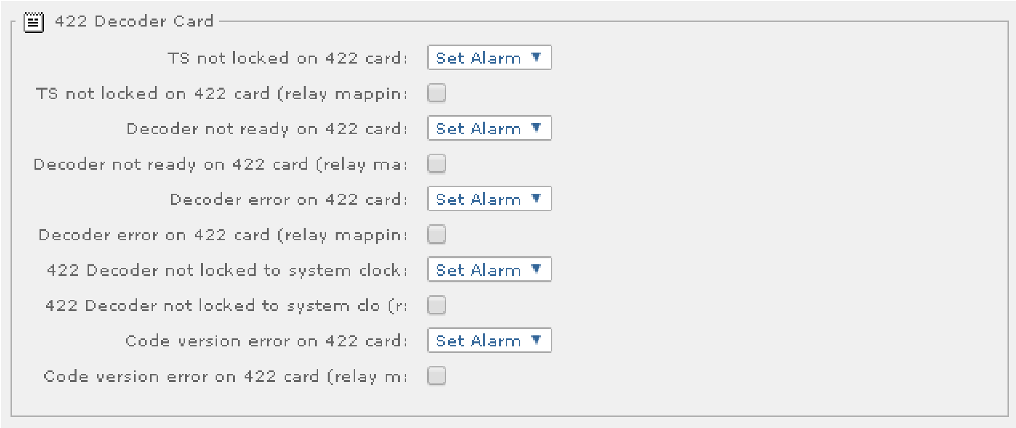


Figure 3-40 Alarm settings for the Service > 422 Decoder Card section

- **TS not locked on 422 card** – Select the alarm condition from the drop-down menu to be activated when there is an issue with the Transport Stream input to the 4:2:2 Decoder Option card **(Set Alarm /No Alarm).**
- **TS not locked on 422 card (relay mapping)** – Place a check mark in the box to activate relay mapping for TS not locked on 422 card error.
- **Decoder not ready on 422 card** – Select the alarm condition from the drop-down menu to be activated when the video decoder on the 4:2:2 Decoder Option card is not ready to operate **(Set Alarm /No Alarm).**
- **Decoder not ready on 422 card (relay mapping)** – Place a check mark in the box to activate relay mapping for Decoder not ready on 422 card error.
- **Decoder error on 422 card** – Select the alarm condition from the drop-down menu to be activated when the video decoder on the 4:2:2 Decoder Option card is in an error state **(Set Alarm /No Alarm).**
- **Decoder error on 422 card (relay mapping)** – Place a check mark in the box to activate relay mapping for Decoder error on 422 card error.
- **422 Decoder not locked to system clock** – Select the alarm condition from the
drop-down menu to be activated when the decoder 422 card is free running
(i.e. Not locked to the system clock) **(Set Alarm /No Alarm).**
- **422 Decoder not locked to system clock (relay mapping)** – Place a check mark in the box to activate relay mapping for 422 Decoder not locked to system clock alarm.
- **Code version error on 422 card** – Select the alarm condition from the drop-down menu to be activated when the code version loaded on the 4:2:2 Decoder Option card is not compatible with the base unit code version. For the 3rd

Generation 4:2:2 Decoder Option card, the minimum supported code version is 3.0 **(Set Alarm / No Alarm).**

- **Code version error on 422 card (relay mapping)** – Place a check mark in the box to activate relay mapping for Code version error on 422 card error.

3.9.3.6.6. Service > Down Converter Card Alarms

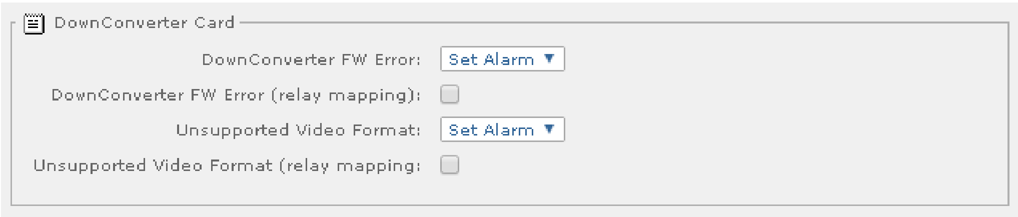


Figure 3-41 Alarm setting for Service > Down Converter Card section

- **DownConverter FW Error** – Select the alarm condition from the drop-down menu to be **activated** when the high quality down-converter FPGA interface presents an error **(Set Alarm / No Alarm).**
- **DownConverter FW Error (relay mapping)** – Place a check mark in the box to activate **relay** mapping for down-converter firmware error.
- **Unsupported Video Format -** Select the alarm condition from the drop-down menu to be activated when the high quality down-conversion card detects an unsupported video format **(Set Alarm / No Alarm).**
- **Unsupported Video Format (relay mapping)** – Place a check mark in the box to activate relay mapping for unsupported video format.

3.9.3.7. Output Alarms

3.9.3.7.1. Output > SDI/CVBS Output Alarms

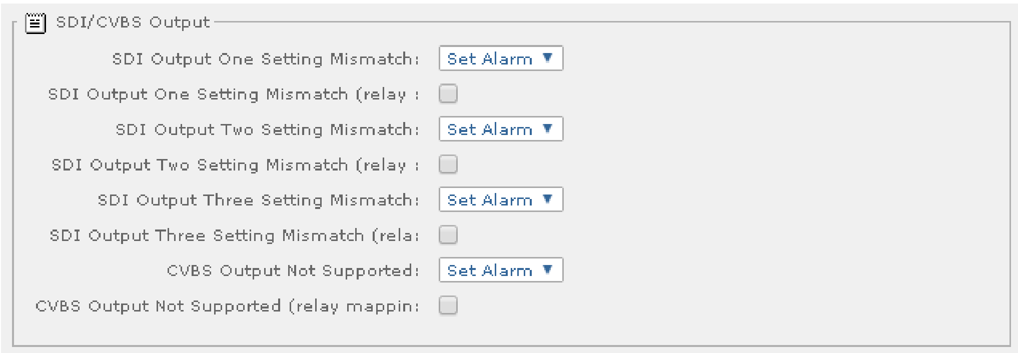


Figure 3-42 Alarm settings for Output > SDI/CVBS section

- **SDI Output One Setting Mismatch -** Select the alarm condition from the drop-down menu to be activated when outgoing video standard is not compatible with the SDI setting on Output One **(Set Alarm / No Alarm).**

- **SDI Output One Setting Mismatch (relay mapping)** – Place a check mark in the box to activate relay mapping for the SDI Output One Setting Mismatch alarm.
- **SDI Output Two Setting Mismatch -** Select the alarm condition from the drop-down menu to be activated when outgoing video standard is not compatible with the SDI setting on Output Two **(Set Alarm /No Alarm).**
- **SDI Output Two Setting Mismatch (relay mapping)** – Place a check mark in the box to activate relay mapping for the SDI Output Two Setting Mismatch alarm.
- **SDI Output Three Setting Mismatch -** Select the alarm condition from the drop-down menu to be activated when outgoing video standard is not compatible with the SDI setting on Output Three **(Set Alarm /No Alarm).**
- **SDI Output Three Setting Mismatch (relay mapping)** – Place a check mark in the box to activate relay mapping for the SDI Output Three Setting Mismatch alarm.
- **CVBS Output Not Supported -** Select the alarm condition from the drop-down menu to be activated when there is an unsupported frame rate on the CVBS output i.e. 30 Hz or 60 Hz **(Set Alarm /No Alarm).**
- **CVBS Output Not Supported (relay mapping)** – Place a check mark in the box to activate relay mapping for the CVBS Output Not Supported alarm.

3.9.3.7.2. Output > IP Output Alarms

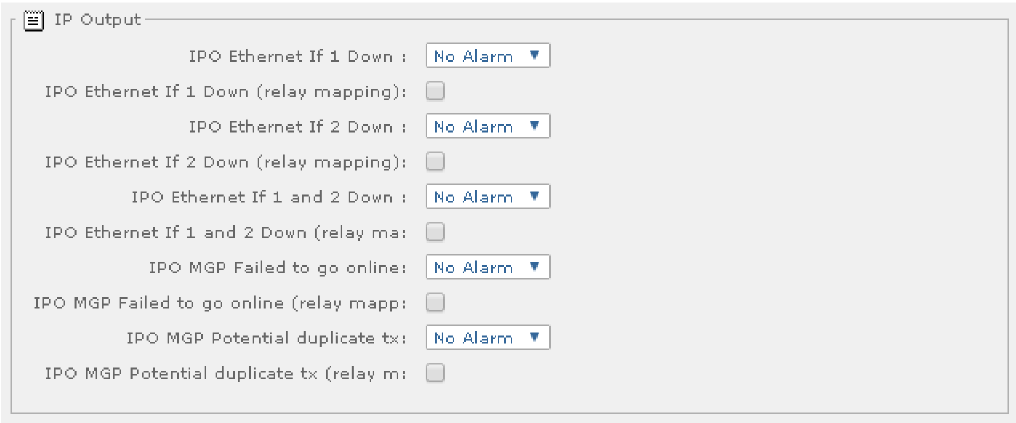


Figure 3-43 Alarm Settings for Output > IP Output section

- **IPO Ethernet If 1/2 Down** – Select the alarm condition from the drop-down menu to be activated when there is no signal at IPO Ethernet 1/2 (**Set Alarm /No Alarm**).
- **IPO Ethernet If 1/2 Down (relay mapping)** – Place a check mark in the box to activate relay mapping for no signal at IPO Ethernet 1/2.
- **IPO Ethernet If 1 and 2 Down** – Select the alarm condition from the drop-down menu to be activated when there is no signal at IPO Ethernet 1 and 2 **(Set Alarm /No Alarm).**

- **IPO Ethernet If 1 and 2 Down (relay mapping)** – Place a check mark in the box to activate relay mapping for no signal at IPO Ethernet 1 and 2.
- **IPO MGP Failed to go online** – Select the alarm condition from the drop-down menu to be activated when there the IP output cannot go online (transmit multicast data) in an MGP enabled system **(Set Alarm /No Alarm).**
- **IPO MGP Failed to go online (relay mapping)** – Place a check mark in the box to activate relay mapping for MGP failed to go online.
- **IPO MGP Potential duplicate tx** – Select the alarm condition from the drop-down menu to be activated when there the IP output detects a clashing multicast on an MGP enabled system **(Set Alarm /No Alarm).**
- **IPO MGP Potential duplicate tx (relay mapping)** – Place a check mark in the box to activate relay mapping for MGP potential duplicate TS.

3.9.3.7.3. Output > Filtering Alarms

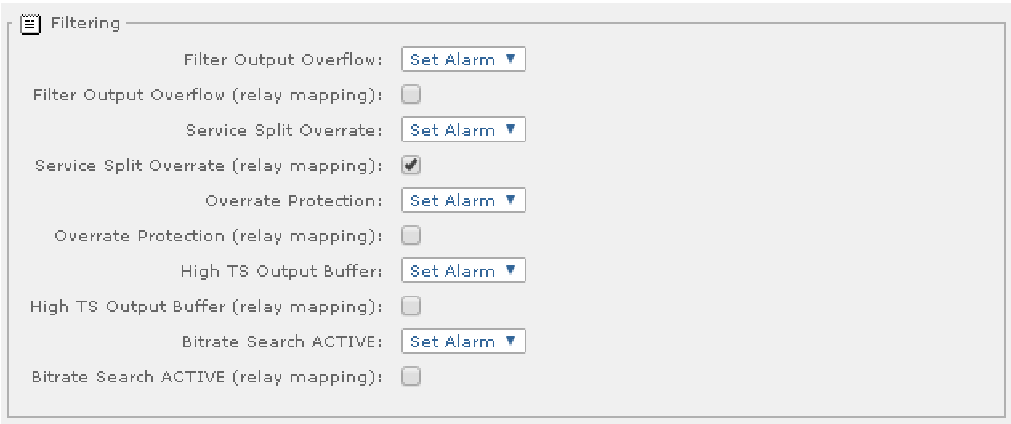


Figure 3-44 Alarm Settings for Output > Filtering section

- **Filter Output Overflow** – Select the alarm condition from the drop-down menu to be activated when the multi-service filter block detects an overflow within its buffers **(Set Alarm /No Alarm).**
- **Filter Output Overflow (relay mapping)** – Place a check mark in the box to activate relay mapping for the Filter Output Overflow alarm.
- **Service Split Overrate** – Select the alarm condition from the drop-down menu to be activated when the CBR Bitrate for a split service is not high enough for the minimum filtered TS data rate for the split service **(Set Alarm /No Alarm).**
- **Service Split Overrate (relay mapping)** – Place a check mark in the box to activate relay mapping for the Service Split Overrate alarm.
- **Overrate Protection** – Select the alarm condition from the drop-down menu to be activated when the MSF Overrate Protection Limit has been reached **(Set Alarm /No Alarm).**

- **Overrate Protection (relay mapping)** – Place a check mark in the box to activate relay mapping for the Overrate Protection alarm.
- **High TS Output Buffer** – Select the alarm condition from the drop-down menu to be activated when the service filter buffer is high and has exceeded 85% occupancy **(Set Alarm /No Alarm).**
- **High TS Output Buffer (relay mapping)** – Place a check mark in the box to activate relay mapping for the High TS Output Buffer alarm.
- **Bitrate Search ACTIVE** – Select the alarm condition from the drop-down menu to be activated when the ***Search Minimum Bitrate*** functionality is active and therefore modifying the output bitrate of the transport stream leaving the IRD. For more information refer to section **Error! Reference source not found.** (Set Alarm /No Alarm).
- **Bitrate Search ACTIVE (relay mapping)** – Place a check mark in the box to activate relay mapping for the Bitrate Search ACTIVE alarm.

3.9.3.8. Environment Alarms

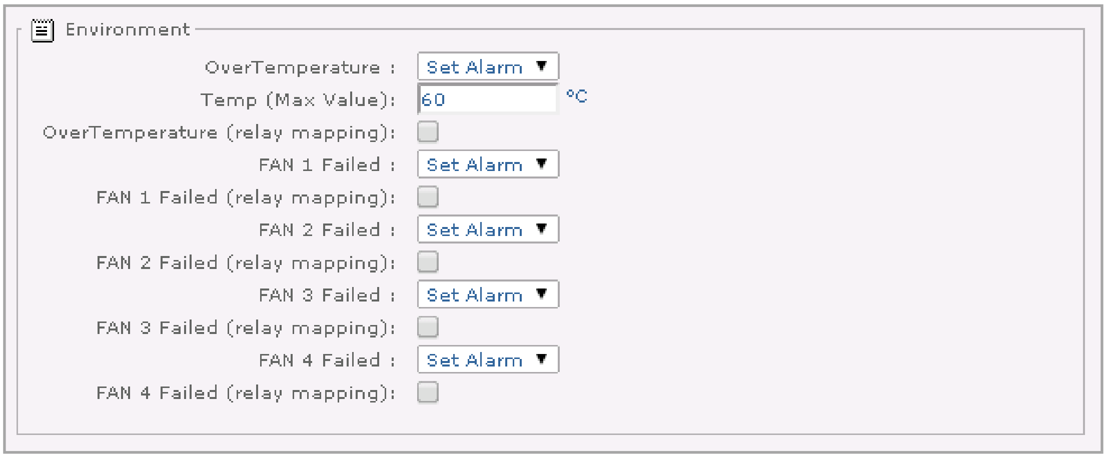


Figure 3-45 Alarm Settings for Environment Section

- **Over Temperature** – Select the alarm condition from the drop-down menu to be activated when an internal temperature value, set below, is exceeded (**Set Alarm /No Alarm**).
- **Temp (Max Value)** – Enter the maximum allowable internal temperature value (degrees Centigrade). This is used to trigger the alarm condition, set above, when exceeded.
- **OverTemperature (relay mapping)** – Place a check mark in the box to activate relay mapping for an overtemperature condition.
- **Fan 1/2/3/4 Failed** – Select the alarm condition from the drop-down menu to be activated when the fan speed is zero (**Set Alarm /No Alarm**).
- **Fan 1/2/3/4 Failed (relay mapping)** – Place a check mark in the box to activate relay mapping for fan 1/2/3/4 failure.

3.9.3.9. Base Decoder Failure Alarm

CAUTION: The **Base Decode Failure** alarm is not cleared by rebooting the IRD and so may appear to be active even when the unit is operating correctly

---

The **Base Decoder Failure** alarm is raised when the base video decoder or base audio decoder had a catastrophic failure that required a reset by a watchdog task. The alarm can not be masked out and is retained after a reboot of the IRD.

To clear the Base Decoder Failure alarm, the operator must use the **Clear** button visible from the top left-hand side of the Status page.

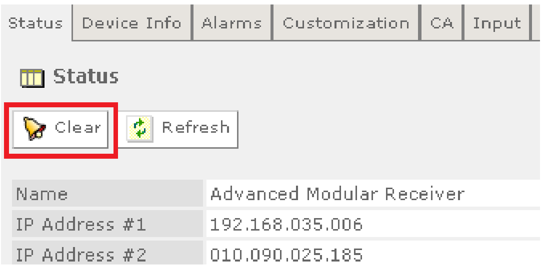


Figure 3-46 Using the Status page Clear button to clear the Base Decoder Failure alarm

3.9.4. Customization

The Customization web page enables the user to view which licenses are enabled on the equipment and enter any Custom Keys acquired when purchasing further licenses.

Custom Keys are entered in the Parameters section of this web page and the unit must be rebooted for the key to take effect. The Custom Key is a 22-digit decimal number and is supplied by MediaKind Customer Support if a License feature is required.

Any changes, which are made to the Licensed Features shown, may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

The **Licensed Features** button enables the user to view which licenses are currently enabled.

To view this page, select the **Customization** tab from the top of the current web page.

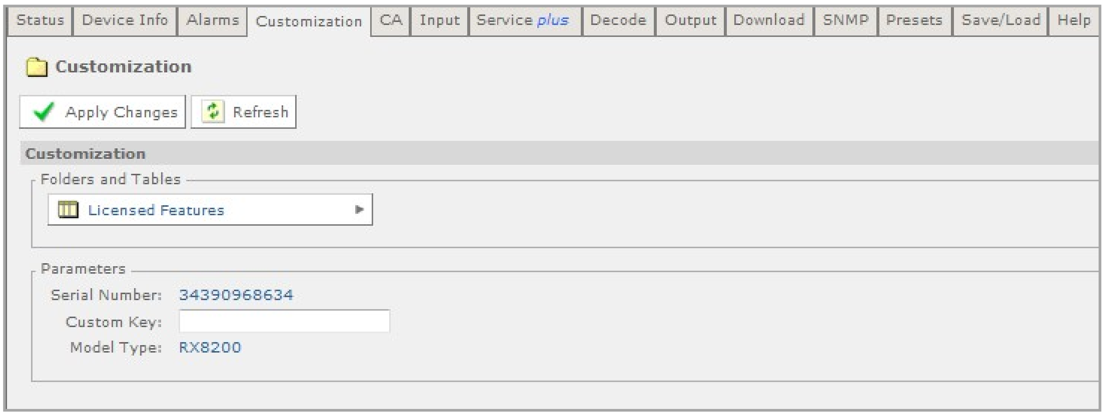


Figure 3-47 Customization Web Page

Folders and Tables

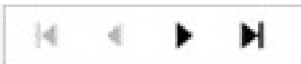
- **Licensed Features** – This button accesses a sub-menu page, described below.

Parameters

- **Serial Number** – Displays the customization serial number for the unit (non-editable). This is a unique number used for customization applications and is not the same as the box serial number.
- **Custom Key** – Enter the custom key into this editable field for your new licensed features. The feature will then appear on the Customization > Licensed Features page, described below.
- **Model Type** – Displays the relevant Model Type number for the unit (non-editable).

3.9.4.1. Customization > Licensed Features

In this page the back and forward buttons allow access to the complete list of available licenses:



Selecting the **Refresh** button will ensure that the latest information is displayed from the current values of the equipment.

To view this web page, select the **Licensed Features** button on the Customization tab.

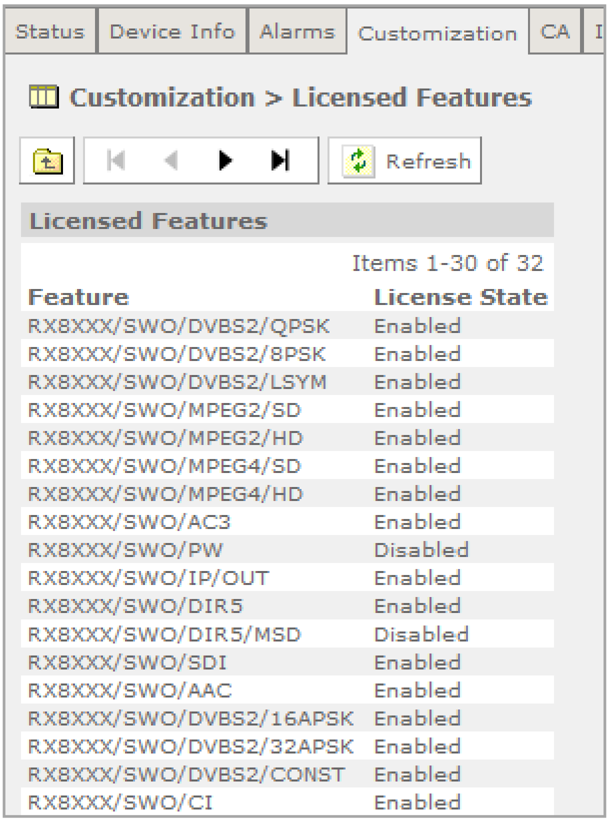


Figure 3-48 Customization > Licensed Features Web Page

3.9.5. Presets

This page gives access to a list of 40 preset configurations. This feature may be used to store input (tuning) parameters in order that settings do not have to be re-entered when changes are made.

Any changes which are made to the Presets page may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

To view this page, select the **Presets** tab from the top of the current web page.

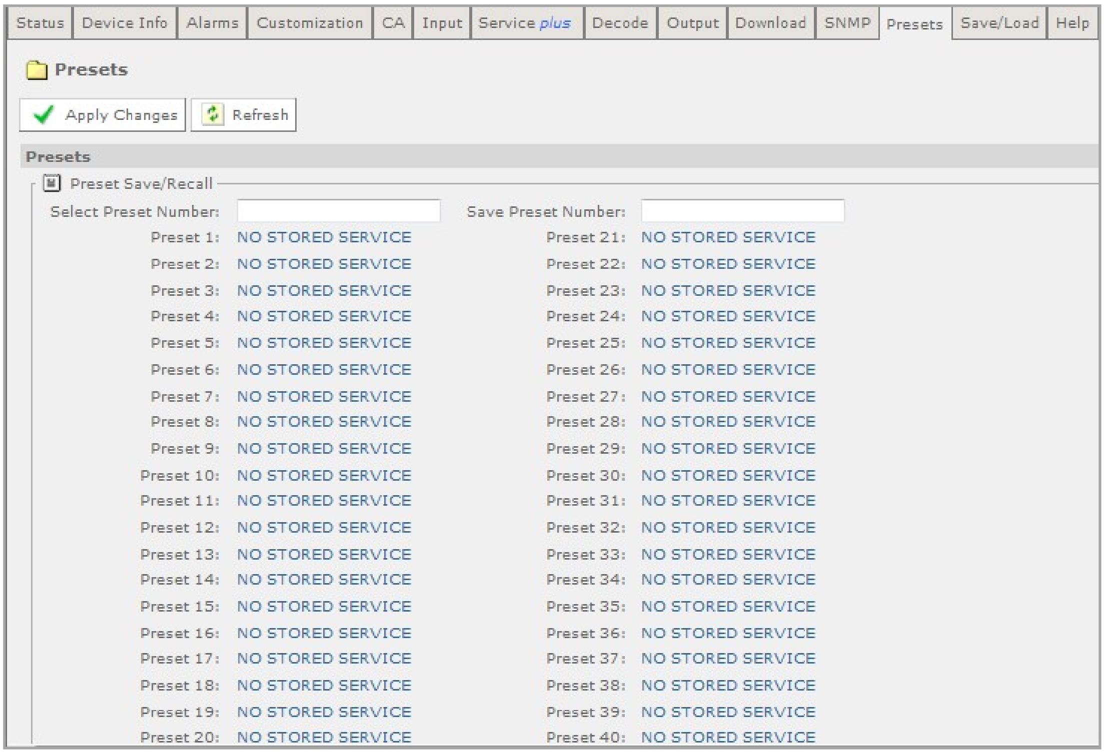


Figure 3-49 Presets Web Page

Preset Save/Recall

- **Select Preset Number** – Enables the input of the number of the preset to be selected. When a number is entered into this box, the tuning information and service ID stored in that numbered preset will be loaded into the unit's configuration.
- **Save Preset Number** – Enables the input of the number of the preset to be saved. When a number is entered into this box, the tuning information and service ID stored currently selected will be stored as that number preset. The name will change from **NO STORED SERVICE** to the name of the service.
- **Preset 1-40** – Displays the name of the preset for the associated preset number. When the preset number is not used, **NO STORED SERVICE** is displayed.

3.9.6. Save/Load

This page gives access to a range of Configuration download and Upload facilities supported by the IRD.

To view this page, select the **Save/Load** tab from the top of the web page.

3.9.6.1. Save Configuration to File

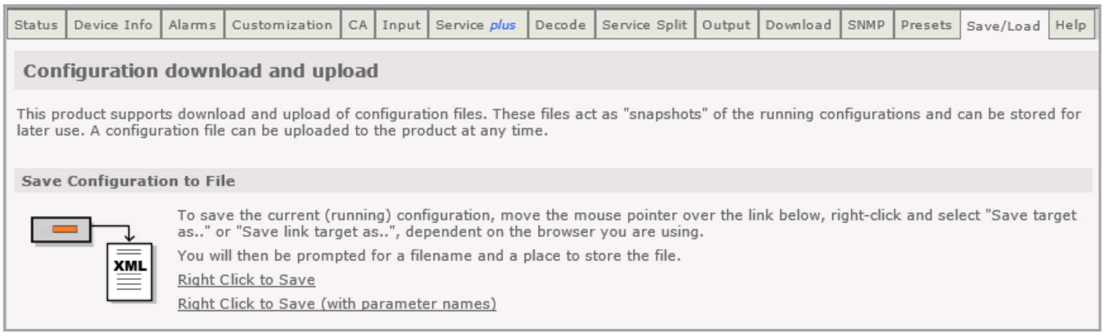


Figure 3-50 Save Configuration

This section enables the user to save the current IRD configuration as an XML file. This may then be used as a back-up to preserve all the settings of the IRD so that it can be used to restore a configuration in the event that the settings have been changed or lost. This feature also enables you to quickly set up multiple devices with the same settings, if required.

The option **Right Click to Save** should always be used.

The option **Right Click to Save (with parameter names)** is for development purposes only.

3.9.6.2. Restore Configuration from File

Figure 3-51 Restore Configuration

This allows the user to upload an XML configuration file of an IRD. This will normally be a configuration file that has previously been saved using *the Save Configuration to File* option from the same or similar device. This provides a quick and simple method of restoring a unit to operation, provided that up-to-date back-ups are maintained.

The configuration will take effect immediately once the upload is complete and provided that it is valid. In the event of an invalid file being uploaded, none of the device settings will be changed.

3.9.6.3. Save MIBs File

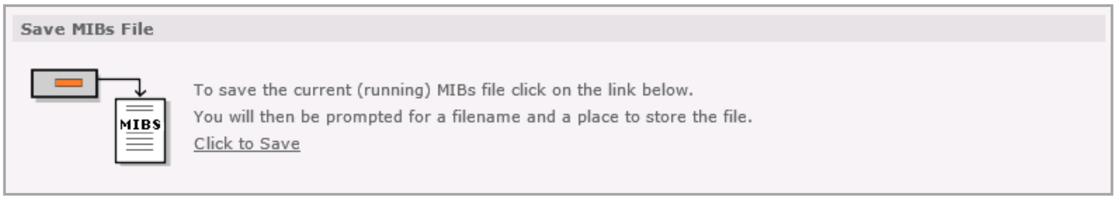


Figure 3-52 Extracting the MIB File

- This enables the user to save the current running Management Information Base (MIB) file. A zip file is downloadable from the unit which defines which variables should be monitored for SNMP purposes. Details of the variables are not described in this document. For more detailed information on SNMP remote control, contact MediaKind AB.

NOTE: Units running an older release of the software may provide a zip of the MIB file that is password protected. In this case, password "Stoneham" should be used.

3.9.6.4. Save Alarm Logs File

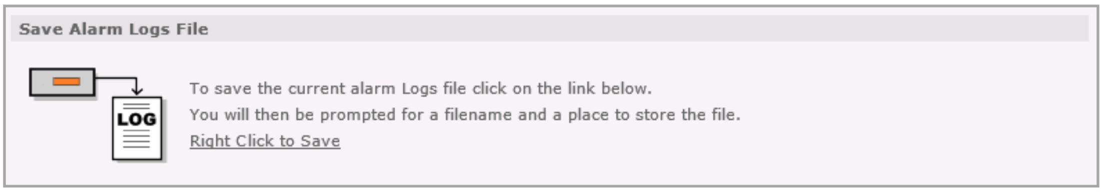


Figure 3-53 Extracting the Alarm Log File

This enables the user to save the current Alarm Logs file. Left-click on the link to display the log in the web page (click the browser refresh button to return to the Web Browser Interface). Right-click on the link and select the **Save target as…** option in the displayed dialog to save as a file.

NOTE: The timestamp for each entry in the log file will be that provided by the NTP server. If not available or configured, the timestamp will be the elapsed unit uptime starting from "0000-00-00 00:00:00"

3.9.6.5. Save Splice Logs File

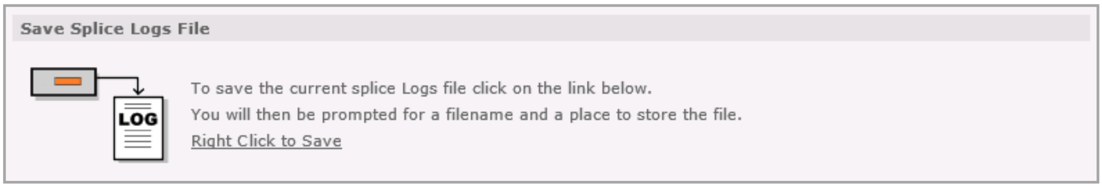


Figure 3-54 Extracting the Splice Log File

This enables the user to save the current Splice Logs file. Left-click on the link to display the log in the web page (click the browser refresh button to return to the Web Browser Interface). Right-click on the link and select the **Save target as…** option in the displayed dialog to save as a file.

NOTE: The timestamp for each entry in the log file will be that provided by the NTP server. If not available or configured, the timestamp will be the elapsed unit uptime starting from "0000-00-00 00:00:00"

3.9.6.6. Save Event Logs File

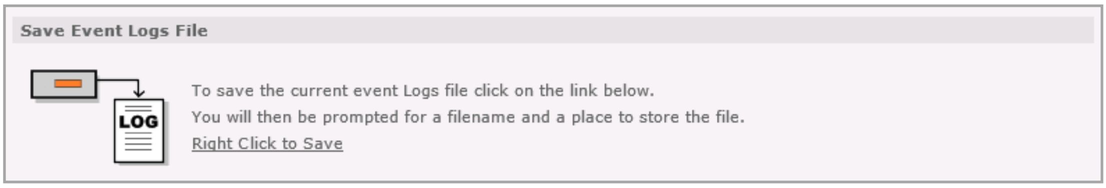


Figure 3-55 Extracting the Event Log File

This enables the user to save the current Event Logs file. Left-click on the link to display the log in the web page (click the browser refresh button to return to the Web Browser Interface). Right-click on the link and select the **Save target as…** option in the displayed dialog to save as a file.

NOTE: The timestamp for each entry in the log file will be that provided by the NTP server. If not available or configured, the timestamp will be the elapsed unit uptime starting from "0000-00-00 00:00:00"

Event logs are for use by MediaKind service personnel; as such, they are not enabled by default. To enable these logs please contact MediaKind Customer Support.

3.9.6.7. Save Quality Logs File

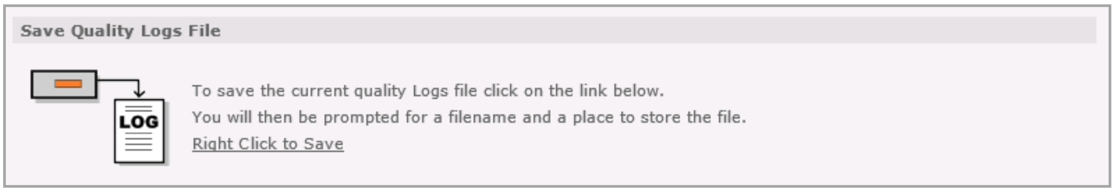


Figure 3-56 Extracting the Quality Log File

This enables the user to save the current Quality Logs file. Left-click on the link to display the log in the web page (click the browser refresh button to return to the Web Browser Interface). Right-click on the link and select the **Save target as…** option in the displayed dialog to save as a file.

3.9.6.8. Store New Software Application File

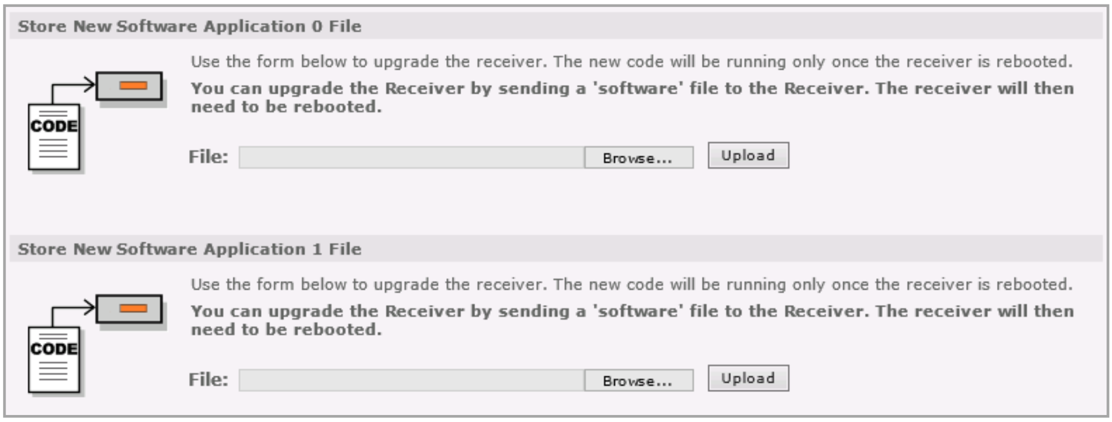


Figure 3-57 Upgrading the IRD Software via the Web Interface

This enables the user to upgrade the IRD. Click the **Browse** button to locate the application file and then click the **Upload** button to begin the software upgrade process. The IRD must be rebooted once the upload is complete in order to run the new software; this can be done using the **Reboot** button on the Device Info tab page.

NOTE: There are two sections named: ***Application 0 File*** which represents upgrading flash ***Bank 0*** and ***Application 1 File*** which represents upgrading flash ***Bank 1***. Refer to the SW Version in section *3.9.2.1* in order to determine the current/active flash bank the IRD booted from.

3.9.7. Help

This page gives access to a Web Interface User Guide which provides a brief description of the interface functionality. To view this page, select the **Help** tab from the top of the current web page.

Figure 3-58 Help Web Page

Select the appropriate heading listed on the web page for help with the associated functions and features.

3.10. Inputs

3.10.1. Availability

All IRDs support ASI input. The RX8310, RX8315 and RX8330 models additionally support satellite input, and the RX8320 supports 8VSB input. By fitting the appropriate hardware options, the RX8200 can support satellite, 8VSB, G.703 and terrestrial (DVB-T/T2) inputs.
IP Input can also be added via hardware options as a third input source to the RX8200.

3.10.1.1. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
See following sections for details of order items required for specific input type			

3.10.1.2. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	✓

3.10.1.3. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/NULL	Enables excess NULL packet detection	FAZ 101 0113/48	RX8XXX/SWO/NULL

3.10.1.4. Web Browser Setup

This page enables the user to view and edit the various inputs to the IRD. To view this page, select the Input tab from the top of the current web page.

Any changes which are made to the Input page may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

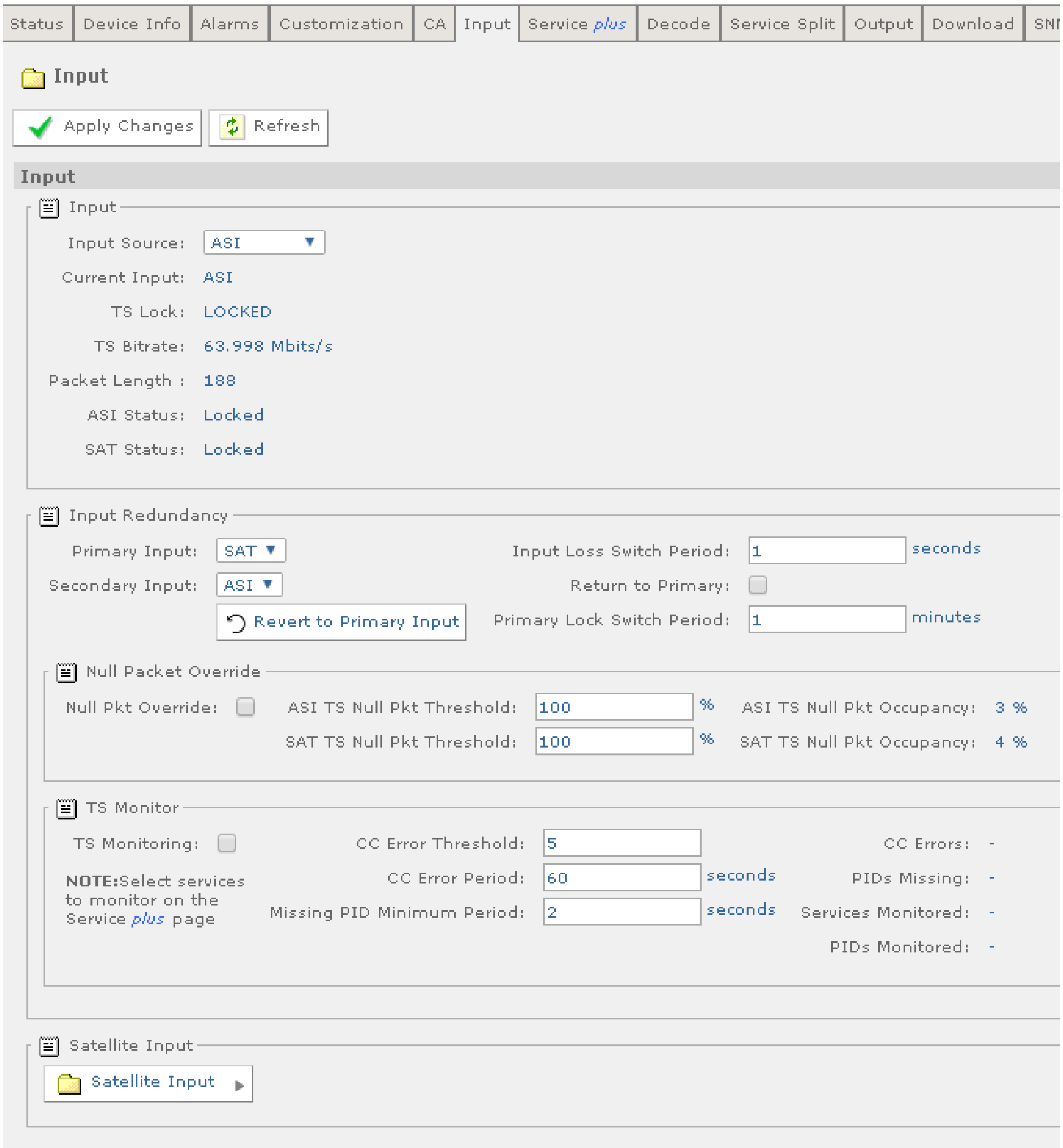


Figure 3-59 Overview of the Input page from the web interface (ASI and Satellite input card fitted)

3.10.1.5. Input

- **Input Source** – Allows the input source type or redundancy mode to be selected
- **Current Input** – Where multiple input types are present, displays the currently selected input. This will be as **Input Source** unless a redundancy mode is selected.
- **TS Lock** – Displays the lock status of the Transport Stream input.
- **TS Bit rate** – Displays the bit rate of the Transport Stream input (in Mbps).
- **Packet Length** – Displays the packet length used in the Transport Stream.
- **ASI Status** – Displays the lock status of the ASI input.

- **Input Type Status** – Below the **ASI Status** field, the lock status of all other input types present are displayed, with the name dependent on the specific hardware options present:
- SAT (DVB-S2, DVB-S2 ACM or DVB-S2X)
- 8VSB
- G.703
- IP Input
- Terrestrial (DVB-T/T2)

3.10.1.6. Input Redundancy

NOTE: This section describes the input redundancy mode that is used to switch the IRD between different input types. IP Input has an additional independent redundancy mode as described in section 3.10.4.13 IP Input Redundancy.

The input redundancy mode is enabled whenever the **Input Source** is set to **AUTO** or **FAILOVER**, as shown in Figure 3-60.

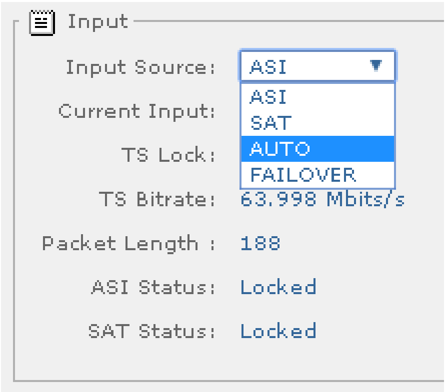


Figure 3-60 Enabling Input Redundancy Mode

When enabled, the unit will immediately change its **Current Input** to be that of the **Primary Input**. Should the **Primary Input** have an input event, then assuming that the **Secondary Input** is reporting that it is locked, the unit will switch to that input. The IRD's behavior should the **Secondary Input** subsequently have an input event will differ depending on the **Input Source:**

- **AUTO** – In this mode, provided the **Primary Input** has been restored, the unit will switch back to that input. Any following input losses will cause a corresponding switch to the other input if available. Should the **Return To Primary** option be enabled, the restoration of the **Primary Input** will cause a reversion to that input regardless of the **Secondary Input** status.
- **FAILOVER** – In this mode, the unit will not switch to use the **Primary Input** even if that input is restored and the **Secondary Input** has failed. Operator intervention is required to manually switch the input using the **Revert to Primary Input** control.

There are three sources of input events than can trigger a redundancy switch:

- Loss of Input Transport Stream Lock

- NULL packet threshold being exceeded
- Input TS Monitor detecting stream error

Once triggered, the redundancy switch will occur if the event is not cleared within the **Input Loss Switch Period**.

Loss of transport stream lock detection is automatically enabled whenever a redundancy mode is enabled. The status of both the **Primary Input** and the **Secondary Input** is continuously monitored and should the status change, the unit will react accordingly.

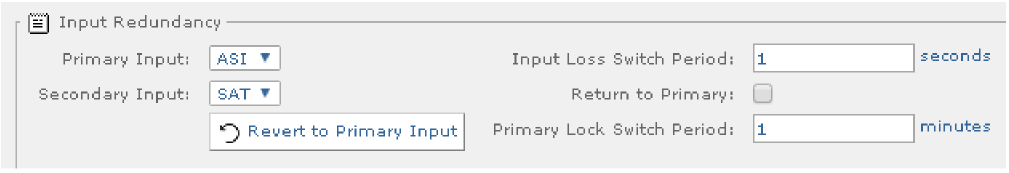


Figure 3-61 Configuration setting for Input Redundancy section

- **Primary Input** – The input type to use as the primary input when Input Redundancy Mode is enabled.

NOTE: If the Primary Input is set to the same type as currently selected for the Secondary Input, then the latter will be automatically changed to the next available input type.

- **Secondary Input** – The input type to use as the secondary input when Input Redundancy Mode is enabled.

NOTE: The list of available input types for the Secondary Input will not include the type currently selected for the Primary Input.

- **Revert to Primary Input** – If Input Redundancy Mode is enabled and the **Current Input** is not the **Primary Input**, this control can be used to force the unit to switch to the Primary Input.

NOTE: The unit will switch to the Primary Input even if that input status is not reporting that it is locked. If the input is not locked, the unit will perform a redundancy switch back to the Secondary Input if that input is locked.

- **Input Loss Switch Period** – The period of time in seconds that the **Current Input** must be reporting that it is not in the locked state before a redundancy switch will occur if the Input Redundancy Mode is enabled.
- **Return to Primary** – If Input Redundancy Mode is enabled, **Input Source** is **Auto** and the **Current Input** is not **Primary Input**, enabling this option will cause the unit to return to the **Primary Input** if that input has been locked for **Primary Lock Switch Period**.

NOTE: It is not recommended that this option be used if the TS Monitor function is enabled. The TS Monitor can only check the Current Input for stream issues, so if it detects errors on the Primary Input, the unit will perform a redundancy switch to the Secondary Input if possible. However if the Primary Input is still present, the unit will consider that input to be locked and so this feature will cause it to return to that input even if the stream continues to exhibit the errors.

- **Primary Lock Switch Period** – If Input Redundancy Mode is enabled, **Input Source** is **Auto**, **Current Input** is not **Primary Input** and **Return to Primary** is enabled, this sets the period of time in minutes that the **Primary Input** must be locked before the unit will return to that input.

3.10.1.7. NULL Packet Override

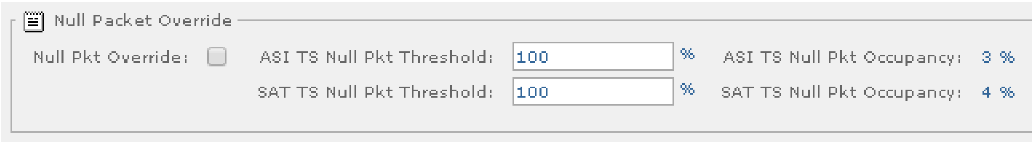


Figure 3-62 Configuration settings for the Input > Null Packet Override section

- **Null Pkt Override** – If Input Redundancy Mode is enabled, this enables the monitoring of the available input types for excessive Null packets, and if detected, will override the status of that input from **Locked** to **Null Pkt Threshold**,which in turn may result in a redundancy switch being performed.
- **<Input> TS Null Pkt Threshold** - For each input type present, this allows the threshold for that input to be configured. The value provided represents the minimum percentage of Null packets that must be detected on that input before its status is overridden from the locked state.
- **<Input> TS Null Pkt Occupancy** - For each input type present, this displays the current Null packet occupancy as a percentage of the incoming transport stream on that input.

3.10.1.8. TS Monitor

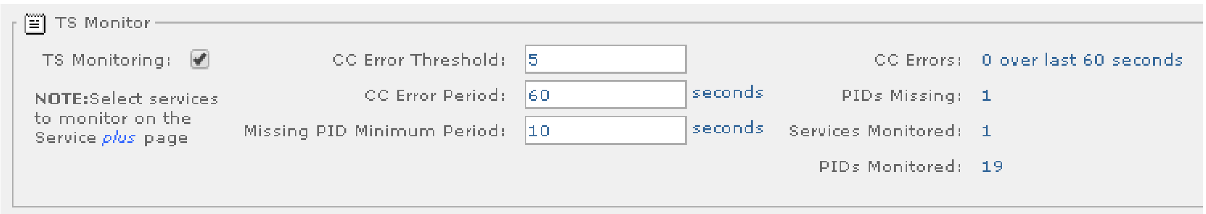


Figure 3-63 Configuration settings for the Input > TS Monitor section

- **TS Monitoring** – This option enables the TS Monitor that analyses the **Current Input** for transport stream issues on a service level basis. Each service is monitored for two error conditions:
- **Missing PID** – Checks that all registered PIDs for the selected services are present in the transport stream

- **Continuity Count errors** – Checks that the number of continuity count (CC) errors detected across all registered PIDs for the selected services does not exceed a threshold.

If an error is detected, the associated alarm will be raised, and if Input Redundancy Mode is enabled, a redundancy switch may be triggered.

- **CC Error Threshold** – The number of CC errors that must be detected across all registered PIDs of the selected services before a stream problem is reported. The errors must occur within the time period set by **CC Error Period**.
- **CC Error Period** – The time window in seconds over which CC errors are counted.
- **Missing PID Minimum Period** – The time in seconds that a monitored PID may not be detected in the transport stream before a stream problem is reported.
- **CC Errors** – The total number of CC errors detected within the given time period across all registered PIDs.
- **PIDs Missing** – The total number of PIDs that have not been seen in the transport stream for the **Missing PID Minimum Period**.
- **Services Monitored** – The number of services selected for monitoring via the **Service *plus*** page. A maximum of 24 services can be selected for monitoring.
- **PIDs Monitored** – The number of PIDs that are being monitored. This is the sum of the PID of the PAT, the PIDs of all registered PMTs, and the PIDs of all components listed in the PMT of the selected services.

NOTE: This number will be non-zero even if no services are selected as the PIDs of the PAT and all registered PMTs will always be monitored.

When the TS Monitor is enabled by selecting the **TS Monitoring** option, an extra column is displayed on the **Service *plus*** page as shown in Figure 3-64. Up to 24 services can be selected for monitoring.

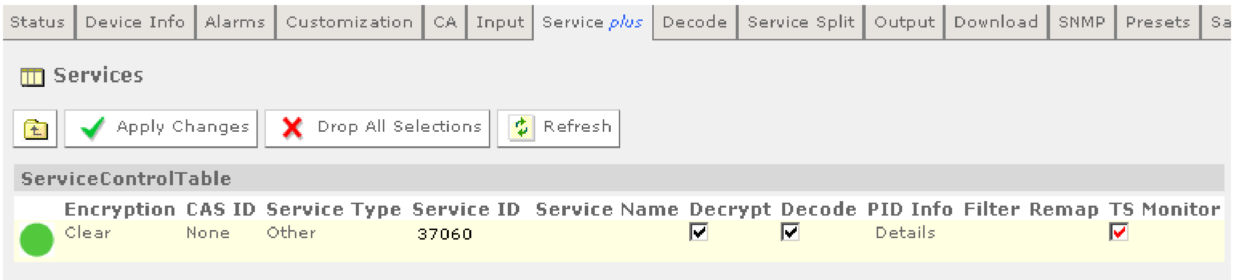


Figure 3-64 Selecting services for the TS Monitor using the Service plus page

3.10.1.9. Front Panel Setup

This menu provides the ability to select the current Transport Stream input, and if redundancy modes is enabled, the primary and secondary inputs.

```
INPUT                        |SELECT INPUT ASI
3.1                          |PRIMARY INPUT ASI
```

Use the ▶ (Forward) and ◀ (Back) keys to move between select input and primary input then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options.

3.10.2. ASI

3.10.2.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
B	B	B	B	B

3.10.2.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items with this functionality			

3.10.2.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	✓

3.10.2.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys associated with this input type			

3.10.2.5. Functional Description

The IRD comes with an ASI input port as standard, allowing the unit to receive Transport Streams as per ETSI TR 101 891 via the ASI input BNC.

3.10.3. Satellite

3.10.3.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●	B	B		B

3.10.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
1st Generation DVB-S2 Capable Satellite Demodulator	1911	FAZ 101 0113/5	RX8200/HWO/DVBS2
2nd Generation DVB-S2 Capable Satellite Demodulator	1912 / 1928	FAZ 101 0113/6	RX8200/HWO/DVBS2/2
Combined DVB-S2 Capable Satellite Demodulator and IP Input	1931	FAZ 101 0113/70	RX8200/HWO/DVBS2/IP
DVB-S2X Capable Satellite Demodulator	1935	FAZ 101 0113/207	RX8200/HWO/DVBS2X/A

3.10.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	✓

3.10.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/DVBS2/QPSK	Enables DVB-S2 QPSK functionality on RX8200 IRDs	FAZ101 0113/32	RX8XXX/SWO/DVBS2/QPSK
RX8200/SWO/DVBS2/8PSK	Enables DVB-S2 QPSK and 8PSK functionality on RX8200 IRDs	FAZ101 0113/30	RX8XXX/SWO/DVBS2/8PSK
RX8200/SWO/DVBS2/16APSK	Enables DVB-S2 QPSK, 8PSK, 16APSK and 32 APSK functionality on RX8200 IRDs Requires 2nd Generation DVB-S2 Capable Satellite	FAZ101 0113/29	RX8XXX/SWO/DVBS2/16APSK

Marketing Code	Description	FAZ Number	License Key Name
	Demodulator, Combined DVB-S2 Capable Satellite and IP Input or DVB-S2X cards		
RX8200/SWO/DVBS2X/32APSK	Enables DVB-S2X 32APSK functionality on RX8200 IRDs Requires DVB-S2X card	FAZ 101 0113/206	RX8XXX/SWO/DVBS2X/32APSK
RX8200/SWO/DVBS2/LSYM	Enables low symbol rate operation for DVB-S2 modes on RX8200 IRDs	FAZ101 0113/31	RX8XXX/SWO/DVBS2/LSYM
RX8200/SWO/DVBS2/VCM	Enables DVB-S2 multi-Transport Stream mode on RX8200 IRDs Requires 2nd Generation DVB-S2 Capable Satellite Demodulator, Combined DVB-S2 Capable Satellite and IP Input or DVB-S2X cards	FAZ 101 0113/56	RX8XXX/SWO/DVBS2/VCM
RX8200/SWO/IP/PROMPEG	Enables SMPTE 2022, ProMPEG FEC on IP inputs Requires Combined DVB-S2 Capable Satellite and IP Input	FAZ 101 0113/37	
RX83XX/SWO/DVBS2/QPSK	Enables DVB-S2 QPSK functionality on RX8300 IRDs	FAZ 101 0118/6	RX8XXX/SWO/DVBS2/QPSK
RX83XX/SWO/DVBS2/8PSK	Enables DVB-S2 QPSK and 8PSK functionality on RX8300 IRDs	FAZ 101 0118/4	RX8XXX/SWO/DVBS2/8PSK
RX83XX/SWO/DVBS2/LSYM	Enables low symbol rate operation for DVB-S2 modes on RX8300 IRDs	FAZ 101 0118/5	RX8XXX/SWO/DVBS2/LSYM

CAUTION: The IRD provides DC power via the active L-Band input connector to drive an LNB (Low-Noise Block Down-Converter). Do not connect equipment other than an LNB to this connector. Failure to do this may result in damage to the external equipment

The F-type Connector is not suitable for repeated connection and disconnection. When intended for use in this way, fit a sacrificial connector and connect to it

3.10.3.5. Functional Description

The satellite input options available for the IRD are capable of DVB-S (EN300-421), DVB-S2 (EN302-307-1) and DVB-S2 extensions or DVB-S2X (EN302-307-2).

DVB-S2 offers up to a 30% increase in data rate carriage for an equivalent link margin compared to what the older DVB-S standard can offer. This functionality is often partnered with MPEG-4 compression to give bandwidth efficient distribution of high definition services.

DVB-S2X is an extension to the DVB-S2 standard can provide up to 20% performance improvement compared to DVB-S2 and increase the efficiency of satellite links. This will enable an increase in video quality or an increase in the number of video services or a reduction in leased satellite bandwidth - bringing lower operational expenditure.

This capability allows the IRD to acquire content from a satellite carrier and demodulate the transmission, making a Transport Stream available to the IRD for onward processing.

Most satellite input options have multiple satellite input connectors. These connectors allow the IRD to be configured for signal feed distribution systems that may involve separate L-band cables for different polarizations or even originating from different antennas.

3.10.3.6. Web Browser Setup

The unit presents individual setup pages for each satellite input connector.

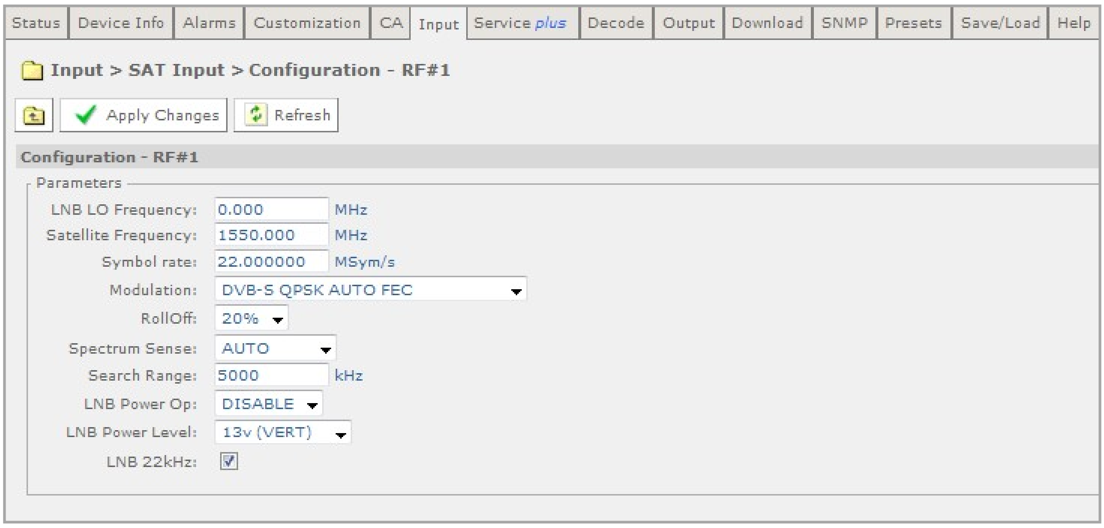


Figure 3-65 Input > Configuration RF#1 Web Page

Parameters

- **LNB LO Frequency** – This field should be entered (in MHz, in steps of 1 kHz) with the frequency of the LNB (low noise block down-converter) used with the satellite dish. Typically a value of 9750 MHz or 10600 MHz would be used to cover the satellite KU band frequency range 11.70 GHz-12.75 GHz. With this value correctly entered and with the satellite frequency entered the IRD can calculate the frequency of the wanted signal at L-band present on the input connector.
- **Satellite Frequency** – This field should be entered (in MHz, in steps of 1 kHz) with the wanted satellite downlink frequency. This will normally be within the C-band or KU band frequency range. Alternatively, if the LNB LO Frequency was entered as 0 MHz the user can manually calculate and directly enter the wanted L-band frequency.

- **Symbol Rate** – This field should be entered with the symbol rate of the wanted signal. In DVB-S2 mode, a Low Symbol Rate license is required to enable 1 – 5 MSyms operation. Where the DVB-S2X card is fitted, this license is not required.

NOTE: The 1st Generation DVB-S2 option is limited to 31 MSyms (or 81 Mbps) in DVB-S2 mode whereas the 2nd Generation DVB-S2 card has a higher symbol rate limit of 60 MSyms (or 170 Mbps). The DVB-S2X card is limited to 54 MSyms.

- **Search Range** – Owing to frequency inaccuracies of the transmission system (mostly LNB inaccuracies) the wanted carrier may not be exactly on frequency. This option provides the satellite input with the maximum frequency search limits within which to attempt to acquire the wanted signal. A typical search range is 5000 kHz. A narrower search range may result in faster acquisition especially for low symbol rate carriers.

NOTE: For low symbol rate transmissions, a search range that is too wide may cause the IRD to lock onto an unwanted, adjacent carrier. Care must be taken to ensure that the search range entered is appropriate for the symbol rate of the incoming carrier.

- **Gold Sequence / Physical Layer Scrambling** – The gold sequence code is the seed for a randomizing sequence which can be used to uniquely identify the owner of the transmission. The satellite input will only lock to the incoming signal when the gold code entered into the IRD matched the code set in the up-link modulator. For this reason, the Gold Sequence will often be used as a form of fixed key CA.
- **Modulation Mode** – Determines the modulation standard - DVB-S, DVB-S2 or DVB-S2X. In DVB-S2/S2X mode, selection of the FEC rates (QPSK, 8PSK, etc.) is automatic and does not require specific user entry.

NOTE: Notes: A license key is required to enable DVB-S2 and DVB-S2X functionality depending on the type of satellite card fitted.

DVB-DSNG (EN301-210) 8PSK/16QAM modulation standard is not supported by older generation satellite cards but is supported by the DVB-S2X card.

The 1st Generation satellite input card and the DVB-S2X card has to be explicitly set DVB-S or DVB-S2 mode whereas the 2nd Generation satellite input card and Combined Satellite/IP card only present an automatic detection option.

The DVB-S2X Input card can take up to 25 seconds to switch between DVB-S and DVB-S2/S2X modes. This is because a different code image is loaded in to the card for each mode.

- **FEC** – Configures the modulation scheme and FEC Rate or MODCOD selection. This option is exposed when the DVB-S2X card is fitted and must be explicitly set in DVB-S mode, but can be set to AUTO for DVB-S2/S2X modes.

- DVB-S
  - QPSK 1/2, 2/3, 3/4, 5/6, 6/7, 7/8
  - 8PSK 2/3, 5/6, 8/9
  - 16QAM 3/4, 7/8
- DVB-S2
  - AUTO
  - QPSK 1/2, 1/3, 1/4, 2/3, 3/4, 2/5, 3/5, 4/5, 5/6, 8/9, 9/10
  - 8PSK 2/3, 3/4, 3/5, 5/6, 8/9, 9/10
  - 16APSK 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
  - 32APSK 3/4, 4/5, 5/6, 8/9, 9/10
- DVB-S2X
  - AUTO
  - QPSK 4/15, 7/15, 8/15, 9/20, 11/20, 11/45, 13/45, 14/45, 32/45
  - 8PSK 7/15, 8/15, 13/18, 23/36, 25/36, 26/45, 32/45
  - 8APSK-L 5/9, 26/45
  - 16APSK 3/5, 7/9, 7/15, 8/15, 13/18, 23/36, 25/36, 26/45, 28/45, 32/45, 77/90
  - 16APSK-L 1/2, 2/3, 3/5, 5/9, 8/15
  - 32APSK 2/3, 7/9, 11/15, 32/45
  - 32APSK-L 2/3

NOTE: Setting the modulation mode to DVB-S2X and the FEC to AUTO will allow the DVB-S2X card to automatically detect MODCODs for both DVB-S2 and DVB-S2X signals. Setting the modulation mode to DVB-S2 and the FEC to AUTO will restrict the DVB-S2X card to automatically detect MODCODs for DVB-S2 signals only. DVB-S mode does not support automatic detection of MODCODs.

- **LNB Power** – Allows the user to **ENABLE/DISABLE** power to the LNB. This menu allows different LNB voltages to be set:
  - 13 V (Vertical polarization)
  - 18 V (Horizontal polarization)
  - Boosted 13 V (Vertical polarization)
  - Boosted 18 V (Horizontal polarization)

NOTE: The Boosted options increase the voltage slightly to account for the voltage drop that occurs down long cable runs from the IRD to the LNB. This feature is not supported by the DVB-S2X card.

- **LNB 22 kHz** – This check box enables the LNB 22 kHz signal to be activated. Enabling the 22 kHz tone will command the LNB to switch to its high band local oscillator frequency.
- **Spectrum Sense** – Allows the satellite card to determine if the incoming satellite signal has been frequency inverted due to the relative frequencies of the local oscillator and modulated frequency (high side or low side local oscillator) either at the up-link or at the down-link.
- **Mapping Mode** – This option allows the IRD to determine the power of the received constellation points relative to an unmodulated carrier or DVB-S2 pilot tones. For single carrier transmissions where one carrier occupies the whole transponder the optimum setting is **PEAK POWER**. For multi-carrier transmissions where multiple carriers are transmitted within one satellite transponder then **MEAN POWER** should be used.

NOTE: The Mapping Mode is only applicable to DVB-S2 16APSK or 32APSK and not available on the DVB-S2X card.

The DVB-S2X card is not compatible with PEAK mapping mode and it is recommended that MediaKind satellite modulators are configured to use MEAN mapping mode when used in conjunction with RX8200 units fitted with the DVB-S2X card.

- **Roll-Off** – Enables the selection of a roll-off rate from a drop-down menu. Available options are 20%, 25%, 35%. Tighter roll-offs (20%, 25%) are only defined for DVB-S2 modulation. These tighter roll-offs allow a higher symbol rate to be used within a given allocated bandwidth. The DVB-S2X card provides the options: AUTO, 5%, 10%, 15%, 20%, 25% and 35%.
- **MIS Filter** – Enables or disables Multiple Input Stream (MIS) filtering and is not applicable **to** DVB-S mode. Multiple Input Streams allows multiple independent transport streams in one satellite carrier. When enabled a single transport stream is filtered out of the baseband frames based upon the **Input Stream ID** (ISI). This should be disabled for single stream carriers.
- **Input Stream ID** – Defines the Input Stream ID (ISI) filter value when the **MIS Filter** is enabled. Only streams with this ISI value will be output, thus a non-matching ISI value will result in zero bit rate being detected by the unit and will raise TS Unlock alarms.

3.10.3.7. Front Panel Setup

3.10.3.7.1. Source 1 Configure

This menu provides sub-menus that enable viewing and configuration of various Source 1 Input 1 parameters. To access this function, press the ▼ (Down) key.

```
SOURCE 1                      |CONFIGURE Input 1 (L-band)
3.2.2                         |(UNLOCKED)                     >
```

3.10.3.7.2. LNB LO Frequency

This field should be entered (in MHz, in steps of 1 kHz) with the frequency of the LNB (low noise block down-converter) used with the satellite dish. Typically a value of 9750 MHz or 10600 MHz would be used to cover the satellite KU band frequency range 11.70 GHz-12.75 GHz. With this value correctly entered and with the satellite frequency entered the IRD can calculate the frequency of the wanted signal at L-band present on the input connector.

To access this menu from the above menu, press the ▶ (Forward) key.

```
SOURCE 1                      |LNB LO FREQUENCY
3.2.2.1                       |00000.000 MHz              (UNLOCKED)
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the frequency.

3.10.3.7.3. Satellite Frequency

This field should be entered (in MHz, in steps of 1 kHz) with the wanted satellite downlink frequency. This will normally be within the C-band or KU band frequency range. Alternatively, if the **LNB LO Frequency** was entered as 0 MHz the user can manually calculate and directly enter the wanted L-band frequency.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                      |SATELLITE FREQUENCY
3.2.2.2                       |01550.000 MHz              (UNLOCKED)
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the frequency.

3.10.3.7.4. Symbol Rate

This field should be entered with the symbol rate of the wanted signal.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                      |SYMBOL RATE
3.2.2.3                       |22.000000 MSym/s           (UNLOCKED)
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the frequency.

3.10.3.7.5. Modulation Mode

Determines the modulation standard - DVB-S, DVB-S2 or DVB-S2X. In DVB-S2/S2X mode, selection of the FEC rates (QPSK, 8PSK, etc.) is automatic and does not require specific user entry.

NOTE: Notes: A license key is required to enable DVB-S2 and DVB-S2X functionality depending on the type of satellite card fitted.

DVB-DSNG (EN301-210) 8PSK/16QAM modulation standard is not supported by older generation satellite cards but is supported by the DVB-S2X card.

The 1st Generation satellite input card and the DVB-S2X card has to be explicitly set DVB-S or DVB-S2 mode whereas the 2nd Generation satellite input card and Combined Satellite/IP card only presents an automatic detection option.

The DVB-S2X Input card can take up to 25 seconds to switch between DVB-S and
DVB-S2/S2X modes. This is because a different code image is loaded in to the card for each mode

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                  |MODULATION
3.2.2.4                   |DVB-S QPSK AUTO FEC          (UNLOCKED)
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the available modulation types (dependent on model and option licenses).

3.10.3.7.6. Roll-off

This enables the selection of a roll-off rate from a drop-down menu (in %). Available options are 20%, 25%, 35%. Tighter roll-offs (20%, 25%) are only defined for DVB-S2 modulation. These tighter roll-offs allow a higher symbol rate to be used within a given allocated bandwidth. The DVB-S2X card provides the options: AUTO, 5%, 10%, 15%, 20%, 25% and 35%.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                  |ROLLOFF
3.2.2.5                   |20%                          (UNLOCKED)
```

Use the ▲ (Up) and ▼ (Down) keys to select the required percentage.

3.10.3.7.7. Spectrum Sense

Allows the satellite card to determine if the incoming satellite signal has been frequency inverted due to the relative frequencies of the local oscillator and modulated frequency (high side or low side local oscillator) either at the up-link or at the down-link.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                  |SPECTRUM SENSE
3.2.2.6                   |AUTO                         (UNLOCKED)
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the available settings: **AUTO, NORMAL** or **INVERTED**.

3.10.3.7.8. Search Mode

Allows the IRD to automatically determine the most appropriate frequency search range or to use a user defined Search Range.

This option is not available for the DVB-S2X card.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1          |SEARCH MODE
3.2.2.7           |AUTO                  (UNLOCKED)
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the available settings: **AUTO** or **MANUAL**.

3.10.3.7.9. Search Range

Owing to frequency inaccuracies of the transmission system (mostly LNB inaccuracies) the wanted carrier may not be exactly on frequency. This option provides the satellite input with the maximum frequency search limits within which to attempt to acquire the wanted signal.
A typical search range is 5000 kHz. A narrower search range may result in faster acquisition especially for low symbol rate carriers.

NOTE: For low symbol rate transmissions, a search range that is too wide may cause the IRD to lock onto an unwanted, adjacent carrier. Care must be taken to ensure that the search range entered is appropriate for the symbol rate of the incoming carrier.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1          |SEARCH RANGE
3.2.2.8           |05000 KHz             (UNLOCKED)
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the search range.

3.10.3.7.10. Mapping Mode

This option allows the IRD to determine the power of the received constellation points relative to an unmodulated carrier or DVB-S2 pilot tones. For single carrier transmissions where one carrier occupies the whole transponder the optimum setting is PEAK POWER. For multi-carrier transmissions where multiple carriers are transmitted within one satellite transponder then **MEAN POWER** should be used.

This option is not available for the DVB-S2X card.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                    |MAPPING MODE (S2 ONLY)
3.2.2.9                     |MEAN POWER                       (UNLOCKED)
```

Use the ▲ (Up) and ▼ (Down) keys to select **ENABLE** or **DISABLE**.

3.10.3.7.11. Gold Sequence

The gold sequence code is the seed for a randomizing sequence which can be used to uniquely identify the owner of the transmission. The satellite input will only lock to the incoming signal when the gold code entered into the IRD matched the code set in the up-link modulator. For this reason, the Gold Sequence will often be used as a form of fixed key CA.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                    |GOLD SEQ N (s2 ONLY)
3.2.2.10                    |000000                           (UNLOCKED)
```

Use the ▲ (Up) and ▼ (Down) keys to select **ENABLE** or **DISABLE**.

3.10.3.7.12. LNB Power

Allows the user to **ENABLE/DISABLE** power to the LNB.

This menu allows different LNB voltages to be set:

- 13 V (Vertical polarization)
- 18 V (Horizontal polarization)
- Boosted 13 V (Vertical polarization)
- Boosted 18 V (Horizontal polarization)

NOTE: The Boosted options increase the voltage slightly to account for voltage drop that occurs down long cable runs from the IRD to the LNB. This feature is not supported by the DVB-S2X card.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                    |LNB POWER LEVEL
3.2.2.11                    |13V (VERT)                       (UNLOCKED)
```

Use the ▲ (Up) ▼ (Down) keys to select the required value from the available options.

3.10.3.7.13. LNB 22 kHz

This check box enables the LNB 22 kHz signal to be activated. Enabling the 22 kHz tone will command the LNB to switch to its high band local oscillator frequency.

To access this menu from the above menu, press the ▼ (Down) key.

```
SOURCE 1                     |LNB 22KHz
3.2.2.12                     |ENABLE                        (UNLOCKED)
```

Use the ▲ (Up) ▼ (Down) keys to select **ENABLE** or **DISABLE**.

This is the end of the **Source 1** sub-menus. To return to the **Source 1** main menu press the ◀ (Back) key.

3.10.3.7.14. Source 2/3/4 Configure

The options for Source 2, 3 and 4 menus are as described for **Source 1**, see above.

To return to the **Input** menu press the ◀ (Back) key twice.

3.10.3.8. Status

The unit presents useful signal quality measurements to the user via the web browser and through the front panel display

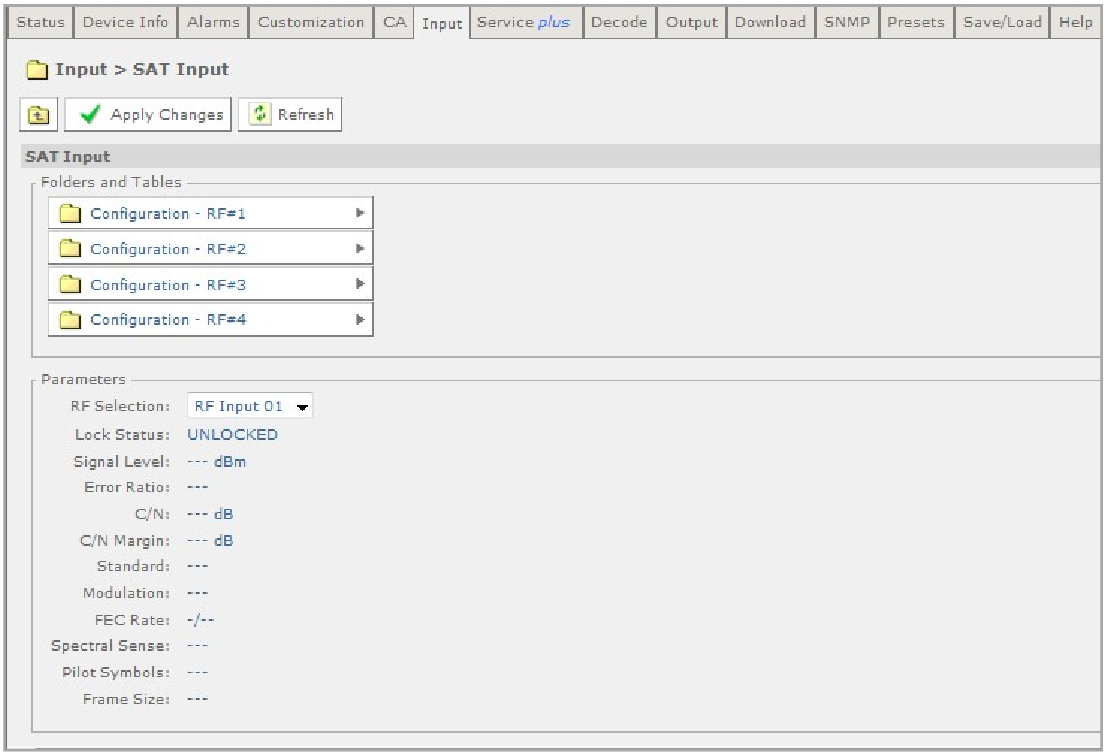


Figure 3-66 Input > SAT Input Web Page

- **Lock Status** – This field indicates if the satellite input option is locked to the incoming carrier or not.
- **Signal Level** – This field displays the estimated input power of the wanted carrier.
- **Error Ratio** – This field displays the Error Ratio for the demodulated data. In DVB-S mode the field displays the post Viterbi error ratio. A level of 2E-4 indicates that the Quasi Error Free point where the signal is deemed to be failing has been reached. In DVB-S2 mode the field returns the Packet Error ratio. A level of 1E-7 indicates that

the Quasi Error Free point where the signal is deemed to be failing has been reached.

- **C/N** – This field displays an estimate for the system carrier to noise ratio (absolute) on the received signal in units of dB.

NOTE: System C/N may not be equivalent to down-link C/N. It is not possible for the IRD to differentiate between the system noise floor and the down-link noise floor. Most satellite links are designed so that they are down-link thermal noise (rain fade) dominated. However, some satellite links can also be affected by system issues such as cross-polar interference, adjacent channel interference, adjacent satellite interference, cable tilt, etc.

- **C/N Margin** – This field displays an estimate for the system carrier-to-noise margin to failure for the received signal in units of dB. When the C/N Margin reads 0 dB the demodulator is likely to be at the Quasi Error Free point and on the verge of failing.

NOTE: System C/N Margin may not be equivalent to down-link C/N Margin. It is not possible for the IRD to differentiate between the system noise floor and the down-link noise floor. Most satellite links are designed so that they are down-link thermal noise (rain fade) dominated. However, some satellite links can also be affected by system issues such as cross-polar interference, adjacent channel interference, adjacent satellite interference, cable tilt, etc.

- **Standard** – This field displays the modulation standard for the incoming, locked signal: **DVB-S** or **DVB-S2**.
- **Modulation** – This field displays the modulation type for the incoming, locked signal: **QPSK, 8PSK** etc.
- **FEC** – This field displays the FEC for the received signal.
- **Spectral Sense** – This field displays the whether the incoming frequency spectrum has become inverted due to frequency up or down-conversion processes in either the up-link or down-link location.
- **Pilot Symbols** – This field indicates if DVB-S2 pilot tones are in use on the transmitted signal.

MediaKind recommends the use of DVB-S2 pilots for the following modulations:

DVB-S2 Pilot Symbols Recommendation

Table 3-6 Pilot Symbols Recommendation

Modulation	FEC	Pilots Recommended
DVB-S2 QPSK	1/4	✓
	1/3	✓
	2/5	✓
	1/2	✓
	3/5	✓
	2/3	×
	3/4	×

	4/5	×
	5/6	×
	8/9	×
	9/10	×
DVB-S2 8PSK	3/5	✓
	2/3	✓
	3/4	✓
	5/6	✓
	8/9	×
	9/10	×
DVB-S2 16APSK	2/3	✓
	3/4	✓
	4/5	✓
	5/6	✓
	8/9	✓
	9/10	✓
DVB-S2 32APSK	3/4	✓
	4/5	✓
	5/6	✓
	8/9	✓
	9/10	✓

- **Frame Size** – This field indicates the DVB-S2 FEC frame size – **Normal** or **Short**.
  DVB-S2 Short frames have a worse C/N performance than Normal frames. The modulation – demodulation latency for Short frames is very slightly less than for the Normal frame length.

3.10.3.9. Additional Notes

Combined DVB-S2 Capable Satellite and IP Input (RX8200/HWO/DVBS2/IP)

This input card offers all the capability of the 2nd Generation DVB-S2 Capable Satellite Demodulator. This card offers two satellite input connectors rather than the four satellite connectors of the satellite only option.

DVB-S2X Input Option Card for RX8200

The DVB-S2X Input Option Card is the latest generation of satellite input card for the RX8200 only. Existing RX8200 IRDs already in the field can be upgraded to the DVB-S2X card by swapping out their existing satellite demodulator cards and upgrading their IRD software to Version 7.14.0 or greater. Please contact MediaKind Customer Support for more details.

When configuring the Modulation Mode, swapping between DVB-S and DVB-S2/S2X mode can take up to 25 seconds. This is because a different code image is loaded in to the card for each mode. During this time the **Lock Status** field will report CONFIGURING HARDWARE. Any configuration changes during this time will be reapplied with the last valid configuration once the code image has finished loading.

The DVB-S2X Input Option card can be upgraded independently to the IRD software release. During the upgrade the **Lock Status** field will report PROGRAMMING HARDWARE and will not accept any configuration changes. When complete, the card will be reset automatically and the last valid configuration will be applied. Configuration access is then restored to normal.

Satellite Input Option for RX8305

The satellite input found on RX8305 provides only one satellite input connector and is limited to DVB-S QPSK, DVB-S2 QPSK and 8PSK modes only.

Satellite Input Option for RX8310/15/30

For the period up to approximately January 2012, the satellite input capability fitted in RX8310/15/30 was the 1st Generation DVB-S2 Capable Satellite Demodulator. After that date units transitioned across to the 2nd Generation DVB-S2 Capable Satellite Demodulator.

32APSK Operation

MediaKind offers 32APSK operation as part of the RX8200/SWO/DVBS2/16APSK feature. Users should note that whilst this card is entirely DVB compliant for 32APSK operation, reliable 32APSK operation in a practical transmission environment requires the highest quality of RF engineering. This level of RF performance for the complete end-to-end system extends beyond achieving the necessary signal to noise ratios. Special care must be applied to other RF system factors such as phase noise, cross polar interference, adjacent channel interference, co-channel interference, adjacent channel interference and cable tilt.

3.10.4. 100/1000BaseT IP Input

3.10.4.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●				

3.10.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
100/1000BaseT Input	1914	FAZ 101 0113/12	RX8200/HWO/IP/GIGE
Combined DVB-S2 Capable Satellite Demodulator and IP Input	1931	FAZ 101 0113/70	RX8200/HWO/DVBS2/IP
Dual Gigabit IP Transport Stream Bi-directional card	1934	FAZ 101 0113/13	RX8200/HWO/IP/IO/A

3.10.4.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.10.4.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/IP/PROMPEG	SMPTE 2022M ProMPEG FEC License	FAZ 101 0113/37	RX8200/SWO/IP/PROMPEG
RX8200/SWO/IP/IN/A*	IP TS Input License	FAZ 101 0113/210	RX8XXX/SWO/IP/IN
RX8200/SWO/IP/IN/SEAMLESS *	IP TS Input Seamless Protection License	????	RX8XXX/SWO/IP/IN/SEAMLESS

*Required for Dual Gigabit IP Transport Stream Bi-directional card only.

3.10.4.5. Functional Description

The IP Input Card supports the following feature set:

- ProMPEG FEC
- Two RJ-45 interfaces and PHY which meet the Ethernet electrical specifications as defined in IEEE 802.3 100/1000BaseT Ethernet, Full Duplex mode.
- MDI statistic – Delay Factor and Media Loss Rate.
- SNMPv1 (MIB-II and MDI values in read-only mode).
- CBR MPTS/SPTS feeds.
- Support a maximum TS Rate of 216 Mbps.
- Support configurable IP de-jittering buffer level up to 60 ms
- 1-7 TS packet per IP frame
- IGMP v2/v3
- VLAN ID support
- SMPTE 2022-7 Seamless Protection Switching Class A/B

The mapping of MPEG-2 TS packets into IP data frames is done according to the protocol stack shown below. The figure shows the Protocol Stack in use when mapping MPEG-2 into IP frames and Ethernet.

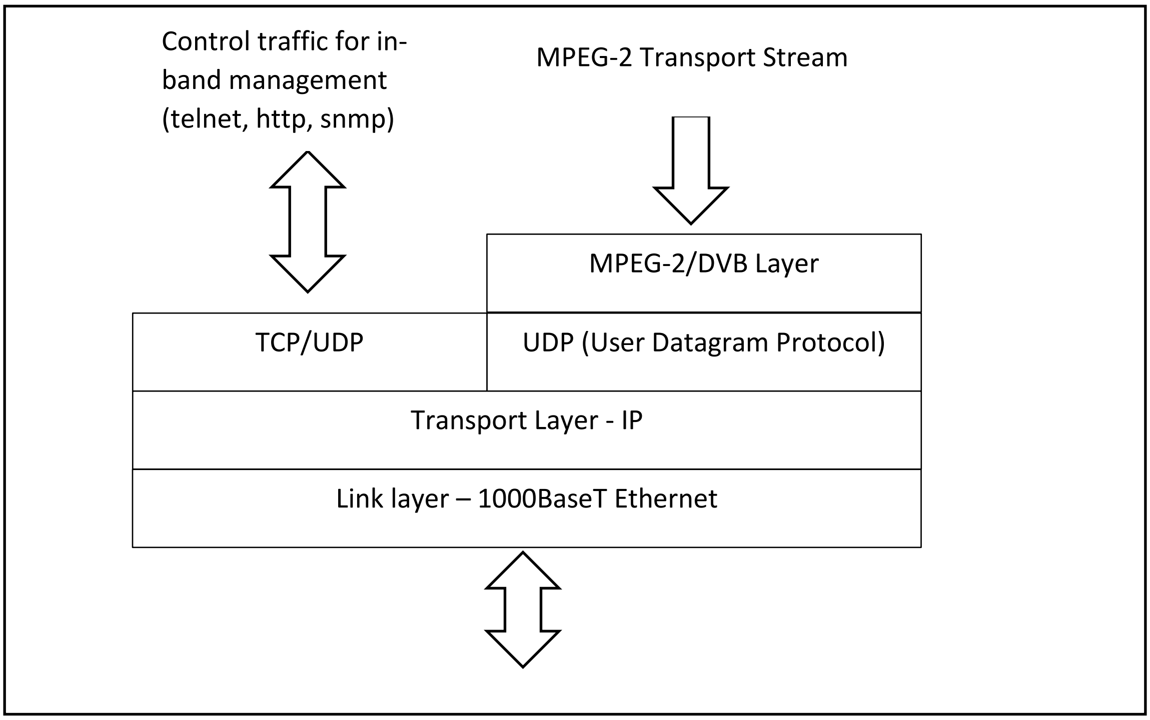


Figure 3-67 The Protocol Stack

The MPEG-2/DVB layer is specified in ISO/IEC IS 13818 – Generic Coding of Moving Pictures and Associated Audio. The UDP layer is compliant with RFC768 – User Datagram Protocol.
A configurable number of 188 byte MPEG-2 TS packets are mapped straight into an UDP frame with no additional overhead. The MTU for Ethernet is usually 1500 bytes. This limits the number of MPEG-2 TS packets per UDP frame to lie within one to seven.

The IP layer is according to RFC791 – Internet Protocol Specification.

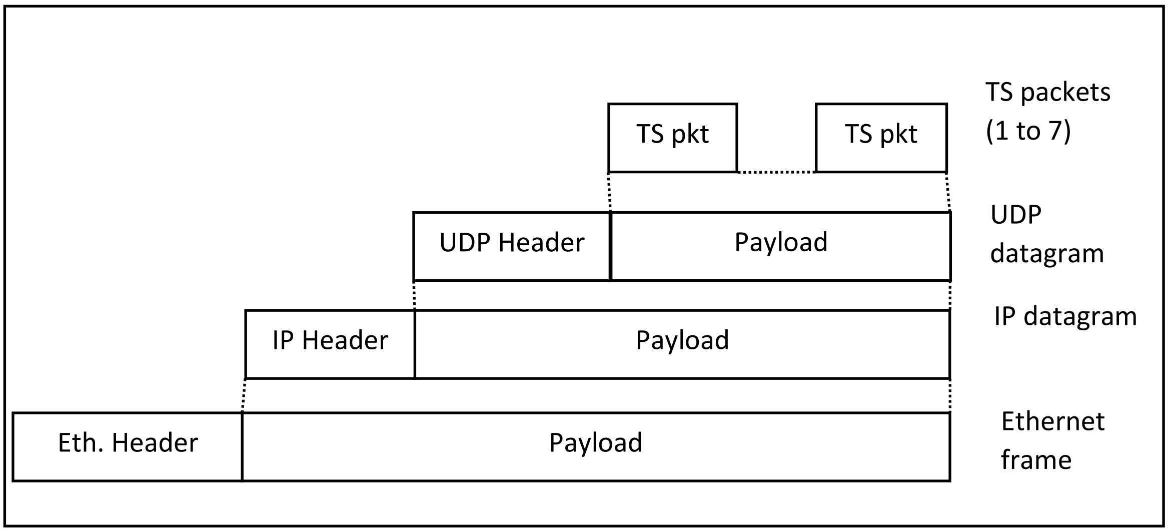


Figure 3-68 Building the Ethernet Frame

The setup and status of the IP Input is accessed through the main Input page from the web interface or front panel.

3.10.4.6. Notes on IP Input Latency

FEC correction can be enabled or disabled on the card. When enabled and the transmitter dispatches a valid ProMPEG FEC (Code of Practice issue 3 release), FEC latency is introduced by the card. The latency introduced by card is directly proportional to the FEC scheme configured at the source and is given by the formula:

FEC latency = 2 x Rows X Columns x packet period

Packet period = ((TS per IP) (188) +54) 8 / Bit rate

The current buffer level status is indicated in milliseconds based on the total buffer memory internally allocated by the card. This status indicates the total latency measured from the card's RJ-45 port to host. This status does not include picture decoding latency introduced by host. Both buffer level and FEC latency are configurable, allowing fine control of the card's latency.

Current buffer level = Jitter Buffer + FEC latency + clock compensation

Clock drift compensation introduces a small amount of latency. The exact amount of latency is based upon the difference between the encoded video's clock rate and the local clock rate.

The clock drift compensation should never be more than +/-5 ms. Typically, the encoder and IRD clocks will never be the full 1620 Hz different and normally a maximum compensation period of a couple of milliseconds is expected.

The maximum buffer size that should be configured is as follows (where bit rate is specified in bits per second):

Max buffer level = (100000000-Bits required for FEC) / Bit rate

The minimum buffer level that should be configured is 20 ms. To determine the minimum buffer size, use the worst case expected jitter value and add 5 ms.

3.10.4.7. PCR Locking Mechanism and Choice of PCR

The bit rate locking mechanism on the IP Input option card is PCR based. It processes the MPTS at the Transport Stream layer and searches for an adaptation field to signify the presence of a header as well as presence of a PCR flag. Should there be more than one PID carrying PCRs, the card will lock onto the highest PID value PCR.

For example, should both PCR PID 0x103 and PCR PID 0x1FFE exist in the stream, the card will lock onto PID 0x1FFE and use its PCR values to determine the bit rate of the MPTS.

3.10.4.8. Notes on Seamless Protection Switching

SMPTE 2022-7 Seamless Protection Switching provides a mechanism for using two identical RTP transports stream that are carried independently over two different data paths for redundancy. Both streams are used simultaneously and are synchronized in the receiver allowing for packet loss on either stream to be mitigated by packets from the other stream.

Only RTP streams are supported and missing packets are identified using the RTP sequence number, each RTP stream must be identical carrying the same transport stream packets in each RTP packet for the same sequence number.

The unit supports SMPTE 2022-7 Class B which allows for 50ms of skew (difference in data path timing) between the two inputs.

NOTE: Seamless Protection Switching is only available when the Dual Gigabit IP Transport Stream Bi-directional card (Board Type 1934) is fitted and the RX8200/SWO/IP/IN/SEAMLESS software option has been enabled

---

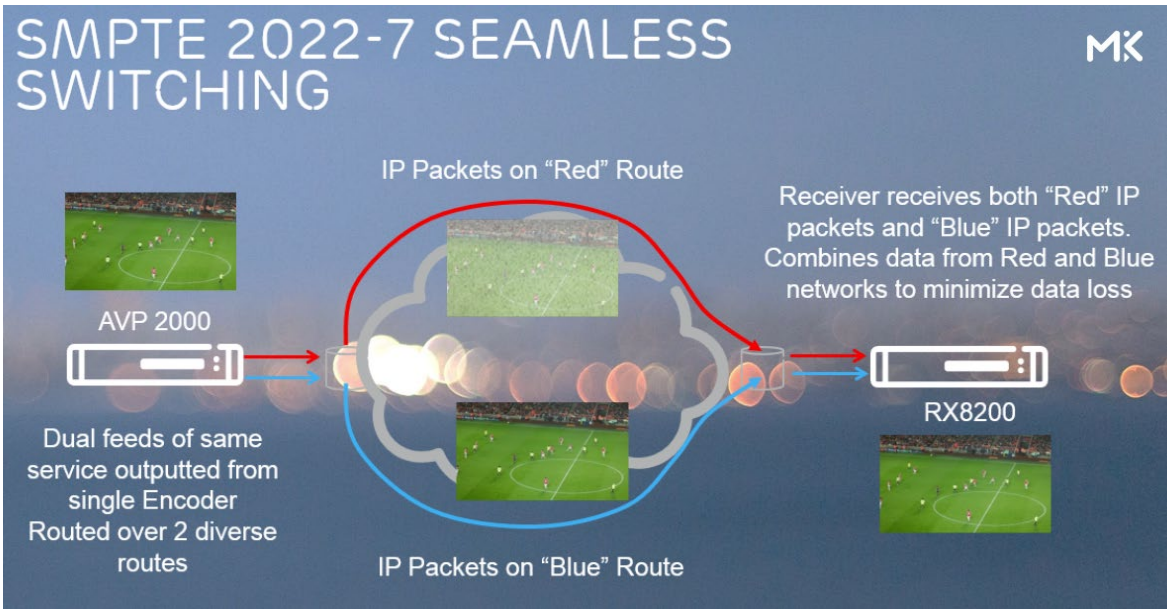


Figure 3-69 Application example of how SMPTE 2022-7 is used

3.10.4.9. IP Status Page

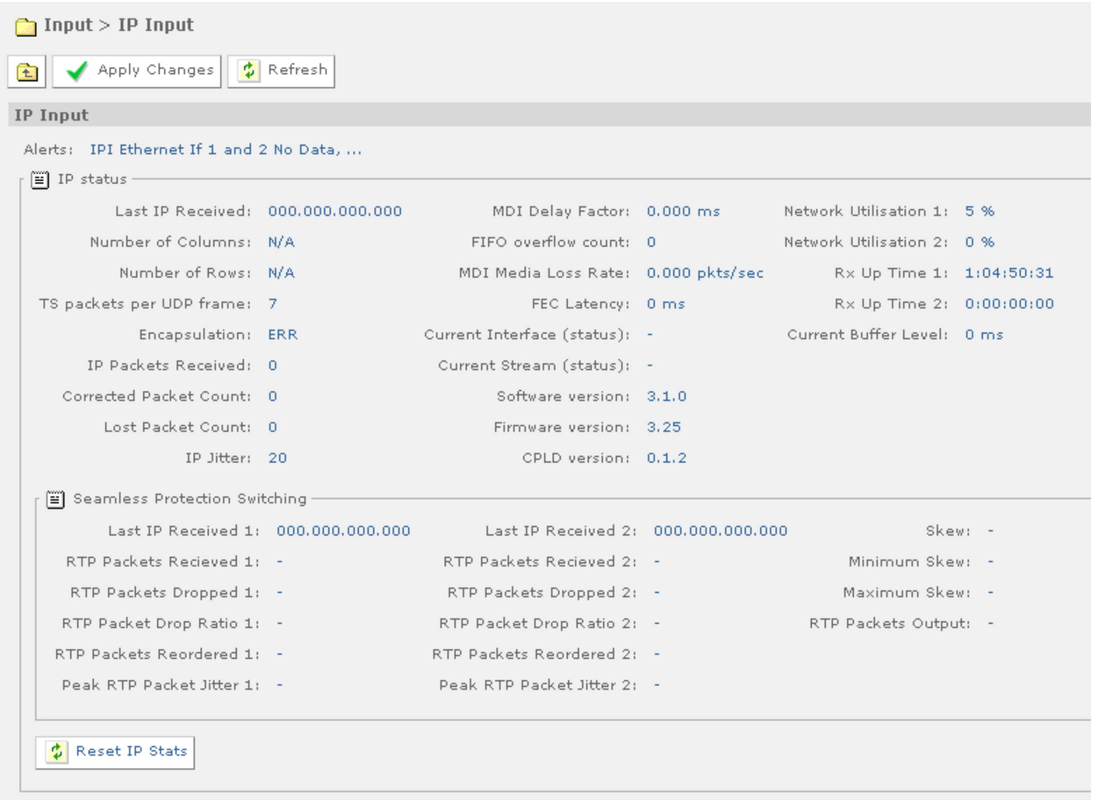


Figure 3-70 IP Input Status

The IP Status page has an Alert status field to summarize the current condition of the IP Input option card. Possible alerts that may be raised are list below.

Table 3-7 List of Possible IP Input Status Alerts

IP Input Status Alerts	
No response	FIFO overflow
Link down on port 1	Link down on port 2
ARP unresolved on port 1	ARP unresolved on port 2
Out of sync	IP conflict on port 2
Packets discarded	No data on port 2
Out of regulation	Seamless Protection Sync Failure
No data on port 1	
Wrong FEC format	
Header error	
Packet lost	
IP conflict	

3.10.4.9.1. IP Input > IP Status

- **Last IP Received** – Source of IP address of the IP datagrams being received.

- **Number of columns** – Shows current number of columns if Encapsulation is **FEC rows and columns** or **FEC columns only**.
- **Number of Rows** – Shows current number of columns if Encapsulation is **FEC rows and columns.**
- **TS packets per UDP frame** – Displays the number of TS packets per UDP frame in a receiving TS.
- **Encapsulation** – Current encapsulation: UDP, RTP, "FEC rows and columns" or "FEC columns only".
- **IP Packets Received** – Cumulative number of IP packets received.
- **Corrected Packet Count** – Cumulative number of IP packets corrected.
- **Lost Packet Count** – Cumulative number of IP packets lost.
- **IP Jitter** – Displays the current level of Transport Stream jitter (variance in arrival of packets) experienced by the card. A more crowded network (less free slots for transport packets) will add jitter to the network. It is recommended that unnecessary traffic is not sent down the network infrastructure that the Transport Stream is being piped down
- **MDI Delay Factor** – Media Delivery Indexes: Delay factor is a time value indicating how many milliseconds' worth of data the buffers must be able to contain in order to eliminate jitter. Recommended maximum acceptable DF is 9-50 ms.
- **MDI Media Loss Rate (MDR)** – Media Delivery Indexes: Media Loss Rate is simply defined as the number of lost or out-of-order media packets per second. Recommended maximum acceptable average MLRs (media packet per second): SDTV 0.004, VOD 0.004, HDTV 0.0005.
- **FIFO overflow count** – Displays the number of times the FIFO in the IP Input card has overflowed.
- **FEC Latency** – Time in milliseconds of expected video delay caused by FEC processing.
- **Current Port (status)** – Current active physical port.
- **Software version** – Displays the software version used on the IP Input Card.
- **Firmware sw version** – Displays the firmware version used on the IP Input Card
- **CPLD sw version** – Displays the CPLD version used on the IP Input Card.
- **Network Utilization** – Network utilization level in %.
- **Rx Up Time** – Time in seconds since network port is up and running.
- **Current Buffer Level** – Delay in milliseconds caused by IP de-jittering and FEC latency.
- **Reset IP Stats** – This button enables the counters displayed on this screen to be reset to 0.

3.10.4.9.2. IP Input > IP Status > Seamless Protection Switching

- **Last IP Received 1** – Source of IP address of the IP datagrams being received on Port 1.
- **RTP Packets Received 1** – Cumulative number of RTP packets received on Port 1
- **RTP Packets Dropped 1** – Cumulative number of RTP packets dropped on Port 1
- **RTP Packet Drop Ratio 1** – Displays the RTP packet ratio on Port 1 as a percentage of total RTP packets dropped in a 30 second period over the total RTP packets received in a 30 second period.
- **RTP Packets Reordered 1** – Cumulative number of RTP packets that had to be reordered on Port 1.
- **Peak RTP Packet Jitter 1** – Displays the peak level of RTP packet jitter measured reported in micro-seconds.
- **Last IP Received 2** – Source of IP address of the IP datagrams being received on Port 2.
- **RTP Packets Received 2** – Cumulative number of RTP packets received on Port 2
- **RTP Packets Dropped 2** – Cumulative number of RTP packets dropped on Port 2
- **RTP Packet Drop Ratio 2** – Displays the RTP packet ratio on Port 2 as a percentage of total RTP packets dropped in a 30 second period over the total RTP packets received in a 30 second period.
- **RTP Packets Reordered 2** – Cumulative number of RTP packets that had to be reordered on Port 2.
- **Peak RTP Packet Jitter 2** – Displays the peak level of RTP packet jitter measured reported in micro-seconds.
- **Skew** – The relative difference in milliseconds between the IP TS at Port 1 and Port 2. If a Port is not receiving a transport stream then the skew will be 'Infinite'. If Port 1 is ahead of Port 2 then the number will be negative.
- **Minimum Skew** – Displays the minimum skew measured between Port 1 and Port 2.
- **Maximum Skew** – Displays the maximum skew measured between Port 1 and port 2.
- **RTP Packets Output** – Cumulative number of RTP packets output from the Seamless Protection Switching block (the successfully recovered transport stream).

3.10.4.10. Configuring the IP Input Option Card

3.10.4.10.1. IP Interface

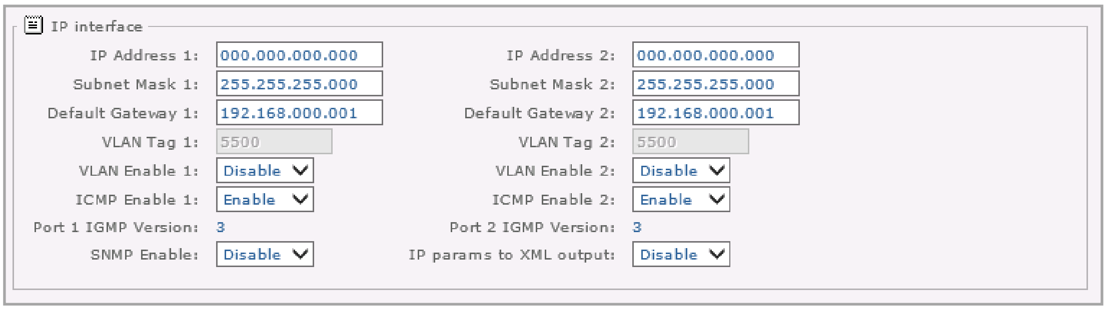


Figure 3-71 IP Interface Parameters

- **IP Address** – Enables the user to input the local IP address. This is used if the port is 'pinged'.
- **Subnet Mask** – Enables the user to input the local Subnet Mask address.
- **Default Gateway** – Enables the user to input the local Default Gateway address.
- **VLAN Tag** – Virtual LAN is a group of hosts with a common set of requirements that communicate as if they were attached to the same wire, regardless of their physical location. This 4 bytes IEEE 802.1Q header should contain a tag protocol identifier (TPID) and tag control information (TCI).
- **VLAN Enable** – Enables the user to **ENABLE/DISABLE** the VLAN tagging.
- **ICMP Enable** – Enables the user to **ENABLE/DISABLE** response to ICMP messages on the input.
- **Port 1/2 IGMP Version** – Currently used IGMP version, can be 2 or 3.
- **SNMP Enable** – Enables the user to **ENABLE/DISABLE** the SNMP facility via the input port (UDP port 161 and 162).
- **IP params to XML output** – Enabling this feature means that the all IP parameters are included in the XML configuration file. Disabling this feature is desirable if key IP parameters must be preserved on a target IRD during a redundancy switch.

3.10.4.10.2. Card Config Settings

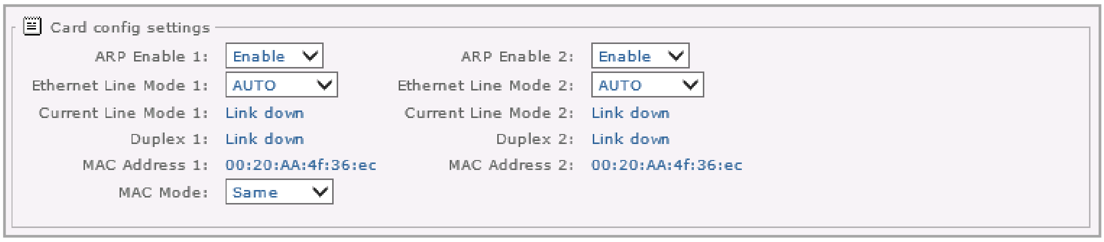


Figure 3-72 Card Config Settings

- **ARP Enable** – Enables the user to ENABLE/DISABLE response to ARP messages on the input.
- **Ethernet Line Mode** – Ethernet speed selection: Auto detect, 100Mbps or 1000Mbps.
- **Current Line Mode** – Reports the status of the Ethernet Line Mode detected on the relevant input port. This will report one of the following: Link Down, 10 Mbps, 100 Mbps or 1 Gbps.
- **Duplex** – Reports the status of the Duplex mode detected on the relevant input port. This will report one of the following: Link Down, Half or Full.
- **MAC Address** – Reports the current MAC address assigned to the relevant input port.
- **MAC Mode** – Enables the user to change the current Media Access Control Mode. The following options are available:
- **Different** – This ensures that the MAC addresses assigned to the Ethernet Input Port 1 and 2 are different.
- **Same** – This forces MAC Address 2 to match that of MAC Address 1.

3.10.4.11. Multicast Input Setup

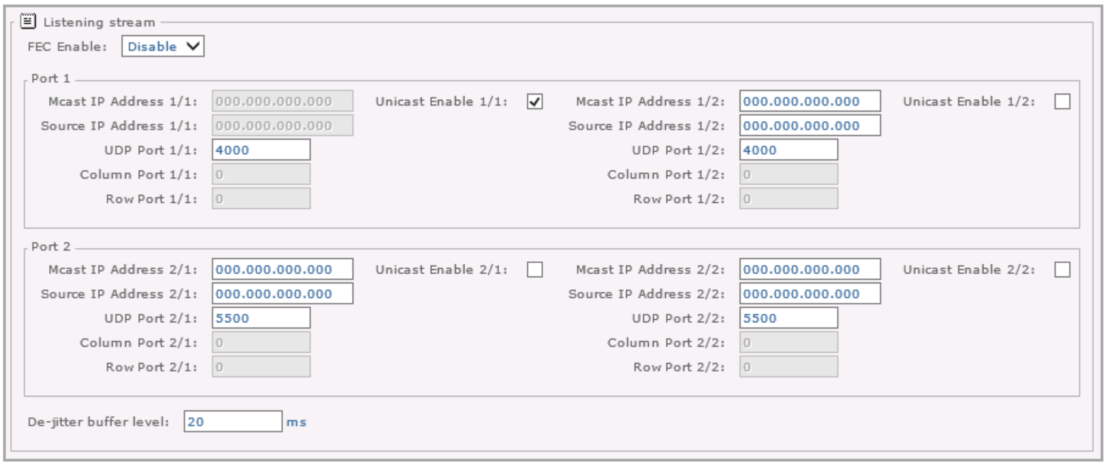


Figure 3-73 IP Input Stream Setup

3.10.4.11.1. Listening Stream Section

- **FEC Enable** – Enables the user to ENABLE/DISABLE Forward Error Correction. This facility is only available when FEC is licensed.
- **Mcast IP 1/1 Address** – Primary Multicast/Unicast address of listening IP TS. In case of Unicast this address should be equal to local IP address.
- **Mcast IP 1/2 Address** –Secondary Multicast/ address of listening IP TS. In case of Unicast or no multicast redundancy this should be left as 000.000.000.000
- **Unicast Enable** – Placing a check in the box enables the Unicast mode for the primary stream on Port 1/2.

- **Source IP Address 1/1** – Enables the user to set the Primary multicast Source IP Address for the primary stream on Port 1/2.
- **Source IP Address 1/2** – Enables the user to set the Secondary multicast Source IP Address for the primary stream on Port 1/2.
- **UDP Port 1/1** – Listening UDP port for primary multicast.
- **UDP Port 1/2** – Listening UDP port for secondary multicast.
- **Column Port 1/1** – Colum port for primary multicast; by default it is "Listening UDP port + 2", but can be reconfigured.
- **Column Port 1/2** – Colum port for secondary multicast; by default it is "Listening UDP port + 2", but can be reconfigured.
- **Row Port 1/1** – Row port for primary multicast by default it is "Listening UDP port + 4", but can be reconfigured.
- **Row Port 1/2** – Row port for secondary multicast by default it is "Listening UDP port + 4", but can be reconfigured.
- **De-Jitter Buffer Level** – IP de-jitter buffer level in milliseconds.

The user may specify the "buffer level" from the front panel or web GUI interface in milliseconds with 1 ms increments. The buffer level selected determines the maximum IP network jitter tolerance and contributes to the overall decoding delay (see current buffer level status). The default value is 60 ms. the card will automatically determine the allocation of an appropriate amount of jitter buffer memory based on the received bit rate. Buffer allocation is packet based. Therefore, the card chooses the nearest denomination to the user specified setting. The absolute minimum is a 16 IP packet buffer. For Seamless Protection Switching, there is a minimum value of 60ms, setting a value lower than this will have the value constrained to 60 ms.

3.10.4.12. Clear ARP Cache

Clear ARP – Two buttons are provided to allow the user to clear the Address Resolution Protocol cache for Port 1 or 2. If these are selected.

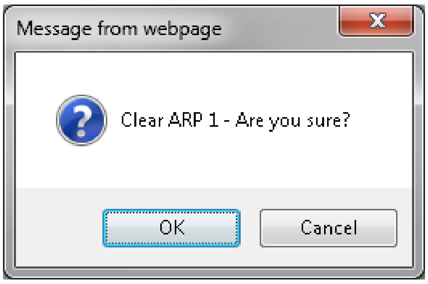


Figure 3-74 IP Message from Webpage Dialog

If **OK** is selected, the **Input > I/P Input** page is displayed showing that the operation has been successful.

3.10.4.13. IP Input Redundancy

The IP Input Redundancy works independently of the ***Input Redundancy Mode*** described in the section 3.10.1.6 and supports the following modes:

- Fail Over
- Fail Over + Revert
- SMPTE 2022-7 Seamless Protection Switching (available on the SFF Bi-directional IP card only, Board Type 1934)

For IP Input Redundancy, the **Primary Port** refers to IP interface Port 1 and the **Secondary Port** refers to IP interface Port 2.

3.10.4.13.1. Avoiding Redundancy Engine Conflicts

The Input Redundancy Mode engine takes precedence over the IP Input Redundancy engine and so care must be taken when configuring these modes. Either disable the Input Redundancy Mode so that the ***Input Source*** is not set to AUTO or FAILOVER, or provide a sufficient ***Input Loss Switch Period*** to prevent switching to an alternate input source.

Figure 3-75 illustrates two possible transport stream inputs, IP input and satellite input. The TS lock state between IP input and satellite input is monitored by the Input Redundancy Mode. If the current input was IP and it loses TS lock, the Input Redundancy Mode engine will switch to the satellite TS input source. This will happen regardless if the IP Input Redundancy engine has resolved itself or not.

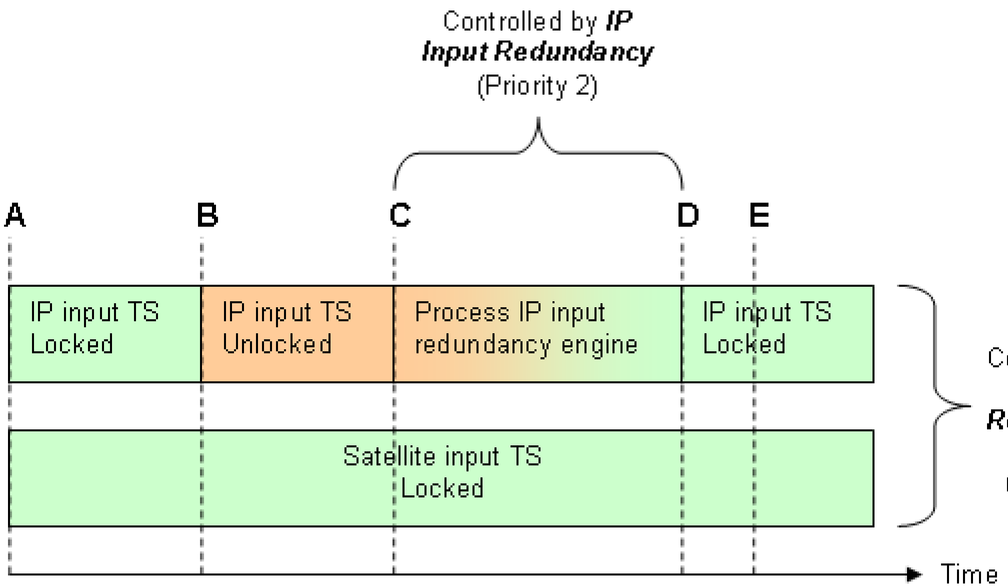


Figure 3-75 Avoiding conflicts between the Input Redundancy Mode engine and the IP Input Redundancy engine

- Point A marks where both the IP input and Satellite have successfully locked to their incoming transport streams.
- Point B marks when IP interface Port 1 loses TS lock.
- Point C marks when the IP Input Redundancy engine detects a failure on TS lock and begins searching for a valid TS input lock.
- Point D marks the time taken for the IP Input Redundancy engine to acquire successful TS lock on IP interface Port 2.
- Point E marks the ideal time that the ***Input Loss Switch Period*** should be set to where the Input Redundancy Mode

triggers a switch between IP input and satellite input. If there is no TS lock on IP input at point D, the unit can switch to satellite input at point E.

3.10.4.13.2. Redundancy Configuration Settings

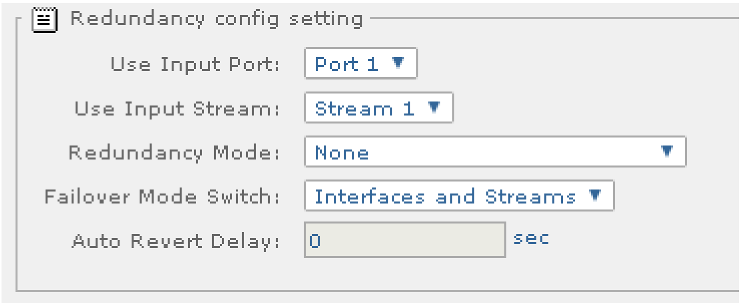


Figure 3-76 IP Redundancy Configuration

- **Use Input Ports** – Port 1 / Port2. This selects the physical port to be used initially

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NOTE: As of Software Version 5.11.2, the AUTO option has been removed and redundancy features are now handled by the Redundancy Mode setting.

- **Use Input Stream** – Stream 1 / Stream 2. This selects the multicast stream to be used. The unit can configure 2 multicast streams so that if the first multicast fails the second multicast is tried.
- **Redundancy Mode** – The redundancy mode provides a simple mechanism to handle loss of transport stream lock between the two IP Ethernet ports. When in a Fail Over mode when lock on the Primary Port is detected, the unit can temporarily switch to the backup Secondary Port depending on user configuration:
- **None:** The redundancy mode is disabled. If the link is down or there is no TS lock then unit will remain in this state and not switch to the redundant port.
- **Fail Over:** The redundancy mode is enabled. A link down or TS lock drop on the primary port would cause a switch from the primary to the secondary port. In any event, the unit will not switch back to the primary port.
- **Fail Over + Revert:** The redundancy mode is enabled. A link down or TS lock drop on the primary port would cause a switch from the primary to the secondary port. The unit will automatically switch back to the primary port after linkup has been detected on the primary port for the length of time indicated by the **Auto Revert Delay** setting.
- **Seamless Protection Switching:** The redundancy mode is enabled. Both ports are used simultaneously to produce a single transport stream, errors on either port are corrected by the other port.
- **Failover Mode Switch** – This determines how the redundancy mode switches between Ports (Interfaces) and / or Streams.

- **Interfaces and Streams:** The unit also allows dual multicast redundancy: if the primary multicast is lost (due to IP encapsulator failure, etc.) the unit can automatically switch to a backup multicast. This will follow the redundancy state diagram shown below in Figure 3-77. In this diagram TS1 = multicast 1, TS2 = multicast 2, IF 1 = Port 1, IF 2 = port 2.
- **Interfaces Only:** The unit allows redundancy between the Ethernet Ports only.
- **Auto Revert Delay** – The delay, in seconds, before automatically reverting back to the primary port.

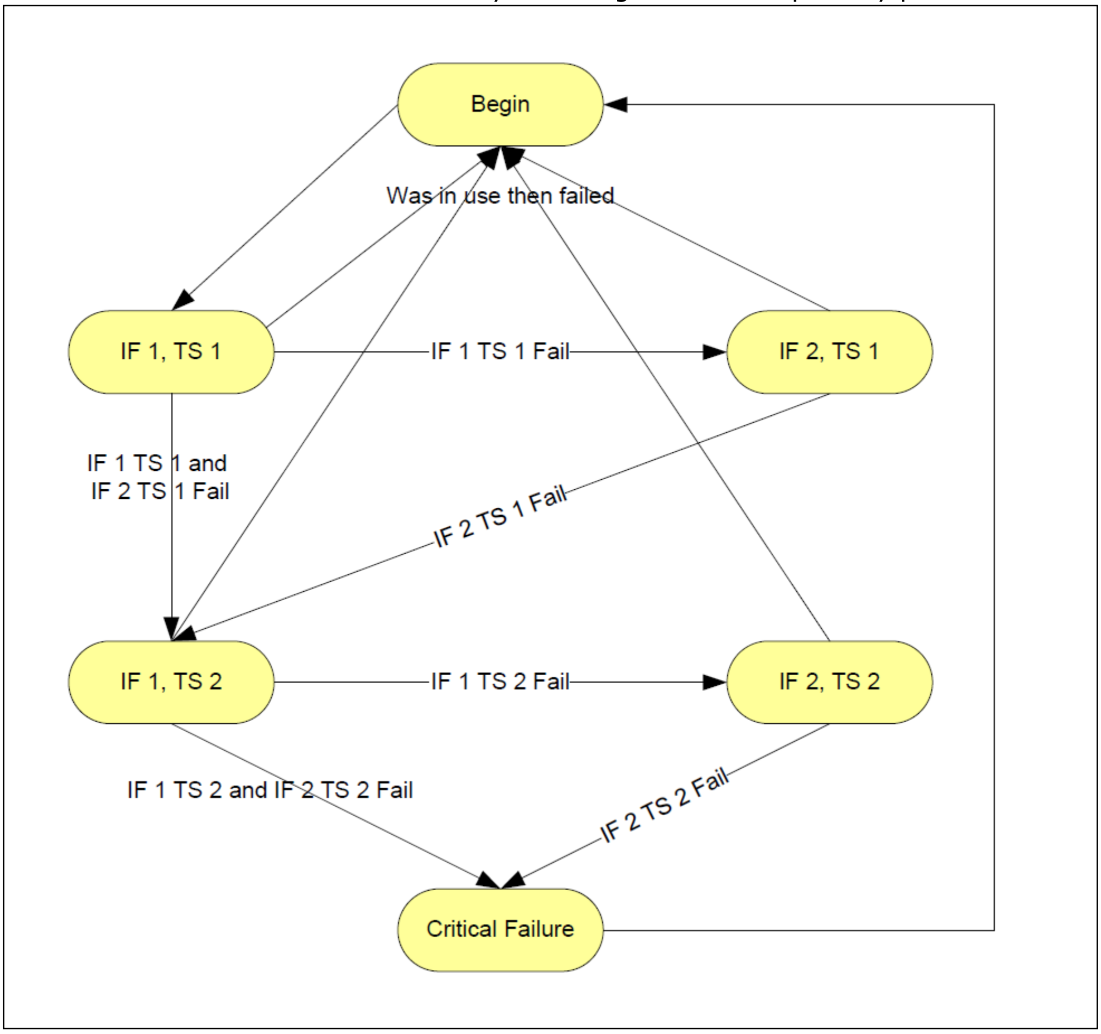


Figure 3-77 IP Multicast Redundancy State Diagram

3.10.4.14. Front Panel

3.10.4.14.1. Status

This menu displays the IP address of the last input received on the Input Card and provides sub-menus to display further details of this communication. To access this menu from the above menu, press the ▶ (Forward) key.

```
STATUS                    |LAST IP RECEIVED
3.2.1                     |000.000.000.000              >
```

3.10.4.14.2. Current Port

This menu displays the current port status for the last input received on the Input Card. To access this menu from the above menu, press the ▶ (Forward) key.

```
STATUS                    |CURRENT PORT (STATUS)
3.2.1.1                   |Port 1
```

3.10.4.14.3. Encapsulation

This menu displays the encapsulation status for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |ENCAPSULATION
3.2.1.2                   |UDP ONLY
```

3.10.4.14.4. Number of Columns/Rows

This menu displays the number of columns and rows detected for the last input received on the Input Card if SMPTE2022 ProMPEG FEC is detected. To view the number of columns and rows, press the ▼ (Down) key.

```
STATUS                    |NUMBER OF COLUMNS            N/A
3.2.1.3                   |NUMBER OF ROWS               N/A
```

3.10.4.14.5. IP Packets Received

This menu displays the number of IP packets received for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |IP PACKETS RECEIVED
3.2.1.4                   |0000000000
```

3.10.4.14.6. Corrected Packet Count

This menu displays the corrected packet count (in the event that there are packets that have been recovered) for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |CORRECTED PACKET COUNT
3.2.1.5                   |0000000000
```

3.10.4.14.7. Lost Packet Count

This menu displays the number of lost packets for the last input received on the Input Card. To view the lost packet count, press the ▼ (Down) key.

```
STATUS                    |LOST PACKET COUNT
3.2.1.6                   |0000000000
```

3.10.4.14.8. Current Buffer Level

This menu displays the current buffer level (in ms) for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |CURRENT BUFFER LEVEL
3.2.1.7                   |0 ms
```

3.10.4.14.9. IP Jitter

This menu displays the IP jitter for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |IP JITTER
3.2.1.8                   |0000000010
```

3.10.4.14.10. TS Packets per UDP Frame

This menu displays the Transport Stream (TS) packets per UDP frame for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |TS PACKETS PER UDP FRAME
3.2.1.9                   |0000000007
```

3.10.4.14.11. FIFO Overflow Count

This menu displays the FIFO overflow count for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |FIFO OVERFLOW COUNT
3.2.1.10                  |0000000010
```

3.10.4.14.12. MDI Delay Factor

This menu displays the MDI delay factor for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |MDI DELAY FACTOR
3.2.1.11                  |00.000
```

3.10.4.14.13. MDI Media Loss Rate

This menu displays the MDI media loss rate for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |MDI MEDIA LOSS RATE
3.2.1.12                  |00.000
```

3.10.4.14.14. FEC Latency

This menu displays the Forward Error Correction (FEC) latency (in ms) for the last input received on the Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |FEC LATENCY
3.2.1.13                  |0 ms
```

3.10.4.14.15. Clear Statistics

This menu allows the statistics to be reset to 0. To access this menu from the above menu, press the ▼ (Down) key.

```
STATUS                    |CLEAR STATISTICS
3.2.1.14                  |ACTIVATE
```

Use the ▼ (Down) key to display the **ACTIVATE** option and then press the SAVE key.

This is the last of the **Status** sub-menus. To return to the **Status** main menu press the ◀ (Back) key.

3.10.4.14.16. Network 1 IP Address

This menu displays the IP Address 1 and provides sub-menus for viewing and editing the Network 1 settings. To access this menu from the **Status** menu, press the ▼ (Down) key.

```
NETWORK 1                  |IP ADDRESS 1
3.2.2                      |000.000.000.000              >
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the address.

3.10.4.14.17. Subnet Mask 1

This menu enables the viewing and editing of the subnet mask address for Network 1, if used. To access this menu from the above menu, press the ▶ (Forward) key.

```
NETWORK 1                  |SUBNET MASK 1
3.2.2.1                    |255.255.255.000
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the address.

3.10.4.14.18. Default Gateway 1

This menu enables the viewing and editing of the default gateway address for Network 1, if used. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                  |DEFAULT GATEWAY 1
3.2.2.2                    |192.168.000.001
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the address.

3.10.4.14.19. MAC Address 1

This menu displays the MAC address for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                  |MAC ADDRESS 1
3.2.2.3                    |00:20:AA:4f:06:1b
```

3.10.4.14.20. Ethernet Line Mode 1

This menu enables the viewing and editing of the Ethernet line mode for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                 |ETHERNET LINE MODE 1
3.2.2.4                   |AUTO
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the available options: **AUTO**, **10MBPS**, **100MBPS** or **1GBPS**.

3.10.4.14.21. Current Line Mode 1

This menu displays the status of the current line mode and duplex detected for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                 |CURRENT LINE MODE 1           Link Down
3.2.2.5                   |DUPLEX 1                      Link Down
```

3.10.4.14.22. RX Up Time 1

This menu displays the status of the port up time for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                 |RX UP TIME 1
3.2.2.6                   |12668.54 sec
```

3.10.4.14.23. Network Utilization 1

This menu displays the status of the % network utilization for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                 |NETWORK UTILISATION 1
3.2.2.7                   |000
```

3.10.4.14.24. ICMP Enable 1

This menu enables the viewing and editing of whether ICMP responses are allowed for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                 |ICMP ENABLE 1
3.2.2.8                   |Enable
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between Enable and Disable options.

3.10.4.14.25. VLAN Enable 1

This menu enables the viewing and editing of VLAN tagging for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                    |VLAN ENABLE 1
3.2.2.9                      |Disable
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **Enable** and **Disable** options.

3.10.4.14.26. VLAN Tag 1

This menu enables the viewing and editing of the VLAN tag for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                    |VLAN TAG 1
3.2.2.10                     |05500
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the tag value

3.10.4.14.27. ARP Enable 1

This menu allows the enabling ARP responses for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                    |ARP ENABLE 1
3.2.2.11                     |Enable
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **Enable** and **Disable** options.

3.10.4.14.28. Port 1 IGMP Version

This menu displays the IGMP Version detected for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
NETWORK 1                    |PORT 1 IGMP VERSION
3.2.2.12                     |3
```

3.10.4.14.29. Clear ARP 1

This menu enables the clearing of the ARP cache for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

MediaKind
everyone. everywhere.

```
NETWORK 1                  |CLEAR ARP 1
3.2.2.13                   |ACTIVATE
```

Use the ▼ (Down) key to show the **ACTIVATE** option.

This is the last of the **Network 1** sub-menus. To return to the **Network 1** main menu press the ◀ (Back) Key.

3.10.4.14.30. Network 2

The **Network 2** menus are identical to that of **Network 1**, described above.

Press the ◀ (Back) key to return to the **Network 2** main menu.

3.10.4.14.31. Setup/MAC Mode

This menu enables the viewing and editing of MAC Mode. To access this menu from the **Network 2** menu, press the ▼ (Down) key.

```
SETUP                      |MAC MODE
3.2.4                      |Same                          >
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the available options: **Same** (both ports use the same MAC address) and **Different** (each port has a unique MAC address).

3.10.4.14.32. De-Jitter Buffer Level

This menu enables the viewing and editing of the de-jitter buffer level in milliseconds. To access this menu from the above menu, press the ▶ (Forward) key.

```
SETUP                      |DE-JITTER BUFFER LEVEL
3.2.4.1                    |00500
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the level.

3.10.4.14.33. SNMP Enable

This menu allows the enabling of SNMP. To access this menu from the above menu, press the ▼ (Down) key.

```
SETUP                      |SNMP ENABLE
3.2.4.2                    |Disable
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **Enable** and **Disable** options.

3.10.4.14.34. FEC Enable

This menu allows the enabling of Forward Error Correction (FEC). To access this menu from the above menu, press the ▼ (Down) key.

```
SETUP                        |FEC ENABLE
3.2.4.3                      |Disable
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **Enable** and **Disable** options.

3.10.4.14.35. Network Util 1 (Max Value)

This menu allows the viewing the maximum percentage network utilization for Network 1. To access this menu from the above menu, press the ▼ (Down) key.

```
SETUP                        |NETWORK UTIL 1 (MAX VALUE)
3.2.4.4                      |100
```

3.10.4.14.36. MDI Delay Factor (Max Value)

This menu allows the viewing of the maximum MDI Delay Factor. To access this menu from the above menu, press the ▼ (Down) key.

```
SETUP                        |MDI DELAY FACTOR (MAX VALUE)
3.2.4.6                      |50.000
```

3.10.4.14.37. MDI Media Loss Rate (Max Value)

This menu allows the viewing and editing of the maximum MDI Media Loss Rate. To access this menu from the above menu, press the ▼ (Down) key.

```
SETUP                        |MDI MEDIA LOSS RATE (MAX FACTOR)
3.2.4.7                      |0.004
```

This is the last of the **Setup** sub-menus. To return to the **Setup** main menu, press the ◀ (Back) key.

3.10.4.14.38. I/P Port/ Use Input Ports

This menu allows the viewing of the MDI Media Loss Rate (simply defined as the number of lost or out-of-order media packets per second). Recommended maximum acceptable average MLRs (media packet per second): SDTV 0.004, VOD 0.004, HDTV 0.0005 and provides sub-menus for setting other parameters. To access this menu from the **Setup** menu, press the ▼ (Down) key.

```
I/P PORT                  |USE INPUT PORTS
3.2.5                     |Port 1                        >
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **Port 1** and **Port 2**.

3.10.4.14.39. Auto Revert Delay

This menu enables the viewing and editing of the time (in seconds) which the input will delay before reverting to primary input upon regaining signal on the primary input. To access this menu from the above menu, press the ▶ (Forward) key.

```
I/P PORT                  |AUTO REVERT DELAY
3.2.5.1                   |00000
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the delay.

3.10.4.14.40. Redundancy Mode

This menu enables the viewing and editing of the Redundancy Mode. To access this menu from the above menu, press the ▼ (Down) key.

```
I/P PORT                  |REDUNDANCY MODE
3.2.5.2                   |NONE
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **None, Fail Over** and **Fail Over + Revert**.

3.10.4.14.41. Failover Mode Switch

This menu enables the viewing and editing of the Failover Mode Switch. To access this menu from the above menu, press the ▼ (Down) key.

```
I/P PORT                  |FAILOVER MODE SWITCH
3.2.5.3                   |INTERFACES ONLY
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **Interfaces and Streams** and **Interfaces Only**.

3.10.4.14.42. Stream 1/Unicast Enable 1

This menu allows the enabling of Unicast and provides sub-menus to further control parameters. To access this menu from the above menu, press the ▼ (Down) key.

```
STREAM 1                      |UNICAST ENABLE 1
3.2.6                         |TRUE                   >
```

Use the ▲ (Up) and ▼ (Down) keys to toggle between the **True** and **False** options.

3.10.4.14.43. MCAST IP Address 1

This menu enables the viewing and editing of the Multicast IP address. To view and edit the **MCAST IP** Address 1, press the ▶ (Forward) key.

```
STREAM 1                      |MCAST IP ADDRESS 1
3.2.6.1                       |000.000.000.000
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the address.

3.10.4.14.44. Source IP Address 1

This menu enables the viewing and editing of source IP address. To access this menu from the above menu, press the ▼ (Down) key.

```
STREAM 1                      |SOURCE IP ADDRESS 1
3.2.6.2                       |000.000.000.000
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the address.

3.10.4.14.45. UDP Port 1

This menu enables the viewing and editing of UDP Port 1. To access this menu from the above menu, press the ▼ (Down) key.

```
STREAM 1                      |UDP PORT 1
3.2.6.3                       |04000
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the port number.

3.10.4.14.46. Column Port 1

This menu enables the viewing and editing of FEC Column Port. To access this menu from the above menu, press the ▼ (Down) key.

```
STREAM 1                      |COLUMN PORT 1
3.2.6.4                       |00000
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the port number.

3.10.4.14.47. Row Port 1

This menu enables the viewing and editing of FEC Row Port. To access this menu from the above menu, press the ▼ (Down) key.

```
STREAM 1                    |ROW PORT 1
3.2.6.4                     |00000
```

Use the ▲ (Up), ▼ (Down), ▶ (Forward) and ◀ (Back) keys to enter the port number.

This is the last of the **Stream 1** sub-menus. To return to the **Stream 1** main menu, press the ◀ (Back) key.

3.10.4.14.48. Stream 2/Unicast Enable 2

This menu is identical to that of **Stream 1/Unicast 1**, described above.

Press the ◀ (Back) key to return to the top level **Stream 2** main menu.

3.10.4.14.49. Alarms/Alerts

This menu displays summary unit alerts and provides sub-menus for individual alert status. To access this menu from the above menu, press the ▼ (Down) key.

```
ALARMS                      |ALERTS
3.2.8                       |Both ports link down, Both ports no data>
```

3.10.4.14.50. Both Ports Link Down/No Data

This menu displays the alarm status for both IP Input Card ports link down and no data. To access this menu from the above menu, press the ▶ (Forward) key.

```
ALARMS                      |BOTH PORTS LINK DOWN         Alarm
3.2.8.1                     |BOTH PORTS NO DATA           Alarm
```

3.10.4.14.51. Port 1/ 2 Link Down

This menu displays the alarm status for IP Input Card Port 1 and Port 2 link down. To access this menu from the above menu, press the ▼ (Down) key.

```
ALARMS                      |PORT 1 LINK DOWN             Alarm
3.2.8.2                     |PORT 2 LINK DOWN             Alarm
```

3.10.4.14.52. Port 1/ 2 IP Conflict

This menu displays the alarm status for IP Input Card Port 1 and Port 2 IP conflicts. To access this menu from the above menu, press the ▼ (Down) key.

```
ALARMS                    |PORT 1 IP CONFLICT
3.2.8.3                   |PORT 2 IP CONFLICT
```

3.10.4.14.53. Port 1/ 2 No Data

This menu displays the alarm status for IP Input Card Port 1 and Port 2 no data. To access this menu from the above menu, press the ▼ (Down) key.

```
ALARMS                    |PORT 1 NO DATA              Alarm
3.2.8.4                   |PORT 2 NO DATA              Alarm
```

3.10.4.14.54. No Response/ Out of Sync

This menu displays the alarm status for IP Input Card no response and out of synchronization. To access this menu from the above menu, press the ▼ (Down) key.

```
ALARMS                    |NO RESPONSE
3.2.8.5                   |OUT OF SYNC                 Alarm
```

3.10.4.14.55. Port 1/ 2 Net Util

This menu displays the alarm status for IP Input Card Port 1 and Port 2 network utilization. To access this menu from the above menu, press the ▼ (Down) key.

```
ALARMS                    |PORT 1 NET UTIL
3.2.8.6                   |PORT 2 NET UTIL
```

3.10.4.14.56. MDI Delay Factor/ MDI Loss Rate

This menu displays the alarm status for IP Input Card Port 1 and Port 2 MDI Delay Factor/ MDI Loss Rate. To access this menu from the above menu, press the ▼ (Down) key.

```
ALARMS                      |MDI DELAY FACTOR
3.2.8.7                     |MDI LOSS RATE
```

To return to the top level **Alarm** screen, press the ◀ (Back) key.

3.10.4.14.57. Version

This menu displays the software version for the IP Input Card and provides sub-menus for further information. To access this menu from the above menu, press the ▼ (Down) key.

```
VERSION                     |SOFTWARE VERSION
3.2.9                       |0.13                        >
```

3.10.4.14.58. Firmware SW Version

This menu displays the firmware version for the IP Input Card. To access this menu from the above menu, press the ▶ (Forward) key.

```
VERSION                     |FIRMWARE SW VERSION
3.2.9.1                     |0.77
```

3.10.4.14.59. CPLD SW Version

This menu displays the CPLD version for the IP Input Card. To access this menu from the above menu, press the ▼ (Down) key.

```
VERSION                     |CPLD SW VERSION
3.2.9.2                     |1.2
G.703
```

3.10.5. G.703

3.10.5.1. Availability

● = Option   **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●				

3.10.5.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
G.703 Capable Demodulator	1924 / 1929	FAZ 101 0113/8	RX8200/HWO/G703

3.10.5.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.10.5.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys associated with this input type			

3.10.5.5. Functional Description

The G.703 Input card allows the user to input Transport Stream data into the IRD from CCITT G.703 Telco networks.

The input to this card is via one 75 Ohm BNC connector on the rear of the unit.

3.10.5.6. Web Browser Setup

The input page shown below enables viewing and editing of the G.703 inputs to the IRD. This page enables viewing and editing of the G.703 inputs to the IRD.

Any changes which are made to the Input page may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

To view this page, select the Input tab from the top of the current web page.

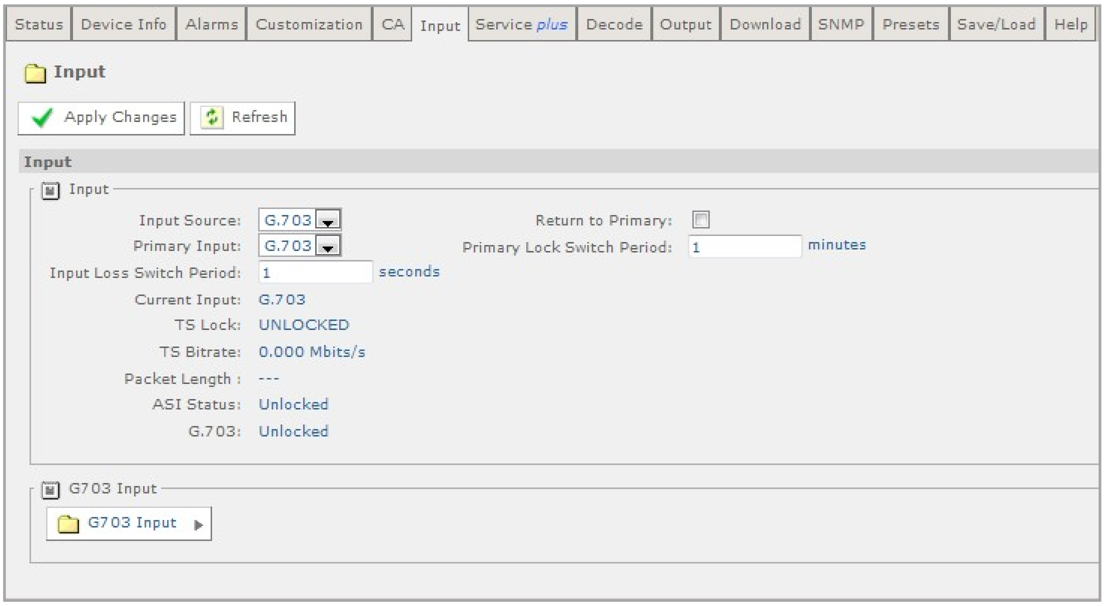


Figure 3-78 Input Web Page (G.703 ATM Input Card Fitted)

3.10.5.6.1. Input

- **Input Source** – Enables a choice of Source Selection from the drop-down menu.
- **Primary Input** – Enables selection of the Primary input to the IRD.
- **Input Loss Switch Period** – Enables the user to define a period (in seconds) before the unit switches to the alternate input (either Input Source or Primary).
- **Current Input** – Displays the currently locked input.
- **TS Lock** – Displays the lock status of the Transport Stream input.
- **TS Bit Rate** – Displays the bit rate of the Transport Stream input (in Mbps).
- **Packet Length** – Displays the packet length used in the Transport Stream.
- **ASI Status** – Status of the ASI input option. This is not the same as the motherboard lock status.
- **G.703** – Displays the lock status of the G.703 card. This is the value sent from the G703 option card and is not the same as the motherboard lock state.
- **Return to Primary** – Checking this box specifies that when the Primary is locked the unit will always return to the Primary after a timeout period, defined below.
- **Primary Lock Switch Period** – Enables the user to define a period, in minutes, before switching back to Primary, if Primary is not currently selected.

3.10.5.6.2. G703 Input

G.703 Input – This button gives access to a further web page, described in the following section.

3.10.5.7. Input > G.703 Input

Any changes which are made to the Input page may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

To view this web page, select the G.703 button from the previous web page.

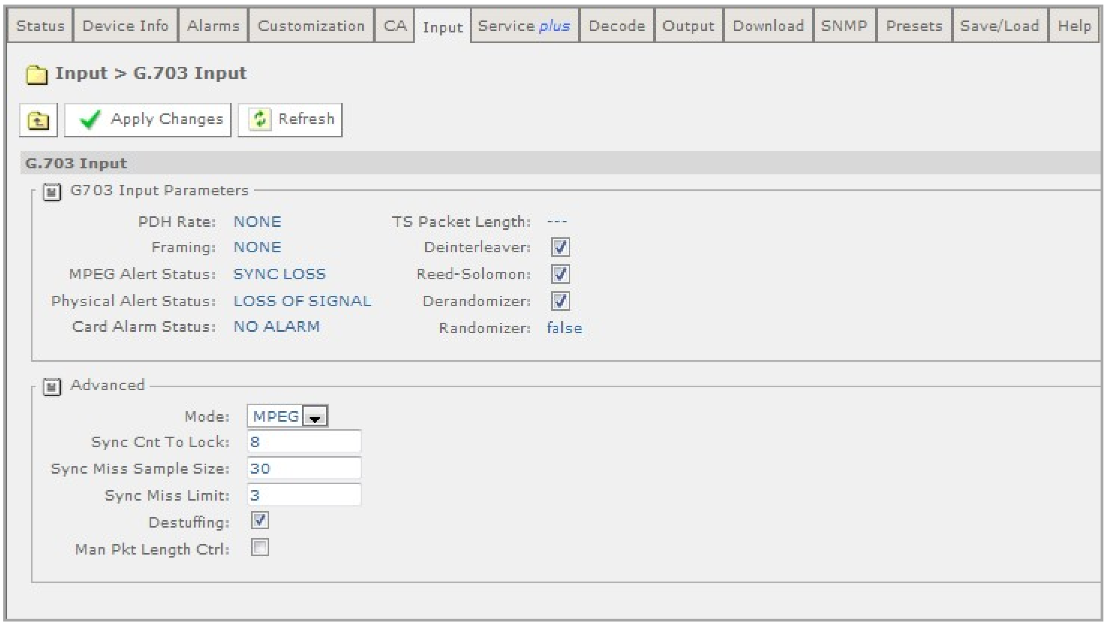


Figure 3-79 Input > G.703 Input Web Page

3.10.5.7.1. G.703 Input Parameters

- **PDH Rate** – displays the detected PDH rate of the incoming G.703 stream. This can have the following values:
- NONE
- E3 (34 Mbps).
- DS3 (45 Mbps).
- **Framing** – current framing mode detected for the G.703 Card.
- NONE
- M13
- C-BIT
- **MPEG Alert Status** – This provides the MPEG level status of the detected Transport Stream within the G.703 Card, this is the status of the de-encapsulation form G.703 to MPEG. This can have the following values:
- NO MPEG ALERTS ACTIVE
- OUT OF REGULATION

- RS THRESHOLD
- SYNC LOSS
- **Physical Alert Status** – Displays the current status of the physical connection, this can have the values:
- NO PHYSICAL ALERTS ACTIVE
- LOSS OF SIGNAL
- PARITY THRESHOLD
- **Card Alert Status** – Displays the current status of the G.703 Card.
- **TS Packet Length** – Displays the length of the packets used in the Transport Stream.
- **Deinterleaver** – Checking this box enables the Deinterleaver function.
- **Reed-Solomon** – Checking this box enables the Reed-Solomon function.
- **Derandomizer** – Checking this box enables the Derandomizer function.
- **Randomizer** – Displays the current status of the G.703 card randomizer function.

3.10.5.7.2. Advanced

- **Mode** – Enables the selection of the input mode from a drop-down menu.
- **Sync Cnt to Lock** – Enables the user to input an appropriate value of sync packets before lock is indicated.
- **Sync Miss Limit** – Enables the user to input an appropriate value of missing sync packets before loss of lock is indicated
- **Destuffing** – Checking this box enables the destuffing function within the card, this will remove all of the stuffing packets within the stream.
- **Man Pkt Length Ctrl** – Checking this box enables this function to manually define the length of the packets within the G.703 stream.

3.10.5.8. Front Panel Interface

3.10.5.8.1. Input Alarm Status

This menu displays the current card alarm.

```
STATUS                    |CARD ALARM STATUS
3.2.1.1                   |NO ALARM
```

This can have the values:

- NO ALARM

- FACTORY IMAGE USED
- POST FAILED

3.10.5.8.2. Physical Alert Status

This menu displays the current input alarm.

```
STATUS                      |PHYSICAL ALERT STATUS
3.2.1.2                     |NO PHYSICAL ALERTS ACTIVE
```

This can have the values:

- NO PHYSICAL ALERTS ACTIVE
- LOSS OF SIGNAL
- PARITY THRESHOLD

3.10.5.8.3. MPEG Alert Status

This menu displays the current MPEG alert status

```
STATUS                      |MPEG ALERT STATUS
3.2.1.3                     |NO MPEG ALERTS ACTIVE
```

This can have the values:

- NO ALERTS ACTIVE
- OUT OF REGULATION
- RS THRESHOLD
- SYNC LOSS

3.10.5.8.4. ATM Alert Status

This menu displays the current ATM alert status.

```
STATUS                      |ATM ALERT STATUS
3.2.1.4                     |NO ATM ALERTS ACTIVE
```

This can have the values:

- NO ATM ALERTS ACTIVE
- RS THRESHOLD
- SYNC LOSS
- SEQUENCE ERROR
- INVALID CELL

3.10.5.8.5. PDH Rate / DS3 Framing

This menu displays the current PDH rate and DS3 framing

STATUS 3.2.1.5	PDH RATE DS3 FRAMING	E3 M13

The PDH Rate can have the following values:

- NONE
- E3 (34 MBPS)
- DS3 (45 MBPS)

The DS3 framing can have the values

- NONE
- M13
- C-BIT

3.10.5.8.6. Packet Length

This menu displays the current detected packet length.

STATUS 3.2.1.6	PACKET LENGTH	188

This can have the values:

- ---
- 188
- 204

3.10.5.8.7. ATM Mode

This menu allows the user to select the desired ATM mode.

SETUP 3.2.2.1	MODE	MPEG

Once edit is selected use the ▲ (Up) and ▼ (Down) keys to toggle between the ATM modes:

- ATM
- MPEG

3.10.5.8.8. Input Destuffing and Input Interleaver

This menu allows the user to control input destuffing and interleaving.

STATUS 3.2.1.1	|DESTUFFING |DEINTERLEAVER	ENABLE ENABLE

Use the ▶ (Forward) and ◀ (Back) keys to move between destuffing and deinterleaver then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options.

- ENABLE
- DISABLE

3.10.5.8.9. Reed Solomon and Input Derandomiser

This menu allows the user to control reed solomon and input derandomiser.

STATUS 3.2.1.1	|REED-SOLOMON |DERANDOMISER	ENABLE ENABLE

Use the ▶ (Forward) and ◀ (Back) keys to move between reed solomon and derandomiser then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options.

- ENABLE
- DISABLE.

3.10.5.8.10. Packet Length Control and Packet Length Size

This menu allows the user to control manual packet length and its size.

STATUS 3.2.1.1	|MAN PACKET LENGTH CONTROL |PACKET LENGTH SIZE	ENABLE 204

Use the ▶ (Forward) and ◀ (Back) keys to move between manual packet length and packet length size then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options, for manual packet length control:

- ENABLE
- DISABLE

For packet length size:

- 188
- 204

3.10.5.8.11. ATM Delta and Alpha

This menu allows the user to control Reed-Solomon and input de-randomiser.

STATUS 3.2.1.1	|ATM DELTA |ATM ALPHA	0 0

Use the ▶ (Forward) and ◀ (Back) keys to move between ATM delta and ATM alpha then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options within the range 0 – 0xff.

3.10.5.8.12. ATM Descrambler and ATM header correction

This menu allows the user to control the ATM descrambler and ATM header correction.

```
STATUS                  |ATM DESCRAMBLING           ENABLE
3.2.1.1                 |ATM HEADER CORRECTION      ENABLE
```

Use the ▶ (Forward) and ◀ (Back) keys to move between ATM descrambing and ATM header correction then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options.

- ENABLE
- DISABLE

3.10.5.8.13. Header Error Ignore and VPI

This menu allows the user to ATM header error ignore and ATM VPI.

```
STATUS                  |ATM HEADER ERR IGNORE      ENABLE
3.2.1.1                 |ATM VPI                    0
```

Use the ▶ (Forward) and ◀ (Back) keys to move between Reed-Solomon and de-randomiser then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options. For ATM header error ignore

- ENABLE
- DISABLE

For VPI select the value between 0 – 0xff.

3.10.5.8.14. Sync Count to Lock and Sync Mis Sample Size

This menu allows the user to control number of sync counts to lock and the sync mis sample size.

```
STATUS                  |SYNC CNT TO LOCK           8
3.2.1.1                 |SYNC MIS SMAPLE SIZE       0
```

Use the ▶ (Forward) and ◀ (Back) keys to move between Sync Cnt To Lock and Sync Mis Sample Size then use the ▲ (Up) ▼ (Down) keys to select the required value from the available options. For Sync count to lock this is a value between 8-0xff; for sync miss sample size this is 0 -0xff.

3.10.5.8.15. Sync Mis Limit

This menu allows the user to control number of sync misses to unlock.

```
STATUS                  |SYNC MIS LIMIT             8
3.2.1.1                 |
```

Use the ▲ (Up) ▼ (Down) keys to select the required value from 0 -0xff.

3.10.6. DVB-T/T2 (OFDM)

3.10.6.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●				

3.10.6.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
DVB-T/T2 Capable Demodulator	1932	FAZ 101 0113/16	RX8200/HWO/OFDM

3.10.6.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.10.6.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/DVBT2	DVB T2 License	FAZ 101 0113/69	RX8200/SWO/DVBT2

3.10.6.5. Functional Description

The DVB-T2 option card complies with the following standards:

- DVB-T2 standard (document ETSI EN 302 755 V1.1.1)
- DVB-T standard (document ETSI EN 300 744 V1.6.1).

This input card can receive a transport stream over DVB-T or DVB-T2 transmissions as defined in the standards shown above. These transmission schemes are used for terrestrial broadcast of digital television within Europe, Africa and Asia. The input card has one RF input port.

3.10.6.6. Summary of Features

- **Systems** – DVB-T and DVB-T2.
- **Bandwidths** – 6, 7 and 8 MHz.
- **Frequency domain for the channel's centre frequency** – Frequencies usually allocated for digital terrestrial broadcasting are defined in Table 3-8.

Table 3-8 Frequencies Allocated for Digital Terrestrial Broadcasting

Band	Working Range (MHz)
VHF III	(174 + B/2) and (230 – B/2)
UHF IV/V	(470 + B/2) and (862 – B/2)

Where B = the selected signal bandwidth.

3.10.6.7. Web Browser Setup

3.10.6.7.1. Main Page

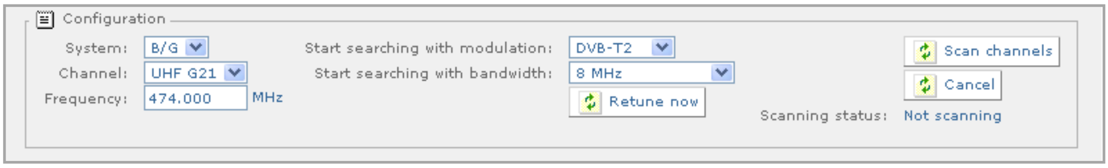


Figure 3-80 Basic Configuration GUI

- **System** – This configures the band plan for the particular country, these can be B/G or D/K. Configuring this determines which items appear in "Channel".
- **B/G´** system – In this system Channel is split as follows:
  - VHF III is split into eight channels named B-channels, each with 7 MHz bandwidth.
  - UHF IV and V is split into 8 MHz channels.
- **D/K system** – In this system Channel is split as follows:
  - VHF III is split into seven channels named D-channels, their bandwidth is 8 MHz.
  - UHF IV and V is split into 8 MHz channels.
- **Frequency** – There are three menu items used to set the frequency to be tuned. These three objects are:
- **Channel** – This is pre defined "TV Channel" for a pre-defined region as defined in *Table 3-9*.
- **Frequency** – This is the center frequency, in MHz, to be tuned to (see *Table 3-9*).
- **Channels Found** – This defines all of the channels found when the tuner last scanned across its frequency range (see *Table 3-9*).

Each of the above controls can be used to tune the unit, i.e. a channel defines a pre-defined frequency; for example within the B/G band plan, the following channels map to the following frequencies.

Table 3-9 System B/G VHF Channel Mapping

Channel	Start Frequency (MHz)	Center Frequency (MHz)	End Frequency (MHz)
VHF B05	174	177.5	181
VHF B06	181	184.5	188
VHF B07	188	191.5	195
VHF B08	195	198.5	202
VHF B09	202	205.5	209
VHF B10	209	212.5	216
VHF B11	216	219.5	223
VHF B12	223	226.5	230

The "channels found" menu item (on the Advanced menu page) is populated after a frequency scan has found all of the channels the unit can tune to in its current location. If the unit is tuned using either a frequency or a channel the item "channels found" will show **NO SELECTION**.

NOTE: "Channels found" is of the highest priority when changing all 3 items (i.e. XML download).

3.10.6.7.2. Auto Tuning

The unit can be "auto-tuned" to find a service this uses the following controls:

- **Start Searching With Modulation** – This indicates which modulation mode the tuner will begin with when retune now is selected. This can be:
- DVB-T
- DVB-T2
- UNKNOWN (this will try both modulation modes)

NOTE: A license key is required to enable DVB-T2 functionality.

- **Start Searching with Bandwidth** – This indicates which bandwidth type the tuner will being with when retune now is selected. This can be:
- 6 MHz
- 7 MHz
- 8 MHz
- UNKNOWN (this will try both modulation modes)
- **Retune Now –** This starts the process of searching for a channel.

NOTE: Scanning status will display Normal retuning during tuning.

- **Cancel –** This will stop a retune process.

With **Retune now**, a tune can be forced any time. This is especially useful when all parameters are valid and the card has not locked (e.g. when **Cancel** has been pressed).

3.10.6.7.3. Scanning Channels

To scan for channels available to the tuner, the following controls are used:

- **Scan Channels –** This goes through all channels and checks whether there is something transmitted on that channel. If there is, its modulation name is appended to the channel item in the "Channel" combo.
- **Cancel –** This will stop a scan process.

NOTE: After scanning is ended or cancelled, the retune must be triggered either by pressing Retune now or it will be automatically done after a period set in Unlocking period if Force Retune is active.

- **Scanning Status –** During this basic channel scanning, the number of already scanned channels is displayed. During tuning **Normal retuning** is displayed. If an error occurs during scanning, **Error** will be displayed. If any of the operations (tuning, scanning) are cancelled, **Cancelled** will be displayed.

3.10.6.7.4. Advanced Page (Presets)

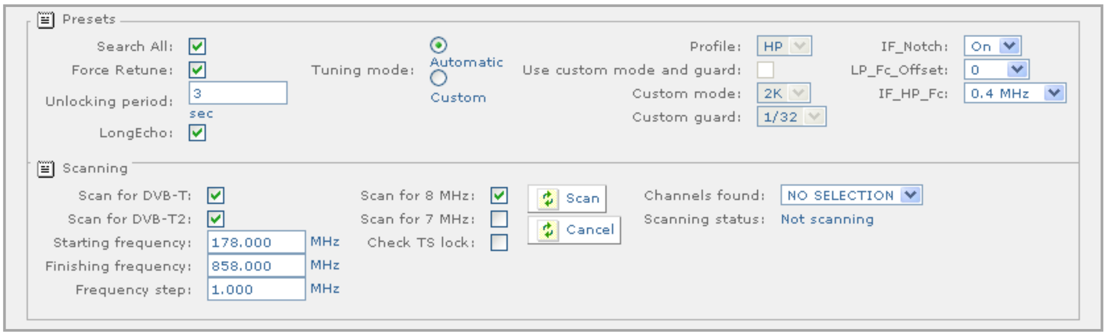


Figure 3-81 Advanced Configuration

- **Search All** – If enabled, it tries all modulations and bandwidths during tuning. If tuning with "Custom" selected and **Tuning mode** fails, it will also try the "Automatic" tuning, i.e. presets will be ignored.
- **Force Retune** – If enabled, the tuner will periodically check the **TS Lock in demodulator**, and if it is not locked for "n" seconds a retune will be attempted.
- **Unlocking period** – This defines the time (in seconds) before force retune is tried.
- **Tuning mode** – (DVB-T only) This allows the unit to be set into "Automatic" or "Custom" modes. In custom mode you can set the profile and custom mode.
- **Profile –** This allows the user to select between the high priority stream and the low priority stream.

- **Use custom mode and guard** – This allows the user to set manual custom modes and guards, if they are known this will reduce tuning time.
- **Custom mode** – This allows the user to select the number of carriers used within the spectrum (if known). This can be either 2K or 8K. If this information is not known it is recommended that tuning mode is set to automatic.
- **Custom guard** – This allows the user to set up a pre-determined guard interval (if known). If this information is not known, it is recommended that tuning mode is set to "Automatic". This can have the values:
- 1/32
- 1/16
- 1/8
- 1/4

3.10.6.7.5. Customizing the Tuner

- **IF_Notch** – Provides additional robustness against the sound carrier of the adjacent analogue channel. This can have the values:
- Off
- On
- **LP_Fc_Offset** – Sets the offset to Low Pass Filter cut-off frequency providing further adjacent channel rejection. This can have the values:
- 0
- -4%
- -8%
- **IF_HP_Fc** – Sets the cut-off frequency of the intermediate frequency filter. It provides additional robustness against adjacent (n+1th) channel. This can have the values:
- 0.4 MHz
- 0.85 MHz
- 1 MHz
- 1.5 MHz

3.10.6.7.6. Scanning (Advanced)

The following controls are available in the Advanced Controls tab, they allow the user to scan across the tuners range in a more targeted way, this will reduce scan-time but should only be used if the operator has knowledge of the current band plan.

- **Starting Frequency** – This defines the starting center frequency for any scan operation.
- **Finishing Frequency** – This defines the finishing center frequency for any scan operation.

- **Frequency Step** – This defines each step taken during the san process (ideally, this will be channel center frequencies or multiples of them).
- **Scan for DVB-T –** If this is checked the SCAN will include DVB-T modulations.
- **Scan for DVB-T2** – If this is checked the SCAN will include DVB-T2 modulations.
- **Scan for 8MHz** – 8 MHz channels will be included in the scan.
- **Scan for 7MHz** – 7 MHz channels will be included in the scan.
- **Scan for 6 MHz** – 6 MHz channels will be included in the scan.
- **Check TS Lock** – This checks for a valid lock before scanning.

NOTE: All channels found are displayed in the "Channels Found" drop down list.

3.10.6.8. Status

3.10.6.8.1. Main Page

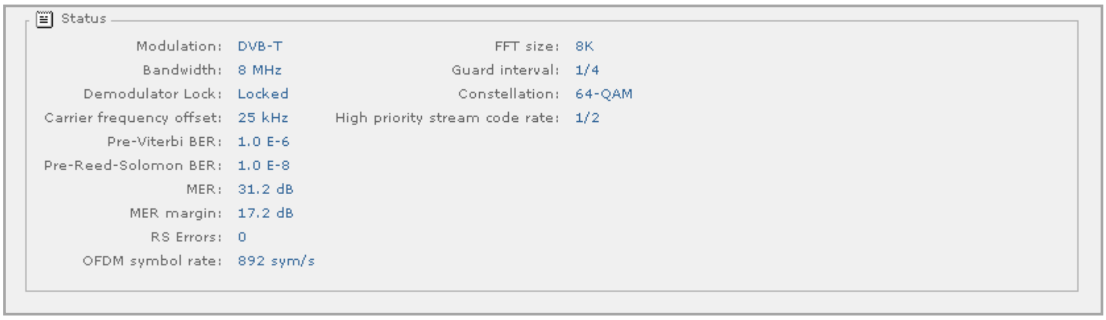


Figure 3-82 Status Display (Receiving a DVB-T Stream)

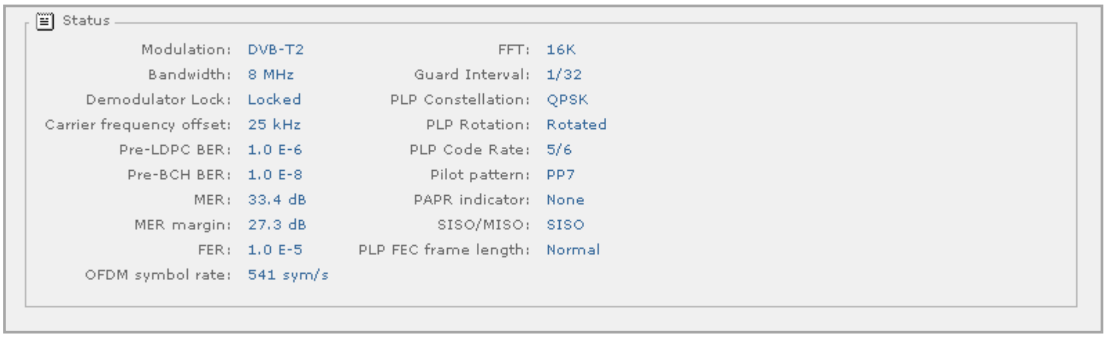


Figure 3-83 Status Display(Receiving a DVB-T2 Stream)

- **Card alarm status** – This supplies the status of the demodulator card, this can have the values:
- NO ALARM
- FACTORY IMAGE USED
- POST FAILED
- **Modulation** – This is the current modulation detected, this can have the values:

- DVB-T
- DVB-T2
- Unknown
- **Bandwidth** – This can have the values:
- 8 MHz
- 7 MHz
- 6 MHz
- **Demodulator Lock** – This reports the demodulator lock status, this can have the values:
- Locked
- Unlocked
- Not Detected
- **Carrier frequency offset** – This is the difference between the detected centre frequency and the configured centre frequency. It is given in kHz.
- **Bit Error Ratios** – The unit displays the following BERs for DVB-T:
- **Pre-Viterbi BER** (DVB-T only) – Displays values in the range $1 \cdot 10^{-7}$ and 1.
- **Pre-Reed-Solomon BER** (DVB-T only) – Displays values in the range $1 \cdot 10^{-9}$ and 1.

The unit displays the following values for DVB-T2:

- **Pre-LDPC BER** (DVB-T2 only) – Displays values in the range $1 \cdot 10^{-7}$ and 1.
- **Pre-BCH BER** (DVB-T2 only) – Displays values in the range $1 \cdot 10^{-9}$ and 1.

NOTE: These are only shown if the demodulator is locked to a valid signal. The minimum values mean no error.

- **MER** – Modulation error ratio in dB.
- **MER Margin** – Shows how far the input signal is from the QEF (Quasi Error Free) limit, where the margin is 0 dB. An alarm is linked to this status whose limit can be customized. Its limit is 0 dB by default.
- **RS Errors** – Errors detected by the RS decoder in one second (DVB-T only).
- **FER** – The frame error rate (DVB-T2 only) or errors detected by the BCH decoder
(DVB-T only).
- **OFDM symbol rate** – Displays how many OFDM symbols are received in a second.

3.10.6.8.2. Modulation-specific Main Status Parameters

DVB-T-specific Parameters:

- **FFT size** – This is the Fast Fourier Transform Size and can have the values:
- 2K
- 8K
- **Guard interval** – This is the guard interval between packets and can have the values:
- 1/32
- 1/16
- 1/8
- 1/4
- **Constellation** – This shows the current modulation mode / constellation, this can have values:
- QPSK
- 16-QAM
- 64-QAM
- **High priority stream code rate** – This shows the code (FEC) rate of the current high priority stream. This can have the values:
- 1/2
- 2/3
- 3/4
- 5/6
- 7/8

DVB-T2-specific Parameters:

- **FFT** – This is as DVB-T but can have values:
- 1K
- 2K
- 4K
- 8K
- 16K
- 16Ke
- 32Ke

NOTE: 'e' refers to the Extended Carrier Mode.

- **Guard Interval** – This is as DVB-T but can have values:

- 1/32
- 1/16
- 1/8
- 1/4
- 1/128
- 19/128
- 19/256
- **Pilot pattern** – This is the detected pattern for the pilot pulses, these pulses aid in the demodulator when tuning, this can have the values:
- PP1
- PP2
- PP3
- PP4
- PP5
- PP6
- PP7
- PP8
- **PAPR indicator** – This can have the values:
- None
- ACE used
- TR used
- TR and ACE used
- **SISO/MISO** – This can have the values:
- SISO
- MISO
- NON DVB-T2

NOTE: The following show the PLP (Physical Layer Pipe)-specific values, that is, the configuration of the "pipe" containing the Transport Stream data within the OFDM transmission.

- **PLP Constellation** – This can have the values:
- QPSK
- 16-QAM
- 64-QAM
- 256-QAM
- **PLP Rotation** – This can have the values:
- Normal
- Rotated
- **PLP Code Rate** – This can have the values:

- 1/2
- 3/5
- 2/3
- 3/4
- 4/5
- 5/6
- **PLP FEC frame length** – This can have the values:
- Short
- Normal

3.10.6.9. Advanced Page

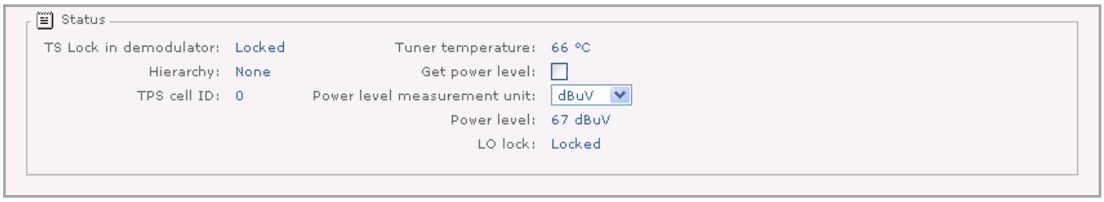


Figure 3-84 Advanced Status if Receiving a DVB-T Stream

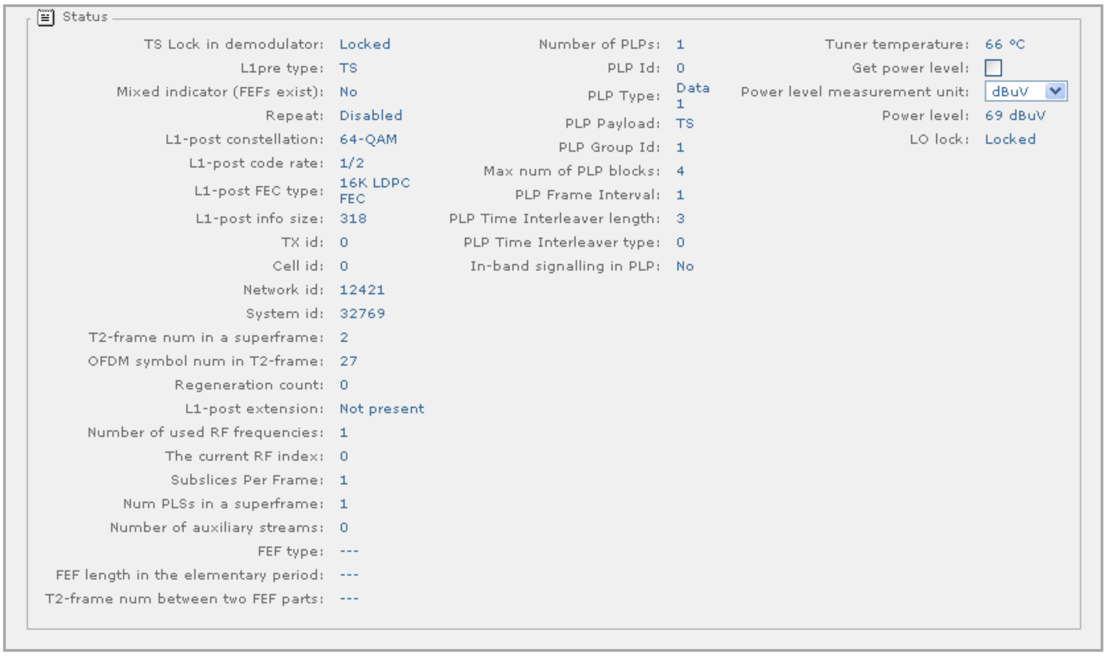


Figure 3-85 Advanced Status if Receiving a DVB-T2 Stream

- **TS Lock in demodulator** – `Locked´, `Unlocked´, `Not Detected´.

There are two controls for controlling the power measurement:

- **Get power level** – Power level is only updated if `Get power level´ is checked, because measuring the power level will disturb the TS lock.

- **Power level measurement unit** – `Power level measurement unit´ is the only control which will not trigger a retune when it is altered. It can have two values:
- dBµV
- dBmW
- **Tuner temperature** – This displays the tuner temperature in Celsius, it is bound to a threshold alarm whose threshold can be altered, and the default value is 80.
- **LO lock** – This displays whether the local oscillator in the tuner is locked.

3.10.6.9.1. DVB-T

- **Hierarchy** – This can have the values: None, $\alpha 1$, $\alpha 2$, $\alpha 4$.
- **TPS cell ID** – TPS cell ID number (if available, otherwise 0).

3.10.6.9.2. DVB-T2

- **L1pre type** – This is the type of transmitted data. It can be TS, GS, Mixed TS and GS.
- **Mixed indicator (FEFs exist)** – No or Yes.
- **Repeat** – This flag indicates whether the dynamic L1-post signaling is provided also for the next frame. This can have the values: Enabled, Disabled.
- **L1-post constellation** – This can have the values: BPSK, QPSK, 16-QAM, 64-QAM.
- **L1-post code rate** – Always 1/2.
- **L1-post FEC type** – Always 16K LDPC.
- **L1-post info size** – The size of the information part of the L1-post signaling, the sum of the configurable and dynamic and extension parts, excluding the CRC and the padding field.
- **TX id** – Transmitter ID availability, always set to 0.
- **Cell id** –Uniquely identifies a geographic cell in a DVB-T2 network.
- **Network id** – NETWORK_ID extracted from the DVB SI.
- **System id** – T2_SYSTEM_ID extracted from the DVB SI.
- **T2-frame num in a superframe** – The number of T2-frames per super-frame.
- **OFDM symbol num in T2-frame** – The number of data OFDM symbols per T2-frame, excluding P1 and P2.
- **Regeneration count** – Indicates how many times the DVB-T2 signal has been regenerated. Value 0 indicates that no regeneration has been done.
- **L1-post extension** – Indicates the presence of the L1-post extension field. It can be Present or Not present.

- **Number of used RF frequencies** – Indicates the number of frequencies in the current T2 system. Always 1, as TFS mode is not supported.
- **The current RF index** – Always 0, as TFS mode is not supported.
- **Subslices Per Frame** – The total number of sub-slices for the type 2 data PLPs in one T2-frame.
- **Num PLSs in a superframe** – Number of PLPs in the current superframe. Always 1, as multi-PLP streams are currently disabled.
- **Number of auxiliary streams** – Indicates the number of auxiliary streams.

NOTE: The following three statuses are only available if Mixed indicator (FEFs exist) has a value Yes.

- **FEF type** – All values are reserved for future use.
- **FEF length in the elementary period** – Indicates the length of the associated FEF part as the number of elementary periods T from the start of the P1 symbol of the FEF part to the start of the P1 symbol of the next T2-frame.
- **T2-frame num between two FEF parts** – Indicates the number of T2-frames between two FEF parts.
- **Number of PLPs** – This feature is not supported and will always display 1.
- **PLP Id** – The ID of the single PLP.
- **PLP Type** – This defines the current PLP type. This can have the values: Common (not supported), Data 1, Data 2.
- **PLP Payload** – This defines the current PLP payload type. This can have the values: TS, GFPS, GCS, GSE.
- **PLP Group Id** – PLP group ID.
- **Max num of PLP blocks** – Maximum num of PLP blocks available.
- **PLP Frame Interval** – The distance in T2 frames between two frames which contain this PLP.
- **PLP Time Interleaver length** – This is the number of T2 frames to which each Interleaving Frame is mapped.
- **PLP Time Interleaver type** – This defines how many T2 frames are mapped to interleaving frames. This can have the values:
- 0 if one interleaving frame is mapped to one T2 frame,
- 1 if one interleaving frame is mapped to many T2 frames.
- --- otherwise.
- **In-band signalling in PLP** – This indicates whether in-band signaling is present at transmitting this PLP. The values can be: No or Yes.

3.10.6.10. SNMP

The base SNMP node is 1.3.6.1.4.1.1773.1.3.208.2.8. MIBs can be downloaded using the Save/Load tab of the web interface, section entitled *Save MIBs file*. The card-specific MIBs are in the file named **Rx8000 S15622 INPUT.mib** in the downloaded MIBs.zip.

3.10.6.11. Front Panel

The DVB-T2 controls on the front panel provide all of the status and control information as described above. It is recommended that the more advanced features are controlled via the web interface, therefore only the basic tuning and status parameters are provided here.

3.10.6.11.1. Input Alarm Status

This menu displays the current card alarm.

```
STATUS                     |CARD ALARM STATUS
3.2.1.1                    |NO ALARM
```

This can have the values:

- NO ALARM
- FACTORY IMAGE USED
- POST FAILED

3.10.6.11.2. Modulation Mode

This menu displays the current modulation mode.

```
STATUS                     |MODULATION
3.2.1.2                    |DVB-T
```

This can have the values:

- DVB-T
- DVB-T2
- DVB-C

3.10.6.11.3. Bandwidth

This menu displays the current channel bandwidth.

```
STATUS                     |BANDWIDTH
3.2.1.3                    |8 MHZ
```

This can have the values:

- 8 MHZ

- 7 MHZ
- 6 MHz

3.10.6.11.4. Demodulator Lock

This menu displays the current lock status of the demodulator.

```
STATUS                          |DEMODULATOR LOCK
3.2.1.4                         |LOCKED
```

This can have the values:

- LOCKED
- UNLOCKED

3.10.6.11.5. Carrier Frequency Offset

This menu displays the current carrier frequency offset.

```
STATUS                          |CARRIER FREQUENCY OFFSET
3.2.1.5                         |30KHz
```

The offset is shown in kHz.

3.10.6.11.6. Pre Viterbi BER

This menu displays the current pre viterbi BER.

```
STATUS                          |PRE VITERBI BER
3.2.1.6                         |30
```

This BER is shown in dB.

3.10.6.11.7. Pre-Reed-Solomon BER

This menu shows the Pre-Reed-Solomon BER.

```
STATUS                          |PRE REED SOLOMON BER
3.2.1.7                         |30
```

This BER is shown in dB.

3.10.6.11.8. Pre LDPC BER

This menu displays the current pre LDPC BER (T2 only).

```
STATUS                    |PRE LDPC BER
3.2.1.8                   |30
```

This BER is shown in dB.

3.10.6.11.9. Pre BCH BER

This menu shows the pre BCH BER (DVB-T2 only).

```
STATUS                    |PRE BCH BER
3.2.1.9                   |30
```

This BER is shown in dB.

3.10.6.11.10. MER

This menu shows the pre Modulation Error Ratio.

```
STATUS                    |MER
3.2.1.10                  |30
```

This MER is shown in dB.

3.10.6.11.11. MER Margin

This menu shows the MER margin above failure.

```
STATUS                    |MER MARGIN
3.2.1.11                  |30
```

This MER margin is shown in dB.

3.10.6.11.12. FEC Block Error Rate

This menu shows the FEC Block Error Rate.

```
STATUS                    |FEC BLOCK ERROR RATE
3.2.1.12                  |30
```

This FEC block error rate is shown in dB.

3.10.6.11.13. OFDM Symbol Rate

This menu shows the OFDM Symbol Rate.

```
STATUS                          |OFDM SYMBOL RATE
3.2.1.13                        |30
```

This FEC block error rate is shown in MSym/s.

3.10.6.11.14. TS Lock in Demodulator

This menu shows the lock state of the demodulator.

```
STATUS                          |TS LOCK IN DEMODULATOR
3.2.1.14                        |NOT DETECTED
```

This can have the values:

- NOT DETECTED
- LOCKED
- NOT LOCKED

3.10.6.11.15. Tuner Temperature

This menu shows the current tuner temperature.

```
STATUS                          |TUNER TEMPERATURE
3.2.1.15                        |30
```

This tuner temperature is shown in degrees Celsius.

3.10.6.11.16. Input Power Level

This menu shows the current power level into the tuner.

```
STATUS                          |INPUT POWER LEVEL
3.2.1.16                        |30
```

This power level is shown in dB.

3.10.6.11.17. Local Oscillator Lock

This menu shows the lock state of the local oscillator.

```
STATUS                          |LO LOCK
3.2.1.17                        |LOCKED
```

This can have the values:

- ---
- LOCKED

- NOT LOCKED

3.10.6.11.18. Reed Solomon Errors

This menu shows the number of reed Solomon errors in 1 second DVB-T only.

```
STATUS                     |RS ERRORS
3.2.1.1.1                  |0
```

This is in RS errors per second.

3.10.6.11.19. FFT Size in TPS

This menu shows the currently used FFT (Fast Fourier Transform) size shown within the TPS (Transmission Parameter Signaling).

```
STATUS                     |FFT IN TPS
3.2.1.1.2                  |0
```

3.10.6.11.20. Guard Interval in TPS

This menu shows the guard interval signaled within the TPS signaling.

```
STATUS                     |GUARD INTERVAL
3.2.1.1.3                  |1/32
```

This can have the values:

- 1/32
- 1/16
- 1/8
- 1/4

3.10.6.11.21. TPS Constellation

This menu shows the constellation signaled within the TPS.

```
STATUS                     |CONSTELLATION
3.2.1.1.4                  |16 QAM
```

This can have the values:

- QPSK
- 16QAM
- 64QAM

3.10.6.11.22. TPS High Priority Stream Code Rate

This menu shows the code rate of the high priority stream signaled by the TPS.

```
STATUS                    |HIGH PRIORITY STREAM CODE RATE
3.2.1.1.5                 |1/2
```

This can have the values:

- 1/2
- 2/3
- 3/4
- 5/6
- 7/8

3.10.6.11.23. DVB-T2 Fast Fourier Transform

This menu shows the current level of Fast Fourier Transform used for DVB-T2 reception

```
STATUS                    |FFT
3.2.1.2.1                 |2K
```

This can have the values:

- 2K
- 8K
- 4K
- 1K
- 16K
- 32K

3.10.6.11.24. Guard Interval in TPS

This menu shows the guard interval used for DVB-T2 reception.

```
STATUS                    |GUARD INTERVAL
3.2.1.2.1                 |1/32
```

This can have the values:

- 1/32
- 1/16
- 1/8
- 1/4
- 1/128

- 19/128
- 19/256

3.10.6.11.25. PLP Constellation

This menu shows the constellation within the physical layer pipe for reception of the DVB-T2 broadcast.

```
STATUS                      |PLP CONSTELLATION
3.2.1.2.2                   |16 QAM
```

This can have the values:

- 16QAM
- 64QAM
- 256QAM

3.10.6.11.26. PLP Rotation

This menu shows the current rotation of the physical layer pipe for the T2 transmission.

```
STATUS                      |PLP Rotation
3.2.1.2.3                   |NORMAL
```

This can have the values:

- NORMAL
- ROTATED

3.10.6.11.27. PLP Code Rate

This menu shows the current code rate of the physical layer pipe for the T2 transmission.

```
STATUS                      |PLP CODE RATE
3.2.1.2.4                   |1/2
```

This can have the values:

- 1/2
- 3/5
- 2/3
- 3/4
- 4/5
- 5/6

3.10.6.11.28. Pilot Pattern

This menu shows the current pattern of pilot carrier used for the T2 transmission.

```
STATUS                          |PILOT PATTERN
3.2.1.2.5                       |PP1
```

This can have the values:

- PP1
- PP2
- PP3
- PP4
- PP5
- PP6
- PP7
- PP8

3.10.6.11.29. Peak to Average Power Indicator

This menu shows the current peak to average power indicator.

```
STATUS                          |PAPR Indicator
3.2.1.2.6                       |NONE
```

This can have the values:

- None
- ACE USED
- TA USED

3.10.6.11.30. SISO / MISO S1 Signaling

This menu shows the scheme used for S1 signaling within the T2 transmission.

```
STATUS                          |SISO / MISO
3.2.1.2.7                       |NONE
```

This can have the values:

- SISO
- MISO
- NON DVB T2

3.10.6.11.31. PLP FEC Frame Length

This menu shows the current PLP frame length within the T2 transmission.

```
STATUS                      |PL FEC FRAME LENGTH
3.2.1.2.8                   |NORMAL
```

This can have the values:

- SHORT
- NORMAL

3.10.6.11.32. DVB-T/T2 Scanning system

This menu allows the user to configure the scanning system used by the tuner.

```
SETUP                       |SCANNING
3.2.2                       |B/G
```

Use the ▲ (Up) ▼ (Down) keys to select the required value from the available options.

- B/G
- D/K

3.10.6.11.33. DVB-T/T2 Channel

This menu allows the user to select the channel to be tuned to by the tuner.

```
STATUS                      |CHANNEL
3.2.1.1                     |UHF G21
```

Use the ▲ (Up) ▼ (Down) keys to select the required value from the available options. Channels are described in more detail above.

3.10.6.11.34. Tuning Frequency

This menu allows the user to input a tuning frequency into the DVB-T /T2 tuner.

```
STATUS                      |FREQUENCY
3.2.1.1                     |230000
```

Use the ▲ (Up) ▼ (Down) keys to select the required value from the available options.
A value between 174000 and 23000 (kHz) should be used.

3.10.6.11.35. Scan Channels

This menu allows the user to start the process of scanning channels for content.

```
STATUS                    |SCAN CHANNELS
3.2.1.1                   |NO
```

Use the ▲ (Up) ▼ (Down) keys to select YES. After confirming this, the tuner will scan all channels.

3.10.6.11.36. Cancel Scan

This menu allows the user to abort scanning channels.

```
STATUS                    |CANCEL
3.2.1.1                   |NO
```

Use the ▲ (Up) ▼ (Down) keys to select YES. After confirming this, the tuner will stop scanning all channels.

3.10.6.11.37. Start Searching with Modulation Type

This menu allows the user to select the tuner to start scanning with a particular modulation type.

```
STATUS                    |START SEARCHING WITH MODULATION
3.2.1.1                   |DVB-T
```

Use the ▲ (Up) ▼ (Down) keys to select the modulation type from the following:

- DVB-T
- DVB-T2
- DVB-C

3.10.6.11.38. Start Searching with Bandwidth Type

This menu allows the user to select the tuner to start scanning with a particular bandwidth type.

```
STATUS                    |START SEARCHING WITH BANDWIDTH
3.2.1.1                   |6MHZ
```

Use the ▲ (Up) ▼ (Down) keys to select the modulation type from the following:

- 6 MHZ
- 7 MHZ
- 8 MHZ
- UNKNOWN
- SYSTEMS DEFAULT

3.10.6.11.39. Long Echo

This menu allows the user to select to use long echo.

```
STATUS                         |LONG ECHO
3.2.1.1                        |ENABLE
```

Use the ▲ (Up) ▼ (Down) keys to select from the following:

- ENABLE
- DISABLE

3.10.6.11.40. Force Retune

This menu allows the user to force the tuner to abandon its current tune and retune.

```
STATUS                         |FORCE RETUNE
3.2.1.1                        |NO
```

Use the ▲ (Up) ▼ (Down) keys to select YES after confirming this the tuner will retune.

3.10.6.11.41. Retune After Period

This menu allows the user to retune the unit after a period of being unlocked.

```
STATUS                         |UNLOCKING PERIOD
3.2.1.1                        |10
```

Use the ▲ (Up) ▼ (Down) keys to select the period (in seconds) of being unlocked before a retune is attempted.

3.10.6.11.42. Blind Tuning Mode

This menu allows the user to select the blind tuning mode required.

```
STATUS                         |TUNING MODE
3.2.1.1                        |AUTOMATIC
```

Use the ▲ (Up) ▼ (Down) keys to select from the following:

- AUTOMATIC
- CUSTOM

3.10.6.11.43. Search All

This menu allows the user to select to select to search across all modulations and bandwidths.

```
STATUS                         |SEARCH ALL
3.2.1.1                        |ENABLE
```

Use the ▲ (Up) ▼ (Down) keys to select from the following:

- ENABLE
- DISABLE

3.10.6.11.44. Force Retune

This menu allows the user to start the tuning process.

```
STATUS                    |RETUNE NOW
3.2.1.1                   |NO
```

Use the ▲ (Up) ▼ (Down) keys to select YES. After confirming this, the tuner will retune.

3.10.6.11.45. Enable IF Notch

This menu allows the user to select to select the 13H 5 notch filter within the demodulator this provides additional robustness against the sound carrier of the adjacent (n-1th) analogue channel if it is set to on.

```
STATUS                    |IF NOTCH
3.2.1.1                   |ON
```

Use the ▲ (Up) ▼ (Down) keys to select from the following:

- ON
- OFF

3.10.7. ATSC 8 VSB Digital Terrestrial Input

3.10.7.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
			B	

3.10.7.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
The 8VSB input is not a separately orderable item, this is only available as part of the RX8320 base configuration			

3.10.7.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.10.7.4. License Keys

There are no license keys associated with 8VSB.

3.10.7.5. Functional Description

The terrestrial input for the RX8320 ATSC Broadcast Receiver supports the 8VSB (8-level Vestigial Side Band) modulation standard that is used in ATSC digital terrestrial transmissions.

The ATSC 8VSB input allows the RX8320 IRD to acquire a terrestrial channel off air and present a demodulated Transport Stream containing a multiplex of video services to the onward IRD functionality.

3.10.7.6. Web Browser Setup

The RX8320 ATSC Broadcast Receiver provides control over selection and management of the configuration of reception of ATSC channels.

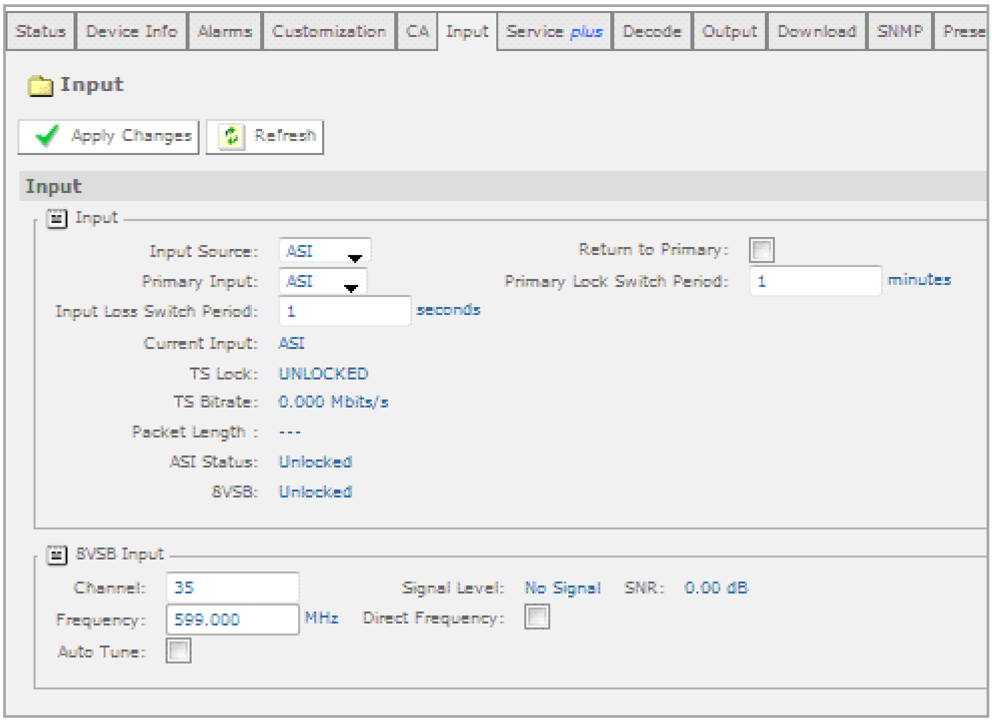


Figure 3-86 Input (ATSC 8 VSB Digital Terrestrial Input) Web Page

3.10.7.6.1. 8VSB Input

Tuning to the 8VSB signal is achieved via the Input tab on the IRD's web browser.

Parameters

- **Channel** – The user can tune to the required signal by entering the ATSC channel number.
- **Frequency** – By selecting the **Direct Frequency** tick box the user can input the frequency of the signal with reference to the 8VSB pilot frequency.
- **Auto Tune** – The auto tune functionality allows the unit to tune to a service based on a scan of the current bandplan and the channel number.
- **Signal Level** – This parameter will indicate if the receiver is locked to the 8VSB signal or not. To further indicate the health status of the incoming the signal the receiver will provide an estimation of the Signal to Noise ratio of the 8VSB signal.

3.10.7.7. Front Panel Setup

3.10.7.7.1. 8VSB

This menu enables the user to tune to the ATSC 8VSB digital terrestrial signal. The user can select the desired channel number to tune to. To access this menu from the above menu, press the ▼ (Down) key.

8VSB	CHANNEL 61	SNR 0.00dB
3.2	FREQUENCY	755.000 MHz

Use the ▲ (Up) and ▼ (Down) keys to select the required number.

3.10.7.7.2. 8VSB CTRL

- This menu allows the enabling of *Direct Frequency* and the *Auto Tune* feature. By enabling the *Direct Frequency* option the user can use the previous menu to enter the 8VSB channel directly by frequency rather than channel number. Frequency of the signal is with reference to the 8VSB pilot frequency.

3.10.7.7.3. Auto Tune

The Auto Tune functionality allows the unit to tune to a service based on a scan of the current bandplan and the channel number

To access this menu from the above menu, press the ▼ (Down) key.

8VSB CTRL	DIRECT FREQUENCY	DISABLED
3.3	AUTO TUNE	DISABLED

Use the ▶ (Forward) and ◀ (Back) keys to toggle between **Direct Frequency** and **Auto Tune**. Use the ▲ (Up) and ▼ (Down) keys to toggle between the **Enabled** and **Disabled** options.

3.10.7.7.4. Input

This parameter will indicate if the receiver is locked to the 8VSB signal or not. To access this menu from the above menu, press the ▶ (Forward) key.

```
INPUT                         |NO TS LOCK
3.1                           |             >
```

3.10.7.7.5. 8VSB Signal Level

To further indicate the health status of the incoming the signal the receiver will provide an estimation of the Signal to Noise ratio of the 8VSB signal.

To access this menu from the above menu, press the ▼ (Down) key.

```
8VSB                          |CHANNEL 61                      SNR 0.00dB
3.2                           |FREQUENCY                       755.000 MHz
```

Use the ▲ (Up) and ▼ (Down) keys to select the required number.

3.10.7.8. Additional Notes

3.10.7.8.1. Regions Using ATSC 8VSB Transmission

The ATSC transmission scheme was developed and deployed in the USA. The ATSC transmission scheme has since been deployed in Canada and Korea.

An alternative digital terrestrial transmission standard has been developed by the European DVB standards organization called DVB-T which uses OFDM technology. MediaKind offers an input option for DVB-T reception in the RX8200 Advanced Modular Receiver.

3.11. Conditional Access

3.11.1. General CA Status

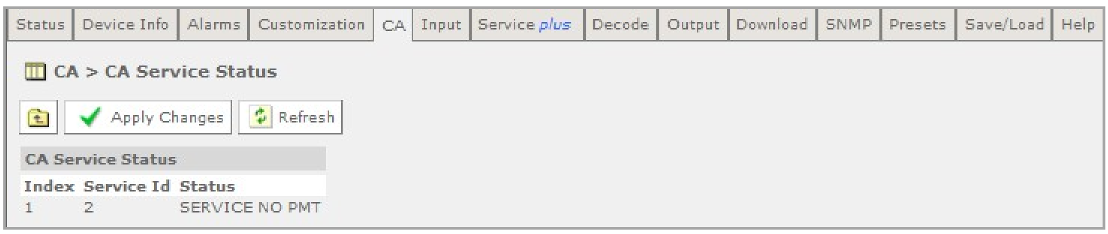


Figure 3-87 CA Service Status Web Page

The diagram above shows the general CA status of the unit, this provides:

- **Index –** The current list number of the CA service being selected for descrambling (this is just an incrementing number).
- **Service ID –** The service ID of the service to be descrambled (this is taken from the PAT).
- **Status –** This is the current CA status of the service. This is more detailed than the CA Status message reported from the main Status page.

The table below lists all the possible CA Status messages and their meaning. The first column lists the CA Status messages that are displayed in the **CA Service Status** table described above. The second column lists the equivalent CA Status message reported from the main Status page shown in *Figure 3-16*. The third column describes meaning of the CA Status message.

Table 3-10 Current Status Messages

CA page > CA Service Status > Status	Status page > CA Status	Description
NO SERVICE	NO SERVICE	No Transport Stream has been detected and no service list can be built.
SERVICE CLEAR	SERVICE CLEAR	Service components for the selected service are not scrambled.
SERVICE AUTHORIZED	SERVICE AUTHORIZED	The receiver is authorized for descrambling the selected service. Descrambling is successfully being applied.
CAM PRESENT (ATTEMPTING DECRYPTION SELECTED PIDS ONLY)	SERVICE AUTHORIZED (SELECTED PIDS ONLY)	The CA Module (DVB-CI) is detected and configured for descrambling selected service component PIDs only.
CAM PRESENT (ATTEMPTING DECRYPTION)	CAM PRESENT (ATTEMPTING DECRYPTION)	The CA Module (DVB-CI) is detected and configured for descrambling. No errors are detected.
SERVICE NOT AUTHORIZED	CONDITIONAL ACCESS ERROR	The receiver is not authorized for descrambling the selected service.
CAM PRESENT NOT DECRYPTING (MAX COMPONENTS/SERV)	CONDITIONAL ACCESS ERROR	The CA Module (DVB-CI) is detected however the number of service components selected for descrambling exceed that configured for each service for the CA Module.
CAM PRESENT NOT DECRYPTING (PID FULL)	CONDITIONAL ACCESS ERROR	The CA Module (DVB-CI) is detected however the number of service components selected for descrambling exceed that configured for the CA Module.
CAM PRESENT NOT DECRYPTING (SERVICE FULL)	CONDITIONAL ACCESS ERROR	The CA Module (DVB-CI) is detected however the number of services selected for descrambling exceed that configured for the CA Module.
CAM PRESENT (NOT DECRYPTING)	CONDITIONAL ACCESS ERROR	The CA Module (DVB-CI) is detected however the service has not been set up for descrambling.

CA page > CA Service Status > Status	Status page > CA Status	Description
VALID CAM NOT PRESENT	CONDITIONAL ACCESS ERROR	The CA Module (DVB-CI) has not been detected by the IRD.
SERVICE NO PMT	CONDITIONAL ACCESS ERROR	The service has been configured for descrambling but its associated PMT has not been detected in the Transport Stream.
SERVICE NO ECM	CONDITIONAL ACCESS ERROR	The service has been configured for descrambling but its associated ECM has not been detected in the Transport Stream.
SERVICE INVALID	CONDITIONAL ACCESS ERROR	Generic error message to cover all other conditions.

NOTE: Not all of CA Status messages are appropriate for all CA systems.

3.11.2. Common Interface

3.11.2.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
DVB-CI	B		B		B
DVB-CI MSD	●		●		●

3.11.2.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No hardware option required. This option is not available if RX8200/BAS/BSKYB or RX8200/BAS/SKYIT are ordered			

3.11.2.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓*	✓*

* Full MSD functionality is not available on these interfaces

3.11.2.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/MSD	Multi service CI descrambling	103 113/46	RX8XXX/SWO/CI/MSD
RX8300/SWO/MSD	Multi service CI descrambling	101 108/13	RX8XXX/SWO/CI/MSD

3.11.2.5. Functional Description

Common Interface (DVB-CI) provides a descrambling solution using integrated descrambling PCMCIA cards, sometimes referred to as a Conditional Access Module or CAM.

CAMs are available in many different CA types and each CAM may have its own limitation. A consumer CAM may only be able to descramble one service and this service may consist of no more than two components (PIDs). A Professional CAM may be able to decode multiple services and multiple components per service. It is always recommended that research is carried out into suitable CAMs for the requirements of the system.

NOTE: The IRD only supports CI+ in compatibility mode with Transport Streams up to 72 Mbps. See the control **Enable Service Limiting** to handle streams greater than 72 Mbps.

3.11.2.6. Multi Service Descrambling (MSD)

The IRD has the ability to descramble more than one service for the output transport stream. This allows the unit to work as a single Transport Stream multi-service descrambler that in turn can feed either an ASI or an IP infrastructure. However the IRD will only ever decode one service at a time

NOTE: The IRD does not regenerate the CA table information after descrambling.

To use multi-service Common Interface descrambling the following software option must be enabled:

- RX8XXX/SWO/CI/MSD

3.11.2.6.1. Restrictions When MSD Is Not Enabled

When MSD is not enabled, the unit will only be able to decrypt the components for a single service. This restricts some of the setup functionality of the unit.

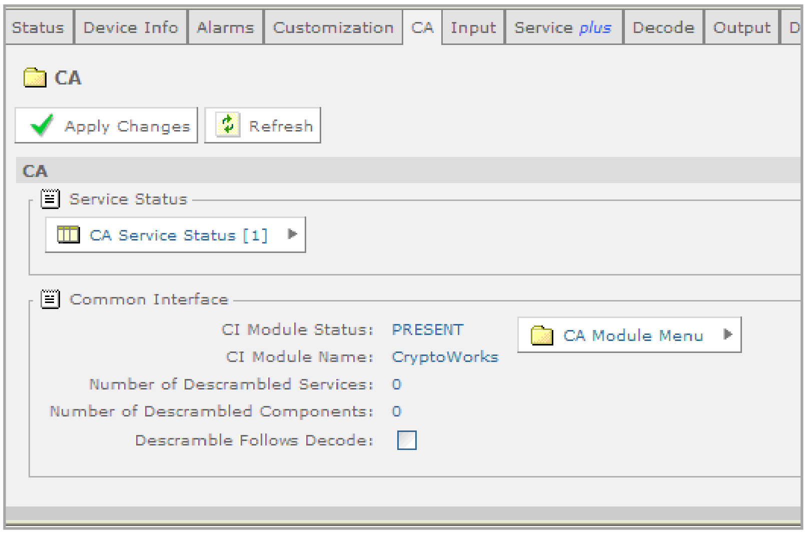


Figure 3-88 Single Service Common Interface

As can be seen from the above screen capture, there is no ability to tune components within services, the only control provided is **Descramble Follows Decode**. When MSD is enabled, further controls are revealed which allow specific component types to be descrambled.

NOTE: The **Service *plus*** page makes it is possible to select a different decode service to that of the descrambled service. This allows monitoring of a non-scrambled service whilst decrypting a scrambled service. In this case **Descramble Follows Decode** should **not** be enabled.

3.11.2.7. Web Browser Setup

3.11.2.7.1. Inserting the CAM

The PCMCIA slot for the CAM is located on the front left of the RX8200 and for the RX8300 it is located on the rear right. The CAM must be inserted until there is no more travel (do not force the card), normally the stops to the card guides on the CAM will be flush with the front / rear panel.

The CAM can now be checked for presence. To do this, navigate to the **CA** tab on the web page. Within the Common Interface area of this tab, the **CI Module Status** should say **PRESENT** and the **CI Module Name** should state the name of the CAM or CA vendor as shown in the example Figure 3-89. If this information is not seen, make sure the CAM is fully inserted.

If no information is seen after this, please contact the MediaKind helpdesk for further support.

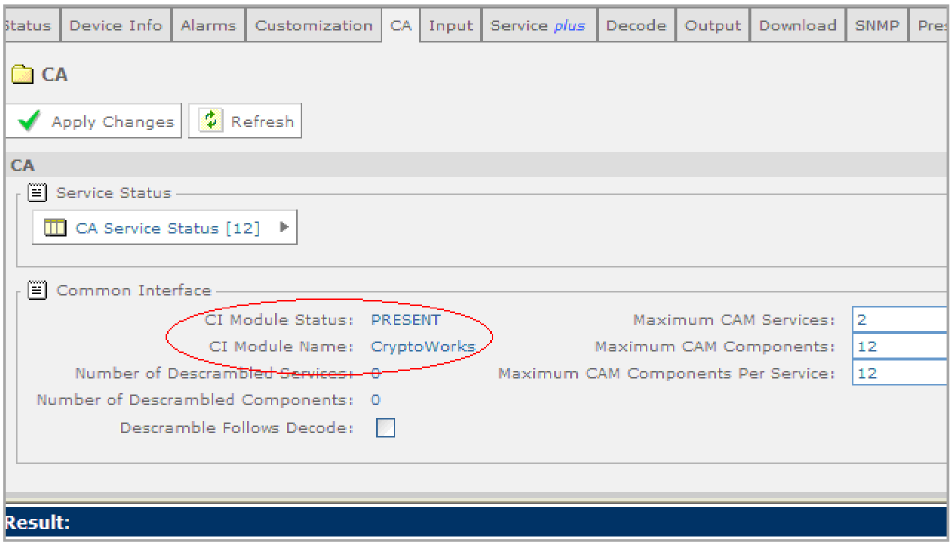


Figure 3-89 CAM Insertion

3.11.2.7.2. Selecting Descramble Components

The scrambled services can be selected using the **Service** ***plus*** functionality. The **Service** ***plus*** page provides a single interface for all multi-service decryption and decode functionality.

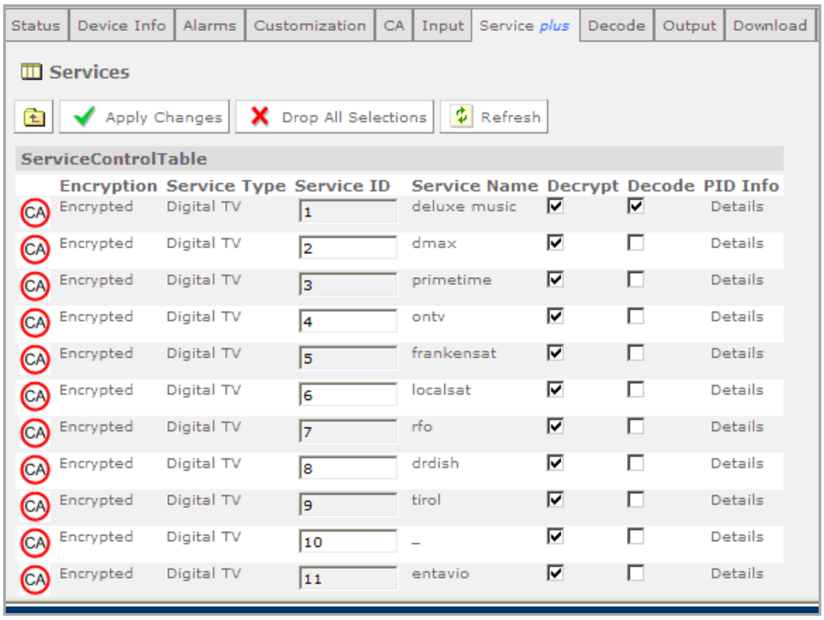


Figure 3-90 Service plus Interface

All the services within the transport stream are shown on the **Service** ***plus***. To select a service for decryption, its corresponding **Decrypt** box selected, and **Apply Changes** used.

Multiple boxes may be selected, however the CAM will only decrypt up to its maximum allowed services / components.

3.11.2.7.3. Setting up the CAM

The CAM does not report how many services or components it is capable of descrambling, this must be manually configured on the unit by the user. To do this the following fields need to be configured:

- **Maximum CAM Services** – This field should be populated with the maximum number of services the CAM can decrypt. The maximum value supported is 24 services. The actual value is CAM specific and this information should be supplied by the CAM vendor. In the case where the CAM vendor only supplies the number of components the CAM can handle (sometimes called slots) the number of services can be calculated as:

  Services = Slots / Components per service to be descrambled.

NOTE: When calculating components, if VBI components are required then this may take one or more slots.

- **Maximum CAM Components** – This field must be populated with the maximum number of components that the CAM can handle (sometimes called slots). The maximum value supported is 72 components. The actual value is CAM specific.
- **Maximum CAM Components per Service** – This field should be filled in with the maximum components in each service required to be descrambled e.g. for a set of services where one audio, one video and one data are required this field will be filled in with 3. The maximum value supported is 72 components. The actual value is CAM specific.

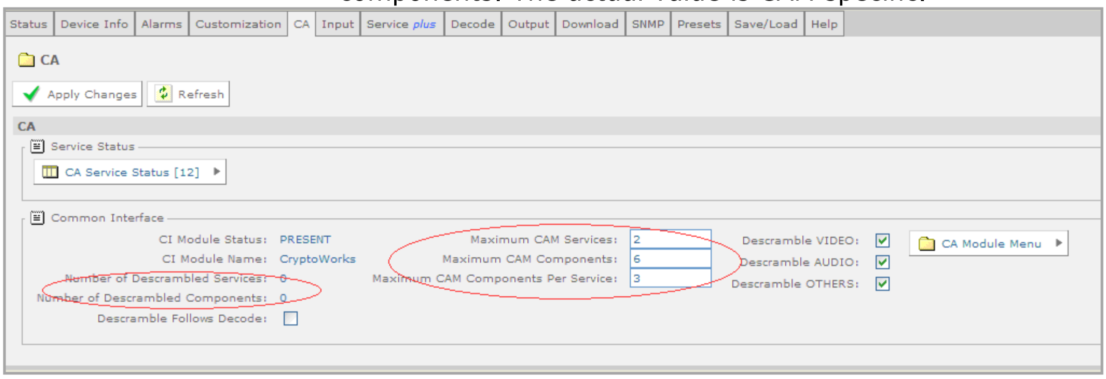


Figure 3-91 Common Interface Components

In addition, the IRD can filter how it uses its CAM slots. The operator can select the component types that are assigned to the pool of slots allocated for a service.

- **Descramble Video** – If this box is ticked the unit will set up the CAM such that the video components for all of the selected services are filtered for descrambling whilst dropping any other component types not ticked.

NOTE: The unit CAM will only descramble these components if the CA system is correct

---

- **Descramble Audio** – If this box is ticked the unit will set up the CAM such that the audio components for all of the selected services are filtered for descrambling whilst dropping any other component types not ticked.

NOTE: The unit CAM will only descramble these components if the CA system is correct

- **Descramble Others** – If this box is ticked the unit will set up the CAM such that all scrambled non audio and video components for all of the selected services are filtered for descrambling.

NOTE: The unit CAM will only descramble these components if the CA system is correct

- **Decrypt Components Follows Decode** – When this mode is activated only the components being decoded (or selected for pass-thru) will be allocated slots within the CAM. This is ideal when for example the CAM only provides the capability to descramble
  2 components and the broadcaster only wants video and one language of audio descrambled and decoded.

NOTE: This function only applies to the decoded service.

- **Enabled Service Limiting** – Enable this if the incoming transport stream exceeds 72 Mbps which is the bit rate limitation of DVB-CI. This will activate a PID filter that strips out unused PIDs. Depending on the content of the transport stream and the services selected, this feature will reduce the incoming bit rate to below the 72 Mbps threshold. This is available on the RX8200 only.
- **Select Service Limiting Bit Rate** – This defines the bit rate threshold of the incoming transport stream for activating Service Limiting. Service Limiting must be enabled for this to take effect. This is available on the RX8200 only.
- **CAM Voltage Forced 3v3** – This overrides the 3V3 / 5V sense for the CAM. Some CAMs may be incapable of working correctly with 5 V despite being advertised as supporting 5 V. This control forces the unit to supply only 3.3 V to the CAM. The IRD must be reset for this to take effect. This is available on the RX8200 only.
- **CAM Enable Burst Mode** – Where the CAM is inserted in to the IRD and no transport stream is detected or no services are listed, try enabling this mode which will attempt to fix the stream going in to the CAM. This is available on the RX8200 only.
- **CAM Compatibility Mode (max TS rate is reduced)** – This is available on the RX83xx IRD range only. Where the CAM is inserted in to the IRD and no transport stream is detected or no services are listed, try enabling this mode which will attempt to fix the stream going in to the CAM. This is similar to enabling Burst Mode in the RX8200.

NOTE: The RX83xx IRD range can only descramble transport streams up to 72 Mbps with the CAM inserted since it does not support the Service Limiting feature available on the RX8200. It should be noted that enabling **CAM Compatibility Mode** reduces this maximum bit rate for the transport stream.

If multiple services are selected for decryption and **Decrypt Components Follows Decode** is selected then changing the decode service will cause **all decrypted services to temporarily stop descrambling.**

3.11.2.8. Status

3.11.2.8.1. CAM Status

The unit does not have the ability to report detailed status of the CAM because of the CAM's "black box" nature. The unit will display if it has been successful in configuring the services and sending the configuration information to the CAM.

The following statuses are available from the CAM:

- **Attempting Decryption** – This status means that the IRD has been successfully configured and that all configuration information has been sent to the CAM. This does not mean that the CAM is decrypting.
- **Decryption Error** – This means that the IRD has not been able to successfully setup or that the PIDs selected for descrambling still have their descramble bits set within the Transport Stream header.
- **MAX PIDS** – In this case, the IRD has found more components that are scrambled than are allowed by the configuration of the unit (Maximum CAM Components). This may not be a problem but does mean that some of the components scrambled within the service cannot be de-scrambled because of limitations of the CAM.

3.11.2.9. Front Panel Setup

3.11.2.9.1. CI Module Status

This menu displays the presence of the CI Module (CAM), this will show either PRESENT or NOT PRESENT, when diagnosing CI issues please check this menu first, if the CAM has a fault it may not be detected by the unit.

```
CI                          |CI MODULE STATUS
5.4.1                       |PRESENT
```

3.11.2.9.2. CI Module Name

This menu displays the name of the CI module (CAM). This is a text string supplied by the CA vendor and can be any value.

```
CI                                        |CI MODULE NAME
5.4.2                                     |VIACCESS
```

3.11.2.9.3. CI Forced Voltage 3V3

This menu allows the user to override the 3V3 / 5V sense for the CAM. Some CAMs may be incapable of working correctly with 5V despite being advertised supporting 5V. This control forces the unit to supply only 3.3V to the CAM.

```
CI                                        |CI VOLTAGE FORCED 3V3
5.4.3                                     |FALSE
```

3.11.3. BISS

3.11.3.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
BISS	B				B
BISS/MSD	●				●

3.11.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No hardware option required. This option is not available if RX8200/BAS/BSKYB or RX8200/BAS/SKYIT are ordered			

3.11.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	✓

3.11.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/UPS/BISS	License key for BISS single service	FAZ 101 0113/86	RX8XXX/SWO/BISS
RX83XX/SWO/BISS/MSD	License key for BISS multi service mode	FAZ 101 0108/16	RX8XXX/SWO/BISS/MSD
RX8200/SWO/BISS/MSD RX8200/UPS/BISS/MSD	License key for BISS multi service mode	FAZ 101 0113/91 FAZ 101 0113/94	RX8XXX/SWO/BISS/MSD

3.11.3.5. Functional Description

BISS (as specified in EBU Tech 3292 May 2002) is standard on RX8330 and RX8200, MSD BISS functionality may be ordered on these base units.

Older units may require an upgrade license key for single service BISS, if in doubt please contact MediaKind Customer Support.

3.11.3.5.1. BISS Mode 1

BISS Mode 1 uses a fixed control word to encrypt the data in the Transport Stream using the DVB Common Scrambling Algorithm.

With BISS mode 1 this control word or key, known as the “clear session word” or CSW, is inputted to the receiver using the front panel or web interface. If the same CSW has been entered in a BISS compliant encoder, then unit will decrypt the encrypted service(s).

The workflow for this operation is to generate a random 12 digit hexadecimal number (any random number), enter this into the encoder and then communicate through secure means this number to all decrypting receivers.

This method of encryption is recommended for short events such as sports broadcasts.

The CSW is entered into the BISS Key box on the CA tab of the web browser. This is a 12 digit hexadecimal number (see below).

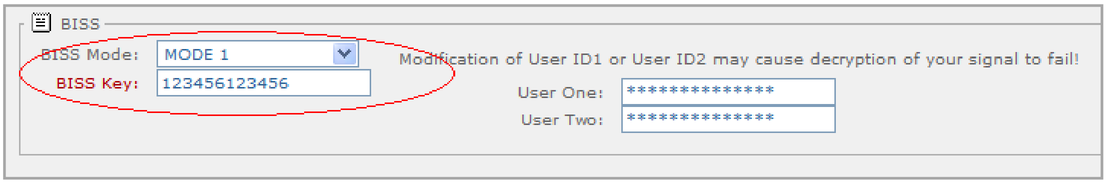


Figure 3-92 Location of BISS Key

The BISS mode box must be set to MODE 1.

3.11.3.5.2. BISS E

BISS E is a more secure version of BISS Mode 1. Rather than the operator sending the CSW in the clear to the decoder end user in the clear, the key is encrypted to generate an encrypted session word (ESW). This ESW is then passed to the decoder end user and inputted into the receiver. The receiver decrypts the ESW to recover the CSW needed to decode the stream.

There are three methods supported to generate the ESW:

- BISS E Fixed.
- BISS E Ericsson.
- BISS E User 1 / User 2.

3.11.3.5.3. BISS E Fixed / BISS E Ericsson

These modes of operation are used to provide a secure content link from one encoder to one receiver. The ESW in both cases is encrypted using the internal fixed serial number of the receiver. As such this method cannot be used to send content to more than one receiver.

A series of ESWs (one for each receiver can however be generated such that the CSW can be decrypted for each unit e.g.

- CSW scrambled by RX8000 unit serial number 1 = ESW 1.
- CSW scrambled by RX8000 unit serial number 2 = ESW 2.
- CSW scrambled by RX8000 unit serial number n = ESW n.

Next,

- ESW 1 is supplied to unit 1.
- ESW 2 is supplied to unit 2.
- ESW n is supplied to unit n.

The receivers will then decode the ESW using its own unique serial number

- ESW1 descrambled by RX8000 1's serial number = CSW.
- ESW2 descrambled by RX8000 2's serial number = CSW.
- ESWn descrambled by RX8000 n's serial number = CSW.

The two modes differ in the algorithm used for the encryption. BISS E Fixed is an implementation of EBU Tech 3292 which describes how the fixed user ID (customization serial number) is used to scramble the CSW; whilst BISS E Ericsson is a proprietary implementation.

The ESW for both formats can be created using a tool provided by MediaKind Customer Support.

3.11.3.5.4. BISS E User ID 1 / BISS E User ID 2

In this mode the receiver does not use its inbuilt serial number to decrypt the ESW in to the CSW. Instead it uses either User ID 1 (User One) or User ID 2 (User Two). These can sometimes be referred to as Injector ID 1 or Injector ID 2.

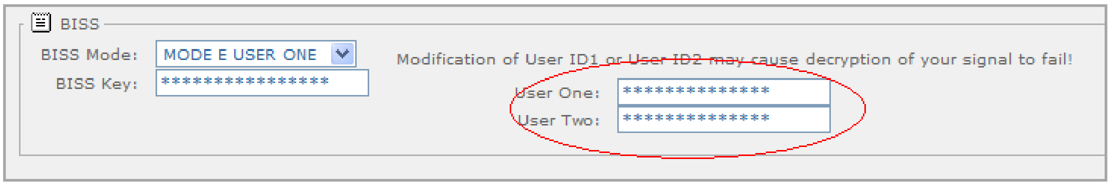


Figure 3-93 Location of User One and User Two IDs

User ID 1 and User ID2 are 12 digit IDs which are used to replace the built in customisation serial number when decrypting the CSW.

The use case for this is that the operator will provide a set of User IDs to the decoder end user. The IDs are used to encrypt the CSW at the encode end and the decrypt the ESW at the decoder end. The end user of the decoder will need to input both the ESW and the User ID into either the User One key box or the User Two key box. The ESW is typed into the BISS key box. The receiver will then decode the ESW into the CSW and use it to descramble the incoming feed.

3.11.3.6. Configuring BISS Decryption

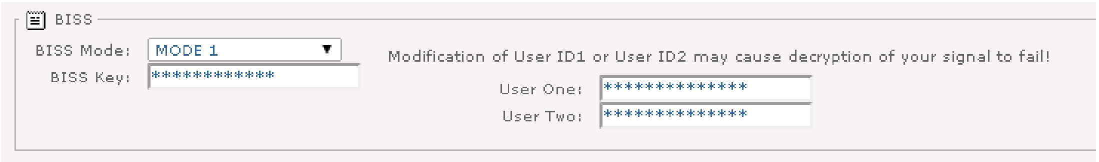


Figure 3-94 BISS Configuration Within the Web Interface

- **BISS Mode** – Configures the receiver to one of the following BISS Modes. This will determines how and what BISS keys are used for descrambling the stream:
- **BISS MODE 1:** The simplest form for BISS decryption. The supplied CSW must be entered in to the ***BISS Key*** field.
- **BISS E FIXED:** This BISS Mode requires a supplied ESW unique to the receiver to be entered in to the ***BISS Key*** field.
- **BISS E ERICSSON:** This BISS Mode requires a supplied ESW unique to the receiver to be entered in to the ***BISS Key*** field.
- **BISS USER ONE:** This BISS Mode uses the key entered in the ***User One*** field to decipher the ESW entered in the ***BISS Key*** field. Both these keys are normally supplied.
- **BISS USER TWO:** This BISS Mode uses the key entered in the ***User Two*** field to decipher the ESW entered in the ***BISS Key*** field. Both these keys are normally supplied.
- **BISS Key** – The main entry point for the supplied BISS key. Depending on the BISS Mode selected, this may be the CSW or ESW.
- **User One** – The entry for the User ID (or Injector ID) if the user wishes to select BISS USER ONE as the desired BISS mode.
- **User Two** – The entry for the User ID (or Injector ID) if the user wishes to select BISS USER TWO as the desired BISS mode.

3.11.3.7. BISS Multi-Service Descrambling (MSD)

If the BISS MSD licence is purchased then the receiver is capable of descrambling multiple services using BISS.

NOTE: The IRD entry for one **Session Key** that will be applied to all services. Therefore, all services must be scrambled with the same **Session Word**.

To use this functionality, BISS is set up in the normal way and all services that are to be descrambled can be selected from the **Service** ***plus*** page as shown below.

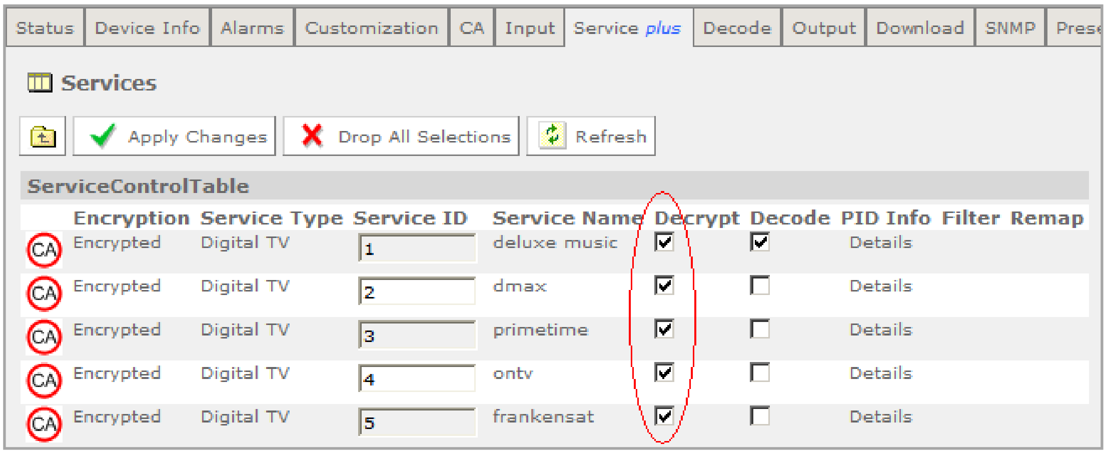


Figure 3-95 Service plus Menu

In the example above, the first 5 services have been selected for decryption. All five services will be decrypted with the single **Session Key** programmed into the unit.

NOTE: The CA System ID of each of the services must be the BISS CA System ID 0x2600.

3.11.3.8. Front Panel

3.11.3.8.1. BISS Mode

This menu displays and allows the editing of the current BISS mode for the unit. These are the same modes as described in the functional description.

```
BISS                                   |BISS MODE
5.3.1                                  |MODE E FIXED
```

3.11.3.8.2. BISS Key

This menu displays and allows the editing of the units BISS Key, i.e. the CSW. In modes other than BISS Mode 1 this will be the ESW as explained in the functional description.

```
BISS                                   |BISS KEY
5.3.2                                  |************
```

3.11.3.8.3. BISS User One Key

This menu displays and allows the editing of the units BISS User 1 Key. This is the key that is used to decrypt the CW when in the **BISS Mode** is set to **Mode E User 1** as explained more fully in the functional description.

```
BISS                        |BISS USER ONE KEY
5.3.3                       |**************
```

3.11.3.8.4. BISS User Two Key

This menu displays and allows the editing of the units BISS User 2 Key. This is the key that is used to decrypt the CW when in the **BISS Mode** is set to **Mode E User 2** as explained more fully in the functional description.

```
BISS                        |BISS USER TWO KEY
5.3.4                       |**************
```

3.11.4. Director

3.11.4.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
DIR5	B	B	B		B
DIR5/MSD	●	●	●		●

3.11.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No hardware option required. This option is not available if RX8200/BAS/BSKYB or RX8200/BAS/SKYIT are ordered			

3.11.4.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.11.4.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/UPS/DIR	Upgrade to single service Director	FAZ 101 0113/88	RX8XXX/SWO/DIR5
RX83XX/SWO/DIR/MSD	Multi service Director	FAZ 101 0108/16	RX8XXX/SWO/DIR5/MS D
RX8200/SWO/DIRMSD RX83XX/UPS/ DIR/MSD	Multi service Director	FAZ 101 0113/28 FAZ 101 0113/88	RX8XXX/SWO/DIR5/MS D

3.11.4.5. Functional Description

MediaKind Director is the next step in secure content distribution and should be purchased where BISS is not felt to be secure enough. MediaKind's Director is made up of a suite of three parts:

- Director CA
- Over Air Control
- Over Air Software Download

The following sections describe these parts in more detail.

3.11.4.6. Director CA

3.11.4.6.1. Director CA Overview

BISS provides fixed key encryption relying on manual distribution of the keys. Director improves on this by automatically changing the encryption key periodically and distributing them within the transport stream.

Director generates a new key periodically within tens of seconds and tight control over timing means that key changes happen seamlessly. The keys are encrypted and transmitted within the transport stream using Entitlement Control Messages (ECMs) and so multiple keys can be transmitted to encrypt more than one service. Each service will be encrypted differently and will always have a unique key and separate ECM.

3.11.4.6.2. Entitlement Control

NOTE: RX8000 release version 8.2.0 or greater contains security enhancements to handling Director CA. When upgrading just the IRD used in an existing nCC & Director system, no further actions are required. However, it should be noted that if the IRD is later downgraded to a release version that does not support the Director security enhancements then ***all entitlements stored in the IRD will be invalidated and lost***. It should also be noted that switching between the software Flash Banks to a version that does not support the Director security enhancements will ***invalidate*** entitlements stored in the IRD.

The MediaKind Director system provides full Conditional Access to precisely control what a viewer can watch. With BISS, a single encryption key is used to firstly control the security of the link and secondly whether the viewer can watch the content. With Director, these two functions are separated.

In the first stage, the security of the transmission is protected by the variable key system, making it highly secure. Unless the IRD receives the continuous stream of ECMs which provide the encrypted session word, the clear session word cannot be recovered and so the link remains secure.

Even if the ECM can be decrypted by a genuine Director receiver, a second stage involves the concept of “entitlements” which means that the receiver must be authorized to descramble specific programs before it can decode video. Different receivers can be authorized for different programs by the Director head-end using Entitlement Management Messages (EMMs).

3.11.4.6.3. Addressing the Receiver

Receivers that are under the control of the Director head-end are each assigned a unique ***receiver Hardware ID*** and a ***receiver Type***.

This information must be supplied to the Director head-end operator and once included in to the database, the unit can then receive commands and various entitlement messages once locked on to the appropriate transport stream.

Receiver Type

All RX8000 models in Director are identified with the receiver Type *RX8000*.

Receiver Hardware ID

The receiver Hardware ID (or sometimes referred to as the "*Unique Hardware ID*") for all RX8000 models is displayed as the **Customization Serial Number** on the Customization web page as shown in Figure 3-96. It is not to be confused with the unit or production serial number often stamped on the back panel of the unit chassis.

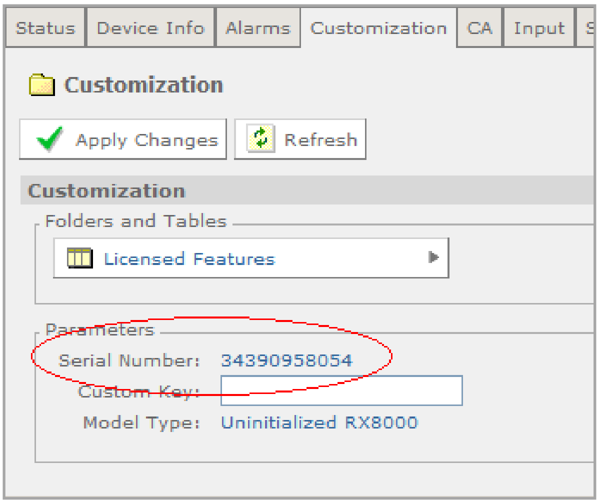


Figure 3-96 Customization Serial Number Field

The Hardware ID is also accessible from the front panel menu, refer to section *3.11.4.12.3* below.

3.11.4.6.4. Multi-Service Descrambling

With the appropriate hardware and software options, up to 24 Director CA scrambled services can be descrambled and output as clear services on the unit's ASI or IP outputs. Selecting multiple services for decryption is achieved in the same way as BISS and DVB-CI using the ***Service plus*** page.

3.11.4.7. Over Air Control (OAC)

3.11.4.7.1. IRD Configuration using Over Air Control

Director provides a list of Over Air Control (OAC) commands that can target an individual IRD, a group of IRDs or the entire population of IRDs registered in the Director Head-end database.

This feature is often referred to as "*Over Air In-Band*" control.

The OAC commands can be used to the configure IRD settings remotely such as satellite tuning parameters and service selection. *Table 3-11* below lists all the OAC commands supported by the RX8000.

The unit must be tuned to the Director head-end transport stream and must in ***Over Air Control*** mode to respond to the majority of commands.

Table 3-11 Director Features Supported by the RX8000 Range

● = Supported feature

Director Feature	RX8200	RX8252	RX8305	RX8310	RX8310B	RX8315	RX8320	RX8330	RX8330C
Director CA Single Service Descrambling	●	●	●	●	●	●		●	
Director CA Multi Service Descrambling	●	●		●	●	●		●	
Maximum simultaneous services descrambled	24	24	1	24	24	24		24	
Over Air Software Download (OASD)									
Software Image Download	●	●	●	●	●	●		●	
Software Image Switch	●	●	●	●	●	●		●	
XML Configuration Download	●			●	●	●		●	
XML Configuration Activate	●			●	●	●		●	
Entitlements									
Enable CA Product	●	●	●	●	●	●		●	
Disable CA Product	●	●	●	●	●	●		●	
Enable/Disable Entitlements	●	●	●	●	●	●		●	
Entitlement Store Capacity	80	80	80	80	80	80		80	
Over Air Control (OAC) Commands									
Force Service Selection	●	●	●	●	●	●		●	
Force Carrier Retune: Satellite	●	●	●	●	●	●		●	
Force Carrier Retune: Extended Satellite	●			●	●	●		●	
Store Carrier Data	●	●	●	●	●	●		●	
Reset Carrier Data	●	●	●	●	●	●		●	
Set Receiver State: Enable front panel controls	●	●	●	●	●	●		●	
Set Receiver State: Disable front panel control	●	●	●	●	●	●		●	
Set Receiver State: Switch to 4:3 aspect ratio	●	●	●	●	●	●		●	
Set Receiver State: Switch to 16:9 aspect ratio	●	●	●	●	●	●		●	
Set Receiver State: Reboot	●	●	●	●	●	●		●	
Set Receiver State: OAC mode	●	●	●	●	●	●		●	
Set Receiver State: local mode	●	●	●	●	●	●		●	
Set Receiver State: serial mode									
Set Receiver State: Enable outputs									
Set Receiver State: Disable outputs									

Director Feature	RX8200	RX8252	RX8305	RX8310	RX8310B	RX8315	RX8320	RX8330	RX8330C
Set Default Audio Languages									
Set Message: Display front panel message	●	●	●	●	●	●		●	
Set Message: Hide front panel message	●	●	●	●	●	●		●	
Set Message: Enable front panel message	●	●	●	●	●	●		●	
Set Message: Disable front panel message	●	●	●	●	●	●		●	
Set Relays	●			●	●	●		●	
Mute Audio Outputs									
Generic Command									
Configure Fingerprint	●	●	●	●	●	●		●	
Turn on/off GPS functionality									
Set the GPS location/radius									
Send a receiver license	●	●	●	●	●	●		●	
Configure the output bit rates		●							
Set a receiver password									
Tune a CTM12 input									
Configure a single BISS key	●	●		●	●	●		●	
Configure multiple BISS keys									
Set encrypted services filter									
Configure multiple radio services	●								
Addressable DPI (SCTE 35)	●			●	●	●		●	
Carrier Slots									
Carrier Slots	40	40	10	40	40	40		40	
Emergency Home Carrier Slots	1	1	1	1	1	1		1	
Power Up Carrier Slots	1	1	1	1	1	1		1	

3.11.4.7.2. Power Up Carrier

The Power Up Carrier (PUC) is a feature of Director’s over air control. The PUC slot can only be configured by a Director head-end as it is not possible to do so locally or through any of the unit’s other control interfaces.

When the PUC slot has been configured correctly, the next time the IRD is powered up or rebooted and the ***Over Air Control*** setting is enabled, the unit will ignore any previous input settings and immediately apply the input settings saved in the PUC slot. If the Over Air Control setting was disabled then there will be no change to the preserved input settings during boot up and the PUC is ignored.

It may be useful to configure the PUC so that every time the IRD is powered up, it automatically tunes to the Director head-end so that it can maintain over air control of the unit.

3.11.4.7.3. Emergency Home Carrier

The Emergency Home Carrier (EHC) is another feature of Director's over air control and is similar to the Power Up Carrier described above.

The EHC slot can only be configured by a Director head-end as it is not possible to do so locally or through any of the unit's other control interfaces.

Once the EHC slot has been configured correctly and the ***Over Air Control*** setting is enabled, the IRD will continuously monitor its input status. If the IRD loses transport stream lock on its input or the current Service being decoded is no longer present, after a pre-defined timeout (EHC Timeout), the unit will immediately apply the input settings saved in the EHC slot.

If the Over Air Control setting was disabled then there will be no change to the input settings if transport stream lock or the selected Service is lost.

If a mistake is made when configuring a new carrier for the IRD resulting in a loss of lock then there would be no access to over air control commands from the incoming transport stream and the head-end would lose control. The EHC is a safe guard that allows the head-end to regain over air control of an IRD.

3.11.4.7.4. Carrier Slots

The IRD supports up to 40 Carrier Slots which store only the Input Parameters (e.g. satellite tuning parameters and service selection) and allow the unit to tune to various preset carriers.

The Director head-end can store (*Store Carrier Data*) or clear (*Reset Carrier Data*) carrier data in these allocated carrier slots. Director can then use OAC commands to setup and select (*Force Carrier Retune*) these carrier slots for a set *duration* or permanently. If the *duration* is specified in the OAC command, then the IRD will revert back to its previous carrier settings when the duration expires.

NOTE: The 40 Carrier Slots allocated for Director actually use the 40 Preset configuration slots. Director will override any Preset configuration slots that may have already been saved. Likewise, manually saving a new Preset configuration will override a Carrier Slot reserved by Director.

3.11.4.8. Over Air Software Download (OASD)

3.11.4.8.1. Software Download

The software running on the IRD can be upgraded using FTP or HTTP via the web interface. Where no network connection is possible, the unit that is part of a population controlled by a Director head-end can be upgraded over air by using a download service in the transport stream. This allows a quick upgrade of multiple receivers that are in remote locations.

The IRD has two flash banks. The active flash bank will contain the software that is currently running on the unit. When an over air download is triggered by the Director head-end, the new image is downloaded to the inactive flash bank. When the head-end signals that the new software download should be used, the flash banks are swapped so that the inactive flash bank containing the new software becomes the active flash bank. The receiver is then be rebooted using the new software upgrade.

There are two methods for applying the software download to the IRD:

- A single over air command that signals the download and once complete, reboots the targeted receivers and automatically switches to newly downloaded software flash bank.
- An over air command that just signals the download but does not reboot or switch the software flash banks. A separate over air command can be sent later at the operator's convenience that will reboot and switch the software flash banks so that the receiver runs the new software upgrade.

NOTE: When performing the Over Air Software Download to a population of receivers some caution should be taken when targeting receiver types. **Not all RX8000 variants are compatible with the same code version, e,g, RX8305 and RX8252 for example. Always refer to the release notes for compatible RX8000 variants.**

Software Download Option Card Support

As of version 8.11.0, it is possible to upgrade some of the option cards using Director's Over Air Download service. If any of the option cards need to be upgraded then it is recommended to use the Upgrade Utility process described in the software release notes.

In most cases, upgrading just the motherboard code only should not present any problems. However, the software release notes for the desired version should be consulted to determine what option cards can be upgraded and to highlight any potential issues if the Over Air Download service is to be considered.

Software Download Version

Every RX8000 release can be downloaded using Director's Over Air Software Download service but will be assigned a unique download version number. Every time a download is performed by Director, the download version is stored by the unit and is used to determine if a Software Image Download has already been stored in either flash bank, or if the Software Image Switch command should be ignored if the download version does not match.

If the IRD is upgraded using another method such as FTP, then download version is cleared for the appropriate flash bank.

NOTE: Validation of the download version described in this section applies to version 8.5.0 or greater.

3.11.4.8.2. XML Configuration Download

The IRD supports configuration through XML files uploaded to the web browser interface and will also generate an XML snapshot of its current configuration. These XML configuration files can also be downloaded using Director's Over Air Download service. The principles are the same as used for downloading software upgrade images.

Only one XML configuration file can be downloaded at any one time and only one XML configuration file is stored for recall/activation. The file is stored in persistent memory so it will not be lost if the IRD is rebooted.

Table 3-12 Difference Between Web Browser Method and Download Service

XML State	XML Configuration via Web Browser	XML configuration via Download Service
Error in parameter	ABORTED: XML is rejected and IRD configuration is unchanged	IGNORED: Drop parameter, continue parsing XML file and update IRD configuration when finished
Missing parameters	NO EFFECT: Continue parsing XML file and update IRD configuration when finished	NO EFFECT: Continue parsing XML file and update IRD configuration when finished
Additional unrecognized parameters	ABORTED: XML is rejected and IRD configuration is unchanged	IGNORED: Drop parameter, continue parsing XML file and update IRD configuration when finished

Just like the software download, where the XML configuration file is downloaded but not 'switched', a second Director command can be sent later to perform the 'switch'.

3.11.4.8.3. Scheduling Download Images in Director

Only one over air software download image should be scheduled at any one time for each IRD family type. More than one download image can be played out at the same time but only if they are each from different IRD family types such RX1290 or RX8000.

The RX8200/RX83xx, RX8305 and RX8252 are regarded as being in the same IRD family type so only one download image can be scheduled for these types at any one time.

The same restrictions should be applied when scheduling over air XML configuration images for download when addressed to different IRD family types.

3.11.4.9. Setup: CA > Director

The basic selection and status information for Director can be found under the **CA** tab.

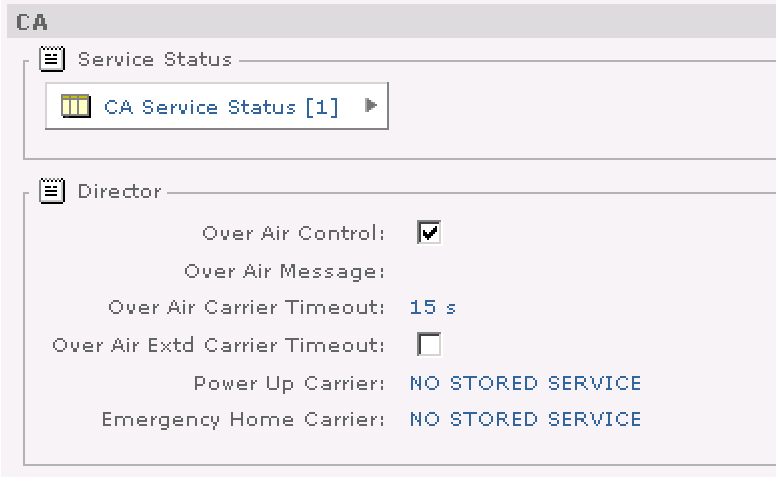


Figure 3-97 CA > Director

3.11.4.9.1. Over Air Control

The Over Air Control mode must be enabled for the IRD to respond to OAC commands such as *Force Carrier Retune* for example. It must also be enabled if you wish to use the PUC and EHC features described above.

The Over Air Control mode is not required for descrambling Director CA services, entitlement control, or the Over Air Software Download service.

The only OAC command that does not require Over Air Control mode to be enabled is the following command which is used to enable or disable Over Air Control mode via Director:

- Configure the receiver’s state: Switch to OAC mode

3.11.4.9.2. Over Air Message

The Over Air Message status field displays any messages sent from the Director head-end using the following OAC command. This can be useful for testing the Director link.

- Configure the message display: Display message on front panel

3.11.4.9.3. Over Air Carrier Timeout

The field reports the current Emergency Home Carrier Timeout (EHC Timeout). This is set by the Director head-end when storing the EHC slot. The IRD will override the EHC Timeout with a minimum of 15 seconds if the timeout is too small.

3.11.4.9.4. Over Air Extd Carrier Timeout

This option modifies the Over Air Carrier Timeout. If disabled then the EHC Timeout is handled in seconds. If enabled then the EHC Timeout is handled in minutes.

3.11.4.9.5. Power Up Carrier

The Power Up Carrier field reports the current status of the PUC slot. If the PUC slot has not been configured (default state) then the status will report “NO STORED SERVICE”.

3.11.4.9.6. Emergency Home Carrier

The Emergency Home Carrier field reports the current status of the EHC slot. If the EHC slot has not been configured (default state) then the status will report “NO STORED SERVICE”.

3.11.4.10. Setup: Download

The Download Status is available from the **Download** tab. It is not just relevant to the FTP and HTTP software upgrade methods but also Director’s Over Air Software Download feature for software images and XML configuration files if supported.

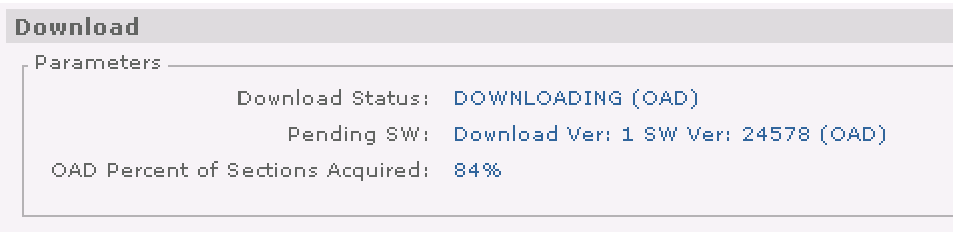


Figure 3-98 Download

3.11.4.10.1. Download Status

The Download Status reports the current status for each stage of the download. Table 3-13 describes all possible status messages.

Table 3-13 Possible Download Status and Their Descriptions

Download Status	Description
IDLE	The Download Manager is idle and there is no download or upgrade currently being performed.
AUTHORIZED	A request to begin downloading a new software version has been made and version check has passed and valid to commence download.

Download Status	Description
REJECTED OLDER VERSION	A request to begin downloading a new software version has been made but version check failed due an inferior version or mismatch. This status is also displayed if the new software version is already detected on the target IRD. The download is aborted. This check is only performed when using the Director Over Air Software Download mechanism.
DOWNLOADING (FTP)	The Download Manager is in the process of downloading new software via the FTP method.
DOWNLOADING (OAD)	The Download Manager is in the process of downloading new software via Director's Over Air Software Download mechanism sourced from the incoming transport stream.
DOWNLOADING (WEB)	The Download Manager is in the process of downloading new software uploaded via the web browser method.
PROGRAMMING	The download is complete and now the new software is being programmed in to the non-volatile flash banks.
PROGRAMMING FAILURE	The download was complete but an error took place when attempting to program the new code in to the non-volatile flash banks. The download is aborted.
CANCELLED	The Download Manager is in the process of downloading new software but has timed out. The download is aborted.
SUCCESSFUL UPDATE	The Download Manager has completed downloading the new software version to the flash banks. The receiver can now be rebooted in which case, the new software version will be loaded.
DOWNLOAD VERSION ALREADY IN FLASH	When the Download Manager receives a request to perform an Over Air Software Download from a Director headend, it will compare the new download version with the download versions already store in any of the flash banks. If the download version has already been downloaded, the new download request is ignored. This message was introduced in version 8.5.0.
INCORRECT SWITCH VERSION	When the Download Manager receives a request to switch and reboot to the specified download version from a Director headend, it will compare the new download version with the download versions already store in any of the flash banks. If the download version is not present in either flash bank then the Download Status is updated and the switch command ignored. This message was introduced in version 8.5.0.

3.11.4.10.2. Pending SW

The Pending SW field reports whether a software image is being downloaded or an XML configuration File is being downloaded. The download version is also reported.

3.11.4.10.3. OAD Percent of Sections Acquired

This field simply reports the percentage of the download complete so far.

3.11.4.11. Checking the IRD and Director Link

Checking that the IRD will respond to the Director head-end is straightforward. It is recommended that a *Display Message* OAC command is sent from the head-end and confirmed locally at the targeted receiver population that the message is visible on the front panel.

At the head-end, using nCC Director, the following typical set of commands should be sent:

- Configure the receiver's state: Switch to OAC mode
- Configure the message display: Display message on front panel; Hello World; 60 seconds

Moments later, the targeted receiver should have the **Over Air Control** mode *Enabled* and the **Over Air Message** field visible in web interface under the CA tab should display the message text set by the head-end (e.g. Hello World).

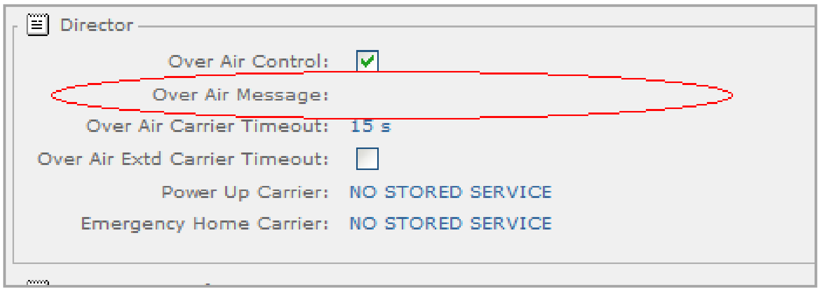


Figure 3-99 Over Air Message Field

NOTE: The duration of the message can be set at the head-end, it is recommended that the duration is set for long enough so that the operator of the receiver will see it. The web page will have to be manually refreshed to see the text.

The Over Air Message is also immediately visible on the front panel. The message should pop up but can be navigated to through the menus (see section *3.11.4.12.1* below).

If the message is not seen then check the receiver Type and receiver Hardware ID at the head end (refer to section *3.11.4.6.3*). Also check that the receiver is tuned to the correct Transport Stream from the head end.

NOTE: Providing a more detailed description of the Director system is outside the scope of this document. Please contact MediaKind Customer Support for more information.

3.11.4.12. Front Panel

3.11.4.12.1. Over Air Message

This menu displays the *Display Message* OAC command sent from the Director head-end.

```
DIRV5                           |OVER AIR MESSAGE
5.2.1                           |TEST MESSAGE 1
```

3.11.4.12.2. Broadcaster ID

This menu allows the input of a Broadcaster ID into the unit. The unit will then only allow streams signed with this Broadcaster ID to be controlled via director.

NOTE: The Broadcaster ID feature is not fully supported and should be set to the default value of zero.

```
 DIRV5                          |BROADCASTER ID
5.2.2                           |*****
```

3.11.4.12.3. Unique Hardware ID

This menu displays the Unique Hardware ID (identical to the Customization Serial number) of the unit. This ID is used to uniquely address the unit from the Director Head-end and as such, this ID must be supplied to the head-end during the commission phase for inclusion in to the Director database.

```
DIRV5                           |UNIQUE HARDWARE ID
5.2.3                           |12345678912
```

3.11.4.12.4. Model Identification

This menu displays all of the model information required by Director. These are fixed according to the RX8000 variant.

Table 3-14 Director Receiver Model Identification Across the RX8000 Range

RX8000 Variant	RX82xx	RX83xx
Manufacturer ID	0xDE	0xDE
Model ID	0x1D	0x1D
Hardware Type	0x82	0x83

These fields are used to identify groups of devices under Director control. The head-end operator may request these values.

```
DIRV5                           |MANUF ID DE                          HW TYPE 82
5.2.4                           |MODEL ID 1D
```

3.11.4.12.5. Download Status

This menu displays the current status of the Over Air Software Download within the unit. The software for downloading and upgrading units is sent within the transport stream and this menu item will inform the user what state the process is at. This mechanism is also used for downloading XML Configuration files. *Table 3-13* describes all possible status messages.

This item also supplies the percentage complete during each download.

```
DIRV5                        |DOWNLOAD STATUS
5.2.5                        |IDLE
```

3.11.4.12.6. Enter New Pin

This menu allows the user to enter a new Local Lock-Out PIN. This is the PIN that restricts entry to the local interfaces (front panel) within the unit. When it is set, access to the local interface is only possible using this PIN or when the PIN has been reset. The default Local Lock-Out PIN is 1234.

```
DIRV5                        |ENTER NEW PIN
5.2.5                        |****
```

3.11.4.12.7. Reset Pin

This menu allows the user to enter the Lock-Out Reset PIN. This PIN resets the Local Lock-Out PIN to its default value.

Please contact MediaKind Customer Support to determine the Reset PIN.

```
DIRV5                        |RESET PIN
5.2.7                        |*************
```

3.11.4.12.8. Over Air Extended Carrier Timeout

This menu allows the user to extend the timeout used to determine a loss of carrier. When in extended mode the carrier timeout is changed from a value in seconds to a value in minutes.
If a loss of carrier is detected and the timeout occurs, the Director functionality of the receiver may cause a retune to the **Emergency Home Carrier** if it has been defined/configured.

```
DIRV5                        |OVER AIR EXTD CARRIER TIMEOUT
5.2.8                        |FALSE
```

3.11.4.12.9. Over Air Control

This menu allows the user to set the unit into **Over Air Control** mode. When the unit is in **Over Air Control** mode it will action any Director OAC commands sent from the Director Head-End, otherwise they will be silently ignored.

```
DIRV5                    |OVER AIR CONTROL
5.2.9                    |FALSE
```

3.11.4.12.10. Power Up Carrier

This menu allows the user to view the tuning parameters and assigned Service ID configured as the **Power Up Carrier.** On power up of the receiver, the Power-Up Carrier settings will be applied if the *Over Air Control* mode was set to **Enabled**. This will override any tuning parameters and service selection that the unit was tuned to when it was powered down or reset. This carrier can only be configured by Director head-end using Director OAC commands. By default the carrier settings are cleared and therefore not used.

```
DIRV5                    |POWER-UP CARRIER
5.2.9                    |TEST SERVICE 1
```

3.11.4.12.11. Emergency Home Carrier

This menu allows the user to view the tuning parameters and assigned Service ID configured as the **Emergency Home Carrier.** When the receiver detects signal loss, the Emergency Home Carrier settings will be applied if the *Over Air Control* mode was set to **Enabled**. This will override any tuning parameters and service selection that the unit was tuned to prior to the loss of signal. This carrier can only be configured by Director head-end using Director OAC commands. By default the carrier settings are cleared and therefore not used.

```
DIRV5                    |EMERGENCY HOME CARRIER
5.2.9                    |TEST SERVICE 2
```

3.11.5. RAS

3.11.5.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●	●	●	●	●

3.11.5.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No hardware option required. This option is not available if RX8200/BAS/BSKYB or RX8200/BAS/SKYIT are ordered			

3.11.5.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	✓

3.11.5.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX83XX/SWO/RAS	License key to enable RAS CA on RX83XX	101 0108/31	RX8XXX/SWO/RAS
RX8200/SWO/RAS	License key to enable RAS CA on RX8200	101 0113/52	RX8XXX/SWO/RAS
RX82000/UPS/RAS	License key to enable RAS CA on RX8200	101 0113/87	RX8XXX/SWO/RAS

3.11.5.5. Functional Description

RAS is an MediaKind proprietary scrambling or Conditional Access system used to prevent unauthorized reception of transmissions. These transmissions are not normally *Direct to Home* (DTH); but will more likely be broadcasters sending signals for *Contribution and Distribution* purposes.

3.11.5.5.1. RAS Types

There are two types of RAS numbered 1 and 2.

- RAS1 uses a fixed key which is installed when the equipment is commissioned.
- RAS2 uses a variable key which is changed at frequent intervals by software from a PC located at the site at the head-end. This PC is under the control of the broadcaster.

NOTE: Only RAS1 is supported on the IRD.

3.11.5.5.2. RAS1

RAS1 uses a 28-bit key. Of the 268,435,456 possible keys, half are reserved for installations which are not DSNG based (Fixed Link Systems) and the other half for installations which are DSNG-based.

- Fixed Link Systems - Each separate system has a single unique key allocated and installed by MediaKind. The broadcaster/owner of the transmission system is not allowed to adjust or change the key in any way.

  RAS1 requires that the Multiplexer has a RAS cypher module and an allocated RAS1 fixed key installed. The IRD must have the same RAS1 fixed key entered by MediaKind Support Engineers or the manufacturing site using a unit customization tool.
- DSNG Systems - The operator is allowed to input a RAS1 key within the reserved range. In order to receive and descramble a RAS1 transmission from a DSNG, the IRD must be in DSNG Key mode and possess the matching key to allow descrambling.

3.11.5.6. RAS Mode Configuration

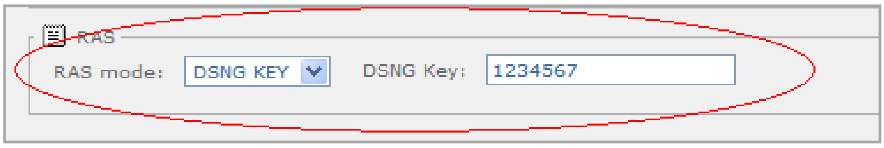


Figure 3-100 DSNG Key Field

RAS

- **RAS Mode** – Configures the IRD to the appropriate RAS1 mode.
- **FIXED Key**: Relies on a fixed key for descrambling.
- DSNG **Key**: Uses the DSNG Key provided by the user for descrambling.
- **DSNG Key** – Entry point for the DSNG Key when the IRD is set to the **DSNG Key** RAS mode.

3.11.5.7. Front Panel

3.11.5.7.1. RAS Mode

This menu sets the units RAS 1 mode. This allows the unit to be configured for fixed link systems (RAS FIXED KEY MODE) or DSNG Systems (RAS DSNG KEY MODE).

```
RAS                          |RAS MODE
5.5.1                        |RAS FIXED KEY MODE
```

3.11.5.7.2. RAS Key

This menu sets the units DSNG Key. This key is applied when the unit is in DSNG key mode

```
RAS                          |RAS KEY
5.5.1                        |0000000
```

3.11.6. Embedded NDS CA (BSkyB)

3.11.6.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●				

3.11.6.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
MPEG2/4 HD/SD MODULAR RECEIVER FOR BSKYB CA (RX8200/BAS/BSKYB)	1923	FAZ 101 0113/71	RX8200/BAS/BSKYB

3.11.6.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.11.6.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no software licenses associated with this feature			

3.11.6.5. Functional Description

The BSkyB variant of NDS CA is supported via the NDS Descrambler card. Unit descrambling for BSkyB is carried out on this card and the descrambled output stream is then supplied to the motherboard for decoding and further processing.

The NDS Descrambler card contains secure features that allow descrambling to take place. As such only code that has been verified and signed by NDS may be loaded onto the card. If any unsigned code is downloaded to the card it may become unable to function and will need to be returned to MediaKind for recovery.

Once the card has been configured to be a BSkyB variant it cannot be used with any other variant of NDS CA. Therefore, a BSkyB variant NDS Descrambler card cannot be used for Sky Italia descrambling, Sky Italia signed code will not work with a BSkyB variant of the card and should not be loaded onto the card.

This card will only fit into the RX8200 platform and is therefore not available in the RX8300 range of receivers.

3.11.6.6. Configuration

When the unit detects that the card has been fitted all Transport Streams will be routed through the card. Unscrambled Transport Streams will pass through without modification.
The RX8200 IRD will display a configuration and status web page for NDS descrambling.

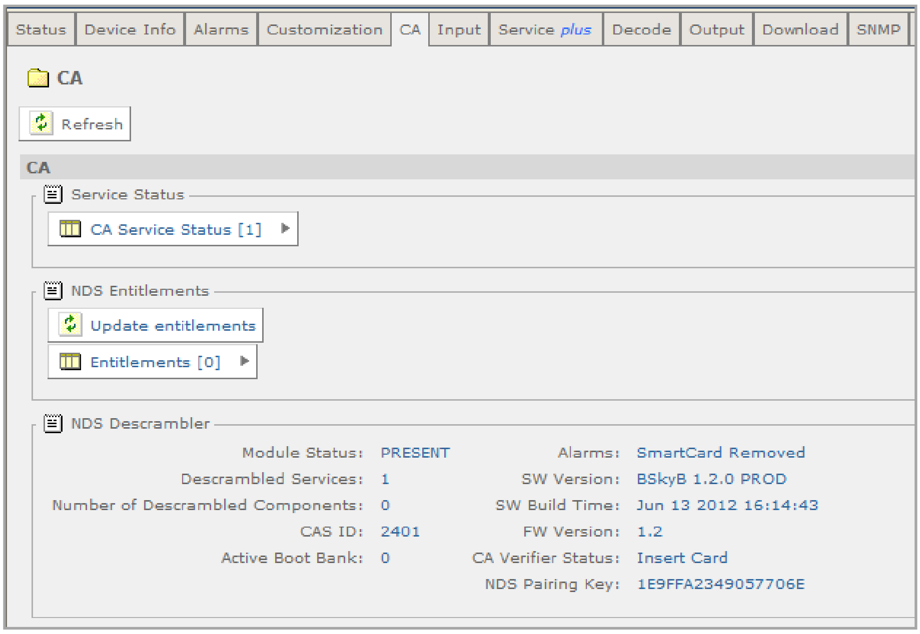


Figure 3-101 CA Web Page (NDS CA Card fitted)

There are no fields that may be edited by the user on this page. Selecting the **Refresh** button will ensure that the latest information is displayed from the current values of the equipment.

To view this page, select the **CA** tab on the web page. The following fields can be seen on the web interface:

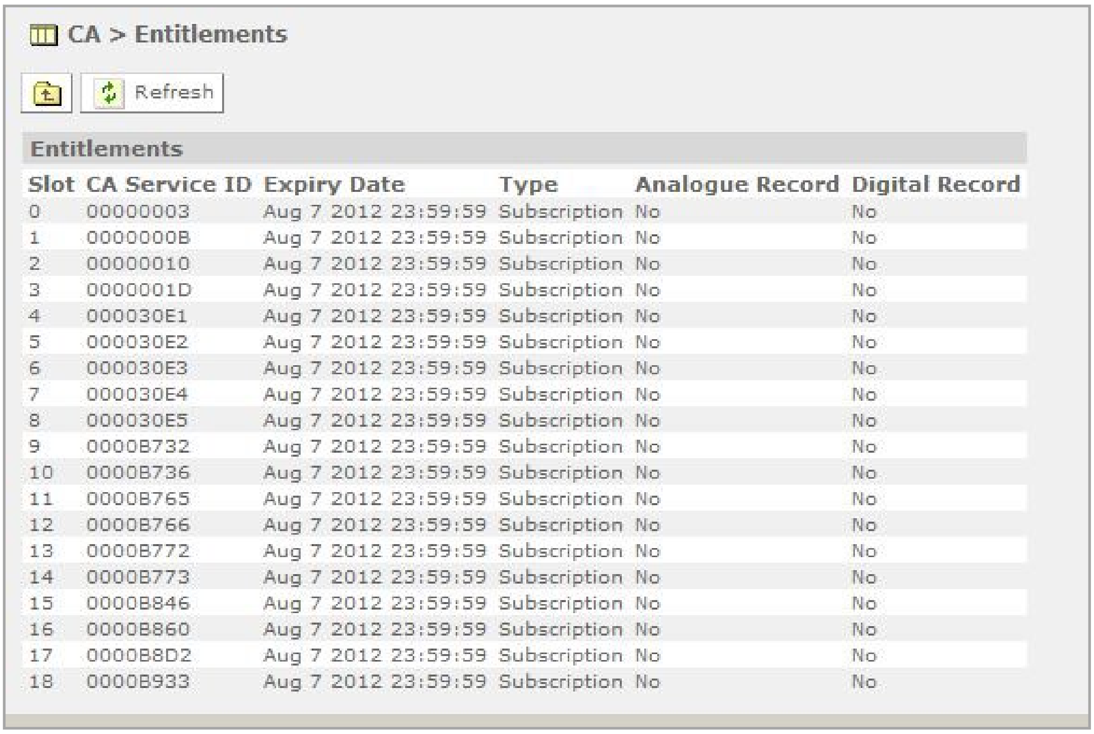
3.11.6.6.1. Service Status

- **CA Service Status** – This button accesses a further web page which details the status of the conditional access services being used.

3.11.6.6.2. NDS Entitlements

This page shows the current entitled services detected within the stream. This shows the service ID of the entitled service, the date of its expiry as well as the slot used to store this entitlement.

To view this page, select the **CA** tab on the web page.



CA > Entitlements

Refresh

Entitlements

Slot	CA Service ID	Expiry Date	Type	Analogue Record	Digital Record
0	00000003	Aug 7 2012 23:59:59	Subscription	No	No
1	0000000B	Aug 7 2012 23:59:59	Subscription	No	No
2	00000010	Aug 7 2012 23:59:59	Subscription	No	No
3	0000001D	Aug 7 2012 23:59:59	Subscription	No	No
4	000030E1	Aug 7 2012 23:59:59	Subscription	No	No
5	000030E2	Aug 7 2012 23:59:59	Subscription	No	No
6	000030E3	Aug 7 2012 23:59:59	Subscription	No	No
7	000030E4	Aug 7 2012 23:59:59	Subscription	No	No
8	000030E5	Aug 7 2012 23:59:59	Subscription	No	No
9	0000B732	Aug 7 2012 23:59:59	Subscription	No	No
10	0000B736	Aug 7 2012 23:59:59	Subscription	No	No
11	0000B765	Aug 7 2012 23:59:59	Subscription	No	No
12	0000B766	Aug 7 2012 23:59:59	Subscription	No	No
13	0000B772	Aug 7 2012 23:59:59	Subscription	No	No
14	0000B773	Aug 7 2012 23:59:59	Subscription	No	No
15	0000B846	Aug 7 2012 23:59:59	Subscription	No	No
16	0000B860	Aug 7 2012 23:59:59	Subscription	No	No
17	0000B8D2	Aug 7 2012 23:59:59	Subscription	No	No
18	0000B933	Aug 7 2012 23:59:59	Subscription	No	No

Figure 3-102 CA Entitlement Page (NDS CA Card fitted)

3.11.6.6.3. NDS Descrambler Window

This window shows all of the information regarding the NDS CA. Some of this information may be required by the broadcaster when updating entitlements into the unit.

- **Module Status** – This describes the presence of the module, this may be **PRESENT** or **NOT PRESENT.**
- **Descrambled Services** – This will feedback the number of services currently being descrambled by the card.

- **Number of Descrambled Components** – This will feedback the number of components currently being descrambled by the card.
- **CAS ID** – Provides the current CAS ID (CA System ID). The CA System ID indicates which CA Systems can descramble the selected service stream and is normally found within the CA descriptor of the service.
- **Active Boot Bank** – The S15441 card has 2 banks available to be used for code download. Code will always download into the inactive bank. This field shows the current active bank, either 0 or 1.
- **Alarms** – This is a general text field which describes any alarms generated by the card. These alarms are generated by fault conditions found by the NDS proprietary block of code. These alarms are:
- TS Not Locked.
- Smartcard Removed.
- Invalid Smartcard.
- Smartcard Comms Failure.
- Invalid Image.
- Invalid Image in Flash.
- Number of Elementary Stream > 8.
- Invalid PID Configuration.
- Processor Overload.
- NDS Card Not Accessible.
- **SW Version** – Describes the software version of the NDS CA Card.
- **SW Build Time** – Describes the software build time of the NDS CA Card.
- **FW Version** – Describes the firmware version of the NDS CA Card.
- **CA Verifier Status** – Displays the status provided by the Verifier NDS proprietary code block, this can have the values:
- OK.
- Insert Card.
- Invalid Card.
- Service Blocked.
- Invalid Packet.
- Not Authorized.
- Hardware Failure.
- Blacked Out.
- Invalid Card.
- Invalid Pairing.

- **NDS Pairing Key** – This is the unique pairing identification number of the S15441 card. It is a 16 digit number that is used to address the unit when any entitlements are changed. When entitlements are changed, this is carried out over air using uniquely addressed "Entitlement Messages". For the unit to receive these messages it recommended that it is left powered up and tuned to the correct BSkyB service.

NOTE: The NDS Pairing key must be supplied to BSkyB so that the unit may be paired. When contacting BSkyB for pairing issues please supply this number.

3.11.6.7. Front Panel

3.11.6.7.1. Alarms

This is a general text field which describes any alarms generated by the card. These alarms are generated by fault conditions found by the NDS proprietary block of code. These alarms are:

- TS Not Locked
- Smartcard Removed
- Invalid Smartcard
- Smartcard Comms Failure
- Invalid Image
- Invalid Image In Flash
- Number of Elementary Stream > 8
- Invalid PID Configuration
- Processor Overload
- NDS Card Not Accessible

```
NDS                         |ALARMS:
5.2.1                       |SMARTCARD REMOVED
```

3.11.6.7.2. CAS-ID

This menu displays the currently detected CAS-ID (or CA System ID) supplied to the unit by the CA system. The unit will use this ID to verify the CA type in the incoming Transport Stream. If a match is found, it should be possible to descramble components within the selected service.

```
NDS                         |CAS ID: 02401
5.2.2                       |
```

3.11.6.7.3. NDS Pairing Key

This menu displays the NDS Pairing Key for the unit. Note that this Pairing Key is actually assigned to the NDS card within the unit. If the card is changed then the Pairing Key will also be changed.

This Pairing Key is used at the head end to uniquely identify the unit and to target entitlements to it. As such when an upgrade to the units entitlements is requested this number must be quoted.

```
NDS                     |NDS PAIRING KEY:
5.2.3                   |1E9FFA2349057706E
```

3.11.7. Embedded NDS CA (Sky Italia)

3.11.7.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●				

3.11.7.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
MPEG2/4 HD/SD MODULAR RECEIVER FOR SKIT CA (RX8200/BAS/SKIT)	1923	FAZ 101 0113/71	RX8200/BAS/SKIT

3.11.7.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.11.7.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no software licenses associated with this feature.			

3.11.7.5. Functional Description

The SKIT variant of NDS CA is supported via the NDS Descrambler card. Unit descrambling for SKIT is carried out on this card and the descrambled output stream is then supplied to the motherboard for decoding and further processing.

The NDS Descrambler card contains secure features that allow descrambling to take place. As such only code that has been verified and signed by NDS may be loaded onto the card. If any unsigned code is downloaded to the card it may become unable to function and will need to be returned to MediaKind for recovery.

Once the card has been configured to be a SKIT variant it cannot be used with any other variant of NDS CA. Therefore, a SKIT variant NDS Descrambler card cannot be used for BSkyB descrambling, BSkyB signed code will not work with a SKIT variant of the card and should not be loaded onto the card.

This card will only fit into the RX8200 platform and is therefore not available in the RX8300 range of receivers.

3.11.7.6. Configuration

When the unit detects that the card has been fitted all Transport Streams will be routed through the card. Unscrambled Transport Streams will pass through without modification.
The RX8200 IRD will display a configuration and status web page for NDS descrambling.

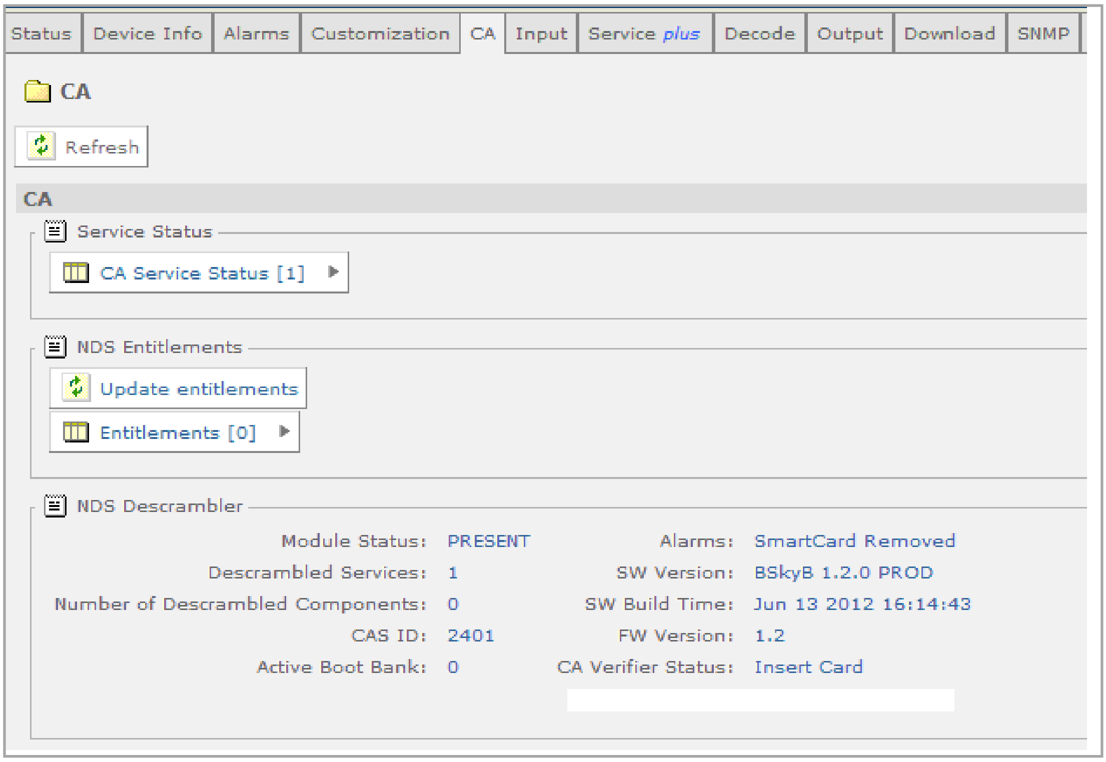


Figure 3-103 CA Web Page (NDS CA Card fitted)

There are no fields that may be edited by the user on this page. Selecting the **Refresh** button will ensure that the latest information is displayed from the current values of the equipment.

To view this page, select the **CA** tab on the web page. The following fields can be seen on the web interface:

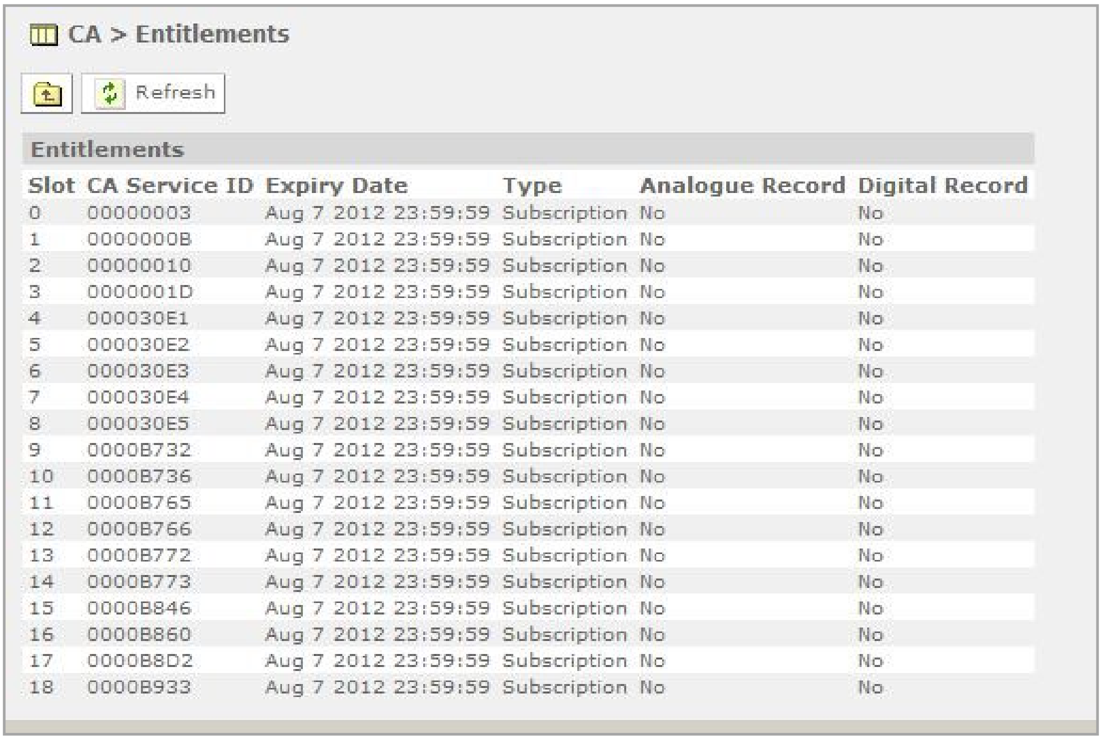
3.11.7.6.1. Service Status

- **CA Service Status** – This button accesses a further web page which details the status of the conditional access services being used.

3.11.7.6.2. NDS Entitlements

This page shows the current entitled services detected within the stream. This shows the service ID of the entitled service, the date of its expiry as well as the slot used to store this entitlement.

To view this page, select the **CA** tab on the web page.


CA > Entitlements

Refresh

Entitlements

Slot	CA Service ID	Expiry Date	Type	Analogue Record	Digital Record
0	00000003	Aug 7 2012 23:59:59	Subscription	No	No
1	0000000B	Aug 7 2012 23:59:59	Subscription	No	No
2	00000010	Aug 7 2012 23:59:59	Subscription	No	No
3	0000001D	Aug 7 2012 23:59:59	Subscription	No	No
4	000030E1	Aug 7 2012 23:59:59	Subscription	No	No
5	000030E2	Aug 7 2012 23:59:59	Subscription	No	No
6	000030E3	Aug 7 2012 23:59:59	Subscription	No	No
7	000030E4	Aug 7 2012 23:59:59	Subscription	No	No
8	000030E5	Aug 7 2012 23:59:59	Subscription	No	No
9	0000B732	Aug 7 2012 23:59:59	Subscription	No	No
10	0000B736	Aug 7 2012 23:59:59	Subscription	No	No
11	0000B765	Aug 7 2012 23:59:59	Subscription	No	No
12	0000B766	Aug 7 2012 23:59:59	Subscription	No	No
13	0000B772	Aug 7 2012 23:59:59	Subscription	No	No
14	0000B773	Aug 7 2012 23:59:59	Subscription	No	No
15	0000B846	Aug 7 2012 23:59:59	Subscription	No	No
16	0000B860	Aug 7 2012 23:59:59	Subscription	No	No
17	0000B8D2	Aug 7 2012 23:59:59	Subscription	No	No
18	0000B933	Aug 7 2012 23:59:59	Subscription	No	No

Figure 3-104 CA Entitlement Page (NDS CA Card Fitted)

3.11.7.6.3. NDS Descrambler Window

This window shows all of the information regarding the NDS CA. Some of this information may be required by the broadcaster when updating entitlements into the unit.

- **Module Status** – This describes the presence of the module, this may be **PRESENT** or **NOT PRESENT**.
- **Descrambled Services** – This will feedback the number of services currently being descrambled by the card.
- **Number of Descrambled Components** – This will feedback the number of components currently being descrambled by the card.
- **CAS ID** – Provides the current CAS ID (CA System ID). The CA System ID indicates which CA Systems can descramble the selected service stream and is normally found within the CA descriptor of the service.

- **Active Boot Bank** – The S15678 card has 2 banks available to be used for code download. Code will always download into the inactive bank. This field shows the current active bank, either 0 or 1.
- **Alarms** – This is a general text field which describes any alarms generated by the card, these alarms are generated by fault conditions found by the NDS proprietary block of code. These alarms are:
- TS Not Locked
- Smartcard Removed
- Invalid Smartcard
- Smartcard Comms Failure
- Invalid Image
- Invalid Image In Flash
- Number of Elementary Stream > 8
- Invalid PID Configuration
- Processor Overload
- NDS Card Not Accessible
- **SW Version** – Describes the software version of the NDS CA Card.
- **SW Build Time** – Describes the software build time of the NDS CA Card.
- **FW Version** – Describes the firmware version of the NDS CA Card.
- **CA Verifier Status –** displays the status provided by the Verifier NDS proprietary code block, this can have the values:
- OK
- Insert Card
- Invalid Card.
- Service Blocked
- Invalid Packet
- Not Authorized
- Hardware Failure
- Blacked Out
- Invalid Card
- Invalid Pairing

3.11.7.7. Front Panel

3.11.7.7.1. Alarms

This is a general text field which describes any alarms generated by the card. These alarms are generated by fault conditions found by the NDS proprietary block of code. These alarms are:

- TS Not Locked
- Smartcard Removed
- Invalid Smartcard
- Smartcard Comms Failure
- Invalid Image
- Invalid Image In Flash
- Number of Elementary Stream > 8
- Invalid PID Configuration
- Processor Overload
- NDS Card Not Accessible

```
NDS                          |ALARMS:
5.2.1                        |SMARTCARD REMOVED
```

3.11.7.7.2. CAS-ID

This menu displays the currently detected CAS-ID (or CA System ID) supplied to the unit by the CA system. The unit will use this ID to verify the CA type in the incoming Transport Stream. If a match is found, it should be possible to descramble components within the selected service.

```
NDS                          |CAS ID: 02401
5.2.2                        |
```

3.11.8. Signal Protection

3.11.8.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●				

3.11.8.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
This item is supplied with all units and cannot be ordered separately			

3.11.8.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.11.8.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/TTV	SIGNAL PROTECTION DESCRAMBLING LICENCE (RX8200/SWO/TTV)	FAZ 101 0113/58	RX8XXX/SWO/TTV

3.11.8.5. Functional Description

Signal Protection is a simple fixed key CA system, which works at the Transport Stream level. A single key is used to encrypt the entire Transport Stream. This key is supplied to the unit via a customization key, which is downloaded into the unit via the custom key entry on the units Customization tab.

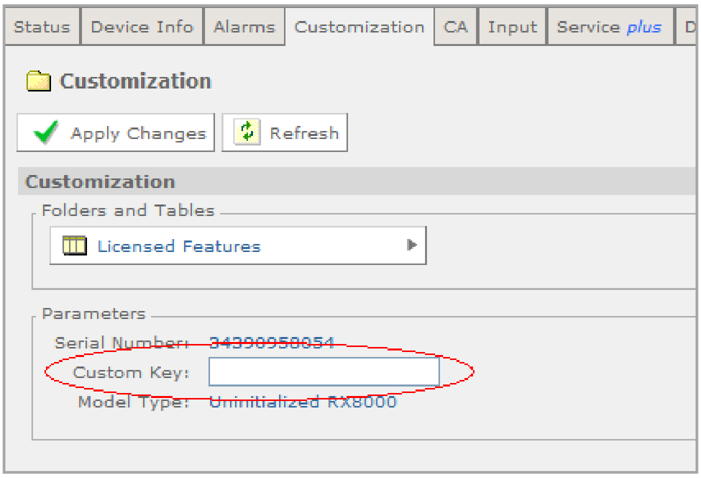


Figure 3-105 Custom Key Field

NOTE: MediaKind Customer Support must be contacted to supply the required customization key. Customer Support will require details of the system for which the key is required.

When the key has been entered the unit can be set into Signal Protection mode from the CA menu by selecting **Enable** from the TTV Signal Protection item on the CA tab.

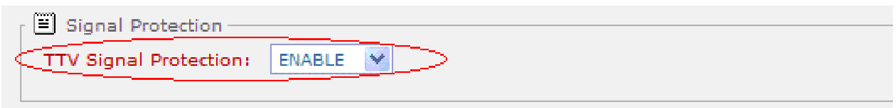


Figure 3-106 TTV Signal Protection Field

When the unit is in this mode, all Transport Streams entering the unit will have the Signal Protection key applied to them. This means only Transport Stream encrypted with this key will be usable by the unit. All other streams will be modified by this key and therefore cannot be correctly processed by the IRD.

3.11.8.6. Front Panel Setup

This control sets the unit into Signal Protection mode. In this mode all transport streams entering the unit will have the Signal Protection key applied to them. This means only Transport Stream encrypted with this key will be usable by the unit. All other streams will not be correctly passed through or decoded by the unit

```
CA                              |SIGNAL PROTECTION
5.6                             |DISABLE
```

3.11.9. DVB-S2 Gold Codes

3.11.9.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●	B	B		B

3.11.9.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
This item is only available on units fitted with S2 card RX8200/DVBS2/2 fitted into RX83XX from January 2012.			

3.11.9.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.11.9.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys required for this feature			

3.11.9.5. Functional Description

Gold codes (also known as the “Gold Sequence Number”) are built into the functionality of DVB-S2 and are designed to randomize/scramble the Physical Layer Frames just before being modulated to a DVB-S2 signal. To recover the scrambled frames after demodulation, the same Gold code must be entered in the IRD configuration.

This randomization is used to reduce signal correlation within a satellite link. This means the bandwidth of the satellite can be used in the most efficient manner. Also this provides a rudimentary form of Conditional Access whereby only a downlink that knows the Gold Code can use the Transport Stream.

To use this system, the Gold Code from the source modulator must be entered into the IRD **Gold Seq N (S2 Only)** menu item on the Input > Sat Input > Input 1…4.

NOTE: A different Gold Code can be provided for each satellite input.

The Gold Code or Gold Sequence Number is a decimal number within the range 0 – 262141 and is only used when the input is in DVB-S2 mode (not DVB-S).

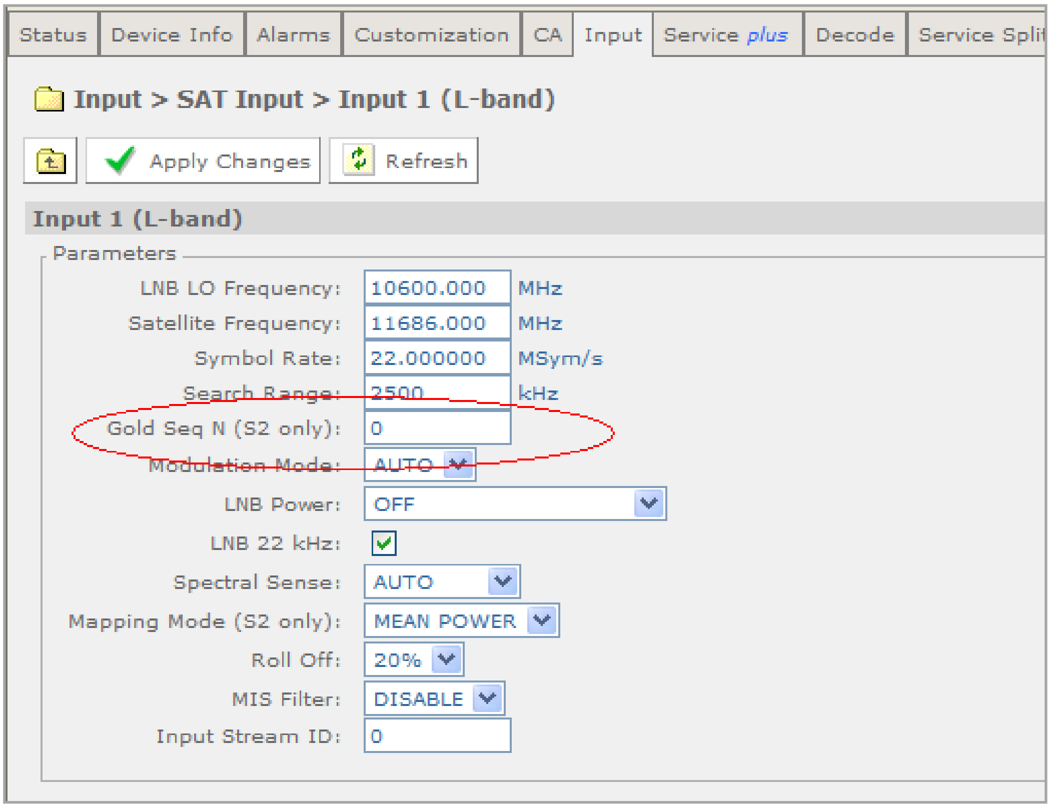


Figure 3-107 Gold Sequence N Field

3.11.9.6. Front Panel Setup

This sets the Gold Sequence Number needed to demodulate and decode a Gold Sequence randomized DVB-S2 transmission. The Gold Sequence must match that entered into the DVB-S2 modulator at the base station. A different Gold Code can be provided for each satellite input.

```
SOURCE X                 |GOLD SEQ N (S2 ONLY)
3.2.X.10                 |000000                     UNLOCKED
```

3.12. Services

3.12.1. Service Selection

Service can be selected using the **Service** ***plus*** page for quick configuration or the **Decode** page which provides more advanced configuration settings.

3.12.1.1. The Service Plus Page

The ***Service plus*** page exposes the Service Control Table which lists the details of all services detected in the input transport stream. For each service, and depending on the available hardware and software options, control and status information is provided.

To view this page, select the **Service** ***plus*** tab.

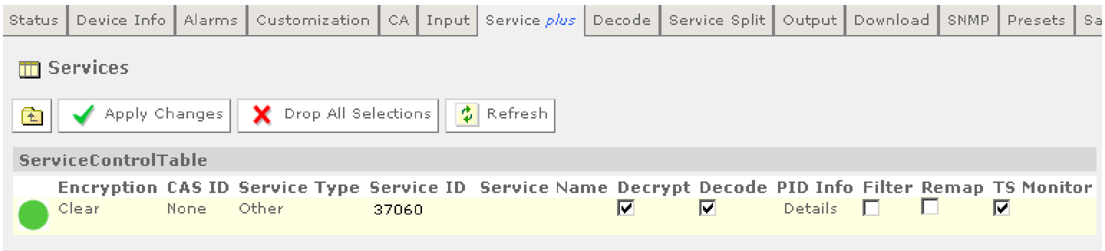


Figure 3-108 Service plus Web Page

- **Decrypt** – This option is used to enable a service for decryption. The number of services that can be selected at any time is determined by the hardware and software options. Refer to section **Error! Reference source not found. Error! Reference source not found.**.
- **Decode** – This option is used to enable a service for decode. As the IRD is a
single-service decoder, only one service can be selected.
- **PID Info** – Hovering over the **Details** text provides a breakdown of the component PIDs associated with that service. If **Remap** mode is enabled for the service, this column will display **Remap Config** which provides a link to the PID remapping configuration.
- **Filter** –This option is used in conjunction with the service filtering mode, as described in section **Error! Reference source not found. Error! Reference source not found.**.

- **Remap** – This option is used in conjunction with the service remap mode, as described in section **Error! Reference source not found. Error! Reference source not found.**.
- **TS Monitor** – This option is used in conjunction with the input TS monitoring function, as described in section **Error! Reference source not found. Error! Reference source not found.**.

Any changes which are made to the **Service** *plus* page may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

3.12.1.2. The Decode Page

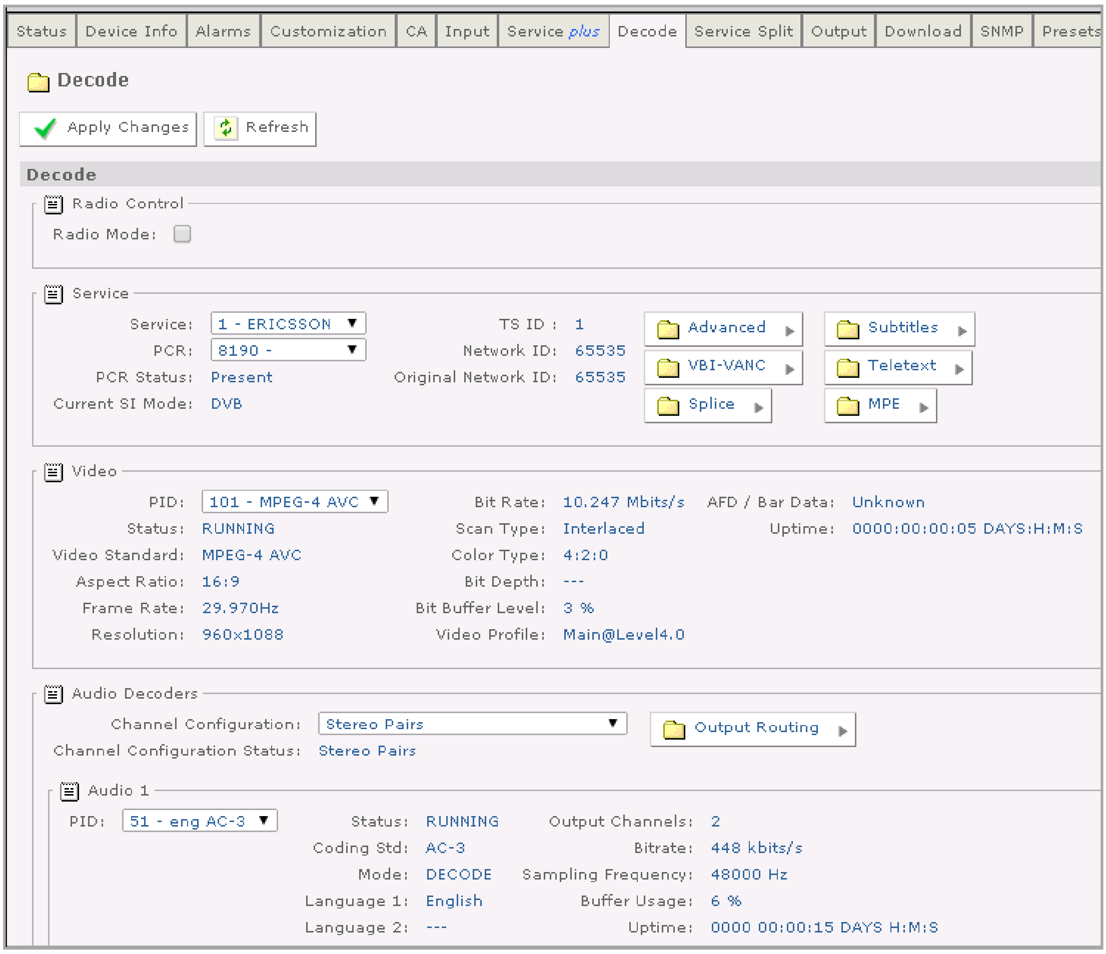


Figure 3-109 Decode Web Page

3.12.1.2.1. Service

- **Service** – Enables the selection of the decode service from the service list provided by the drop-down menu. The service list will comprise of the following:
- **NO SELECTION** – An entry in the list that clears the service selection and all PID selections associated with the service (no service will be selected for decoding / descramble).

- ***nnn* Service Name** – A list of Service ID numbers (nnn) and their associated Service names
- **PCR** – Enables the selection of the Program Clock Reference component from the component list provided by the drop-down menu. By default this is the PCR associated for the selected Decode Service. The component list will comprise of the following:
- **NO SELECTION** – An entry in the list that turns off component selection for the PCR.
- ***nnn*** – A list of PID numbers (nnn) found with the PCR descriptor tag.
- **0 - USER** – Allows selection of the PCR User PID defined in the *PCR User PID* field.
- **PCR Status** – Indicates the presence of PCR data on the selected PID.
- **Current SI Mode** – Displays the current assumed service type according to the incoming transport stream. This will be either DVB or ATSC.
- **TS ID** – Displays the Transport Stream Identifier for the acquired Transport Stream. This is acquired from the PAT and serves to label and identify the Transport Stream from any other within a network. Its value is user defined by the broadcaster.
- **Network ID** – Displays the Network Identifier for the acquired Transport Stream. This is specific to DVB SI and is contained within the NIT. This defines the current network broadcasting the Transport Stream. Allocations of these codes can be found in ETR162 [9].
- **Original Network ID** – Displays the Original Network Identifier for the acquired Transport Stream. This is specific to DVB SI and is contained within the SDT. This defines the network of origin for the Transport Stream, this might not be the same as the current Network ID.

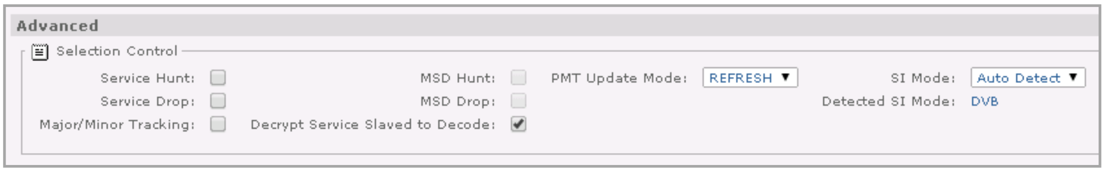


Figure 3-110 Decode > Advanced Web Page

3.12.1.2.2. Advanced > Selection Control

- **Service Hunt** – Place a check mark in this box to enable this mode. If the selected decode service is lost or none was selected, the unit will select the first video service from the available Service List. Note that this is processed in list order which is based on the PMTs listed in the PAT. See *Figure 3-111.*

NOTE: When a PMT appears (signaled by a PAT change) the receiver will update its Service List. For the service that is currently selected, its PMT is reviewed and as a consequence, each component decoder may be updated.

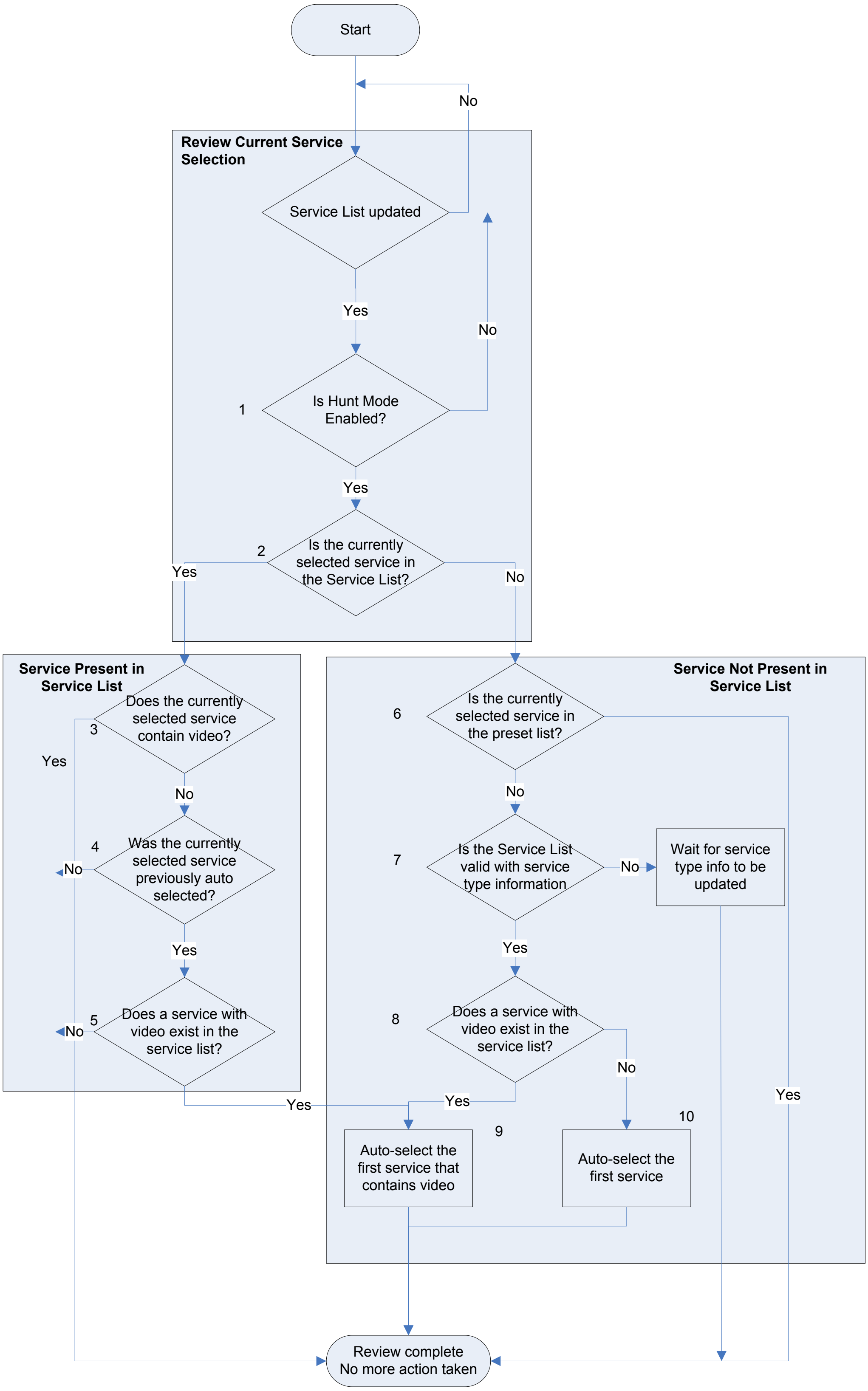


Figure 3-111 Hunt Mode Operation

- **Service Drop** – Place a tick in this box to enable this mode. If the unit has Hunt Mode enabled and Service Drop mode is enabled when a new PAT is detected, the unit will review the new Service List. If the current decode service selection is not in the Service List, the decode selection will be cleared. If Service Drop is disabled then the unit will hold onto its current selection until a new service is selected. See *Figure 3-112*.

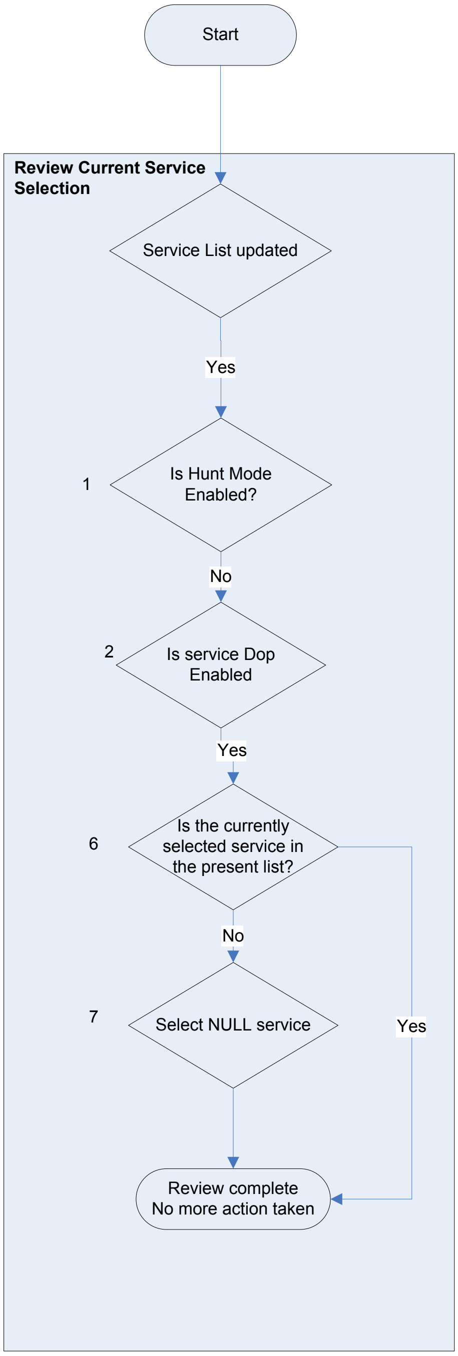


Figure 3-112 Service Drop Operation

- **Major / Minor Tracking** – Place a check mark in this box to enable this mode. When the unit is in this mode, the service will be selected / maintained using the major and minor channels referenced from the VCT within an ATSC PSIP (ATSC A/65) compliant Transport Stream. If this is not ticked the unit tracks the service by service ID from within the PAT. Within this pair the major channel is normally allocated by the FCC per broadcaster and the minor channel uniquely identifies the service, this means in practice the minor channel is used for tracking.

- **MSD Hunt** – Place a check mark in this box to enable this mode. When the unit is in this mode it will after first acquisition or update of the PAT, select every service within the PAT up to the maximum of 24 services for decryption. This can be confirmed on the ***Service plus*** page. The first service in the list will be set to ***decode***.

NOTE: This functionality is only available when the appropriate Multi-Service Descrambling license has been enabled for any of the following CA systems: BISS, DVB-CI or Director.

- **MSD Drop** – Place a check mark in this box to enable this mode. If *MSD Hunt* is enabled and *MSD Drop* is enabled when a new PAT is detected, the unit will review the new Service List. If the current selections are not in the service list those selections will be cleared. If *MSD Drop* is disabled, unit will hold onto all current selections until new services are selected. See *Figure 3-113.*

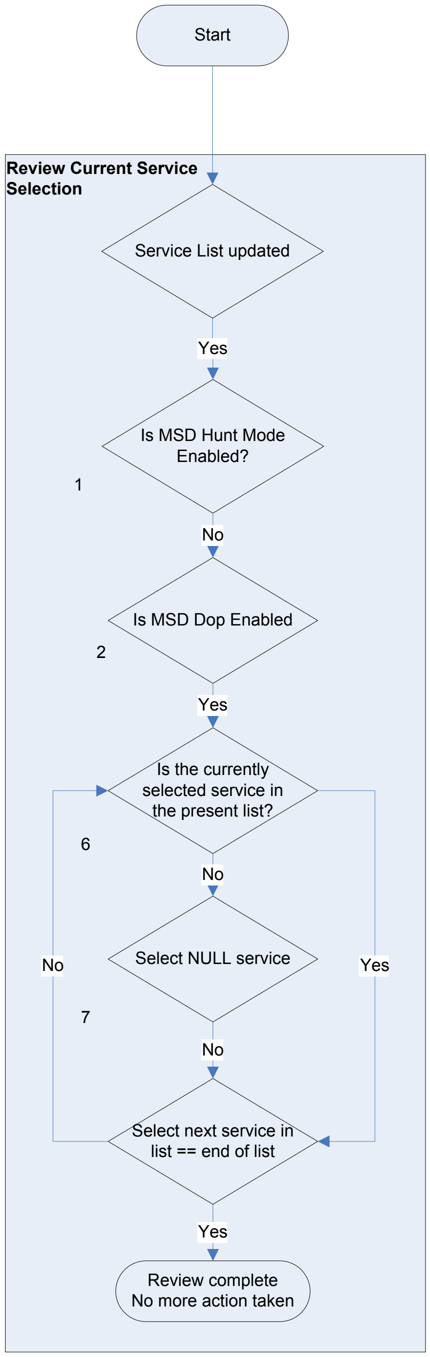


Figure 3-113 Multi Service Drop Mode

- **Decrypt Service Slaved to Decode** – When this option is enabled, selecting a new service for decode will automatically be selected for decryption too.
- **Single Filter Service Slaved to Decode** – When this option is enabled and a new service is selected for decode, services currently being filtered will be cleared and just the decoded service will be added to the Service Filter. This is regardless of the SINGLE or MULTI filter selection. Additional services for the Service Filter can be configured afterwards if necessary. The alarm "**MSF invalid operation**" will be raised in the case where **MULTI-SERVICE** filter mode is modified via SNMP control and the **Single Filter Service Slaved to Decode**

option is enabled. The alarm will be cleared when the IRD is rebooted or the follow option is disabled.

- **PMT Update Mode** – This item reviews PID selection after a PMT update for the currently selected decode service, see *Figure 3-114*. There are three PMT Update modes available:
- **SUSTAIN** – This is the default setting and behaves the same as the previous releases i.e. it takes in to consideration the current PID selection when deciding what PIDs to select and maintains it.
- **REFRESH** – On arrival of a new PMT this flushes the existing PID selections, except for USER PID type selections, before deciding which PIDs to select. In general PID selections are dependent on component order within the PMT.
- **FLUSH** – This mode is similar to **REFRESH** but flushes the PID selections when no PMT is received for 2 seconds.

NOTE: PMT Update Mode is a separate process to Hunt Mode. Hunt Mode handles the service selection, whilst PMT Update Mode handles the service component (PID) selection after the service has already been selected.

The PMT update method can be configured via the front panel, web interface or RCP control.

NOTE: If a new service has been selected either by the user or by the Hunt Mode operation, all existing PID selections are flushed when processing the PMT for the first time i.e. PID selections will be dependent on the PMT order initially.

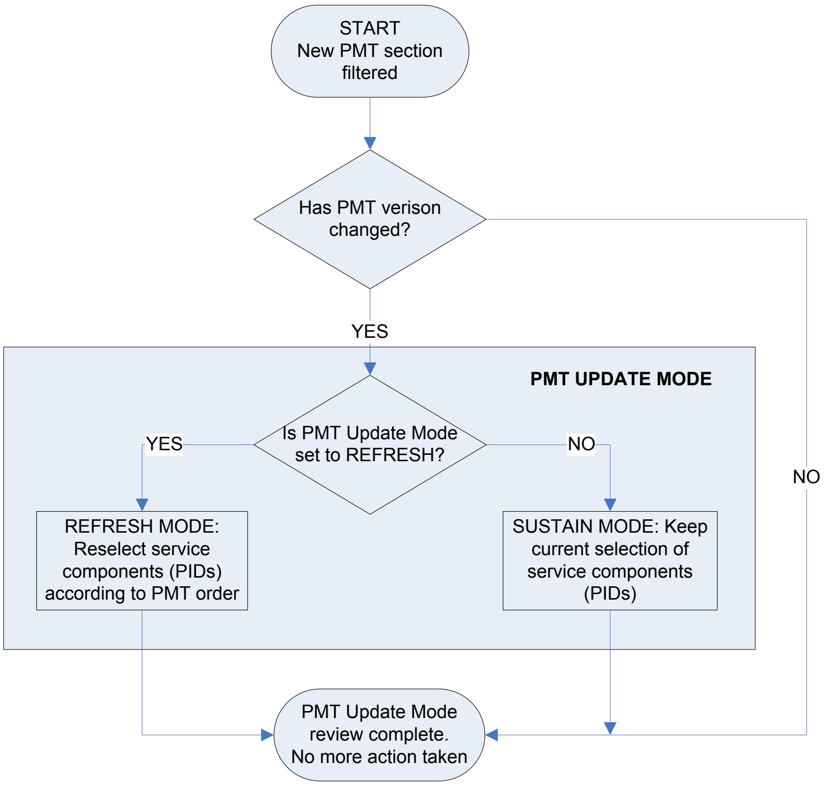


Figure 3-114 PMT Refresh Mode

- **SI Mode** – This menu selects the following options.
- **DVB:** The receiver will assume DVB table syntax and will only look for the appropriate tables on the appropriate PIDS for DVB SI.
- **ATSC:** The unit will only look for the appropriate tables on the appropriate PIDs for ATSC SI.
- **Auto Detect:** The unit will attempt to judge the SI type based upon the Transport Stream. Auto mode may fail to correctly navigate the SI when the SI has PIDS assigned to some of the private table PIDs for either ATSC or DVB.
- **Detected SI Mode** – Displays the SI mode detected from currently extracted SI tables. This will be DVB, ATSC or Unknown.

3.13. Video Selection and Control

All video aspects of the IRD can be controlled from the Decode web tab. The basic selection and status information can be found under the Video section of the main Decode tab.

More advanced features can be found under the **Advanced** sub page.

3.13.1. Video Configuration

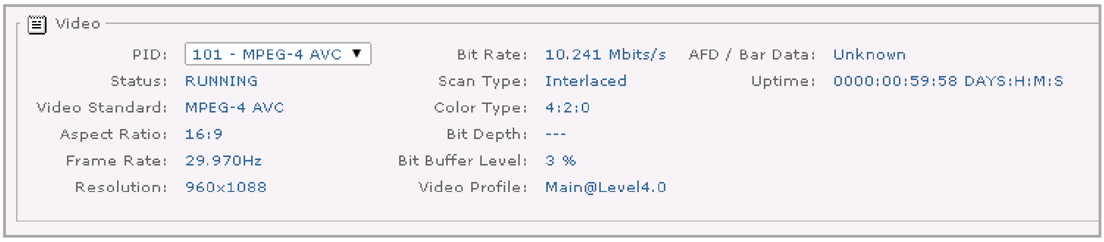


Figure 3-115 Video Configuration Under the Decode Web Page

3.13.1.1. Video Component Selection and Status

- **PID** – Enables the selection of the video component from the component list provided by the drop-down menu. By default this is the video associated for the selected Decode Service. The component list will comprise of the following:
- **NO SELECTION** – An entry in the list that turns off component selection for the video.
- ***nnn* xxxx** – A list of PID numbers (nnn) found with the video descriptor tag and its associated video coding standard (xxxx), i.e. MPEG-2, MPEG-4 , JPEG2000 or HEVC.
- ***nnn xxxx* USER** – Allows selection of the video User PID (nnn) and video coding standard (xxxx) that have been specified by the **User PID** and **User Std** fields of the **Advanced** sub page respectively.

NOTE: Switching between streams where the same video PID is used but has a different video coding standard is not recommended.

- **Status** – Displays the status of the video input. This has the values:
- **Running** – This status is seen when a valid video component has been selected, the necessary license for the video coding standard of the incoming video is present and the video decoder reports successful decode.
- **Stopped** – This status is seen when no video component is selected.
- **Configuring** – This status is seen when a valid video component has been selected, but the video decoder is being prepared to start the decode.
- **Error** – This status is seen if a video component has been selected but the video decoder does not report a successful decode or the component is not present in the stream, this may also be due to the video being an unknown video coding standard.
- **Unlicensed** – This status is seen when a video component is selected but the necessary license for the video coding standard of the incoming video has not been enabled or purchased. The unit will output a blue blanking frame in this instance.
- **Unsupported Conversion** – This status is seen when a video component is selected and the necessary license for the video coding standard of the incoming video is present but conversion of the incoming video standard set by the **Video Output Mode** is not supported, e.g. incoming SD video being converted to 1080p output. This may also depend on whether the 4:2:2 Decoder Option card is in use or the Base Decoder. When in this state, the unit will output a blue blanking frame.
- **Unsupported Resolution** – This status is seen when a video component is selected and the necessary license for the video coding standard of the incoming video is present but the resolution of the incoming video is not a resolution supported by the IRD. Refer to *Annex B, Technical Specification, section B.1.1.2* for a list of the resolutions supported by the receiver. When in this state, the unit will output a blue blanking frame at the last supported video resolution.
- **Unsupported Standard** – This status is seen when a video component is selected and the necessary license for the video coding standard of the incoming video is present but the IRD cannot decode the video. Typically this status will be seen if the 4:2:2 Decoder Option Card is required to perform the decode and it is performing its power on initialization. If this status is still seen 2 minutes after power has been applied to the IRD, check that the unit has the necessary software installed. When in this state, the unit will output a blue blanking frame.
- **Video Standard** – Displays the video coding standard detected on the video input. The current recognized standards are:
- MPEG-2
- MPEG-4 AVC
- JPEG2000

- HEVC
- **Aspect Ratio** – Displays the incoming aspect ratio, this is supplied by the video sequence header information within the Transport Stream. This is not the output aspect ratio (This is defined by the **Screen Aspect Ratio** menu option). This can have the values:
- UNKNOWN
- 16:9
- 4:3
- 221:1
- SQUARE
- EXTENDED
- **Frame Rate** – Displays the incoming frame rate, this is supplied by the video sequence header information, this will be the same as the output frame rate because this unit does support frame-rate conversions. This can have the values:
- 23.976
- 24
- 25
- 29.97…
- 30
- 50
- 59.94…
- 60
- **Resolution** – Displays the incoming resolution, this is supplied by the video sequence header information notably the horizontal_size and vertical_size, this may not be the same as the output resolution if down or up conversion features have been enabled.
- **Bit Rate** – Displays the input video bit rate (in Mbps) detected by demux process for the PID supplied to the video decoder.
- **Scan Type** – Displays the scan type detected by the unit, this is derived from the resolution and frame rate provided in the sequence header information.
- **Color Type** – Displays the color type as defined in the chroma_format in the sequence extension of the video stream, this can have the values:
- 4:2:0
- 4:2:2
- 4:4:4 (This is not supported by the IRD)
- **Bit Buffer Level** – Displays the bit buffer level as a percentage This is the fill level of the input PES buffer to the video decoder, this buffer contains the compressed video data to be decoded by the video decoder. Under normal operation the buffer can appear almost empty, a level of above 2% can be classed as normal.

- **AFD/Bar Data** – Displays the Active Format Descriptor / Bar Data used to override manual setup of aspect ratio during down-conversion. The AFD is extracted from the video header. This can have the values:
- "0000 Reserved : 16:9 -> 4:3 Letterbox".
- "0001 Reserved : 16:9 -> 4:3 Letterbox".
- "0010 box 16:9 (top) : 16:9 -> 4:3 Letterbox".
- "0011 box 14:9 (top) : 14:9 -> 4:3 Letterbox".
- "0100 box 16:9 (center) : 16:9 -> 4:3 Letterbox".
- "1000 As the coded frame : 16:9 -> 4:3 Letterbox".
- "1001 4:3 (center) : 16:9 -> 4:3 Center Cutout".
- "1010 16:9 (center) : 16:9 -> 4:3 Letterbox".
- "1011 14:9 (center) : 14:9 -> 4:3 Letterbox".
- "1101 4:3 (with 14:9 center) : 16:9 -> 4:3 Center Cutout".
- "1110 16:9 (with 14:9 center) : 16:9 -> 4:3 Letterbox".
- "1111 16:9 (with 4:3 center) : 16:9 -> 4:3 Center Cutout".
- All other values are shown as "Unknown".
- **Uptime** – The Uptime field is a read-only field that reports the Video Decoder uptime (expressed in Days : Hours : Minutes : Seconds) at which the Video Decoder has been successfully decoding, or has remained in the **RUNNING** state. If the Video Decoder changes to a different state such as **ERROR** then the uptime will remain reset to zero. The uptime will start counting from zero once the Video Decoder state is set to **RUNNING**.

3.13.1.2. Front Panel Setup

3.13.1.2.1. Video Status

This menu allows the user to view the status of the video decoder

VIDEO 8.4.1	STATUS ERROR

This has the values as described above:

- RUNNING
- STOPPED
- CONFIGURING
- ERROR
- UNLICENSED
- UNSUPPORTED CONVERSION
- UNSUPPORTED RESOLUTION
- UNSUPPORTED STANDARD

3.13.1.2.2. Video Standard

This menu allows the user to view the current standard detected by the video decoder

```
VIDEO                          |VIDEO STANDARD
8.4.2                          |MPEG-2
```

This has the values as described above:

- MPEG-2
- MPEG-4 AVC
- JPEG2000
- HEVC

3.13.1.2.3. Aspect Ratio

This menu allows the user to view the current aspect ratio detected by the video decoder

```
VIDEO                          |ASPECT RATIO
8.4.3                          |UNKNOWN
```

This has the values as described above:

- UNKNOWN
- 16:9
- 4:3
- 221:1
- SQUARE
- EXTENDED

3.13.1.2.4. Frame Rate

This menu allows the user to view the current input frame rate detected by the video decoder. This will be the same as the output frame rate because the unit does not support frame-rate conversion.

```
VIDEO                          |FRAME RATE
8.4.3                          |0HZ
```

This can be any of the following values:

- 0 (no video detected)
- 23.976
- 24
- 25
- 29.97…
- 30
- 50

- 59.94…
- 60

3.13.1.2.5. Resolution

This menu allows the user to view the current input resolution detected by the video decoder, this may not be the same as the output resolution depending upon up-conversion and down-conversion settings.

```
VIDEO                  |RESOLUTION
8.4.5                  |0X0
```

This is read and displayed directly from the information of the incoming video sequence header information, notably the horizontal_size and vertical_size fields. A size of 0x0 means no video has been detected.

3.13.1.2.6. Bit Rate

This menu allows the user to view the current video bit rate detected by the demux process for the currently selected video stream.

```
VIDEO                  |BIT RATE
8.4.6                  |0.000 MBPS
```

3.13.1.2.7. Scan Type

This menu allows the user to view the scan type for the incoming video material.

```
VIDEO                  |SCAN TYPE
8.4.7                  |INTERLACED
```

This will be either:

- PROGRESSIVE
- INTERLACED

3.13.1.3. Advanced Video Configuration

The video section of the **Advanced** sub tab exposes the advanced video features supported by the unit. The following sections briefly describe these features but further sections will describe these features in greater detail.

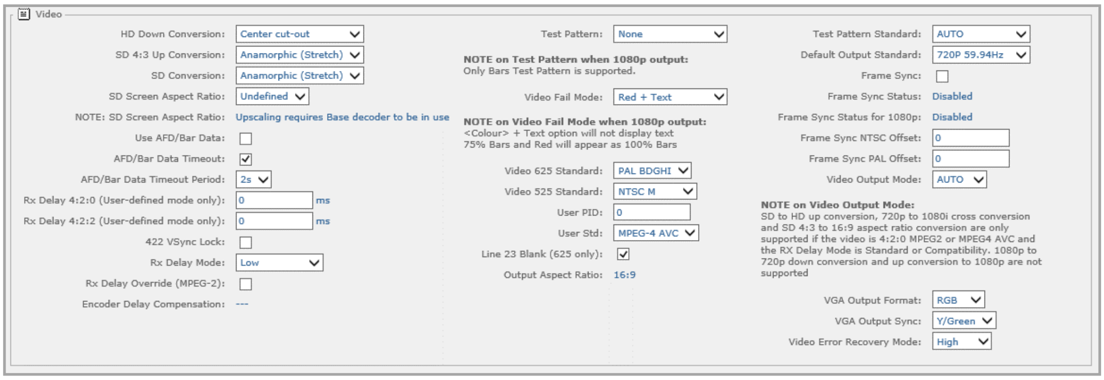


Figure 3-116 Advanced Video Features

- **HD Down Conversion** – Configures how the video should be down-converted and has the following options. Refer to section *3.13.4 Video Conversion.*
- Anamorphic (Stretch)
- Center cut-out
- Letterbox
- **SD 4:3 Up Conversion –** Configures how the video should be up-converted and has the following options. Refer to section *3.13.4 Video Conversion.*
- Anamorphic (Stretch)
- Center cut-out
- Letterbox
- **SD Conversion** – Configures how the video should be up-converted and has the following options. Refer to section *3.13.4 Video Conversion*.
- Anamorphic (Stretch)
- Pillarbox/Letterbox
- Center cut-out
- 14:9 (Combined)
- Disabled

NOTE: Selecting the **SD Conversion** option **14:9 (Combined)** and the **SD Screen Aspect Ratio** option 16:9 will not work when decoding a SD video service that has a 4:3 aspect ratio.

- **SD Screen Aspect Ratio** – Configures the outgoing SD aspect ratio and has the following options. Refer to section *3.13.4 Video Conversion.*
- 16:9
- 4:3
- Undefined
- **Use AFD/Bar Data** – If enabled the down-converted SD aspect ratio will be set according the Active Format Descriptor. Refer to section *3.13.4 Video Conversion.*

- **AFD/Bar Data Timeout** – Handles when AFD is not detected AFD/Bar Data Timeout Period. Refer to section 3.13.4 Video Conversion.
- **AFD/Bar Data Timeout Period** – Defines the period in seconds before the receiver determines that AFD is no longer detected. Refer to section *3.13.4 Video Conversion.*
- **Rx Delay 4:2:0 (User-defined mode only)** – Defines the system delay within the unit when decoding with the Base Decoder. This is useful if the operator wishes to reduce the overall system delay or, increase the system delay to allow buffers to fill up and prevent underflow. Refer to section *3.13.5,* Receiver Delay*.*
- **Rx Delay 4:2:2 (User-defined mode only)** – Defines the system delay within the unit when decoding with the Decoder 4:2:2 card. This is useful if the operator wishes to reduce the overall system delay or, increase the system delay to allow buffers to fill up and prevent underflow. Refer to section *3.13.5,* Receiver Delay*.*
- **422 VSync Lock** – This option only applies when the 4:2:2 Decoder Option card is active and decoding. When checked, it ensures that the picture output time (as determined by the PTS) is within 5 ms of the output's Vertical Sync signal. If the difference between the two is greater than 5 ms, it will halt and realign the picture output. This option should be checked to provide the lowest possible end-to-end video delay.
- **Rx Delay Mode** – This option selects between a set of pre-defined System Delays. Refer to section 3.13.5, Receiver Delay.
- **Standard** – The default pre-defined system delay optimized for most encoded streams.
- **Compatibility** – This pre-defined system delay increases overall delay to guarantee smooth decoding for some encoded streams.
- **Low** – This pre-defined system delay reduces the overall delay. Requires Software License option.
- **Mega Low** – This pre-defined system delay reduces the overall delay. Requires Software License option.
- **User-Defined** – Applies the user defined **Rx Delay 4:2:0** or **Rx Delay 4:2:2** values to the system delay.

NOTE: Apart from User-defined, RX Delay Modes are not applicable to JPEG 2000 encoded streams. For JPEG 2000, the lowest possible delay is always used

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- **Rx Delay Override (MPEG-2)** – Enabling this option overrides the Rx Delay Mode selection to **Compatibility** for MPEG-2. It does not affect H.264 settings.
- **Encoder Delay Compensation** – This status field gets updated to **PRESENT** when the IRD is configured for 3D operation. (Requires the software license RX8200/SWO/3D)
- **Test Pattern** – Overrides the video output of the unit with the selected Test Pattern mode. Refer to section *3.13.6, Test Patterns*.

- **Video Fail Mode** – Configures the Fail Mode video output screen to applied when the Video Decoder is not in the **RUNNING** state. Refer to section *3.13.8, Fail Modes*.

NOTE: For 1080P, only a subset of the **Video Fail Modes** are supported.

- **Video 625 Standard** – Configures the video standard for the composite output for 625 line video. Refer to section 3.13.7, Video Standards Control.
- **Video 525 Standard** – Configures the video standard for the composite output for 525 line video. Refer to section 3.13.7, Video Standards Control.
- **User PID** – Defines the PID value to be used as the Video User PID selection and is used in conjunction with the **User STD** selection.
- **User Std** – Defines the video coding standard to be used in conjunction with the Video User PID selection.
- MPEG-2
- MPEG-4 AVC
- JPEG-2000
- HEVC
- **Line 23 Blank (625 only)** – If enabled, the unit will blank the output of line 23 for 625 line video. If disabled, line 23 will be passed-through. This may be useful for clearing WSS for example.
- **Test Pattern Standard** – Defines the video resolution and frame-rate for the video output when the **Test Pattern** is applied. Refer to section *3.13.6, Test Patterns*.
- **Default Output Standard** – Defines the video resolution and frame-rate for the video output when the IRD is booting up. This is particularly where there is no service selected and the unit is generating a Fail Mode screen.
- **Frame Sync** – Enables or disables Frame-Sync mode. Refer to section 3.13.9, Frame Sync.
- **Frame Sync Status** – Reports the current Frame-Sync status. Refer to section 3.13.9, Frame Sync.
- **Frame Sync Status for 1080p** – Reports the current Frame-Sync status when decoding 1080p video formats. Refer to section *3.13.9, Frame Sync*.
- **Frame Sync NTSC Offset** – Offsets the video sync timing when the IRD is locked to a NTSC frame-sync source. Refer to section *3.13.9, Frame Sync*.
- **Frame Sync PAL Offset** – Offsets the video sync timing when the IRD is locked to a PAL frame-sync source. Refer to section *3.13.9, Frame Sync*.
- **Video Output Mode** – Sets the video output standard so that the source video resolution is maintained, down-converted or even up-converted. Refer to section *3.13.7, Video Standards Control*.

- **VGA Output Format** – Configures the signals for the 15-Pin Component Video output connector. Refer to section *3.18.2,* VGA Component Output.
- **VGA Output Sync** – Configures the output sync signals for the 15-pin Component video connector. Refer to section *3.18.2,* VGA Component Output.
- **Video Error Recovery Mode** – Determines how the video decoder handles errors in the input data stream with visual consequences on the output. This mode applies to the **Base Decoder** only and has no effect on the 4:2:2 Decoder card.
- **Normal:** This is the default setting for the IRD and recommended for most video streams. When handling errors from the input stream, allows the video output to remain fluid but not all video errors are concealed.
- **High:** When handling errors from the input stream, filters out video errors before the decode and thereby better conceals errors. The trade-off however is that the video may appear jerky due to long frozen frames. This mode better prevents the decoder from crashing due to errors in the stream.

3.13.2. Video Formats Supported

3.13.2.1. Availability

● = Software License Option; **B** = Supplied with Base Model; † = Additional Hardware Option required

	RX8200	RX8310	RX8315	RX8320	RX8330
SD MPEG-2 4:2:0	●	●	●	B	●
HD MPEG-2 4:2:0	●	●	●	B	●
SD MPEG-2 4:2:2	●†				
HD MPEG-2 4:2:2	●†				
SD MPEG-4 AVC 4:2:0	●	●	●	●	●
HD MPEG-4 AVC 4:2:0	●	●	●	●	●
SD MPEG-4 AVC 4:2:2	●†				
HD MPEG-4 AVC 4:2:2	●†				
SD JPEG-2000 4:2:0 / 4:2:2	●†				
HD JPEG-2000 4:2:0 / 4:2:2	●†				
SD HEVC	●†				
HD HEVC	●†				
SD HEVC 4:2:2	●†				
HD HEVC 4:2:2	●†				

3.13.2.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
MPEG-2 4:2:2 Decode Card (First Generation)	1920	FAZ 101 0113/15	RX8200/HWO/MP2/422
MPEG-4 4:2:2 Decode Card with MPEG-2 (Second Generation)	1921	OBSOLETE	RX8200/HWO/MP4/422
Multi-format 4:2:2 Decode Card (Third Generation)	1933	FAZ 101 0113/157	RX8200/HWO/J2K/MP24
Enhanced multi-format (HEVC 4:2:2 1080p) Decode Card (Fourth Generation)	1936	FAZ 1010113/218	RX8200/HWO/HEVC

3.13.2.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.2.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/MP2/422/SD	MPEG-2 SD 4:2:2 Decoding	FAZ 101 0113/59	RX8200/SWO/MPEG2/SD/422
RX8200/SWO/MP2/HD/422	MPEG-2 HD and SD 4:2:2 Decoding	FAZ 101 0113/39	RX8200/SWO/MPEG2/HD/422
RX8200/SWO/MP4/422/SD	MPEG-4 SD 4:2:2 Decoding	FAZ 101 0113/43	RX8200/SWO/MPEG4/SD/422
RX8200/SWO/MP4/422/HD	MPEG-4 HD and SD 4:2:2 Decoding	FAZ 101 0113/42	RX8200/SWO/MPEG4/HD/422
RX8200/SWO/J2K/HD	JPEG2000 HD and SD Decoding	FAZ 101 0113/182	RX8200/SWO/J2K/HD
RX8200/SWO/MP24/HEVC/SDHD	MPEG-2, MPEG-4 AVC, HEVC HD and SD Decoding	FAZ 101 0113/220	RX8200/SWO/MPEG2/HD & RX8200/SWO/MPEG4/HD & RX8200/SWO/HEVC/HD
RX8200/SWO/HEVC/422/SD/HD	HEVC HD and SD 4:2:2 Decoding	FAZ 101 0113/221	RX8200/SWO/MPEG2/HD/422 & RX8200/SWO/MPEG4/HD/422 & RX8200/SWO/HEVC/HD/422

3.13.2.5. Functional Description

The RX8200 offers a vast and sophisticated array of configuration possibilities allowing it to cover a broad range of applications. The RX8200 can be tailored to standard definition or high definition uses with MPEG-2, MPEG-4 AVC, JPEG-2000 and HEVC decode technology in both 4:2:0 and 4:2:2 modes.

The RX8300 range can be tailored to decode standard definition or down-convert high definition video that uses the MPEG-2 or MPEG-4 AVC formats but restricted to 4:2:0 video standards only.

3.13.2.5.1. Base Decoder (4:2:0 Only)

The Base Decoder card can support decode of 4:2:0 video formats encoded with MPEG-2 or MPEG-4 AVC.

This is fitted as standard to all RX8000 models.

3.13.2.5.2. First Generation 4:2:2 Decoder Card (MPEG-2 Only)

The first generation 4:2:2 Decoder card can support decode of SD and HD 4:2:0 and 4:2:2 video encoded with the MPEG-2 format only.

This hardware option is only available on the RX8200.

3.13.2.5.3. Second Generation 4:2:2 Decoder Card (MPEG-2/MPEG-4 AVC Only)

The second generation 4:2:2 Decoder Card can support decode of 4:2:0 and 4:2:2 video formats encoded with MPEG-2 or MPEG-4 AVC.

This card has more power draw than the first generation 4:2:2 Decoder card so can only be fitted to the RX8200 that has been upgraded with a higher rated power supply (RX8200/BAS/2 Hardware Base).

This hardware option is only available on the RX8200.

NOTE: With the appropriate software and licenses, this card can be used to perform a
JPEG-2000 decode rather than MPEG-2/MPEG-4 AVC. This is only supported by software version 5.16.3 release.

3.13.2.5.4. Third Generation 4:2:2 Card (Multi-Format Decoder)

The third generation 4:2:2 Decoder Card can support decode of SD and HD 4:2:0 and 4:2:2 video encoded with MPEG-2 or MPEG-4 AVC format. For MPEG-4 AVC, decode of 1080P50/60 is also supported. It can also support the decode of SD and HD JPEG-2000 or HEVC video formats. If suitably configured and licensed, it will automatically switch between these four formats.

This card also improves on the previous generation card as it does not require as much power to function and therefore can be fitted to any RX8200 Hardware Base.

This hardware option is only available on the RX8200.

3.13.2.5.5. Fourth Generation 4:2:2 Card (Enhanced Multi-Format Decoder)

The fourth generation 4:2:2 Decoder Card can support decode of 4:2:0 and 4:2:2 video formats encoded with MPEG-2, MPEG-4 AVC or HEVC. For all formats, SD and HD decode is supported, with 1080P50/60 support for both MPEG-4 AVC and HEVC. If suitably configured and licensed, it will automatically switch between these three formats.

As with the third generation card, it can be fitted to any RX8200 Hardware Base.

This hardware option is only available on the RX8200.

3.13.2.6. 1080p Video Support

The second, third and fourth generation 4:2:2 Decoder Cards support MPEG-4 AVC 1080p decode. The fourth generation 4:2:2 Decoder Card also supports HEVC 1080p decode.

3.13.2.7. Summary of Video Formats Supported

The Base Decoder is fitted to all RX8000 models and supports 4:2:0 video formats only. The 4:2:2 Decoder card is required for 4:2:2 video decode and support for JPEG-2000 or HEVC decode. Early generations of the 4:2:2 Decoder card support a limited number of video formats but the range of formats and features has increased with each generation. The table summarizes those features supported.

Table 3-15 Supported Video Formats

● = Supported Option

	Base Decoder	First Generation 4:2:2 Decoder	Second Generation 4:2:2 Decoder (MPEG-2/MPEG-4 AVC)	Third Generation 4:2:2 Decoder	Fourth Generation 4:2:2 Decoder
RX8200/BAS	●	●		●	●
RX8200/BAS/2	●	●	●	●	●
RX83xx	●				
SD MPEG-2 4:2:0	●	●	●	●	●
HD MPEG-2 4:2:0	●	●	●	●	●
SD MPEG-2 4:2:2		●	●	●	●
HD MPEG-2 4:2:2		●	●	●	●
SD MPEG-4 AVC 4:2:0	●		●	●	●
HD MPEG-4 AVC 4:2:0	●		●	●	●
3G MPEG-4 AVC 4:2:0			●	●	●
SD MPEG-4 AVC 4:2:2			●	●	●
HD MPEG-4 AVC 4:2:2			●	●	●
3G MPEG-4 AVC 4:2:2			●	●	●

	Base Decoder	First Generation 4:2:2 Decoder	Second Generation 4:2:2 Decoder (MPEG-2/MPEG-4 AVC)	Third Generation 4:2:2 Decoder	Fourth Generation 4:2:2 Decoder
SD JPEG-2000 4:2:0				●	
HD JPEG-2000 4:2:0				●	
SD JPEG-2000 4:2:2				●	
HD JPEG-2000 4:2:2				●	
SD HEVC 4:2:0				●	●
HD HEVC 4:2:0				●	●
3G HEVC 4:2:0					●
SD HEVC 4:2:2				●	●
HD HEVC 4:2:2				●	●
3G HEVC 4:2:2					●

3.13.2.8. Card Identification

Where fitted to the IRD, the card generation of the 4:2:2 Decoder can be determined by referring to the **Device Info > Modules** page in the web browser. *Table 3-16* indicates how the fields will be labeled.

Table 3-16 Identifying the 4:2:2 Decoder fitted

Generation of 4:2:2 Decoder Card	Board Type	HW-ID
First Generation	1920	1.?.?
Second Generation	1921	2.?.?
Third Generation	1933	3.?.?
Fourth Generation	1936	4.?.?

Additionally, the text displayed for the module Name indicates the standards that the card and licenses permit, e.g. a name of “MPEG2/4 HEVC Decoder 4:2:2” indicates that the card supports MPEG-2, MPEG-4 AVC and HEVC decode.

3.13.3. Ultra HD (4K) Contribution Support

3.13.3.1. Availability

● = Software License Option **B** = Supplied with Base Model † = Additional Hardware Option required

	RX8200	RX8310	RX8315	RX8320	RX8330
4K Configuration Support	●†				

NOTE: Four IRDs are required to synchronize a 4K video output, a single IRD does not support 4K video.

3.13.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
MPEG-4 4:2:2 Decode Card with MPEG-2 (Second Generation)	1920	OBSOLETE	RX8200/HWO/MP4/422
Multi-format 4:2:2 Decode Card (Third Generation)	1921	FAZ 101 0113/157	RX8200/HWO/J2K/MP24
Enhanced multi-format (HEVC 4:2:2 1080p) Decode Card (Fourth Generation)	1936	FAZ 1010113/218	RX8200/HWO/HEVC
HD Output Card + 1xCVBS, 1xRGB, 3x3G-SDI connectors	1915	FAZ 101 0113/10	RX8200/HWO/HD/3G
HQ Down-Conversion	1930	FAZ 101 0113/60	RX8200/HWO/HQDCONV

3.13.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/MP2/HD/422	MPEG-2 HD and SD 4:2:2 Decoding	FAZ 101 0113/39	RX8200/SWO/MPEG2/HD/422

RX8200/SWO/MP4/422/HD	MPEG-4 HD 4:2:2 Decoding	FAZ 101 0113/42	RX8200/SWO/MPEG4/HD/422
RX8200/SWO/3D	Simul-Sync 3D License	FAZ 101 0113/61	RX8200/SWO/3D
RX8200/SWO/FSYNC	Frame-Sync License	FAZ 101 0113/33	RX8200/SWO/FSYNC
RX8200/SWO/LDELAY	Low Delay License	FAZ 101 0113/38	RX8200/SWO/LDELAY
RX8200/SWO/HDSDI/3G	MPEG-4 HD 4:2:2 1080p 50/60 Decoding	FAZ 101 0113/34	RX8200/SWO/HDSDI/3G

3.13.3.5. Functional Description

Contribution of 4K UHDTV is possible by utilizing MediaKind AVP 2000 Encoders and RX8200 IRDs. The 4K picture is split in to four 1920x1080 quadrants and encoded by the AVP2000 encoders to produce a 4 Service MPTS that can then be transmitted.

At the next stage four RX8200 IRDs are required for decoding, one for each quadrant. Each IRD will output a 3G-SDI signal.

These four 3G-SDI signals need to be recombined to produce the 4K image. Some monitors may perform this internally. For others 3rd party equipment must be used to create the required format signal.

For a more detailed explanation of MediaKind's 4K contribution solution, please contact MediaKind Customer Services.

3.13.3.6. 4K Configuration

The four IRDs must be identical in terms of hardware, software and licenses. Only the second, third and fourth generation Decoder 4:2:2 cards are capable of performing the MPEG-4 AVC 1080p decode requires for each quadrant.

The necessary licenses are listed in section 3.13.3.4

A recommended configuration is shown in the following table and figure.

Table 3-17 RX8200 4K Configuration

RX8200	Designation	Quadrant	Comment
RX 1	Master IRD	Q1	Quadrant one is the 4K Upper Left quadrant
RX 2	Slave IRD	Q2	Quadrant two is the 4K Lower Left quadrant
RX 3	Slave IRD	Q3	Quadrant three is the 4K Upper Right quadrant
RX 4	Slave IRD	Q4	Quadrant four is the 4K Lower Right quadrant

RX 1 is configured as the Master IRD and used as the synchronization source for RX 2, 3 and 4 which are the Slave IRDs. This is done by taking the CVBS output from the Master IRD into an analogue distribution amplifier which is then used to feed the Frame Sync inputs for each of the Slave IRDs.

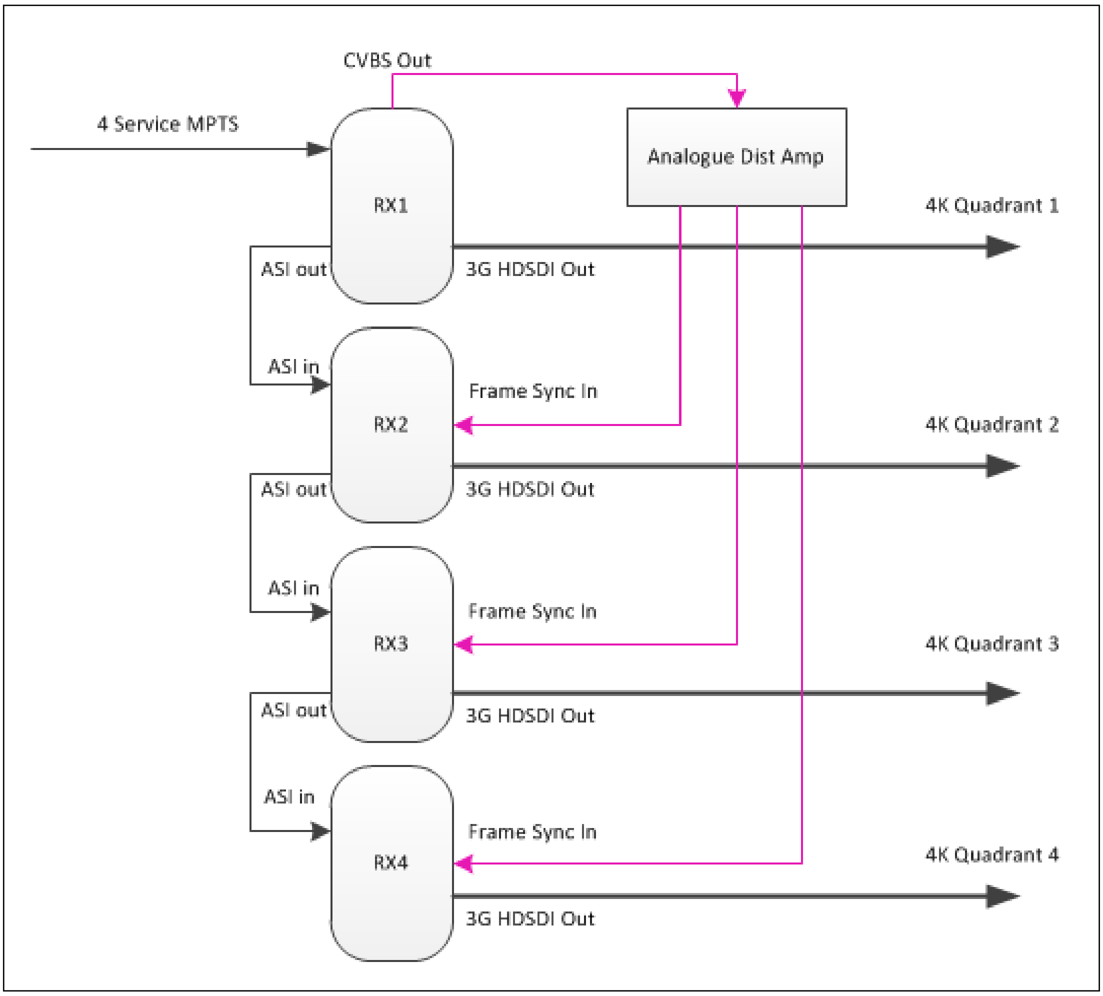


Figure 3-117 RX8200 4K Configuration

The Transport Stream containing the 4 Service MPTS is input into the Master IRD, this can be via ASI, IP, or Satellite. The Transport Stream is then supplied to the Slave IRDs by daisy-chaining the ASI Output from one IRD to the ASI Input of the next IRD. The delay introduced by each 'hop' in the ASI daisy chain is negligible and has no effect on the synchronization between the IRDs.

3.13.3.6.1. Master IRD

On the **Decode > Advanced** settings, the Master IRD is configured with **Frame-Sync** DISABLED. Enabling frame-sync will force the behaviour of the IRD to act as a Slave IRD.

The **422 VSync Lock** option must be DISABLED.

The Simul-Sync 3D license must be enabled. Confirm this by ensuring that the status field **Encoder Delay Compensation** is displayed.

The **Rx Delay Mode** option can be set to the desired level.

The **Frame Sync NTSC Offset** or **Frame Sync PAL Offset** should be set to zero pixel offset.

On the Output settings, **Output One** should be set to 3G-SDI and **Output Two** should be set to ASI for daisy-chaining. The **3G-SDI Level** can be set to the desired level.

3.13.3.6.2. Slave IRD

On the **Decode > Advanced** settings, the Slave IRD is configured with **Frame-Sync** ENABLED and the frame-sync signal is sourced from the Master IRD as described above.

The Simul-Sync 3D license must be enabled and therefore any offset alignment messages embedded in the video stream are picked up and applied by the Slave IRD. Confirm this by ensuring that the status field **Encoder Delay Compensation** is displayed.

The **Rx Delay Mode** option must be set to the same mode as set on the Master IRD.

The **Frame Sync NTSC Offset** or **Frame Sync PAL Offset** should be set to zero pixel offset. By default the Master IRD will output its quadrant slightly ahead of the Slave IRDs due to propagation delay of the sync signal going through the analog distribution amplifier. Normally this delay is minimal and does not cause any issues with the synchronization of the four quadrants. However, to bring the receivers into the closest possible alignment, the frame-sync on the Slave IRDs can be offset using the above setting. If modified, the offset must be matched across all Slave IRDs with the same value.

NOTE: As an example, configuring the **Frame Sync PAL Offset** with a value of +67 pixels corresponds to a delay of 1 micro-second. A negative value will advance the signal output.

On the Output settings, **Output One** should be set to 3G-SDI and **Output Two** should be set to ASI for daisy-chaining. The **3G-SDI Level** must be set to the same level as set on the Master IRD.

3.13.3.7. HD Output Card with 3G-SDI Support

Only certain hardware revisions of the HD Output card are capable of providing a 3G-SDI output. It should be determined that a HW-ID 1.2.1 or greater is fitted in order to support
3G-SDI output.

3.13.4. Video Conversion

3.13.4.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Up-Conversion	●				
Down-Conversion	●	●	●	●	●
Aspect Ratio Conversion	B	B	B	B	B

3.13.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
High Quality Down-Conversion	1930	101 113/60	RX8200/HWO/HQDCONV

3.13.4.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.4.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/DCONV	Down-Conversion	101 113/26	RX8200/SWO/DCONV
RX83XX/SWO/MPEG2/HD	MPEG-2 HD Down-conversion	101 113/44	RX8XXX/SWO/MPEG2/HD
RX83XX/SWO/MP2/MP4/SD/HD	MPEG-4 AVC HD Down-Conversion	101 113/41	RX8XXX/SWO/MPEG4/HD
RX8200/SWO/UPCONV	Up-Conversion	101 0113/54	RX8200/SWO/UPCONV

3.13.4.5. Functional Description

3.13.4.5.1. Down-Conversion

The IRD has capability to receive a high definition service and convert this to standard definition video – a process called down-conversion. This down-conversion feature is a video processing application that is performed on decoded, baseband high definition video.

The IRD is capable of performing simultaneous down-conversion from HD to SD. This functionality means that the unit can decode the native HD video and output the on HD interfaces (HD-SDI and RGB/YPrPb), and at the same time perform down-conversion on the decoded HD video and generate an SD version for output on the SD interfaces (SD-SDI and CVBS).

The HD video and down-converted SD video are output simultaneously. Because the HD and SD video are synchronized, audio lip sync is maintained on both HD and SD video.

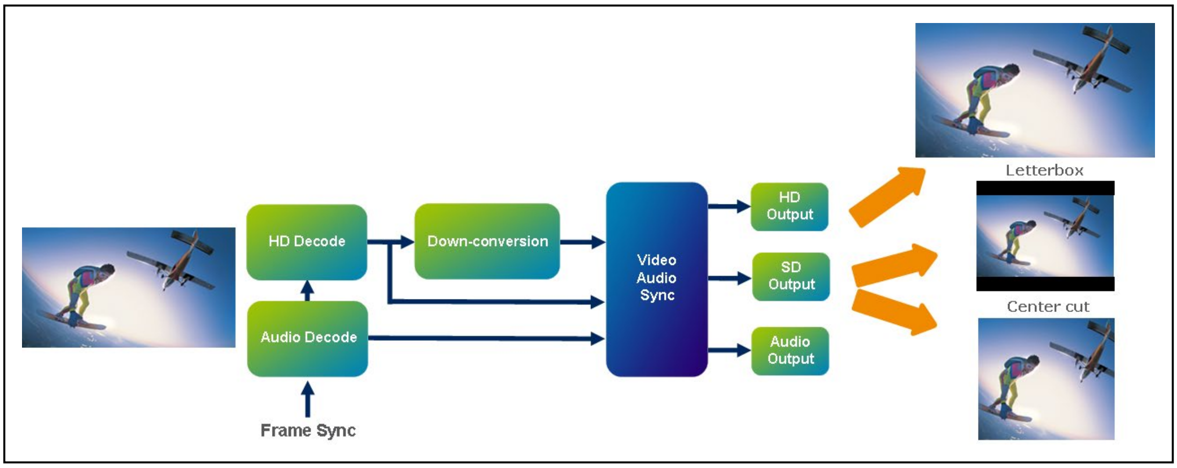


Figure 3-118 Down-conversion Quality Levels

The IRD offers different levels of down-conversion quality, where the Grade levels are defined by MediaKind:

- **Grade 1 Down-conversion –** High quality down-conversion option (RX8200/HWO/HQDCONV) which requires a dedicated hardware option to be present within the RX8200. This implies that the outgoing, down-converted SD video is of the highest possible quality and eminently suitable for broadcast.
- **Grade 2 Down-conversion –** Quality down-conversion option (RX8200/SWO/DCONV) which can be enabled on every RX8200 via a chargeable software license key. This video quality level is definitely suitable for high quality monitoring applications and may be considered suitable for broadcast by some operators, particularly if the incoming native HD content is in 720p format.
- **Grade 3 Down-conversion –** Available on the RX8300 series IRDs, it offers grade
  3 quality down-conversion. This video quality is equivalent to consumer set-to-box
  down-conversion quality. This level of quality is still considered suitable for broadcast by many operators and broadcasters.

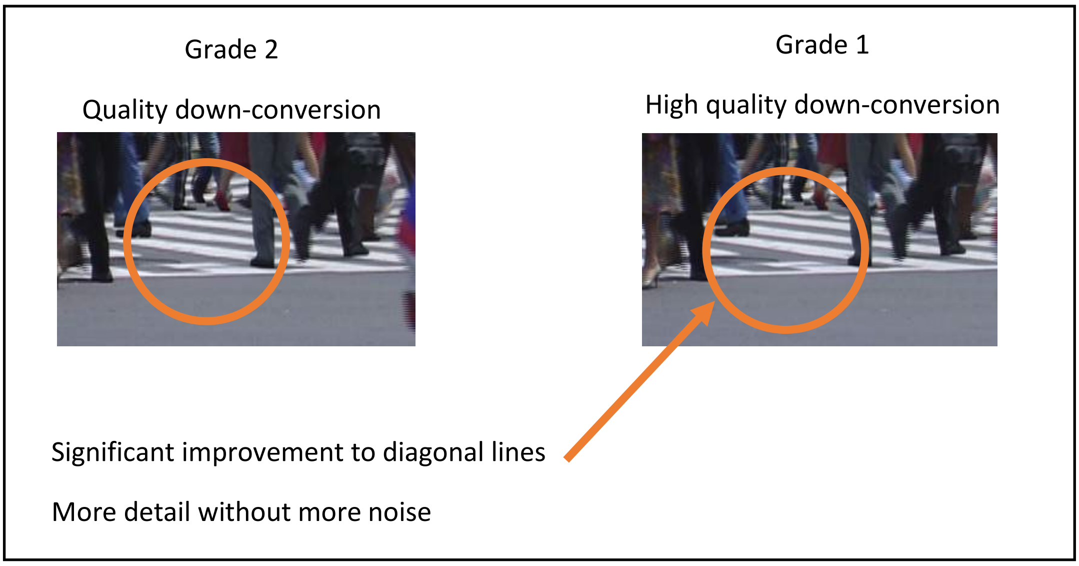


Figure 3-119Down-conversion Grades

3.13.4.5.2. Aspect Ratio Conversion

Whilst all high definition video services have a 16:9 aspect ratio, standard definition services have a number of different possible aspect ratios (4:3, 14:9, 16:9). The IRD has the capability to define how an incoming 16:9 service should be displayed on a 4:3 aspect ratio monitor and how the display aspect ratio should be controlled on a dynamic basis.

As part of the HD to SD down-conversion process, the unit can performing aspect ratio conversion from an incoming, native HD 16:9 service to a 4:3 SD video output. As part of the aspect ratio conversion process it is possible to set the output as a center cut or letterbox.
The output SD aspect ratio can be controlled dynamically by using an Active Format Descriptor (AFD) signal.

3.13.4.5.3. Up-conversion

Up-conversion cannot be performed when decoding 4:2:2 video formats or when the video is being decoded by the 4:2:2 Decoder option card, therefore it is only a feature of the Base Decoder.

3.13.4.5.4. Simultaneous Dolby Digital 5.1 and Stereo Output

To partner the IRD's capability to present simultaneously both native HD and locally derived, down-converted SD video, the unit has the ability to process the source audio service in a manner that is suitable to both HD and SD video. The unit can "pass-thru" the native compressed Dolby Digital 5.1 service embedding the audio stream on the HD-SDI output. Additionally the unit can decode and down-mix that 5.1 audio service to stereo, outputting the stereo audio channels alongside the SD video output.

This feature requires the 4 Audio license (RX8200/SWO/4AUD) and Dolby Digital license (RX8200/SWO/AC3).

3.13.4.5.5. Video Conversion Tables

The IRD can manipulate the decoded video stream on the incoming service, either up-converting or down-converting the video to a different resolution on the output. The Base Decoder is capable of both up-conversion and down-conversion whereas the 4:2:2 Decoder Option card is only capable of down-conversion. Down-conversion options are extended where High Quality Down-conversion Card is fitted.

Table 3-18 Video Conversion Running on the Base Decoder

Output Mode	Base Decoder: Input Video			
	SD	720p	1080i	1080p
AUTO	SD	720p	1080i	-
SD	SD	SD *	SD *	-
720p	720p †	720p	720p *	-
1080i	1080i †	1080i †	1080i	-
1080p	-	-	-	-

Key: * Down-conversion license required † Up-conversion license required

Table 3-19 Video Conversion Running on the Base Decoder with the High Quality Down-conversion Card Fitted

Output Mode	Base Decoder + HQ Down Converter: Input Video			
	SD	720p	1080i	1080p
AUTO	SD	720p	1080i	-
SD	SD	SD *	SD *	-
720p	720p †	720p	720p *	-
1080i	1080i †	1080i †	1080i	-
1080p	-	-	-	-

Key: * Down-conversion license required † Up-conversion license required

Table 3-20 Video Conversion Running on the 4:2:2 Decoder Option Card

Output Mode	4:2:2 Decoder: Input Video			
	SD	720p	1080i	1080p
AUTO	SD	720p	1080i	1080p
SD	SD	SD *	SD *	SD *
720p	-	720p	-	-
1080i	-	-	1080i	1080i *
1080p	-	-	-	1080p

Key: * Down-conversion license required

Table 3-21 Video Conversion Running on the 4:2:2 Decoder Option Card with the High Quality Down-conversion Card Fitted

Output Mode	4:2:2 Decoder + HQ Down Converter: Input Video			
	SD	720p	1080i	1080p
AUTO	SD	720p	1080i	1080p
SD	SD	SD *	SD *	SD *
720p	-	720p	720p *	-
1080i	-	-	1080i	1080i *
1080p	-	-	-	1080p

Key: * Down-conversion license required

3.13.4.6. Configuration

Resolution conversion is determined by the **Video Output Mode** control, which may be set so that the output is the same as the input, or can be set to always be a particular resolution, subject to the enabled hardware and software options.

The unit's output is also determined by the settings of the **Output One, Output Two** or **Output Three**, which can similarly be set to follow the configured output resolution, or be set to a specific format. Should the selected output format be incompatible with the configured output mode, that particular output will be disabled.

Regardless of the input resolution and with the appropriate software options, the IRD is always capable of producing an SD output, which is available by selecting the **SD-SDI** output option, or from the CVBS connector.

3.13.4.6.1. Up/Down Conversion Parameters

The IRD provides control over down-conversion, up-conversion and aspect ratio conversion through the **Decode > Advanced** *page*.

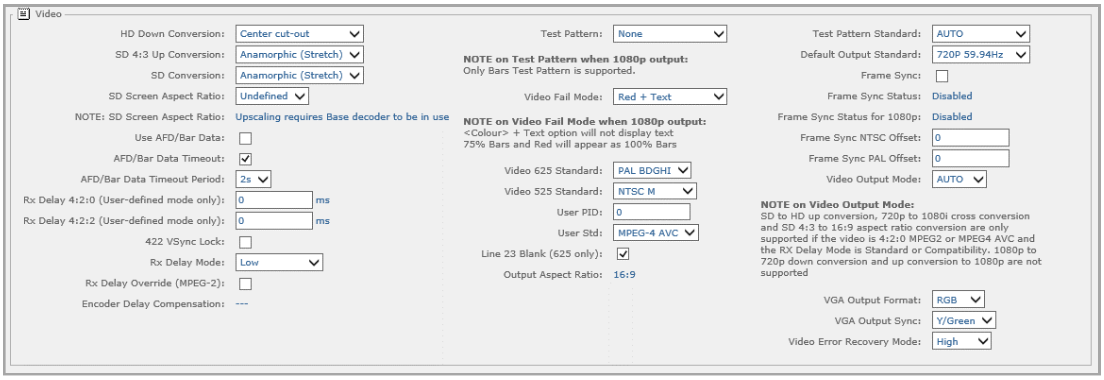


Figure 3-120 Decode > Advanced Web Page

- **Video Output Mode** – This sets the main video output that gets routed to the unit's SDI Output ports (not the composite output, this will always output SD video). This allows for down-conversion and up-conversion. There is no cross-conversion with regard to
frame-rates.
- **AUTO** – In this mode the unit will output the same standard as the incoming video. Where a SDI **Output Port** is configured to **SD-SDI**, incoming HD video will be

down-converted. Incoming SD video will **not** be up-converted if the **Output Port** is set to HD-SDI or 3G-SDI

- **SD** – The unit will output the closest SD standard to the incoming video material.
  SD formats will be passed-through and HD formats will be down-converted to SD.
- **720P** – The unit will output the closest HD 720P standard to the video being decoded. SD formats will be up-converted and higher resolution HD formats will be down-converted.
- **1080i** – The unit will output the closest HD 1080i standard to the video being decoded. SD or HD (720P) formats will be up-converted and HD (1080i) formats will be passed through.
- **1080P**

See section 3.13.4.5.5 for details of which conversions are supported.

NOTE: When up-converting and down-converting the unit may have to change its aspect ratio.

Down-conversion can be controlled from the **Output** page where the **Video Output Mode** has been set to **AUTO**.

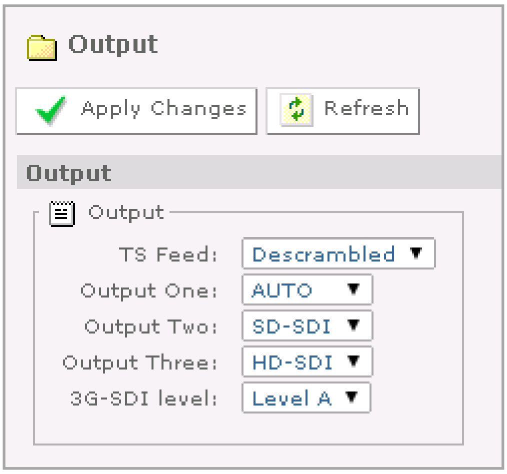


Figure 3-121 Output Web Page

- **Output One / Two / Three** – This menu configures the signal output from one of the SDI/ASI Output BNC ports at the rear of the unit.
- **AUTO** – The video format, whether it is SD, HD or 3G, is passed through without conversion. If the outgoing video is 3G, the output BNC connector will be configured as 3G-SDI. If the outgoing video is HD, the output BNC connector will be configured as HD-SDI. If the outgoing video is SD, the output BNC connector will be configured as (SD) SDI.
- **HD-SDI** – Only HD video will be output from this Output BNC connector. If the incoming video is SD or 3G the output on the video out BNC connector is invalid.
- **SD-SDI** – Only SD video will be output from this Output BNC connector. Where the video being decoded is HD or 3G, it will automatically be down-converted to SD.
- **3G-SDI** – This configures the Output BNC connector for 3G-SDI required for outputting 1080P50/60 video content.

- **ASI** – The Output BNC connector will output the incoming Transport Stream providing an ASI source for down-stream equipment.

NOTE: 3G-SDI and HD-SDI are exclusive modes. Thus, if one BNC is configured as 3G-SDI
(or AUTO when the video content is 1080P50/59.94), the only permitted options for the other BNCs are AUTO, SD-SDI, 3G-SDI or ASI.

3.13.4.6.2. Aspect Ratio Conversion Parameters

Aspect ratio conversion is controlled through the **Decode > Advanced** section of the control interface.

NOTE: 4:2:2 Video Aspect Ratio cannot be up-scaled.

The IRD provides a hierarchy of intelligent control for setting the Aspect Ratio of the outgoing down-converted SD video. The outgoing Aspect Ratio is controlled by the **SD Screen Aspect Ratio** menu using the following two controls in the order of precedence as shown below:

- Use AFD/BAR Data
- HD Down-Conversion

If the highest priority item is not present or has not been configured the IRD will act on the next highest priority control. If the screen aspect ratio is set with the same value as the incoming video aspect ratio, then the aspect ratio of the output video will not be changed as per any of the above two controls.

- **USE AFD/Bar Data** – If this option is enabled the down-converted SD aspect ratio will be set according the Active Format Descriptor that has been embedded in the incoming HD content. The Active Format Descriptor can be dynamically changed by the content originator so that content can be switched between aspect ratios as required. For example, movie content may be commanded to be shown in letterbox format with commercial breaks being shown in center-cut format.
- **AFD/Bar Data Timeout** – AFD is a continuous signal. In the case where this option is enabled, If the IRD detects that and AFD signal has not been received for a user defined time period the unit will fall back on the settings and operation defined by the Screen Aspect Ratio and HD Down-Conversion fields.
- **AFD/Bar Data Timeout Period** – This parameter defines the timeout period used by the AFD/Bar Data Timeout feature.
- **SD Screen Aspect Ratio** – This field defines the outgoing SD aspect ratio. This menu allows the aspect ratio of the display device to be set:
- **16:9** – The IRD outputs an SD aspect ratio of 16:9.
- **4:3** – The IRD outputs an SD aspect ratio that, when used in conjunction with HD services and down-conversion, follows the aspect ratio parameter that has been set in the HD Down-Conversion field.

- **Undefined** – The IRD outputs an SD aspect ratio that, when used in conjunction with HD services and down-conversion, follows the aspect ratio parameter that has been set in the HD Down-Conversion field.
- **HD Down-Conversion** – This field defines the outgoing SD aspect ratio. This menu allows different aspect ratio conversions to be set:
- Anamorphic (Stretch)
- Center cut-out
- Letterbox

3.13.4.7. Status

The unit reports the Active Format Descriptor status to the user via the web browser.

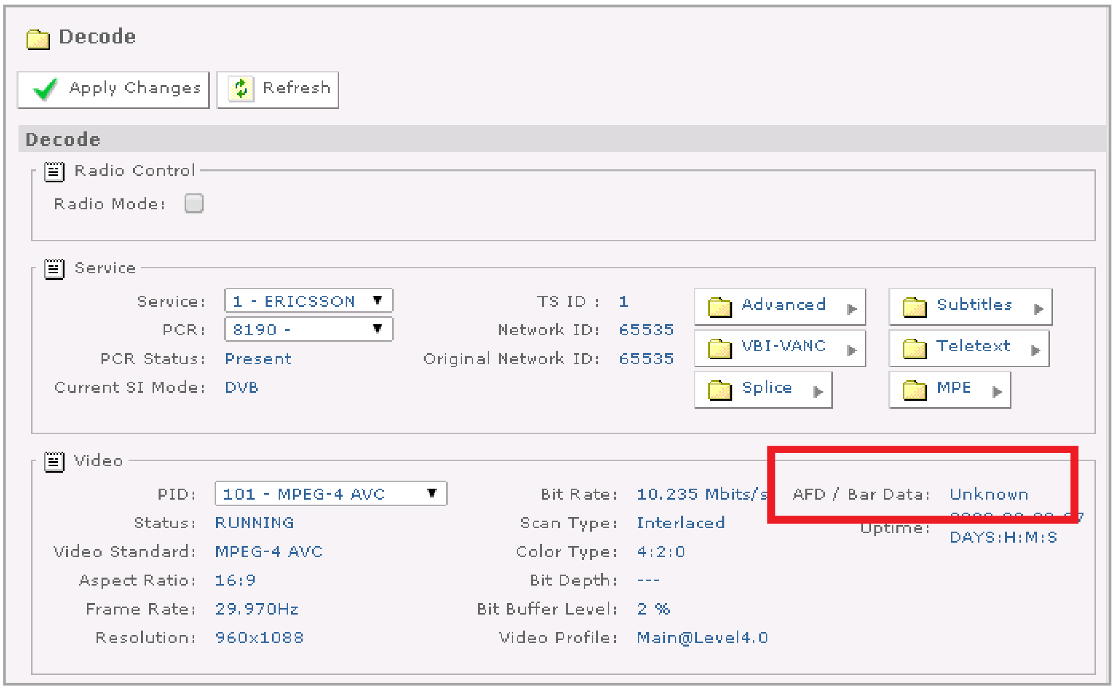


Figure 3-122 Decode Web Page with AFD/Bar Data Status

3.13.4.8. Front Panel Setup

3.13.4.8.1. Output

This menu allows access to and selection of the video and Transport Stream outputs. To view this menu from the **CA** menu, press the ▼ (Down) key.

OUTPUT **5**	**OUTPUT** **>**

3.13.4.8.2. Output Selection

This menu provides sub-menus that enable the viewing and editing of output functions for HD/SD-SDI/ASI BNC output connectors and IP Transport Stream outputs. To view this menu from the above menu, press the ▶ (Forward) key.

```
OUTPUT                     |OUTPUT SELECTION
5.1                        |                              >
```

3.13.4.8.3. Outputs One and Two

This menu enables the viewing and editing of output mode for HD/SD-SDI/ASI BNC output connectors 1 and 2. To access this menu from the above menu, press the ▶ (Forward) key.

```
OUTPUT                     |OUTPUT ONE : SD-SDI
5.1.1                      |OUTPUT TWO : HD-HDI
```

Use the ◀ (Back) and ▶ (Forward) keys to toggle between OUTPUT ONE and OUTPUT TWO. Use the ▲ (Up) and ▼ (Down) keys to toggle between the available options.

This menu allows different configurations to be set:

- **Auto** – If the incoming video is 3G, the output BNC connector will be configured as
  3G-SDI. If the incoming video is HD, the output BNC connector will be configured as
  HD-SDI. If the incoming video is SD, the output BNC connector will be configured as
  (SD) SDI.
- **HD-SDI** – If the incoming video is HD the output BNC connector will be configured as HD-SDI. If the incoming video is SD the output on the video out BNC connector is invalid.
- **SD-SDI** – If the incoming video is HD the IRD will down-convert the native HD video to SD and output on the video output BNC connector as (SD) SDI.
- **3G-SDI** – Allows 1080P50/60 video content to be output on the Output BNC connector as 3G-SDI. If the incoming video is SD or HD, the output on the video out BNC connector is invalid.
- **ASI** – The output BNC connector will output Transport Stream.

NOTE: 3G-SDI and HD-SDI are exclusive modes. Thus, if one BNC is configured as 3G-SDI (or AUTO when the video content is 1080P50/60), the only permitted options for the other BNC(s) are AUTO, SD-SDI, 3G-SDI or ASI.

Press the ◀ (Back) key to return to the **Output Selection** menu.

3.13.4.8.4. Output Three

This menu enables the viewing and editing of output mode for HD/SD-SDI/ASI BNC output connector 3 (dependent on model and option licenses obtained). To access this menu from the above menu, press the ▼ (Down) key.

```
OUTPUT                          |OUTPUT THREE : SD-SDI
5.1.2                           |
```

Use the ◀ (Back) and ▶ (Forward) keys to toggle between OUTPUT ONE and OUTPUT TWO. Use the ▲ (Up) and ▼ (Down) keys to toggle between the available options.

This menu allows different configurations to be set:

- **Auto** – If the incoming video is 3G, the output BNC connector will be configured as 3G-SDI. If the incoming video is HD, the output BNC connector will be configured as HD-SDI. If the incoming video is SD, the output BNC connector will be configured as (SD) SDI.
- **HD-SDI** – If the incoming video is HD the output BNC connector will be configured as HD-SDI. If the incoming video is SD the output on the video out BNC connector is invalid.
- **SD-SDI** – If the incoming video is HD the IRD will down-convert the native HD video to SD and output on the video output BNC connector as (SD) SDI.
- **3G-SDI** – Allows 1080P50/60 video content to be output on the Output BNC connector as 3G-SDI. If the incoming video is SD or HD, the output on the video out BNC connector is invalid.
- **ASI** – The output BNC connector will output Transport Stream.

NOTE: 3G-SDI and HD-SDI are exclusive modes. Thus, if one BNC is configured as 3G-SDI (or AUTO when the video content is 1080P50/60), the only permitted options for the other BNC(s) are AUTO, SD-SDI, 3G-SDI or ASI.

Press the ◀ (Back) key to return to the **Output Selection** menu.

3.13.5. Receiver Delay

3.13.5.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Receiver Low Delay	●				

3.13.5.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.13.5.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.5.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/LDELAY	Low delay	FAZ 101 0113/38	RX8200/SWO/LDELAY

3.13.5.5. Functional Description

The IRD provides the means to control the delay through the unit in order to adjust or minimize the end-to-end delay of a system. It is sometimes desired to reduce the delay to achieve a minimal end-to-end system delay. Increasing the delay may be required if the video or audio buffers are continually under-flowing and break-up is experienced on the output.

3.13.5.6. Configuration

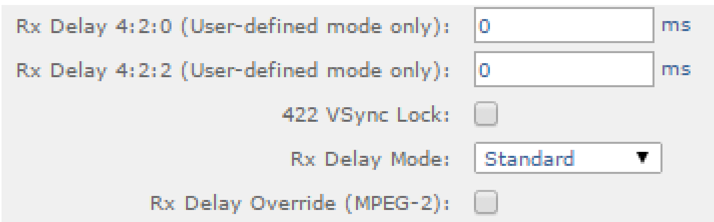


Figure 3-123 Delay Fields

NOTE: The modes shown below will not work correctly if the unit is frame synchronized, it is recommended for low latency that frame sync is not used.

The modes shown below will not work correctly if the unit has 3D license enabled.

- **RX Delay Mode** – Configures the delay mode through the unit. All of these delays are added to the PCR/PTS time and this means the presentation of the picture is held by a defined amount of time compared to clock reference.
- **Compatibility** – This mode adds the largest delay before presentation (390 ms). This is designed to guarantee compatibility between all encode units in all modes.
- **Standard** – This is the default value for the IRD delay before presentation (210 ms). This is designed to allow usage between all current encoders in all modes of encoder delay operation, older encoders may provide buffer models that are too aggressive to allow this mode to be used at all bit rates and all audio encoding schemes
- **Low** – This is only available if the Low Delay license option is purchased. This is the recommended setting for simple contribution links, this adds a delay before presentation (66 ms). This should be used with contribution systems only, it is recommended that lower bit rate audio encoded with simpler coding formats is used e.g. pass-thru or MPEG.
- **Mega Low** – This is only available if the Low Delay license option is purchased.
  In this mode there is no delay before presentation (0 ms). The unit will present video and audio when the PTS associated with the video / audio components is equal to the PCR. This will cause problems when the encoder delay is very aggressive and the bit rates are high, also complex audio coding formats will require longer delay to be decoded (i.e. AAC and AC3).

NOTE: **For 4:2:2 video formats** – To achieve the lowest possible end to end delay, this mode should be used in conjunction with the **422 VSync Lock** option.
For 4:2:0 video formats – If a compatible 4:2:2 Decoder Option card is fitted, it will be used for decoding in place of the Base Decoder and the above note regarding 4:2:2 video formats will also apply to 4:2:0. Otherwise the Base Decoder will be used and no further action is required.

- **User-defined** – This instructs the IRD to use delay values defined by the user entered in the **Rx Delay 4:2:0** field or **Rx Delay 4:2:2** field.

NOTE: Apart from User-defined, **RX Delay Modes** are not applicable to JPEG 2000 encoded streams. For JPEG 2000, the lowest possible delay is always used.

- **Rx Delay 4:2:0** – This allows the user to define the additional system delay to be applied to the receiver the Base Decoder is being used. The Base Decoder will be used for 4:2:0 decodes unless a compatible 4:2:2 Decoder option card is fitted. The **Rx Delay Mode** must be set to **User-defined** for this to take effect. Refer to *Table 3-22* for range of possible values.
- **Rx Delay 4:2:2** – This allows the user to define the additional system delay to be applied to the receiver when the 4:2:2

Decoder Option card is being used. If the fitted 4:2:2 Decoder Option card is compatible with the video standard it is used in place of the Base Decoder for 4:2:0 decodes, as well as 4:2:2 decodes. The **Rx Delay Mode** must be set to **User-defined** for this to take effect. Refer to *Table 3-22* for range of possible values.

- **Rx Delay Override (MPEG-2)** – Enabling this option overrides the Rx Delay Mode selection to **Compatibility** for MPEG-2. It does not affect H.264 settings.
- **422 VSync Lock** – When enabled, this configures the 4:2:2 Decoder Option card to minimize the system delay by ensuring the picture output time (as determined by the PTS) is within 5 ms of the output's Vertical Sync signal. When used with the **Mega Low** setting of the **RX Delay Mode** this will provide the lowest possible end to end delay.

The user can override the pre-defined delay settings with user-defined delay values. The value range for the user-defined delay is defined below. To achieve a lower user-delay value, the Low Delay License option must be enabled.

Table 3-22 User-Defined Delay Value Ranges

Low Delay License (RX8200/SWO/LDELAY)	Maximum User Delay Setting	Minimum User Delay Setting
Disabled	+500 ms	+250 ms
Enabled	+500 ms	-100 ms

NOTE: Using a user-defined delay value of less than zero breaks the MPEG buffer model for the transmission, care must be taken when attempting this.

3.13.5.7. Receiver Delay Mode and 4:2:2 Decoder Option Card

Where the 4:2:2 Decoder option card is fitted, it is possible to manipulate the RX8200 to use the 4:2:2 Decoder for 4:2:0 video formats rather than the default Base Decoder.

Setting the Rx Delay Mode to Low, Mega Low or User Defined will force the RX8200 IRD to use the 4:2:2 Decoder regardless of whether the video is 4:2:2 or 4:2:0 format. However, this only occurs if the 4:2:2 Decoder card supports the video and coding format.

3.13.5.8. Achieving Minimum System Latency with the MediaKind AVP 2000/3000

- When the MediaKind RX8200 IRD is coupled with the MediaKind AVP 2000 or AVP 3000 Voyager, a very low end-to-end delay is achieved. The RX8200 IRD must be configured so that the **Rx Delay Mode** is set to **Mega Low** and the **4:2:2 VSync Lock** option is **Enabled**.
- For minimum system latency the MediaKind AVP should be set up as follows:

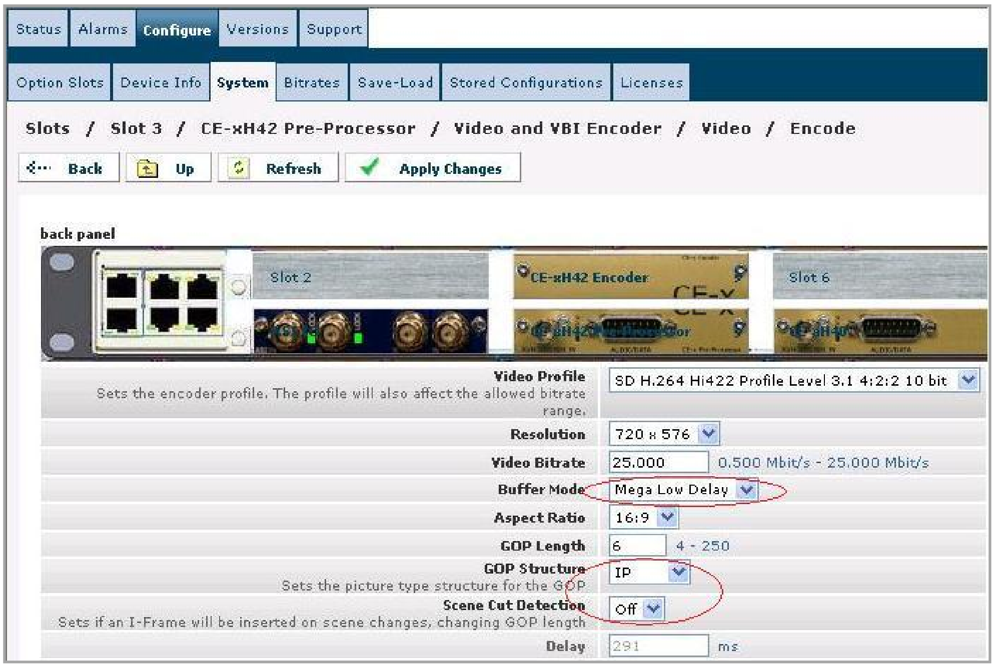


Figure 3-124 System Web Page

3.13.5.9. Front Panel Setup

3.13.5.9.1. Delay Mode

This menu allows the user to select the delay mode required as described above

```
VIDEO          |DELAY MODE: STANDARD
4.5.3          |
```

Once edit is selected the user can select between the delay modes:

- COMPATIBILITY
- STANDARD
- LOW
- MEGA LOW
- USER DEFINED

As described above using the ▲ (Up) and ▼ (Down) keys.

3.13.5.9.2. Receiver Delay 4:2:0

This menu allows the user to adjust the user defined delay for 4:2:0 material when the unit is in user defined delay mode and only the Base Decoder is present. This delay is in ms.

```
VIDEO          |RX DELAY 4:2:0: 250
4.5.4          |
```

Once edit is selected the delay can be adjusted using the ▲ (Up) and ▼ (Down) keys.

3.13.5.9.3. Receiver Delay 4:2:2

This menu allows the user to adjust the user defined delay for 4:2:2 and 4:2:0 material when the unit is in user defined mode and a compatible 4:2:2 Decoder card is fitted. This delay is in ms.

```
VIDEO                          |RX DELAY 4:2:2: 250
4.5.4                          |
```

Once edit is selected the delay can be adjusted using the ▲ (Up) and ▼ (Down) keys.

3.13.6. Test Patterns

3.13.6.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Test Patterns	B	B	B	B	B

3.13.6.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.13.6.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.6.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
This is not a licensable feature			

3.13.6.5. Functional Description

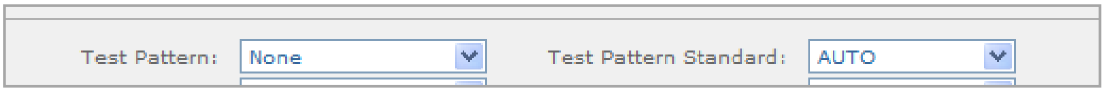


Figure 3-125 Test Pattern Display Fields

The IRD provides the ability to display test patterns on all of its video outputs, that is CVBS, SD-SDI and where appropriate, HD-SDI and RGB. Currently the unit supports the following test patterns:

- **None** – This is the default setting for the Test Pattern option. This disables the test pattern and the decoded video from the selected service will be output.
- **75% Bars and Red** – This provides a set of calibrated color bars, these are not SMPTE Color Bars but instead the top two-thirds of the picture contain seven vertical bars at 75% intensity and the bottom third is filled with red.
- **Border**
- **Bars** – This provides a set of calibrated color bars, these are not SMPTE Color Bars but instead contain a full field of 8 calibrated colors. These include a black bar (blank level in PAL 54mV above black in NTSC) and a white level bar (700 mV or 100 IRE in PAL 714 mV 100 IRE in NTSC) these bars can be used to calibrate the color within downstream equipment using processes similar to those defined for calibration using SMPTE color bars.
- **Pathological** – This pattern is designed to stress the phase locked loop of SDI (serial digital) equipment. The pattern is designed to create the probability of long strings of 1s and then long strings of the opposite polarity on the digital output signal, this can cause poorly designed PLLS to unlock.
- **Multiburst** – This is a series of frequency sweeps throughout the range of the television signal, this can be used to verify the frequency response of the downstream equipment.
- **Monitor Lineup** – This pattern consists of a calibrated border, this border is designed to be central within the connected monitor, as such it can be used to calibrate the horizontal and vertical positioning of downstream monitoring equipment.
- **Contrast** – The contrast test pattern provides a full luminance sweeps from white level to full back, this can be used to calibrate the luminance of downstream equipment.
- **White** – This provides a full field white level (100 IRE).

All of the above test patterns are available for all of the currently supported output standards.

The standard for the test patterns is set up using the **Test Pattern Standard** option. This allows the following standards to be set as default:

- 480i 29.97
- 576i 25
- 1080i 30
- 1080i 29.97
- 1080i 25

- 720p 60
- 720p 59.94
- 720p 50
- 1080p 50
- 1080p 60
- 1080p 59.94
- Auto (this matches the incoming video resolution)

Only full resolution test patterns are available.

3.13.6.6. Front Panel Setup

3.13.6.6.1. Test Pattern

This menu allows the user to select the test patter required as described above.

```
VIDEO                      |TEST PATTERN
4.5.7                      |NONE                           >
```

Once edit is selected the user can select between the test patterns as described above using the ▲ (Up) and ▼ (Down) keys.

3.13.6.6.2. Default Output Standard

This menu allows the user to select the output standard for the test pattern selected above to be displayed.

```
TEST                       |STANDARD: AUTO
4.5.7.1                    |
```

Once edit is selected the user can select between the values described previously using the ▲ (Up) and ▼ (Down) keys.

3.13.7. Video Standards Control

3.13.7.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Video Standards Control	B	B	B	B	B
Russian SECAM					●

3.13.7.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
Russian SECAM output card	1926	FAZ 101 0108/33	RX83XX/HWO/RSECAM

3.13.7.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.7.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
No software license options are required for this feature.			

3.13.7.5. Functional Description

The IRD provides the ability to select many different video standards for both input and output configuration, these are controlled by the following menu options.

3.13.7.6. Configuration

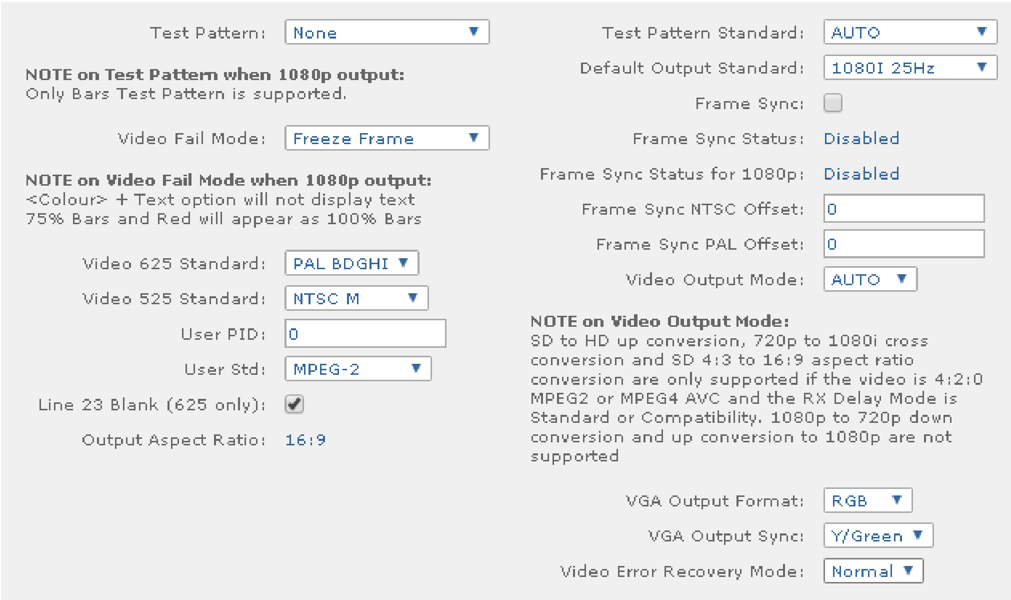


Figure 3-126 Video Standards Fields

3.13.7.6.1. Decode > Advanced > Video

- **Video 625 Standard** – This sets the required standard for the composite output when a 625 line source is output from the unit. A 625 line standard is assumed when a 25Hz or 50Hz input standard is detected, this includes HD standards which will be down converted and output as a 625 standard composite video picture.

The IRD allows the user to select the following regional output standards:

- **PAL BDGHI** – This set of standards are the most commonly used PAL standards throughout the world.
- **PAL N** – This is primarily used in Paraguay and Uruguay, it is similar to other PAL standards but has a different chrominance subcarrier.
- **PAL N CMB** – This is primarily used in Argentina. This is similar to other PAL standards but has a different burst frequency and has a different video bandwidth.
- **Video 525 Standard** – This sets the required standard for the composite output when a 525 line source is output form the unit. A 525 line standard is assumed when a 30 Hz, 29.97 Hz, 60 Hz or 59.94 Hz input standard is detected, this includes HD standards which will be down converted and output as a 525 standard composite video picture.
- The IRD allows the user to select the following regional output standards:
- **NTSC M** – This standard is the most commonly used NTSC standards throughout the world.
- **PAL M** – This is mostly used in Brazil. This is a 525 line / 30Hz version of the PAL system.

- **NTSC J** – This is primarily used in Japan. This is similar NTSC but has some differences with its black and blanking levels.
- **Default Output Standard** – This sets the output standard for default when the unit first boots up. If no video is detected after boot up, the unit will produce the appropriate Fail Mode screen (or Test Pattern mode if not set to **NONE**) using the video standard defined by the **Default Output Standard**. The exception to this is if a test pattern is selected and the **Test Pattern Standard** is set to anything other than **AUTO**. This setting will be overridden when video is successfully decoded. When video decode fails, the unit will output video to the last used standard for the fail mode screen.
- 480i 29.97Hz
- 576i 25Hz
- 1080i 30Hz
- 1080i 29.97Hz
- 1080i 25Hz
- 720p 60Hz
- 720p 59.94Hz
- 720p 50Hz
- 1080p 60Hz
- 1080p 59.94Hz
- 1080p 50Hz

3.13.7.7. Russian SECAM Output Card

The Russian SECAM variant is for the Russian market only and is only supported by the RX8330 with the RX8300/HWO/RSECAM option. Only SECAM video is output from the Russian SECAM output card, it cannot be configured to output any other video standard types.

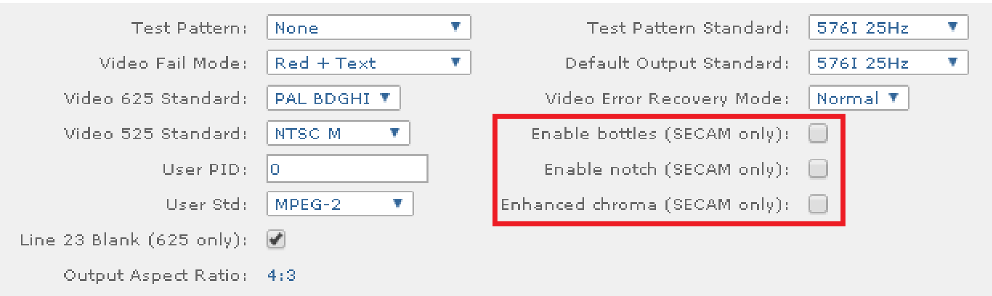


Figure 3-127 Additional SECAM settings in the Video Standards fields for RX8330

3.13.7.7.1. Decode > Advanced > Video

- **Enable Bottle (SECAM only)** – This is used to enable bottles and insert them on to the output signal.
- **Enable Notch (SECAM only)** – This is used to enable the Luma/Chroma cross-filtering notch.

- **Enhanced Chroma (SECAM only)** – This is used to enable enhanced Chroma encoding.

3.13.7.8. Front Panel Setup

3.13.7.8.1. User Configuration

This menu allows the user to setup the unit for non-SI based video decoding. This allows the input of a user PID for video decoding and a user standard to attempt to decode this PID.

```
VIDEO                      |USER PID : 000
4.5.2                      |USER STD : MPEG 2
```

Once edit is selected the user can move between the **USER PID** and the **USER STD** items using the Left and Right arrow keys. The user can enter a PID between the values of 1…8191 using the ▲ (Up) and ▼ (Down) keys. Also the user can toggle between **MPEG 2** and **MPEG-4 AVC** for **USER STD**. These sections will not be used unless for component selection **0 – USER** is selected.

3.13.7.8.2. Default Output Standard

This menu allows the user to select an output standard for the unit to use until a video input is detected for the first time after powering up.

```
VIDEO                      |DEFAULT OUTPUT STANDARD
4.5.5                      |1080I 25HZ
```

Once **Edit** is selected the user can select between the following options using the ▲ (Up) and ▼ (Down) keys:

- 480I 29.97HZ
- 576I 25HZ
- 1080I 30HZ
- 1080I 29.97HZ
- 1080I 25HZ
- 720P 60HZ
- 720P 59.94HZ
- 720P 50HZ
- 1080P 60HZ
- 1080P 59.94
- 1080P 50HZ

3.13.8. Fail Modes

3.13.8.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Fail Modes	B	B	B	B	B

3.13.8.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.13.8.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.8.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
This is not a licensable feature			

3.13.8.5. Functional Description

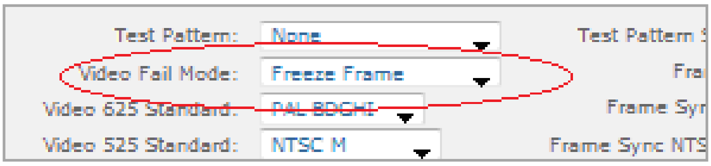


Figure 3-128 Video Fail Mode Field

Video Fail Modes allow the broadcaster to define a failure screen upon loss of video output. This loss can be due to either signal or video errors but as such the fail screen does not always imply a video problem and therefore alarm messages should be examined for the cause of the video failure.

The unit provides the following fail screens:

- **Freeze Frame** – This provides the last decoded frame of video as a still image.
  If a frame is not available because the unit has been power cycled or the decoder has been turned off, a black frame will be displayed instead.

NOTE: If the PMT Update Mode has been set to Flush or Refresh, this can result in the video PID being dropped if not specified after a PMT update. If the video PID is dropped,
a Black Frame is displayed instead of a Freeze Frame.

- **Black** – This outputs a full screen Black Frame (0-7.5 IRE depending upon standard) upon video failure.
- **Blue** – This provides a standard color blue (seen as blue on a vector scope) for a full frame.
- **75% Bars and Red** – This provides a set of calibrated color bars, these are not SMPTE Color Bars but instead the top two-thirds of the picture contain seven vertical bars at 75% intensity and the bottom third is filled with red.

NOTE: If the video is 1080P50/60, selecting this option will result in 100% Bars being generated.

- **Blue + Text** – This is the same as the full field blue but also contains diagnostic information about the failure that has occurred (not user configurable) as listed below. Not supported for 1080P50/60 output.
- Cause of failure – This can be either video alarm detected (video decode fail) or signal loss detected (error with the input signal).
- The service ID of the currently selected service.
- The serial number of the affected unit.
- **Red + Text** – This is the same as *Blue + Text* but contains a full field standard red rather than blue. Not supported for 1080P50/60 output.
- **Black + Text** – This is the same as *Blue + Text* but contains a full field black rather than blue. Not supported for 1080P50/60 output.
- **No Syncs** – Both Digital (SDI) and Analogue (CVBS) outputs have their video sync signals disabled. Only supported if the RX8200/HWO/HD or RX8200/HWO/HD/3G option is fitted.
- **No DigSyncs** – Only Digital (SDI) output has its sync signal disabled. The Analogue (CVBS) output will still output video sync signal (Freeze Frame). Only supported if the RX8200/HWO/HD or RX8200/HWO/HD/3G option is fitted.

The fail mode screens will be displayed at the same standard of the previously decoded video or as configured by the **Default Output Standard** option.

NOTE: 1080P Support Limitations
When 1080P50/60 video is being output, there are restrictions on the Video Fail Mode displayed.

If 75% Bars and Red is selected, the output will be 100% Bars instead.
For the Blue+Text, Red+Text or Black+Text selections, no text will be shown.

3.13.8.6. Front Panel Setup

3.13.8.6.1. Video Fail Mode

This menu allows the user to select the desired video fail mode

```
SERVICE                     |VIDEO FAIL MODE
4.2                         |FREEZE FRAME
```

Once **Edit** is selected use the ▲ (Up) and ▼ (Down) keys to toggle between the fail modes described above.

3.13.9. Frame Sync

3.13.9.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Frame Sync	●				

3.13.9.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.13.9.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.13.9.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/FSYNC	FRAME SYNC LICENCE	FAZ 101 0113/48	RX8200/SWO/FSYNC

3.13.9.5. Functional Description

The RX8200 contains a Frame-Sync input BNC (located on the rear of the unit). This allows the user to synchronize the unit to a reference studio sync pulse such that the output video (either in HD or SD) aligns to that of the studio feed.

The studio feed must be of the same frequency as the video service being decoded by the IRD:

- 50 Hz (field timing for interlaced or frame timing for progressive).
- 59.94 Hz (field timing for interlaced or frame timing for progressive).

If the unit detects a signal mismatch then frame sync will not be acquired and the unit will continue to run using its own internal sync.

For pixel accurate positioning of frame sync the controls used for Frame Sync Offset can be used.

3.13.9.6. Configuration

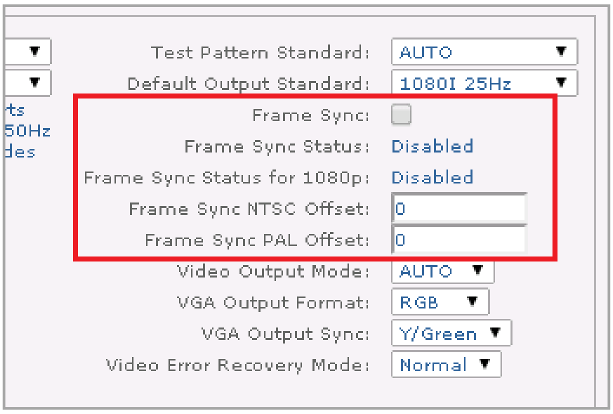


Figure 3-129 Frame Sync Fields

The Frame-Sync is configured using the following menu options.

- **Frame Sync** – Enables or disables Frame-Sync mode.
- **Frame Sync Status** – Reports the current Frame-Sync status.
- **Sync SD** – Frame-sync for the decoded SD video is successful
- **Sync HD** – Frame-sync for the decoded HD video is successful
- **Syncing...** - A frame-sync source or reference feed has been detected but the IRD has not acquired a lock yet
- **Disabled** – Frame-sync mode is disabled, or no frame-sync source or reference feed has been detected

- **No Signal** – Frame-sync mode is enabled but no frame-sync source or reference feed has been detected
- **Mismatch Format** - Frame-sync mode is enabled and detected but the frame-rate is incorrect
- **Frame Sync Status for 1080p** – Reports the current Frame-Sync status when decoding 1080p video formats.
- **Sync HD** – Frame-sync for the decoded 1080p video is successful
- **Syncing…** - A frame-sync source or reference feed has been detected but the IRD has not acquired a lock yet
- **Disabled** – Frame-sync mode is disabled, or no frame-sync source or reference feed has been detected
- **No Signal** – Frame-sync mode is enabled but no frame-sync source or reference feed has been detected
- **Mismatch Format** - Frame-sync mode is enabled and detected but the frame-rate is incorrect
- **Frame Sync NTSC Offset** – This allows the user to adjust the position of the presented video frame / field relative to the 59.94 Hz or 60 Hz sync pulse provided to the unit. This delay can be adjusted in pixels and allows the value range -32768 (pixels behind sync) to 32767 (pixels in front of sync).
- **Frame Sync PAL Offset** – This allows the user to adjust the position of the presented video frame / field relative to the 50 Hz sync pulse provided to the unit. This delay can be adjusted in pixels and allows the value range -32768 (pixels behind sync) to 32767 (pixels in front of sync).

3.13.9.7. Front Panel Setup

3.13.9.7.1. Frame Sync

This menu allows the user to control whether frame sync is enabled or disabled and also allows the user to check the status of the units frame sync input

```
VIDEO                         |FRAME SYNC : ENABLED
4.5.6                         |STATUS : NO SIGNAL        >
```

Once **Edit** is selected use the ▲ (Up) and ▼ (Down) keys to toggle between **ENABLE** and **DISABLE** for the frame sync enabled item. This menu item also displays the status of the frame sync, this can be:

- NO SIGNAL
- SYNCHING
- SYNC SD
- SYNC HD
- MISMATCHED FORMAT
- DISABLED

3.13.9.7.2. Frame Sync Alignment

This menu allows the frame sync offset to be adjusted for both PAL and NTSC, the adjustments are in pixels and allow the output video frame presentation to be between the range -32768 (pixels behind sync) to 32767 (pixels in front of sync).

```
FSYNC                        |NTSC OFFSET: 10
4.5.6.1                      |PAL OFFSET: 10
```

3.14. Audio Selection and Control

As with the video controls, audio configuration is accessed from the **Decode** tab in the web browser interface. The basic selection and status information can be found under the **Audio Decoders** section of the main **Decode** tab and more advanced features can be found in the **Decode > Advanced** sub tab found within the **Service** section of the main **Decode** tab.

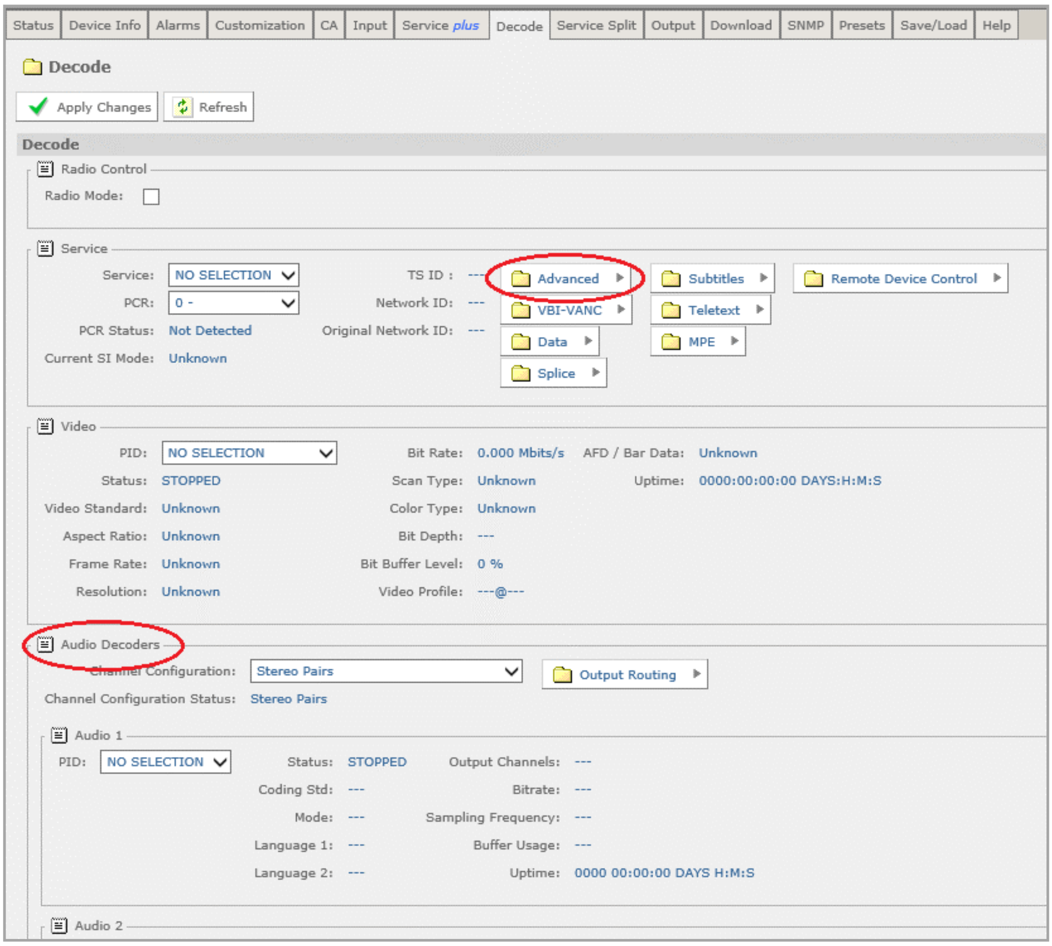


Figure 3-130 Decode Web Page

3.14.1. Audio Decoders Present

Two different types of audio decoder can be present in the IRDs These are termed Advanced Audio Decoder and Basic Audio Decoder throughout this document.

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Basic Audio Decoder	●	B	B	B	B
Advanced Audio Decoder	B				

By default, the RX8200 provides two Advanced Audio Decoders but can provide additional audio decoders depending on configuration setup and whether the RX8200/SWO/4AUD license option is enabled.

The RX8300 is limited to having two Basic Audio Decoders.

3.14.2. Audio Output Options

Audio that is decoded or pass-thru by the IRD can be embedded with the video in to the SDI output as digital AES3. AES3 (also known as AES/EBU) is the standard used to transport digital audio signals between professional equipment.

The unit is also fitted with Audio Output connectors that each provide balanced analogue left and right channels as well as a digital AES3 output. By default, all units are fitted with two Audio Output connectors that are mapped to two audio decoders.

The RX8200 has the option of supporting up to four Audio Output connectors but an additional Audio Output card must be fitted to facilitate this.

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Two Audio Output Connectors	B	B	B	B	B
Four Audio Output Connectors	●				

Each Audio Output connector uses a DE9 connector and a break-out cable is available to provide XLR terminals. The pin-out for the DE9 connector is described in a later section.

3.14.2.1. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
Balanced Analogue and Digital Audio Output Providing 2 Stereo Pairs of Audio	1916	FAZ 101 0113/3	RX8200/HWO/BAL/AUD
XLR Terminal Audio Break-out Cable		FAZ 101 0108/24	RX8XXX/CABLE/XLR
Screw Terminal Audio Break-out Cable		FAZ 101 0108/23	RX8XXX/CABLE/SCRTRM

3.14.2.2. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/4AUD	4 x Audio Capacity (Enable additional audio decoders)	FAZ 101 0113/20	RX8200/SWO/4AUD

3.14.3. Audio Formats Supported

The IRD supports the following audio formats. Where indicated, some of the formats may be limited to pass-thru only.

● = Option **B** = Supplied with Base Model **†** = Pass-Thru only
* = Pass-Thru or decode

	RX8200	RX8310	RX8315	RX8320	RX8330
MUSICAM	B	B	B	B	B
Dolby E	B†				
Linear	B*				
Dolby® Digital Plus (E-AC-3)	B†				
Dolby® Digital (AC-3)	●*	●	●	B	●
AAC	●	●	●	B	●
PAA	●				

3.14.3.1. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.14.3.2. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX83XX/SWO/AC3	Dolby Digital® Decoding / Down-mixing	FAZ 101 0108/28	RX8XXX/SWO/AC3
RX8200/SWO/AC3	Dolby Digital® Decoding / Down-mixing	FAZ 101 0113/22	RX8XXX/SWO/AC3
RX83XX/SWO/AAC	AAC decode	FAZ 101 0108/2	RX8XXX/SWO/AAC
RX8200/SWO/AAC	AAC Decode	FAZ 101 0113/21	RX8XXX/SWO/AAC
RX8200/SWO/PAA	Phase Aligned Audio decode	FAZ 101 0113/49	RX8XXX/SWO/PAA

3.14.3.3. RX8200 Audio Format Support

The RX8200 IRDs support decode and in some cases pass-thru of the following audio formats depending on license options enabled (Channel Configuration is set to **Stereo Pairs** mode).

Table 3-23 Audio Types Supported (RX8200/SWO/4AUD disabled)

RX82xx	Disable 4AUD license	
Audio Decoder	1	2
Physical decoder	Advanced	Advanced
MUSICAM	Decode	Decode
Dolby E	Pass-Thru	Pass-Thru
Linear	Decode/ Pass-Thru	Decode/ Pass-Thru
E-AC-3	Pass-Thru	Pass-Thru
AC-3 (license required)	Decode/ Pass-Thru	Decode/ Pass-Thru
AAC (license required)	Decode	Decode
PAA (license required)	N/A	N/A

Table 3-24 Audio Types Supported (RX8200/SWO/4AUD enabled)

RX82xx	Enable 4AUD license					
Audio Decoder	1	2	3	4	5	6
Physical decoder	Advanced	Advanced	Advanced	Advanced	Basic	Basic
MUSICAM	Decode	Decode	Decode	Decode	Decode	Decode
Dolby E	Pass-Thru	Pass-Thru	Pass-Thru	Pass-Thru	N/A	N/A
Linear	Decode/ Pass-Thru	Decode/ Pass-Thru	Decode/ Pass-Thru	Decode/ Pass-Thru	N/A	N/A
E-AC-3	Pass-Thru	Pass-Thru	Pass-Thru	Pass-Thru	N/A	N/A
AC-3 (license required)	Decode/ Pass-Thru	Decode/ Pass-Thru	Decode/ Pass-Thru	Decode/ Pass-Thru	Decode	Decode
AAC (license required)	Decode	Decode	Decode	Decode	Decode	Decode
PAA (license required)	Decode	Decode	Decode	Decode	N/A	N/A

3.14.3.4. RX8300 Audio Format Support

The RX8300 range is limited to decoding the following audio formats depending on license options enabled (Channel Configuration is set to **Stereo Pairs** mode). The following table shows audio types supported by the RX83xx IRD

Table 3-25 Audio Types Supported by the RX83xx IRD

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	1	2	N/A
Physical decoder	Basic	Basic	
MUSICAM	Decode	Decode	
Dolby E	N/A	N/A	
Linear	N/A	N/A	
E-AC-3	N/A	N/A	
AC-3 (license required)	Decode	Decode	
AAC (license required)	Decode	Decode	
PAA (license required)	N/A	N/A	

3.14.4. Audio Configuration Options

3.14.4.1. Decode > Audio Decoders

3.14.4.1.1. Channel Configuration

Channel Configuration allows the user to change how the Audio Decoders behave and the following modes are available:

- Stereo Pairs
- Multi-Channel (5.1)
- Dual Multi-Channel (5.1)
- Phase Aligned Audio (PAA)
- Paired Audio Decoder Mode
- 10-stereo Pairs (MUS only) Audio
- 8 Channel AES3
- 16 Channel Aligned (MUS only) Audio

The Channel Configuration mode is selected manually except for the Phase Aligned Audio mode, which is selected automatically by the IRD. A detailed description for each mode is provided in a later section.

3.14.4.1.2. Channel Configuration Status

Channel Configuration Status indicates the mode currently set and accepted by the IRD. This is particularly useful in the case where the Phase Aligned Audio mode is automatically selected.

3.14.4.2. Decode > Audio Decoders > Audio

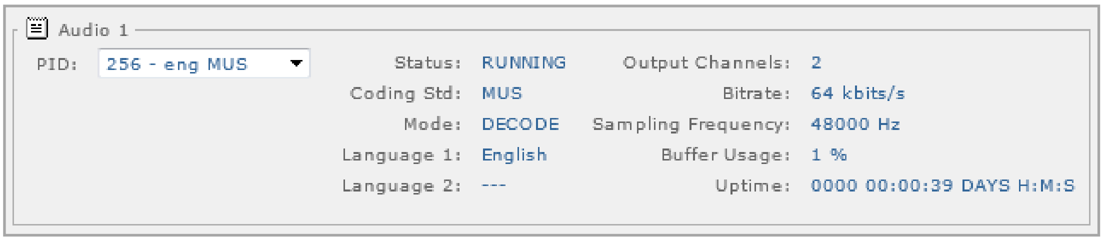
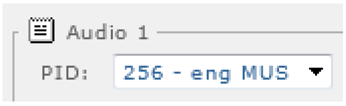


Figure 3-131 Decode > Audio Decoders > Audio Window

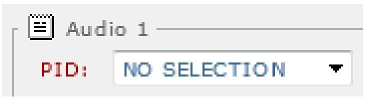
Depending on the model and the Channel Configuration mode selected, a number of Audio Decoder sections will be presented that allows PID selection and status feedback.

3.14.4.2.1. Audio Decoder > PID

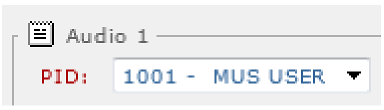


The PID field provides the audio PID selection for the associated audio decoder. The audio PIDs are automatically assigned to an audio decoder when a service is selected. Audio PID selection is based on their order within the service PMT. This field provides an opportunity for the user to override any PID selections.

Each selection choice details the PID value, the audio language and the audio format. This information is derived from the audio descriptors listed in the service PMT.



The **NO SELECTION** option allows the user to clear any PID selection and stop the associated audio decoder. Depending on the state of the **PMT Update Mode** selected from the **Decode > Advanced > Selection Control** section, this setting may be automatically overridden by the unit after a PMT update event.



Also provided is the option to select a **USER PID** that has been defined in the Decoder > Advanced options along with an associated audio format. This allows the user to decode any audio stream that has not been declared in the PMT of the selected decode service. However, the decoder will continue to enforce synchronization with the Program Clock Reference (PCR) identified in the service PMT. If synchronization fails, this will disrupt the audio output.

NOTE: **Note:** The same PID can be selected across the Advanced Audio Decoders; however, this is not supported for the Basic Audio Decoders. If the same PID is selected for both Basic Audio Decoders, one decoder will attempt to decode and may report status RUNNING, but the second decoder will fail and report status ERROR.

3.14.4.2.2. Audio Decoder > Status

Status: RUNNING

The Status field is a read-only field that reports the Audio Decoder status.

- **RUNNING** – The Audio Decoder is successfully decoding.
- **STOPPED** – The Audio Decoder is not active.
- **ERROR** – The Audio Decoder is experiencing errors during decode.
- **UNLICENSED** – The Audio Decoder cannot decode the audio format because the unit does not have the appropriate license or the audio format is not supported.

3.14.4.2.3. Audio Decoder > Coding Std

Coding Std: MUS

The Coding Std field is a read-only field that reports the audio format type.

Table 3-26 Coding Standards

Coding Std	Represented Audio Format or Coding Standard
MUS	MPEG-1 Audio Layer II or MPEG-2 Audio Layer II (sometimes called MUSICAM)
AC-3	Dolby Digital (AC-3)
E-AC-3	Dolby Digital Plus (DD+, E-AC-3 or Enhanced AC-3)
Linear	Linear PCM
AAC	Advancing Audio Coding (AAC), either ADTS or LOAS
AAC5.1	Advancing Audio Coding (AAC) with six-channel surround sound
HE-AAC	High-Efficiency Advanced Audio Coding (HE-AAC), either ADTS or LOAS
---	Unknown or not used

3.14.4.2.4. Audio Decoder > Mode

Mode: DECODE

The Mode field is a read-only field that reports the current mode of the Audio Decoder. This state depends on the Mode configured in the Decode > Advanced settings and also depends on the audio format type. If pass-thru is not supported for the audio format in use then the Audio Decoder will attempt to decode the audio stream by default.

- **DECODE** – The Audio Decoder is decoding the audio stream. The default state if
  pass-thru of the audio format is not supported.
- **PASS THRU** – The Audio Decoder will pass-thru the audio stream without any alteration. Typically, the audio stream is passed on to an external piece of equipment that will decode the audio stream.

3.14.4.2.5. Audio Decoder > Language

The Language fields are read-only fields that report the audio language of the audio stream being decoded (or pass-thru). In the case where the audio stream is stereo or mono, only the Language 1 field may be specified. In the case where the audio stream is dual mono, both the Language 1 field and the Language 2 field may be specified.

3.14.4.2.6. Audio Decoder > Output Channels

The Output Channels field is a read-only field that reports the number of output channels generated by the Audio Decoder from the audio stream. For example, where the audio stream is stereo then the number of output channels will be 2. Where the audio stream is 5.1 then the number of output channels will be 6, unless it being down-mixed in which case the number of output channels will be 2.

3.14.4.2.7. Audio Decoder > Bit rate

The Bit rate field is a read-only field that reports the Bit rate in kilobits per second at which the audio stream was encoded.

3.14.4.2.8. Audio Decoder > Sampling Frequency

The Sampling Frequency field is a read-only field that reports the sampling frequency in Hertz at which the audio stream was encoded.

3.14.4.2.9. Audio Decoder > Buffer Usage

The Buffer Usage field is a read-only field that reports the buffer level used by the Audio Decoder as a percentage.

3.14.4.2.10. Audio Decoder > Uptime

The Uptime field is a read-only field that reports the Audio Decoder uptime (expressed in Days : Hours : Minutes : Seconds) at which the Audio Decoder has been successfully decoding, or has remained in the **RUNNING** state. If the Audio Decoder changes to a different state such as **ERROR** then the uptime will remain reset to zero. The uptime will start counting from zero once the Audio Decoder state is set to **RUNNING**.

3.14.4.3. Decode > Advanced > Audio Decoders

3.14.4.3.1. Suppress Phase Aligned Audio Mode

This function suppresses the automatic selection of Phase Aligned Audio mode. The section 3.15.5 Channel Configuration: Phase Aligned Audio (PAA) describes the behavior in more detail.

3.14.4.4. Decode > Advanced > Audio Decoders > Audio

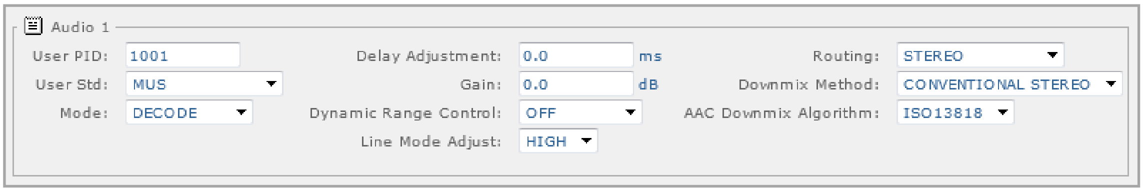


Figure 3-132 Decode > Advanced > Audio Decoders > Audio Window

Depending on the model, a number of Advanced Audio Decoder sections will be presented for advanced options.

3.14.4.4.1. Audio Decoder > User PID

The **User PID** field specifies the User PID value for a specific Audio Decoder and is used in conjunction with the User Std value. The field accepts PID values between 0 and 8191. The User PID is selected from the main Audio Decoder PID selection list.

3.14.4.4.2. Audio Decoder > User Std

The **User Std** field specifies the User Coding Standard (or Audio Format type) for a specific Audio Decoder and is used in conjunction with the User PID value. The User Std is selected as part of the

User PID from the main Audio Decoder PID selection list. The table below lists the available User Coding Standards.

Table 3-27 User Coding Standards

User Std	Represented Audio Format or Coding Standard
MUS	MPEG-1 Audio Layer II or MPEG-2 Audio Layer II (sometimes called MUSICAM)
AC-3	Dolby Digital (AC-3)
E-AC-3	Dolby Digital Plus (DD+, E-AC-3 or Enhanced AC-3)
Linear	Linear PCM
AAC (ADTS)	Advancing Audio coding (AAC): Packaged in a streaming format called Audio Data Transport Stream (ADTS)
AAC (LOAS)	Advancing Audio coding (AAC): Packaged in a streaming format called Low Overhead Audio Stream (LOAS)
HE-AAC	High-Efficiency Advanced Audio Coding (HE-AAC)
HE-AAC (ADTS)	High-Efficiency Advanced Audio Coding (HE-AAC): Packaged in a streaming format called Audio Data Transport Stream (ADTS)

3.14.4.4.3. Audio Decoder > Mode

The **Mode** field sets the default decoder mode or behavior to **DECODE** or **PASS-THRU**. The decoder mode is only applied if supported by the audio format type in use. The Mode state can be confirmed in the main Audio Decoder section (refer to section *3.14.4.2.4*).

This feature is only available with the Advanced Audio Decoder devices and therefore only the RX8200.

- **DECODE** – The Audio Decoder will attempt to decode the audio stream if decode is supported for the audio format type in use. The audio stream may be down-mixed or modified.
- **PASS THRU** – The Audio Decoder will attempt to pass-thru the audio stream if
pass-thru is supported for the audio format type in use. The audio stream will pass-thru without any alteration and will typically be decoded by an external piece of equipment.

3.14.4.4.4. Audio Decoder > Delay Adjustment

This field specifies the Delay Adjustment value for a specific Audio Decoder. The field accepts delay values between -49.5 ms and +49.5 ms. The audio Delay Adjustment value is used to offset the System Time Clock (STC) inside the decoder, where the STC is referenced to the Program Counter Reference (PCR). The STC is the master clock used to synchronize the Presentation Time Stamp (PTS) of the incoming audio stream being decoded.

3.14.4.4.5. Audio Decoder > Gain

This field specifies the Gain (dB) to be applied to the audio output on a specific Audio Decoder, affecting both the analogue and digital outputs. The field accepts values between -16.0 dB and +6.0 dB

3.14.4.4.6. Audio Decoder > Dynamic Range Control

This field specifies the Dynamic Range Control (DRC, or Operational Mode) for a specific Audio Decoder. Dynamic Range Control can be used to automatically adjust the audio output signal level according to the audio’s dynamic range. This is dependent on how the audio is configured during the encode stage.

- **OFF** – Disables any adjustment to the audio signal level that would be applied according to the audio’s dynamic range. The audio output level will be the same as the audio input level.
- **LINE MODE** – In this mode, the Line Mode dynamic range compression variable is applied according to the Line Mode compression profile in the Dolby Metadata. The volume of loud sounds is reduced or quiet sounds are amplified according to the audio’s dynamic range. The amount of dynamic range compression applied to the audio output can be made variable according to the **Line Mode Adjust** setting.
- **RF MODE** – In this mode, the RF Mode dynamic range compression variable is applied according to the RF Mode compression profile in the Dolby Metadata. An 11 dB gain is applied to the output signal. RF Mode is optimized for linear signal transmission (i.e. not digital transmission), the output can be attenuated by 11 dB and applied to the input of a linear modulator without causing over modulation and consequent distortion.

3.14.4.4.7. Audio Decoder > Line Mode Adjust

This field specifies the Line Mode adjust for a specific Audio Decoder. This weighting value affects the Dynamic Range Scale Factor. This is only applicable if the Dynamic Range Control is set to **LINE MODE**.

- **OFF** – A zero scaling factor is applied to the audio output when the Dynamic Range Control is set to **LINE MODE**. Effectively the audio output level will be the same as the audio input level.
- **LOW** – A mid-range scaling factor of 0.5/0.5 (high/low) is applied to the audio output when the Dynamic Range Control is set to **LINE MODE**. Effectively the audio output level will be different to the audio input level.
- **HIGH** – A maximum scaling factor of 1.0/1.0 (high/low) is applied to the audio output when the Dynamic Range Control is

set to **LINE MODE**. Effectively the audio output level will be different to the audio input level.

3.14.4.4.8. Audio Decoder > Routing

This field specifies the routing for the audio signal for a specific Audio Decoder.

- **STEREO** – Channel 1 will be output on the left, channel 2 will output on the right.
- **MIXED TO BOTH** – Channel 1 and Channel 2 are mixed and both output on the left and right.
- **LEFT TO BOTH** – Channel 1 will output on the left and right. Channel 2 is dropped.
- **RIGHT TO BOTH** – Channel 2 will output on the left and right. Channel 1 is dropped.

3.14.4.4.9. Audio Decoder > Down-mix Method

This field specifies the Down-mix Method for a specific Audio Decoder. The Down-mix Method is applied only to AC-3 5.1 and AAC 5.1 audio formats so that the audio output is mixed to a stereo pair (2/0). The Low Frequency Effects (LFE) channel is ignored in both down-mix methods.

- **SURROUND STEREO** – This stereo down-mix method is the same as Left total/Right total (Lt/Rt). This is where the different channels are processed before summing them together and is suitable for processing by a Surround Sound decoder to provide a rear Surround signal.
- **CONVENTIONAL STEREO** – This stereo down-mix method is the same as Left only/Right only (Lo/Ro). This is where the different channels are simply summed together with the centre channel added to both left and right outputs.

3.14.4.4.10. Audio Decoder > AAC Down-mix Algorithm

This field specifies the AAC Down-mix Algorithm to be applied for a specific Audio Decoder. This is only applicable for the AAC audio format.

This feature is only available with the Advanced Audio Decoder devices and therefore only the RX8200.

- **ISO13818** – Use the down-mix equations defined by ISO/IEC 13818-7
- **ARIB B21** – Use the down-mix equations defined by ARIB document STD-B21

3.14.4.4.11. Audio Decoder > Enable PTS Synchronization

This field specifies whether to synchronize the audio stream being decoded for a specific Audio Decoder.

If enabled (default), the PTS from the audio stream is synchronized to the STC/PCR maintained by the decoder in which case, lip-sync is maintained and the decoder may skip or repeat audio frames.

If disabled, the decoder does not attempt to synchronize the audio frames.

This feature is only available with the Basic Audio Decoder devices. PTS synchronization cannot be disabled on the Advanced Audio Decoder devices.

3.14.4.4.12. Audio Decoder > Cue Tone Detection

This field activates DTMF tone detection algorithms in the DSP.

This allows the receiver to monitor the audio service for DTMF tone sequences, which can then be used to trigger SCTE 104 and / or SCTE 35 messages.

If enabled for any audio decoder and the receiver is setup for Multi Service Filtering or Remapping, and the service is present in the output Transport Stream then the decoded service will be modified to insert a SCTE 35 registration descriptor and a reference to a SCTE 35 PID.

If disabled for all decoders, it will not modify the PMT in the output stream.

This feature is only available with the Advanced Audio Decoder devices and therefore only the RX8200.

For further instructions / setup, see section 3.17.5 Cue Tone (DTMF) Splicing Support.

3.14.4.5. Decode > Audio Output Routing > Audio Connectors

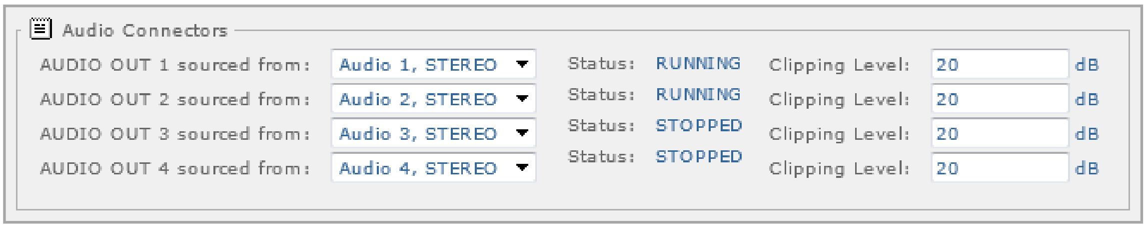


Figure 3-133 Decode > Audio Output Routing > Audio Connectors

Depending on the model and hardware options fitted, a number of audio output configurations are available. Where no hardware options are fitted, this menu option may not be shown.

This refers to the physical audio output ports accessed at the rear of the unit: Audio OUT 1, Audio OUT 2, Audio OUT 3 and Audio OUT 4. Each audio output port has a DE9 interface that provides an analogue left channel, an analogue right channel and a digital AES3 channel.

3.14.4.5.1. Audio Connectors > AUDIO OUT Source

This field maps a physical Audio Output port to the output of one the Audio Decoders available. The Audio Decoders available will vary depending on the Channel Configuration mode selected.

The **NO OUTPUT** selection allows the user to stop any output coming from the associated Audio Output port.

3.14.4.5.2. Audio Connectors > Status

The Status field is a read-only field that reports the Audio Decoder status. It reflects the Audio Decoder Status reported in the main Decode page and confirms that the audio is correctly being routed Audio Output port.

- **RUNNING** – The Audio Decoder is successfully decoding.
- **STOPPED** – The Audio Decoder is not active.
- **ERROR** – The Audio Decoder is experiencing errors during decode.
- **UNLICENSED** – The Audio Decoder cannot decode the audio format because the unit does not have the appropriate license or the audio format is not supported.
- **UNAVAILABLE** – The number of physical audio output connectors exceed the number of Audio Decoders available.
- **---** – Nothing is being routed to the audio output.

3.14.4.5.3. Audio Connectors > Clipping Level

This field specifies the Clipping Level (dB) to be applied to the associated analogue output.
The field accepts values between 0 dB and 20 dB.

3.14.4.6. Decode > Audio Output Routing > SDI Embedding

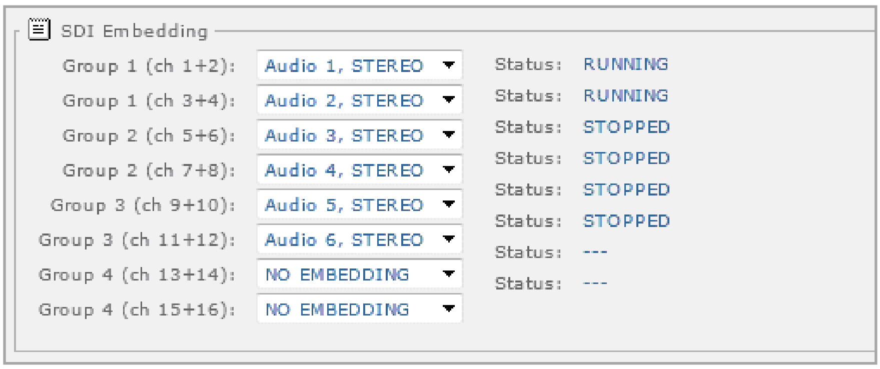


Figure 3-134 Decode > Audio Output Routing > SDI Embedding

Embedded Audio is encapsulated in to the SDI output signal and can provide up to 16 audio channels (8 pairs). The Embedded Audio is carried as AES3 digital audio. All models support this feature and no extra hardware options are required.

3.14.4.6.1. SDI Embedding > Group Source

This field maps an Embedded Audio group to the output of one the Audio Decoders available. The Audio Decoders available will vary depending on the Channel Configuration mode selected.

The **NO EMBEDDING** option allows the user to stop any embedding of audio to the Embedded Audio group.

3.14.4.6.2. SDI Embedding > Status

This is a read-only field that reports the Audio Decoder status. It reflects the Audio Decoder Status reported in the main Decode page and confirms that the audio is correctly being routed to the Embedded Audio group.

- **RUNNING** – The Audio Decoder is successfully decoding.
- **STOPPED** – The Audio Decoder is not active.
- **ERROR** – The Audio Decoder is experiencing errors during decode.
- **UNLICENSED** – The Audio Decoder cannot decode the audio format because the unit does not have the appropriate license or the audio format is not supported.
- **---** – Nothing is being routed to the SDI embedded group.

3.14.4.7. Decode > Audio Output Routing > Create Paired Decoders

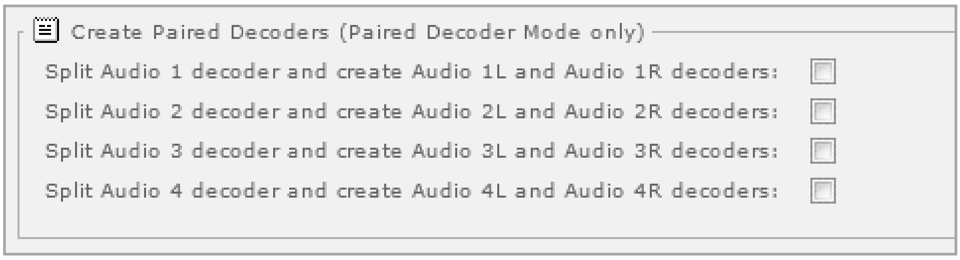


Figure 3-135 Decode > Audio Output Routing > Create Paired Decoders

This section is only applicable when the Channel Configuration is set to *Paired Decoder Mode*. The number of decoders available for *Paired Decoder Mode* will depend whether the following software options are enabled:

- RX8200/SWO/4AUD
- RX8200/SWO/AUD/PAIRED

3.14.4.7.1. Split Audio Decoder and Create Audio L and Audio R Decoders

This function specifies if an Audio Decoder will output a stereo pair or is split to form a dedicated left Audio decoder and a dedicated right Audio Decoder. The section *Channel Configuration: Paired Decoder Mode* describes the behavior in more detail.

3.14.5. Front Panel Audio Selection and Control

Selection and control of audio options are limited on the front panel. It is possible to change the audio PID selection for each Audio Decoder and which group the audio is embedded when inserted in to the SDI output.

An overview of where the audio menus are accessed through the front panel is shown below. It should be noted that the menu number shown in the bottom left corner of the display may be different to number shown in the diagram below. Menu items may be added or removed depending on hardware and software options present

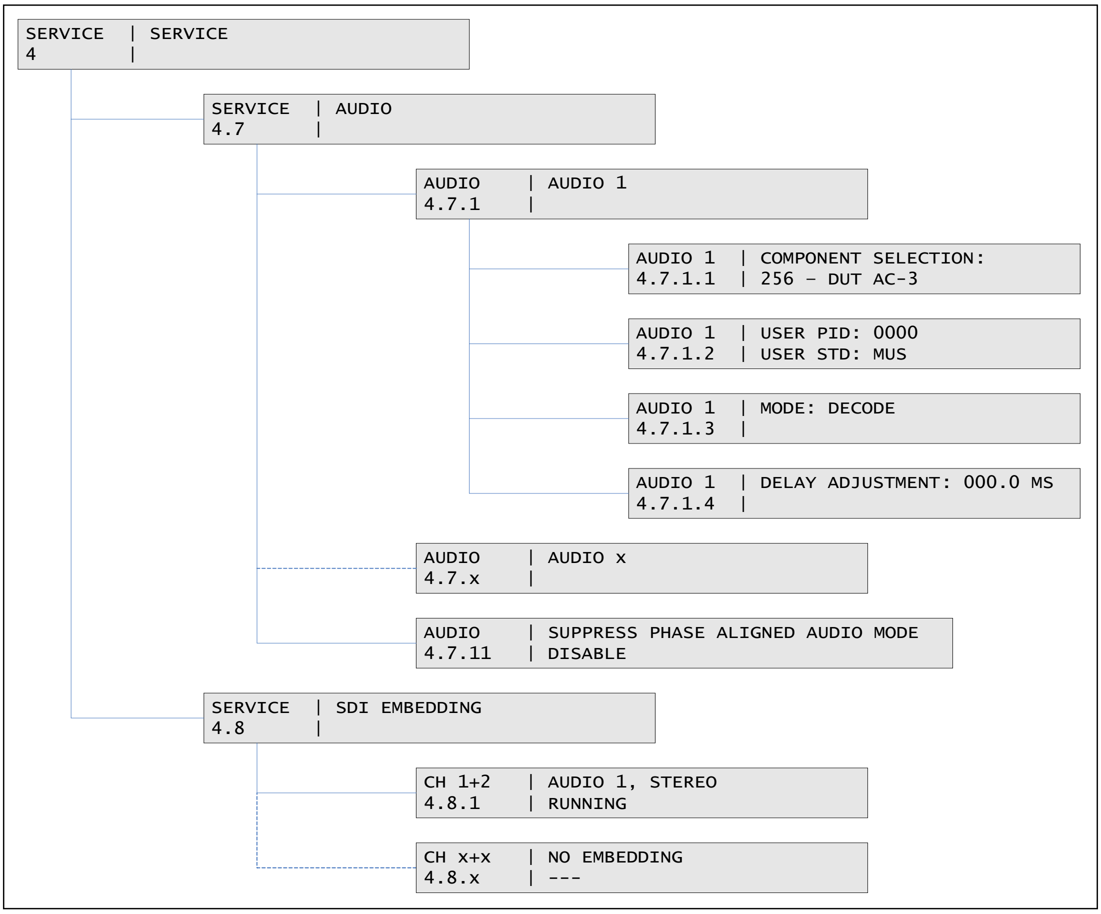


Figure 3-136 Accessing Audio Menus through the Front Panel

3.14.5.1. Audio

This menu provides sub-menus for viewing and editing audio component settings. To access sub-menu for each of the audio decoders, press the ▶ (Forward) key.

```
SERVICE                     |AUDIO
4.7                         |                              >
```

3.14.5.1.1. Audio 1

This menu provides sub-menus for viewing and editing Audio Decoder 1 settings. To access the sub-menus for the specific audio decoder, press the ▶ (Forward) key. Use the ▼ (Down) key to navigate to the other audio decoders available.

```
AUDIO                       |AUDIO 1
4.7.1                       |                              >
```

Component Selection

This menu enables the viewing and editing of component selection for the associated audio decoder.

```
AUDIO 1                     |COMPONENT SELECTION:
4.7.1.1                     |256 - DUT AC-3
```

After selecting the (Edit) key, use the ▲ (Up) and ▼ (Down) keys to toggle between **NO SELECTION**, the **Audio PID list** and **User PID** options.

Each selection choice from the PID list details the PID value, the audio language and the audio format. This information is derived from the audio descriptors listed in the service PMT.

The **NO SELECTION** option is selected to stop the audio decoder. Depending on the state of the PMT Update Mode, this setting may be automatically overridden by the unit after a PMT update event.

The **User PID** selection is selected if the desired audio stream is not present in the audio PID list. User PID selections are not affected by the PMT Update Mode but are dropped when a new decode service is selected.

NOTE: The same PID can be selected across the Advanced Audio Decoders; however, this is not supported for the Basic Audio Decoders. If the same PID is selected for both Basic Audio Decoders, one decoder will attempt to decode and may report status RUNNING, but the second decoder will fail and report status ERROR.

User PID / User STD

This menu enables the viewing and editing of User PID and User Coding Standard (audio format) settings for the associated audio decoder.

```
AUDIO 1                    |USER PID: 6553
4.7.1.2                    |USER STD: MUS
```

Use the **Edit** key to modify the settings as described below.

Use the ◀ (Back) and ▶ (Forward) keys to navigate between **USER PID** and **USER STD**. You will need to navigate past the four USER PID digits before the **USER STD** is selected.

Use the ▲ (Up) and ▼ (Down) keys to increment or decrement the USER PID value.

Use the ▲ (Up) and ▼ (Down) keys to toggle between the USER STD options.

Table 3-28 Represented Audio Format or Coding Standards

USER STD	Represented Audio Format or Coding Standard
MUS	MPEG-1 Audio Layer II or MPEG-2 Audio Layer II (sometimes called MUSICAM)
AC-3	Dolby Digital (AC-3)
E-AC-3	Dolby Digital Plus (DD+, E-AC-3 or Enhanced AC-3)
Linear	Linear PCM
AAC (ADTS)	Advancing Audio coding (AAC): Packaged in a streaming format called Audio Data Transport Stream (ADTS)
AAC (LOAS)	Advancing Audio coding (AAC): Packaged in a streaming format called Low Overhead Audio Stream (LOAS)
HE-AAC	High-Efficiency Advanced Audio Coding (HE-AAC)
HE-AAC (ADTS)	High-Efficiency Advanced Audio Coding (HE-AAC): Packaged in a streaming format called Audio Data Transport Stream (ADTS)

Mode

This menu enables the viewing and editing of default decoder mode or behavior for the associated audio decoder.

```
AUDIO 1                    |MODE: DECODE
4.7.1.3                    |
```

After selecting the **Edit** key, use the ▲ (Up) and ▼ (Down) keys to toggle between **DECODE** and **PASS-THRU**.

This feature is only available with the Advanced Audio Decoder devices and therefore only the RX8200.

- **DECODE** – The audio decoder will attempt to decode the audio stream if decode is supported for the audio format type in use. The audio stream may be down-mixed or modified.

- **PASS THRU** – The audio decoder will attempt to pass-thru the audio stream if pass-thru is supported for the audio format type in use. The audio stream will pass-thru without any alteration and will typically be decoded by an external piece of equipment. If pass-thru is not supported for the audio format in use then the audio decoder will attempt to decode the audio stream by default.

Delay Adjustment

This menu enables the viewing and editing of Delay Adjustment (in ms) settings for the associated audio decoder.

```
AUDIO 1                  |DELAY ADJUSTMENT: 000.0 MS
4.7.1.4                  |
```

After selecting the **Edit** key, use the ▲ (Up) and ▼ (Down) keys to enter the Delay Adjustment value (in ms).

This field specifies the Delay Adjustment value for a specific audio decoder. The field accepts delay values between -49.5 ms and +49.5 ms. The audio Delay Adjustment value is used to offset the System Time Clock (STC) inside the decoder, where the STC is referenced to the Program Counter Reference (PCR). The STC is the master clock used to synchronize the Presentation Time Stamp (PTS) of the incoming audio stream being decoded.

3.14.5.1.2. Audio 2 Onwards

The **Audio 2** and onward menus are identical to the **Audio 1** menus, described above. Unless the RX8200/SWO/4AUD option is fitted and enabled, only **Audio 1** and **2** will be available.

To return to the **Audio** main menu, press the ◀ (Back) button.

3.14.5.1.3. Suppress Phase Aligned Audio

This menu enables the viewing and editing of the **Suppress Phase Aligned Audio** (PAA) mode.

```
AUDIO                    |SUPPRESS PHASE ALIGNED AUDIO
4.7.11                   |DISABLE
```

After selecting the **Edit** key, use the ▲ (Up) and ▼ (Down) keys to toggle between **DISABLE** and **ENABLE**.

- **DISABLE** – PAA mode will not be suppressed if a PAA service is selected. The audio component selections for each audio decoder will be selected as per their unique PAA language descriptor. Component selections cannot be overridden by the user.
- **ENABLED** – PAA mode will be suppressed if a PAA service is selected. The audio component selections for each audio decoder will be as per the PMT order. Component selections assigned to each audio decoder can be overridden by the user.

The section 3.15.5 Channel Configuration: Phase Aligned Audio (PAA) describes the behavior in more detail.

3.14.5.2. SDI Embedding

This menu provides sub-menus for viewing and editing of SDI embedded audio settings. To access this menu from the **Audio** menu, press the ▶ (Forward) key.

```
AUDIO                      |SDI EMBEDDING
4.8                        |                              >
```

3.14.5.2.1. CH 1+2 Embedding

This menu enables viewing and editing of Channel 1 and 2 for audio embedding.

```
CH 1+2                     |NO EMBEDDING
4.8.1                      |---
```

After selecting the **Edit** key, use the ▲ (Up) ▼ (Down) keys to toggle between the available audio decoders. The options presented will depend on what audio decoders are available and the Channel Configuration mode selected.

3.14.5.2.2. CH 3+4, 5+6, 7+8, 9+10, 11+12, 13+14 and 15+16 Embedding

The embedding menus for the remaining channels are identical to those of CH 1+2, described above.

```
CH x+x                     |NO EMBEDDING
4.8.x                      |---
```

3.15. Audio Channel Configuration Modes

3.15.1. Audio Formats Supported by the Channel Configuration Modes

The IRD supports a number of audio format types, but depending on the Channel Configuration mode selected, some of these audio formats may not be processed. The tables below summarize what audio formats can be processed with what Channel Configuration mode.

3.15.1.1. Channel Configuration vs Audio Format on the RX8200

RX8200	MUSICAM	Dolby E	Linear	Dolby® Digital Plus	Dolby® Digital	AAC	PAA
Stereo Pairs	✓	✓	✓	✓	✓	✓	
Multi-Channel (5.1)	✓	✓	✓	✓	✓	✓	
Dual Multi-Channel (5.1)	✓	✓	✓	✓	✓	✓	
Phase Aligned Audio							✓
Paired Decoder mode	✓					✓	
10-Stereo Pairs (MUS only) Audio	✓						
8 Channel AES3	✓	✓	✓	✓	✓	✓	
16 Channel Aligned (MUS only) Audio	✓						

3.15.1.2. Channel Configuration Vs Audio Format on the RX83xx

RX83xx	MUSICAM	Dolby E	Linear	Dolby® Digital Plus	Dolby® Digital	AAC	PAA
Stereo Pairs	✓				✓	✓	

3.15.2. Channel Configuration: Stereo Pairs

3.15.2.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Stereo Pairs	B	B	B	B	B

3.15.2.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.2.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.15.2.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no software licenses associated with this feature			

3.15.2.5. Functional Description

This is the default Channel Configuration mode where each audio decoder will output two channels i.e. a stereo pair. The majority of audio formats are decoded in this mode including AC-3 5.1 and AAC 5.1, which will be down-mixed to a stereo pair. Six audio decoders are available in this mode after enabling the RX8200/SWO/4AUD license. The following table shows the stereo pairs: available output channels on RX82xx and stereo pairs: available output channels on RX83xx.

Table 3-29 Stereo Pairs: Available Output Channels on RX82xx

RX82xx	Disable 4AUD license		Enable 4AUD license					
Audio Decoder	1	2	1	2	3	4	5	6
Physical decoder	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced	Basic	Basic
Output Channels	2	2	2	2	2	2	2	2
Channel Name	L R (Stereo)	L R (Stereo)	L R (Stereo)	L R (Stereo)	L R (Stereo)	L R (Stereo)	L R (Stereo)	L R (Stereo)

Table 3-30 Stereo Pairs: Available Output Channels on RX83xx

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	1	2	N/A
Physical decoder	Basic	Basic	
Output Channels	2	2	
Channel Name	L R (Stereo)	L R (Stereo)	

Under the **Decode > Audio Output Routing** section, the user is presented with the following options for both the analogue outputs and the SDI embedded outputs:

- Audio 1, STEREO.
- Audio 2, STEREO.
- Audio 3, STEREO (available with 4AUD license).
- Audio 4, STEREO (available with 4AUD license).
- Audio 5, STEREO (available with 4AUD license).

3.15.3. Channel Configuration: Multi-Channel (5.1)

3.15.3.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Multi-Channel (5.1)	●				

3.15.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.15.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/AC3	Dolby Digital® Decoding / Down-mixing	FAZ 101 0113/22	RX8XXX/SWO/AC3
RX8200/SWO/AAC	AAC Decode	FAZ 101 0113/21	RX8XXX/SWO/AAC
RX8200/SWO/4AUD	4 x Audio Capacity	FAZ 101 0113/20	RX8200/SWO/4AUD

3.15.3.5. Functional Description

This mode configures the Audio 1 decoder to provide a six-channel output whilst any remaining audio decoders continue to provide a two-channel output (stereo pair). This mode is applicable to AC-3 5.1 and AAC 5.1 audio formats. A 5.1 channel surround system has five discrete, full-range channels of sound: Left, Right, Center, Left Surround, and Right Surround - plus a subwoofer that delivers low-frequency information only.

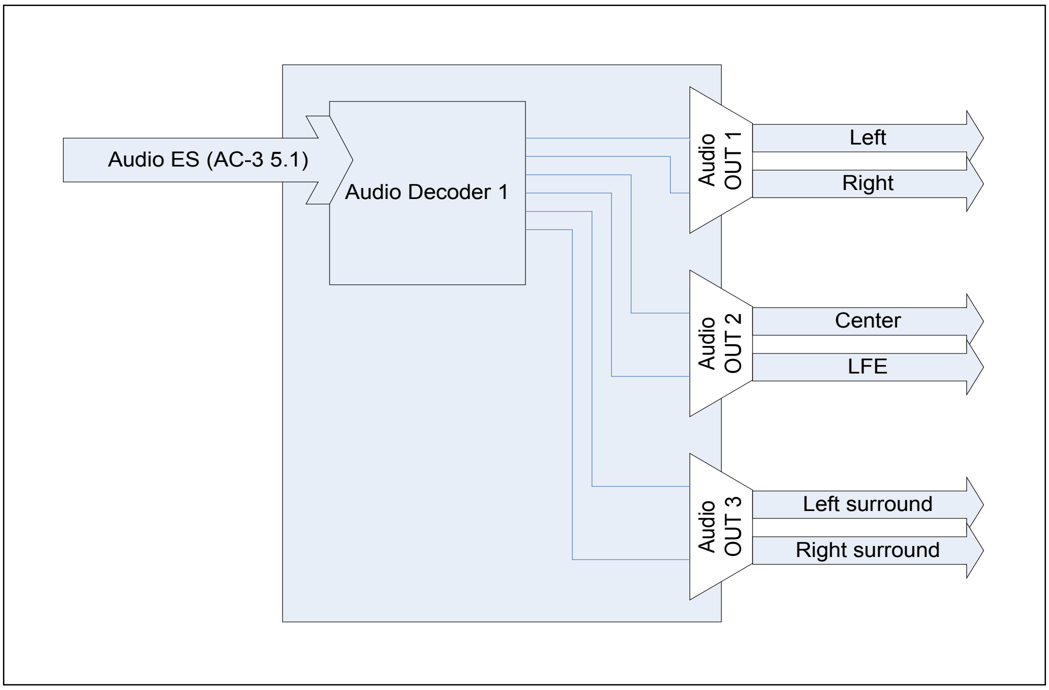


Figure 3-137 Audio Decoder 1 Flow Diagram

The RX8200/SWO/4AUD license must be enabled for this mode which will expose four audio decoders but it is only the Audio 1 decoder that can provide the six-channel output. The following tables show the available output channels on RX82xx with the 4AUD license enabled and those not available when the 4AUD license is disabled or on the RX83xx.

Table 3-31 Output Channels Available on RX82xx

RX82xx	Disable 4AUD license		Enable 4AUD license			
Audio Decoder	1	2	1	2	3	4
Physical decoder	Advanced	Advanced	Advanced	Advanced	Basic	Basic
Output Channels	N/A	N/A	6	2	2	2
Channel Name	N/A	N/A	(Lf Rf) (C LFE) (Lr Rr)	L R (Stereo)	L R (Stereo)	L R (Stereo)

Table 3-32 Output Channels Available on RX83xx

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	1	2	N/A
Physical decoder	Basic	Basic	
Output Channels	N/A	N/A	
Channel Name	N/A	N/A	

Under the **Decode > Audio Output Routing** section, the user is presented with the following options for both the analogue outputs and the SDI embedded outputs:

- Audio 1, Lf Rf (available with 4AUD license).
- Audio 1, C LFE (available with 4AUD license).
- Audio 1, Lr Rr (available with 4AUD license).
- Audio 2, STEREO (available with 4AUD license).
- Audio 3, STEREO (available with 4AUD license).
- Audio 4, STEREO (available with 4AUD license).
- Audio 6, STEREO (available with 4AUD license).

3.15.4. Channel Configuration: Dual Multi-Channel (5.1)

3.15.4.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Dual Multi-Channel (5.1)	●				

3.15.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.4.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.15.4.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/AC3	Dolby Digital® Decoding / Down-mixing	FAZ 101 0113/22	RX8XXX/SWO/AC3
RX8200/SWO/AAC	AAC Decode	FAZ 101 0113/21	RX8XXX/SWO/AAC
RX8200/SWO/4AUD	4 x Audio Capacity	FAZ 101 0113/20	RX8200/SWO/4AUD
Included with RX8200/SWO/4AUD	Dual Multi-Channel (5.1) mode	-	RX8200/SWO/AUD/ 2MULTICHAN

3.15.4.5. Functional Description

This mode is similar to Multi-Channel (5.1) described above except in addition to the Audio 1 decoder providing a six-channel output, the Audio 2 decoder also provides a six-channel output. Hence the mode name Dual Multi-Channel (5.1). As before, any remaining audio decoders continue to provide a two-channel output (stereo pair). This mode is applicable to AC-3 5.1 and AAC 5.1 audio formats and will require the RX8200/SWO/AUD/2MULTICHAN license.

The RX8200/SWO/4AUD license must be enabled for this mode which will expose four audio decoders but it is only the Audio 1 and 2 decoders that provide the six-channel output. It is therefore possible to output up to 16 channels of audio, for example:

Table 3-33 Example of How 16 Channels can be Accumulated Using Dual Multi-Channel (5.1) Mode

Audio Decoder	Max Output Channels by Decoder	Output Channel Names	Example Decoder Setup	Output Channels Accumulated
Audio 1	6	(Lf Rf) (C LFE) (Lr Rr)	PID 101 - AAC 5.1 6 channel output	6
Audio 2	6	(Lf Rf) (C LFE) (Lr Rr)	PID 102 - AAC 5.1 6 channel output	12
Audio 3	2	L R (Stereo)	PID 103 - AAC 5.1 Down-mixed to 2 channel output	14
Audio 4	2	L R (Stereo)	PID 104 - AAC 2.0 2 channel output	16

The following tables show the available output channels on RX82xx with the 4AUD license enabled and those not available with the 4AUD license disabled or on the RX83xx.

Table 3-34 Output Channels Available on RX82xx

RX82xx	Disable 4AUD license		Enable 4AUD license			
Audio Decoder	1	2	1	2	3	4
Physical decoder	Advanced	Advanced	Advanced	Advanced	Basic	Basic
Output Channels	N/A	N/A	6	6	2	2
Channel Name	N/A	N/A	(Lf Rf) (C LFE) (Lr Rr)	(Lf Rf) (C LFE) (Lr Rr)	L R (Stereo)	L R (Stereo)

Table 3-35 Output Channels Available on RX83xx

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	**1**	**2**	**N/A**
Output Channels	**N/A**	**N/A**	

Under the **Decode > Audio Output Routing** section, the user is presented with the following options for both the analogue outputs and the SDI embedded outputs:

- Audio 1, Lf Rf. (available with 4AUD license).
- Audio 1, C LFE. (available with 4AUD license).
- Audio 1, Lr Rr. (available with 4AUD license).
- Audio 2, Lf Rf. (available with 4AUD license).
- Audio 2, C LFE. (available with 4AUD license).
- Audio 2, Lr Rr. (available with 4AUD license).
- Audio 3, STEREO (available with 4AUD license).
- Audio 4, STEREO (available with 4AUD license).

3.15.5. Channel Configuration: Phase Aligned Audio (PAA)

3.15.5.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Phase Aligned Audio	●				

3.15.5.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.5.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.15.5.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/4AUD	4 x Audio Capacity (Enable additional audio decoders)	FAZ 101 0113/20	RX8200/SWO/4AUD
RX8200/SWO/PAA	Phase Aligned Audio decode	FAZ 101 0113/49	RX8XXX/SWO/PAA

3.15.5.5. Functional Description

MediaKind encoders and receivers can utilize a unique audio technology called Phase Aligned Audio. This utilizes multiple, synchronized, MPEG-1 Layer II audio channels that can deliver surround sound channels plus additional audio services. A single decoder synchronizes all the PAA components so that they remain aligned.

This Configuration Mode is only available to the RX8200 with the 4AUD license enabled.

Phase Aligned Audio is indicated in the service PMT for each audio component involved. Normally, the three-letter language code should be an ISO 639 Language code, but in this case, a unique code is used to identify each of the PAA channels.

Table 3-36 PAA Channel Codes

Channel Configuration Mode Assigned	Audio Decoder	First Channel Language Code	Second Channel Language Code
PAA	Audio 1	Channel 1: a,a,a	Channel 2: a,a,b
	Audio 2	Channel 3: a,a,c	Channel 4: a,a,d
	Audio 3	Channel 5: a,a,e	Channel 6: a,a,f
	Audio 4	Channel 7: a,a,g	Channel 8: a,a,h
Stereo Pair	Audio 5	Channel 1: ISO 639	Channel 2: ISO 639
Stereo Pair	Audio 6	Channel 1: ISO 639	Channel 2: ISO 639
Dual PAA	Audio 7	Channel 1: b,b,a	Channel 2: b,b,b
	Audio 8	Channel 3: b,b,c	Channel 4: b,b,d
	Audio 9	Channel 5: b,b,e	Channel 6: b,b,f
	Audio 10	Channel 7: b,b,g	Channel 8: b,b,h

PAA mode is automatically selected by the RX8200 when the PAA descriptors are detected in the selected decode service, it cannot be manually selected. The PAA audio components will be assigned to the correct Audio Decoder as listed in the table above despite their order in the PMT and will override any configuration settings necessary. Audio decoders assigned for PAA whether it is 6 or 8 channel will become read-only fields in the web-browser that cannot be changed by the user. The remaining audio decoders are still available for decode as a Stereo Pair.

In PAA mode, the Decode > Advanced > Audio X: Mode setting is forced to DECODE and the Decode > Advanced > Audio X: Routing setting is forced to STEREO.

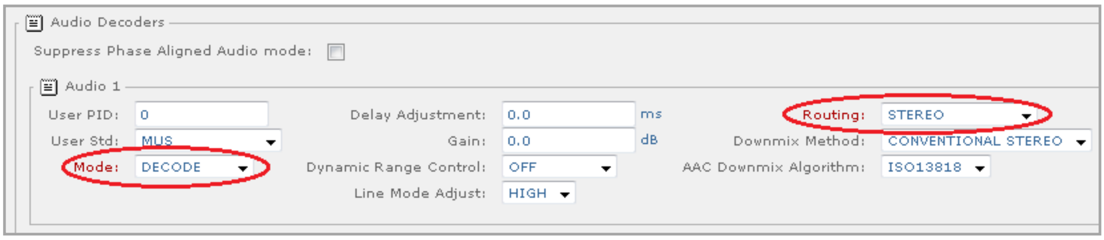


Figure 3-138 Audio Decoders > Audio 1 Windows

Under the Decode > Audio Output Routing section, the user is presented with the following options for both the analogue outputs and the SDI embedded outputs:

- Audio 1, STEREO.
- Audio 2, STEREO.
- Audio 3, STEREO.
- Audio 4, STEREO.
- Audio 5, STEREO.
- Audio 6, STEREO.

Note that in PAA mode, Groups 1 and 2 under the **Decode > Audio Output Routing > SDI Embedding** section will be changed to read-only fields that cannot be modified by the user (Groups 3 and 4 will also be changed in the case of Dual PAA). These will be forced to default routing values.

3.15.5.5.1. Phase Aligned Audio

For a single PAA instance, up to 8 channels are supported by the IRD. Six audio decoders are exposed to the user with Audio Decoders 1-4 reserved for PAA.

It should be noted that with the RX8200, where 6 Channel PAA is being decoded, Audio Decoder 4 will become available to the user for configuration. This was originally unavailable on the RX1290.

Table 3-37 Available Output Channels on RX82xx for PAA

RX82xx	Disable 4AUD license		Enable 4AUD license					
Audio Decoder	1	2	1	2	3	4	5	6
Physical decoder	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced	Basic	Basic
Output Channels	N/A	N/A	6 channels across 3 decoders			2	2	2
Channel Name	N/A	N/A	PAA			L R (Stereo)	L R (Stereo)	L R (Stereo)

Table 3-38 Available Output Channels on RX82xx for 8-Channel PAA

RX82xx	Disable 4AUD license		Enable 4AUD license					
Audio Decoder	1	2	1	2	3	4	5	6
Physical decoder	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced	Basic	Basic
Output Channels	N/A	N/A	8 channels across 4 decoders				2	2
Channel Name	N/A	N/A	PAA				L R (Stereo)	L R (Stereo)

Table 3-39 PAA Not Available on RX83xx

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	1	2	N/A
Physical decoder	Basic	Basic	
Output Channels	N/A	N/A	
Channel Name	N/A	N/A	

3.15.5.5.2. Dual Phase Aligned Audio

Dual PAA is where the stream presents two PAA instances under a single service. The three-letter language codes for the second PAA instance are unique so that they do not clash with the first PAA instance (e.g. uses language code b,b,a instead of a,a,a). Again, up to 8 channels are supported by the IRD for each PAA instance but ten audio decoders are now exposed to the user with Audio Decoders 1-4 reserved for the first PAA instance and Audio Decoders 7-10 reserved for the second PAA instance.

Where 6 Channel PAA is being decoded, Audio Decoder 4 and/or Audio Decoder 10 will become available to the user for configuration.

3.15.5.5.3. Suppressing Phase Aligned Audio

Since selection of the PAA Channel Configuration mode is automatic, an option is available that will suppress the mode including any automatic configurations that would normally be required for PAA. If a PAA service is selected with PAA suppressed, the audio component selections for each audio decoder will be as per the default behavior for the IRD, which is to select components based on the PMT order.

This control is located in the web browser under the section Decode > Advanced > Audio Decoders: Suppress Phase Aligned Audio mode.

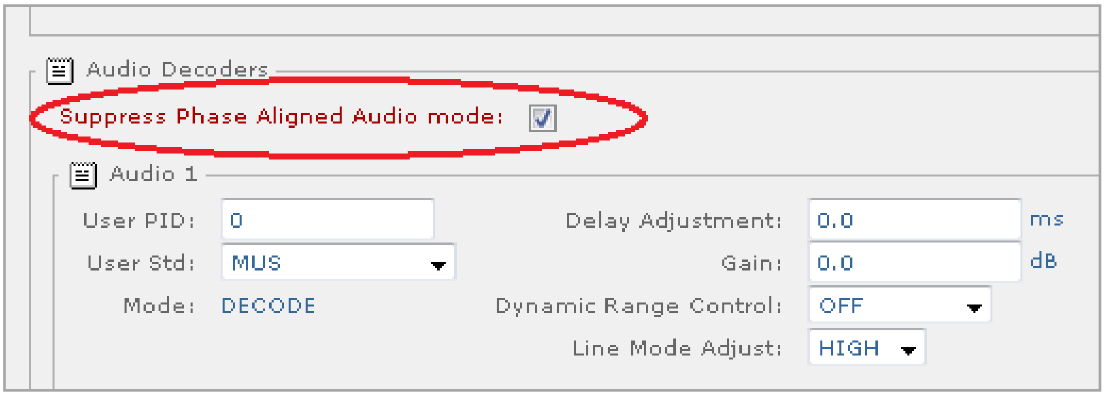


Figure 3-139 Suppress Phase Aligned Audio Mode Check Box

3.15.6. Channel Configuration: Paired Decoder Mode

3.15.6.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Paired Decoder Mode	●				

3.15.6.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.6.3. Control

Web	Front Panel	SNMP	Serial Remote	Director OAC
✓		✓		✓

3.15.6.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/AUD/PAIRED	Paired Decoder Mode		RX8200/SWO/AUD/PAIRED

3.15.6.5. Functional Description

In this mode, a single audio decoder or a pair of audio decoders is used to create a two-channel output.

- A single decoder is configured to output two channels. This could decode a stereo audio stream, a mono audio stream (output to both channels) or a dual mono audio stream.
- A pair of single decoders are configured to output one channel each but are paired together to artificially provide a dual mono output. Each decoder could decode a mono audio stream or a stereo audio stream that is down-mixed to mono. This will not work with a dual mono audio stream because one of the channels will be lost.

Initially, four Audio Decoders are exposed to the user that are configured to output two channels each but these can be expanded to eight Audio Decoders configured to output one channel each that are then paired together.

This mode is manually selected by the user or automatically forced by Director's OAC command **Configure multiple radio services**.

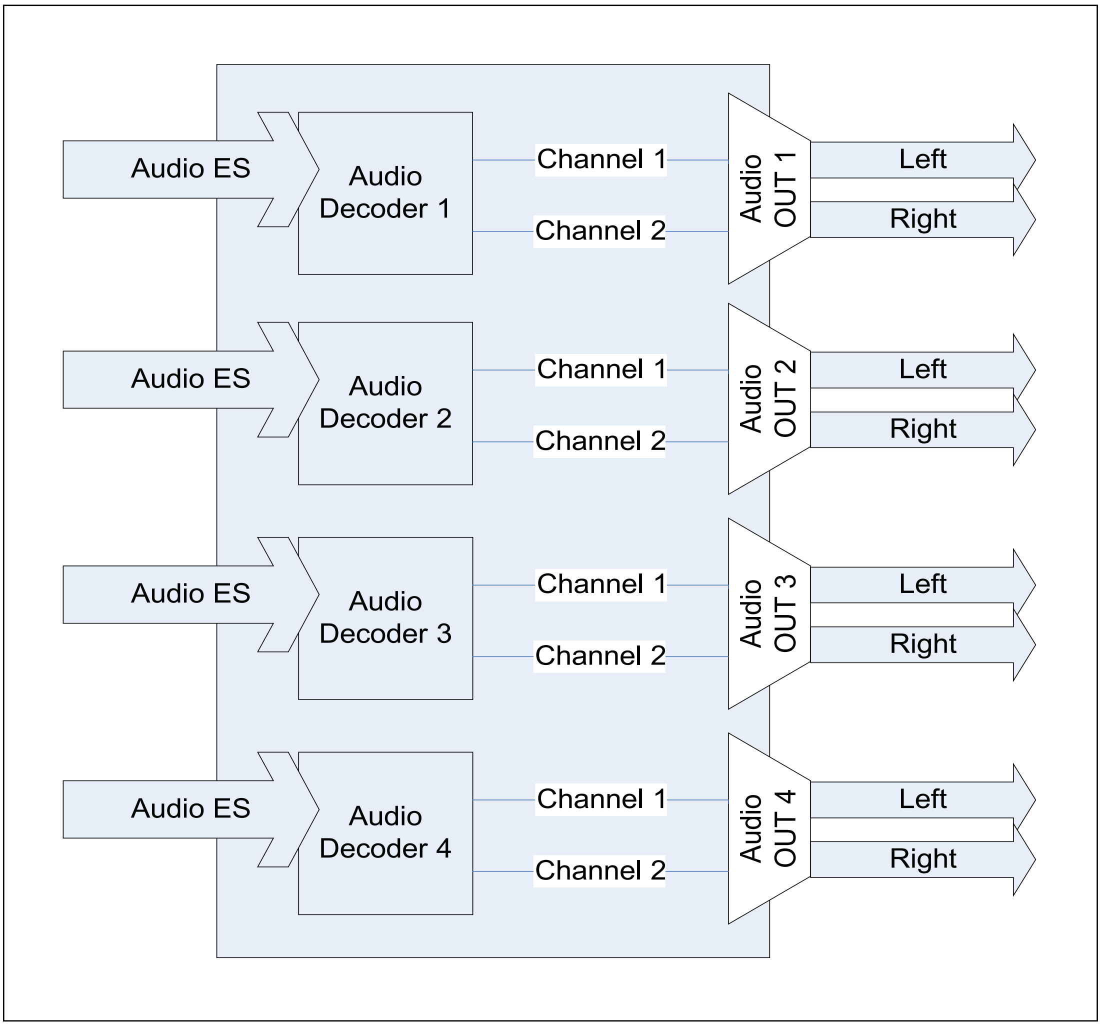


Figure 3-140 Four-Audio Decoder Configuration

The diagram above illustrates four Audio Decoders each configured to output two channels and assigned to an audio output port. Where the decoded audio stream is mono, it is output on both channels.

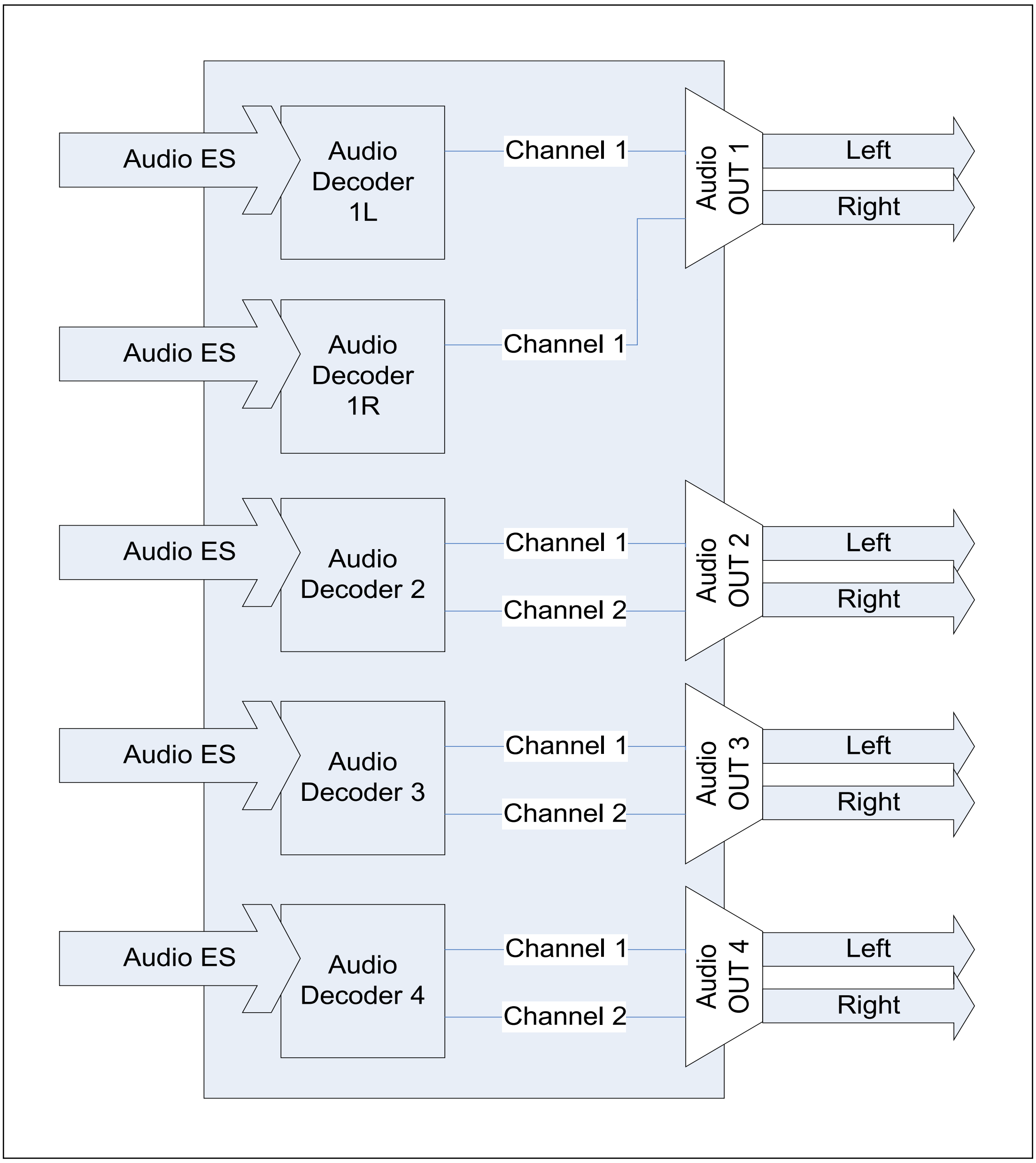


Figure 3-141 Configuration for Audio Decoder Pairing

The diagram above illustrates how Audio Decoder 1 has been paired with another decoder to produce Audio Decoder 1L and 1R. Audio Decoder 1L and 1R are then configured to output one channel each. This allows two separate audio streams to be decoded separately but paired together to provide a dual-mono output on the associated audio output port. Where the decoded audio stream is stereo, it will be down-mixed to a single mono channel.

NOTE: Note: In this mode there will only ever be eight output channels after enabling the RX8200/SWO/4AUD license.

Table 3-40 Paired Audio Decoder Output Mode on RX8200

RX82xx	Disable 4AUD license		Enable 4AUD license							
Audio Decoder	1	Hide	1	Hide	2L	2R	3	Hide	4	Hide
Physical decoder	Adv	Adv	Adv	Adv	Adv	Adv	Adv	Adv	Adv	Adv
Output Channels	2	0	2	0	1	1	2	0	2	0
Channel Name	L+R	-	L+R	-	L	R	L+R	-	L+R	-
Paired Decoder Output Mode	L+R		L+R		L+R		L+R		L+R	

Table 3-41 Paired Audio Decoder Output Mode: Not Available on RX83xx

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	1	2	N/A
Physical decoder	Basic	Basic	
Output Channels	N/A	N/A	
Channel Name	N/A	N/A	

In order to create a paired decoder, the user can split an existing decoder in the **Decode > Audio Output Routing > Create Paired Decoder** section.

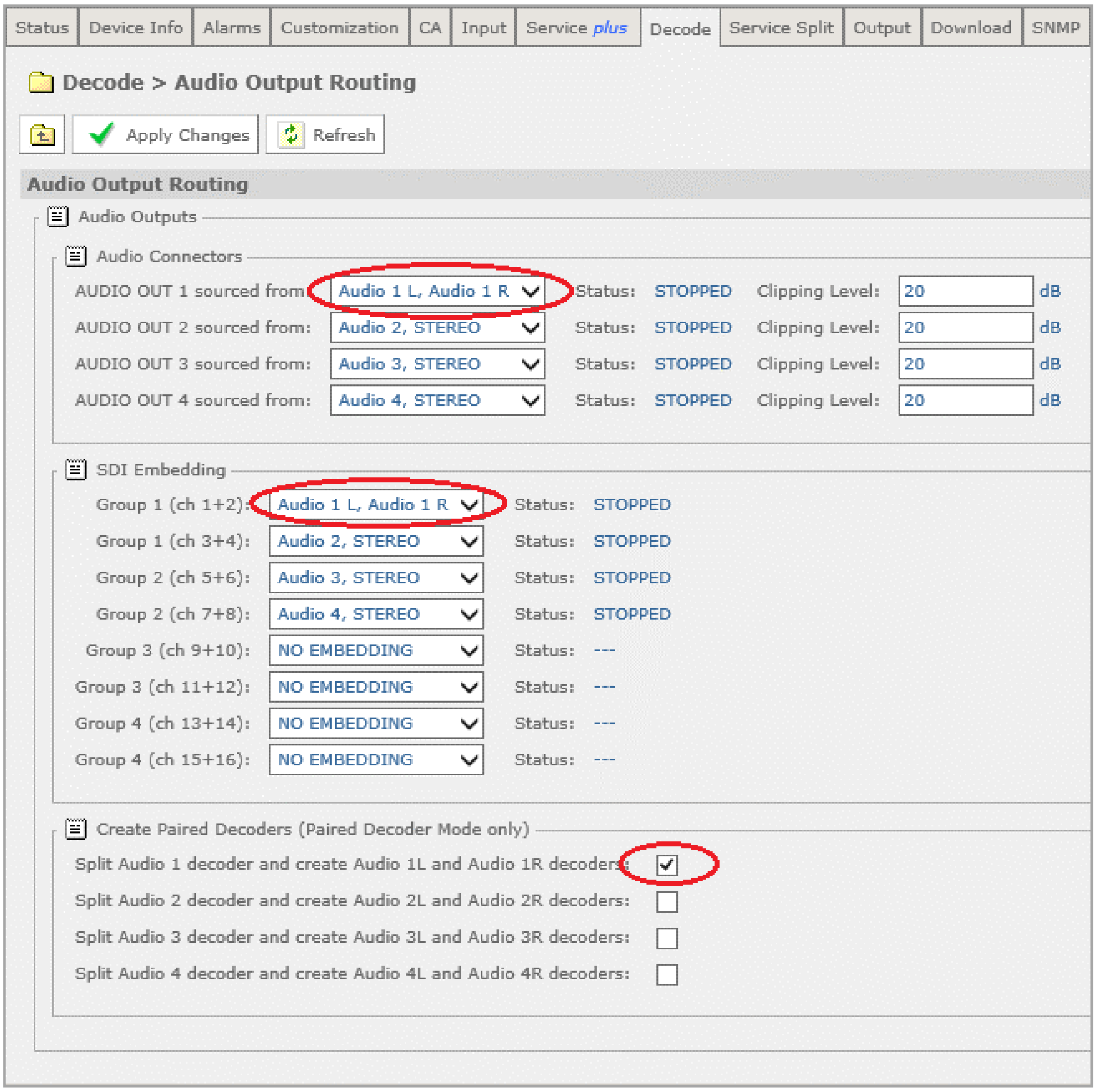


Figure 3-142 Create Paired Decoders Fields

The user is presented with the following options that pair decoders together. This will modify the choice descriptions for both the analogue output and the SDI embedded output.

Create Paired Decoders (Paired Decoder Mode only)

- Split Audio 1 and create paired-decoders Audio 1L and Audio 1R.
- Split Audio 2 and create paired-decoders Audio 2L and Audio 2R - available with 4AUD license.
- Split Audio 3 and create paired-decoders Audio 3L and Audio 3R - available with 4AUD license.
- Split Audio 4 and create paired-decoders Audio 4L and Audio 4R - available with 4AUD license.

3.15.7. Channel Configuration: 10-Stereo Pairs (MUSICAM only) Audio

3.15.7.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
10-Stereo Pairs (MUS only) Audio	●				

3.15.7.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.7.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.15.7.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/4AUD	4 x Audio Capacity (Enable additional audio decoders)	FAZ 101 0113/20	RX8200/SWO/4AUD

3.15.7.5. Functional Description

This is where ten audio decoders are exposed, each providing two-channel output (a stereo pair) but will only decode MPEG-1 Layer II.

Up to 16 audio channels can be encapsulated as Embedded Audio in the SDI output signal, thus only the eight Advanced Audio Decoders can be routed to the SDI Embedded output. In this mode, the Advanced Decoders are assigned to Audio Decoders 1-8 and the *Basic Decoders* are assigned to Audio Decoders 9-10 so that the first eight Audio Decoders are mapped to the SDI Embedded outputs by default.

NOTE: Previous to software version 7.1.3, the Basic Decoders were assigned to Audio Decoders 5-6 and Advanced Decoders were assigned to Audio Decoders 1-4 and 7-10.

It is possible to get up to 8 audio channels out of the physical audio output ports if the extra audio output option card has been fitted. Any of the ten Audio Decoders exposed can be routed to the audio output ports.

Table 3-42 Available Output Channels on RX82xx: Ten Stereo Pairs Mode as of Software Version 7.1.3 Onwards

RX82xx	Enable 4AUD License									
Audio Decoder	1	2	3	4	5	6	7	8	9	10
Physical Decoder	Adv	Adv	Adv	Adv	Adv	Adv	Adv	Adv	Basic	Basic
Output Channels	2	2	2	2	2	2	2	2	2	2
Channel Name	L R Stereo	L R Stereo	L R Stereo	L R Stereo	L R Stereo	L R Stereo	L R Stereo	L R Stereo	L R Stereo	L R Stereo
SDI Em-bedded Audio	✓	✓	✓	✓	✓	✓	✓	✓	×	×
Audio Output Ports	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Audio Decoder can be routed to specified audio output

× = Audio Decoder cannot be routed to specified audio output

Table 3-43 Available Output Channels on RX83xx: Ten Stereo Pairs

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	1	2	N/A
Physical decoder	Basic	Basic	
Output Channels	N/A	N/A	
Channel Name	N/A	N/A	

3.15.8. Channel Configuration: 8 Channel AES3

3.15.8.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
8 Channel AES3	●				

3.15.8.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.8.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.15.8.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no software licenses associated with this feature			

3.15.8.5. Functional Description

This mode configures the Audio 1 decoder to provide an eight-channel output whilst any remaining audio decoders continue to provide a two-channel output (stereo pair).

This mode is applicable to a special case where a single audio stream containing up to 8 channels of compressed audio may be passed through and Embedded in Groups 1 and 2 of the SDI output. A typical audio stream may be constructed as shown in *Table 3-44*.

Table 3-44 Example of an 8-Channel Stream That May Use the 8-Channel AES3 Mode

Audio Decoder 1	Audio Channel	Channel Content	Embedded Group Output	Audio Output Connector
Audio stream on a single PID	1	Linear PCM	Group 1	Audio OUT1
	2			
	3			Audio OUT2
	4			
	5	Dolby E	Group 2	Adio OUT3
	6			
	7			Audio OUT4

Three audio decoders are available in this mode after enabling the RX8200/SWO/4AUD license but it is only the Audio 1 decoder that can provide the 8-channel output. The following tables show the available output channels on RX82xx and those not available on the RX83xx.

Table 3-45 Output Channels Available on RX82xx

RX82xx	Disable 4AUD license		Enable 4AUD license					
Audio Decoder	1		1				3	4
Physical decoder	Advanced		Advanced				Basic	Basic
Output Channels	8		8				2	2
Channel Name	(AES3 Ch 1+2) (AES3 Ch 3+4) (AES3 Ch 5+6) (AES3 Ch 7+8)		(AES3 Ch 1+2) (AES3 Ch 3+4) (AES3 Ch 5+6) (AES3 Ch 7+8)				L R (Stereo)	L R (Stereo)

Table 3-46 Output Channels Available on RX83xx

RX83xx	Disable 4AUD license		Enable 4AUD license
Audio Decoder	**1**	**2**	**N/A**
Output Channels	**N/A**	**N/A**	

Under the **Decode > Audio Output Routing** section, the user is presented with the following options for both the analogue outputs and the SDI embedded outputs:

- Audio 1, AES3 Ch 1+2
- Audio 1, AES3 Ch 3+4
- Audio 1, AES3 Ch 5+6
- Audio 1, AES3 Ch 7+8
- Audio 2, STEREO (available with 4AUD license).
- Audio 3, STEREO (available with 4AUD license).

3.15.9. Channel Configuration: 16 Channel Aligned (MUSICAM only) Audio

3.15.9.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
16 Channel Aligned (MUS only) Audio	●				

3.15.9.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.15.9.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.15.9.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/4AUD	4 x Audio Capacity (Enable additional audio decoders)	FAZ 101 0113/20	RX8200/SWO/4AUD
RX8200/SWO/PAA	Phase Aligned Audio decode	FAZ 101 0113/49	RX8XXX/SWO/PAA

3.15.9.5. Functional Description

This is where eight audio decoders are exposed, each providing two-channel output (a stereo pair) but will only decode MPEG-1 Layer II.

This utilizes multiple, synchronized, MPEG-1 Layer II audio channels that can deliver surround sound channels plus additional audio services. A single decoder synchronizes all the components so that they remain aligned. All source audio services must have their audio components aligned in PES packets with the same timestamp.

This is similar to the Phase Aligned Audio mode but configuration is done manually without using the language descriptors.

It is possible to get up to eight audio channels out of the physical audio output ports if the extra audio output option card has been fitted. Any of the eight Audio Decoders exposed can be routed to the audio output ports.

3.16. Multi-Service Radio Decoder

The IRD is typically used to decode a single video or radio service. It can recover a single 27 MHz clock from the single service and this is used to synchronize all service components such as video and audio lip-sync.

Radio Mode transforms the IRD to decode multiple radio services. However, all services are synchronized to a single clock reference.

3.16.1. Radio Mode

3.16.1.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Radio Mode	B				

3.16.1.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
No option cards are required for this feature			

3.16.1.3. Control

Web	Front Panel	SNMP	Serial Remote	Director OAC
✓				✓

3.16.1.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no software licenses associated with this feature			

3.16.1.5. Functional Description

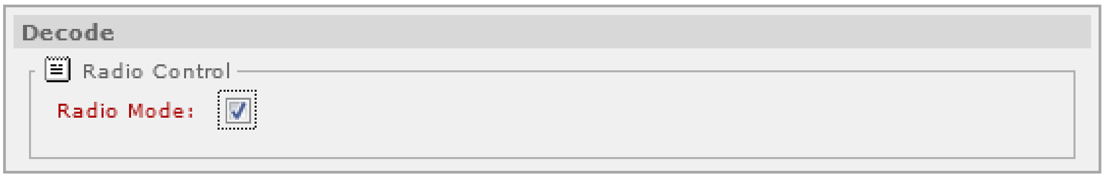


Figure 3-143 Radio Mode Field

By default the Radio Mode is disabled and the IRD will present a single service selection for decoding a video or radio service. Video can be decoded and all the service component elementary streams are synchronized to a single clock reference i.e. PCR.

When Radio Mode is enabled, the ability to decode a single video service is removed, and instead a number of radio service selections are exposed. Rather than just having a PID selection for each audio decoder, it will also have a radio Service ID selection. The number of audio decoders available is dependent on the Channel Configuration mode selected.

The service component streams for all these radio services are still synchronized to a single clock reference. If the Radio service does not share the same PCR, there may be errors and disruptions with that audio output.

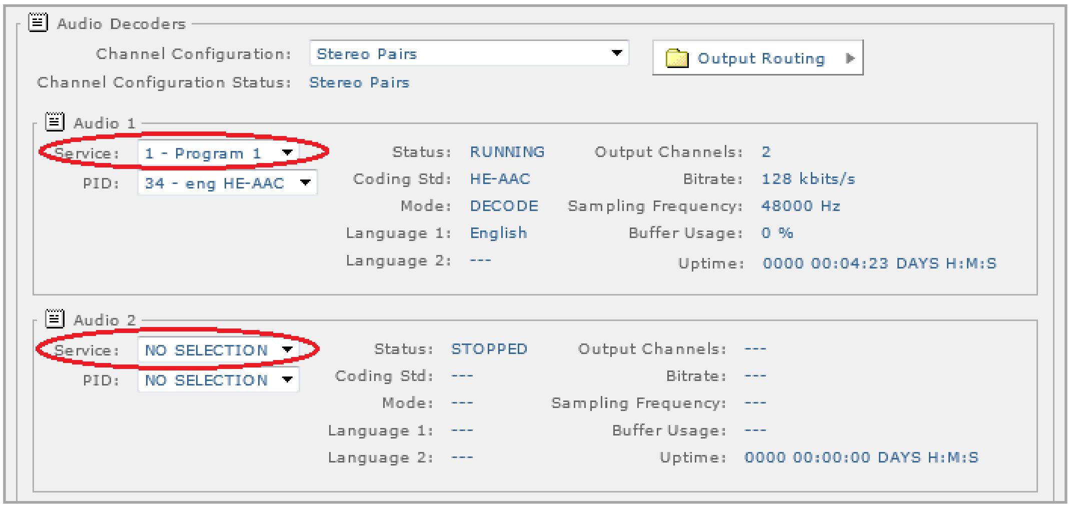


Figure 3-144 Radio Mode – Selecting Audio 1 and 2 Services

3.16.1.6. Radio Mode Disabled

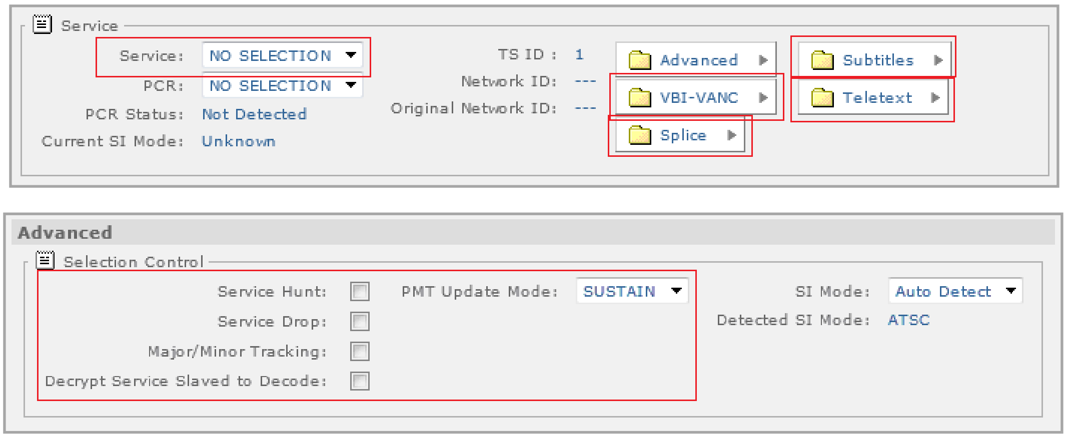


Figure 3-145 Radio Mode Disabled

When the Radio Mode is disabled, most of the video related features are exposed.

- Decode > Service ID selection is shown.
- Decode > Video PID selection is shown.
- Decode > VBI-VANC options are shown.
- Decode > Splice options are shown.
- Decode > Subtitles options are shown.
- Decode > Teletext options are shown.
- Decode > Advanced > Service Drop option is shown.
- Decode > Advanced > Service Hunt option is shown.

- Decode > Advanced > Major/Minor Tracking option is shown.
- Decode > Advanced > Decrypt Service Slaved to Decode option is shown.
- Decode > Advanced > PMT Update Mode option is shown.
- Phase Aligned Audio mode is not suppressed permanently. Whether the Phase Aligned Audio mode becomes active depends on license state, stream content and the Decode > Advanced > Suppress Phase Aligned Audio Mode setting.

3.16.1.7. Radio Mode Enabled

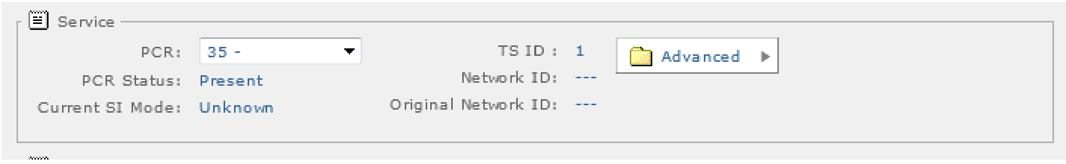


Figure 3-146 Radio Mode Enabled

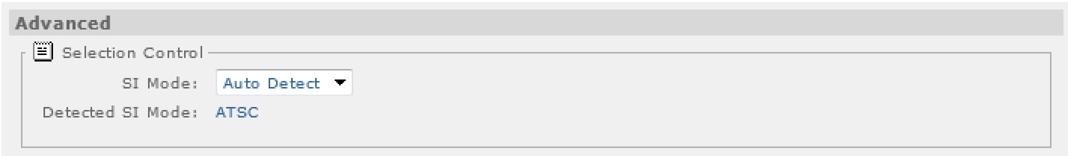


Figure 3-147 SI Mode Field

When the Radio Mode is enabled, most of the video related features are hidden.

- Decode > Service ID selection is hidden and flushed to a NO SELECTION state.
- Decode > Video PID selection is hidden.
- Decode > VBI-VANC options are hidden.
- Decode > Splice options are hidden.
- Decode > Subtitles options are hidden.
- Decode > Teletext options are hidden.
- Decode > Advanced > Service Drop is disabled and the option is hidden.
- Decode > Advanced > Service Hunt is disabled and the option is hidden.
- Decode > Advanced > Major/Minor Tracking is disabled and the option is hidden.
- Decode > Advanced > Decrypt Service Slaved to Decode is disabled and the option is hidden.
- Decode > Advanced > PMT Update Mode option is hidden.
- A single PCR reference is still exposed as this is used as the single clock reference for all the selected Radio Services.
- Phase Aligned Audio is disabled if it was active and will be suppressed permanently regardless of license state, stream content and the Decode > Advanced > Suppress Phase Aligned Audio Mode setting.

3.16.1.8. Channel Configurations Supported in Radio Mode

Enabling Radio Mode will limit the available Channel Configuration modes. The table below identifies the modes supported.

Table 3-47 Supported Radio Modes

Channel Configuration Mode	Radio Mode Disabled	Radio Mode Enabled
Stereo Pairs	✓	✓
Multi-Channel (5.1)	✓	✓
Dual Multi-Channel (5.1)	✓	✓
Phase Aligned Audio (PAA)	✓	
Paired Decoder Mode	✓	✓
10-Stereo Pairs (MUS only) Audio	✓	✓
8 Channel AES3	✓	✓

3.17. Auxiliary Data

3.17.1. VBI and VANC Data

3.17.1.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
VBI	B	B	B	B	B
VANC	B				
SD VANC	B				

3.17.1.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items available			

3.17.1.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	✓

3.17.1.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys associated with this functionality.			

3.17.1.5. Functional Description

All models support outputting Vertical Blanking Interval (VBI) data in to the composite video and SD-SDI video. In addition, the RX8200 model support outputting Vertical Ancillary (VANC) data in to the HD-SDI video, and a subset in to the SD-SDI video.

3.17.1.5.1. Data Type Order of Precedence

Some data types can be sourced from multiple data paths. Where a data type is available or repeated in different sources, the IRD will source the data from the following list in order of precedence:

1. VANC PES
2. VBI PES
3. SEI/User Data

3.17.1.5.2. SD-VANC

The RX8200 will insert a number of the data types extracted from the SEI or User Data and embed them in to the VANC space of the HD-SDI video but it is also capable of inserting a limited set of data types extracted from the SEI or User Data in to the VANC space of the SD-SDI video. This includes the SD-SDI output for down-converted HD video. The limited data types that can be extracted from the SEI or User Data output in to the SD-SDI VANC space are:

- Closed Captions
- AFD/Bar data
- SMPTE 2031
- Station ID

Where the same data type is available from multiple sources, the order of precedence as defined above still applies. For example, when the Closed Captions are present in the VANC PES as well as Video User-Data, the insertion is as shown in the following table. The **VANC Enable** option determines if Closed Captions is sourced from VANC PES; the **SD-VANC Enable** determines if Closed Captions regardless of its source is to be embedded in to the SD-SDI video; the **CC Insertion** determines if Closed Captions is sourced from video User-Data.

Table 3-48 Insertion when Closed Captions are Present in VANC PID

		CC Insertion Enabled	CC Insertion Disabled
VANC Enabled	SD-VANC Enabled	CC from VANC PES inserted in to both SD and HD VANC space	CC from VANC PES inserted in to both SD and HD VANC space
	SD-VANC Disabled	CC from VANC PES inserted in to HD VANC space only	CC from VANC PES inserted in to HD VANC space only
VANC Disabled	SD-VANC Enabled	CC from User-Data inserted in to both SD and HD VANC space	CC not inserted
	SD-VANC Disabled	CC from User-Data inserted in to HD VANC space only	CC not inserted

3.17.1.6. Configuration

All configuration options for VBI and VANC data are located in the web browser interface from the *Decode > VBI-VANC* page.

3.17.1.6.1. VBI

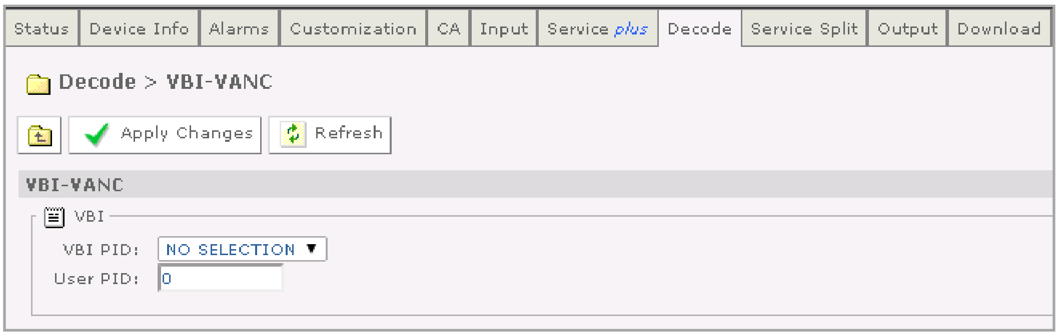


Figure 3-148 Decode > VBI-VANC > VBI

- **VBI PID** – Enables selection of the Vertical Blanking Interval Packet Identifier from the service list via a drop-down menu. The first VBI PID in the PMT of the selected service is selected automatically.
- **User PID** – Enables user to specify the VBI User PID that can be selected the VBI PID list.

3.17.1.6.2. VANC

Figure 3-149 Decode > VBI-VANC > VANC

- **VANC PID** – Enables selection of Vertical Ancillary Data Packet Identifier from the service list via a drop-down menu. The first

VANC PID in the PMT of the selected service is selected automatically.

- **User PID** – Enables user to specify the VANC User PID that can be selected the VANC PID list.
- **Stream Status** – Displays the presence of Vertical Ancillary Data from the incoming stream.
- **Output Status** – Displays the presence of Vertical Ancillary Data in the output stream.
- **Enable VANC** – This menu allows the user to enable or disable data to be extracted from the VANC PID.
- **Enable SD-VANC** – This menu allows the user to enable or disable the insertion of data in to the SD-SDI VANC space.

3.17.1.6.3. VANC > OP-47 Subtitle Distribution Packet (SDP)

The OP-47 specification for the Subtitle Distribution Packet (SDP) format describes storage and distribution of Teletext subtitle data in VANC.

The RX8200 can extract OP-47 SDP from VANC PES and insert these packets in to the VANC space of the HD-SDI output (DID 0x43 and SDID 0x02).

The RX8200 is capable of parsing Teletext PES packets that carry Teletext subtitle data and convert in to OP-47 SDP for insertion.

Figure 3-150 Decode > VBI-VANC > VANC > OP-47 SDP

- **Stream Status** – Displays the presence of OP-47 SDP in the incoming Teletext PES stream or VANC PES stream.
- **Output Status** – Displays the presence of OP-47 SDP being output to the VANC space.
- **SDP Insertion** – This menu enables or disables the insertion of the OP-47 SDP into the VANC space of the HD-SDI output.
- **SDP Insertion Line** – Allows the user to select **AS INPUT**, or a specific Line Number in the range **9** to **20**. Where OP-47 SDP is converted from WST data, this field specifies the Line Number it should be inserted to on the output.
- **AS INPUT** – Uses the same Line Number specified from the source data.
- **9 to 20** – Overrides the source Line Number and outputs to the Line Number specified here.
- **SDP Insertion Field** – Allows the user to select **AS INPUT** or a specific Video Field. This control allows the user to manage how OP-47 SDP data is inserted into the HD-SDI VANC. It is useful when cross converting an interlaced source into a progressive output, e.g. 1080i > 720p.
- **AS INPUT** – Uses the field as determined by the source data

- **FIELD 0** – forces OP-47 SDP insertion into video field 0
- **FIELD 1** – forces OP-47 SDP insertion into video field 1

3.17.1.6.4. VANC > OP-47 Multi-Packet

The OP-47 specification for the Multi-Packet format describes carriage of Teletext subtitle data and other ancillary data such as WSS in VANC. OP-47 Multi-Packet have a DID value of 0x43 and a SDID value of 0x03. OP-47 SDP may be carried as an inner packet within the VANC Multi packet.

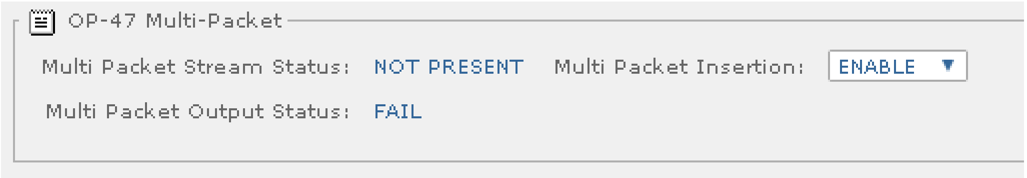


Figure 3-151 Decode > VBI-VANC > VANC > OP-47 Multi-Packet

- **Multi Packet Stream Status** – Displays the presence of OP-47 Multi-Packet data in the incoming VANC PES.
- **Multi Packet Output Status** – Displays the presence of OP-47 Multi-Packet data in the VANC space of the HD-SDI output.
- **Multi Packet Insertion** – This menu enables or disables the insertion of the OP-47
  Multi-Packet data into the VANC space of the HD-SDI output.

3.17.1.6.5. VANC > SMPTE 2031

The SMPTE 2031 specification describes the carriage of VBI data in VANC and therefore is used to for the carriage of Teletext data.

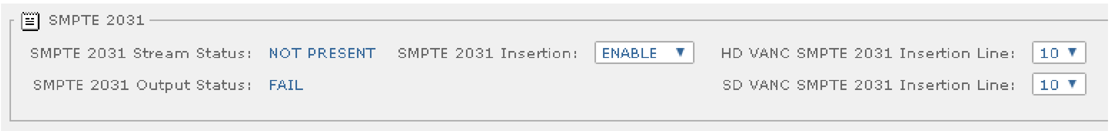


Figure 3-152 Decode > VBI-VANC > VANC > SMPTE 2031

- **SMPTE 2031 Stream Status** – Displays the presence of SMPTE 2031 packets in the incoming VANC PES.
- **SMPTE 2031 Output Status** – Displays the presence of SMPTE 2031 in the VANC space of the HD-SDI output.
- **SMPTE 2031 Insertion** – This menu enables or disables the insertion of the SMPTE 2031 packets into the VANC space of the HD-SDI output.
- **HD VANC SMPTE 2031 Insertion Line** – Specifies the Line Number on which the unit inserts the SMPTE 2031 sourced from video User-Data in the VANC space of the HD-SDI output signal.
- **SD VANC SMPTE 2031 Insertion Line** – Specifies the Line Number on which the unit inserts the SMPTE 2031 sourced from video User-Data in the VANC space of the SD-SDI output signal.

3.17.1.6.6. Closed Captions

Closed Captions provides a form of data insertion within ATSC systems, this provides subtitle data (caption data) for programming. Closed captions are provided within either the video header data of the selected service or via PES. This data is then provided to down-stream equipment (for example a television) for decode and display. Provision of this is mandatory within ATSC compliant areas of the world.

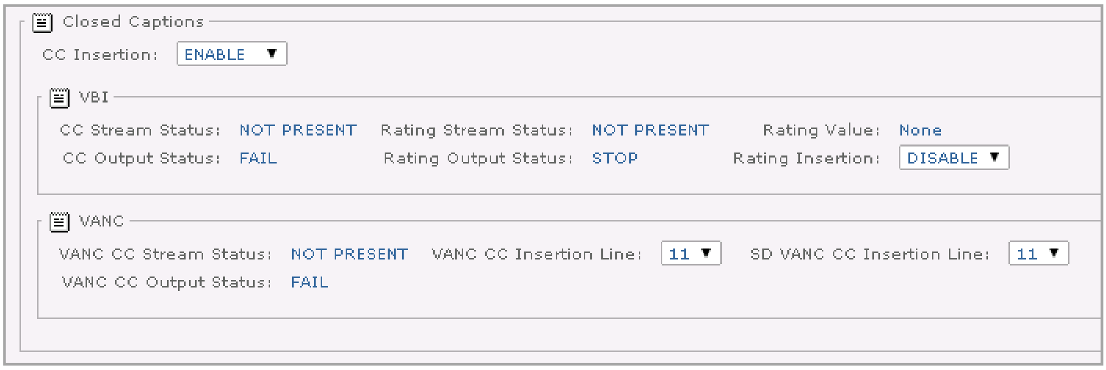


Figure 3-153 Decode > VBI-VANC > Closed Captions

- **CC Insertion** – This menu allows the user to enable or disable Closed Caption data to be extracted from User-Data or VBI PES. In case of a SD input video where closed captions are present in VBI PES as well as video User-Data then the receiver inserts the closed captions from the video User-Data.
- **CC Stream Status** – Displays the presence of closed caption data in the incoming VBI PES stream.
- **CC Output Status** – Displays the presence of closed caption data in the VBI space of the output video.
- **Rating Stream Status** – Displays the presence of Rating data which IRD extracts from the incoming video User-Data.
- **Rating Output Status** – Displays the presence of Rating data in the VBI space of SD output video.

- **Rating Value** – Displays the rating value that IRD extracts from the video User-Data.
- **Rating Insertion** – Enables or disables insertion of rating information in the VBI space of the output video.
- **VANC CC Stream Status** – Displays the presence of closed caption data in the incoming video User-Data.
- **VANC CC Output Status** – Displays the presence of closed caption data in the VANC Space of the output video.
- **VANC CC Insertion Line** – Specifies the Line Number on which the unit inserts the closed captions sourced from video User-Data in the VANC space of the HD-SDI output signal.
- **SD VANC CC Insertion Line** – Specifies the Line Number on which the unit inserts the closed captions sourced from video User-Data in the VANC space of the SD-SDI output signal.

3.17.1.6.7. AMOL-48 and AMOL-96

Automated Measurement of Lineup (AMOL) signals are inserted by the IRD in 525/60 NTSC signals on lines 20, 22 for field and lines 283 and 285 for field 2. These signals are typically used in North America to allow audience level monitoring to take place. AMOL-48 and AMOL-96 are confined to analog NTSC on terrestrial or cable.

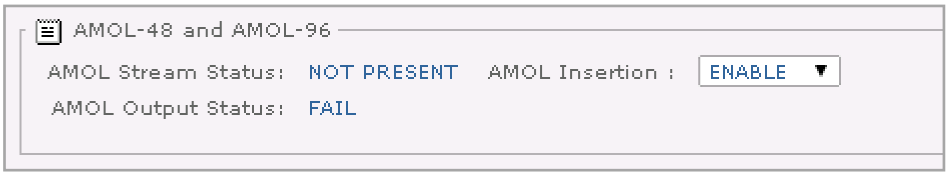


Figure 3-154 Decode > VBI-VANC > AMOL

- **AMOL Stream Status** – Displays the presence of AMOL signals in the VBI PES.
- **AMOL Output Status** – Displays the presence of AMOL signals in the VBI output signal.
- **AMOL Insertion** – Enables or disables insertion AMOL signals in to the VBI of the output signal.

3.17.1.6.8. TVG

TV Guide data is used to provide proprietary Electronic Program Guide information.

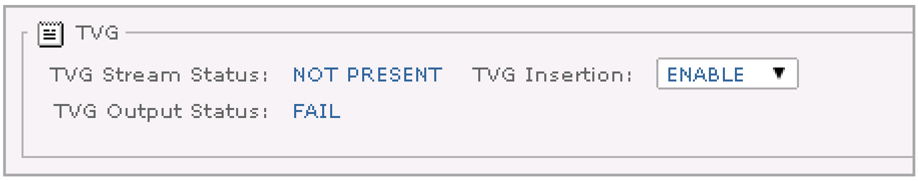


Figure 3-155 Decode > VBI-VANC > TVG

- **TVG Stream Status** – Displays the presence of Television Guide data in the VBI PES.

- **TVG Output Status** – Displays the presence of Television Guide data in the VBI output signal.
- **TVG Insertion** – Enables or disables insertion of Television Guide data in to the VBI output signal.

3.17.1.6.9. VPS

Video Programming System (VPS) data is used for program delivery control signaling. VPS is a scheme for controlling VCR recording. VPS is used only with the PAL standard and it is received during line 16 of the VBI comprising a total of 13 bytes per frame.

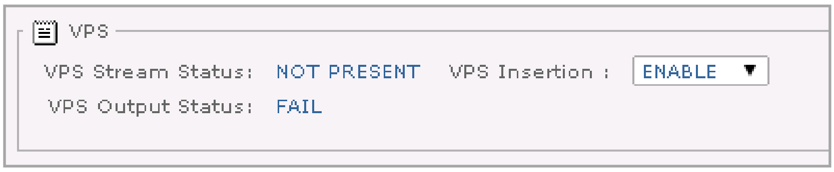


Figure 3-156 Decode > VBI-VANC > VPS

- **VPS Stream Status** – Displays the presence of VPS data in the VBI PES.
- **VPS Output Status** – Displays the presence of VPS data in the VBI output signal.
- **VPS Insertion** – Enables or disables insertion of Video Program System data in to the VBI output signal.

3.17.1.6.10. WSS

In MPEG domain, Wide Screen Signaling (WSS) data is carried as aspect ratio in the sequence header of the video stream. IRDs construct WSS signaling from this field, requiring them to reorder. WSS can also be delivered inside the PES data. WSS is used to indicate the aspect ratio of the picture. The IRD inserts WSS on line 23 in PAL standard only.

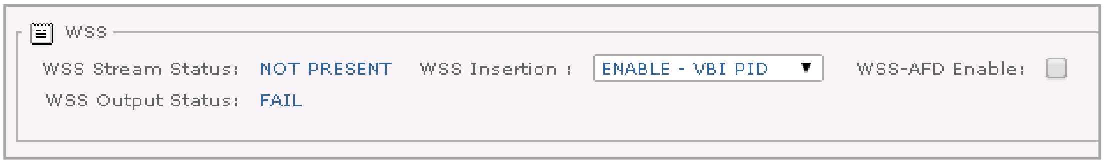


Figure 3-157 Decode > VBI-VANC > WSS

- **WSS Stream Status** – Displays the presence of WSS information in the incoming VBI PES. If the insertion type is selected as from Video AR, then the WSS is generated using the aspect ratio of the incoming video. In this case, the WSS stream status indicates the presence of this type of WSS.
- **WSS Output Status** – Displays the presence of WSS information in the VBI on the output.
- **WSS Insertion** – Enables or disables the insertion of the WSS signal in the video output signal. The following options are available:
- **DISABLE** – Stops the IRD inserting WSS on the video output signal.

- **ENABLE – VBI PID** – Enables insertion of WSS in to the video output signal where the WSS data is sourced from the VBI PID.
- **ENABLE – VIDEO AR** – Enables insertion of WSS in to the video output signal where the WSS data is sourced from the Aspect Ratio coded in the video sequence header.
- **WSS-AFD Enable** – Enabling this option allows the WSS waveform to carry the AFD value when **WSS Insertion** is enabled.

3.17.1.6.11. ITS

Vertical Interval Test Signal (VITS) are a group of analog test signals inserted in the composite video output. They allow performance measurements or receiver corrections to be made.

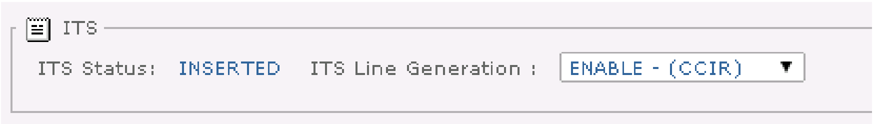


Figure 3-158 Decode > VBI-VANC > ITS

- **ITS Status** – Displays the ITS status inserted in to the VBI on the output.
- **ITS Line Generation** – Enables or disables the insertion of VITS in to the video output signal. The following options are available:
- DISABLE
- ENABLE-(CCIR)
- ENABLE-(FCC/UK).

3.17.1.6.12. Monochrome Samples

This provides the user with EN301 775 transparent mode data (4:2:2) samples, known as monochrome sample data. This data is carried as PES data marked by the descriptor tag 0x45.

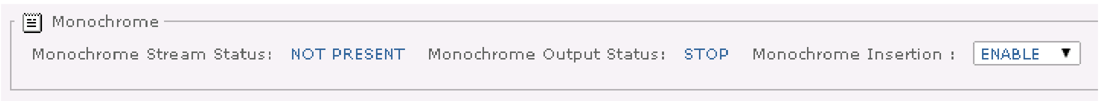


Figure 3-159 Decode > VBI-VANC > Monochrome

- **Monochrome Stream Status** – Displays the presence of Monochrome data in the incoming VBI PES stream.
- **Monochrome Output Status** – Displays the presence of Monochrome data in the VBI space of the output video.
- **Monochrome Insertion** – Enables or disables insertion of Monochrome data in to the VBI of the output signal.

3.17.1.6.13. Brandnet

ABC uses a proprietary waveform for transmitting data to their affiliates. A total of 22 or 44 bits are carried by this waveform. This is only present for NTSC standard video on line 18 of field 2.

Figure 3-160 Decode > VBI-VANC > Brandnet

- **Brandnet Stream Status** – Displays the presence of Brandnet data in the incoming VBI PES stream.
- **Brandnet Output Status** – Displays the presence of Brandnet data in the VBI space of the output video.
- **Brandnet Insertion** – Enables or disables insertion of Brandnet data in to the VBI of the output signal.

3.17.1.6.14. VITC

For the SD video, the IRD can insert the Vertical Interval Timecode (VITC) extracted either from video User-Data or VBI PES.

For the HD video, the IRD can insert the VITC in the VANC space of the HD output video extracted from VANC PES by enabling the **Enable VANC** option.

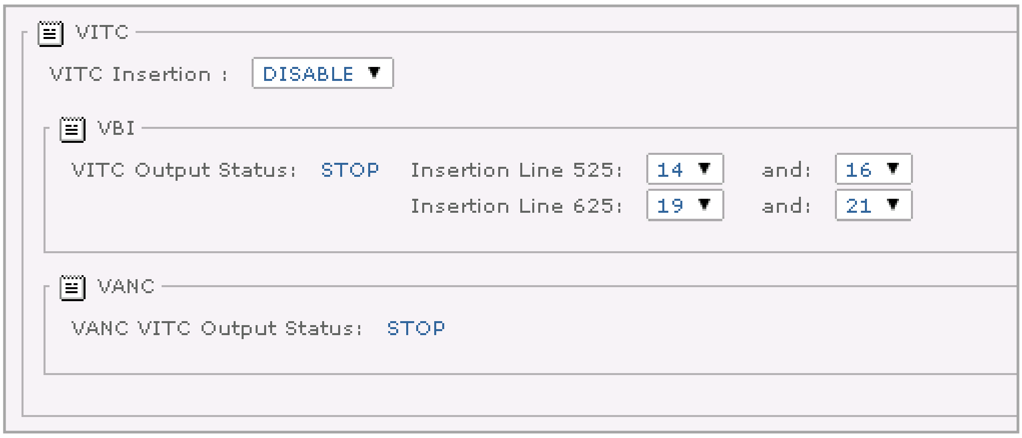


Figure 3-161 Decode > VBI-VANC > VITC

- **VITC Insertion** – Provides an option to enable or disable Vertical Interval Timecode insertion in the VANC and/or VBI of the output video. The following options are available:
- **DISABLE:** Stops insertion of VITC data
- **VIDEO:** Enables insertion of VITC data in to the video output signal where the VITC data is sourced from the video User-Data (GOP).
- **PES:** Enables insertion of VITC data in to the video output signal where the VITC data is sourced from the VBI PES.
- **AUTO:** Enables insertion of VITC data in to the video output signal where the VTIC data is sourced from either **PES** or **VIDEO** in that order of precedence.
- **VITC Output Status** – Displays the presence of VITC in the VBI area of the SD output video.

- **VBI Insertion lines 525** – Specifies the Line Number for VITC insertion in the VBI area of 525 standard video.
- **VBI Insertion lines 625** – Specifies the Line Number for VITC insertion in the VBI area of 625 standard video.
- **VANC VITC Output Status** – Displays the presence of Vertical Interval Timecode in the VANC space of the HD output video.

3.17.1.6.15. NTSC Pedestal

NTSC video uses a pedestal to offset the black level from the blanking level on composite signal. This offset is 7.5 IRE from the blanking level of 0 IRE.

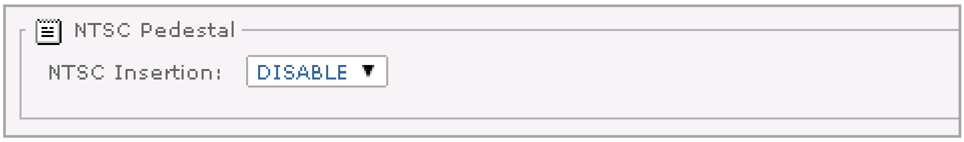


Figure 3-162 Decode > VBI-VANC > NTSC Pedestal

- **NTSC Pedestal Insertion** – This menu enables or disables addition of the pedestal level to all the VBI lines for NTSC based signals.

3.17.1.6.16. Video Index

Video Index data is carried as chrominance data on lines 14 and 277 for the 525-line (NTSC) system and on lines 11 and 324 for the 625-line (PAL) system. RP186 provides a method of coding the Video Index data structure in 525-line and 625-line so that various picture and program related source data can be carried within the video signal. The IRD can either extract the Video Index data from VBI PES or derive it from the aspect ratio and frame rate of the incoming video.

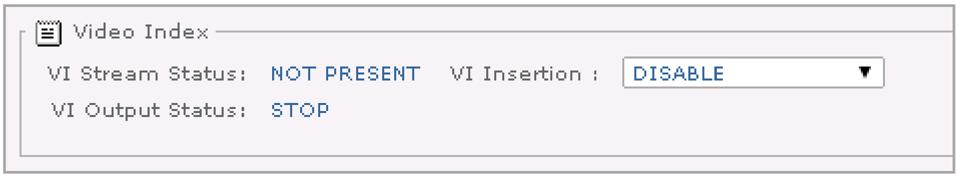


Figure 3-163 Decode > VBI-VANC > Video Index

- **Video Index Stream Status** – Displays the presence of Video Index information in either the incoming VBI PES or generated using the video information.
- **Video Index Output Status** – Displays the presence of Video Index information in the VBI area of SD output video.
- **Video Index Insertion** – Enables or disables Video Index insertion in the VBI area of the SD output video.
- **DISABLE**: Stops the insertion of Video Index data in to the output video signal.
- **ENABLE- VIDEO AR**: Generates the Video Index information from the aspect ratio and frame rate of an incoming video.
- **ENABLE – VBI PID**: Extracts the Video Index information from the VBI PES.

3.17.1.6.17. Station ID

By enabling Enable VANC and Station ID, the RX8200 can insert Station ID extracted from VANC PES in the VANC space of the HD-SDI output. The line number is signaled in the VANC PES on which this Station ID is inserted.

The RX8200 can also generate the Station ID information locally by using Transport Stream information and service information. Additionally, if there is no information provided in the Transport Stream, a manually specified Station ID name can be used. If **Enable VANC** is selected, the Station ID will be inserted on the specified HD VANC line. If **Enable SDVANC** is selected, the Station ID will be inserted on the specified SD VANC line.

When there is Station ID data present in the VANC PES and Station ID insertion, is enabled, the RX8200 will insert the Station ID from both of the above sources on appropriate lines.

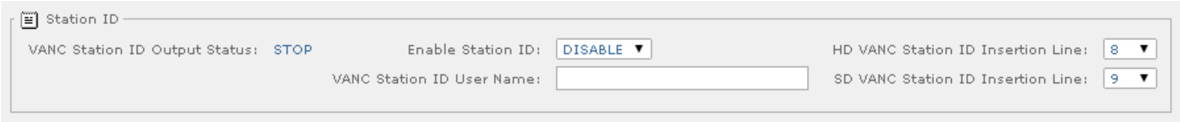


Figure 3-164 Decode > VBI-VANC > Station ID

- **VANC Station ID Output Status** – Displays the presence of Station ID data in the VANC space of the output video.
- **Enable Station ID** – Enables or disables insertion of Station ID in the VANC area of the HD output video.
- **VANC Station ID User Name** – Allows manual input of a Station ID User Name.
- **HD VANC Station ID Insertion Line** - Specifies the HD VANC line on which the Station ID should be inserted (Default 8).
- **SD VANC Station ID Insertion Line** - Specifies the SD VANC line on which the Station ID should be inserted (Default 9).

3.17.1.6.18. AFD/Bar

AFD/Bar data provides aspect ratio control and picture format information of the incoming picture to allow either 4:3 or 16:9 pictures to be presented optimally. This data will include whether the picture should be displayed as Letterbox, Center-Cut or Anamorphic.

The Active Format Descriptor (AFD) and Bar data can be inserted in the VANC area of the HD as well as SD output video.

Figure 3-165 Decode > VBI-VANC > AFD/Bar

- **VANC AFD/Bar Output Status** – Displays the presence of AFD/Bar data in the VANC area of the output video.
- **Enable AFD/Bar** – Enables or disables the insertion of AFD/Bar data in the VANC space. This menu controls the

insertion of AFD data, which is extracted from the video USER-DATA. If the AFD is also present in the VANC PES and the insertion is enabled by enabling Enable VANC menu, then RX8200 will insert the AFD from the VANC PES. For the SD video, Enable SDVANC menu should be enabled with Enable AFD/Bar in order to insert the AFD from the video USER-DATA.

- **HD VANC AFD Insertion Line** – Specifies the line number for AFD insertion in the VANC area of the HD output video.
- **SD VANC AFD Insertion Line** – Specifies the line number for AFD insertion in the VANC area of the SD output video. Where AFD is inserted on the specified line in the VANC space of the SD output video, this overwrites any VBI data that may have been present on that line.

3.17.1.7. VBI-VANC Front Panel Setup

The front panel menus allow control for selection of the VBI/VANC PID and the insertion of various VBI/VANC types in the output video.

3.17.1.7.1. VBI-VANC

This menu provides sub-menus for viewing and editing VBI and VANC component settings. To access sub-menu for VBI, press the ▶ (Forward) key.

```
DECODE                      |VBI-VANC
7.1                         |                              >
```

3.17.1.7.2. VBI

The VBI sub menu provides access to VBI specific options. To access these further options, press the ▶ (Forward) key.

```
VBI-VANC                    |VBI
7.1.1                       |                              >
```

3.17.1.7.3. VBI PID

Enables selection of the VBI PID from the VBI component list. The first VBI PID in the PMT of the selected service is selected automatically.

```
VBI                         |VBI PID
7.1.1.1                     |
```

3.17.1.7.4. User PID

Enables user to input a user-defined VBI PID for selection from the VBI PID menu.

```
VBI                        |USER PID
7.1.1.2                    |
```

3.17.1.7.5. VANC

The VANC sub menu provides access to VANC specific options. To access these further options, press the ▶ (Forward) key.

```
VBI-VANC                   |VANC
7.1.2                      |                              >
```

3.17.1.7.6. Stream Status

Displays the presence of Vertical Ancillary Data in the incoming stream.

```
VANC                       |STREAM STATUS
7.1.2.1                    |
```

3.17.1.7.7. Output Status

Displays the presence of Vertical Ancillary Data in the output stream.

```
VANC                       |OUTPUT STATUS
7.1.2.2                    |
```

3.17.1.7.8. VANC PID

Enables selection of the VANC PID from the VANC component list. The first VANC PID in the PMT of the selected service is selected automatically.

```
VANC                       |VANC PID
7.1.2.3                    |
```

3.17.1.7.9. Enable VANC

This menu allows the user to enable or disable the insertion of Vertical Ancillary Data extracted from the selected VANC PID in to the Vertical Ancillary Space of the HD-SDI output.

```
VANC                          |ENABLE VANC
7.1.2.4                       |
```

3.17.1.7.10. SDP (OP47 Subtitles)

- This menu provides the sub-menus for viewing the status of Subtitle Distribution packets (SDP) in the incoming stream and outgoing video

```
VANC                          |SDP
7.1.2.5                       |                               >
```

3.17.1.7.11. Stream Status

Displays the presence of Subtitling Distribution packets (SDP) in the incoming Teletext PES stream or VANC PES stream.

```
SDP                           |STREAM STATUS
7.1.2.5.1                     |
```

3.17.1.7.12. Output Status

Displays the presence of SDP (OP47 Closed Captions/ Subtitling data) in the VANC space of the HD-SDI output.

```
SDP                           |OUTPUT STATUS
7.1.2.5.2                     |
```

3.17.1.7.13. SDP Insertion

This menu enables or disables the insertion of the SDP into the VANC space of the HD-SDI output.

```
SDP                           |SDP INSERTION
7.1.2.5.2                     |
```

3.17.1.7.14. Multi

- This menu provides the sub-menus for viewing the status of VANC Multi packets in the incoming stream and outgoing video

```
VANC                       |MULTI
7.1.2.6                    |                              >
```

3.17.1.7.15. Multi Packet Insertion

This menu enables or disables the insertion of the VANC Multi packets into the VANC space of the HD-SDI output.

```
SDP                        |MULTI PACKET INSERTION
7.1.2.6.1                  |
```

3.17.1.7.16. Multi Packet Stream Status

Displays the presence of VANC Multi packets in the incoming VANC PES stream.

```
SDP                        | MULTI PACKET STREAM STATUS
7.1.2.6.2                  |
```

3.17.1.7.17. Multi Packet Output Status

Displays the presence of VANC Multi packets (OP47 Closed Captions/ Subtitling data) in the VANC space of the HD-SDI output.

```
SDP                        | MULTI PACKET OUTPUT STATUS
7.1.2.6.3                  |
```

3.17.1.7.18. Closed Caption

This menu provides the sub menu for selection and insertion of closed captions in VBI as well as VANC. Also shows the status of the closed captions in the incoming stream and output video.

```
VBI-VANC                   |CLOSED CAPTIONS
7.1.3                      |                              >
```

3.17.1.7.19. CC Insertion

This menu enables or disables the insertion of the Closed Captions.

```
CC                          |CC INSERTION
7.1.3.1                     |
```

3.17.1.7.20. CC in VBI

This menu provides a sub-menu to access settings and status regarding Closed Captions in the VBI space.

```
CC                          |VBI
7.1.3.2                     |                              >
```

3.17.1.7.21. CC Stream Status

Displays the presence of closed caption data in the incoming VBI PES stream.

```
VBI                         |CC STREAM STATUS
7.1.3.2.1                   |
```

3.17.1.7.22. CC Output Status

Displays the presence of closed caption data in the VBI space of the output video.

```
VBI                         |CC OUTPUT STATUS
7.1.3.2.2                   |
```

3.17.1.7.23. Rating Stream Status

Displays the presence of Rating data which RX8200 extracts from the incoming video User-Data.

```
VBI                         |RATING STREAM STATUS
7.1.3.2.3                   |
```

3.17.1.7.24. Rating Output Status

Displays the presence of Rating data in the VBI space of SD output video.

```
VBI                         | RATING OUTPUT STATUS
7.1.3.2.4                   |
```

3.17.1.7.25. Rating Value

Displays the rating value that RX8200 extracts from the video User-Data.

```
VBI                         | RATING VALUE
7.1.3.2.5                   |
```

3.17.1.7.26. Rating Insertion

Enables or disables insertion of Rating information in the VBI space of the output video.

```
VBI                         |RATING INSERTION
7.1.3.2.6                   |
```

3.17.1.7.27. CC in VANC

This menu provides a sub-menu to access settings and status regarding Closed Captions in the VANC space.

```
CC                          |VANC
7.1.3.3                     |                              >
```

3.17.1.7.28. VANC CC Stream Status

Displays the presence of closed caption data in the incoming video User-Data.

```
VANC                        |VANC CC STREAM STATUS
7.1.3.3.1                   |
```

3.17.1.7.29. VANC CC Output Status

Displays the presence of closed caption data in the VANC space of the output video.

```
VANC                        |VANC CC OUTPUT STATUS
7.1.3.2.2                   |
```

3.17.1.7.30. VANC CC Insertion Line

Specifies the line number on which the RX8200 inserts the closed captions sourced from video User-Data in the VANC space of the HD-SDI output signal.

```
VBI                         |VANC CC INSERTION LINE
7.1.3.3.3                   |
```

3.17.1.7.31. AMOL-48 AND AMOL-96

This menu provides the sub-menu for selection and insertion of AMOL as well as status information.

```
VBI-VANC                    | AMOL-48 AND AMOL-96
7.1.4                       |                              >
```

3.17.1.7.32. AMOL Stream Status

Displays the presence of AMOL signals in the VBI PES stream.

```
AMOL                        | AMOL STREAM STATUS
7.1.4.1                     |
```

3.17.1.7.33. AMOL Output Status

Displays the presence of AMOL signals in the VBI space of the output signal.

```
AMOL                        | AMOL OUTPUT STATUS
7.1.4.2                     |
```

3.17.1.7.34. AMOL Insertion

Enables or disables insertion of AMOL in to the VBI space of the output signal.

```
AMOL                        | AMOL STREAM STATUS
7.1.4.1                     |
```

3.17.1.7.35. TVG

This menu provides the sub-menu for selection and insertion of TVG as well as status information.

```
VBI-VANC                  | TVG
7.1.5                     |                              >
```

3.17.1.7.36. TVG Stream Status

Displays the presence of TVG data in the VBI PES stream.

```
VBI-VANC                  | TVG STREAM STATUS
7.1.5.1                   |
```

3.17.1.7.37. TVG Output Status

Displays the presence of TVG data in the VBI space of the output signal.

```
VBI-VANC                  | TVG OUTPUT STATUS
7.1.5.2                   |
```

3.17.1.7.38. TVG Insertion

Enables or disables insertion of TVG data in to the VBI space of the output signal.

```
VBI-VANC                  | TVG INSERTION
7.1.5.3                   |
```

3.17.1.7.39. WSS

This menu provides the sub-menu for selection and insertion of WSS as well as status information.

```
VBI-VANC                  | WSS
7.1.6                     |                              >
```

3.17.1.7.40. WSS Stream Status

Displays the presence of WSS information in the incoming VBI PES. If the insertion type is selected as from Video AR, then the WSS is generated using the aspect ratio of the incoming video. In this case, the WSS stream status indicates the presence of this type of WSS.

```
VBI-VANC                  | WSS STREAM STATUS
7.1.6.1                   |
```

3.17.1.7.41. WSS Output Status

Displays the presence of WSS in the VBI of the output signal.

```
VBI-VANC                     | WSS OUTPUT STATUS
7.1.6.2                      |
```

3.17.1.7.42. WSS AFD Enable

Enabling this menu allows WSS waveform to carry the AFD values when WSS insertion is enabled as either **ENABLE-VBI PID** or **ENABLE-VIDEO AR.**

```
VBI-VANC                     | WSS-AFD ENABLE
7.1.6.3                      |VITC
```

This menu provides the sub-menu for selection and insertion of VITC as well as status information.

```
VBI-VANC                     | VITC
7.1.7                        |                              >
```

3.17.1.7.43. VITC Insertion

Enables or disables insertion of VITC data.

```
VITC                         | VITC INSERTION
7.1.7.1                      |
```

3.17.1.7.44. VITC-VBI

This menu provides the sub-menu for VITC settings and status with regard to VBI.

```
VITC                         | VBI
7.1.7.2                      |                              >
```

3.17.1.7.45. VITC Output Status

Displays the presence of VITC in the VBI area of the SD output video.

```
VITC                         | VITC OUTPUT STATUS
7.1.7.2.1                    |
```

3.17.1.7.46. Insertion Line 525_1 and 525_2

Specifies the line for VITC insertion in the VBI area of 525 standard video.

```
VITC                        |INSERTION LINE 525_1
7.1.7.2.2                   |INSERTION LINE 525_2
```

3.17.1.7.47. Insertion Line 625_1 and 625_2

Specifies the line for VITC insertion in the VBI area of 625 standard video.

```
VITC                         | INSERTION LINE 625_1
7.1.7.2.3                    | INSERTION LINE 625_2
```

3.17.1.7.48. VITC – VANC

This menu provides the sub-menu for VITC settings and status with regard to VANC.

```
VITC                        | VANC
7.1.7.3                     |                              >
```

3.17.1.7.49. VANC VITC Output Status

Displays the presence of VITC in the VANC space of the HD output video.

```
VITC                         | VANC VITC OUTPUT STATUS
7.1.7.3.1                    |
```

3.17.1.7.50. NTSC Pedestal

This menu provides the sub-menu for selection and insertion of NTSC Pedestal as well as status information.

```
VBI-VANC                    | NTSC PEDESTAL
7.1.8                       |                              >
```

3.17.1.7.51. NTSC Insertion

This menu allows the user to enable or disable the addition of the pedestal level to all the VBI lines for the NTSC signal.

```
NTSC                         | NTSC INSERTION
7.1.8.1                      |
```

3.17.1.7.52. Station ID

This menu provides the sub-menu for selection and insertion of Station ID as well as status information.

```
VBI-VANC                     | STATION ID
7.1.9                        |                              >
```

3.17.1.7.53. VANC Station ID Output Status

Displays the presence of Station ID data in the VANC space of the output video.

```
STATION                      | VANC STATION ID OUTPUT STATUS
7.1.9.1                      |
```

3.17.1.7.54. Enable Station ID

Enables or disables insertion of Station ID in the VANC area of the HD output video.

```
STATION                      | ENABLE STATION ID
7.1.9.2                      |
```

3.17.1.7.55. VANC Station ID User Name

Allows the user to input the VANC Station ID user name.

```
STATION                      | VANC STATION ID USER NAME
7.1.9.3                      |
```

3.17.1.7.56. AFD/BAR

This menu provides the sub-menu for selection and insertion of AFD/Bar Data as well as status information.

```
VBI-VANC                     | AFD/BAR
7.1.10                       |                              >
```

3.17.1.7.57. VANC AFD BAR Output Status

Displays the presence of AFD/Bar data in the VANC space of the output video.

```
AFD/BAR                          | VANC AFD BAR OUTPUT STATUS
7.1.10.1                         |
```

3.17.1.7.58. Enable AFD BAR

Enables or disables the insertion of AFD/Bar data in the VANC.

```
AFD/BAR                          | ENABLE AFD BAR
7.1.10.2                         |
```

3.17.2. Teletext

3.17.2.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Teletext	B	B	B	B	B

3.17.2.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items available			

3.17.2.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.17.2.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys associated with this functionality.			

3.17.2.5. Teletext Types

- **CCIR Teletext System B (EBU Teletext) -** CCIR Teletext System B (Enhanced Teletext specification ETS 300 706), also known as World System Teletext (WST). Due to its traditional association with SD services predominantly in European countries, it is commonly known as EBU Teletext.
- **DVB Teletext** - DVB Teletext refers to the carriage of CCIR Teletext System B data in DVB bitstreams (ETSI EN 300 472: Digital Video Broadcasting (DVB); Specification for conveying ITU-R System B Teletext in DVB bitstreams).
- **DVB Subtitles** - DVB Subtitles use subtitle bitmaps that are carried in the DVB bitstream. DVB Subtitles are different to CCIR Teletext System B in that bitmaps are used to render characters and symbols rather than transmitting character codes and using character set tables to render characters and symbols.

- **NABTS Teletext** - North American Broadcast Teletext Specification (NABTS) is an alternative format predomintly utilized in North America.

3.17.2.6. Teletext Functionality

3.17.2.6.1. EBU Teletext

The IRD will process EBU Teletext and embed it on to the intended VBI lines for the CVBS and SD-SDI output paths.

The units do not feature a Teletext decoder for non-subtitle data with page selection for example, but can burn in the Teletext subtitles to the decoded video.

For some EBU Teletext types, the RX8200 has additional features that prepare the Teletext data for carriage in to the VANC space for HD-SDI and in some cases SD-SDI too.

Table 3-49 Teletext support and manipulation

Teletext sourced from TS input	Teletext data for carriage in VBI	SMPTE 2031 data for carriage in VANC	OP-47 SDP format for carriage in VANC	OP-47 Multi -Packet format for carriage in VANC
Teletext PES (EBU Teletext subtitle data)	CVBS SD-SDI	HD-SDI SD-SDI	HD-SDI	-
Teletext PES (EBU Teletext non-subtitle data)	CVBS SD-SDI	HD-SDI SD-SDI	-	-
Teletext PES (Inverted EBU Teletext data)	CVBS SD-SDI	-	-	-
VANC PES (SMPTE 2031 format)	-	HD-SDI	-	-
VANC PES (OP-47 SDP format)	CVBS SD-SDI (EBU Teletext subtitle data)	-	HD-SDI	-
VANC PES (OP-47 Multi-Packet format)	-	-	-	HD-SDI

3.17.2.6.2. Carriage of EBU Teletext in VANC Space

SMPTE 2031

The SMPTE 2031 specification describes the carriage of VBI data in VANC and therefore is used to for the carriage of EBU Teletext data.

The RX8200 can prepare incoming EBU Teletext subtitle and non-subtitle data in to SMPTE 2031 packets for simultaneous embedding in to VANC for the HD-SDI and SD-SDI outputs.

Alternatively, any incoming VANC PES already containing SMPTE 2031 packets will be passed through and embedded in to the HD-SDI output. SMPTE 2031 packets from VANC PES are not embedded in to the SD-SDI output.

OP-47 Subtitle Distribution Packet (SDP) Format

The OP-47 specification for the Subtitle Distribution Packet (SDP) format similarly describes storage and distribution of Teletext subtitling data in VANC.

The RX8200 can prepare incoming EBU Teletext subtitle data in to OP-47 SDP format for embedding in to the VANC space for the HD-SDI.

Alternatively, any incoming VANC PES already containing OP-47 SDP format packets will be passed through and embedded in to the HD-SDI output.

The unit can convert Teletext data present in the OP-47 SDP packets in to EBU Teletext subtitle data for embedding in the VBI lines during down-conversion to SD-SDI. The ***Teletext Insertion*** mode needs to be set to **ENABLE – OP47(SDP)** for this feature.

OP-47 Multi-Packet Format

The OP-47 specification for the Multi-Packet format describes carriage of Teletext subtitle data and other ancillary data such as WSS in VANC

Any incoming VANC PES containing OP-47 Multi-Packet format packets will be passed through and embedded in to the HD-SDI output.

The unit does not perform any conversion to this packet format.

3.17.2.7. Configuration

3.17.2.7.1. Decode > Teletext

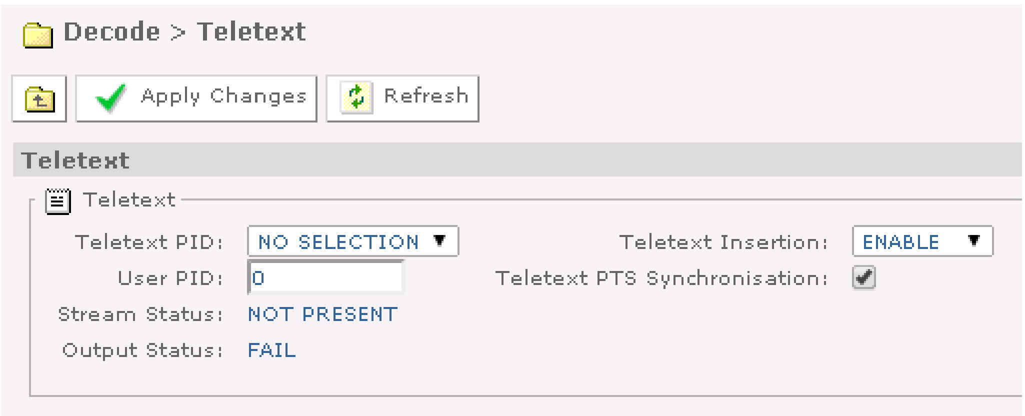


Figure 3-166 Decode > Teletext Web Page

- **Teletext PID** – Enables selection of the Teletext PID from the Teletext component list via a drop-down menu. The first Teletext PID in the PMT of the selected service is selected automatically.

- **User PID** – Enables user to define a user PID that can be selected from the Teletext PID selection.
- **Stream Status** – Display the presence of Teletext data in the Teletext PES stream.
- **Output Status** – Displays the presence of Teletext in VBI area of the output video.
- Teletext Insertion – Enables or disables insertion of Teletext data in the output video (VBI)
- **DISABLE** – Blocks Teletext data being output on the VBI lines. Teletext sourced from incoming Teletext PES or VBI PES and converted in to SMPTE 2031 and OP47(SDP).
- **ENABLE** – Inserts Teletext data in to the output VBI lines. Teletext sourced from incoming Teletext PES or VBI PES and converted in to SMPTE 2031 and OP47(SDP).
- **ENABLE – OP47(SDP)** – Sources Teletext data present in OP47(SDP) from the incoming VANC PES and converts it in to EBU Teletext subtitle data to be inserted in to the outgoing VBI lines. This setting will block Teletext data present from the incoming Teletext PES or VBI PES. Teletext PES or VBI PES **is not** converted in to SMPTE 2031 and OP47(SDP).

Table 3-50 Source of the EBU Teletext inserted on to outgoing VBI lines

Teletext Insertion Mode	EBU Teletext sourced from Teletext or VBI PES	EBU Teletext sourced from OP47 SDP VANC PES	Insert EBU Teletext in VBI lines	EBU Teletext converted to SMPTE 2031	EBU Teletext converted to OP47 SDP
DISABLE	✓	-	-	✓	✓
ENABLE	✓	-	✓	✓	✓
ENABLE-OP47(SDP)	-	✓	✓	-	-

- **PTS Synchronization** – This menu enables or disables the use of PTS present in the Teletext PES packet for synchronization with the output video.

Disabling PTS synchronization is sometimes desirable when services switch between regional and national broadcasts that may have different PCR references but continue to the same Teletext stream. Where the PCR reference is different to the Teletext PTS, Teletext cannot be synchronized to the output video and will be continually dropped.

3.17.3. Subtitles

3.17.3.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Subtitles	B	B	B	B	B

3.17.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items available			

3.17.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.17.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys associated with this functionality.			

3.17.3.5. Functional Description

The IRD provides the ability to decode and display on-screen DVB format subtitles and Telextext subtitles (also called EBU subtitles). The unit can also pass through EBU subtitles using the Teletext control described in section *0.*

DVB subtitles are an MPEG-DVB digital format, with no analogue or uncompressed digital format defined. The subtitles are converted to the On-Screen Display (OSD) area in DVB decoders directly. A subtitle stream is carried in transport stream packets identified on a single PID. A single subtitle stream can carry several different subtitle services. These different subtitle services can be in different languages that represent a common program or they can be subtitles for different programs provided the programs share a common PCR.

To view this page, select the **Subtitles** button from the **Decode** page from the web browser interface.

NOTE: The IRD does not support simultaneous OSD generation of DVB subtitles and Teletext subtitles. If both are enabled and present in the selected decode service, the OSD output is undefined.

3.17.3.6. Subtitle Control

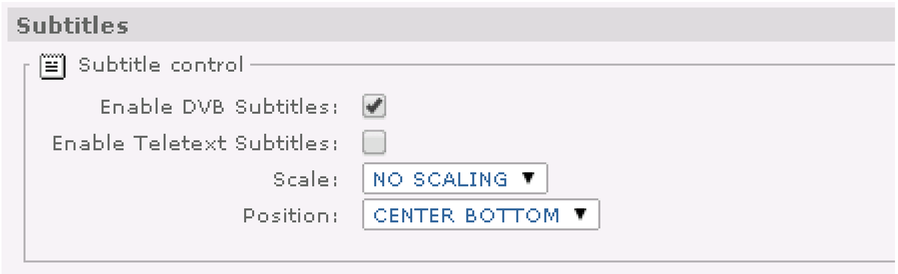


Figure 3.36 Decode > Subtitles > Subtitle Control

- **Enable DVB Subtitles** – Enables or disables insertion of DVB Subtitles on the output Video.
- **Enable Teletext Subtitles** – Enables or disables conversion of the Teletext stream and generate OSD subtitles to the output video.
- **Scale** – This menu allows the size of the subtitle graphics to be increased. Available Scaling options are.
- **NO SCALING** – This is the default value after factory reset. The actual size depends on the type of subtitles and Video Output Mode. The following table defines how the default size is derived:

Table 3-51 Subtitle Scale Factors When Using NO SCALING

Subtitle Type	Video Output Mode	Default Size
DVB – HD subtitles (DDS present)	AUTO, 1080i or 1080p	As per stream
	SD*	Size reduced by 46%
	720p	Size reduced by 33%
DVB – SD subtitles (No DDS present)	AUTO, SD*, 1080i, 720p or 1080p	As per stream
Teletext – HD video	AUTO, 1080i or 1080p	Size increased by 87%
	SD*	As per stream
	720p	Size increased by 25%
Teletext – SD video	AUTO or SD*	As per stream
	1080i or 1080p	Size increased by 87%

* RX8200 No High Quality Down Conversion card fitted.

- **SCALING 1, 2, 3, 4, 5, 6 –** There are 6 user selectable **scale** values available. Each of these will increase the size of the default subtitle size which will depend on Scale selection, the type of subtitles and **Video Output Mode** selected.

Table 3-52 Subtitle Scale Factors When Using Scaling

Subtitle Type	Video Output Mode	SCALING					
		1	2	3	4	5	6
DVB – HD subtitles	AUTO or HD*	10%	20%	30%	40%	50%	60%
	SD**	0%	0%	0%	0%	0%	0%
DVB – SD subtitles	HD*	25%	50%	75%	100%	125%	150%
	AUTO or SD**	0%	0%	0%	0%	0%	0%
Teletext – HD video	AUTO or HD*	16%	33%	50%	66%	83%	100%
	SD**	0%	0%	0%	0%	0%	0%
Teletext – SD video	HD*	16%	33%	50%	66%	83%	100%
	AUTO or SD**	0%	0%	0%	0%	0%	0%

* HD = 1080i, 1080p or 720p

**RX8200 No High Quality Down Conversion card fitted

- **AUTO MAX –** This option means that the receiver will automatically select the SCALING value such that the subtitles use the maximum width of the graphics safe area and avoid a SCALE alarm being raised.
- **Position –** This menu specifies the position of the subtitles on the video output.

Table 3-53 Subtitle Control > Position Options

Position	Description
DEFAULT	DVB subtitles are displayed in the position defined by the broadcaster. Teletext Subtitles are displayed as per CENTER BOTTOM. Note: Selecting this option and anything other than NO SCALING for DVB subtitles is likely to result in a SCALE alarm being raised.
LEFT TOP	Subtitles are left aligned at the top of the graphics safe area
CENTER TOP	Subtitles are center aligned at the top of the graphics safe area
RIGHT TOP	Subtitles are right aligned at the top of the graphics safe area
LEFT MIDDLE	Subtitles are left aligned in the middle of the graphics safe area
CENTER MIDDLE	Subtitles are center aligned in the middle of the graphics safe area
RIGHT MIDDLE	Subtitles are right aligned in the middle of the graphics safe area
LEFT BOTTOM	Subtitles are left aligned at the bottom of the graphics safe area
CENTER BOTTOM	Subtitles are center aligned at the bottom of the graphics safe area
RIGHT BOTTOM	Subtitles are right aligned at the bottom of the graphics safe area

NOTE: There are times when subtitle graphics may be clipped from the right or left hand edges. This typically occurs when using up or down conversion to Center cut-out and the **SD Screen Aspect Ratio** is set to 4:3. This occurs on the CVBS output but may occur on SD-SDI configured outputs. HD-SDI configured outputs should be fine. If this is a problem then try adjusting the **Position** and **Scale** of subtitles until the problem is resolved.

3.17.3.7. Subtitle Alarms

If DVB Subtitle or Teletext Subtitle OSD graphics are too big to fit into the safe area then a DVB Subtitle Alarm will be raised and the **Error Status** field shall show the value SCALE. The graphics safe area is defined as 10% of the display width for the left and right margins and 5% of the display height for the top and bottom margins.

Alarms will clear automatically when the conditions that caused the alarm are removed.

- **SCALE** - A SCALE alarm will be raised if the subtitles, after scaling, exceed the bounds of the display rectangle.
- **OUT OF MEMORY** - An OUT OF MEMORY alarm is signalled if the receiver runs out of graphics memory and is unable to display the subtitles. If subtitles have been scaled, reducing the scaling value may resolve the problem.
- **PIXEL BUFFER LOW** - The receiver allocates 400KiB for decoding subtitle objects. If the size of an incoming object exceeds this limit, the PIXEL BUFFER LOW alarm is raised.
- **NOT SUPPORTED ON 4:2:2 DECODER** - It is not possible to decode and display subtitles whilst using the 4:2:2 decoder to decode the incoming video data.
- **OVERLAP** - An OVERLAP alarm may be raised if both DVB Subtitles and Teletext Subtitles are enabled at the same time. Please select only one subtitle decoder at a time.
- **CLIPPED** - A CLIPPED alarm is raised if the subtitle decoder detects an object is wider than the display. The object is clipped to the display width.
- **DECODE ERROR** - If DVB subtitles are enabled but there are no DVB subtitles present in the transport stream for the selected service then a DECODE ERROR alarm is raised.
  A DECODE ERROR alarm is also raised if an attempt is made to decode an object with a zero width. This can occur if subtitle recovery is enabled and the source of the subtitles is transcoded from SCTE-27. In this situation the object data may have a ragged right edge which prevents correct operation of the recovery mechanism. To clear the alarm, disable subtitle recovery.

3.17.3.8. DVB Subtitles

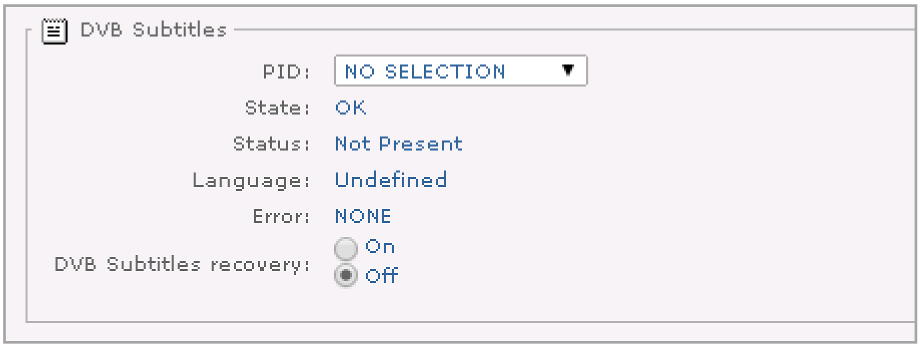


Figure 3.36 Decode > Subtitles > DVB Subtitles

- **PID** – Enables selection of the DVB Subtitle PID from the DVB Subtitle component list via a drop-down menu. The first DVB Subtitles PID in the PMT of the selected service is selected automatically.
- **State** – Displays the presence of Subtitle data in the incoming PES stream. This menu reports **STOP** if the **Enable DVB Subtitles** option is disabled. This also reports **STOP** if the Subtitle PID is not a valid PID as well as when the Composition Page ID and Ancillary Page ID within the incoming subtitle stream are both set to zero.
- **Status** – Displays the presence of subtitles in the output video.
- **Language** – Displays the language of the subtitle stream.
- **Error** – Displays error messages related to scaling and positioning of subtitles for
on-screen display to the output video.
- **DVB Subtitles recovery** – Configures how the unit should handle errors present in the DVB Subtitle stream.
- **On** – The DVB Subtitle data is verified and where errors are detected, no OSD text will applied to the video picture. Errors will be filtered out and therefore large amounts of text may be appear missing.
- **Off** – The DVB Subtitles are passed through for OSD text generation to be applied to the video picture. Data is not pre-filtered for errors.

3.17.3.9. User DVB Subtitles

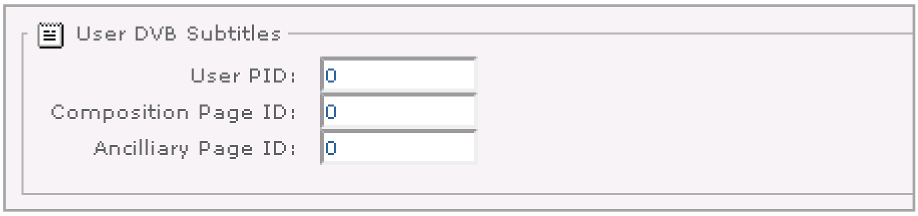


Figure 3.36 Decode > Subtitles > User DVB Subtitles

- **User PID** – Specifies the User PID that can be selected from the DVB Subtitle PID selection.

- **Composition Page ID** – This option specifies the Composition Page ID to be used. This is the means of conveying subtitle elements for one specific subtitle service. Subtitling system allows sharing of subtitling data between services within the same subtitle stream. Different Composition Page IDs can be used to carry different subtitle languages for the same service.
- **Ancillary Page ID** – This option specifies the Ancillary Page ID to be used. This is the means of conveying subtitle elements that may be shared by multiple subtitle services within a subtitle stream.

3.17.3.10. Teletext Subtitles

The IRD can convert Teletext data into subtitles which are then applied for on-screen display to the output video. The subtitles are effectively 'burnt-in' to the video picture.

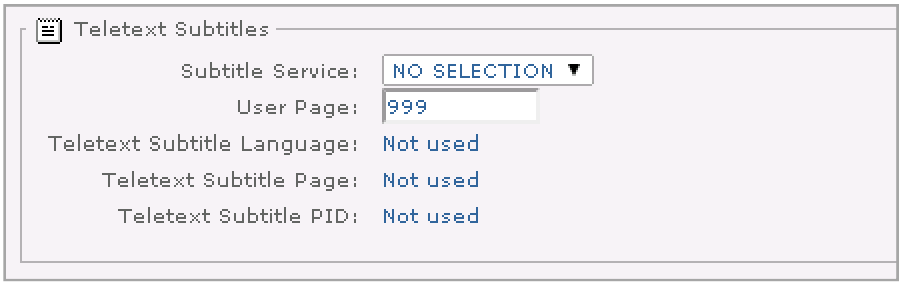


Figure 3.36 Decode > Subtitles > Teletext Subtitles

- **Subtitle Service -** Enables selection of the Subtitle PID from the Subtitle component list via a drop-down menu.
- **User Page** – Specifies the page number to be used.
- **Teletext Subtitle Language** – Displays the language on which the Teletext subtitles are displayed. The IRD supports the following languages
  - English
  - Estonian
  - French
  - German
  - Italian
  - Norwegian
  - Spanish
  - Swedish

NOTE: Non-supported languages may be rendered with incorrect or missing glyphs for certain characters

- **Teletext Subtitle Page** – Displays the page number on which the Teletext subtitles are displayed.
- **Teletext Subtitle PID** – Displays the Packet Identifier of the Teletext PES stream associated with the currently selected service if the **Enable Teletext Subtitles** option is enabled.

3.17.4. SCTE 35 Splice Message Decode Support

The IRD supports SCTE 35 (Digital Program Insertion Cueing Message for Cable) that contain Splice commands intended for notifying a splicer of splice events. It is designed to accommodate advert insertion in and out of network feeds.

3.17.4.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Splice	B	B	B	B	B

3.17.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items with this functionality			

3.17.4.3. Control

Web	Front Panel	SNMP	Serial Remote	Director OAC
✓		✓		✓

3.17.4.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys associated with this input type			

3.17.4.5. Functional Description

SCTE 35 defines a mechanism for signaling splice points in the transport stream. The RX8200 can process SCTE 35 splice information to control two contact closures, one signaling network Out Point and other signaling network In Point. Also, the unit can convert SCTE 35 in to SCTE 104 for insertion in VANC.

3.17.4.5.1. SCTE 35 Splice Messages

A number of Splice commands are defined within SCTE 35 but only the following commands are parsed by the IRD, all others are silently ignored:

- **splice_null()** - The splice_null() command is provided for extensibility. It can be used as a means of providing a heartbeat message to downstream splicing equipment. This message is silently passed through by the unit.
- **splice_insert()** - The splice_insert() command syntax allows a number different splice messages to be sent. Splice network Out/In and splice cancel are two main sub-types of message. Splice network Out/In Points have further optional parameters allowing specification of time, duration and the auto_return flag. The time specifies when the splice network Out/In Point occurs.

The unit processes the splice events to filter out the network Out/In points and uses them to signal two single throw double pole relays:

- A network Out Point (may also be referred to as Splice On) would typically indicate the beginning of the advert break. This is signaled by Relay 3 with a duration of 200 ms.
- A network In Point (may also be referred to as Splice Off) would typically indicate the end of the advert break. This is signaled by Relay 2 with a duration of 200 ms.

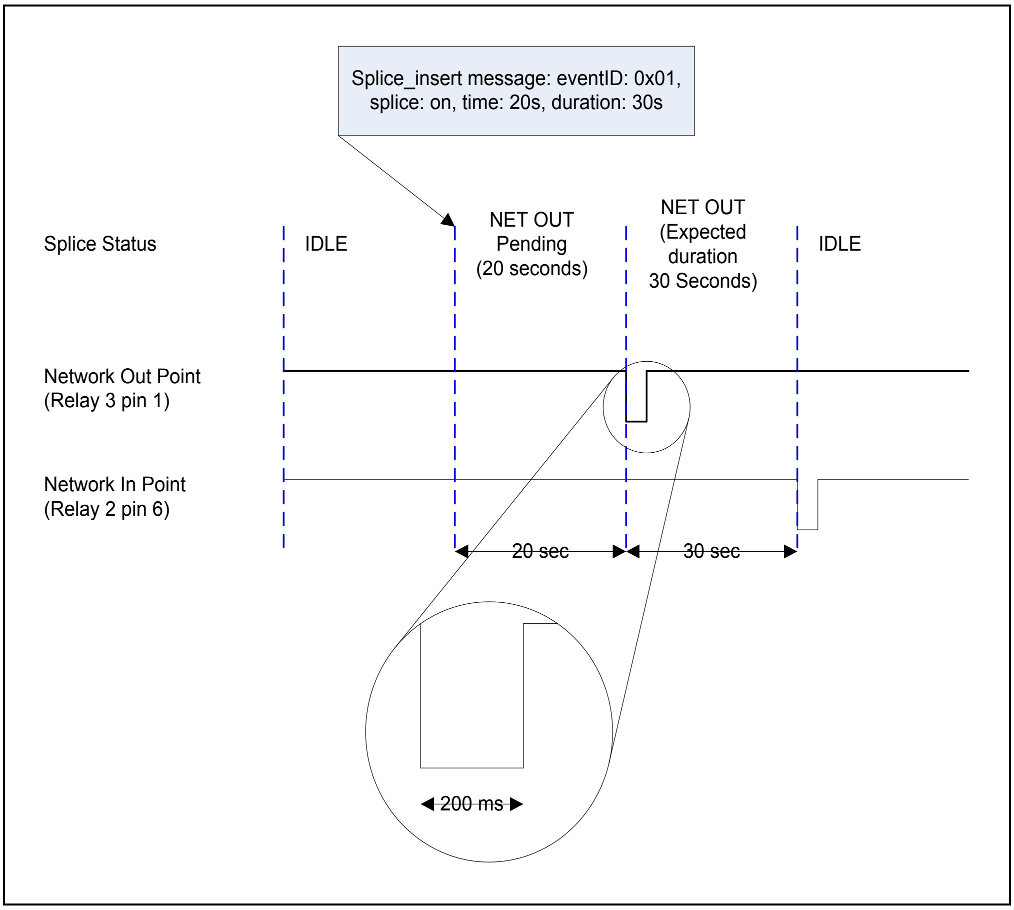


Figure 3-167 Splice Event Signalling

Only one splice event is processed at a time, the unit is not designed to handle multiple splice messages signaling multiple events. If a splice event has been signaled then the unit will only accept splice messages tagged with the same Splice Event ID as the current event until the current event is either cancelled or expired.

3.17.4.5.2. Relay Assignments for SCTE 35 Control

By default, the unit's relays are assigned to the Summary Alarm and SCTE 35 Control:

Table 3-54 Relay Pin Assignment for SCTE 35 Control

Relay Set	Purpose	Pin	Pin Assignment
Relay 1	Summary Alarm	4	Common
		8	Normally Closed (Closed on Alarm)
		9	Normally Open (Open on Alarm)
Relay 2	SCTE 35 Control: Splice network In Point	2	Common
		6	Normally Closed
		7	Normally Open
Relay 3	SCTE 35 Control: Splice network Out Point	1	Normally Closed
		3	Common pin
		5	Normally Open

NOTE: If the satellite input card (DVB-S/S2) is fitted, the relay assignment can be manually configured for another purpose. Check that the **Relay Configuration** mode found under the main Alarm tab is configured correctly for SCTE 35 operation.

3.17.4.5.3. Conversion to SCTE 104

For units supporting HD-SDI output, SCTE 35 messages can also be converted into SCTE 104 messages inserted in line 10 of the VANC space using DID 0x41 and SDID 0x07. This feature is enabled using the **Splice Insertion** tick box and a count of the spice points inserted is recorded in the **Splice Count** field.

NOTE: Only the supported Splice messages specified above will be inserted in to the VANC space.
SCTE 104 conversion requires the RX8200/HWO/HD or RX8200/HWO/HD/3G option, so is not supported on the RX83XX IRD range.

3.17.4.6. Setup: Decode > Splice

The basic selection and status information for Splice control can be found in the **Decode > Splice** sub tab found within the **Service** section of the main **Decode** tab.

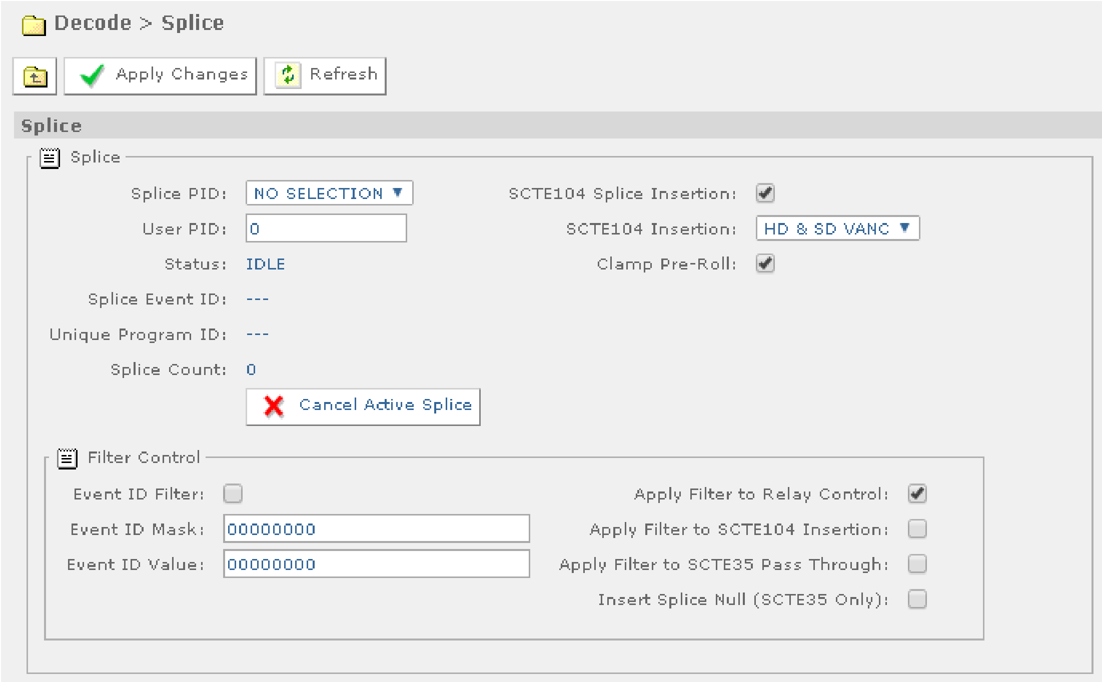


Figure 3-168 Decode > Splice Section in Web Page

3.17.4.6.1. Splice PID

The Splice PID field provides the PID selection. The Splice PIDs are automatically assigned when a service is selected and is based on their order within the service PMT. This field provides an opportunity for the user to override any PID selections.

The NO SELECTION option allows the user to clear any PID selection and stop Splice processing. Depending on the state of the **PMT Update Mode** selected from the **Decode > Advanced > Selection Control** section, this setting may be automatically overridden by the IRD after a PMT update event.

Also provided is the option to select a USER PID that has been defined in the **Decoder > Splice** section. This allows the user to process any splice stream that has not been declared in the PMT of the selected decode service. However, the decoder will continue to enforce synchronization with the Program Clock Reference (PCR) identified in the service PMT. If synchronization fails, this will disrupt the splice processing.

3.17.4.6.2. User PID

The User PID field specifies the User PID value for Splice processing. The field accepts PID values between 0 and 8191. The User PID is selected from the main Splice PID selection list.

3.17.4.6.3. Status

Status: NET OUT Pending (2 seconds)

The Status field reports back the current state of any Splice processing. Possible status messages are:

- **IDLE** – A network In Point has been processed and nothing else is pending. It could also mean Splice processing is inactive, normally when no Splice PID is selected or no Splice Event ID has been received / filtered.
- **NET OUT Pending (X seconds)** – A network Out Point has been received but not yet signalled by the IRD, a time has been specified and the event is pending (where X is the number of seconds remaining before signalling the network Out Point). If the time specified failed to satisfy the minimum Pre-Roll time and **Clamp Pre-Roll** is active, this will be indicated by adding the term **(Clamped)** at the end of the **Status** field message.
- **NET OUT (Remaining duration X seconds)** – A network Out Point has been signaled by the IRD, the duration has been specified (where X is the number seconds) and the auto_return flag is set. A network In Point will be signalled at the end of the duration period.
- **NET OUT (Expected duration X seconds)** – A network Out Point has been signaled by the IRD and the duration has been specified (where X is the number seconds) but the auto_return flag was not set. A second splice_insert message would be expected to signal a network In Point to end the break.
- **NET OUT (Duration indefinite)** – A network Out Point has been signaled by the IRD but no duration has been specified. A network In Point won't be signaled until a further splice_insert message is received to indicate the event.

NOTE: Where X seconds are specified, click **Refresh** to update this value.

3.17.4.6.4. Splice Event ID

Splice Event ID: 400003E8

This field displays the 32-bit hexadecimal value of the current event ID extracted from the SCTE 35 message.

3.17.4.6.5. Unique Program ID

Unique Program ID: 0001

This field display the value extracted from the splice_insert command of the SCTE 35 message. It provides a unique identification for viewing events within the service.

3.17.4.6.6. Splice Count

Splice Count: 10

This field displays a counter for the number of splice packets parsed by IRD. The counter rolls back to zero after the value 65535.

3.17.4.6.7. Cancel Active Splice

This button causes any active or pending Splice event to be cancelled, returning the status to IDLE.

3.17.4.6.8. SCTE 104 Splice Insertion

This field enables or disables Splice Insertion in the VANC space of the SDI output in the form of SCTE 104 messages.

NOTE: The Splice Insertion tick box works independently to VANC insertion control determined by the **Enable VANC** option (located in **Decoder > VBI-VANC** section).

3.17.4.6.9. SCTE 104 Insertion

This drop-down determines where the SCTE 104 messages are inserted if enabled. The options are HD VANC space only, SD VANC space only or both the HD and SD VANC spaces

3.17.4.6.10. Clamp Pre-Roll

When enabled, this option ensures that the pre-roll time signalled in the SCTE 104 messages is at least 4 seconds, thus ensuring that the Splice message is not discarded by downstream processing equipment. In addition, if set this option will also adjust the point that the Network Out relay pulse occurs so that it is at least 4 seconds after the receipt of the splice_insert() message.

3.17.4.7. Setup: Decode > Splice > Filter Control

This feature, also referred to as *Addressable DPI*, allows the IRD to filter out undesired DPI events according to the splice_event_id in the incoming SCTE-35 messages. Typically this would be used at downlink sites, and can additionally be configured using Director’s Over Air Command control. IRDs can be allocated into groups, and all receivers in Group 1 might be configured to only output SCTE-35/104 messages with splice_event_id 1, all receivers in Group 2 only output splice_event_id 2 and so on

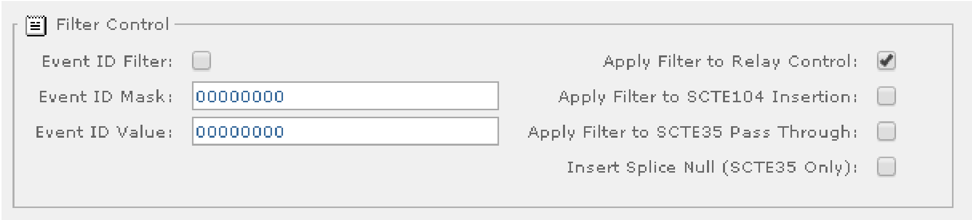


Figure 3-169 Decode > Splice > Filter Control

3.17.4.7.1. Event ID Filter

This field enables or disables Splice Event ID filtering according to the Event ID Mask and Event ID Value settings. Event filtering allows operators to specify different splice points for different units. Splice Event ID filtering can be configured to affect:

- Relay Control
- SCTE 104 insertion in VANC
- SCTE 35 TS packets being passed through

When Event ID filtering is enabled, then the Event ID field extracted from every SCTE 35 message is evaluated against a filter mask and if the result is true then the SCTE 35 message will trigger the appropriate relay. When Event ID filtering is disabled, all SCTE 35 messages will trigger the appropriate relay, are inserted as SCTE 104 (if enabled) and all SCTE 35 TS packets are passed through to the output transport stream interfaces.

Event ID filtering is evaluated by determining the two results A and B as described in *Table 3-55* below. If result A is equal to result B then this would allow the SCTE 35 message to pass the filter.

Table 3-55 Event ID Evaluation

Result	Evaluation Description
A	The *Event ID* from the SCTE 35 message is evaluated against the *Event ID Mask* using a logical-AND operator. For example: Event ID 0000 1200 (hex) & Event ID Mask 1000 1000 (hex) = Result A 0000 1000 (hex)
B	The *Event ID Value* specified by the user is evaluated against the *Event ID Mask* using the logical-AND operator. For example: Event ID Value 0000 1000 (hex) & Event ID Mask 1000 1000 (hex) = Result B 0000 1000 (hex)

In the examples shown above, the value of result A (0000 1000) is equal to the value in result B (0000 1000) and therefore this would trigger the relay.

Event ID Filtering Example

Scenario: Using the IRD to attempt to filter 2 SCTE triggers, definable by the SCTE event ID. To use the Event ID filter to allow all SCTE triggers that begin with 4 or 6.

Allow any events that match:

```
Id 1 4xxxxxxx  (where x means 'don't care')

Id 2 6xxxxxxx
```

First, identify the common bits that match the 2 IDs, in this case, converting the hexadecimal to binary gives:

```
 0x4 = 0100

 0x6 = 0110
```

The 3rd bit can be a 1 or a 0, so should be ignored for the comparison by setting it to 0, whilst the other bits should be set to 1:

```
 0xD = 1101
```

When a SCTE trigger arrives it then it bitwise 'ands' it with the Event ID Mask and then compares the result against the Event ID Filter, if this matches then the trigger passes.

E.g. (working with 16 bits instead of 32 to make things simpler):

```
Event ID Mask   D000 (in binary 1101 0000 0000 0000)

Event ID Value  4000 (in binary 0100 0000 0000 0000)        (a)
```

The only bits that should be set in the Event ID Value are those whose corresponding bits in the Mask are set to 1 and the values should match the common bits of the 2 Event IDs.

Then for SCTE trigger Event IDs as they arrive:

Incoming Event ID 4123

Comparing with the mask:

```
         D000 (in binary 1101 0000 0000 0000) &

         4123 (in binary 0100 0001 0010 0011)
result   4000 (in binary 0100 0000 0000 0000)     (b)
```

(a) and (b) match so the SCTE Trigger passes.

Incoming event ID 6123

Comparing with the mask

```
         D000 (in binary 1101 0000 0000 0000) &

         6123 (in binary 0110 0001 0010 0011)

result   4000 (in binary 0100 0000 0000 0000)     (c)
```

Since (c) also matches (a) it also passes.

Incoming Event ID 5123

Comparing with the mask

```
          D000 (in binary 1101 0000 0000 0000) &
          5123 (in binary 0101 0001 0010 0011)
result    5000 (in binary 0101 0000 0000 0000)     (d)
```

(d) doesn't match (a) therefore the event is blocked.

3.17.4.7.2. Event ID Mask

This field allows the user to specify a 32-bit hexadecimal value for the **Event ID Mask**.

See the above section describing the Event ID Filter operation.

3.17.4.7.3. Event ID Value

This field allows the user to specify a 32-bit hexadecimal value for the **Event ID Value**.

See the above section describing the Event ID Filter operation.

3.17.4.7.4. Apply Filter to Relay Control

When the **Event ID Filter** is enabled and the **Apply Filter to Relay Control** is enabled, any SCTE 35 messages that pass the filter will trigger the Relay Control.

When the **Event ID Filter** is enabled and the **Apply Filter to Relay Control** is disabled, all SCTE 35 messages will trigger the Relay Control.

When the **Event ID Filter** is disabled, the **Apply Filter to Relay Control** has no effect and all SCTE 35 messages will trigger the Relay Control.

3.17.4.7.5. Apply Filter to SCTE 104 Insertion

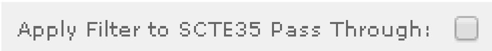
When the **Event ID Filter** is enabled and the **Apply Filter to SCTE 104 Insertion** is enabled, any SCTE 35 messages that pass the filter will be inserted in to SCTE 104 VANC data.

When the **Event ID Filter** is enabled and the **Apply Filter to SCTE 104 Insertion** is disabled, all SCTE 35 messages will be inserted in to SCTE 104 VANC data.

When the **Event ID Filter** is disabled, the **Apply Filter to SCTE 104 Insertion** has no effect and all SCTE 35 messages will be inserted in to SCTE 104 VANC data.

NOTE: For backward compatibility reasons, the ***SCTE 104 Splice Insertion*** control must also be enabled when converting SCTE 35 to SCTE 104.

3.17.4.8. Apply Filter to SCTE 35 Pass Through



When the **Event ID Filter** is enabled and the **Apply Filter to SCTE 35 Pass Through** is enabled, any SCTE 35 messages that pass the filter will be passed through as SCTE 35 packets on the outgoing transport stream interfaces, otherwise the packet will be dropped (filtered out).

When the **Event ID Filter** is enabled and the **Apply Filter to SCTE 35 Pass Through** is disabled, all SCTE 35 messages be passed through as SCTE 35 packets on the outgoing transport stream interfaces.

When the **Event ID Filter** is disabled, the **Apply Filter to SCTE 35 Pass Through** has no effect and all SCTE 35 messages will be passed through as SCTE 35 packets on the outgoing transport stream interfaces.

3.17.4.9. Insert Splice Null (SCTE 35 Only)

When the Event ID Filter is configured to filter the outgoing SCTE 35 TS packets, it will drop the filtered out packet. Rather than dropping SCTE 35 packets which can effect the outgoing TS bitrate slightly, enable this option to replace the dropped SCTE 35 packet with a SCTE 35 packet containing a splice_null() message to maintain the same effective bitrate.

3.17.4.10. Setup: Alarms > Relay Configuration

3.17.4.10.1. Relay Configuration

This field displays the options available for how to configure the behavior of the three relays.
It is located under the main **Alarm** tab only if the satellite input card (DVB-S/S2) is fitted otherwise the control is hidden.

- **Summary Alarm; SCTE 35 Signalling:** This is the default assignment for the three relays. Relays 2 and 3 are used for signalling SCTE 35 splice events.

Relay Set	Purpose
Relay 1	Summary Alarm
Relay 2	SCTE 35 Control
Relay 3	

- **Summary Alarm; C/N Margin Alarm:** This option is exposed only when the satellite input card (DVB-S/S2) is fitted. This option allows the user to assign the C/N Margin Alarm to a dedicated relay.

Relay Set	Purpose
Relay 1	Summary Alarm
Relay 2	Not used
Relay 3	C/N Margin Alarm

3.17.4.11. Setup: Save/Load

3.17.4.11.1. Save Splice Logs File

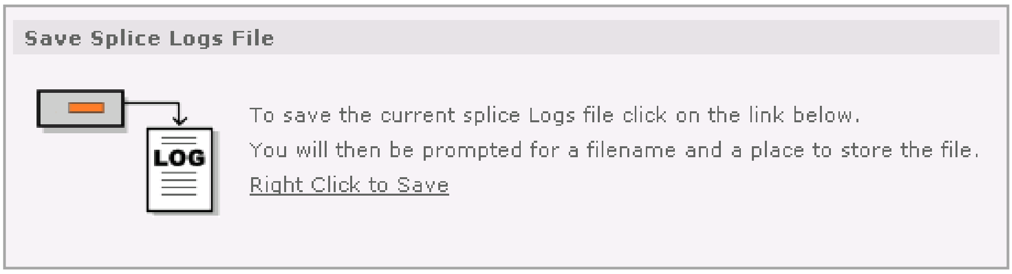


Figure 3-170 Save Splice Log File

Each time a splice event occurs whether it processed or ignored, these are logged and can be accessed through the web browser interface under the main Save/Load tab. The user can click on the link **Right Click to Save** to view the logs directly or as suggested by the link, right-click over the link to download and save as a text file.

3.17.5. Cue Tone (DTMF) Splicing Support

3.17.5.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Splice	B				

3.17.5.2. Control

Web	Front Panel	SNMP	Serial Remote
✓			

3.17.5.3. Functional Description

Cue (DTMF) Tones are a sequence of audio tones used to encode a character sequence. This sequence can be used to trigger splicing events. The receiver has the ability to detect and interpret these tones and sequences and can be configured to insert SCTE 104 messages into (HD)SDI and/or SCTE 35 messages into the output transport stream.

To detect the character tone sequence, the audio service containing the tones must be decoded on an Advanced Audio Decoder device with Cue Tone Detection enabled.

The character sequence must be configured to be interpreted as a splicing message. This is setup in the IRD web interface.

The input pre-roll for each tone sequence must be configured to identify the target splice time. When the SCTE 104 or SCTE 35 packet is inserted on the output the pre-roll may change due to processing delays. The output pre-roll is recalculated to maintain the same target splice time.

For Cue Tones splicing configuration the input pre-roll is the time between the end of the last tone of the Cue Tone sequence and the time of the splice event.

For SCTE 35 insertion in the output transport stream the receiver must also be configured with the ‘Service Filter Mode’ set to either ‘Multi Service’ or ‘Remap’ mode.

SCTE 104 insertion will be limited to inserting a Multiple Operation Message of a ‘splice start normal’ or ‘splice end normal’ type.

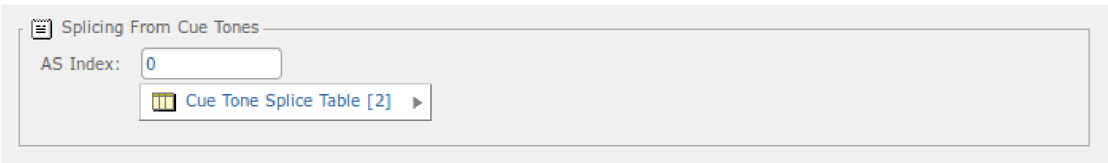
SCTE 35 insertion will be limited to inserting a ‘splice_insert’ command.

3.17.5.4. Setup

3.17.5.4.1. Setup: Enable Audio DTMF detection

Cue Tone detection must be enabled for the correct audio service, see section 3.14.4.4.12 Audio Decoder > Cue Tone Detection.

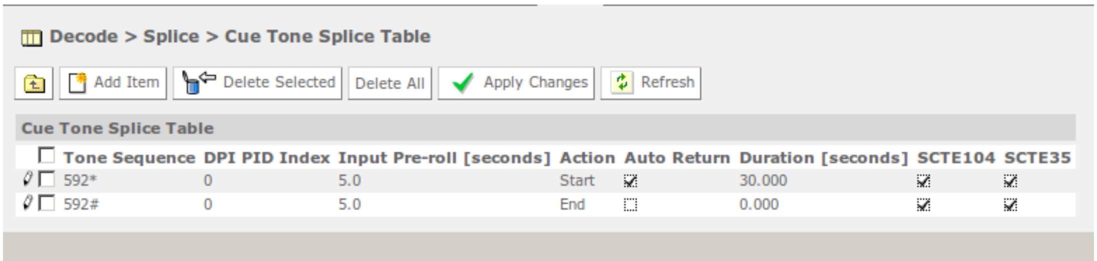
3.17.5.4.2. Setup: Decode > Splice > Splicing From Cue Tones



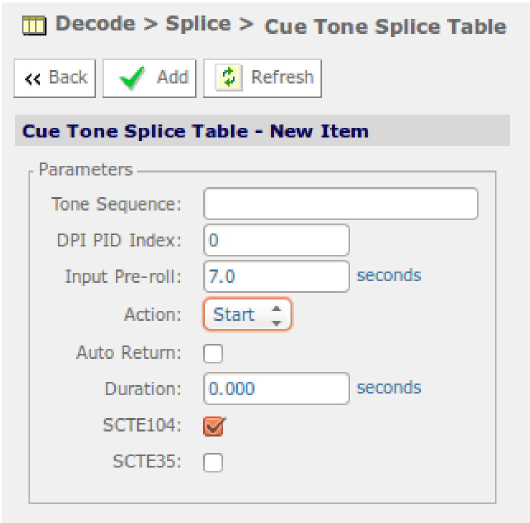
- **AS Index** – The AS Index value to be inserted in all SCTE 104 / SCTE 35 messages inserted as a result of a Cue Tone sequence detection and match.

3.17.5.4.3. Setup: Decode > Splice > Splicing From Cue Tones > Cue Tone Splice Table

This table contains the configuration for interpreting tone sequences. The receiver is able to store 16 possible configurations. Each tone sequence must be unique but can be used to configure SCTE 104 and SCTE 35.



Setup: Adding a Configuration – 'Add Item'



- **Tone Sequence** – A sequence of 4 characters representing the DTMF signal. Valid characters are a-d, 0-9 # or *
- **DPI PID Index** – The DPI PID index field to be used in SCTE 104.
- **Input Pre-roll** – This is the pre-roll of the tones in the source. It is the time between the end of the last tone of the sequence and when the splice is due.
- **Action** – The type of splice message to send:
- **Start** – This will send a splice_insert_type of spliceStart_normal for SCTE 104. For SCTE 35 it will send a splice_insert command with the out_of_network_indicator indicating an opportunity to exit from the network feed, a Program Out Point.

- **End** – This will send a splice_insert_type of spliceEnd_normal for SCTE 104. For SCTE 35 it will send a splice_insert command with the out_of_network_indicator indicating an opportunity to return to the network feed, a Program In Point.
- **Auto Return** – This will set the auto_return_flag and break_duration fields in SCTE 104. This will insert a break_duration field in SCTE 35. This should be used in conjunction with the Duration field.
- **Duration** – Used in conjunction with the Auto Return field to define the duration of the splice. Inserted in the break_duration field of the SCTE 104 and SCTE 35 message.
- **SCTE 104** – If enabled this will output a SCTE 104 packet with this event.
- **SCTE 35** – If enabled this will output a SCTE 35 packet with this event.

3.17.5.4.4. Setup: SCTE 104 Output

Activate Splice Insertion, see section 3.17.4.6.8 SCTE 104 Splice Insertion.

Set SCTE 104 Insertion for HD or SD output, see section 3.17.4.6.9 SCTE 104 Insertion.

Optionally set Clamp Pre-roll, see section 3.17.4.6.10 Clamp Pre-Roll.

3.17.5.4.5. Setup: Relay Trigger

Optionally configure the relay to trigger on the splice event, see section 3.17.4.10 Setup: Alarms > Relay Configuration.

3.17.5.4.6. Setup: SCTE 35 Output

Configure the **Output > Filter > Service Filter Mode** to be set to either MULTI SERVICE or REMAP. See section 3.19.4 Multi Service Filtering or 3.19.5 Remapping respectively, for detailed configuration of these modes.

SCTE 35 output is also available in Service Splitting mode.

The output SCTE 35 PID cannot be configured manually it will be automatically determined in the receiver. It will be set to the next unused PID after the video PID.

3.17.6. Multi Protocol Encapsulation (MPE) Data

3.17.6.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●	●	●	-	●

3.17.6.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
RX83XX/HWO/IP/OUT	1919	FAZ 101 0108/22	RX83XX/HWO/IP/OUT
RX8200/HWO/IP/OUT	1918	FAZ 101 0113/14	RX8200/HWO/IP/OUT
RX8200/HWO/IP/OUT	1934	FAZ 101 0113/13	RX8200/HWO/IP/IO/A

3.17.6.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.17.6.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX82XX/SWO/IP/DATA	MPE DATA DE-ENCAPSULATION	FAZ 101 0113/35	RXXXX/SWO/DATA
RX8200/HWO/IP/OUT	IP Transport Stream Output	FAZ 101 0113/14	RX8XXX/SWO/DATA/ IP/OUT
RX83XX/SWO/IP/DATA	MPE DATA DE-ENCAPSULATION	FAZ 101 0108/7	RXXXX/SWO/DATA

3.17.6.5. Functional Description

Multi Protocol Encapsulation (MPE) provides a method for IP datagrams to be placed into DVB compliant Transport Streams using an MPE encapsulator. Upon reception of the Transport Stream this “broadcast data” can then be returned to IP data. This means a broadcaster can use their broadcast infrastructure to send IP data transparently across a DVB link. This data is defined in ISO-IEC 13818-6 / ETSI 301-192. The data is broadcast as private section information on a particular PID. These sections are known as DSM-CC sections. Each of these private sections contains an IP datagram.

IP datagrams are identified within the section by a MAC address field. Within the MPE data PID there can be many IP datagrams with many different destinations. Further filtering on the PID must be carried out using this MAC address. This MAC address is also used to regenerate MAC frames for transmission on the output data port (this becomes the destination MAC address).

The IRD supplies the recovered IP data to down-stream network equipment using either one or both of its output data ports.

3.17.6.6. Setup: Decode > MPE

The output port configuration on the *Output* tab does not need to be used for this functionality to work. All setup is carried out from the **Decode > MPE** sub-tab of the web interface.

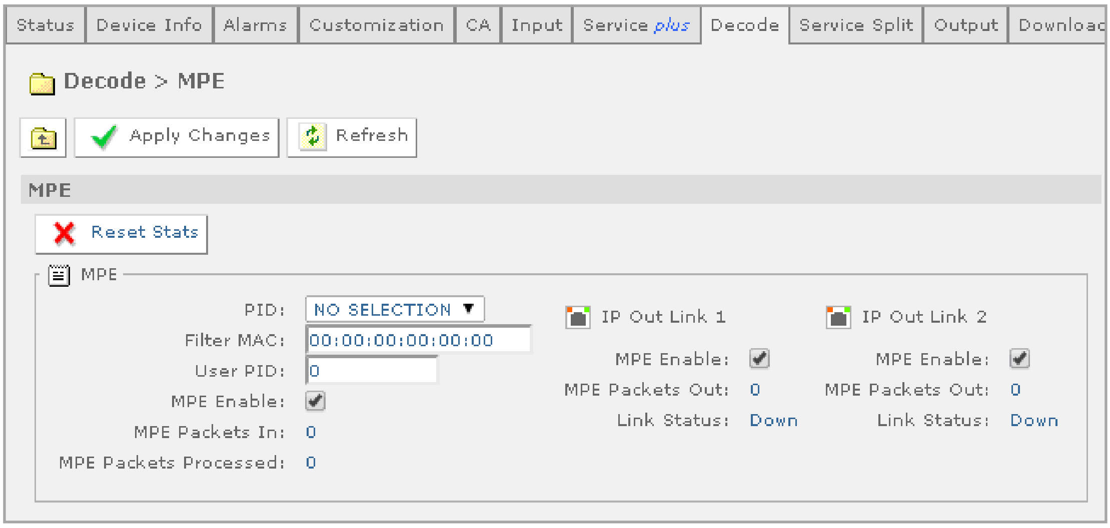


Figure 3-171 MPE Configuration

3.17.6.6.1. PID

The PID field provides the PID selection. The PIDs are automatically assigned when a service is selected and is based on their order within the service PMT. This field provides an opportunity for the user to override any PID selections.

The NO SELECTION option allows the user to clear any PID selection and stop processing. Depending on the state of the *PMT Update Mode* selected from the Decode > Advanced > Selection Control section, this setting may be automatically overridden by the IRD after a PMT update event.

Also provided is the option to select a USER PID that has been defined in the Decoder > MPE section. This allows the user to process any MPE stream that has not been declared in the PMT of the selected decode service.

3.17.6.6.2. Filter MAC

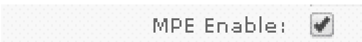
- This selects the MAC address to be filtered within the section data, this MAC address is also used as the destination MAC address within the re-assembled MAC frame. This MAC address will have been configured by the IP Encapsulator at the Head-End, the administrator of this Head-End must be contacted for the correct MAC address. The downstream network equipment must also be setup to accept IP datagrams with this destination MAC address.

NOTE: Setting the **Filter MAC** is mandatory to successfully use the MPE Data functionality.

3.17.6.6.3. User PID

The User PID field specifies the User PID value for MPE processing. The field accepts PID values between 0 and 8191. The User PID is selected from the main PID selection list.

3.17.6.6.4. MPE Enable



- Placing a check mark in this box enables the Multi-Protocol Encapsulation functionality.

3.17.6.6.5. MPE Packet In

This status field reports the number of MPE packets received from the incoming Transport Stream based in the current PID selection.

3.17.6.6.6. MPE Packets Processed

This status field reports the total number of MPE packets processed so that they can be converted for IP output.

3.17.6.6.7. IP Out Link 1 > MPE Enable

This field enables or disables the data being output on IP Output Port 1.

NOTE: The unit is only capable of outputting one MPE stream, if both ports are selected then the same stream will be output on both ports.

3.17.6.6.8. IP Out Link 1 > MPE Packets Out

This status field reports the total number of data packets being output on IP Output Port 1.

3.17.6.6.9. IP Out Link 1 > Link Status

Link Status: Down

This status field reports the link status of the port. MPE is a connectionless broadcast so the link status does not indicate if the IP contents of the MPE packets have been successfully received.

- 10 Mb
- 100 Mb
- 1000 Mb
- Down

3.17.6.6.10. IP Out Link 2 > MPE Enable

MPE Enable: ☑

This field enables or disables the data being output on IP Output Port 2.

NOTE: The unit is only capable of outputting one MPE stream, if both ports are selected then the same stream will be output on both ports.

3.17.6.6.11. IP Out Link 2 > MPE Packets Out

MPE Packets Out: 0

This status field reports the total number of data packets being output on IP Output Port 2.

3.17.6.6.12. IP Out Link 2 > Link Status

Link Status: Down

This status field reports the link status of the port. MPE is a connectionless broadcast so the link status does not indicate if the IP contents of the MPE packets have been successfully received.

- 10 Mb
- 100 Mb
- 1000 Mb
- Down

3.17.6.7. Front Panel Setup

3.17.6.7.1. Component Selection

This menu allows the user to select the desired MPE component for the list.

```
SERVICE                          |COMPONENT SELECTION
4.9.1                            |NO SELECTION
```

Once **Edit** is selected use the ▲ (Up) and ▼ (Down) keys to toggle the MPE components within the service and the **USER PID** and **NO SELECTION** options.

3.17.6.7.2. Filter MAC / User PID

This menu allows the user to select either a MAC address to filter on or a user PID to use when the MPE component selection is set to **USER**.

```
SERVICE                  |FILTER MAC: 00:00:00:00:00:00
4.9.2                    |USER PID:  0000
```

Once **Edit** is selected Use the ◀ (Back) and ▶ (Forward) keys to toggle between **FILTER MAC** and **USER PID**.

Use the ▲ (Up) and ▼ (Down) keys to increment each element in the MAC address and increment or decrement the **USER PID** value.

3.17.6.7.3. Component Selection

This menu allows the user to turn MPE de-encapsulation either off or on.

```
SERVICE                  |MPE ENABLE: ENABLE
4.9.3                    |
```

Once **Edit** is selected use the ▲ (Up) and ▼ (Down) keys to toggle the **MPE ENABLE** status between the values **ENABLE** and **DISABLE**.

3.17.6.7.4. Port 1 Enable and Status

This menu allows the user to view the link status of the MPE port and to enable or disable the transmission of MPE de-encapsulated IP data from that port.

```
MPE PORT 1               |PORT 1 MPE ENABLE: ENABLE
4.9.4.1                  |PORT 1 MPE LINK STATUS: DOWN
```

Once edit is selected use the ▲ (Up) and ▼ (Down) keys to toggle the **PORT 1 MPE ENABLE** status between the values **ENABLE** and **DISABLE**.

3.17.6.7.5. Port 2 Enable and Status

This menu allows the user to view the link status of the MPE port and to enable or disable the transmission of MPE de-encapsulated IP data form that port.

```
MPE PORT 2               |PORT 1 MPE ENABLE: ENABLE
4.9.4.1                  |PORT 1 MPE LINK STATUS: DOWN
```

Once edit is selected use the ▲ (Up) and ▼ (Down) keys to toggle the PORT 2 MPE ENABLE status between the values **ENABLE** and **DISABLE**.

3.17.7. Low Speed Data

3.17.7.1. Availability

● = Option **B** = Supplied with Base Model

RX8200	RX8310	RX8315	RX8320	RX8330
●	-	-	-	-

3.17.7.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
RX82XX/HWO/RS232	1927	FAZ 101 0113/17	RX82XX/HWO/RS232

3.17.7.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.17.7.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no licenses for this option			

3.17.7.5. Description

Low Speed Data is an asynchronous form of data output that is sent via the optional RS232 data port of the unit.

The Low Speed Data is supplied from the incoming Transport Stream and can be sent in a number of different formats. Currently the following are supported:

- **TTV_F2 Format** – This is a proprietary MediaKind format.
- **DVB Format** – In this mode the data is carried as DVB specified asynchronous data PES packets defined in ISO13818-1.

- **Piped Format** – In this mode the data is supplied as data directly into DVB transport packets, the only mandate for this is that the packet has an ISO 13818-1 Transport Stream packet structure, the rest is user defined. This is described in ETSI TR 101-202.

The data is then sent from the unit as RS232 data at rates between 1200 and 38400 bps. This is automatically set when processing the TTV_F2 format otherwise this must be correctly set by the operator when handling the other formats.

To view this page, select the **Data** button from the Decode page.

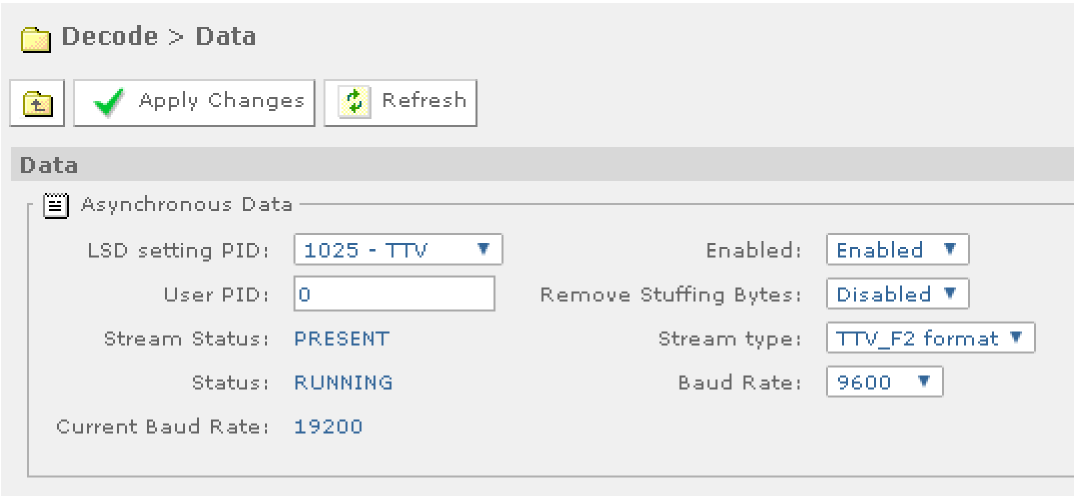


Figure 3-172 Decode > Data Web Page

3.17.7.6. Decode > Asynchronous Data

- **LSD setting PID** – Enables the selection of the Low Speed Data component from a drop-down menu. By default this is the Low Speed Data component associated for the selected Decode Service. The component list will comprise of the following:
- **NO SELECTION** – An entry in the list that turns off component selection for Low Speed Data.
- **nnn xxx** – A list of PID numbers (nnn) found with a supported Low Speed Data descriptor tag and its associated Stream Type (xxx), i.e. **TTV** for TTV_F2 format, **DVB** for DVB format or **PIP** for Piped format.
- **nnn xxxx USER** – Allows selection of the Low Speed Data User PID (nnn) and Stream Type (xxx) that have been specified by the User PID and Stream Type fields.
- **User PID** – Specifies the User PID that can be selected from the LSD Setting PID option.
- **Stream Status** – Indicates the presence of the incoming stream selected as the Low Speed Data PID:
- **NOT PRESENT** – The selected PID has not been detected for at least 3 seconds.
- **PRESENT** – The selected PID has been detected and sent forward for processing.

- **Status** – Indicates the status of the incoming stream being processed:
- **STOPPED** – No Low Speed Data PID has been selected and is not being processed.
- **RUNNING** – The Low Speed Data stream is successfully being processed.
- **ERROR** – There has been an error detected whilst processing the Low Speed Data stream.

NOTE: Because the data is RS232, this does not reflect the status of the down-stream connection

---

- **Current Baud Rate** – Indicates the current baud rate being used to output the post processed asynchronous data through the RS232 port.
- **Enabled** – Enable or disable the Low Speed Data output from the RS232 port.
- **Remove Stuffing Bytes** – If disabled (default), all contents of the Low Speed Data TS packet is output through the RS232 port. If enabled, only the TS packet payload indicated by the packet length is output through the RS232 port and any stuffing data is dropped.

NOTE: The ***Remove Stuffing Bytes*** feature is only applicable when processing Low Speed data indicated as **DVB Format**.

- **Stream type** – Specifies the user-defined stream type for the incoming Low Speed Data stream when a **User PID** is selected:
- TTV_F2 format
- DVB format
- Piped format
- **Baud rate** – Specifies the default Baud Rate at which the Low Speed Data should be output from the RS232 port (1200, 2400, 4800, 9600, 19200 or 38400 bps). If the undefined option "---" is selected, the baud rate will default to 9600 bps.

NOTE: When processing Low Speed data indicated as **TTV_F2 Format**, the output baud rate is automatically set by the incoming stream and overrides the ***Baud Rate*** setting.

-

3.17.7.7. Front Panel Setup

3.17.7.7.1. Asynchronous Data Enable

This menu allows the user to enable or disable the Low Speed Data stream output through the RS232 port. It also reports current baud rate being applied.

```
SERVICE                             |ASYNCHRONOUS DATA: ENABLED
4.10                                |            BAUD 19200 >
```

Use the ▲ (Up) and ▼ (Down) keys to select either **ENABLED** or **DISABLED** for the low speed data enabled state.

3.17.7.7.2. Component Selection

This menu allows the user to select which Low Speed Data stream to process. It also reports the incoming stream status and the outgoing processing status.

```
ASYNC                               |SELECTION: 1025 - TTV
4.10.1                              |PRESENT        RUNNING
```

Once **Edit** is selected Use the ▲ (Up) and ▼ (Down) keys to toggle between **SELECTION** and **USER PID**. Select the **Save** key to apply the change or the **Edit** key again to cancel.

3.17.7.7.3. User PID Configuration

This menu allows the user to define the User PID value and the user-defined Stream Type.

```
ASYNC                               |USER PID:  0000
4.10.2                              |STREAM TYPE: TTV_F2 FORMAT
```

Once **Edit** is selected the user can move between the **USER PID** and the **STREAM TYPE** items using the ◀ (Back) and ▶ (Forward) keys. The user can enter a PID between the values of 1…8191 using the ▲ (Up) and ▼ (Down) keys. Also the user can toggle between Low Speed Data formats for **STREAM TYPE**. These settings will not be used unless the Component Selection **USER** is selected.

3.17.7.7.4. Baud Rate Configuration

This menu allows the user to select the default baud rate to be applied to the RS232 port if not automatically configured by the Low Speed Data format being processed. The menu also reports the current baud rate applied to the Low Speed Data stream being processed.

```
ASYNC                               |DVB BAUD RATE:   9600
4.10.3                              |CURRENT BAUD RATE: 19200
```

Once **Edit** is selected Use the ▲ (Up) and ▼ (Down) keys to toggle between **DVB BAUD RATE** setting. Select the **Save** key to apply the change or the **Edit** key again to cancel.

3.17.7.7.5. Remove Stuffing Bytes Configuration (DVB Format Only)

This menu allows the user to configure whether the stuffing data present in the TS packet should be removed or output with the TS payload on the RS232 port.

NOTE: The ***Remove Stuffing Bytes*** feature is only applicable when processing Low Speed data indicated as **DVB Format**.

```
ASYNC                       |REMOVE STUFFING BYTES:
4.10.4                      |DISABLED     (DVB FORMAT)
```

Use the ▲ (Up) and ▼ (Down) keys to select either **ENABLED** or **DISABLED** for the low speed data enabled state.

3.17.8. Remote Device Control

3.17.8.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Remote Device Control	B	B	B	B	B

3.17.8.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
There are no order items with this functionality			

3.17.8.3. Control

Web	Front Panel	SNMP	Serial Remote
✓		✓	

3.17.8.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys associated with this input type			

3.17.8.5. Functional Description

Remote Device Control (RDC) is an MediaKind protocol that provides a means of sending control messages from a headend to 3rd party equipment located on the same Ethernet network as the receiver.

For more information on the use, configuration and compatibility of this protocol, please contact MediaKind Customer Services

To view this page, select the **Remote Device Control** button from the **Decode** page.

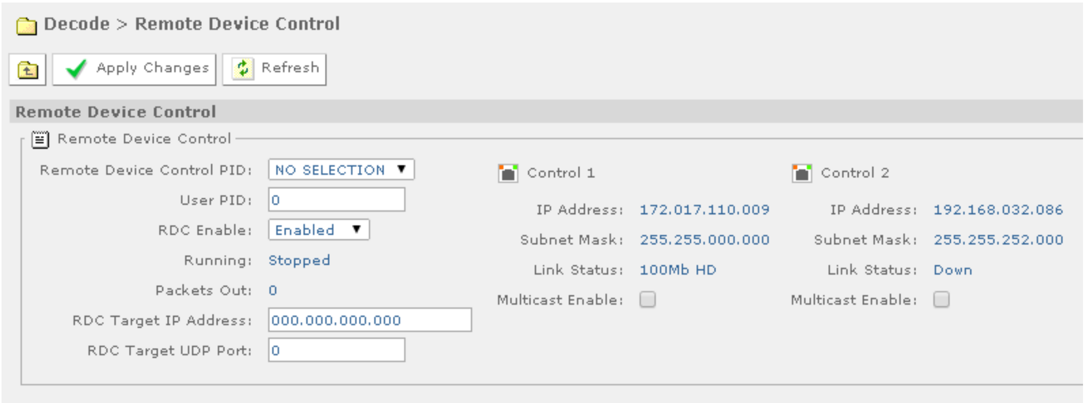


Figure 3-173 Decode > Remote Device Control Page

3.17.8.6. Decode > Remote Device Control

- **Remote Device Control PID** – Enables the selection of the PID from a drop-down menu.
- **User PID** – Specifies the User PID that can be selected from the Remote Device Control PID option.
- **RDC Enable** – Allows the remote device control functionality to be enabled or disabled.
- **Running** – Indicates the current status of the Remote Device Control.
- **Running** – Remote Device Control data is being received, processed and transmitted.
- **Stopped** – No Remote Device Control data is being processed.
- **Packets Out** – The number of Remote Device Control packets that have been transmitted over the Ethernet interface.
- **RDC Target IP Address** – The IPv4 address to which the Remote Device Control packets should be sent via the receiver's control interface. These can be any valid IPv4 unicast, broadcast or multicast address. For unicast or broadcast addresses, the packet will be sent over **Control Port 1** or **Control Port 2** according to the standard packet routing scheme determined by the Port's IP address, Subnet Mask and the receiver's Gateway address. Multicast addresses will be sent over the Control Port if the **Multicast Enable** option is enabled for that particular port.
- **RDC Target UDP Port** – The UDP port to which the Remote Device Control packets should be sent.

- **Control 1 / 2** – This displays the current status of the receiver's control ports as configured on the **Device Info > Network Settings** webpage
- **Control 1 > Multicast Enable** – If checked, and a multicast IPv4 address is entered in the **RDC Target IP Address** option, then the multicast packet will be transmitted on Control Port 1.
- **Control 2 > Multicast Enable** – If checked, and a multicast IPv4 address is entered in the **RDC Target IP Address** option, then the multicast packet will be transmitted on Control Port 2.

NOTE: If **Multicast Enable** is selected for both **Control 1** and **Control 2**, then two packets will be transmitted, one on each interface.

3.18. Output Ports

The IRD can have many types of output depending upon the hardware and software options enabled. These outputs include:

- ASI output
- SD-SDI output
- HD-SDI output
- 3G-SDI output
- IP output
- CVBS
- CVBS with support for Russian SECAM
- VGA output
- Analogue audio.
- RS232 data

Table 3-56 IRD Card and Output Types

Card type	Output type	Port(s)
Russian SECAM	analog	2 BNC 75 Ohm
IP output	digital	2 Ethernet RJ45
HD output	digital/analog	3 BNC + 1 VGA port
Audio output	analog/digital	2 DE9 ports

3.18.1. Asynchronous Serial Interface (ASI) and Serial Digital Interface (SDI) Output

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
ASI	B	B	B		B
SDI	B				●
HD-SDI	●				
3G-SDI	●				

3.18.1.1. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
RX8200/HWO/HD	1915	FAZ 101 0113/9	RX8200/HWO/HD
RX8200/HWO/HD/3G	1915	FAZ 101 0113/10	RX8200/HWO/HD/3G

3.18.1.2. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	✓

3.18.1.3. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX83XX/SWO/SDI	SDI Output Capability	FAZ 101 0108/35	RX83XX/SWO/SDI
RX8200/SWO/HDSDI/3G	3G SDI Output Capability	FAT 102 0176	RX8200/SWO/HDSDI/3G

3.18.1.4. Functional Description

The IRD has connectors on the rear of the unit that can be used to transport ASI or SDI data. The number of connectors and the supported transports is dependent on the hardware and software options configured.

- **ASI** is used to transport MPEG-2 Transport Streams
- **SD-SDI** is used to transport baseband digital video at SD resolutions.

- **HD-SDI** is used to transport baseband digital video at HD resolutions such as 720p and 1080i.
- **3G-SDI** is used to transport baseband digital video at higher rate HD resolutions such as 1080p.

The ASI output may be a direct copy of the input, or may have been processed by the unit as covered by section **Error! Reference source not found. Error! Reference source not found.**.

The SDI output is internally generated by the unit and is a combination of the video, audio decode, audio routing and ancillary data processing paths as explained in sections **Error! Reference source not found.**, **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.** respectively.

3.18.1.5. Output Configuration

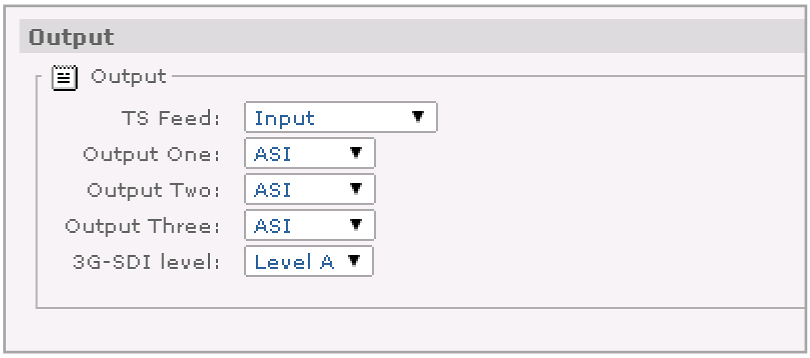


Figure 3-174 ASI Output Fields

- **TS Feed** – This specifies routing of the transport stream from the unit's input to the output processing stages, as described in section **Error! Reference source not found. Error! Reference source not found.**.
- **Input** – The input transport stream is routed to the output stages prior to any descrambling being performed.
- **Descrambled** – The input transport stream is routed to the output stages after first being process by the CA descrambling functionality, as described in section **Error! Reference source not found. Error! Reference source not found.**
- **Output One / Two / Three** – This menu configures the signal output from one of the SDI/ASI Output BNC ports at the rear of the unit.
- **AUTO** –If the incoming video is HD then the output will be configured as HD-SDI. If the incoming video is SD then the output will be configured as (SD) SDI. If the incoming video is 1080p then the output will be configured as 3G-SDI.
- **HD-SDI** – Only HD video will be output from this connector.
- **SD-SDI** – Only SD video will be output from this connector.
- **3G-SDI** – Only 1080P 3G video will be output from this connector
- **ASI** – An MPEG-2 transport stream will be output from this connector. This transport stream may have been processed as described in section **Error! Reference source not found. Error! Reference source not found.**

- **3G-SDI Level** – Specifies the mapping scheme for transporting the uncompressed video and its components into a serial digital interface operating at a nominal rate of 3 Gbps.
- **Level A** – Is the direct mapping of an uncompressed 1080p video stream into a serial digital interface operating at a nominal rate of 3 Gbps.
- **Level B** – Is the dual-link mapping of a 1080p video stream into a serial digital interface operating at a nominal rate of 3 Gbps

3.18.2. VGA Component Output

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
VGA Output	●				

3.18.2.1. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
RX8200/HWO/HD	1915	FAZ 101 0113/9	RX8200/HWO/HD
RX8200/HWO/HD/3G	1915	FAZ 101 0113/10	RX8200/HWO/HD/3G

3.18.2.2. Control

Web	Front Panel	SNMP	Serial Remote
✓			

3.18.2.3. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys required for this feature			

3.18.2.4. Functional Description

The RX8200 series fitted with the HD Output (RX8200/HWO/HD) or 3G Output (RX8200/HWO/3G) option card provides a VGA port which may be used to connect to a component monitor.

NOTE: This functionality is not supported as a fully compliant output and should be used for test purposes only.

3.18.2.5. Configuration

Configuration options for the VGA output port are located in the **Decode > Advanced** tab within the web browser interface.

3.18.2.5.1. Decode > Advanced

Figure 3-175 Decode > Advanced > VGA options

- **VGA Output Format** –Configures the signals for the 15-Pin Component Video output connector.
- **YPbPr** – YPBPR is the luminance and color difference signals. Y is output on the green channel, PB is output on the blue channel and PR is output on the red channel.
- **RGB** – RGB (red, green, blue) is an analog component video standard utilized by ports such VGA from a computer or via the SCART connector for a monitor.
- **VGA Output Sync** – The VGA connector carries separate H and V sync signals, however, television monitors often require the sync signal to be embedded on one or more of the video channels. Tri-level syncs can optionally be inserted on the Y/Green video channel or on all video channels.
- **None**
- **All**
- **Y/Green**

3.18.3. IP Transport Stream Output

3.18.3.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
IP TS Output	●	●	●	●	●

3.18.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
Dual Gigabit IP Transport Stream Output Card	1918	FAZ 101 0108/22	RX82XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Output Card	1919	FAZ 101 0108/22	RX83XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Bi-directional Card	1934	FAZ 101 0113/13	RX8200/HWO/IP/IO/A

3.18.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.18.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys required for this feature			

3.18.3.5. Functional Description

The unit can output transport streams over two 100/1000 Ethernet ports, encapsulating the TS packets into UDP or RTP, according to SMPTE 2022-2, optionally including SMPTE 2022M (ProMPEG) FEC support. The transport stream can be a single MPTS duplicated across both outputs, or with the appropriate software options enabled as multiple SPTS on one or both outputs. This functionality is described in section **Error! Reference source not found. Error! Reference source not found.**.

Output redundancy operation is supported using the MediaKind propriety Multimedia Guarding Protocol (MGP).

3.18.3.6. Variable Bit Rate IP Output TS Generation

It is recommended to always use the Constant Bit Rate (CBR) setting for IP output TS generation, but the unit can be configured to generate an output that is Variable Bit Rate (VBR).

In VBR mode, the output of the unit removes any TS null packet stuffing from the IP output transport stream. This provides the most space efficient output transport stream and thus most efficient use of the Ethernet transport medium, but the resulting output transport stream may not comply with ETR 290 specifications, and so the following issues may be seen:

- Table repetition rate non compliance
- PCR accuracy and interval errors

- Other timing related errors

Hence this mode can only be used where the downstream equipment is able to either re-generate the ETR 290 compatible transport stream, or is capable of otherwise handling null packet stripped transport streams.

3.18.3.7. User Redundancy and MGP

The IRD supports device redundancy. If one unit fails, another can take its role. This ensures a continuous service on the output of the system. The output of each unit can be enabled or disabled manually (see *User Redundancy Mode*) or automatically by the redundancy engine (MGP).

Multimedia Guarding Protocol (MGP) is an MediaKind specific protocol used between MediaKind devices ensuring the ability for an automatic redundancy switch. MGP ensures that only one device provides output at one time (avoiding duplicated output) and that if one unit fails another takes over its role automatically and starts providing output. This reduces service lapse to a minimum time.

In order to know each other's status, devices communicate between each other using Multimedia Status Messages (MSM). These messages are sent over the data network (not over the control network) in order to reach every devices providing output to the same network. MSMs are multicast messages for the same reason and are sent every n^{th} second which can be set by *Tx Interval option* setting.

3.18.3.8. Forward Error Correction (FEC)

FEC is intended to introduce redundancy in the output data stream, which can help recover lost data on the IRD side. As the most common data loss on an IP network is packet loss, FEC is intended to introduce redundancy through packets so that whole packets can be restored if lost.

FEC uses a simple parity bit for redundancy. This is computed from *n* bit spread through packets. In case of "row FEC", a FEC packet is created from *n* consecutive packets. Each bit of the FEC packet is computed from the corresponding bits of the *n* packets, e.g. 1st bit is computed from the 1st bits of the n packets. Note that only the payload of the packets is protected by the FEC packet, headers are ignored and FEC packets have a FEC header.

In case of "column FEC" non-consecutive packets are protected with FEC packets (interleaving). However, the offset between the packets are constant, which means, drawn in a table they are in the same column.

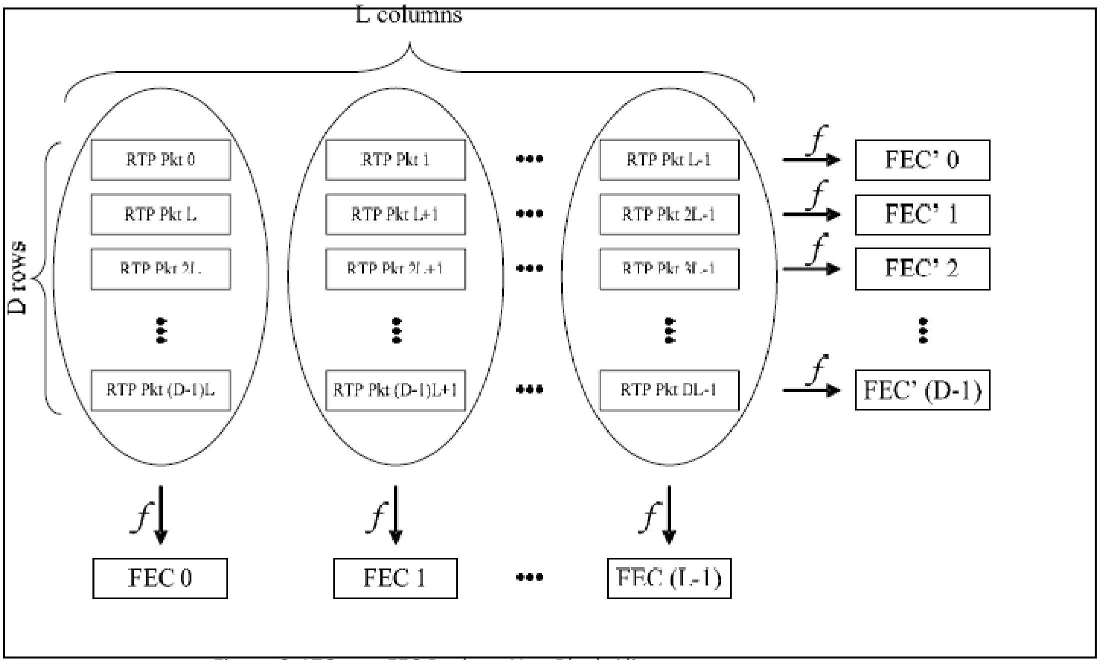


Figure 3-176 FEC Packets-Non Block Alignment

An important question is determining the emission time of the FEC packets. If the FEC packet is emitted just after the last packet used for the computation, a large amount of packets will be output at the end of columns (in the last row) while a smaller amount will be output at any other time. This causes an uneven bandwidth. A more even bandwidth can be guaranteed by using a non-block alignment (*see* ***Error! Reference source not found.***) or with delayed emission (*see* Figure 3-177 FEC Packets – Delayed Emission).

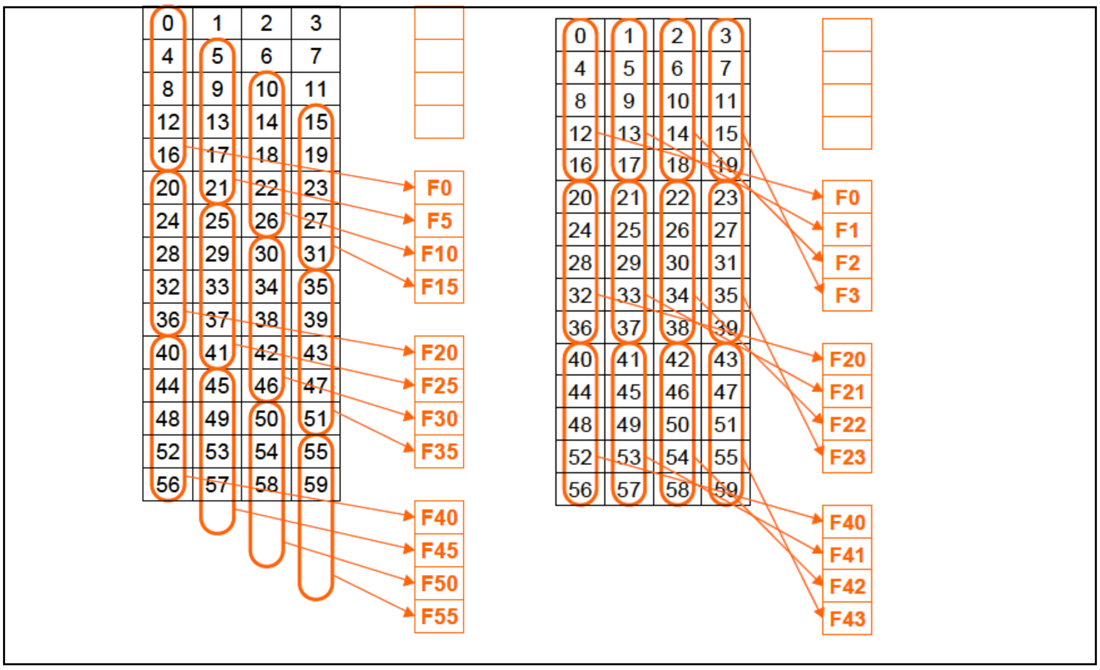


Figure 3-177 FEC Packets – Delayed Emission

3.18.3.9. Configuration

Any changes made to any of the settings will not be applied until the **Apply Changes** button is selected. Selecting the **Refresh** button will update current settings and status values.

3.18.3.9.1. Output > IP Out 1 / 2

The two output ports are configured independently using a common set of parameters.

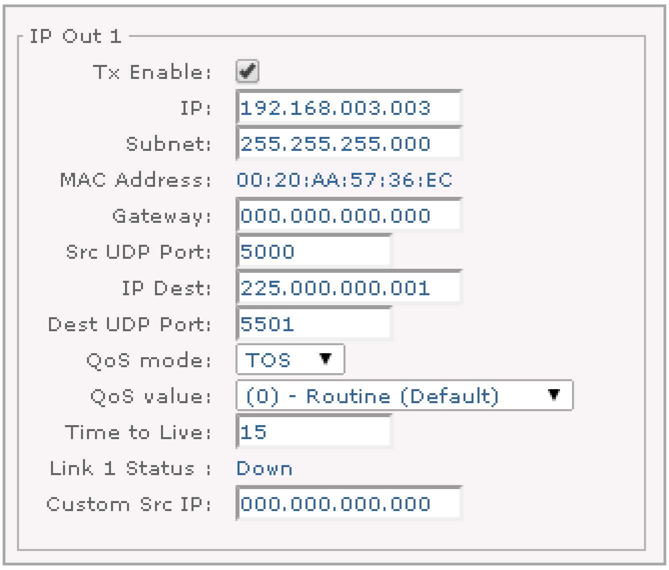


Figure 3-178 Output > IP Out 1 Section

- **TX Enable** – If selected, enables the output from the interface.
- **IP** – The IP address of the interface.
- **Subnet** – The subnet mask address of the interface.
- **MAC Address** – The MAC address of the interface.
- **Gateway** – The gateway address of the interface.
- **Src UDP Port** – The source User Datagram Protocol port to be set on the IP datagrams sent from the interface.
- **IP Dest** – The destination IP address to be set on the IP datagrams sent from the interface.
- **Dest UDP Port** – The destination User Datagram Protocol port to be set on the IP datagrams sent from the interface.
- **QoS mode** – Defines how to set the DSCP field of the IP datagram, which defines the Quality of Service.
- **TOS** – Type of service.
- **DSCP** – Differentiated services Code Point.
- **QoS value** – Sets the priority of the IP packets based on the QoS mode.
- If QoS mode is TOS – Priority can be selected between 0 and 7.
- If QoS mode is DSCP – The whole DSCP field can be set. The type of Per-Hop Behavior and in addition the Class Pairs can be selected. There are four types of Per-Hop Behaviors:

- Default PHB (default).
- Class selector PHB (CSx) – Similar to TOS mode. Where x is Class Pair.
- Expedited Forwarding (EFxx) – Where xx is Class Pair.
- Assured Forwarding (AFxx) – Where xx is Class Pair.

- **Time to Live** – The TTL value set on IP datagram the sent from the interface.
- **Link Status** – Display whether the link is up and the speed of the link.
- **Custom Src IP** – Allows a different source address to the one set in the **IP** field to be set on the IP datagram sent from the interface.

3.18.3.9.2. Output > Common

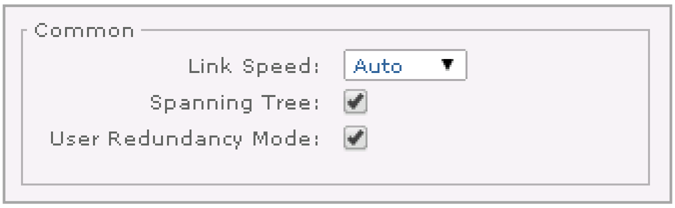


Figure 3-179 Output > Common

- **Link Speed** – Sets the link speed to apply to both output ports

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NOTE: This setting does not exist on units fitted with the Dual Gigabit IP Transport Stream Bi-directional Card, Board Type 1934. See Output > Link Settings

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- **Spanning Tree** – Enables Spanning Tree Protocol (STP).
- **User Redundancy Mode** – If enabled, the output of each port is determined by the respective **TX Enable** setting. If disabled, the output of each port is determined by the MGP status.

3.18.3.9.3. Output > Link Settings

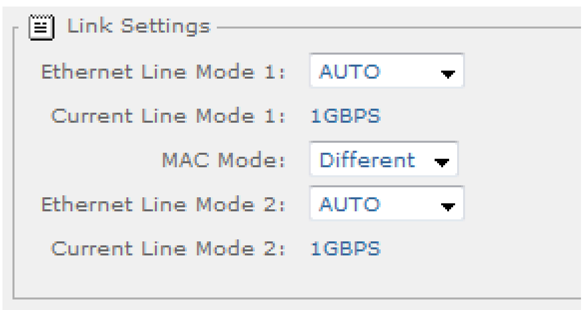

Figure 3-180 Output > Link Settings Section

Units fitted with the Dual Gigabit IP Transport Stream Bi-directional Card, Board Type 1934 permit the link speed and mode of each port to be configured independently.

- **Ethernet Line Mode 1 / 2** – Sets the link speed and mode to apply to the specified port.
- **Current Line Mode 1 /2** – The reported current status of the specified port.
- **MAC Mode** – If set to **Different**, the MAC address of the two output ports will differ. If set to **Same**, the MAC address of port 2 will be set to the same as that for port 1.

NOTE: If the card is enabled for IP Input, these parameters are instead configured on the Input > IP Input page, refer to section 3.10.4.10.2 Card Config Settings

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3.18.3.9.4. Output > IP encapsulation, FEC parameters

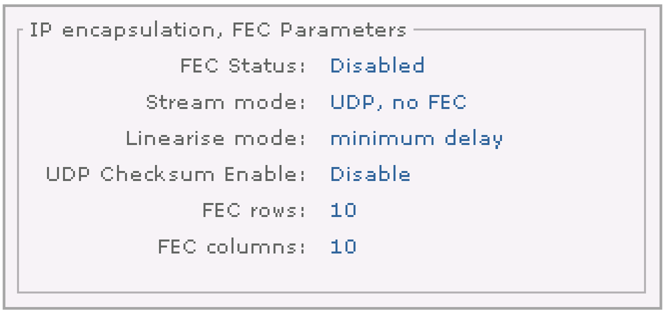


Figure 3-181 Output > IP Encapsulation, FEC Parameters Section

- **FEC Status** – Displays whether Forward Error Correction is enabled or disabled.
- **Stream Mode** – Determines which protocol to use for forwarding Transport Stream packets, and which version of FEC to use:
- Protocols can be UDP (User Datagram Protocol) or RTP (Real-time Transport Protocol).
- FEC packets can be computed per rows (for n consecutive packets), per columns (form of every nth packet) or both.
- **Linearise Mode** – Determines where to put the FEC packets in the stream:
- **Minimum delay** – Packets are emitted immediately after the last related data packet. This can cause uneven bandwidth as columns are ended nearly the same time.
- **Non block alignment** – Columns are shifted (begin at different rows), resulting in a more even bandwidth but are delayed.
- **Block alignment** – Columns begin in the same row, but the FEC packets are emitted evenly.
- **UDP Checksum Enable** – Reports if UDP checksum computation is needed and therefore enabled, or not and therefore disabled.
- **FEC rows** – Reports how many rows are needed to compute a column FEC.

- **FEC columns** – Reports how many columns are needed to compute a row FEC.

3.18.3.9.5. Output > IP Output Status

Figure 3-182 Output > IP Output Status Section

- **TS Tx Status** – Displays the status of the output Transport Stream transmission.
- **Redundancy Status** – Displays the current redundancy status of the IP Card.

3.18.3.9.6. Output > MGP (Multimedia Guarding Protocol) Parameters

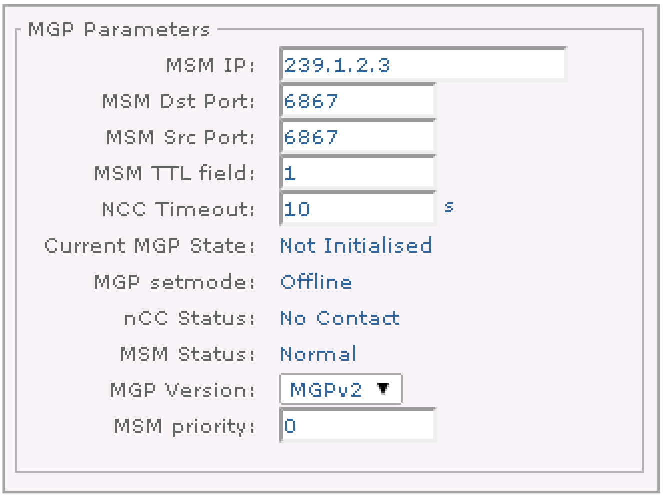


Figure 3-183 Output > MGP Parameters Section

- **MSM IP** – The destination IP address of the MSM (Multimedia Status Message) packets. This is usually a multicast address as MSMs are meant to be sent to all devices in the same redundancy group.
- **MSM Dst Port** – The destination UDP port of the MSM packets.
- **MSM Src Port** – The source UDP port of the outgoing MSM packets. Also this is the port on which the device receives MSM packets. This is usually the same as **Dst Port**.
- **MSM TTL field** – The Time to Live field of the MSM packets. It has to be high enough to reach every device in the redundancy network.
- **TX Interval** – Enables input of the Tx Interval for MSM packets in seconds where the range is between 1 and 200 seconds.

- **nCC Timeout** – If no polling message is received from MediaKind's nCompass Control (e.g. the SNMP OID sysTimeUp or CSM messages) during this interval, contact is determined as lost with nCC. This can activate transitions in the MGP state machine.
- **Current MGP State** – Displays the state of the MGP state machine. It can be:
- **Not initialized** – MGP is not yet initialized, no output.
- **S0 (Spare Idle)** – Initialized, but not ready to go online, no output.
- **S1 (Spare Ready)** – Ready to go online.
- **R1 (Normal Running)** – Device is online and outputs Transport Stream.
- **R0 (Not In Service**) – Output is stopped, no output.
- **MGP Setmode** – Displays the MGP Setmode state which can be set via SNMP or XPO. It can be:
- **Offline** – Intention to go offline.
- **Online** – Intention to go online.
- **Retire** – Intention to go offline only when another unit is ready to go online.
- **Preview** – Intention to go online while there is no other unit with online Setmode state.
- **nCC Status** – Displays whether the device is in contact with MediaKind's nCompass Control (nCC).
- **MSM Status** – Indicates if there is another unit in the system with the same settings and it is online or ready to go online ("MSM duplicated"). If there is not any, status is reported as "Normal".
- **MGP version** – Enables to select the MGP version used by the device.
- **MGPv1** – Version 1.1.
- **MGPv2** – Version 2.3.
- **MSM priority** – Sets the priority field in the MSM packets (this is not the TOS in the IP header).

3.19. Service Filtering and Service Splitting

The IRD can be used to receive, process and output transport streams. The range of available actions ranges from a simple transport type conversion, such as DVB-S2 input to IP output, to performing a CA descrambling on multiple services and subsequent transmission of each service to a different IP destination.

The capabilities available depend on the IRD model and hardware and software options enabled.

Figure 3-184***Error! Reference source not found.*** illustrates how the input transport stream may be routed and processed by the unit.

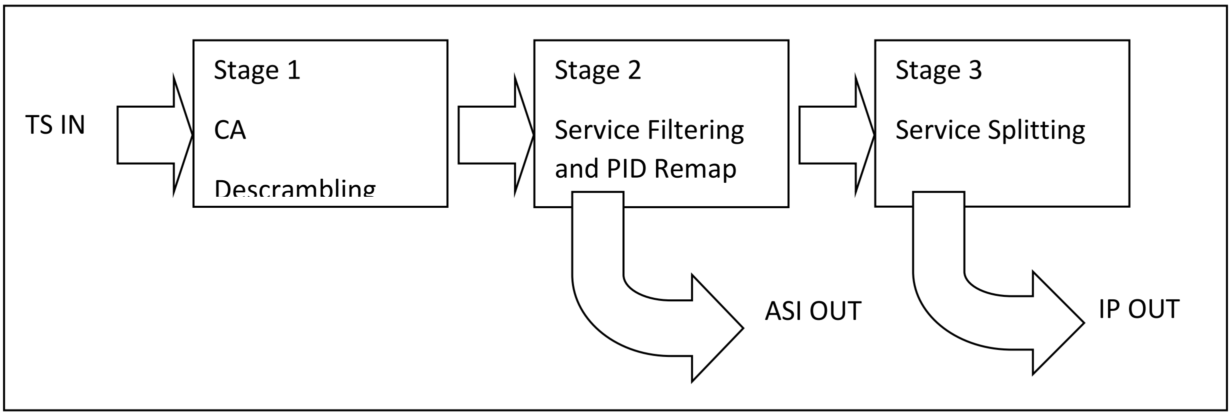


Figure 3-184 Transport Stream routing through the unit

- The transport stream is received from the input source, such satellite, IP or ASI.
- **Stage 1** – The Conditional Access function can be used to descramble one or more services within the transport stream so they are in the clear.
- **Stage 2** – The transport stream can be processed for Service Filtering or PID Remapping:
- Service Filtering allows one or more services to be selected for inclusion in the output transport stream, whilst other unwanted services are removed.
- Additionally, a single service may be modified so that its service component PID values are remapped to different PID values.
- **Stage 3** – If the unit output is via IP, a Service Splitting stage may be enabled to further split the transport stream into up to 8 single service transport streams, each encapsulated and transmitted to a different IPv4 address.

3.19.1. Searching the Minimum Bit Rate When Service Filtering

It is important to set the correct bit rate for the outgoing Transport Stream when using any of the Service Filter modes. If the output bit rate is set too low this will introduce PCR errors on the output Transport Stream. Lowering the bit rate increases the mean Service Filter buffer level and this makes it more vulnerable to buffer overflow if the incoming stream contains bursty traffic (packets not distributed evenly) and peaks occur. When a buffer overflow occurs this can invalidate the PCR re-stamping on the outgoing stream.

Service Splitting is a separate stage routed after Service Filtering stage and therefore has the potential to be affected too. These stages are described in more detail in the following sections.

3.19.1.1. TS Output Bit Rate Search

A button has been introduced to help determine the ideal or minimum bit rate to configure the TS Output according to the services being filtered. This feature is only available when the Service Filtering mode is active, i.e. Single Service, Multi Service or Remap modes.

NOTE: The **Search Minimum Bitrate** function will affect the Service Filter modes only. However, the resulting Transport Stream output from the Service Filter stage will be routed to the Service Splitting stage and thus affect Service Splitting. The bit rates defined in the Service Splitting configuration are not modified or monitored.

A typical operational use case is described below:

1. Select the appropriate **Service Filter Mode**.
2. Configure the services for filtering under the **Service** ***plus*** page.
3. Select the **Search Minimum Bitrate** button to start the bit rate search. This process will raise the "Bitrate Search ACTIVE" alarm and will take approximately one minute to progress. Once the search is complete, the "Bitrate Search ACTIVE" alarm is cleared.
4. Review the value set in the **Minimum Bitrate Reached** field and use it as a starting point for the **TS Output Constant Bitrate** value.
5. Ideally, no Service Filter alarms should be active from this point onward. It may be acceptable that an alarm is raised very briefly on some occasions but if the alarms are not clearing then the user should raise the **TS Output Constant Bitrate** value if these were overflow related alarms, or consider enabling **Over Rate Protection**.

NOTE: The value identified in the **Minimum Bitrate Reached** field is intended to be used for guidance only and should therefore be a starting point for the **TS Output Constant Bitrate** setting. There may be characteristics to the transport stream being filtered that will cause filter alarms not observed during the sample period of the bit rate search.

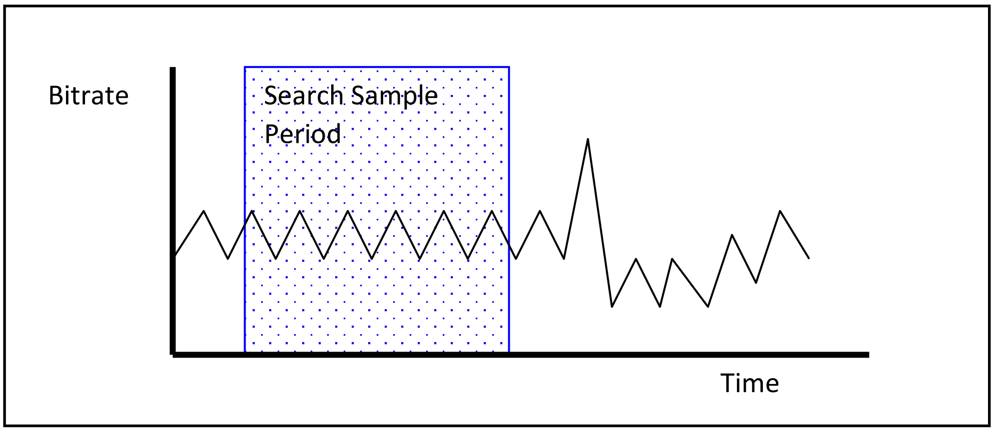


Figure 3-185 Search Sample Period Provides a Starting Point Where the Incoming Bit Rate is Variable

3.19.2. Configuration

Configuration of the CA Descrambling is as described in section **Error! Reference source not found. Error! Reference source not found.**.

NOTE: For the unit to output the transport stream after the descrambling, the **TS Feed** must be set to **Descrambled** as detailed in section 3.18.1.5

Configuration of the Service Filtering, PID Remapping and Service Splitting is enabled by the Filter configuration of the Output page and further refined through the Service *plus* and Service Split pages.

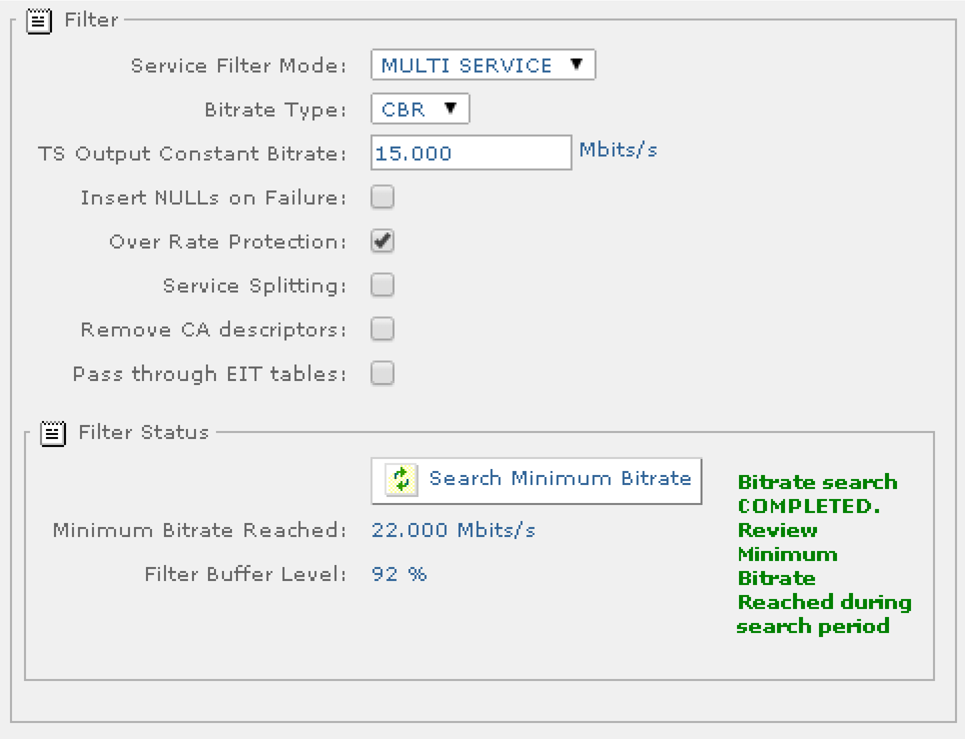


Figure 3-186 Output > Filter Section

3.19.2.1.1. Filter

- **Service Filter Mode** – Specifies the Service Filter Mode from a drop-down menu. Options are:
- **Off** – No Service Filtering or PID Mapping will be performed.
- **Single Service** – Only one selected service will be output (selection can be made on **Service *plus*** page).
- **Multi Service** – A number of selected services will be present in the output Transport Stream (selection can be made on **Service *plus*** page).
- **Remap** – The selected service will be present in the output Transport Stream after PID remapping (selection and remapping can be made on **Service *plus*** page).
- **Bit rate Type** – Enables selection of the bit rate type from a drop-down menu:
- **VBR** – Variable Bit Rate: The output bit rate will be the sum of the individual component bit rates in the output services, and thus will vary depending on the utilization of the unit’s input.
- **CBR** – Constant Bit Rate: The output bit rate will be constant, with Null packets used to maintain the specified rate should the

sum of the individual component bit rates in the output services be lower.

- **TS Output Constant Bit rate** – Specifies the output transport stream bit rate (Mbps) when configured for Constant Bit Rate mode. This may be configured up to 200 Mbps. The output Transport Stream will be extended with NULL packets to ensure this bit rate on the output. A Filter Output Overflow alarm will be raised if the output requires a higher bit rate to be played out properly.
- **Insert Nulls on Failure** – Checking this box will ensure that a constant bit rate is maintained even if the source Transport Stream is unlocked.
- **Over Rate Protection** – In CBR mode the output TS bit rate may not be sufficient to allow for the maximum instantaneous bit rate of the services selected for filtering. This can especially be a problem in Stat MUX systems where each service within a multi-service transport stream may continuously vary its bit rate. To handle this, Over Rate Protection allows the peak packets to be passed rather than clipped by to maintain the constant bit rate on the output Transport Stream.
- **Service Splitting** – Enables service splitting on the IP output.
- **Remove CA descriptors** – Removes the CA descriptors from the filtered output Transport Stream. This feature is only effective when the TS Feed setting on the Output Tab is set to **Descrambled** and when the Service Filter Mode is configured to MULTI SERVICE or SINGLE SERVICE (these modes are exposed depending on license options enabled on the IRD). Internally, the Transport Stream output from Service Filtering module is routed to the Service Splitting module so services selected for Service Splitting will be affected.

  It only supports stripping out CA descriptors for one service only, i.e. one PMT. It does not support multiple services. It will not modify the CAT and does not remove any components listed in the removed CA descriptors and therefore it is possible that these components will become ghost PIDs on the output transport stream.

  If enabled, will strip out the CA descriptors from the PMT of the service selected for service filtering on the ASI and IP output being descrambled:
- For MPTS, it will strip out the CA descriptors from the PMT for the single service selected for descrambling **and decode**. Descrambled services that are not selected for decode shall not have their associated PMTs regenerated and shall remain unaffected. i.e. If no service is selected for decode, then no CA descriptors are removed.
- For SPTS, it will strip out the CA descriptors from the PMT for the single service selected for descrambling regardless of whether it is selected for decode or not, i.e. where there is only one service in the Transport Stream being descrambled, it will always have CA descriptors removed when this feature is enabled.

- **Pass Through EIT tables** – By default EIT tables are not present in the filtered Transport Stream. This tick box allows EIT tables to be passed through from the input to the output stream.

3.19.2.1.2. Filter Status

- **Search Minimum Bitrate** – This button initiates a simple search for the lowest bit rate over a sample period of approximately one minute. The search will step through a range of bit rate settings from 1 to 200 Mbps. During this time the "Bitrate Search ACTIVE" alarm is raised and cleared once the search is complete. Other alarms related to Service Filtering may be raised and cleared during this time. Status information is updated to the right of the button and is updated by pressing the Refresh button on the top-left of the page.

NOTE: The **Search Minimum Bitrate** function will affect the **TS Output Constant Bitrate** control and therefore the bit rate of the filtered transport stream being output on a live system.

- **Minimum Bitrate Reached** – This field is updated after the bit rate search is complete and holds the minimum bit rate found during the sample period which did not cause any filter alarms.
- **Filter Buffer Level** – This indicates the current level of the filter buffer as a percentage value when the Service Filter Mode is active.

3.19.3. Single Service Filtering

3.19.3.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Single Service Filter	●		●	●	●

3.19.3.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
Dual Gigabit IP Transport Stream Output Card	1918	FAZ 101 0108/22	RX82XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Output Card	1919	FAZ 101 0108/22	RX83XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Bi-directional Card	1934	FAZ 101 0113/13	RX8200/HWO/IP/IO/A

3.19.3.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.19.3.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/SING/SERVFILT	Single service filtering	FAZ 101 0113/53	RX8XXX/SWO/SING/SERVFILT
RX83XX/SWO/SING/SERVFILT	Single service filtering	FAZ 101 0108/15	RX8XXX/SWO/SING/SERVFILT

3.19.3.5. Functional Description

- In Single Service Filter mode, the unit can be used to output only one service from an input multi service transport stream. As this is a Stage 2 process, the transport stream may have already been descrambled.

3.19.3.6. Configuration

From the **Output > Filter** page of the web browser interface, the **Service Filter Mode** must be set to **Single Service**.

3.19.3.6.1. Service Selection

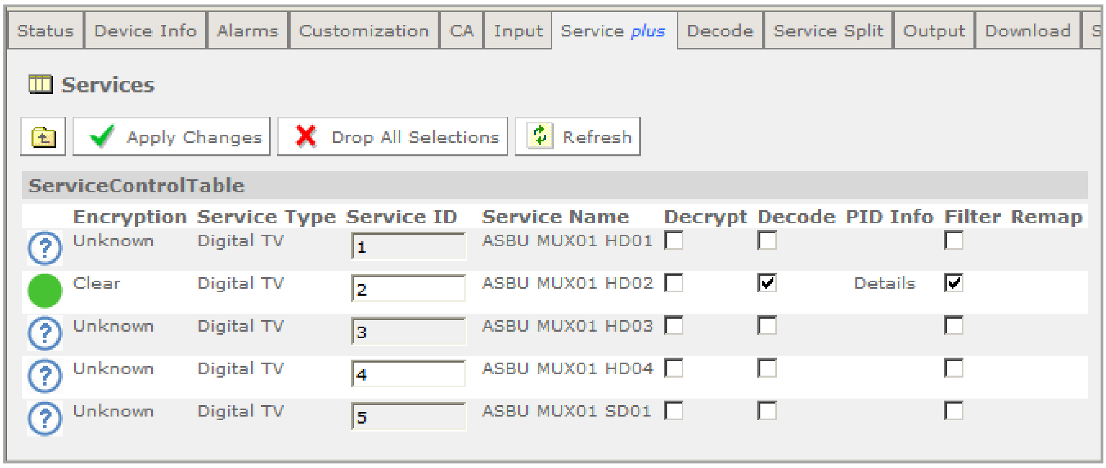


Figure 3-187 Services Web Page Showing the Service Control Table

Using the ***Service** plus* page, the service can be selected for filtering using the **Filter** option.
If the service is scrambled and the appropriate hardware and software options are present, it may be descrambled using the **Decrypt** option, and the configuration updated using the **Apply Changes** button. For each service, component PID information is available through **Details** link of **PID Info**.

3.19.4. Multi Service Filtering

3.19.4.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Multi Service Filter	●		●	●	●

3.19.4.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
Dual Gigabit IP Transport Stream Output Card	1918	FAZ 101 0108/22	RX82XX/HWO/IP/OUT

Dual Gigabit IP Transport Stream Output Card	1919	FAZ 101 0108/22	RX83XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Bi-directional Card	1934	FAZ 101 0113/13	RX8200/HWO/IP/IO/A

3.19.4.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.19.4.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/MULT/SERVFILT	Multi service filtering	FAZ 101 0113/47	RX8XXX/SWO/SING/SERVFILT
RX83XX/SWO/MULTI/SERVFILT	Multi service filtering	FAZ 101 0108/14	RX8XXX/SWO/SING/SERVFILT

3.19.4.5. Functional Description

In Multi Service Filter mode, the unit can be used to output up to 22 services from an input multi service transport stream. As this is a Stage 2 process, the transport stream may have already been descrambled.

NOTE: This mode is not compatible with the Remap mode

3.19.4.6. Configuration

From the **Output > Filter** page of the web browser interface, the **Service Filter Mode** must be set to **Multi Service**.

3.19.4.6.1. Service Selection

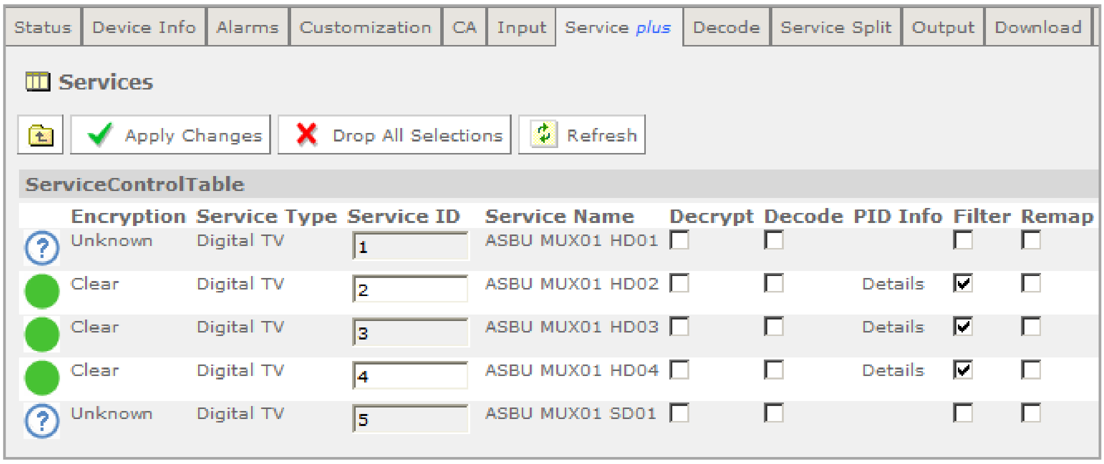


Figure 3-188 Services Web Page Showing Multi Service Filtering

Using the ***Service** plus* page, up to 22 services can be selected for filtering using the **Filter** option. If the service is scrambled and the appropriate hardware and software options are present, it may be descrambled using the **Decrypt** option, and the configuration updated using the **Apply Changes** button. For each service, component PID information is available through **Details** link of **PID Info**.

NOTE: Decrypting multiple services requires the appropriate multi-service descrambling software option to be present, as detailed in section **Error! Reference source not found. Error! Reference source not found.**

3.19.5. Remapping

3.19.5.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Remap	●		●	●	●

3.19.5.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
Dual Gigabit IP Transport Stream Output Card	1918	FAZ 101 0108/22	RX82XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Output Card	1919	FAZ 101 0108/22	RX83XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Bi-directional Card	1934	FAZ 101 0113/13	RX8200/HWO/IP/IO/A

3.19.5.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.19.5.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
RX8200/SWO/SING/SERVFILT	Single service filtering	FAZ 101 0113/53	RX8XXX/SWO/SING/SERVFILT
RX83XX/SWO/SING/SERVFILT	Single service filtering	FAZ 101 0108/15	RX8XXX/SWO/SING/SERVFILT

3.19.5.5. Functional Description

- In Remap mode the IRD can remap any video, audio or data components from a filtered service to different PID values. The unit is not capable of remapping the SI table PID values for services. As this is a Stage 2 process, the transport stream may have already been descrambled.

3.19.5.6. Configuration

From the **Output > Filter** page of the web browser interface, the **Service Filter Mode** must be set to **Remap**.

3.19.5.6.1. Service Selection

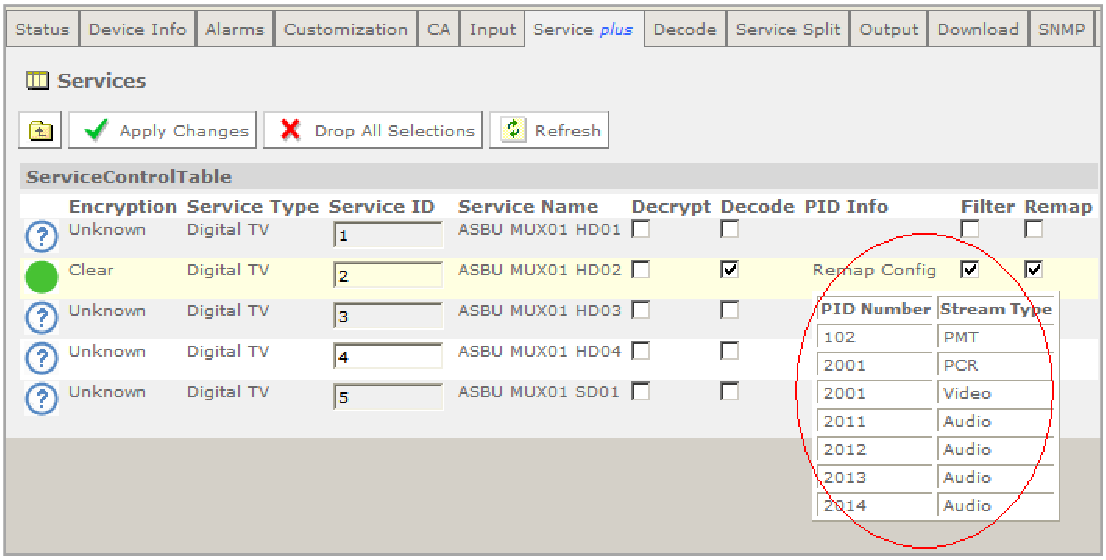


Figure 3-189 Services Web Page Showing PID Remapping Menu

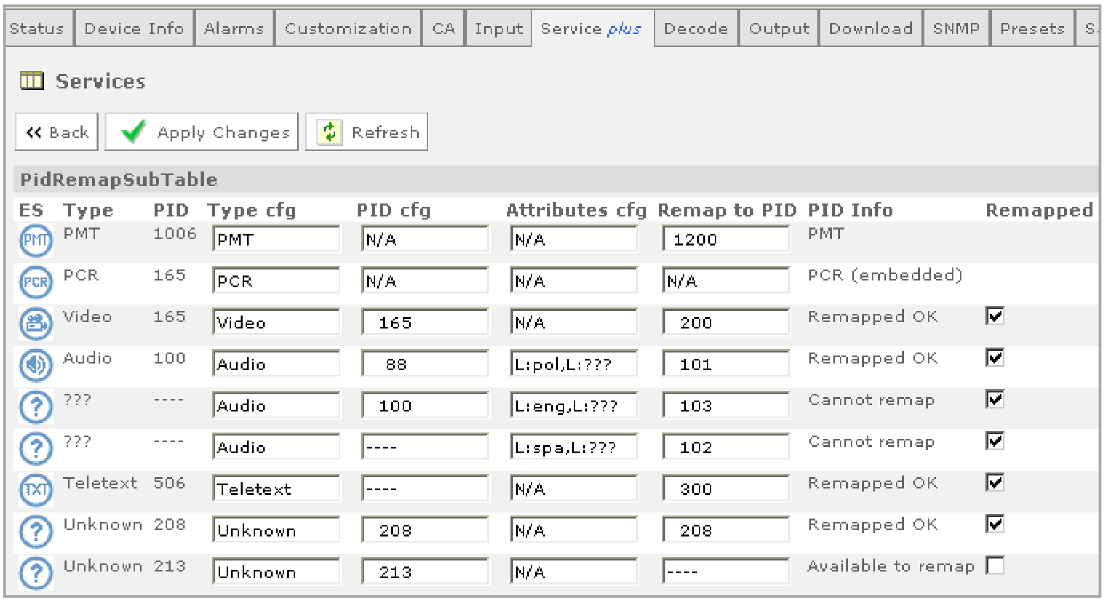
Click the **Service *plus*** tab and select a service to be filtered. Tick the ***Remap*** check box from the service row. Then, click **Apply Changes**. When the mouse hovers over the **Remap Config** hyperlink, a list of the current components will be shown as a pop up box (see above).

3.19.5.6.2. Component Configuration

To configure the components to be re-mapped, click on the **Remap Config** menu item. The PID Remap sub-table will now be shown.

It is possible to filter and remap up to 30 components in addition to the PMT and the PCR (if not embedded). When a configuration has been set for a selected service, it will be stored and applied for any service selection. Therefore, if the service changes, the components that best match the current configuration will be filtered and remapped.

The following figure shows an example of a service configuration. To access this table, click the **Details** hyperlink for the selected service to remap when in the **Service *plus*** page.



Status | Device Info | Alarms | Customization | CA | Input | Service plus | Decode | Output | Download | SNMP | Presets | S

Services

« Back | Apply Changes | Refresh

PidRemapSubTable

ES	Type	PID	Type cfg	PID cfg	Attributes cfg	Remap to PID	PID Info	Remapped
PMT	PMT	1006	PMT	N/A	N/A	1200	PMT	
PCR	PCR	165	PCR	N/A	N/A	N/A	PCR (embedded)	
	Video	165	Video	165	N/A	200	Remapped OK	☑
	Audio	100	Audio	88	L:pol,L:???	101	Remapped OK	☑
?	???	----	Audio	100	L:eng,L:???	103	Cannot remap	☑
?	???	----	Audio	----	L:spa,L:???	102	Cannot remap	☑
TXT	Teletext	506	Teletext	----	N/A	300	Remapped OK	☑
?	Unknown	208	Unknown	208	N/A	208	Remapped OK	☑
?	Unknown	213	Unknown	213	N/A	----	Available to remap	☐

Figure 3-190 Example of PID Remap Sub Table Showing a Component Configuration

- **ES** – Shows the component type icon.
- **Type** – Shows the component type. '???' appears when the configuration cannot match any present component.
- **PID** – Input PID of the present component. '----' appears when the configuration cannot match any present component.
- **Type cfg** – Type of the configuration. This field must match the filtered component type.
- **PID cfg** – Input PID stored in the configuration. It will be relevant when more than one component have the same type. The one that matches the PID cfg value will be filtered.
- **Attributes cfg** – Attributes stored in the configuration. At the moment, it is only applicable for the languages of the Audio and DVB Subtitles components.
- **Remap to PID** – Output PID for the selected component.
- **PID Info** – Information about the component or the remapped status:
- **Remapped OK** – The component is present and remapped.
- **Cannot remap** – The configuration is stored but it did not match any present component.
- **Remapped** – A tick is placed in this field if the PID is to be remapped.

3.19.5.6.3. Setting Up a New Configuration

1. Select a component that is present in the stream. When the component is present, the Type cfg, PID cfg and Attributes cfg fields are filled in automatically to make things easier. To filter it, tick the check box of its row and click **Apply Changes**. Then, the input PID will be assigned to the output PID.

2. If you want to remap its PID, type a valid PID in the Remapped to PID field before applying the changes.
3. If you want to specify any attributes, do it in the Attributes cfg field before applying the changes.
4. Select a component that is not present in the stream: To set a custom configuration, type in any row at least a valid Type cfg and either a valid PID cfg or a valid Remapped to PID values.
5. The Remapped to PID value should be different to the ones already configured. Otherwise, it will not add a new configuration but it will modify the existing one for that PID.
6. Tick the corresponding check box and click **Apply Changes**.

3.19.5.6.4. Modifying an Existing Configuration

Type the new values over the ones that you want to change and click **Apply Changes**.

3.19.5.6.5. Removing an Existing Configuration

Deselect the corresponding check box and click **Apply Changes**.

3.19.5.6.6. Valid Attributes Configurations

Table 3-57 Valid Attributes Configurations

Short type	Long type	Type definition
V	Video	VIDEO
A	Audio	AUDIO
LSD	Data	LSD DATA
HSD	Data	HSD DATA
VBI	VBI	VBI
VANC	VANC	VANC
DVBsub	DVB subtitles	DVB SUBTITLES
Ttxt	Teletext	TELETEXT
Spl	Splice	SPLICE
MPE	MPE	MPE
?	Unknown	UNRECOGNISED
???	???	INVALID

3.19.5.6.7. Filtering Components by Language

Audio components can be filtered by language. This is achieved by typing “L:***xxx***,L:***zzz***” in the Attributes cfg field.

Where ***xxx*** and ***zzz*** is specified, this is three character language field defined in the ISO 639-3 standard. These values do not need to be the same. The first one is for the first language of the audio component and the second one refers to the language for the second audio component. It is possible to specify just one language by typing only "L:***xxx***".

An unidentified language will be shown as "???".

DVB Subtitle components can be filtered by language. This is achieved by typing "L:***xxx***" in the Attributes cfg field.

If you do not want to specify any attribute, either remove the content of the field (leaving it empty) or specify ***???*** in place of ***xxx***.

3.19.5.6.8. Matching Weights

An available component will be evaluated to find the best match between all the stored configurations for its matching type. Between all those configurations, it will compare the input PID.

For the audio and DVB subtitles component types, the attributes (languages) will precedence over the input PID value. There is an example in *Figure 3-190*, where the audio language present is Polish, so the configuration that best matches it is the one with the Polish attribute instead of the component with the same input PID value.

It is possible to filter only by type, refer to the Teletext component in example shown in *Figure 3-190.*

3.19.6. Service Splitting

3.19.6.1. Availability

● = Option **B** = Supplied with Base Model

	RX8200	RX8310	RX8315	RX8320	RX8330
Single Service Filter	●		●	●	●

3.19.6.2. Order Items

Option Name	Board Type	FAZ Number	Marketing Code
Dual Gigabit IP Transport Stream Output Card	1918	FAZ 101 0108/22	RX82XX/HWO/IP/OUT
Dual Gigabit IP Transport Stream Output Card	1919	FAZ 101 0108/22	RX83XX/HWO/IP/OUT

Dual Gigabit IP Transport Stream Bi-directional Card	1934	FAZ 101 0113/13	RX8200/HWO/IP/IO/A

3.19.6.3. Control

Web	Front Panel	SNMP	Serial Remote
✓	✓	✓	

3.19.6.4. License Keys

Marketing Code	Description	FAZ Number	License Key Name
There are no license keys required for this feature			

3.19.6.5. Functional Description

Service Splitting allows up to 8 services from the outgoing transport to be split across the two Ethernet output ports. This Stage 3 process is performed after the descrambling and filtering processes.

3.19.6.6. Configuration

From the **Output > Filter** page of the web browser interface, the **Service Splitting** option must be **Enabled**. If not, the complete transport stream that has been routed to this stage will be output through both Ethernet output ports.

Any changes which are made to the Service Split page may be confirmed by selecting the **Apply Changes** button. Selecting the **Refresh** button will ensure that the latest information is being displayed from the current values of the equipment.

The **Drop All Selections** button will remove all service selections including services stored from the previous PAT.

To view this page, select the **Service Split** tab from the top of the web page.

3.19.6.6.1. Service Split Table

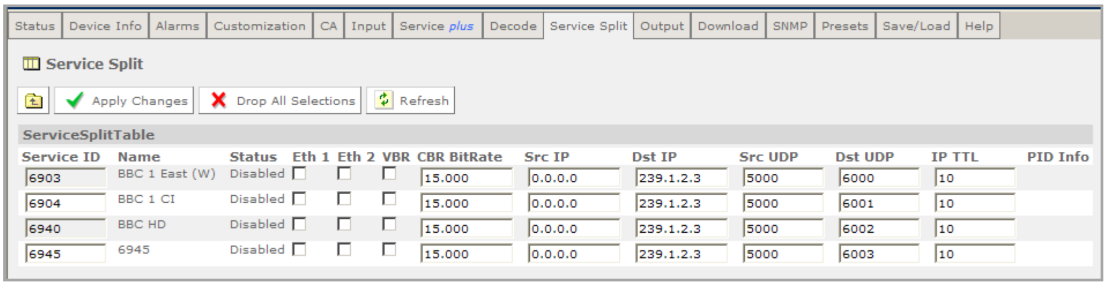


Figure 3-191 Service Split Web Page

This page contains a list of the services currently contained within the Transport Stream. Each service can be selected to be output on either Ethernet output port 1 or 2. The Service Split Table displays the following information.

- **Service ID** – Displays the Service Identifier number
- **Name** – Displays the name of the service.
- **Status** – Displays the status of the service being processed. In addition to the possible status messages listed below, the message may state whether Ethernet Output Port 1 or 2 has its link down e.g. ETH 1 DOWN.
- **Disabled** – Service Splitting mode has been disabled from the **Output** page.
- **Not Present** – The service that has been configured for Service Splitting is no longer present in the incoming transport stream. Service Filter mode has been set to OFF from **Output** page.
- **Present** - The service that has been configured for Service Splitting is present in the incoming transport stream. Service Filter mode has been set to OFF from **Output** page.
- **Remapped** - The service that has been configured for Service Splitting is present in the incoming transport stream. Service Filter mode has been set to REMAP from **Output** page.
- **MSF Passed** - The service that has been configured for Service Splitting is present in the incoming transport stream. Service Filter mode has been set to SINGLE SERVICE or MULTI SERVICE on the Output page and the service has been filtered from the **Service** ***plus*** page.
- **MSF Dropped** - The service that has been configured for Service Splitting is NOT present in the incoming transport stream. Service Filter mode has been set to SINGLE SERVICE or MULTI SERVICE on the Output page and the service has **not** been filtered from the **Service** ***plus*** page.
- **Eth 1** – Placing a check mark in this box selects the Ethernet output port 1 for the service output.
- **Eth 2** – Placing a check mark in this box selects the Ethernet output port 2 for the service output.
- **VBR** – Placing a check mark in this box selects a Variable Bit Rate (VBR) for the output service. If not selected then a Constant Bit Rate (CBR) is used, padded with NULL packets, the rate is determined by the value set in the **CBR Bit Rate** field.
- **CBR Bit rate** – Specifies the Constant Bit Rate value in Mbps when the **VBR** box is disabled. The output will be padded with NULL packets to achieve this rate.
- **Src IP** – Specifies a source Internet Protocol address to be stamped onto the IP datagrams.
- **Dst IP** – Specifies a destination Internet Protocol address to be stamped onto the IP datagrams.

- **Src UDP** – Specifies a source port to be stamped into the User Datagram Protocol IP datagrams.
- **Dst UDP** – Specifies a destination port to be stamped into the User Datagram Protocol IP datagrams.
- **IP TTL** – Specifies the TTL (time to live) stamped into the IP datagrams TTL field; this field defines the number of hops before the packet should be discarded.
- **PID Info** – displays the Packet Identifier information for the filtered service. The user must hover the mouse pointer over this field in the web interface to generate a pop-up table with the PID information.

3.20. Miscellaneous Operations

3.20.1. Front Panel Procedures

3.20.1.1. Rebooting the IRD Using the Front Panel

The IRD can be rebooted quickly using the front panel interface. This can be done at any time from any of the front panel menu screens.

1. Standing in front of the unit, press and hold simultaneously the **EDIT** and **SAVE** keys for at least 5 seconds. The front panel screen will display the following options:

```
                    Reboot Unit?
SAVE=Confirm                              EDIT=Cancel
```

2. If no further interaction with the front panel is taken, the front panel display will timeout after 15 seconds and restore back to the main menu screen.
3. Pressing the **EDIT** button will cancel the operation and restore the front panel display back to the main menu screen.
4. Pressing the **SAVE** button will confirm the operation and immediately cause the unit to reboot itself:

```
Rebooting...
```

3.20.1.2. Swapping Between Flash Banks Using the Front Panel

The IRD has two flash banks. The unit operates from one bank, known as the active bank, and typically upgrades are performed to the other, inactive bank. The currently active flash bank can be determined by navigating to menu number **1.2.1** and viewing the current software version running on the unit. The Bank number is shown in brackets after the version number:

```
1.2.1                                  |SW VERSION
                                       |8.21.0 (BANK 0)
```

To switch between flash banks:

1. Reboot the IRD either by power cycling the unit or by following the procedure described in the above section.
2. Immediately hold the ▶ (Forward) key on the front panel whilst the unit is booting.
3. Let go the of the ▶ (Forward) key once the initialization screen is displayed on the front panel:

```
INITIALIZING
8.22.0 (BANK 1)
```

4. Confirm that the active flash bank by checking the bank number displayed in the brackets.
5. The user can switch back to the other flash bank by repeating this whole procedure.

3.20.2. Remote Procedures

3.20.2.1. Rebooting the IRD Using FTP

The IRD can be rebooted using the FTP session. This can be done at any time using a PC to remotely connect to the unit.

1. On a PC, open the command prompt and connect to the unit to be reset using the **ftp** command and the appropriate IP address eg

C:\> ftp 172.17.110.9

2. Enter the username **rx8000** and password **rx8000**:

Connected to 172.17.110.9.
220 RX8000 unit ready for user ...
User (172.17.110.9:(none)): rx8000
331 Password required for user rx8000.
Password:
230 User logged in.
ftp>

3. Now send the command that will reboot the unit. The FTP connection will be lost shortly afterwards.

ftp> quote site reset

3.20.2.2. Swapping Between Flash Banks Using FTP

The IRD has two flash banks. The unit operates from one bank, known as the active bank, and typically upgrades are performed to the other, inactive bank. The current active flash bank can be determined during the FTP session:

1. On a PC, open the command prompt and connect to the unit to be checked using the **ftp** command and the appropriate IP address eg:

C:\> ftp 172.17.110.9

2. Enter the username **rx8000** and password **rx8000**:

Connected to 172.17.110.9.
220 RX8000 unit ready for user ...
User (172.17.110.9:(none)): rx8000
331 Password required for user rx8000.
Password:
230 User logged in.
ftp>

1. The current flash bank in use can be determined by sending the following command:

ftp> quote site bankversion
200 running image from bank 0;
ftp>

3. Now send the command that will swap to the inactive flash bank. This command will reboot the unit and make it boot to the other flash bank. The FTP connection will be lost.

ftp> quote site swap

3.21. Install Software with Upgrade Utility

3.21.1. Compatibility

The RX8000 Unit Upgrade Utility will only detect and upgrade IRDs that are running release version 5.12.0 or later. For units running an earlier release version, these can be upgraded manually using the *"Ethernet Upgrading"* method described in *section 3.23* or as described in the *Release Notes* provided with a release version.

3.21.2. Installation

RX8000 Unit Upgrade Utility is distributed in two forms:

- EXE file that installs the correct Java environment on a Windows PC.
- JAR file that can be launched on a PC running Linux or Windows.

NOTE: The upgrade utility is not supported by Mac OS or any virtual machine running on a Mac OS host

3.21.2.1. EXE File Distribution

EXE file distribution is intended for Windows PC only.

To install the Upgrade Utility EXE file:

1. Double-click the RX8000 Unit Upgrade Utility EXE file to run the installer (e.g. the file called **RX8000UpgradeUtility-8.22.0.exe** for version 8.22.0 distribution).
2. Set up the target installation folder then click **Next**.
3. Set up the shortcut path for the Start Menu folder, then click **Next**.
4. When you are ready to proceed with the installation, click **Install**.
5. Click **Finish** when the installation has finished.

To launch the upgrade utility, navigate to the **RX8000UpgradeUtility-X.X.X** program from the Windows Start menu, e.g. **Start > All Programs > MediaKind** or the shortcut path specified in step 3 above.

3.21.2.2. JAR File Distribution

JAR file distribution can run on Windows or Linux PC.

The distribution has been built using **Version 8** of the Java Runtime Environment (JRE), so this version must be pre-installed on your target PC. Running the JAR file should launch the upgrade utility.

3.21.3. Quick User Guide

The Upgrade Utility interface is shown in Figure 3-192, below.

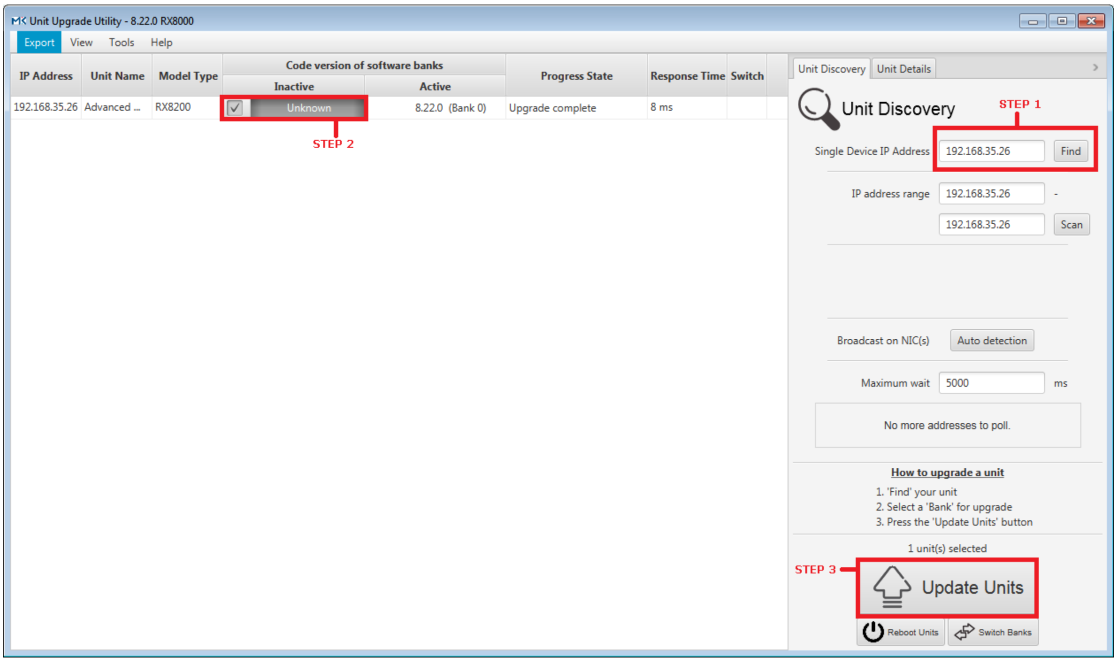


Figure 3-192 Overview of the Upgrade Utility Interface

STEP 1 – Find Device on Network

Go to the ***Unit Discovery*** tab and enter the IP address of the device in the **Single Device IP Address** field, then click the **Find** button.

The device should appear in the left pane with the expected **Model Type**.

STEP 2 – Select Bank for Upgrade

All devices discovered on the network are listed on the left pane of the Unit Upgrade Utility. Tick the **Inactive** or **Active** software bank column for the device that will be upgraded.

The selected software bank will become the active software bank after the upgrade and the device has rebooted.

NOTE: By default, only the **Inactive** software bank can be selected. See **Advanced Mode** in the **Configuration Options** to expose the **Active** software bank.

STEP 3 – Upgrade Units

Click the large **Update Units** button at the bottom-right-side of the Upgrade Utility.

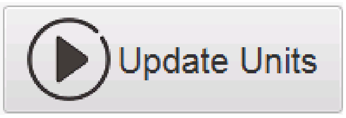


Figure 3-193 Upgrade Units Button

When a device is selected for upgrading, the wizard will determine what cards are installed on the device and upgrade all cards to the versions contained in the distribution package.

NOTE: The Upgrade Utility does not allow you to pick and choose which modules to upgrade. All fitted modules will be upgraded.

3.22. Ethernet Upgrading

To upgrade from Ethernet:

1. Connect the unit's Ethernet port to a PC containing the download image and the upgrade batch file. This can be achieved in two ways:

- A **point to point connection** (between unit and the PC) with an Ethernet crossover cable: The unit must be configured to an appropriate IP address and subnet mask such that it can be seen by the PC.
- The unit can be connected **via a hub or local network**: If the unit is connected to a hub or local network, the unit must be set-up so that it can be seen by the network.

2. The unit should now be tested for connectivity. To do this, open a DOS window on the networked PC. At the DOS prompt type:

ping <ip address>

3. If the unit is successfully connected to the network, some replies should be seen at the DOS prompt, these will be of the form:

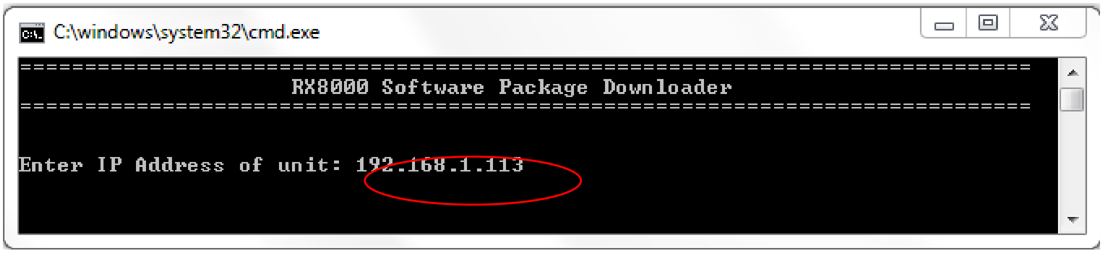
reply from <ip address> bytes =32 time = nn TTl =nn

NOTE: If no valid replies are seen then steps 1 to 3 should be repeated.

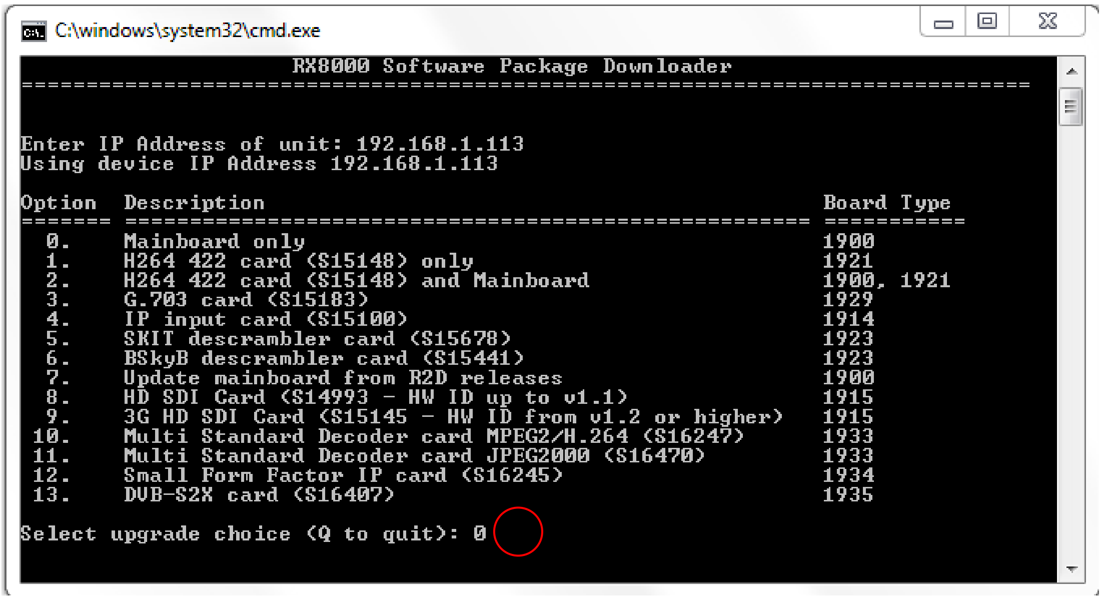
4. The batch file **updateallrx8000.bat** is supplied with the code package. This batch file allows the update of code to either flash bank of the IRD and also allows option cards to be upgraded.
5. Ensure the batch file **updateallrx8000.bat** is placed on the networked PC in the same directory as the new image file **main.bin** and any other option card software images.
6. Using a DOS window, navigate the directories until the directory with the above two files is accessible.
7. At the DOS prompt type:

Updateallrx8000.bat

8. The batch file will now prompt the user for the IP address of the unit to be upgraded. The IP address of the unit should be entered in the same way as circled in the example below followed by pressing Enter.

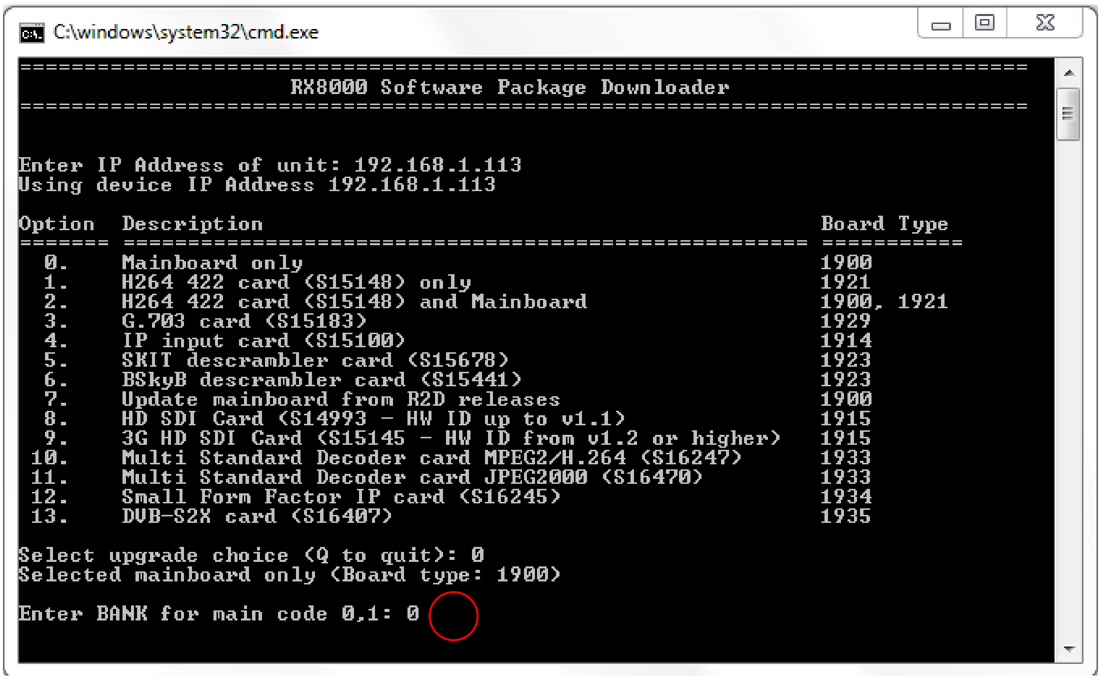


9. The batch file will now prompt for the board type to be upgraded. This will be either the Mainboard code or one of the option cards installed on the unit. The choice is entered in the same way as circled in the example below followed by pressing **Enter.**



10. If the Mainboard code has been selected, the batch file will prompt for the Bank to upload the code in to. The choice is entered in the same way as circled in the example below followed by pressing **Enter.**

NOTE: In most cases it is recommended to only upgrade the Mainboard code to bank 0; in that way bank 1 may be used as a code backup in the event of a problem and allow the unit to be recovered.



```
C:\windows\system32\cmd.exe
================================================================================
                      RX8000 Software Package Downloader
================================================================================


Enter IP Address of unit: 192.168.1.113
Using device IP Address 192.168.1.113

Option  Description                                              Board Type
======= ======================================================== ===========
  0.    Mainboard only                                           1900
  1.    H264 422 card (S15148) only                              1921
  2.    H264 422 card (S15148) and Mainboard                     1900, 1921
  3.    G.703 card (S15183)                                      1929
  4.    IP input card (S15100)                                   1914
  5.    SKIT descrambler card (S15678)                           1923
  6.    BSkyB descrambler card (S15441)                          1923
  7.    Update mainboard from R2D releases                       1900
  8.    HD SDI Card (S14993 - HW ID up to v1.1)                  1915
  9.    3G HD SDI Card (S15145 - HW ID from v1.2 or higher)      1915
 10.    Multi Standard Decoder card MPEG2/H.264 (S16247)         1933
 11.    Multi Standard Decoder card JPEG2000 (S16470)            1933
 12.    Small Form Factor IP card (S16245)                       1934
 13.    DVB-S2X card (S16407)                                    1935

Select upgrade choice (Q to quit): 0
Selected mainboard only (Board type: 1900)

Enter BANK for main code 0,1: 0
```

11. The batch file will feedback information during the upload similar to that shown below:

```
-----------------RX8000 Software package downloader--------------------
enter ip address of unit: 192.168.1.113
enter code to upgrade
0= mainboard only,
1= H264 4:2:2 only
2= H264 4:2:2 and mainboard
3= g703 card
select choice:0
enter bank for main code 0,1: 0
bank 0
making config file
adding mainboard to config
FTP transfer config to target on ip 192.168.1.113...
please wait....
Connected to 192.168.1.113.
220 RX8000 unit ready for user ...
User (192.168.1.113:(none)):
331 Password required for user tatsuper.

230 User logged in.
ftp> binary
250
ftp> Hash mark printing On  ftp: (2048 bytes/hash mark) .
ftp> hash
put main.bin app0
200 Set port to 192.168.1.100:1333.
150 opening data connection
################################################################################
################################################################################
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226-starting update..... please wait
226 updated code...
ftp: 5170480 bytes sent in 2.00Seconds 2585.24Kbytes/sec.
ftp> bye
221 Closing connection ... goodbye.
Transfer complete
--------------------unit upgrade complete------------------------------------
------------please check downloadHistory.txt before reboot-------------------
P:\Current Projects\Receivers & Decoders\RX8000\RX8XXX_Development\Software\Rele
ases\Package Releases\Release 5.2.5>
P:\Current Projects\Receivers & Decoders\RX8000\RX8XXX_Development\Software\Rele
ases\Package Releases\Release 5.2.5>_
```

12. The upgrade is complete when the following information is reported in the DOS prompt:

226 updated code…

ftp: xxxxxxxx bytes sent in x.xx Seconds xxx.xx Kbytes/sec

13. If the information reported in step 12 is not seen, do not reboot the unit. Repeat steps
7 onwards.

14. If the information reported in step 12 is still not seen, please contact a member of MediaKind Customer Support. The text file **downloadHistory.txt** is created during the upgrade process and this must be sent to MediaKind Customer support with your query so that an investigation can be carried out.

15. If the DVB-S2X option card has been upgraded then please see the caution below:

CAUTION: UPGRADE OF DVB-S2X CARD (Board Type 1935)

When the DVB-S2X card has finished upgrading, it will reboot itself automatically and validate the new code image as it boots up. It is important that the IRD is NOT REBOOTED during this time otherwise this could invalidate the new code image and the upgrade procedure will need to be repeated from the beginning.

It should not take more than 30 seconds for the DVB-S2X card to boot up and validate the new code image. The new version can be checked by referring to the SW Version listed in the Modules table found under the Device Info tab of the web interface.

When the new Software Version change has been confirmed, it should be safe to reboot the IRD, if desired.

---

16. If the unit has successfully upgraded, i.e. the Mainboard code or any other option card other than the DVB-S2X card, it is necessary to **reboot** the unit for the new code to take effect. Ensure that the DVB-S2X card has finished validating its new code image **before** rebooting the IRD unit, as described in step 15.

4. Preventive Maintenance and Fault-Finding

Contents

List of Tables

4.1. Introduction

This chapter provides the schedules and instructions, where applicable, for routine inspection, cleaning and maintenance of the equipment which should be performed by an operator. There are also some basic fault-finding procedures to follow in the event of a suspected unit failure

4.2. Preventive Maintenance

4.2.1. Routine Inspection

4.2.1.1. Cooling Fans

There are no routine checks associated with this unit other than to ensure that the unit is adequately cooled. The fans should be on continuously. This unit must never be operated unless the cooling fans are working. Check periodically.

CAUTION: The fan contained within this unit is not fitted with an insect/dust filter. Pay particular attention to the environment in which it is going to be used.

Failure to ensure a free flow of air around the unit may cause overheating.

4.2.2. Cleaning

CAUTION: Do not use liquid cleaners or aerosol cleaners

Unplug the unit from the wall outlet before cleaning the exterior with a damp cloth. Do not use liquid cleaners or aerosol cleaners.

NOTE: Only the exterior of the case should be cleaned.

4.2.3. Servicing

4.2.3.1. Conditions Requiring Servicing

WARNING: Removing the covers of this equipment may invalidate any warranties, cause a safety hazard or/and affect the EMC performance. Refer all servicing to service personnel who have been authorized by MediaKind.

Unplug the equipment from the wall outlet and refer servicing to qualified service personnel under the following conditions:

1. When the power supply cord or plug is damaged.
2. If liquid has been spilled, or objects have fallen into the product.
3. If the product has been exposed to rain or water.

4. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
5. If the product has been dropped or the case has been damaged.
6. When the product exhibits a distinct change in performance.
7. If the equipment has been subject to a lightning strike or power surge.

4.2.3.2. Replacement Parts

When replacement parts are required, be sure only parts specified by MediaKind (or having the same characteristics as the original part) have been used. Unauthorized substitutions may result in fire, electric shock or other hazards.

4.2.3.3. Checks on Completion of Servicing

Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in a safe operating condition. Performance and EMC checks may also be required.

4.3. Maintenance and Support Services

4.3.1. Introduction

MediaKind is a leader in the design, integration and implementation of digital broadcasting products and systems. It has a large team dedicated to keeping our customers on-air 24 hours a day, 365 days a year.

With regional offices worldwide, and ultra-modern specialist service facilities in the US, UK and Asia, MediaKind covers the world. There is a customer service centre open round the clock, every day of the year.

Years of design and support experience enable MediaKind to offer a range of service options that will meet your needs at a price that makes sense.

4.3.2. Warranty

All MediaKind products and systems are designed and built to the highest standards and are covered under a comprehensive 12 month warranty.

4.3.3. Service Levels Agreements

Customers may choose one of several Support packages, either as an enhancement during the standard 12-month warranty or as an extension after the warranty has expired.

For standalone equipment, customers may choose either MediaKind's Extended Hardware Warranty or Secure Basic Support. Extended Hardware Warranty provides hardware repair of covered equipment after the expiration of the standard warranty. Secure Basic Support provides hardware repair, remote diagnostics and support, and 24x7x365 remote support for emergencies.

For systems, along with Secure Basic Support, customers have the option of either Secure Advanced Support or Secure Superior Support. These support packages provide higher committed response and resolution times, onsite support where necessary, service performance review and a host of other proactive services to help you get the maximum return on your investment in MediaKind solutions.

Call MediaKind Sales for more details.

4.4. Fault-finding

4.4.1. General

The information contained in this chapter is intended to isolate the unit as the faulty equipment if a system failure occurs.

WARNING: Do not remove the covers of this equipment. Hazardous voltages are present within this equipment and may be exposed if the covers are removed. Only MediaKind trained and approved service engineers are permitted to service this equipment.

CAUTION: Do not remove the covers of this equipment. Unauthorized maintenance or the use of non-approved replacements may affect the equipment specification and invalidate any warranties.

This Reference Guide does not include any maintenance information or procedures that would require the removal of covers.

If the following information fails to clear the abnormal condition, please contact Customer Services using the information given in the *Preliminary Pages* of this *Reference Guide.*

4.4.2. System Defaults

The system defaults can be restored at any time using the **Restore System Defaults** option.

4.4.3. Preliminary Investigations

Always investigate the failure symptoms fully, prior to taking remedial action. Fault diagnosis for the equipment operator is limited to the following tasks, since the operator should **NOT** remove the covers of the equipment:

1. Ensure all leads and connectors are in place and serviceable.
2. Ensure the unit is powered. If not investigate the power source. Check the fuse.
3. Ensure the alarm status LED on the front of the unit is not lit. If it is, investigate the Alarm status.
4. Use the C/N Margin display to ensure that the C/N Margin is greater than 0 dB. If it is not, check the input to the Receiver (when utilizing satellite input).

4.4.4. AC Fuse Replacement

Please refer to the *Installation, Safety and Compliance Information for MediaKind Compression Products Reference Guide* supplied with your product for full details of how to replace the fuse in your product.

4.4.5. Power Supply Problems

WARNING: Do not attempt to service the Power Supply Unit as opening or removing covers may expose dangerous voltages or other hazards. Refer all servicing to service personnel who have been authorized by MediaKind.

Use the following techniques to fault-find according to the observed symptom(s) when a power supply failure is suspected.

4.4.6. Summary Status LED Unlit

If the Summary Status LED is unlit, use *Table 4.1* to help identify the fault.

Table 4.1 Summary Status LED Unlit Fault-Finding

Step	Action	If Result of Action is Yes...	If Result of Action is No...
1	**Check Status LED**. Is the unit still working?	If the unit is clearly working normally then the **Status LED** itself is probably at fault. Call a Service Engineer.	Proceed to next step.
2	**Check Power Source**. Connect a known-working piece of equipment to the power source outlet. Does it work?	The problem lies within the unit or power cable. Proceed to next step.	The problem lies with the power source. Check building circuit breakers, fuse boxes, etc. If problem persists, contact the electricity supplier.
3	**Check Power Cable and Fuse**. Unplug the power connector from the unit and try it in another piece of equipment. Does it work?	The problem lies within the unit. Proceed to next step.	The problem lies with either the cable itself, or with the fuse in the plug. Replace the fuse or try to substitute another cable.
4	**Check PSU Module(s) and Fuse(s)**. Ensure the power connector is unplugged. Remove the fuse from the rear panel connector and inspect it. Has the fuse blown?	Replace the fuse with one of the correct type and rating. If the PSU still does not work, unplug the power cable and call a Service Engineer.	Possible problem with the PSU module. Call a Service Engineer.

4.4.7. Fan(s) Not Working/Overheating

The unit is fitted with fans, all of which run continuously. The unit contains a temperature sensor that will highlight if there is a cooling problem. In the event of overheating problems, fault find as detailed in Table 4.2.

NOTE: Failure to ensure a free air-flow around the unit may cause overheating. This condition is detected by a temperature sensor; it may be used to trigger an automatic alarm.

Table 4.2 Fans Not Working/Overheating Fault-Finding

Step	Action	If Result of Action is Yes...	If Result of Action is No...
1	**Check Fan Rotation**. Inspect the fans located at the sides of the enclosure. Are the fans rotating? Check the temperature (select **Environment** on the **Device Info** web page).	Check that the unit has been installed with sufficient space allowed for air-flow (see *Chapter 2, Installing the Equipment*). If the ambient air is too hot, additional cooling may be required.	Possible break in the DC supply from the PSU module to the suspect fan(s). Call a Service Engineer.

4.4.8. Input Card Failure

To aid in diagnosing an Input Card problem, fault-find as detailed in *Table 4.3*.

Table 4.3 Input Card Failure Fault-Finding

Step	Action	If Result of Action is Yes...	If Result of Action is No...
1	**Check the status of the Input Card.** Is there a modulator failure alarm being shown on the Status web page?	If the unit indicates a critical failure, call a Service Engineer.	If no modulator failure alarm is shown, go to Step 2.
2	**Check the status of the input ports.** Do the ports reflect the reported status?	Discuss the perceived problem with MediaKind Customer Support.	If the port is not providing a valid input when it has been enabled, call a Service Engineer.

A. Glossary

The following list covers most of the abbreviations, acronyms and terms as used in MediaKind Manuals, User and Reference Guides. All terms may not be included in this Reference Guide.

μm	Micrometer (former name - micron): A unit of length equal to one millionth (10^{-6}) of a meter.
1000BaseT	The term for the Electrical Gigabit Ethernet interface. This is the most common interface for Gigabit Ethernet. Most Gigabit-enabled PCs and equipment use this interface.
3:2 pull-down	A technique used when converting film material (which operates at 24 pictures per second) to 525-line video (operating at 30 pictures per second).
4:2:0	Digital video coding method in which the color difference signals are sampled on alternate lines at half the luminance rate.
4:2:2	Digital video coding method in which the color difference signals are sampled on all lines at half the luminance rate.
422P@ML	422 Profile at Main Level: A subset of the MPEG-2 standard, which supports digital video storage (DVD etc.) and transmissions up to 50 Mbps over various mediums. Used for Contribution and Distribution applications.
8b10b	8-bit data mapped to 10-bit symbols.
ABR	Adaptive Bit Rate.
ADPCM	Adaptive Differential Pulse Code Modulation: An advanced PCM technique that converts analogue sound into digital data and vice versa. Instead of coding an absolute measurement at each sample point, it codes the difference between samples and can dynamically switch the coding scale to compensate for variations in amplitude and frequency.
ACC	Authorization Control Computer.
ADT	Audio, Data And Teletext.
AFC	Automatic Frequency Control.
AFS	Automation File Server.
AGC	Automatic Gain Control.
ALC	Automatic Loudness Control: ALC is an audio processing mode for measuring and modifying audio amplitude with the aim of changing the perceived loudness level. It uses a measurement based upon the new standards for measuring audio loudness defined in ITU-R BS.1770-2, this standard forms the measurement basis of the guidelines in EBU R128 and ATSC/A85.
AMOL I and II	Automatic Measure of Line-ups I and II: Used by automated equipment to measure programme-viewing ratings.
ARP	Address Resolution Protocol. A protocol used to "resolve" IP addresses into underlying Ethernet MAC addresses.
ASI	Asynchronous Serial Interface.
ASIC	Application-Specific Integrated Circuit: A customized chip designed to perform a specific function.
Async	Asynchronous.

ATM	Asynchronous Transfer Mode: A connection orientated, cell based, data transport technology designed for Broadband ISDN (B-ISDN). It provides a circuit-switched bandwidth-on-demand carrier system, with the flexibility of packet switching. It offers low end-to-end delays and (negotiable on call set up) Quality of Service guarantees. Asynchronous refers to the sporadic nature of the data being transmitted. Cells are transmitted only when data is to be sent, therefore the time interval between cells varies according to the availability of data.
ATSC	Advanced Television Standards Committee: An organization founded in 1983 to research and develop a digital TV standard for the U.S.A. In late 1996, the FCC adopted the ATSC standard, the digital counterpart of the NTSC standard.
AVP	Advanced Video Processor.
B3ZS	Bipolar with Three Zero Substitution: A method of eliminating long zero strings in a transmission. It is used to ensure a sufficient number of transitions to maintain system synchronization when the user data stream contains an insufficient number of 1s to do so. B3ZS is the North American equivalent of the European HDB3.
Backward Compatibility	Refers to hardware or software that is compatible with earlier versions.
BAT	Bouquet Association Table: Part of the service information data. The BAT provides information about bouquets. It gives the name of the bouquet and a list of associated services.
baud rate	The rate of transfer of digital data when the data comprises information symbols that may consist of a number of possible states. Equivalent to bit rate when the symbols only have two states (1 and 0). Measured in Baud.
BER	Bit Error Ratio: A measure of transmission quality. The rate at which errors occur in the transmission of data bits over a link. It is generally shown as a negative exponent, (e.g., 10-7 means that 1 in 10,000,000 bits are in error).
BISS	Basic Interoperable Scrambling System: Non-proprietary encryption from EBU (Tech3290).
Bit rate	The rate of transfer of digital data when the data comprises two logic states, 1 and 0. Measured in bit/s.
Block; Pixel Block	An 8-row by 8-column matrix of luminance sample values, or 64 DCT coefficients (source, quantized, or de-quantized).
Bouquet	A collection of services (TV, radio, and data, or any combination of the three) grouped and sold together, and identified in the SI as a group. A single service may be in several bouquets.
B-Picture; B-Frame	Bi-directionally Predictive Coded Picture/Frame: A picture that is coded using motion-compensated prediction from previous I or P frames (forward prediction) and/or future I or P frames (backward prediction). B frames are not used in any prediction.
BPSK	Binary Phase Shift Keying: A data modulation technique.
Buffer	A memory store used to provide a consistent rate of data flow.
BW	Bandwidth: The transmission capacity of an electronic line such as (among others) a communications network, computer bus, or broadcast link. It is expressed in bits per second, bytes per second or in Hertz (cycles per second). When expressed in Hertz, the frequency may be a greater number than the actual bits per second, because the bandwidth is the difference between the lowest and highest frequencies transmitted. High bandwidth allows fast transmission or high-volume transmission.

Byte-mode	Each byte is delivered separately in the ASI transport stream, with stuffing data added between the Bytes to increase the data rate to 270 Mbps. See DVB Document A010 rev. 1, Section B3.3, (ASI) Layer-2 Transport Protocol.
CA	Conditional Access: The technology used to control the access to viewing services to authorized subscribers through the transmission of encrypted signals and the programmable regulation of their decryption by a system such as viewing cards.
CAT	Conditional Access Table: Part of the MPEG-2 Program Specific Information (PSI) data. Mandatory for MPEG-2 compliance if CA is in use.
C-Band	The portion of the electromagnetic spectrum, which spans the frequency range of approximately 4 GHz to 6 GHz. Used by communications satellites. Preferred in tropical climates because it is not susceptible to fading.
CCIR	See: ITU-R.
CCITT	See: ITU-T.
Channel	a narrow range of frequencies, part of a frequency band, for the transmission of radio and television signals without interference from other channels. In the case of OFDM, a large number of carriers spaced apart at precise frequencies are allocated to a channel.
Channel Coding	A way of encoding data in a communications channel that adds patterns of redundancy into the transmission path in order to improve the error rate. Such methods are widely used in wireless communications.
Chrominance	The color part of a TV picture signal, relating to the hue and saturation but not to the luminance (brightness) of the signal. In a composite-coded color system, the color information (chrominance, often referred to as chroma) is modulated onto a high frequency carrier and added to the monochrome-format video signal carrying the luminance (Y). In a component-coded color system, the two color-difference signals (R-Y)(B-Y) usually referred to as C_RC_B (digital) or P_RP_B (analogue), are used to convey color information. When C_RC_B (P_RP_B) is added to the luminance (Y), the complete picture information is conveyed as YC_RC_B (YP_RP_B).
Closed Captioning	A TV picture subtitling system used with 525-line analogue transmissions.
CODE	Create Once Distribute Everywhere.
Codec	The combination of an En<u>co</u>der and a complementary <u>Dec</u>oder located respectively at the input and output of a transmission path.
COFDM	Coded OFDM: COFDM adds forward error correction to the OFDM transmission consisting of Reed-Solomon (RS) coding followed by convolutional coding to add extra bits to the transmitted signal. This allows a large number of errors at the receive end to be corrected by convolutional (Viterbi) decoding followed by RS decoding.
Composite	CVBS Video Signal, 1 V pk-pk
Compression	Reduction in the number of bits used to represent the same information. For the purposes of a broadcast system, it is the process of reducing digital picture information by discarding redundant portions of information that are not required when reconstituting the picture to produce viewing clarity. Compression allows a higher bite-rate to be transmitted through a given bandwidth.

Compression System	Responsible for compressing and multiplexing the video / audio / data bitstreams, together with the authorization stream. The multiplexed data stream is then ready for transmission.
C_RC_B	Digital Color difference signals. These signals, in combination with the luminance signal (Y), define the color and brightness of each picture element (pixel) on a TV line. See: Chrominance
CRC	Cyclic Redundancy Check: A mathematical algorithm that computes a numerical value based on the bits in a block of data. This number is transmitted with the data and the receiver uses this information and the same algorithm to ensure the accurate delivery of data by comparing the results of algorithm and the number received. If a mismatch occurs, an error in transmission is presumed.
CVBS	Chroma Video Burst and Sync: An analogue Video SD resolution signal, such as NTSC or PAL.
dB	Decibels: A ratio of one quantity to another using logarithmic scales to give results related to human aural or visual perception. dB is a ratio whereas dBm, for example, is an absolute value, quoted as a ratio to a fixed point of 0 dBm. 0 dBm is 1 mW at 1 kHz terminated in 600 Ω. 0 dBmV is 1 mV terminated in 75 Ω.
DCE	Data Communications Equipment: Typically a modem. It establishes, maintains and terminates a session on a network but in itself is not the source (originator) or destination (end receiving unit) of signals (e.g. a computer, see DTE). A DCE device may also convert signals to comply with the transmission path (network) format.
DCT	Discrete Cosine Transform: A technique for expressing a waveform as a weighted sum of cosines. Raw video data is not readily compressible. DCT is not in itself a compression technique but is used to process the video data so that it is compressible by an encoder. DCT processes the picture on an 8x8-pixel block basis, converting the data from an uncompressible X Y form (as displayed by an oscilloscope) to a compressible frequency domain form (as displayed by a spectrum analyzer). Can be forward DCT or inverse DCT.
DDS	Direct Digital Synthesiser.
Decoder	The unit containing the electronic circuitry necessary to decode encrypted signals. Some Decoders are separate from the receiver but in satellite TV broadcasting, the term is often used interchangeably as a name for an Integrated Receiver Decoder (IRD). The term IRD, or IRD / Decoder, is usually associated with satellite TV broadcasting while Cable systems are based on Converters or on Set-Top Boxes / Converters.
Decoding Time stamp	A field that may be present in a PES packet header that indicates the time that an access unit is to be decoded in the system target Decoder.
DENG	Digital Electronic News Gathering
DID	Data Identifier.
Differential Coding	Method of coding using the difference between the value of a sample and a predicted value.
DiffServ	Differentiated Services. A mechanism used on layer 3 - e.g. the IP layer - to differentiate between traffic of various types. DiffServ is based on the ToS field and provides a mechanism for the network to give e.g. video traffic higher priority than other traffic (for example Internet traffic).

DIL	Dual In Line: The most common type of package for small and medium scale integrated circuits. The pins hang vertically from the two long sides of the rectangular package, spaced at intervals of 0.1 inch.
DIN	Deutsches Institut für Normung: German Standards Institute.
Downlink	The part of the satellite communications circuit that extends from the satellite to an Earth station.
Downconvert	The process by which the frequency of a broadcast transport stream is shifted to a lower frequency range.
DPCM	Differential Pulse Code Modulation: An audio digitization technique that codes the difference between samples rather than coding an absolute measurement at each sample point.
DSNG	Digital Satellite News-Gathering.
DSP	Digital Signal Processor.
DTE	Data circuit Terminating Equipment: A communications device that originates (is the source) or is the end receiving unit (destination) of signals on a network. It is typically a terminal or computer.
DTH	Direct-To-Home. The term used to describe uninterrupted transmission from the satellite directly to the subscriber, that is, no intermediary cable or terrestrial network utilized.
DTMF	Dual-Tone MultiFrequency
DVB	Digital Video Broadcasting: A European project which has defined transmission standards for digital broadcasting systems using satellite (DVB-S), cable (DVB-C) and terrestrial (DVB-T) medium, created by the EP-DVB group and approved by the ITU. Specifies modulation, error correction, etc. (see EN 300 421 for satellite, EN 300 429 for cable and EN 300 744 for terrestrial).
DVB SI	Digital Video Broadcasting Service Information.
DVB-PI	DVB-Professional Interfaces
DWDM	Dense Wavelength Division Multiplexing. A mechanism to utilize existing fiber with even more bandwidth by adding extra signals using other wavelengths/colors
Earth	Technical Earth: Ensures that all equipment chassis within a rack are at the same potential, usually by connecting a wire between the Technical earth terminal and a suitable point on the rack. This is sometimes known as a Functional earth. Protective Earth: Used for electric shock protection. This is sometimes known as a safety earth.
EBU	European Broadcast Union.
ECM	Entitlement Control Message.
EDI	Ethernet Data Input
EIA	Electronics Industries Association (USA).
EIT	Event Information Table: Equipment: A component of the DVB-Service Information (SI) stream generated within an Encoder, containing information about events or programmes such as event name, start time, duration, etc. System: EIT (Present/Following) contains the name of the current and next event. It may include an optional descriptor (synopsis) giving brief details of content. EIT (Schedule) is used to produce a full EPG. The EIT is the only DVB-SI table, which can be encrypted.
Elementary Stream	A generic term for a coded bitstream, be it video, audio or other.
EMC	Electromagnetic Compatibility.

EMM	Entitlement Management Message.
Encryption	Encoding of a transmission to prevent access without the appropriate decryption equipment and authorization.
EPG	Electronic Programme Guide: On-screen programme listing using thumbnail pictures and/or text.
Ethernet	The most widely used local area network (LAN) defined by the IEEE as the 802.3 standard. Transmission speeds vary according to the configuration. Ethernet uses copper or fiber-optic cables.
ETS	European Telecommunications Standard.
ETSI	European Telecommunications Standards Institute.
FBAS	German for CVBS
FCC	Federal Communications Commission.
FDM	Frequency Division Multiplex: A common communication channel for a number of signals, each with its own allotted frequency.
FEC	Forward Error Correction: A method of catching errors in a transmission. The data is processed through an algorithm that adds extra bits and sends these with the transmitted data. The extra bits are then used at the receiving end to check the accuracy of the transmission and correct any errors.
FFT	Fast Fourier Transformation: A fast algorithm for performing a discrete Fourier transform.
FIFO	First In, First Out: A data structure or hardware buffer from which items are taken out in the same order they were put in. Also known as a shelf from the analogy with pushing items onto one end of a shelf so that they fall off the other. A FIFO is useful for buffering a stream of data between a sender and receiver that are not synchronized - i.e. they not sending and receiving at exactly the same rate.
FM	Frequency Modulation: Analogue modulation procedure
Footprint	The area of the Earth's surface covered by a satellite's downlink transmission. Also (generally) the area from which the satellite can receive uplink transmissions.
FTP	File Transfer Protocol: A protocol used to transfer files over a TCP/IP network (Internet, UNIX, etc.). For example, after developing the HTML pages for a Web site on a local machine, they are typically uploaded to the Web server, using FTP. Unlike e-mail programs in which graphics and program files have to be attached, FTP is designed to handle binary files directly and does not add the overhead of encoding and decoding the data.
G.703	The ITU-T standard which defines the physical and electrical characteristics of hierarchical digital interfaces.
GOP	Group of Pictures: MPEG video compression works more effectively by processing a number of video frames as a block. The MediaKind AB Encoder normally uses a 12 frame GOP; every twelfth frame is an I frame.
GUI	Graphical User Interface: The use of pictures rather than just words to represent the input and output of a program. A program with a GUI runs under a windowing system and has a screen interface capable of displaying graphics in the form of icons, drop-down menus and a movable pointer. The on-screen information is usually controlled / manipulated by a mouse or keyboard.
HDTV	High Definition Television.

HEVC	High Efficiency Video Coding. A video compression standard, a successor to MPEG-4 AVC. HEVC is said to double the data compression ratio compared to MPEG-4 AVC at the same level of video quality. It can alternatively be used to provide substantially improved video quality at the same bit rate.
HPA	High Power Amplifier: Used in the signal path to amplify the modulated and up-converted broadcast signal for feeding to the uplink antenna.
HSYNC	Horizontal (line) SYNCs.
HTTP	HyperText Transfer Protocol. The fundamental protocol used on the Internet for transmission ofWEB pages and other data between servers and PCs
HU	Height Unit
Hub	A device in a multi-point network at which branch nodes interconnect.
ICAM	Integrated Conditional Access Module: Embedded in the IRD and responsible for descrambling, plus packet filtering and reception. It also contains the physical interface to the subscriber's viewing card.
ICMP	Internet Control Message Protocol. ICMP messages, delivered in IP packets, are used for out-of-band messages related to network operation or mis-operation
IGMP	Internet Group Management Protocol. IGMP is a protocol used to manage multicasts on the Internet. For a host (receiver unit) to receive a multicast, it needs to transmit IGMP "join" messages on the right format. Three versions exist. IGMPv2 is common today but IGMPv3 is the next step.
IDU	Indoor unit
IEC	International Electrotechnical Committee.
IF	Intermediate Frequency: Usually refers to the 70 MHz or 140 MHz output of the Modulator in cable, satellite and terrestrial transmission applications.
Interframe Coding	Compression coding involving consecutive frames. When consecutive frames are compared, temporal redundancy is used to remove common elements (information) and arrive at difference information. MPEG-2 uses B and P frames, but since they are individually incomplete and relate to other adjacent frames, they cannot be edited independently.
Intraframe Coding	Compression coding involving a single frame. Redundant information is removed on a per frame basis. All other frames are ignored. Coding of a macroblock or picture that uses information only from that macroblock or picture. Exploits spatial redundancy by using DCT to produce I frames; these are independent frames and can be edited.
IP	Internet Protocol: The IP part of TCP/IP. IP implements the network layer (layer 3) of the protocol, which contains a network address and is used to route a message to a different network or sub-network. IP accepts packets from the layer 4 transport protocol (TCP or UDP), adds its own header to it and delivers a datagram to the layer 2 data link protocol. It may also break the packet into fragments to support the Maximum Transmission / Transfer Unit (MTU) of the network.
I-picture; I-frame	Intracoded Picture/Frame: A picture / frame, which is coded using purely intracoding with reference to no other field or frame information. The I frame is used as a reference for other compression methods.
IPPV	Impulse Pay Per View: One-time events, purchased at home (on impulse) using a prearranged SMS credit line.

IRD	Integrated Receiver Decoder: The Receiver with an internal MPEG Decoder, which is connected to the subscriber's TV. The IRD is responsible for receiving and de-multiplexing all signals. The unit receives the incoming signal and if CA is active, decodes the signal when provided with a control word by the viewing card. Domestic IRDs are also known as Set-Top Units or Set-Top Boxes.
IRE	Institute of Radio Engineers: No longer in existence but the name lives on as a unit of video amplitude measurement. This unit is 1% of the range between blanking and peak white for a standard amplitude signal.
ISDN	Integrated Services Digital Network: The basic ISDN service is BRI (Basic Rate Interface), which is made up of two 64 kbps B channels and one 16 kbps D channel (2B+D). If both channels are combined into one, called bonding, the total data rate becomes 128 kbps and is four and a half times the bandwidth of a V.34 modem (28.8 kbps). The ISDN high speed service is PRI (Primary Rate Interface). It provides 23 B channels and one 64 kbps D channel (23B+D), which is equivalent to the 24 channels of a T1 line. When several channels are bonded together, high data rates can be achieved. For example, it is common to bond six channels for quality videoconferencing at 384 kbps. In Europe, PRI includes 30 B channels and one D channel, equivalent to an E1 line.
ISO	International Standards Organisation.
ISOG	Inter-union Satellite Operations Group.
ITS	Insertion Test Signal: A suite of analogue test signals placed on lines in the VBI. Also known as VITS.
ITT	Invitation To Tender.
ITU-R	International Telecommunications Union - Radiocommunications Study Groups (was CCIR).
ITU-T	International Telecommunications Union - Telecommunications Standardization Sector (was CCITT).
JPEG	Joint Photographic Experts Group: ISO/ITU standard for compressing still images. It has a high compression capability. Using discrete cosine transform, it provides user specified compression ratios up to around 100:1 (there is a trade-off between image quality and file size).
kbps	1000 bits per second.
Kbit	1024 bits, usually refers to memory capacity or allocation.
Ku-band	The portion of the electromagnetic spectrum, which spans the frequency range of approximately 12 GHz to 14 GHz. Used by communications satellites. Preferred for DTH applications because this range of frequency is less susceptible to interference.
LAN	Local Area Network: A network, which provides facilities for communications within a defined building or group of buildings in close proximity.
L-band	The frequency band from 950 MHz to 2150 MHz, which is the normal input-frequency-range of a domestic IRD. The incoming signal from the satellite is down-converted to L-band by the LNB.
LED	Light Emitting Diode.
LNB	Low Noise Block Down-Converter: The component of a subscriber satellite transmission receiving dish which amplifies the incoming signal and down-converts it to a suitable frequency to input to the IRD (typically 950 MHz - 1600 MHz).
LO	Local Oscillator.
lsb	Least significant bit.

Luminance	The television signal representing brightness, or the amount of light at any point in a picture. The Y in YC_RC_B.
LVDS	Low Voltage Differential Signal: LVDS is a generic multi-purpose Interface standard for high speed / low power data transmission. It was standardized in ANSI/TIA/EIA-644-1995 Standard (aka RS-644).
Macroblock	A 16x16-pixel area of the TV picture. Most processing within the MPEG domain takes place with macro blocks. These are converted to four 8x8 blocks using either frame DCT or field DCT. Four 8 x 8 blocks of luminance data and two (4:2:0 chrominance format), four (4:2:2) or eight (4:4:4) corresponding 8 x 8 blocks of chrominance data coming from a 16 x 16 section of the luminance component of the picture. Macroblock can be used to refer to the sample data and to the coded representation of the sample values and other data elements.
Mbps	Million bits per second.
MCC	Multiplex Control Computer: A component of a System 3000 compression system. The MCC sets up the configuration for the System 3000 Multiplexers under its control. The MCC controls both the main and backup Multiplexer for each transport stream.
MCPC	Multiple Channels Per Carrier.
Meta-data	Meta-data is descriptive data that is "tagged" to a movie or audio clip. Meta-data is essential for the broadcaster.
MMDS	Multichannel Microwave Distribution System: A terrestrial microwave direct-to-home broadcast transmission system.
Motion Compensation	The use of motion vectors to improve the efficiency of the prediction of sample values. The prediction uses motion vectors to provide offsets into the past and/or future reference frames or fields containing previously decoded sample values that are used to form the prediction error signal.
Motion Estimation	The process of estimating motion vectors in the encoding process.
Motion Vector	A two-dimensional vector used for motion compensation that provides an offset from the coordinate position in the current picture or field to the coordinates in a reference frame or field.
MP@ML	Main Profile at Main Level: A subset of the MPEG-2 standard, which supports digital video storage (DVD etc.) and transmissions up to 15 Mbps over various mediums.
MP@HL	Main Profile at High Level: A subset of the MPEG-2 standard, which supports digital video storage (DVD etc.) and transmissions up to 80 Mbps over various mediums.
MPEG	Moving Pictures Experts Group: The name of the ISO/IEC working group which sets up the international standards for digital television source coding.
MPEG-2	Industry standard for video and audio source coding using compression and multiplexing techniques to minimize video signal bit rate in preparation for broadcasting. Specified in ISO/IEC 13818. The standard is split into layers and profiles defining bit rates and picture resolutions.
MPLS	Multi-protocol Label Switching. A Quality of Service mechanism for IP networks that allow IP packets to flow along a predefined path in a network, improving the reliability and robustness of the transmission.
MPM	Media Processing Module.
MPTS	Multi-Program Transport Streams. Transport Streams that carry multiple TV/Radio services.
msb	Most significant bit.

Msymbol/s	(Msym/s) Mega (million) Symbols per second (10^6 Symbols per second).
Multiplex	A number of discrete data streams (typically 8 to 12), from encoders, that are compressed together in a single DVB compliant transport stream for delivery to a Modulator.
Multicast	An IP mechanism that allows transmission of data to multiple receivers. A multicast can also have several transmit sources simultaneously. In video applications, multicast is typically used to distribute a video signal from a central source to multiple destinations.
MUSICAM	Masking pattern adapted Universal Sub-band Integrated Coding And Multiplexing: An audio bit rate reduction system relying on sub-band coding and psychoacoustic masking.
Mux	Multiplexer: Transmission Multiplexer: receives EMMs from the ACC, ECMs from the BCC, video/audio data from the encoders, and the SI stream from the SIC. It then multiplexes them all into a single DVB-compliant transport stream, and delivers the signal to the uplink after modulation. The Multiplexer also contains the cipher card, which scrambles the services according to the control words supplied by the BCC.
Network	In the context of broadcasting: a collection of MPEG-2 transport stream multiplexes transmitted on a single delivery system, for example, all digital channels on a specific cable system.
NICAM	Near Instantaneously Companded Audio Multiplex: Official name is NICAM 728. Used for digital stereo sound broadcasting in the UK employing compression techniques to deliver very near CD quality audio. 728 refers to the bit rate in kbps.
NIT	Network Information Table: Part of the service information data. The NIT provides information about the physical organization of each transport stream multiplex, and the characteristics of the network itself (such as the actual frequencies and modulation being used).
nm	Nanometer: a unit of length equal to one thousand millionth (10^{-9}) of a meter.
NMS	Network Management System. A system used to supervise elements in an IP network. When a device reports an alarm, the alarm will be collected by the NMS and reported to the operator. NMS systems typically collect valuable statistics information about the network performance and can warn the operator early.
NTSC	National Television Systems Committee: The group, which developed analogue standards used in television broadcast systems in the United States. Also adopted in other countries (e.g. Mexico, Canada, Japan). This system uses 525 picture lines and a 59.97 Hz field frequency.
NVOD	Near Video On-Demand: Method of offering multiple showings of movies or events. The showings are timed to start at set intervals, determined by the broadcaster. Each showing of a movie or event can be sold to subscribers separately.
NVRAM	Non-volatile Random Access Memory: Memory devices (permitting random read / write access) that do not lose their information when power is removed. Stores the default configuration parameters set by the user.
ODU	Outdoor Unit

OFDM	Orthogonal Frequency Division Multiplex: A modulation technique used for digital TV transmission in Europe, Japan and Australia; more spectrally efficient than FDM. In OFDM, data is distributed over a large number of carriers spaced apart at precise frequencies. The carriers are arranged with overlapping sidebands in such a way that the signals can be received without adjacent channel interference.
OPPV	Order ahead Pay Per View: An advance purchase of encrypted one-time events with an expiry date.
OSD	On-screen display: Messages and graphics, typically originating from the SMS, and displayed on the subscriber's TV screen by the IRD, to inform the subscriber of problems or instruct the subscriber to contact the SMS.
Packet	A unit of data transmitted over a packet switching network. A packet consists of a header followed by a number of contiguous bytes from an elementary data stream.
PAL	Phase Alternating Line: A color TV broadcasting system where the phase of the R-Y color-difference signal is inverted on every alternate line to average out errors providing consistent color reproduction.
PAT	Program Association Table: Part of the MPEG-2 Program Specific Information (PSI) data and is mandatory for MPEG-2 compliance. The PAT points (maps) to the PMT.
PCM	Pulse Code Modulation: A process in which a signal is sampled, each sample is quantized independently of other samples, and the resulting succession of quantized values is encoded into a digital signal.
PCR	Program Clock Reference: A time stamp in the transport stream from which the Decoder timing is derived.
PDC	Program Delivery Control: A Teletext service allowing simple programming (i.e. VideoPlus) of VCR recording times. If the desired program is rescheduled, PDC updates the programming information in the VCR.
Pel	Picture Element: Also known as a pixel. The smallest resolvable rectangular area of an image either on a screen or stored in memory. On-screen, pixels are made up of one or more dots of color. Monochrome and grey-scale systems use one dot per pixel. For grey-scale, the pixel is energized with different intensities, creating a range from dark to light (a scale of 0-255 for an eight-bit pixel). Color systems use a red, green and blue dot per pixel, each of which is energized to different intensities, creating a range of colors perceived as the mixture of these dots. If all three dots are dark, the result is black. If all three dots are bright, the result is white.
PES	Packetized Elementary Stream: A sequential stream of data bytes that has been converted from original elementary streams of audio and video access units and transported as packets. Each PES packet consists of a header and a payload of variable length and subject to a maximum of 64 kbytes. A time stamp is provided by the MPEG-2 systems layer to ensure correct synchronization between related elementary streams at the Decoder.
PID	Packet Identifier: the header on a packet in an elementary data stream, which identifies that data stream. An MPEG-2 / DVB standard.

PIN	Personal Identification Number: A password used to control access to programming and to set purchase limits. Each subscriber household can activate several PINs and may use them to set individual parental rating or spending limits for each family member.
Pixel	PIX (picture) Element: The digital representation of the smallest area of a television picture capable of being delineated by the bit-stream. See Pel for more information.
pk-pk	peak to peak: Measurement of a signal or waveform from its most negative point to its most positive point.
PLL	Phase-Locked Loop. A phase-locked loop is a control system which controls the rotation of an object by comparing its rotational position (phase) with another rotating object as in the case of a sine wave or other repeating signal. This type of control system can synchronize not only the speed, but also the angular position of two waveforms that are not derived from the same source.
PMT	Program Map Table: Part of the MPEG-2 Program Specific Information (PSI) data and is mandatory for MPEG-2 compliance. Each service has a PMT, which lists the component parts (elementary streams of video, audio, etc.) for the various services being transmitted.
P-picture/P-frame	A picture / frame produced using forward prediction. It contains predictions from either previous I frames or previous P frames. The P frame is used as a reference for future P or B frames.
ppm	Parts per million.
PPV	Pay Per View: A system of payment for viewing services based on a usage / event basis rather than on on-going subscription. Subscribers must purchase viewing rights for each PPV event that they wish to view. PPV events may be purchased as IPPV or OPPV.
Program	PC - A sequence of instructions for a computer. TV - A concept having a precise definition within ISO 13818-1 (MPEG-2). For a transport stream, the timebase is defined by the PCR. The use of the PCR for timing information creates a virtual channel within the stream.
Programme	A linking of one or more events under the control of a broadcaster. For example, football match, news, film show. In the MPEG-2 concept, the collection of elementary streams comprising the programme, have a common start and end time. A series of programmes are referred to as events.
P_RP_B	Analogue Color difference signals. Refer to C_RC_B for an explanation.
PS	Program Stream: A combination of one or more PESs with a common timebase.
PSI	Program Specific Information: Consists of normative data, which is necessary for the de-multiplexing of transport streams and the successful regeneration of programs (see also: SI).
PSIP	Program System Information Protocol: The ATSC equivalent of SI for DVB.
PSK	Phase Shift Keying: A method of modulating digital signals particularly suited to satellite transmission.
PSR	Professional Satellite Receiver: See also: IRD.
PSU	Power Supply Unit.

QAM	Quadrature Amplitude Modulation: A method of modulating digital signals, which uses combined techniques of phase modulation and amplitude modulation. It is particularly suited to cable networks.
QoS	Quality of Service. A common term for a set of parameters describing the quality you get from an IP network: Throughput, availability, delay, jitter and packet loss.
QPSK	Quadrature Phase Shift Keying: A form of phase shift keying modulation using four states.
QSIF	Quarter Screen Image Format.
Quantise	A process of converting analogue waveforms to digital information. 8-bit quantization as set out in ITU-R Rec. 601. Uses 256 levels in the range 0 – 255 to determine the analogue waveform value at any given point. The value is then converted to a digital number for processing in the digital domain.
RAM	Random Access Memory: A volatile storage device for digital data. Data may be written to, or read from, the device as often as required. When power is removed, the data it contains is lost.
RAS	Remote Authorization System: An MediaKind AB proprietary public-key encryption system used to prevent unauthorized viewing of a TV programme or programmes.
Reflex™	An MediaKind AB proprietary system to provide efficient use of bandwidth by a set of encoders without sacrificing picture quality. A group bit rate is allocated to a set of Encoders and the bit rate for each encoder is allocated according to the requirements of the picture encoding process. The bit rate allocation can be performed externally by a multiplexer, or internally in a unit fitted with multiple VCM's.
RF	Radio Frequency.
RGB	Red, Green, Blue: The Chroma information in a video signal.
RIP2	Routing Information Protocol v2. A protocol used between network routers to exchange routing tables and information.
ROM	Read Only Memory: A non-volatile storage device for digital data. Data has been stored permanently in this device. No further information may be stored (written) there and the data it holds cannot be erased. Data may be read as often as required.
RS	Reed-Solomon coding: An error detection and correction, coding system. 16 bytes of Reed-Solomon Forward Error Correction code are appended to the packet before transmission bringing the packet length to 204 bytes. The 16 bytes are used at the receiving end to correct any errors. Up to eight corrupted bytes can be corrected.
RSVP	ReSerVation Protocol. A Quality-of-service oriented protocol used by network elements to reserve capacity in an IP network before a transmission takes place.
RTP	Real-time Transfer Protocol. A protocol designed for transmission of real-time data like video and audio over IP networks. RTP is used for most video over IP transmissions.
RLC	Run Length Coding: Minimization of the length of a bit-stream by replacing repeated characters with an instruction of the form 'repeat character x y times'.
SBR	Spectral Band Replication.
SCPC	Single Channel Per Carrier.

Spectral Scrambling	A process (in digital transmission) used to combine a digital signal with a pseudo-random sequence, producing a randomized digital signal that conveys the original information in a form optimized for a broadcast channel.
Scrambling	Alteration of the characteristics of a television signal in order to prevent unauthorized reception of the information in clear form.
SDI	Serial Digital Interface.
SDT	Service Description Table: Provides information in the SI stream about the services in the system; for example, the name of the service, the service provider, etc.
SDTI	Serial Data Transport Interface. A mechanism that allows transmission of various types of data over an SDI signal. This may be one or more compressed video signals or other proprietary data types. The advantage of SDTI is that existing SDI transmission infrastructure can be used to transport other types of data.
SELV	Safety Extra Low Voltage (EN 60950).
SFP	Small Form-factor Pluggable module. A standardized mechanism to allow usage of various optical interfaces for Gigabit Ethernet. Several types of SFP modules exist: Single-mode fiber modules for long-distance transmission and multi-mode fiber modules for shorter distances. SFP is also known as "mini-GBIC".
SIP	Session Initiation Protocol. A common acronym for the ongoing effort to standardize signaling over IP networks, i.e. connection set-up and tear-down. SIP makes it possible to "dial" a remote receiver of data and set-up the connection in this way.
STB	Set-Top Box: A box that sits on top of a television set and is the interface between the home television and the cable TV company. New technologies evolving for set-top boxes are video-on-demand, video games, educational services, database searches, and home shopping. The cable equivalent of the IRD.
SFN	Single Frequency Network: The SFN technique allows large geographic areas to be served with a common transmission multiplex. All transmitters in the network are synchronously modulated with the same signal and they all radiate on the same frequency. Due to the multi-path capability of the multi-carrier transmission system (COFDM), signals from several transmitters arriving at a receiving antenna may contribute constructively to the total wanted signal. The SFN technique is not only frequency efficient but also power efficient because fades in the field strength of one transmitter may be filled by another transmitter.
SI	Service Information: Digital information describing the delivery system, content and scheduling (timing) of broadcast data streams. DVB-SI data provides information to enable the IRD to automatically demultiplex and decode the various streams of programmes within the multiplex. Specified in ISO/IEC 13818[1]. (DVB)
Single Packet Burst Mode	A burst of ASI bytes (either 188 or 204, depending on packet length) is contiguously grouped into an MPEG-2 transport stream packet. Stuffing data is added between the packets to increase the data rate to 270 Mbps. See DVB Document A010 rev. 1, Section B3.3, (ASI) Layer-2 Transport Protocol.

Smart Card	A plastic card with a built-in microprocessor and memory used for identification, financial transactions or other authorizing data transfer. When inserted into a reader, data is transferred to and from the host machine or a central computer. It is more secure than a magnetic stripe card and it can be disabled if the wrong password is entered too many times. As a financial transaction card, it can be loaded with digital money and used in the same way as cash until the balance reaches zero. The file protocol is specific to its intended application.
SMATV	Satellite Mast Antenna Television: A distribution system, which provides sound and television signals to the households of a building or group of buildings, typically used to refer to an apartment block.
SMPTE	Society of Motion Picture and Television Engineers.
SMS	Subscriber Management System: A system which handles the maintenance, billing, control and general supervision of subscribers to conditional access technology viewing services provided through cable and satellite broadcasting. An SMS can be an automatic (e.g. Syntellect) system where subscribers order entitlements by entering information via a telephone. Alternatively, an SMS can be a manual system, which requires subscribers to speak with an operator who then manually enters their entitlement requests. Some systems support multiple SMSs.
SNG	Satellite News-Gathering.
SNMP	Simple Network Management Protocol.
SNTP	Simple Network Time Protocol is an Internet protocol used to synchronize the clocks of computers to some time reference. It is a simplified version of the protocol NTP protocol which is too complicated for many systems.
Spatial Redundancy	Information repetition due to areas of similar luminance and/or chrominance characteristics within a single frame. Removed using DCT and Quantization (Intra-Frame Coding).
SPI	Synchronous Parallel Interface.
Statistical Redundancy	Data tables are used to assign fewer bits to the most commonly occurring events, thereby reducing the overall bit rate. Removed using Run Length Coding and Variable Length Coding.
TCP / IP	Transmission Control Protocol/Internet Protocol: A set of communications protocols that may be used to connect different types of computers over networks.
TDM	Time Division Multiplex: One common, communications channel carrying a number of signals, each with its own allotted time slot.
TDT	Time and Date Table: Part of the DVB Service Information. The TDT gives information relating to the present time and date.
Temporal Redundancy	Information repetition due to areas of little or no movement between successive frames. Removed using motion estimation and compensation (Inter-Frame Coding).
Time stamp	A term that indicates the time of a specific action such as the arrival of a byte or the presentation of a presentation unit.
TNS	Temporal Noise Shaping.
TOT	Time Offset Table: This optional SI table supports the use of local offsets as well as the UTC time/date combination. The purpose of the table is to list by country the current offset from UTC and the next expected change to that offset (to track when daylight saving occurs). The offset resolution is to within 1 minute over a range of ±12 hours from UTC.

Transport Stream	A set of packetized elementary data streams and SI streams, which may comprise more than one programme, but with common synchronization and error protection. The data structure is defined in ISO/IEC 13818-1 [1] and is the basis of the ETSI Digital Video Broadcasting standards.
Transport Stream Packet Header	A data structure used to convey information about the transport stream payload.
TS	Transport Stream.
TSDT	Transport Stream Descriptor Table: A component of the MPEG-2 PSI data. This table describes which type of Transport stream it is in (i.e. DVB, ATSC etc.). It may also contain other descriptors.
TSP	Transport Stream Processor.
U	44.45 mm (rack height standard).
UART	Universal Asynchronous Receiver Transmitter: A device providing a serial interface for transmitting and receiving data.
UDP	User Datagram Protocol. A protocol above the IP layer that provides port multiplexing in addition. In essence, you can transmit IP data packets to several receiving processes in the same unit/device.
Unicast	Point-to-point connection, i.e. the "opposite" of multicast which is one to many (or many to many). In this mode, a transmit unit sends video data direct to a unique destination address.
Upconvert	The process by which the frequency of a broadcast transport stream is shifted to a higher frequency range.
Uplink	The part of the communications satellite circuit that extends from the Earth to the satellite.
UPS	Uninterruptable Power Supply: A method of supplying backup power when the electrical power fails or drops to an unacceptable voltage level. Small UPS systems provide battery power for a few minutes; enough to power down the computer in an orderly manner. This is particularly important where write back cache is used. Write back cache is where modified data intended for the disk is temporarily stored in RAM and can be lost in the event of a power failure. Sophisticated systems are tied to electrical generators that can provide power for days. UPS systems typically provide surge suppression and may provide voltage regulation.
UTC	Universal Time Coordinated: The Coordinated Universal Time and is synonymous with Greenwich Mean Time (GMT).
VCM	Video Compression Module.
VITC	Vertical Interval Time Code.
VITS	Vertical Interval Test Signal: See: ITS.
VLAN	Virtual LAN, a network of units that behave as if they are connected to the same wire even though they may actually be physically located on different segments of a LAN.
VPS	Video Programming System: A German precursor to PDC
WSS	Wide Screen Switching: Data used in wide-screen analogue services, which enables a receiver to select the appropriate picture display mode.
WST	World System Teletext: System B Teletext. Used in 625 line / 50 Hz television systems (ITU-R 653).
XLR	Audio connector featuring three leads, two for signal and one for GND.

XML	eXtensible Markup Language. A very common self-describing text-based data format. Used for many purposes: Meta-data, configuration files, documents, etc. The readability of the format has made it very popular and is now the fundament for many types of WEB services.
XPO	The name given to the second generation MediaKind standard for web pages and additional supporting interfaces.
Y (Luminance)	Defines the brightness of a particular point on a TV line. The only signal required for black and white pictures.
Y/C	Broadcast video with separate color, Y (luminance) and C (Chroma) (sometimes called S-Video).
YUV	Y: Luminance component (Brightness), U and V: Chrominance (Color difference)

B.Technical Specification

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B.1. General Specifications

B.1.1. Video Decoding and Output Stage

B.1.1.1. General

The RX8000 Integrated Receiver/Decoder is capable of decoding one PES stream of video from the Transport Stream. The decoder supports extraction of the following types of coded video from the Transport Stream as follows:

- MPEG-2
- MPEG-4 AVC
- JPEG-2000
- HEVC

B.1.1.2. Supported Video Bit Rates

The equipment supports decoding of non-encrypted compressed video at rates of up to 90 Mbps MPEG-2, 85 Mbps MPEG-4 AVC, 50 Mbps* HEVC and 200 Mbps JPEG-2000.

Table B.1 Supported Video Rates

Coding Technology	Parameter	Limit
MPEG-4 AVC	Level 3	12 Mbps
MPEG-4 AVC	Level 4	25 Mbps
MPEG-4 AVC	Level 4.2	50 Mbps CABAC, 85 Mbps CAVLC
MPEG-2	4:2:0, Main Level	15 Mbps
MPEG-2	4:2:0, High Level	80 Mbps
MPEG-2	4:2:2, Main Level	50 Mbps
MPEG-2	4:2:2, High Level	90 Mbps
JPEG-2000	-	200 Mbps
HEVC	Level 4.0 High Tier	30 Mbps*
HEVC	Level 4.1 High Tier	50 Mbps*

* Preliminary figures, subject to characterization.

B.1.1.3. Supported Video Resolutions

The supported video resolutions and standards are dependent on the fitted hardware and software options and are summarized in Table B.2 below. The hardware options are abbreviated in the table as follows:

- Base – Base Decoder (4:2:0 Only), Board Type 1900, 1901 or 1902
- 1st – First Generation 4:2:2 Decoder, Board Type 1920
- 2nd – Second Generation 4:2:2 Decoder, Board Type 1921
- 3rd – Third Generation 4:2:2 Decoder, Board Type 1933
- 4th – Fourth Generation 4:2:2 Decoder, Board Type 1936

Table B.2 *Supported Video Resolutions*

Input Resolutions (H x V)	Frame Rates	Output Standard (H x V)*	Coding Technology	Base	1st	2nd	3rd	4th
1920 x 1088 1920 x 1080 1440 x 1088 1440 x 1080 1280 x 1088 1280 x 1080 960 x 1088 960 x 1080	59.94 50	1920 x 1080 progressive 1920 x 1080 progressive	MPEG-2					
			MPEG-4 AVC			●	●	●
			JPEG-2000					
			HEVC					●
1920 x 1080	29.97 25	1920 x 1080 interlaced 1920 x 1080 interlaced	MPEG-2	●	●	●	●	●
			MPEG-4 AVC	●		●	●	●
			JPEG-2000				●	
			HEVC				●	●
1920 x 1088 1920 x 1080 1440 x 1088 1440 x 1080 1280 x 1088 1280 x 1080 960 x 1088 960 x 1080	29.97 25	1920 x 1080 interlaced 1920 x 1080 interlaced	MPEG-2	●	●	●	●	●
			MPEG-4 AVC	●		●	●	●
			JPEG-2000					
			HEVC				●	●
1280 x 720	59.94 50	1280 x 720 progressive 1280 x 720 progressive	MPEG-2	●	●	●	●	●
			MPEG-4 AVC	●		●	●	●
			JPEG-2000				●	
			HEVC				●	●
960 x 720 640 x 720	59.94 50	1280 x 720 progressive 1280 x 720 progressive	MPEG-2	●	●	●	●	●
			MPEG-4 AVC	●		●	●	●
			JPEG-2000					
			HEVC				●	●
720 x 480 720 x 576	29.97 25	720 x 480 interlaced 720 x 576 interlaced	MPEG-2	●	●	●	●	●
			MPEG-4 AVC	●		●	●	●
			JPEG-2000				●	
			HEVC				●	●
704 x 480 640 x 480 544 x 480 528 x 480 480 x 480 704 x 576 640 x 576 544 x 576 528 x 576 480 x 576	29.97 25	720 x 480 interlaced 720 x 576 interlaced	MPEG-2	●	●	●	●	●
			MPEG-4 AVC	●		●	●	●
			JPEG-2000					
			HEVC				●	●

*Unit Output Format is dependent on fitted hardware and software options.

B.1.1.4. Composite Video Output

The equipment supports video decoding as per ITU-R BT.470 and ANSI/SMPTE 170M.

Table B.3 625 Line

Description	Test Signal	Limit
Bar Level	VITS17	700 mV +/- 7 mV
Bar tilt	VITS17	<0.5%
Sync level	VITS17	300 mV +/- 3 mV
DC offset	VITS17	+/- 100 mV
Chrominance to luminance gain inequality	Color Bars	100 +/- 5%
Chrominance to luminance phase inequality	VITS17	<20 nS
K factor K 2T	VITS17	<1%
Pulse X bar K rating	VITS17	100 +/- 1%
Frequency response (multiburst)	VITS18 0. 5 MHz VITS18 1 MHz VITS18 2 MHz VITS18 4 MHz VITS18 4.8 MHz VITS18 5.8 MHz	0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.3 dB 0dB +/- 0.3 dB 0dB +/- 0.8 dB
Differential gain	VITS330	<1.5%
Differential phase	VITS330	<1 Degree
Non-linearity	VITS17	<5%
Jitter	VITS17	<5 nS
Weighted luminance noise	Luminance ramp	<60 dB
Weighted luminance noise	Flat grey field	<63 dB
Chrominance PM noise	Flat red field	<55 dB

Table B.4 525 Line

Description	Test Signal	Limit
Bar level	NTC-7 comp	100 IRE +/- 1 IRE
Bar tilt	NTC-7 comp	<0.5%
Sync level	NTC-7 comp	40 IRE +/- 0.5 IRE
DC offset	NTC-7 comp	+/- 100 mV
Chrominance to luminance gain inequality	NTC-7 comp	100 +/- 5%
Chrominance to luminance phase inequality	NTC-7 comp	<20 nS
K factor K 2T	NTC-7 comp	<1%
Pulse X bar K rating		100 +/- 1%
Frequency response (multiburst)	FCC multiburst 0.5 MHz 1.25 MHz 2 MHz 3 MHz 3.58 MHz	 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.3 dB

	4.1 MHz	0dB +/- 0.3 dB
Differential gain	NTC-7 comp	<2%
Differential phase	NTC-7 comp	<1 Degree
Non-linearity	NTC-7 comp	<5%
Jitter		<5 nS
Weighted luminance noise	Luminance ramp	<60 dB
Weighted luminance noise	Flat grey field	<63 dB
Chrominance PM noise	Flat red field	<55 dB

B.1.1.5. Analogue HD Video Output

Table B.5 HD Analogue Output Specification

Parameter	Value for Y, R, G, B	Value for Pb, Pr	Condition	Notes
Amplitude	700 mV ± 2%	700 mV ± 2%	100% color bar	
DC offset	± 10 mV	± 10 mV	Black field	
Bandwidth	DC to 10 MHz ± 0.2 dB 10 MHz to 20 MHz ± 1 dB 20 MHz to 30 MHz +1 dB/-2.5 dB	DC to 10 MHz ± 0.2 dB 10 MHz to 15 MHz ± 1 dB	Sweep	
Group delay	DC to 30 MHz < 50 ns	DC to 30 MHz < 50 ns		
Noise	DC to 30 MHz < -50 dB	DC to 30 MHz < -50 dB	100% ramp	
Out-of-band noise	30 MHz to 100 MHz < -50 dB	15 MHz to 100 MHz < -50 dB	Sweep	
Linearity	< 5%	< 5%	5 step	
Inter-channel delay	< 10 ns	< 10 ns	100% color bar	
Interchannel crosstalk	< -40 dB	< -40 dB	Multiburst	
Blanking rise and fall time	100 ns ± 50 ns	100 ns ± 50 ns	Flat field	20% to 80%
Active line width inequality	<50 ns	<50 ns	Flat field	
Sync edge to start of active picture	2.586 µs +80 ns/-0 ns	2.586 µs +80 ns/-0 ns		50% to 50%
Sync amplitude Pos and Neg	300 mV ± 5%	300mV ± 5%		
Tri-level Sync rise and fall time	54 ns ± 20 ns	54 ns ± 20 ns		20% to 80%
Output impedance	75 Ω nominal	75 Ω nominal		
Return loss	DC to 20 MHz > 20 dB	DC to 20 MHz > 20 dB		

Table B.6 Sync Output Specification

Parameter	Value	Condition	Notes
H and V sync. high voltage	>2.5 V	2.2 kΩ	
H and V Sync. low voltage	<0.5 V	2.2 kΩ	

B.1.1.6. SD SDI Digital Video

Table B.7 Digital Video Output Connectors

Item	Specification
Safety status	SELV
Connector type	BNC, female, 75 Ω
Connector designation	SDI 1 SDI 2 SDI 3
Output standard (USA)	ANSI/SMPTE 259M
SDI output level	800 mV pk-pk nominal ±10%
Jitter performance, nominal	SMPTE Recommended Practices RP 192 –1996 Jitter Measurement Procedures in Bit-Serial Digital Interfaces

B.1.1.7. HD SDI Digital Video

Table B.8 Digital Video Output Connectors

Item	Specification
Safety status	SELV
Connector type	BNC, female, 75 Ω
Connector designation	HD SDI 1 HD SDI 2 HD SDI 3
Output standard (USA)	ANSI/SMPTE 292M
SDI output level	800 mV pk-pk nominal ±10%
Jitter performance, nominal	SMPTE Recommended Practices RP 192 –1996 Jitter Measurement Procedures in Bit-Serial Digital Interfaces

B.1.1.8. 3G SDI Digital Video

Table B.9 Digital Video Output Connectors

Item	Specification
Safety status	SELV
Connector type	BNC, female, 75 Ω
Connector designation	3G SDI 1 3G SDI 2 3G SDI 3
Output standard (USA)	ANSI/SMPTE 424M
SDI output level	800 mV pk-pk nominal ±10%
Jitter performance, nominal	SMPTE Recommended Practices RP 192 –1996 Jitter Measurement Procedures in Bit-Serial Digital Interfaces

B.1.2. Audio Decoding and Output Stage

B.1.2.1. General

The RX8000 Integrated Receiver/Decoder is capable of simultaneously decoding at least two PES streams of audio from the Transport Stream. Each of the decoders are identical in operation but act independently of the other.

Each channel supports extraction of the following types of coded audio from the Transport Stream as follows:

- MPEG-1, Layer 2 Audio (Musicam): ISO/IEC 13818-3
- Dolby Digital AC-3 Audio: ATSC document A/52
- AAC Audio
- HE-AAC Audio
- Linear Audio
- Dolby E pass-thru
- Enhanced Dolby Digital pass-thru

Audio component selection is automatic or may be specified from the User Interface or remote interfaces. The RX8000 Integrated Receiver/Decoder automatically detects the audio type of the selected audio component and applies the appropriate algorithm. Audio component selection is based on the position of the component descriptor in the PMT. Audio 1 takes the first component and Audio 2 the second. These may be overridden by selecting User-specified component PIDs.

B.1.2.2. MPEG Audio

The RX8000 Integrated Receiver/Decoder supports decoding of MPEG audio as follows:

- Compression layers: MPEG-1 layers I and II
- Sampling rate: 48 kHz
- Maximum compressed data rate: 384 kbps (layer II)

B.1.2.3. Dolby Digital AC-3 Audio

The RX8000 Integrated Receiver/Decoder is able to decode and output the primary stereo pair of a Dolby Digital AC-3 encoded audio stream. When there is data encoded on the audio surround channels, the Decoder applies downmixing, so that either a surround encoded stereo pair (LtRt downmix) or a conventional stereo pair (LoRo downmix) is available at the output.

The RX8000 Integrated Receiver/Decoder is able to decode and output all 5.1 channels individually as separate channels:

- Sampling rate: 48 kHz
- Maximum compressed data rate: 640 kbps

NOTE: Support for Dolby Digital decoding requires approval and licensing from Dolby.

B.1.2.4. AAC Audio

The receiver is capable of decoding and outputting as per specifications:

- For MPEG-2 AAC Audio ISO/IEC 13818-7
- For MPEG-4 AAC Audio ISO/IEC 14496-3

B.1.2.5. Linear Audio

The receiver is capable of pass-thru of linear (LPCM) audio and output via the AES3 digital output.

The receiver supports sample resolutions of 16, 20 or 24 bits.

B.1.2.6. Audio Output General

The RX8000 Integrated Receiver/Decoder provides an independent stereo pair output for each audio channel. Analogue audio is always output and the following digital audio formats can be chosen from the User Interface and remote control interfaces:

- AES3 format

B.1.2.7. Analogue Audio

The RX8000 Integrated Receiver/Decoder supports level control of the audio outputs. Independent control of each output of each stereo pair is provided via the User Interface and remote interfaces.

Table B.10 Analogue Audio Performance Specifications

Parameter	Specification
Safety status	SELV
Output connector	Male 9 pin D-sub
Output format	Balanced
Nominal output level	0 dBu +/- 0.1 dB in 20 kΩ Output impedance: <20 kΩ
Clipping level	12 dBFS – 24 dBFS (step size 1 dB)

Parameter	Specification
Frequency response 48 kHz	+/- 0.65 dB (< 25 Hz) +/- 0.5 dB (25 Hz – 16 kHz) +/- 0.65 dB (16 kHz – 20 kHz)
THD+N at 8dB 100 Hz 1 kHz	 <-70 dB <-70 dB
Cross-talk @ 0dB 100 Hz 1 kHz 6.3 kHz 10 kHz	 <-70 dB <-70 dB <-70 dB <-70 dB
Noise unweighted	<66 dB
Noise A-weighted	<62 dB
Linearity @ 1 kHz +10 dB -10 dB - 20 dB -30 dB -40 dB	 +/- 0.2 dB +/- 0.2 dB +/- 0.2 dB +/- 0.2 dB +/- 0.3 dB
Phase @ 0 dB (40 Hz – 15 kHz)	+/- 2 degrees

B.1.2.8. Audio Routing

The RX8000 Integrated Receiver/Decoder supports the following routing of audio signals:

- STEREO (Channel 1 left, Channel 2 right).
- MIXED TO BOTH (Channel 1 and 2 on left and right).
- LEFT TO BOTH (Channel 1 on left and right).
- RIGHT TO BOTH (Channel 2 on left and right).

When the input signal is STEREO, the Audio digital output format will always be STEREO.

Where a dual mono service is available, it is possible to configure the output as MIXED TO BOTH, LEFT TO BOTH and RIGHT TO BOTH.

B.1.2.9. Lip Sync

The audio at the output remains synchronous to the decoded video by default (i.e. where both video and audio streams are available from the same service). In such circumstances the video and audio streams share the same PCR.

The lip sync error (delay from presentation of video until presentation of audio) introduced by the Receiver is in the range of ±5 ms.

The lip sync delay between different stereo pairs is ±2 ms because the PTS will be presented independently for each pair.

B.1.2.10. Supported Audio Specifications

Table B.11 Supported Audio Specifications

Specification	Description
ISO/IEC 13818	Generic Coding of Moving Pictures and Associated Information: (MPEG-2) Audio.
ATSC A-52	Digital Audio Compression Standard (Dolby Digital).
SMPTE302M	Linear Audio

B.1.2.11. Supported Audio Bit Rates

Table B.12 Supported Audio Data Bit Rates (MPEG-2)

Mono (kbps)	Stereo (kbps)
32	64
48	96
56	112
64	128
80	160
96	192
112	224
128	256
160	320
192	384

B.1.2.12. Digital Audio Outputs

Digital audio outputs comply with E1A-4221 and have a maximum data rate of 3.072 Mbps.

Digital audio is output on two 9-way, D-type and four BNC connectors

.

B.1.3. Audio Alignment Levels

In broadcasting a signal coding level is recommended so that digital/analog audio signals can easily be exchanged between equipment. Two recommendations are applicable:

- **SMPTE RP155 Reference Level for Digital Audio Systems**. For professional equipment the SMPTE Alignment Level specifies that a digital signal level of -20 dBFS will equal an analogue signal level of +4 dBu.
- **EBU Technical Recommendation R68-2000**. For professional equipment the EBU Alignment Level specifies that a digital signal level of -18 dBFS will equal an analogue signal level of 0 dBu.

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[1] EIA-422-A-1978: Electrical characteristics of balanced voltage digital interface circuits.

B.1.3.1. RX8000 Audio Alignment Levels

The audio Alignment Levels on the RX8000 are configured according to SMPTE RP155. That is, with the audio Gain and analogue Clipping Level at their default values, a digital audio source at -20 dBFS (SMPTE Alignment Level) decoded on the RX8000 will produce an AES output level of 0 dB(VU) and an analogue output level of +4 dBu.

Table B.13 Alignment Levels on RX8000 in its Default State (Satisfies SMPTE RP155)

Input Digital dBFS	Gain dB	Clipping Level dB	Output AES dB(VU)	Output Analogue dBu
-20	0	20	0	+4
-18	0	20	+2	+6

Where it is desired that the output levels of the RX8000 satisfy EBU Alignment Levels then the Gain and/or Clipping Level can be adjusted to achieve this.

Table B.14 Alignment Levels on RX8000 Adjusted to Satisfy EBU R68-2000

Input Digital dBFS	Gain dB	Clipping Level dB	Output AES dB(VU)	Output Analogue dBu
-18	-6	20	-4	0

B.1.1.1 Supported Audio Specifications

Table B.15 Supported Audio Specifications

Specification	Description
ISO/IEC 13818	Generic Coding of Moving Pictures and Associated Information: (MPEG-2) Audio.
ATSC A-52	Digital Audio Compression Standard (Dolby Digital).
SMPTE302M	Linear Audio

B.1.3.2. Supported Audio Bit Rates

Table B.16 Supported Audio Data Bit Rates (MPEG-2)

Mono kbps	Stereo kbps
32	64
48	96
56	112
64	128
80	160
96	192
112	224
128	256
160	320
192	384

B.1.3.3. Digital Audio Outputs

Digital audio outputs comply with E1A-422[2] and have a maximum data rate of 3.072 Mbps.

Digital audio is output on two 9-way, D-type connectors.

Audio output is balanced 2 – 7 Volts.

B.1.4. Ethernet Control Connector

Table B.17 Ethernet Control Connector Specification

Item	Specification
Safety status	SELV
Connector type	8-way, RJ-45
Connector designation	ETHERNET or CONTROL

B.1.5. RS-232/RS-485 Remote Control Connector

Table B.18 RS-232/RS-485 Remote Control Connector Specification

Item	Specification
Safety status	SELV
Connector type	9-way, D-type male
Connector designation	REMOTE
Standards	EIA RS-232C / RS-485

B.2. Input Specifications

B.2.1. DVB-S2 Satellite Receivers

B.2.1.1. General

Table B.19 DVB-S2 Satellite Receiver Input Specification

Parameter	Specification
L-band input	
Safety status	TNV - 1
Number of inputs	4 (RX83XX/HWO/DVBS2 or RX8200/HWO/DVBS2)
Input connector type	F-type, female 75 Ω
Input impedance	75 Ω
Return loss	> 11 dB
Isolation between inputs	> 60 dB, typically 70 dB

[2] EIA-422-A-1978: Electrical characteristics of balanced voltage digital interface circuits.

Parameter	Specification
L-band frequency	
Tuning range[3]	Fc = 950 to 2150 MHz
Tuning step	1 kHz
Carrier frequency search range	± 1 to ± 5 MHz
Receive spectrum sense	Normal and inverted
L-band power	
Input power level per carrier	-65 to –25 dBm
Total L-band input power	< -10 dBm
Oscillator power at the L-band input	< -65 dBm, 950 < Fosc < 2150 MHz
DVB-S modulation (EN 300 421)	
Modulation	QPSK
Convolutional FEC rates	1/2, 2/3, 3/4, 5/6, 7/8
Symbol rate range	Rs = 1.0 to 45.0 MSymbol/s
Symbol rate step	1 Symbol/s
Symbol rate lock range	± 100 ppm
Eb/No ratio	See Table B.20
DVB-S2 modulation (EN 302 307)	
DVB-S2 mode	Broadcast services
Modulation	QPSK, 8PSK
QPSK LDPC FEC rates	1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9. 9/10
8PSK, LDPC FEC rates	3/5, 2/3, 3/4, 5/6, 8/9, 9/10
LDPC FEC frame length	Normal
Pilot tones	Automatic detection
Symbol rate range	Rs = 5 to 31 MSymbol/s, 1 Msymbol/s min with RX8200/SWO/LSYM
Symbol rate step	1 Symbol/s
Symbol rate lock range	± 100 ppm
Maximum channel bit rate	90 Mbps
Maximum user bit rate	81 Mbps
Es/No (C/No) ratio	See Table B.21
Miscellaneous	
DVB-S phase noise tolerance[4]	SSB phase-noise power spectral density < -68 – 10*log(Rs/20) dBc/Hz at δF = 10 kHz offset Phase noise power spectral density of the form C – 20*Log(δF) δF = Frequency offset from carrier Rs = Symbol-rate (Msymbol/s)

[3] The displayed frequency is either L-band or SHF dependent on the LNB frequency and the SHF carrier frequency set in the satellite receiver input menu.
[4] These specifications apply in the presence of thermal noise at the threshold Eb/N_0 ratio given in *Table* B.20

Parameter	Specification
DVB-S2 phase noise tolerance[5]	-25 dBc/Hz at δF = 100 Hz -50 dBc/Hz at δF = 1 kHz -73 dBc/Hz at δF = 10 kHz -93 dBc/Hz at δF = 100 kHz -103 dBc/Hz at δF = 1 MHz -114 dBc/Hz at δF > 10 MHz
LNB power and control	See Table B.22

Table B.20 shows the Eb/No requirements for DVB-S and *Table B.21* for DVB-S2 Es/No requirements to ensure error-free demodulation for all supported FEC rates.

Table B.20 DVB-S2 Satellite Input – DVB-S Eb/No Ratio

Convolutional FEC Rate	Eb/No Ratio (dB) in IF Loop for correct MPEG-2 system operation
1/2	4.5
2/3	5.0
3/4	5.5
5/6	6.0
7/8	6.4

Eb/No ratio is referred to user bit rate Ru188. See EN 300 421 specification. For more detailed specification information and advice on performance in specific applications, please contact MediaKind Customer Services.

Table B.21 DVB-S2 Satellite Input – DVB-S2 Es/No Ratio

LDPC FEC Rate	DVB-S2 Theoretical[6] Es/No Ratio (dB) in perfect linear channel for correct MPEG-2 system operation
1/2 QPSK	1.00
3/5 QPSK	2.23
2/3 QPSK	3.10
3/4 QPSK	4.03
4/5 QPSK	4.68
5/6 QPSK	5.18
8/9 QPSK	6.20
9/10 QPSK	6.42
3/5 8PSK	5.50
2/3 8PSK	6.62
3/4 8PSK	7.91
5/6 8PSK	9.35
8/9 8PSK	10.69
9/10 8PSK	10.98

For more detailed specification information and advice on performance in specific applications, please contact MediaKind Customer Services.

[5] These specifications apply in the presence of thermal noise at the threshold Es/No ratio given in *Table B.21* and assume a degradation to the thermal noise performance of 0.3 dB.
[6] Add 0.2 dB (0.4 dB for FEC 3/5) to any system calculation for modulator – demodulator implementation margin

B.2.1.2. LNB Power and Control

The RX8000 Integrated Receiver/Decoder provides LNB power and control signals through the active RF input connector. LNB power and controls are enabled through the Satellite Input Menu.

The RX8000 Integrated Receiver/Decoder supports voltage controlled LNBs only. The LNB power circuit provides automatic protection against short circuits in the LNB or its cable. When the short circuit has been removed recovery is automatic. Switchable boost of the LNB voltage to allow for losses in long cables and control of 22 kHz tone insertion are provided. The LNB power characteristics comply with IEC 1319-1 and are as per *Table B.22.*

Table B.22 LNB Power and Control

Parameter	Specification	
	Voltage V (nominal)	**Receiver Polarisation**[7]
Voltage	13 18	Vertical/circular right Horizontal/circular left
Current	350 mA maximum	
LNB control	22 ± 2 kHz tone	
Tone amplitude	0.65 ±0.2 Vp-p	

B.2.2. DVB-S2X Satellite Receivers

B.2.2.1. General

Table B.23 DVB-S2X Satellite Receiver Input Specification

Parameter	Specification
L-band input	
Safety status	TNV - 1
Number of inputs	4 (RX8200/HWO/DVBS2X/A)
Input connector type	F-type, female 75 Ω
Input impedance	75 Ω
Return loss	> 10 dB
Isolation between inputs	> 60 dB, typically 70 dB
LO leakage	< -80 dBm
L-band frequency	
Tuning range8	Fc = 950 to 2150 MHz
Tuning step	1 kHz
Carrier frequency search range	± 1 to ± 5 MHz
Receive spectrum sense	Normal and inverted
Signal Level	-65 to -25 dBm @ 1 MSymbol/s -55 to -25 dBm @ 10 MSymbol/s -48 to -25 dBm @ 45 MSymbol/s

[7] Receive Polarisation: As specified in ETS 300 784 Satellite Earth Station and Systems (SES); Television Receive-only (TVRO) earth stations operating in the 11/12 GHz frequency bands.

Parameter	Specification
Total L-band input power	< -10 dBm
Oscillator power at the L-band input	< -65 dBm, 950 < Fosc < 2150 MHz
Modulation	QPSK, 8PSK, 16QAM
QPSK convolutional FEC rates	1/2, 2/3, 3/4, 5/6, 6/7, 7/8
8PSK convolutional FEC rates	2/3, 5/6, 8/9
16QAM convolutional FEC rates	3/4, 7/8
Roll-off	25%, 35%
Symbol rate range	Rs = 1.0 to 45.0 MSymbol/s
Symbol rate step	1 Symbol/s
Symbol rate lock range	± 100 ppm
DVB-S2 modulation (EN 302 307-1)	
DVB-S2 mode	Broadcast services
Modulation	QPSK, 8PSK, 16APSK, 32APSK
QPSK LDPC FEC rates	1/2, 1/3, 1/4, 2/3, 3/4, 2/5, 3/5, 4/5, 5/6, 8/9, 9/10
8PSK, LDPC FEC rates	2/3, 3/4, 3/5, 5/6, 8/9, 9/10
16APSK, LDPC FEC rates	2/3, 3/4, 4/5, 5/6, 8/9, 9/10
32APSK, LDPC FEC rates	3/4, 4/5, 5/6, 8/9, 9/10
LDPC FEC frame length	Automatic detection
Pilot tones	Automatic detection
Roll-Off	25%, 35%, 20%, Auto detection
Symbol rate range	Rs = 1 to 54 MSymbol/s
Symbol rate step	1 Symbol/s
Symbol rate lock range	± 100 ppm
DVB-S2X mode	Broadcast services
Modulation	QPSK, 8PSK, 8PSK-L, 16APSK, 16APSK-L, 32APSK, 32ASPK-L
QPSK LDPC FEC rates	4/15, 7/15, 8/15, 9/20, 11/20, 11/45, 13/45, 14/45, 32/45
8PSK LDPC FEC rates	7/15, 8/15, 13/18, 23/36, 25/36, 26/45, 32/45
8APSK-L LDPC FEC rates	5/9, 26/45
16APSK LDPC FEC rates	3/5, 7/9, 7/15, 8/15, 13/18, 23/36, 25/36, 26/45, 28/45, 32/45, 77/90
16APSK-L LDPC FEC rates	1/2, 2/3, 3/5, 5/9, 8/15
32APSK LDPC FEC rates	2/3, 7/9, 11/15, 32/45
32APSK-L LDPC FEC rates	2/3
LDPC FEC frame length	Automatic detection
Pilot tones	Automatic detection
Roll-off	25%, 35%, 20%, 15%, 10%, 5%, auto detection
Symbol rate range	Rs = 1 to 54 MSymbol/s

Parameter	Specification
Symbol rate step	1 Symbol/s
Symbol rate lock range	± 100 ppm
Phase noise SSB (single sideband) for all rates (PL_DRO)	-70 dBc/Hz at δF = 100 Hz < -75 dBc/Hz at δF = 1 kHz < -63 dBc/Hz at δF = 100 Hz < -95 dBc/Hz at δF = 100 kHz δF = Frequency offset from carrier
Phase noise SSB (single sideband) DVB-S2 with pilots on only: QPSK > 10-45 MSymbol/s 8PSK > 10-45 MSymbol/s (free running DRO)	< -35 dBc/Hz at δF = 10 Hz < -63 dBc/Hz at δF = 100 Hz < -85 dBc/Hz at δF = 10 kHz < -90 dBc/Hz at δF = 100 kHz < -90 dBc/Hz at δF = 1 MHz < -96 dBc/Hz at δF = 1 MHz < -108 dBc/Hz at δF = >10 MHz δF = Frequency offset from carrier
Phase noise SSB (single sideband) DVB-DSNG/S: QPSK > 5 MSymbol/s 8PSK > 22 MSymbol/s 16QAM > 6 MSymbol/s (free running DRO)	< -35 dBc/Hz at δF = 10 Hz < -63 dBc/Hz at δF = 100 Hz < -85 dBc/Hz at δF = 10 kHz < -90 dBc/Hz at δF = 100 kHz < -90 dBc/Hz at δF = 1 MHz < -96 dBc/Hz at δF = 1 MHz < -108 dBc/Hz at δF = >10 MHz δF = Frequency offset from carrier
LNB power and control	See Table B.24.

For more detailed specification information and advice on performance in specific applications, please contact MediaKind Customer Services.

B.2.2.2. LNB Power and Control

The RX8000 supports voltage controlled LNBs only. The active input is selectable and can provide DC power and frequency band selection signals compatible with most professional and commercial LNBs. The LNB power is made available on only one of its L-band inputs (F-type connector) and its power characteristics comply with IEC 1319-1 and are as per *Table B.24.*

Table B.24 LNB Power and Control

Parameter	Specification	
	Voltage V (nominal)	**Receiver Polarisation**
Voltage	13 18	Vertical/circular right Horizontal/circular left
Current	350 mA maximum	
LNB control	22 ± 4 kHz tone	

B.2.3. 8-VSB Terrestrial Receivers

Table B.25 8-VSB Receiver Input Specification

Parameter	Specification
RF input	
Safety status	TNV - 1
Number of inputs	1
Input connector type	F-type, female 75 Ω
Input impedance	75 Ω
VSWR	5
Maximum input level	-5 dBm
Minimum input level	-80 dBm
RF Frequency	
Tuning range	Fc = 54 to 863 MHz
Tuning step	1 kHz
LO phase noise	Min 92 dBc/Hz at 100 kHz offset
Channel bandwidth	6 MHz
FEC	2/3 Trellis
Bit rate	19.39 Mbps
Maximum input level	-5 dBm
Minimum input level	-80 dBm

B.2.4. DVB-ASI Input

Table B.26 DVB-ASI Copper

Input	Specification
Safety status	SELV
Connector type	BNC, female
Input impedance	75 Ω
Data rate range	0.350 - 210 Mbps
Error decoding	None

B.2.5. 100/1000BaseT Dual NIC Input Receivers

Table B.27 100/1000BaseT IP Dual NIC Input Specifications

Input	Specification
Safety status	SELV
Connector type	8-way, RJ-45
Connector designation	100/1000 BT
Signal type	100/1000BaseT Ethernet (IEEE 802.3/802.3u) full duplex
Data rate	1.5 – 216 Mbps
TS	CBR MPTS/SPTS feeds
Error correction	ProMPEG FEC

B.2.6. G.703 (E3 and DS3) Input Receivers

Table B.28 G.703 Input Specifications

Input	Specification
Safety status	SELV
Connector type	BNC, female
Input impedance	75 Ω
Data rate	E3: 34 Mbps DS3: 45 Mbps
Network type	PDH
Network specification	CCITT (ITU-T) G.703
Reed-Solomon	On/Off, Not available in 188-packet mode
De-interleaver	On/Off, Not available in 188-packet mode
Status LED	Green: lock, red: no lock

B.2.7. DVB-T2 Input Receivers

Table B.29 DVB-T2 Input Specifications

Input	Specification
Safety status	SELV
Connector type	F-Type, female
Input impedance	75 Ω
Input MER level	6 – 36 dB
Frequency range	UHF 470 – 862 MHz VHF 174 – 230 MHz
Channel bandwidth	6, 7 and 8 MHz

B.2.8. Frame Sync Connector

The receiver can frame lock to an external video source. The frame information is input as a composite synchronous signal, with or without active video. The user can offset the sync to the video output by ±32,000 pixels, with a resolution of one pixel.

It is possible to connect multiple receivers to the same reference signal. This input requires an external 75 Ω termination.

Table B.30 Frame Sync Connector

Item		Specification
Safety status		SELV
Connector type		BNC, female
Connector designation		Frame Sync
Pin:	Centre	Analogue black and burst input
	Shield	Ground/chassis

B.3. Output Specifications

B.3.1. Video Outputs

See:
Table B.3 625 Line
Table B.4 525 Line,
Table B.5 HD Analogue Output Specification
Table B.8 Digital Video Output Connectors

B.3.2. Audio Outputs

See:
Table B.10 Analogue Audio Performance Specifications

B.3.3. Alarm Connector

Table B.31 Relay Alarm Output Specification

Item	Specification
Safety status	SELV
Connector type	9-way, D-type female
Connector designation	ALARM
Contact configuration	SPDT (Change-over) All volt-free contacts, fully isolated.
Contact rating	1 A at 24 V DC 1 A at 50 V AC
Maximum switching current	1 A
Maximum switching voltage	50 V DC / 30 V AC
Maximum switching power	24 W / 60 VA
Minimum switching load	0.1 mA, 100 mV AC

B.3.4. DVB-ASI Output

Table B.32 DVB-ASI Copper

Input	Specification
Safety status	SELV
Connector type	BNC, female
Input impedance	75 Ω
Data rate range	0.350 - 160 Mbps
Error decoding	None

B.3.5. 1000BaseT IP Data

Table B.33 1000BaseT IP Data Specifications

Input	Specification
Safety status	SELV
Connector type	8-way, RJ-45
Connector designation	IP DATA
Signal type	100/1000BaseT Ethernet (IEEE 802.3/802.3u)

B.3.6. RS-232 Asynchronous (Low-speed) Data

Table B.34 RS-232 Asynchronous (Low-speed) Data Output Specification

Item	Specification
Safety status	SELV
Connector type	9-way, D-type female
Connector designation	DATA OUT
Data rates (bit/s)	1200; 2400; 4800; 9600; 19 200; 38 400
Standards	EIA RS-232C / ITU-T BT. V.24/V.28
Line length	< 15 meters

B.4. Bi-directional Specifications

B.4.1. Small Form Factor (SFF) IP Bi-directional Card

The Small Form Factor (SFF) Bi-Directional IP card is designed as a direct replacement for the Dual Gigabit IP Transport Stream Output card and the Gigabyte 100/1000BaseT IP Input cards. The SFF IP card cannot be fitted alongside any other IP input cards.

Table B.35 IP Bi-directional Card Specifications

Item	Specification
Safety status	SELV
Connector type	8-way, RJ-45
Connector designation	100/1000 BT
Signal type	100/1000BaseT Ethernet (IEEE 802.3/802.3u) Full Duplex mode
Data rate	1.5 – 216 Mbps
TS	CBR MPTS/SPTS feeds
Error correction	ProMPEG FEC

B.5. Environmental

B.5.1. Conditions

Table B.36 Environmental Conditions

Operational	Specification
Temperature	0°C to +50°C ambient air temperature with free air-flow
Humidity	0% to 95% (non-condensing)
Cooling requirements	Convection cooling/free air-flow
Handling movement	Fixed (non-mobile) use only
Storage/transportation	
Temperature	-20°C to +70°C (-4°F to +158°F)
Humidity	0% to 95% (non-condensing)

C. Alarm Identifiers

Contents

List of Tables

C.1. Introduction

This section lists the fixed Alarm Identifiers used when the Alarm Mode is configured to **Compatibility Mode**.

C.1.1. Alarm Modes

C.1.1.1. Dynamic Mode

The dynamic mode alarm functionality utilizes the next available incrementing identifier assigned at start-up. These identifiers will change depending on the cards detected in the unit configuration.

C.1.1.2. Compatibility Mode

The compatibility mode setting uses pre-defined identifiers assigned at startup. This in-turn allows the identifier of different units to be tracked through the external control system consistently. These identifiers are listed in the following sections.

C.2. Alarm Identifier Lists

C.2.2. Generic Alarm Identifiers

Table C.1 Generic Alarm Identifiers

Name	Identifier	Description
No TS Lock	1000	No valid transport stream is available on selected input
No Primary Input Lock	1001	Primary TS input failure
No Secondary Input Lock	1002	Secondary TS input failure
Primary Input Failed And Switched	1003	Input Redundancy Mode is enabled and the current input is not the Primary Input.
TS Monitor CC Error Threshold	1004	TS Monitor is enabled and the PIDs of the selected services in the incoming transport stream are exhibiting continuity count errors above the configured threshold
TS Monitor Missing PID	1005	TS Monitor is enabled and one or more PIDs of the selected services have not been detected within the configured period

C.2.3. Decode Alarm Identifiers

Table C.2 Decode Alarm Identifiers

Name	Identifier	Description
Video Not Running	1010	Video decode is not in the running state
Audio 1 Not Running	1011	Audio instance 1 is not in the running state
Audio 2 Not Running	1012	Audio instance 2 is not in the running state
Audio 3 Not Running	1013	Audio instance 3 is not in the running state
Audio 4 Not Running	1014	Audio instance 4 is not in the running state
Audio 5 Not Running	1015	Audio instance 5 is not in the running state
Audio 6 Not Running	1016	Audio instance 6 is not in the running state
Unsupported Input Resolution Detected	1017	Video decoder does not support the current video resolution
Base decoder failure	1018	Base video or audio decoder had failed and was reset by a watchdog
Audio DSP Boot EEPROM Failed	1019	Audio DSP has not booted
Audio 7 Not Running	1087	Audio instance 7 is not in the running state
Audio 8 Not Running	1088	Audio instance 8 is not in the running state
Audio 9 Not Running	1089	Audio instance 9 is not in the running state
Audio 10 Not Running	1090	Audio instance 10 is not in the running state
Audio 11 Not Running	1091	Not Used
Audio 12 Not Running	1092	Not Used

C.2.4. CA Alarm Identifiers

Table C.3 CA Alarm Identifiers

Name	Identifier	Description
CA Error	1020	Overall CA error
Authorization Error	1021	Director not authorized
NDS Error	1022	NDS CA error

C.2.5. Network Alarm Identifiers

Table C.4 Network Alarm Identifiers

Name	Identifier	Description
SNTP Sync Error	1029	No SNTP sync achieved

C.2.6. Environment Alarm Identifiers

Table C.5 Environment Alarm Identifiers

Name	Identifier	Description
OverTemperature	1030	Over temperature threshold
FAN 1 Failed	1031	FAN 1 Failure
FAN 2 Failed	1032	FAN 2 Failure
FAN 3 Failed	1033	FAN 3 Failure
FAN 4 Failed	1034	FAN 4 Failure

C.2.7. Subtitle and Caption Alarm Identifiers

Table C.6 Closed Caption Alarm Identifiers

Name	Identifier	Description
Closed Caption Fail	1040	Closed captions output failure
Subtitles Failed	1041	DVB or Teletext Subtitle renderer is Out Of Memory or Scaling DVB or Teletext Subtitles are too big to fit in to the display safe area

C.2.8. IP Output Alarm Identifiers

Table C.7 IP Output Alarm Identifiers

Name	Identifier	Description
IPO Ethernet If 1 Down	1050	Link down on IP output port 1
IPO Ethernet If 2 Down	1051	Link down on IP output port 2
IPO Ethernet IF 1 & 2 Down	1052	Both links down
IPO MGP Error	1053	MGP protocol error
IPO MGP Duplicate	1054	Potential duplicate stream detected
No CSMs received	1055	Not receiving redundancy CSM messages on control port

C.2.9. Service Split Alarm Identifiers

Table C.8 Service Split Alarm Identifiers

Name	Identifier	Description
Filter Output Overflow	1060	Service filter output bit rate is not high enough for the data rate. Packet drop detected.
Service Split Overrate	1061	Service output bit rate is not high enough for the data rate.
MSF Invalid Operation	1062	Invalid configuration of the Multi-Service Filter via SNMP such as the case where the Single Filter Service Slaved to Decode option is enabled.
MSF Overrate Protection Limit	1063	Packet buffer is nearly full and the output rate has been raised to 200 Mbps. This only occurs when the Buffer Overrate Protection mode is enabled.
High TS Output Buffer	1064	Service Filter buffer is high and has exceeded 85% full.
Bit rate Search ACTIVE	1065	The search minimum bit rate function is active and will affect the output bit rate on a live system.

C.2.10. Down Conversion Alarm Identifiers

Table C.9 Down Conversion Alarm Identifiers

Name	Identifier	Description
Down-converter FW Error	1070	Failure on the High Quality down-conversion option card
Unsupported Video Format	1071	The output video resolution is not supported by High Quality down-conversion option card
SDI Output One Setting Mismatch	1072	Outgoing video standard is not compatible with the SDI setting on Output One For example, setting the output to 3G-SDI when outgoing video is SD format
SDI Output Two Setting Mismatch	1073	Outgoing video standard is not compatible with the SDI setting on Output Two
SDI Output Three Setting Mismatch	1074	Outgoing video standard is not compatible with the SDI setting on Output Three
CVBS Output Not Supported	1075	Unsupported frame rate on the CVBS output i.e. 30 Hz and 60 Hz

C.2.11. Miscellaneous Input Alarm Identifiers

Table C.10 Miscellaneous Input Alarm Identifiers

Name	Identifier	Description
SNR	1080	Signal/Noise Ratio below threshold on ATSC 8VSB input
C/N Margin	1081	Carriage/noise margin below threshold on DVB-S2 Satellite input
G.703 Input Option Card Alarm	1082	General alarm from G.703 input
DVB-T2 Temperature	1083	Over temperature
DVB-T2 Software Error	1084	General error
DVB-T2 MER	1085	MER threshold
DVB-T2 BER	1086	BER threshold
DVB-T2 Power	1093	Diagnostics
Frame Sync Out of Sync	1094	Frame Sync is enabled but is not synchronized with the current video frame rate or no signal is detected on the Frame Sync input.

C.2.12. IP Input Alarm Identifiers

Table C.11 IP Input Alarm Identifiers

Name	Identifier	Description
IPI Ethernet If 1 Down	1100	Link down on port 1
IPI Ethernet If 1 No Data	1101	No data being received on port 1
IPI Ethernet If 1 IP Conflict	1102	Assigned IP address conflicts with other equipment on network
IPI Ethernet If 2 Down	1103	Link down on port 2
IPI Ethernet If 2 No Data	1104	No data being received on port 2
IPI Ethernet If 2 IP Conflict	1105	Assigned IP address conflicts with other equipment on network
IPI Ethernet If 1 and 2 Down	1106	Link down on both port 1 and 2
IPI Ethernet If 1 and 2 No Data	1107	Data data is being received on both port 1 and 2
Port 1 net util	1108	Network utilization is above threshold
Port 2 net util	1109	Network utilization is above threshold
MDI delay factor	1110	The delay factor is greater than set value
MDI loss rate	1111	The loss rate is above set value
Out of sync	1112	The card has failed to lock to a valid TS
No response	1113	No response on link
Wrong FEC format	1114	Wrong FEC format
FIFO overflow	1115	FIFO overflowed
Primary interface not in use	1116	If redundancy switch to secondary has occurred
Primary TS not in use	1117	If redundancy switch to secondary TS has occurred
All TSs missing at all input IFs	1118	If no multicast is available

C.2.13. Seamless Protection Switching Alarm Identifiers

Table C.12 Seamless Protection Switching Alarm Identifiers

Name	Identifier	Description
Seamless Switching sync failure	1150	If seamless switching mode fails to sync between the two input streams when Seamless Protection mode is enabled
RTP Packet Drop Ratio 1	1151	The ratio of RTP Packet sequence numbers missing over the number of RTP Packets entering the Seamless Protection block on interface Port 1 has exceeded the user defined alarm threshold. The ratio is continuously evaluated over the preceding 30 seconds.
RTP Packet Drop Ratio 2	1152	The ratio of RTP Packet sequence numbers missing over the number of RTP Packets entering the Seamless Protection block on interface Port 2 has exceeded the user defined alarm threshold. The ratio is continuously evaluated over the preceding 30 seconds.
Seamless Switching Excess Skew	1153	When Seamless Protection mode is enabled and thus the measured skew between interface Port 1 and Port 2 has exceed the user defined alarm threshold The skew is continuously evaluated over the preceding 30 seconds.

C.2.14. 4:2:2 Decoder Card Alarm Identifiers

Table C.13 4:2:2 Decoder Card Alarm Identifiers

Name	Identifier	Description
TS not locked on 422 card	1400	The 4:2:2 Decoder card does not detect an incoming Transport Stream for decode. Not supported by the MPEG-2 4:2:2 Decoder Card (First Generation).
Decoder not ready on 422 card	1401	The 4:2:2 Decoder is in a reset state and currently not ready for video decode. Not supported by the MPEG-2 4:2:2 Decoder Card (First Generation).
Decoder error on 422 card	1402	Decoding errors detected by the 4:2:2 Decoder card. Not supported by the MPEG-2 4:2:2 Decoder Card (First Generation).
Code version error on 422 card	1403	Activated when the code version loaded on the 4:2:2 Decoder Option card is not compatible with the motherboard code version. As of motherboard code version 7.14.0 onwards, the minimum supported code version for the Third Generation 4:2:2 Decoder Option card is 3.0.
Decoder not locked to system clock on 422 card	1404	Alarm to indicate when the decoder 422 card is free running i.e. Not locked to the system clock.

C.2.15. DVB-S2X Input Alarm Identifiers

Table C.14 DVB-S2X Input Alarm Identifiers

Name	Identifier	Description
SAT S2X Invalid License	1408	This alarm is raised if there is a license error reported by the DVB-S2X card or the modulation standard of the locked signal is not licensed.
SAT S2X Self-Test Fail	1409	After power-on or reset, the DVB-S2X card performs an internal self-test. If this self-test fails it will trigger this alarm.
SAT S2X No Input Detected	1410	This alarm is raised if any one of the input related alarms on the DVB-S2X card is raised.
SAT S2X Over Temperature	1411	This alarm is raised if the internal temperature of the DVB-S2X card is outside its operating specification.
SAT S2X Upgrade Failed	1412	This alarm is raised when a software upgrade of the DVB-S2X card has failed. The alarm can only be reset by executing a successful software upgrade.
SAT S2X Not Calibrated	1413	This alarm is raised if there is a calibration error on the DVB-S2X card. Optimal performance is not guaranteed.
SAT S2X Undefined Internal Error	1414	This alarm is raised when there an internal error reported by the DVB-S2X card.
SAT S2X Input Level Too High	1415	This alarm is raised when the DVB-S2X card experiences an input level that is too high.
SAT S2X Failed To Acquire PLL	1416	This alarm is raised when DVB-S2X card fails to acquire Physical Layer lock (not applicable for DVB-S).
SAT S2X Failed To Acquire Lock	1417	This alarm is raised when DVB-S2X card fails to acquire lock.
SAT S2X DC Overcurrent	1418	This alarm is raised when a DC overcurrent is detected on the input of the DVB-S2X card.
SAT S2X Core Overloaded	1419	This alarm is raised when the DVB-S2X card decoder core is loaded too high.
SAT S2X Buffer Overflow	1420	This alarm is raised when a buffer mismatch occurs in the DVB-S2X card.