ericsson.com

RX1290 Multi-Format Receiver

Software Version 3.0.0 (and later)

REFERENCE GUIDE

EN/LZT 790 0003/2 R1A

ERICSSON

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Contents

Introduction

This Reference Guide provides instructions and information for the installation and operation of the RX1290 Multi-Format Receiver.

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
1	Jul 2006	1.0.0	Initial release.
2	Oct 2006	1.0.0	Updates to *Annex B Technical Specification* Product name also corrected.
3	Mar 2007	2.0.0	G.703 and IP Options added..
4	Jan 2008	3.0.0	Maintenance release.
5	May 2008	3.0.0	References to New IP Card added.
A	June 2011	3.0.0	Allocation of Ericsson Number Identity and re-brand completion.

Associated Documents

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

Ericsson Document Identity	Original Document Number	Title
1/1424-EN/LZT 790 0003 Uen A	ST.US.E10228	RX1290 User Guide
1424-EN/LZT 790 0003 Uen A	ST.TS.E10288	RX1290 RCP

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Heed Warnings

All warnings on the product and in the operating instructions should be adhered to. The manufacturer cannot 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.

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Europe, Middle East and Africa	Tel:	+44 (0) 23 8048 4455	
	Fax:	+44 (0) 23 8048 4467	
	Email:	tvsupportemea@ericsson.com	
Americas	Tel:	+888 671 1268	US and Canada
	Tel:	+678 812 6255	International
	Fax:	+678 812 6262	
	Email:	tvsupportamericas@ericsson.com	Compression
	Email:	tvsupport@ericsson.com	Software Support Centre
China	Tel:	+86 10 8476 8676	Beijing
	Fax:	+86 10 8476 7741	Beijing
	Tel:	+852 2590 2388	Hong Kong
	Fax:	+852 2590 9550	Hong Kong
	Email:	tvsupportapac@ericsson.com	
Australia and New Zealand	Tel:	+612 (0) 9111 4027	
	Fax:	+612 (0) 9111 4949	
	Email:	tvsupportanz@ericsson.com	
Internet Address	www.ericsson.com		

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

Customer Services and Technical Training Postal Address

Ericsson
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 Ericsson 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.

Technical Publications

If you need to contact Ericsson Technical Publications regarding this publication, e-mail: tvtechpubs@ericsson.com.

Introduction

Chapter 1

Contents

List of Figures

List of Tables

1.1 Scope of This Reference Guide

1.1.1 Who Should Use This Reference Guide

This Reference Guide is written for operators/users of the RX1290 Multi-Format Receiver. It describes the unit's 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 Ericsson television 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 What Equipment is Covered by This Reference Guide

1.1.2.1 The Equipment Models

Ericsson is introducing an improved ordering system for its television products. New part numbers are being introduced to support this new system. The tables below shows the new part numbers used for ordering and supply of the product and its options. The Multi-Format Receiver described in this Reference Guide is the base model.

Figure 1.1 Front View of a RX1290 Multi-Format Receiver

Table 1.1 Equipment Model Descriptions

Marketing Code	Price Object Number	Supply Object Number	Description
RX1290/BAS	FAZ 101 0116/1	KDU 137 642/1	Decoder with integrated Common Interface CAM reader, AC voltage input. SD MPEG-2 4:2:0, SD MPEG-2 4:2:2, HD MPEG-2 4:2:0 video decode only.

Table 1.2 Hardware Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX1290/HWO/DVBS2	FAZ 101 0116/3	ROA 128 3800	DVBS2 I/P SAT DEMOD OPTION
RX1290/HWO/DVBS2/IF/C	FAZ 101 0116/5	ROA 128 3801	DVBS2 I/P SAT DEMOD+CONST O/P
RX1290/HWO/IP/PROFEC	FAZ 101 0116/8	ROA 128 3802	IP, PRO-MPEG INPUT OPTION
RX1290/HWO/G703	FAZ 101 0116/6	ROA 128 3803	G.703 INPUT OPTION CARD
RX1290/HWO/IP/GIGE	FAZ 101 0116/7	ROA 128 3804	100/1000 BASE-T INPUT OPTION

Table 1.3 Software Options

Marketing Code	Price Object Number	Supply Object Number	Description
RX1290/SWO/MPEG2/HD/422	FAZ 101 0116/22	FAT 102 0205	MPEG-2 HD 4:2:2 LICENSE
RX1290/SWO/MPEG4/SD	FAZ 101 0116/24	FAT 102 0206	MPEG-4 SD 4:2:0 LICENSE
RX1290/SWO/MPEG4/HD	FAZ 101 0116/23	FAT 102 0207	MPEG-4 HD 4:2:0 LICENSE
RX1290/SWO/DIR5	FAZ 101 0116/14	FAT 102 0208	DIRECTOR V5 LICENSE
RX1290/SWO/AC3	FAZ 101 0116/11	FAT 102 0209	DOLBY AC3 LICENSE
RX1290/SWO/DVBS2/QPSK	FAZ 101 0116/18	FAT 102 0210	DVB-S2 QPSK LICENSE
RX1290/SWO/DVBS2/8PSK	FAZ 101 0116/16	FAT 102 0211	DVB-S2 8PSK LICENSE
RX1290/SWO/DVBS2/LSYM	FAZ 101 0116/17	FAT 102 0212	DVB-S2 LOW SYMBOL RATE LICENSE
RX1290/SWO/DVBS2/16APSK	FAZ 101 0116/15	FAT 102 0213	DVB-S2 16APSK LICENSE
RX1290/SWO/CI	FAZ 101 0116/12	FAT 102 0214	COMMON INTERFACE LICENSE
RX1290/SWO/RAS	FAZ 101 0116/28	FAT 102 0215	RAS LICENSE
RX1290/SWO/PROV/LOCK	FAZ 101 0116/26	FAT 102 0216	PROVIDER LOCK LICENSE
RX1290/SWO/IP/PROMPEG	FAZ 101 0116/20	FAT 102 0217	PRO-MPEG IP LICENSE
RX1290/SWO/UPCONV	FAZ 101 0116/29	FAT 102 0218	UPCONVERSION LICENSE
RX1290/SWO/DCONV	FAZ 101 0116/13	FAT 102 0219	DOWN CONVERSION LICENSE
RX1290/SWO/AAC	FAZ 101 0116/10	FAT 102 0220	AAC AUDIO LICENSE
RX1290/SWO/PW	FAZ 101 0116/27	FAT 102 0222	PASSWORD PROTECTION LICENSE

Marketing Code	Price Object Number	Supply Object Number	Description
RX1290/SWO/LDELAY	FAZ 101 0116/21	FAT 102 0223	LOW LATENCY DECODE MODE (4:2:0 ONLY)
RX1290/SWO/HSETHER	FAZ 101 0116/19	FAT 102 0224	HIGH SPEED DATA PIPING LICENSE
RX1290/SWO/PAA	FAZ 101 0116/25	FAT 102 0229	QUAD PHASE ALIGNED MPEG-1 LAYER 2 AUDIO
RX1290/SWO/4AUD	FAZ 101 0116/9	FAT 102 0221	DIGITAL AUDIO 3&4 LICENSE
RX1290/SWO/EBU/3.6.2	FAZ 101 0116/34	FAT 102 0227	RX1290 SW 3.6.2 FOR EBU
RX1290/SWO/UPG/MP4SD/MP4H	FAZ 101 0116/31	FAT 102 0225	UPGRADE FROM MPEG4 SD TO HD
RX1290/SWO/UPG/MP2422/MP4H	FAZ 101 0116/30	FAT 102 0226	UPGRADE FROM MPEG-2 HD 4:2:2 TO MPEG-4 HD

1.1.2.2 Software Version

This Reference Guide covers the functions of software **version 3.0.0 and later**.

To verify the installed version access the **Systems Menu** (Menu 7.2.1). The menus are described in *Annex C, Menus.*

1.2 Summary of Features

1.2.1 Main Features

The Multi-Format Receiver is fully compliant with the appropriate sections of the MPEG-2[1], DVB-S[2] and MPEG-4 AVC[3] specifications and offers the following features:

- Front Panel Controls and Indications:
  - A vertical split two line x 40 character back-lit dot matrix LCD display with pushbuttons for Up, Down, Left, Right, Edit, and Save to provide information and operator choice entry.
  - LEDs to indicate lock and general alarm conditions.
- Service Selection:
  - Chosen from a menu list of available Services carried in the currently received Transport Stream.

[1] Moving Pictures Expert Group: MPEG-2 specification ISO 13818.
[2] European Digital Video Broadcasting (DVB) Project. EN 300 421 Digital broadcasting systems for television, sound and data services: Framing structure, channel coding and modulation for the 11/12 GHz satellite service.
[3] ITU-T Recommendation and ISO/IEC 14496-10 (MPEG-4 AVC) Advanced Video Coding.

  - Up to 40 preselected choices can be stored within the unit.

- Multiple Inputs (Satellite Receivers):
  - L-band Satellite Receivers have four inputs.
- Video Decoding:
  - MPEG 4:2:0 mode support.
  - MPEG 4:2:2 mode support (MPEG-2 Only).
- Audio Decoding:
  - Sampling rate 48 kHz.
  - All MPEG-1 data rates.
  - AAC decode.
  - All Dolby Digital AC-3 data rates, decoded as a Dolby Stereo downmix.
  - Dolby E pass-through.
  - Linear uncompressed audio, data rates as defined by SMPTE 302M.
  - DTS audio detection and pass-through.
- Data:
  - Low Speed Data: RS-232 asynchronous (up to 38.4 kbps).
  - High Speed Data: Ethernet Data-piping (up to 5 Mbps) (option).
- Transport Stream Output:
  - ASI Transport Stream output with maximum data rate 160 Mbps.
- Remote Control:
  - SNMP.
  - RS-232 (Alteia protocol).
- Clock/Calendar:
  - Available to coordinate universal and local time.
  - Constantly updated when locked to a valid Transport Stream.
- Transport Stream Demultiplexing:
  - Maximum capability is 160 Mbps, depending on CA in use and input front-end.
- Video Decoding:
  - Maximum Video decoding capability of 90 Mbps.
- Audio:
  - Audio embedding in the digital video output.
- VANC data support:
  - Closed Captions.
  - VITC.
  - ARIB reference spec TR23.
- Frame Synchronization of video output to a composite analogue input.
- Local Control Methods:

- Front Panel User Interface.

1.2.2 Inputs

1.2.2.1 ASI Input (Decoder)

One BNC connector supporting both byte-mode and single packet burst mode.

1.2.2.2 Remote Control

An RJ-45 Ethernet connector for connection to a PC or network switch to provide SNMP control.

1.2.2.3 DVB-S / DVB-S2 L-Band Inputs (Satellite Receivers) (Option)

Four F-type connectors connect the L-band output of a suitable LNB either directly or via a suitable attenuator giving lightning and surge protection.

1.2.2.4 TTV G.703 DS3 and E3 Input (Telco Receivers) (Option)

Equipped with a single BNC connector for receiving signals over a PDH Telco network.

1.2.2.5 IP Input (Telco Receivers) (Option)

A single 10/100/1000BaseT RJ-45 connector for receiving signals over Ethernet

1.2.2.6 Frame Synchronization

A BNC connector accepts a composite video input to which the video output timing can be synchronized.

1.2.3 Outputs

1.2.3.1 Transport Stream Outputs

- Up to three BNC connectors output ASI Transport Streams with a maximum data rate of 160 Mbps, depending on the CA in use and the input card front-end.

1.2.3.2 Video Outputs

- One SVGA HD video output carried on a D-type connector for monitoring only.
- Three digital video outputs carried on BNC connectors (same connectors as ASI).
- One SD Analogue composite video output on BNC.

1.2.3.3 Audio Outputs

- Two 9-way, D-type, male connectors each provide simultaneous analogue stereo and balanced digital audio output. The digital mode can be changed via the user interface.

- Four BNC connectors providing unbalanced audio output.

1.2.3.4 Data Output

- RS-232 asynchronous low-speed data output carried on a 9-way, D-type, female connector.
- RJ-45 high speed data over Ethernet output (option).

1.2.3.5 Alarm Output

A 9-way, D-type connector for interfacing to the alarm and failure monitoring within the Multi-Format Receiver. This includes a summary alarm signal that coincides with the general front-panel **ALARM** LED.

There is one relay for failure monitoring. The operator can define (using the Alarm Menu pages) which alarm conditions drive the relay. This is described in *Chapter 5, Alarms* and *Annex C, Menus*.

1.3 The Satellite Receiver

1.3.1 Typical Satellite System

The Multi-Format Receiver is a component of the MPEG-4 AVC/MPEG-2/DVB compliant range of Ericsson's equipment. They are designed for use by broadcasters and distributors of video, audio and data Services over satellite.

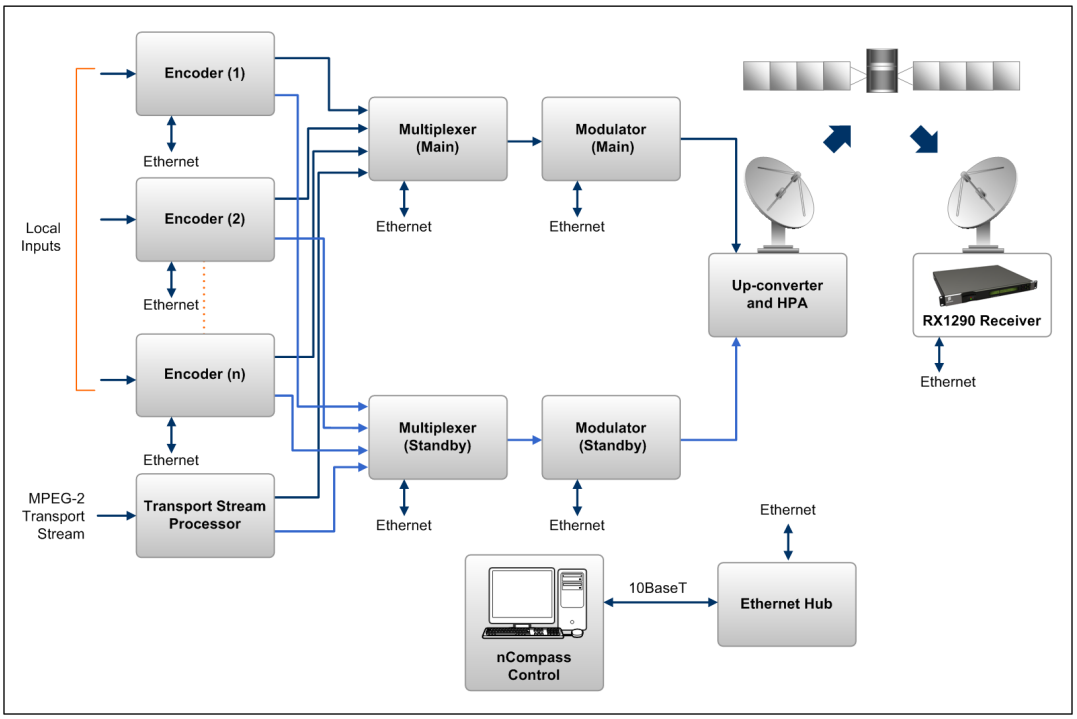

Figure 1.2 Typical Satellite Compression System

1.3.2 Input Connections

The Satellite Receiver interfaces directly to Low-Noise Block (LNB) and accepts an intermediate frequency (IF) input in the band 950 - 2150 MHz (L-band) for operation in the specified symbol-rate range (see *Annex B, Technical Specification*). The unit can provide dc power and polarization switching to the LNB.

1.3.3 What the Satellite Receiver Does

The Receiver can be tuned to a specified satellite channel frequency and polarization. The input is down-converted via a Low-Noise Block (LNB) to provide an L-band input to the Receiver. The front-end tuning is microprocessor controlled with a frequency synthesized local oscillator. A software tuning and acquisition algorithm resolves translation errors (mainly due to the LNB).

The signal is then passed to a demodulator that recovers the signal using soft-decision decoding. The resulting stream is Reed-Solomon decoded and descrambled to provide inputs to the Decoder circuit. The received channel may contain multiple Services, therefore the Receiver's demultiplexer is configured to select a single video Service and other audio/data components and present them at the output.

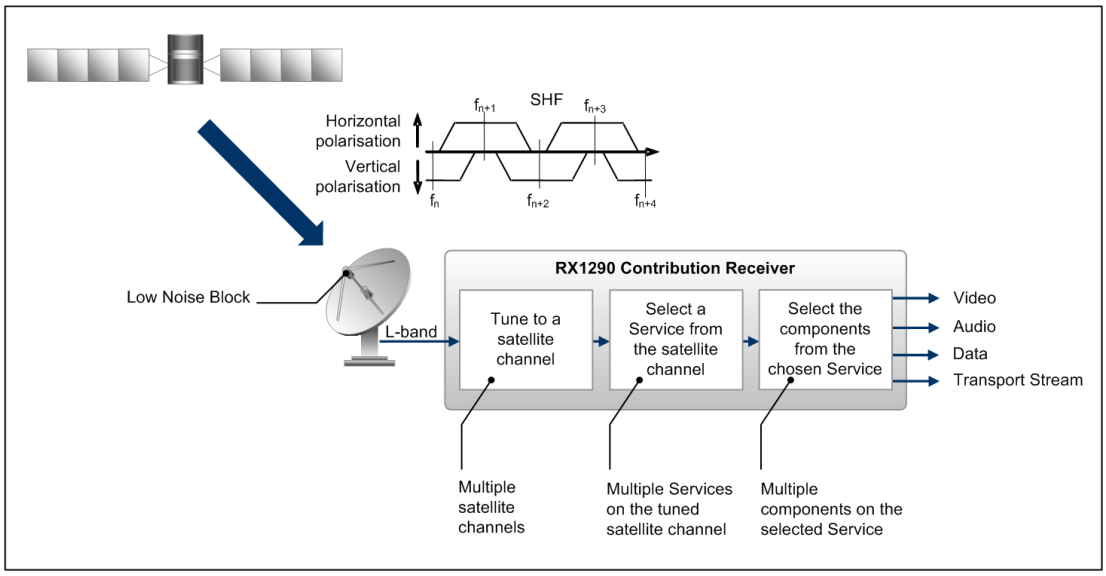

Figure 1.3 What the Satellite Receiver Does

1.4 The Telco Receiver/Decoder

1.4.1 Typical Decoder System

The Decoder is a component of Ericsson's range of equipment. It is designed for use by broadcasters and distributors of video and audio Services. It can be used as a Transport Stream monitor or to decode signals received over a telecommunications network.

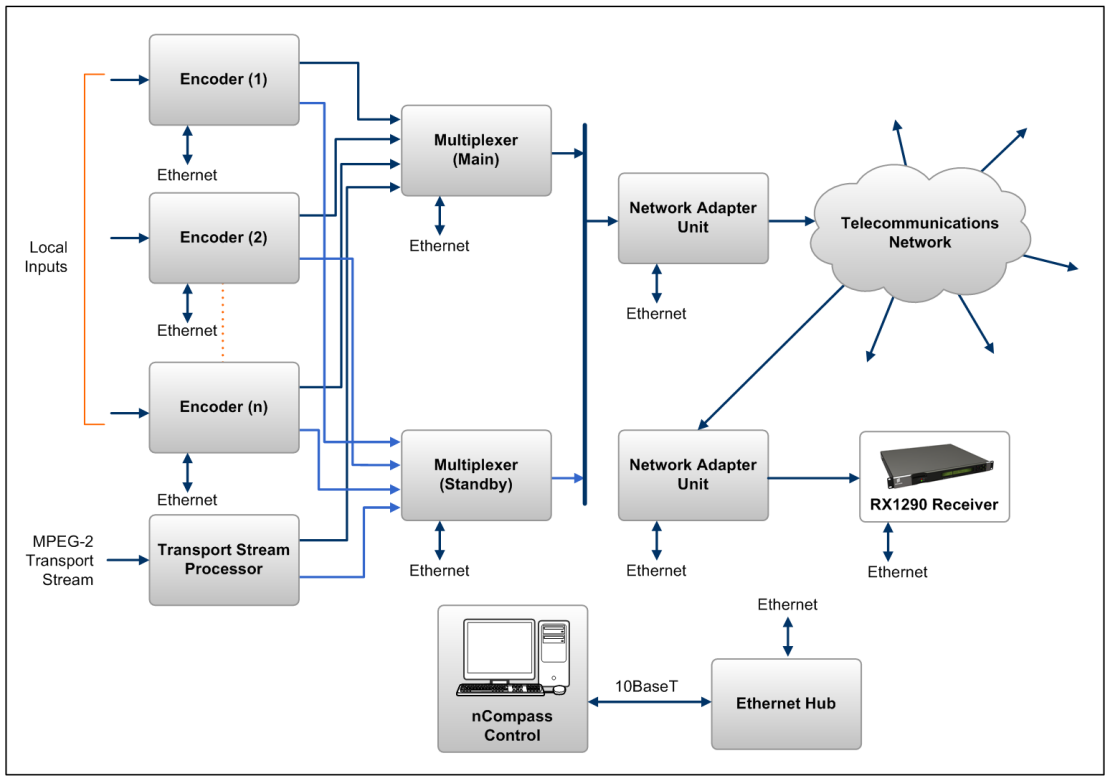

Figure 1.4 Typical Compression System

1.4.2 What the Decoder Does

The ASI interface is used to present the Transport Stream in the format required by the internal Decoder circuitry. At this point, the operation of the unit is the same as the Satellite Receiver.

The Decoder can be used to receive an input signal from a Public Telecom Network via a Network Adapter Unit (NAU). No error correction is supported at the input of the unit so a level of Quality of Service should be negotiated with the Telecom Network Provider.

The Decoder is configured to select a single video Service and other audio/data components from the multiple Services on the incoming Transport Stream and present them at the output.

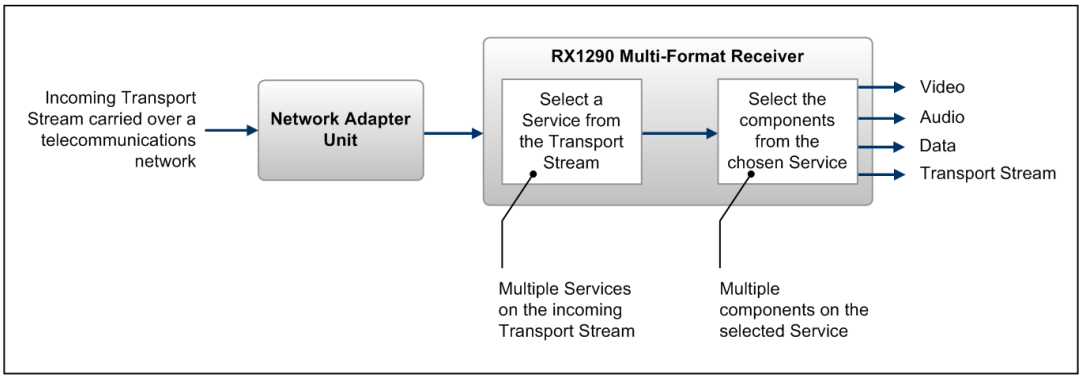

Figure 1.5 Role of the Decoder

1.5 Control Modes

1.5.1 Introduction

The Multi-Format Receiver is designed for unattended operation. Once set-up, the unit requires no further attention except to ensure the fans are working. There are up to three control modes associated with the Receiver (dependent upon options fitted). The unit remains in the chosen control mode until another mode is requested.

Note: Local (Front Panel) Control is the factory default if Director is not installed.

1.5.2 Front Panel (Local) Modes

Operating the Multi-Format Receiver from the Front Panel is via two main operating modes: **Navigate** and **Edit**. See *Section 3.3, Front Panel Operating Modes*.

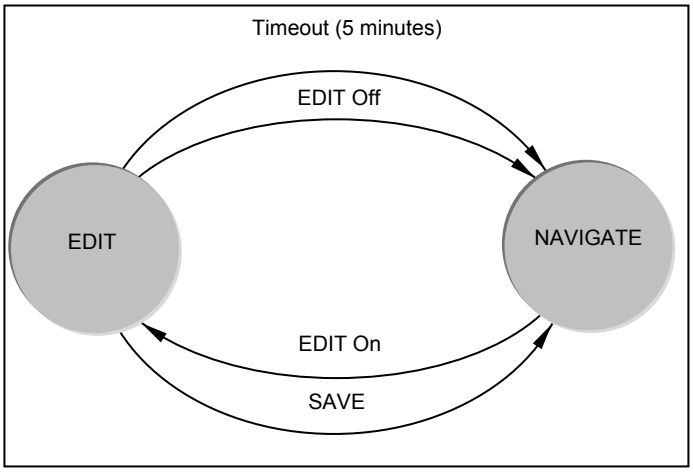

Figure 1.6 Front Panel States

1.6 Guided Tour

1.6.1 Construction

The Multi-Format 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.

1.6.2 Front Panel Controls

The physical interface for the Front Panel consists of an alphanumeric LCD display, pushbuttons, and status LEDs that are used to set-up and monitor the unit. The general layout is shown in *Figure 1.7.* Information on the use of these controls is given in *Chapter 3, Operating the Equipment Locally.*

User input is via six pushbuttons comprising four cursor pushbuttons: **Left**, **Right**, **Up**, and **Down**; and two edit control pushbuttons: **Edit** and **Save**.

Each pushbutton has an integral green LED except **Save**, which has an integral red LED. When lit these LEDs indicate to the user which pushbutton is currently active.

Automatic repeat following an initial delay period is implemented for the **Left**, **Right**, **Up**, and **Down** pushbuttons in software.

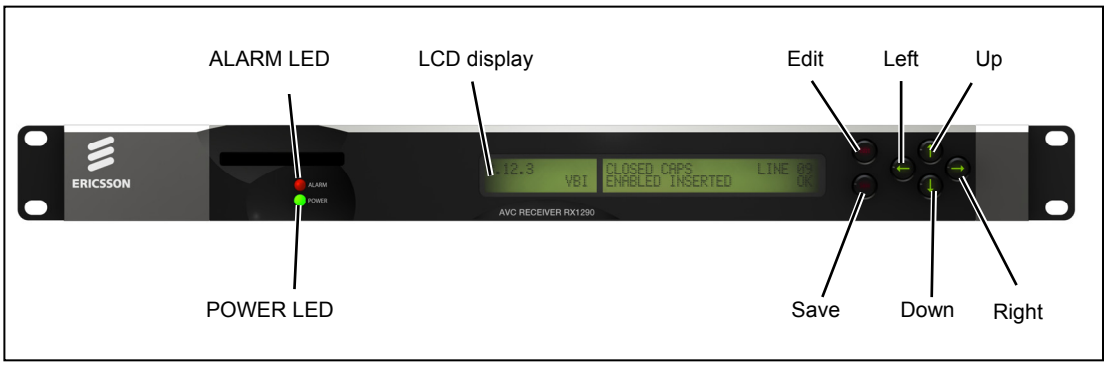

Figure 1.7 Front Panel Controls

1.6.3 Front Panel LEDs

Figure 1.7 shows the location of the LEDs on the front panel The LEDs indicate the Multi-Format Receiver status as follows:

The red **ALARM** LED is used to indicate a Multi-Format Receiver fault condition, e.g. a missing or faulty input signal. It should be off for correct operation, although it may be lit briefly during power up.

The green **POWER** LED is used to indicate that the Multi-Format Receiver is locked to a Transport Stream when lit, indicates correct conditions and correct system functioning.

1.6.4 Rear Panel

Inputs and outputs to the unit are taken via the rear panel. Connector descriptions are given in *Chapter 2, Installing the Equipment* and *Chapter 6, Options.*

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Installing the Equipment

Chapter 2

Contents

List of Figures

List of Tables

2.1 Read This First!

2.1.1 Handling

The equipment must be handled and installed carefully and thoughtfully to prevent safety hazards and damage.

2.1.2 Installing the Equipment

Ensure the personnel designated to fit the unit have the appropriate skills and knowledge. If in any doubt, contact Ericsson Customer Services (see *Preliminary Pages* for contact details).

Installation of the product should follow these instructions, and should only use installation accessories recommended by the manufacturers. When rack mounted, this equipment must have shelf supports as well as being fixed at the front panel.

Do not use this product as a support for any other equipment.

2.1.3 Lifting

In some circumstances the unit might be awkward to lift. In which case, do not attempt to lift or move it without proper assistance or equipment. If in doubt, seek assistance.

2.1.4 Site Requirements

2.1.4.1 Power Supplies

See *Annex B Technical Specification* for a full specification.

2.1.4.2 Environment

See *Annex B, Technical Specification* for a full specification.

Do not install this product in areas of high humidity or where there is danger of water ingress.

2.1.4.3 Lightning Protection

Warning!

If the receiver has been subject to a lightning strike or power surge that has stopped it working, disconnect the power immediately. Do not re-apply power until it has been checked for safety. If in doubt contact Ericsson Customer Services.

Where appropriate, ensure this product has an adequate level of lightning protection. Alternatively, during a lightning storm or when it is left unattended and unused for long periods of time, unplug it from the supply outlet and disconnect the output equipment. This prevents damage to the product due to lightning and power line surges.

2.2 Preliminary Checks

2.2.1 Mechanical Inspection

Warning!

Removing the covers of this equipment may invalidate any warranties, cause a safety hazard or/and affect the EMC performance.

2.2.2 Moving the Equipment Safely

Do not place this product on an unstable cart, stand, bracket, or table. The product may fall, causing serious injury and serious damage to the product. Use only with a cart, stand, bracket or table recommended by Ericsson.

An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn. Do not move or carry the equipment whilst it is still connected to the supply or other leads, is live, or is in operation.

2.3 Installing the Equipment

2.3.1 Fixing

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 panhead 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.

2.3.2 Ventilation

2.3.3 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

2.3.3.1 Care in Positioning

Cautions!

The fans contained within this unit are not fitted with a dust/insect filter. Pay attention to the environment in which it is to be used.

Do not install equipment so that the air intake of one aligns with the outlet on another. Provide baffles and adequate spacing.

The equipment should never be placed near or over a radiator or other source of heat. It should not be placed in a built-in installation such as a rack unless proper ventilation is provided and the instructions have been adhered to.

Allow at least 40 mm free air-space at each side of the equipment to ensure adequate cooling. Racks containing stacked equipment may need to be forced air-cooled to reduce the ambient temperature within the rack.

2.3.3.2 Protection from Moisture

Do not install this equipment in areas of high humidity or where there is a danger of water ingress.

2.3.4 Installing Cables - Safety

Power supply cables should be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cables at plugs, convenience receptacles, and the point where they exit from the appliance.

Do not run AC power cables in the same duct as signal leads. Do not move or install equipment whilst it is still attached to the mains supply. Ensure safety and ESD precautions are observed whilst inter-connecting equipment.

2.4 EMC Compliance Statements[1]

2.4.1 EN 55022/AS/NZS 3548

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

2.4.2 FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the Reference Guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

2.5 AC Supply Operating Voltage and Fusing – Safety Information

2.5.1 AC Power Supply

The equipment operates from an wide-ranging mains power supply (100-240 V AC 50/60 Hz nominal) and is designed for use in ambient air temperature in the range 0°C to +50°C. There are no links etc. to be altered for operation from different supply voltages. The full Technical Specification is given in *Annex B, Technical Specification*.

[1] The EMC information was correct at the time of manufacture. The EMC tests were performed with the Technical Earth attached.

Warning!

The RX1290 should only be operated from the type of power source indicated on the marking label. If you are not sure of the type to your business, consult your appliance dealer or local power company. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

The RX1290 Receivers are not fitted with an AC power ON/OFF switch. Ensure the supply socket outlet is installed or located near the equipment so that it is accessible.

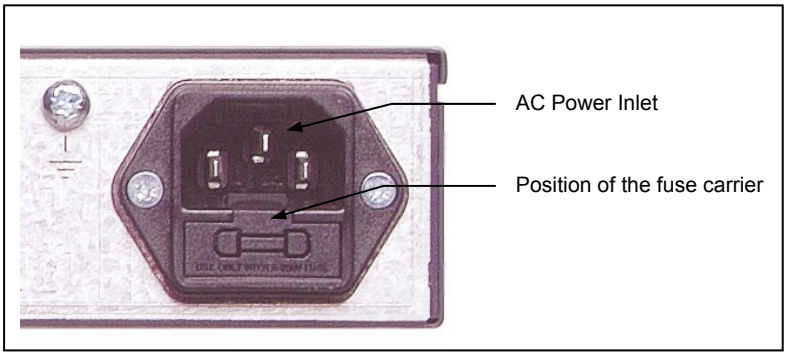


Figure 2.2 AC Power Inlet Assembly

Note: See *Annex B, Technical Specification* for fuse information.

2.5.2 AC Power Supply Cord

2.5.2.1 General

A two-meter power supply cord is supplied with this product. It is fitted with a molded plug suitable for the USA, UK or mainland Europe as advised at the time of ordering.

Note: The equipment is not fitted with an AC power supply ON/OFF switch. Ensure the socket-outlet supplying the equipment is installed near the equipment so that it is easily accessible.

2.5.2.2 Wire Colors

The wires in the supply cord are colored as shown in *Table 2.1*.

Table 2.1 Supply Cord Wiring Colors

	UK (BS 1363)	EUROPE (CEE 7/7)	USA (NEMA 5-15P)
Earth:	Green-and-yellow	Green-and-yellow	Green
Neutral:	Blue	Blue	White
Live:	Brown	Brown	Black

If the colors do not correspond with the colored markings identifying the terminals in a locally supplied plug, proceed as in *Table 2.2.* The inclusion of *Table 2.2* is for reference.

Table 2.2 Non Standard Supply Cord Wire Colors

Wire Color (UK)	Action
green-and-yellow	...must be connected to the terminal in the plug which is marked with the letter E or the safety earth symbol ⏚ or colored green or green-and-yellow.
blue	...must be connected to the terminal in the plug which is marked with the letter N or colored black.
brown	...must be connected to the terminal in the plug which is marked with the letter L or colored red.

2.5.3 Connecting the Equipment to the AC Power Supply

As there is no mains power switch fitted to this unit, ensure the local AC power supply is switched OFF before connecting the supply cord.
Connect the mains lead to the equipment and then to the local supply.

2.6 Protective Earth/Technical Earth

Warning!

This unit must be correctly earthed through the molded plug supplied. If the local mains supply does not have an earth conductor do not connect the unit. Contact Ericsson Customer Services for advice.

Before connecting the unit to the supply, check the supply requirements in *Annex B*.

The terminal marked ⏚ at the rear panel is a Technical Earth. Its use is recommended. This is NOT a protective earth for electric shock protection. The terminal is provided to:

- Ensure all equipment chassis fixed within a rack are at the same technical earth potential. To do this, connect a wire between the Technical Earth terminal and a suitable point on the rack.
- Eliminate the migration of stray charges when connecting between equipment.

The Technical Earth provides a suitable connection between the equipment and the installation to give a low impedance path at normal operating frequencies.

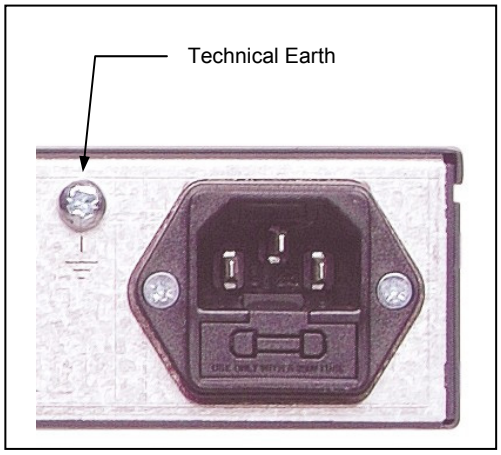


Figure 2.3 Location of the Technical Earth

2.7 Signal Connections

2.7.1 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 2.4.* The connections are also shown schematically in *Figure 2.5*, and a full technical specification is 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.

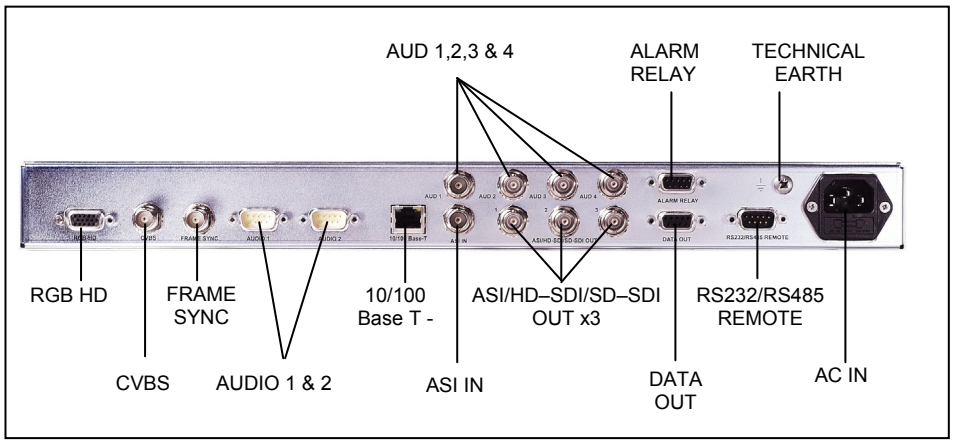


Figure 2.4 Typical Receiver Rear Panel

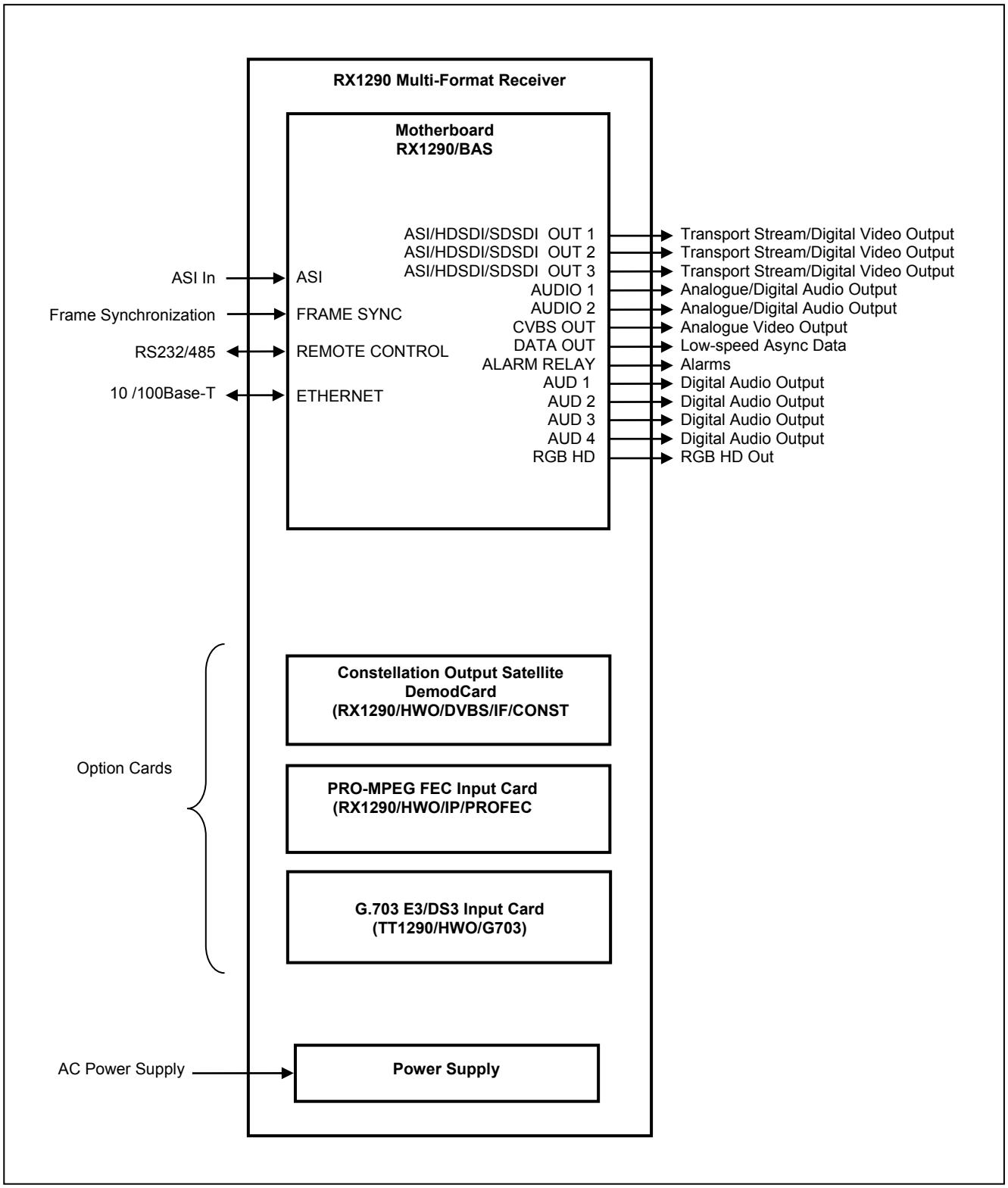


Figure 2.5 Signal Connections

2.7.2 ASI/HD-SDI/SD-SDI OUT

ASI/HD-SDI/SD-SDI OUT 1/2/3

The unit has three ASI/SMPTE 292M video (HD-SDI)/656 video (SD-SDI) outputs in the standard configuration.

The output standard must be selected from the user interface or remote control interface.

The ASI/HD-SDI/SD-SDI output is coaxial via BNC connectors. Video control is through the **Video Menu** (Menu 3.1).

Table 2.3 Digital Output 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	Video output Ground/Chassis

Note: These sockets are under the control of Menu 5.1

2.7.3 CVBS

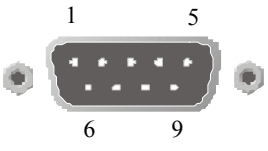
CVBS

A BNC socket is provided for composite video output which supports NTSC(M) (with and without pedestal) and PAL(B,D,H,I,M).

Table 2.4 Digital Output 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	Video output Ground/Chassis

2.7.4 Audio Outputs



AUDIO 1 / 2

A pair of 9-way male D-type connectors provide two stereo channels. Each connector carries a single channel of a stereo pair in both analogue and balanced digital form.

Audio control is through the **Service Menu** (Menu 3).

In addition, four unbalanced digital audio outputs are available via separate BNC connectors.

AUD 1

Table 2.5 Analogue/Digital Audio Connectors

Item	Specification
Connector type	9-way, D-type, Male
Connector designations	AUDIO 1 AUDIO 2
Pin-outs	Pin 1 - Digital audio + Pin 2 - Ground Pin 3 - Left + Pin 4 - Right + Pin 5 - Ground Pin 6 - Digital audio - Pin 7 - Ground Pin 8 - Left - Pin 9 - Right -
Nominal output impedance	50 Ω
Maximum data rate	3.072 Mbps
Analogue Output level	+18 dBm nominal clipping level. Selectable in range 12 to +24 dBm.
Load impedance	≥600 Ω balanced

Table 2.6 Digital (Unbalanced) Audio Connectors

Item		Specification
Connector type		BNC 75 Ω socket
Connector designation		AUD 1, AUD 2, AUD 3 and AUD 4
Pin-outs	Centre Shield	Digital Audio output (AES/EBU) Ground/Chassis

2.7.5 SVGA Output (RGB HV)

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 2.7 SVGA Connector

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

2.7.6 Frame Synchronization

FRAME SYNC

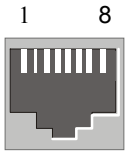
A BNC socket is used by the Decoder to frame lock to an external video source (NTSC, PAL or SECAM). The frame information is input as a composite signal, with or without active video. The user can offset the synchronization to the video output by ±8 lines of the reference signal, with a resolution of 1 pixel of the reference signal. Lip sync error introduced by the Receiver is in the range -10 ms to +30 ms. This implies audio frame skip and repeat may occur.

This Frame Sync is activated through the **Service Menu** (Menu 3).

Table 2.8 Frame Sync Hi-Z Connector

Item		**Specification**
Connector type		BNC 75 Ω socket
Connector designation		FRAME SYNC
Pin:	Centre	Analogue Black and Burst Input
	Shield	Ground/Chassis
Impedance		Last unit must be terminated with 75 Ω

2.7.7 Ethernet



10/100BaseT

The equipment has an Ethernet remote control port for SNMP Control. This is also used for high speed data over Ethernet output and engineering debug purposes.

Table 2.9 Ethernet Pin-outs

Item	Specification
Connector type	RJ-45 (100BaseT)
Connector designation	10/100BaseT
Pin-outs (Unused pins not connected)	Pin 1 - Tx Out (+) Pin 2 - Tx Out (-) Pin 3 - Rx In (+) Pin 6 - Rx In (-)

2.7.8 ASI IN

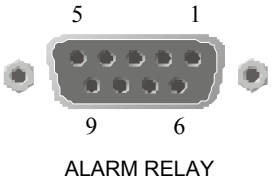
ASI IN

A BNC socket is provided for detection of the transport stream lock on the ASI input.

Table 2.10 Digital Input Connector

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

2.7.9 Alarm Connector and Relay



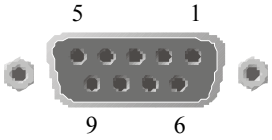
ALARM RELAY

The alarm relay connector has a summary relay. The summary relay is activated whenever the unit detects an alarm, or the power is switched off.

Table 2.11 Alarm Connector

Item	Specification
Connector type	9-way, D-type, Female for the summary alarm relay
Connector designation	ALARM RELAY
Pin-outs	Pin 1 - Open
	Pin 2 - Open
	Pin 3 - Open
	Pin 4 - Relay 1, common pin
	Pin 5 - Open
	Pin 6 - Open
	Pin 7 - Open
	Pin 8 - Relay 1, Normally Closed (Open on Alarm)
	Pin 9 - Relay 1, Normally Open (Closed on Alarm)

2.7.10 RS-232 Low-speed Asynchronous Data Output



DATA

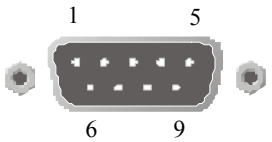
A 9-way, D-type female connector provides a asynchronous low-speed data serial communications interface. The status of the data output on this connector is given in the **Data Menus** (Menus 3.4 and 3.5).

Table 2.12 RS-232 Low-speed Data

Item	**Specification**
Connector type	9-way, D-type, Female
Connector designation	RS-232 Data Out
Standards	RS-232 DATA
Configuration	DCE
Pin-outs	Pin 1 - Reserved Pin 2 - Receive Data Output (RxD) (RS-232) Pin 3 - Reserved Pin 4 - No connection

Item	Specification
	Pin 5 - Ground (RS-232) Pin 6 - Reserved Pin 7 - No connection Pin 8 - Reserved Pin 9 - Reserved

2.7.11 Serial Remote Control



RS232/RS485 REMOTE

A 9-way, D-type male connector provides a configurable RS232/RS485 asynchronous low-speed data serial communications interface for remote control.

Table 2.13 RS232/RS485 Remote Control

Item	Specification	
Connector type	9-way, D-type, Female	
Connector designation	RS232/RS485 Remote	
Standards	RS-232/RS-485	
Configuration	**RS-232**	**RS-485**
Pin-outs	Pin 1 - Data Carrier Detect (DCD) - Input Pin 2 - Receive Data (RXD) - Input Pin 3 - Transmit Data (TXD) - Output Pin 4 - Data Terminal Ready - Output Pin 5 - Ground Pin 6 - Data Set Ready - Input Pin 7 - Request to Send - Output Pin 8 - Clear to Send - Input Pin 9 - Not connected	Pin 1 - Not connected - Input Pin 2 - Not connected - Input Pin 3 - Not connected - Output Pin 4 - Rx - Input Pin 5 - Ground Pin 6 - Not TX - Output Pin 7 - TX - Output Pin 8 - Not RX - Input Pin 9 - Not connected

2.8 Option Card Connectors

Option cards are described in *Chapter 6, Options.*

Operating the Equipment Locally

Chapter 3

Contents

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List of Tables

BLANK

3.1 Powering the Equipment

3.1.1 Switching On

Caution!

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

Connect the signal inputs and AC power supply to the Multi-Format Receiver and power up the unit. After a short period of initialization and the Multi-Format Receiver gaining lock, the unit powers up in Navigate mode. This is the usual operating condition.

The POWER LED will be on (green) when a signal is locked and off when unlocked. See *Figure 3.2* for the location of the POWER LED.

3.1.2 Power up Operating Modes

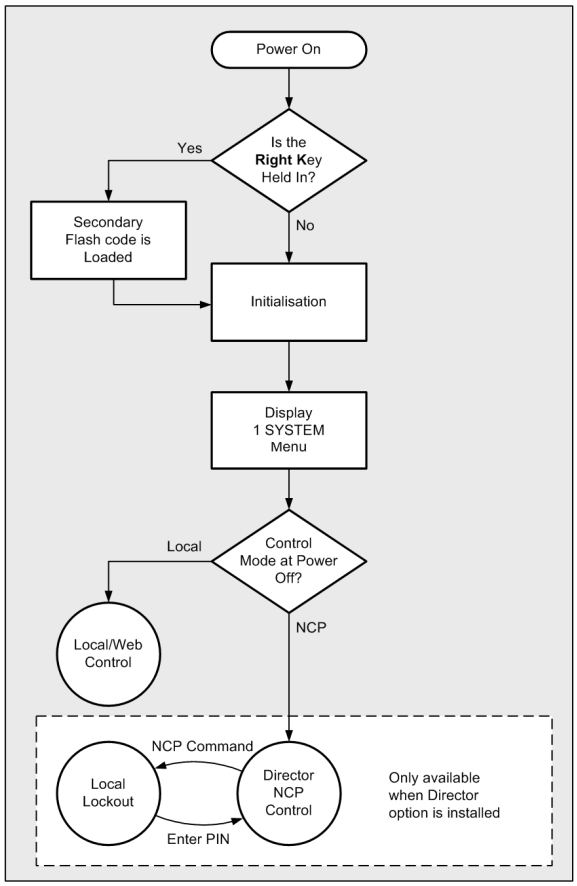

Figure 3.1 Power up Operating Mode

3.2 Front Panel Controls and Pushbuttons

Front Panel items are described under *Section 1.6, Guided Tour*.

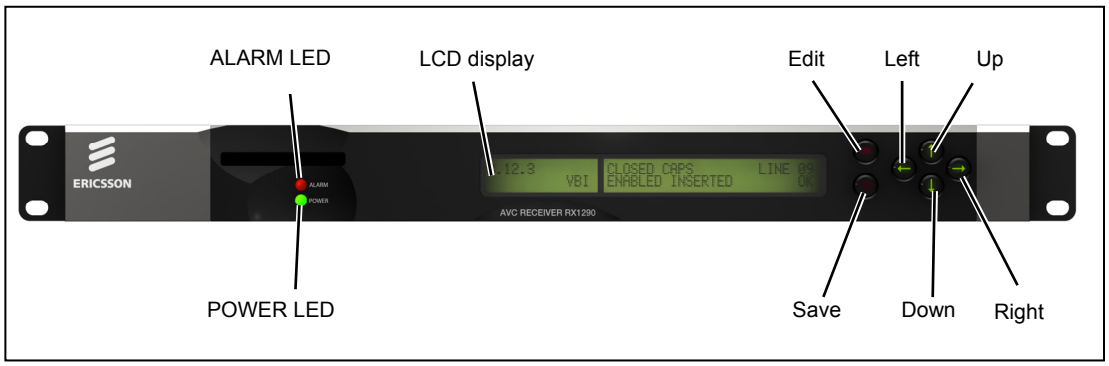

Figure 3.2 Front Panel Controls and Pushbuttons

3.3 Front Panel Operating Modes

3.3.1 General

Operating the Multi-Format Receiver from the Front Panel is via two operating modes: **Navigate Mode** *(*see *Section 3.3.2)* and **Edit Mode** *(*see *Section 3.3.3).*

3.3.2 Navigate Mode

Navigate mode allows the user to move between menus and pages within menus (editing the left display area).

Table 3.1 Navigate Mode

Action	**Result**
Up Pushbutton Pressed	Go to page given by uplink of current page, obtain and display current data.
Down Pushbutton Pressed	Go to page given by down link of current page, obtain and display current data.
Left Pushbutton Pressed	Go to page given by left link of current page, obtain and display current data.
Right Pushbutton Pressed	Go to page given by right link of current page, obtain and display current data.
Edit Pushbutton Pressed	Enter Edit mode at current page (if permitted else no effect).
Save Pushbutton Pressed	No effect.

Pushbutton LEDs will be updated to indicate which pushbutton presses are still valid as each navigation pushbutton press event is processed. For example, a lit **Up** pushbutton LED indicates there are pages above the current one.

3.3.3 Edit Mode

Edit mode edits the right display area and allows the user to alter control parameters that define the Multi-Format Receiver behavior. To enter **Edit** mode press the **Edit** pushbutton when on a page containing an editable control parameter and the front panel is the controlling user interface. Edit may be entered on some special pages at all times, for example on the page defining the controlling user interface.

The Front Panel returns to Navigate mode when **Edit** is pressed again (abort edit with no save) or when **Save** is pressed (save modified parameter values). Processing of events from the front panel event queue depends on the current operating mode of the front panel.

Table 3.2 Edit Mode

Action	Result
Up Pushbutton Pressed	Increases value of current edit parameter by one unit.
Down Pushbutton Pressed	Decreases value of current edit parameter by one unit.
Left Pushbutton Pressed	Moves cursor one edit parameter/parameter digit left (making that the current edit parameter).
Right Pushbutton Pressed	Moves cursor one edit parameter/parameter digit right (making that the current edit parameter).
Edit Pushbutton Pressed	Aborts edit (no save/action of any modified parameters) and returns to Navigate mode, obtain and display current data.
Save Pushbutton Pressed	Save/action new parameter values and returns to Navigate mode, obtain and display current data.

Pushbutton LEDs are updated to indicate which pushbutton presses are still valid as each edit pushbutton press event is processed. For example, when the **Left** pushbutton LED is lit it indicates there are additional editable parameters to the left of the current cursor position. There is a maximum idle period of five minutes when **Edit** mode will time out and return to **Navigate** mode.

3.4 Using the Local Controls

3.4.1 LCD Menu Descriptions

Detailed LCD menu descriptions are given in *Annex C, Menus*. This chapter concentrates on describing the use of the menus for local operation.

3.4.2 Selecting a Menu Option

Some items shown in the right display area of the front panel LCD display have a set number of options. An example of this is the VIDEO TEST PATTERN (Menu 3.1.6) which has a number of preset Video Test Patterns associated with it. Use the following steps as a general guide to selecting an option.

Table 3.3 Selecting a Menu Option

Step	Action	Result
1	Select the menu and display the required selection.	Normally there is only one selectable item. If there is more than one, use the **Right** and **Left** pushbuttons as described in *Table 3.4.*
2	Press **Edit** on the front panel.	The **Save** button will come on to show that the new option can be stored.
3	Use the arrow pushbuttons to step through the options.	This action scrolls through the options in a continuous loop.
4	Press **Save** to store the option or press **Edit** to cancel the selection and return to the source menu.	

3.4.3 Entering a Menu Value

Some items shown in the right display area of the front panel LCD display have a user-entered value. An example of this is the IP Address (Menu 7.1.3) in which the unit's Network address has to be entered. Use the following steps as a general guide to entering a value.

Table 3.4 Entering a Menu Value

Step	Action	Result
1	Select the menu and display the required selection.	
2	Press **Edit** on the front panel.	The **Save** button will come on to show that the new value can be stored.
3	Use the **Right** or **Left** pushbutton to move the cursor to the required digit.	Each pushbutton has a built-in LED that turns on if the pushbutton function is appropriate to the displayed information.
4	Change the value by using the arrow pushbuttons.	
5	Press **Save** to store the option.	

3.5 Setting Up Preset Services (Menu 1)

3.5.1 Using Preset Services

This group allows up to 40 Services to be stored as presets. Selecting a Service from the preset list in Menu 1 automatically reconfigures the Multi-Format Receiver to receive that Service with its associated parameters set as stored.

3.5.2 Setting Up a Preset Service

Follow the steps in *Table 3.5* to store the current Service as a preset.

Table 3.5 Setting Up a Preset Service

Step	Action	Result
1	Use the menus to set-up the unit so that the required Service is current. (Refer to *Section 3.7, Service Configuration (Menu 3)*).	This selects the Service and associated parameters for the preset process.
2	Go to Menu 1 to view the Preset menu.	This displays the menu which allows the Current Service to be stored at a chosen location (01 – 40). If there is no Current Service, the menu display reads NO STORED SERVICE.
3	Select a location to store the preset. The **Edit** mode cannot be entered unless a valid Service being decoded.	Use **Edit** and the arrow pushbuttons to step through the stored items. This allows a specific location to be chosen. Any vacant locations are marked by NO STORED SERVICE.
4	Press **Save**.	This stores the current Service and its associated parameters as a preset in the selected location. This adds the Service to the list displayed on page 1.

3.6 Setting Up the Input (Menu 2)

3.6.1 DVB-S2 Satellite Receiver (TT1290/HWO/DVBS2 and TT1290/HWO/DVBS2/IF/CONST)

Table 3.6 Setting Up the DVB-S2 Satellite Receiver

Step	Action	Result
1	Go to Menu 2.3 and select SOURCE 1.	The Receiver can take its signals from four sources. Set-up source 1.
2	Scroll to Menu 2.3.2. Enter the LNB FREQUENCY then press **Save**.	This sets up the LNB frequency for the selected Source in MHz.
3	Scroll to Menu 2.3.2.1. Enter the SATELLITE FREQUENCY then press **Save**.	This sets up the Satellite frequency for the selected Source in MHz.
4	Scroll to Menu 2.3.2.2. Enter the SYMBOL RATE then press **Save**.	Sets the symbol rate for the selected Source in Msymbols/s.
5	Scroll to Menu 2.3.2.3. Enter the DVB Modulation Standard then press **Save**.	This sets up the DVB modulation Standard (DVB-S or DVB-S2). FEC detection is automatic. In DVB-S2 mode the demodulator automatically detects and locks to both QPSK and 8PSK constellations.
6	Scroll to Menu 2.3.2.4. Enter the ROLL-OFF then press **Save.**	Sets the Roll-Off of the demodulator Root Nyquist Filter. Choose between 35%, 25%, 20%. This value should match that set in the transmitting modulator.
7	Scroll to Menu 2.3.2.5. Enter the SEARCH RANGE then press **Save**.	This sets up the centre frequency Search Range for the selected Source in kHz.
8	Scroll to Menu 2.3.2.6. Enter the LNB POWER and VOLTAGE settings then press **Save**.	Sets the LNB power for the selected Source (ON, OFF, BOOSTED). BOOSTED provides 1V extra power over the ON setting. Also sets the LNB voltage settings (18v – Horiz, 13v – Vert).
9	Scroll to Menu 2.3.2.7. Enter the LNB 22 kHz setting then press **Save**.	Enables or disables the LNB 22 kHz control tone for the selected Source (On, Off).
10	Repeat steps 2 through 9 for input 2 to 4	

3.6.1.1 DVB-S2 Input Option Card TT1290/HWO/DVBS2/IF/CONST

The DVB-S2 demod option TT1290/HWO/DVBS2/IF/CONST offers three L-band inputs plus an IF input. If this input option card is fitted in the receiver then note that Menu 2.3.5 sets the IF input frequency. LNB Frequency, Satellite Frequency and LNB Power parameters are not applicable for this input.

The DVB-S2 demod option TT1290/HWO/DVBS2/IF/CONST also offers a constellation output in DVB-S2 mode. This output can be enabled for each L-band/IF input from the menu 2.3.X.6. Enabling this mode disables the demodulator transport stream rendering the receiver unable to decode a service.

3.6.2 Telco Receiver – RX1290/HWO/G703

Table 3.7 steps through the set-up procedure of the Telco Receiver using Menu 2 Input, and the TTV G.703 input.

Table 3.7 Setting Up the TTV G.703 Interface

Step	Action	Result
1	Connect the cable to the TTV G.703 input.	
2	Power up the unit and navigate to Menu 2 Input.	Accesses the Input menu.
3	Press the **Right** pushbutton to access Menu 2.3.	Selects the G.703 menu.
4	Navigate to INTERLEAVER (Menu 2.3.3), then press **Edit**. Select Enable or Disable, then press **Save**.	Sets the required interleaving.
5	Navigate to SIGNAL LEVEL (Menu 2.3.4), then press **Edit**. Select Normal or Low, then press **Save**.	Sets the unit sensitivity to the input signal level.
6	Navigate to REED-SOLOMON (Menu 2.3.2), then press **Edit**. Select ENABLE, then press **Save**.	Enables FEC functionality.
7	Return to Input Menu 2, it should display the current status. If status is NOT LOCKED, verify that the cable is properly connected and that all values have been entered correctly.	

3.6.3 10/100BaseT Input – RX1290/HWO/IP

Table 3.8 steps through the set-up procedure of the Telco Receiver using Menu 2 Input, and the IP input.

Table 3.8 Setting Up the IP Interface

Step	Action	Result
1	Connect the Ethernet cable to the IP input connector.	
2	Power up the unit and navigate to Menu 2 Input.	Accesses the Input menu.
3	Navigate to UDP PORT (Menu 2.3.2), then press **Edit.** Select the Receive UDP Port number, then press **Save**.	Edits the UDP Port parameter.
4	Navigate to IP INPUT IP ADDRESS (Menu 2.3.2.1), then press **Edit.** Select the IP address, then press **Save**.	Edits the IP Input address parameter.
5	Navigate to IP INPUT SUBNET MASK (Menu 2.3.2.2), then press **Edit**. Select the Subnet mask, then press **Save**.	Edits the IP Input subnet mask parameter.
6	Navigate to IP INPUT GATEWAY ADDRESS (Menu 2.3.2.3), then press **Edit**. Select the Gateway address, then press **Save**.	Edits the IP Input Gateway address parameter.
7	Navigate to IP INPUT MULTICAST IP ADD (Menu 2.3.2.4), then press **Edit**. Select the Multicast IP address, then press **Save**.	Edits the IP Input Multicast IP address parameter.
8	Return to Input Menu 2, it should display the current status. If status is NOT LOCKED, verify that the cable is properly connected and that all values have been entered correctly.	

3.6.4 100/1000BaseT Dual IP Input – RX1290/HWO/GIGE

Steps through the set-up procedure of the Receiver using Menu 2 Input, and the IP input.

Table 3.9 Setting Up the Dual IP Interface

Step	Action	Result
1	Connect the Ethernet cables to the IP input connectors.	
2	Power up the unit and navigate to Menu 2 Input.	Accesses the Input menu.
3	Navigate to NETWORK INTERFACE 1	Accesses parameters of Port 1
4	Navigate to IP ADDRESS, then press **Edit.** Select the IP address, then press **Save**.	Edits the IP Input address parameter.
5	Navigate to NET MASK ADDRESS, then press **Edit**. Select the Subnet mask, then press **Save**.	Edits the IP Input subnet mask parameter.
6	Navigate to GATEWAY ADDRESS, then press **Edit**. Select the Gateway address, then press **Save**.	Edits the IP Input Gateway address parameter.
7	Navigate to NETWORK INTERFACE 2 and repeat steps 4, 5 and 6	Accesses and edits parameters of Port 2
8	Navigate to LISTENING STREAM 1	Accesses parameters of listening multicast 1
9	Navigate to MCAST IP, then press **Edit.** Select the IP address, then press **Save**.	Edits the Listening IP address parameter.
10	Navigate to UDP PORT, then press **Edit.** Select the UDP port number, then press **Save**.	Edits the Listening UDP port number parameter.
11	Navigate to LISTENING STREAM 2 and repeat steps 9 and 10	Accesses and edits parameters of listening multicast 2

Step	Action	Result
12	Return to Input Menu 2, it should display the current status. If status is NOT LOCKED, verify that the cable is properly connected and that all values have been entered correctly.	

3.7 Service Configuration (Menu 3)

3.7.1 Selecting and Setting Up a Service

Each Transport Stream may contain many Services. Menu 3 allows a Service to be chosen as current and the profile of its components to be specified. This Service will be used as the power up default Service until a new Service is selected.

Table 3.10 Selecting a Service

Step	Action	Result
1	Go to Menu 3 and select the required Service. The **Edit** mode cannot be entered unless there are available Services.	This page shows the total number of Services available in the incoming Transport Stream. Use **Edit** and the arrow pushbuttons to select the required Service.
2	Press **Save**.	This stores the Service as the Current Service.

3.7.2 Selecting the Video Component

Table 3.11 Selecting the Video Component

Step	Action	Result
1	Go to Menu 3.1 and press **Edit**. Select one of the video streams or enter a video stream PID.	Selects the video component.
2	Scroll to Menu 3.1.6 and edit the parameter for setting the response to loss of video (FREEZE FRAME, BLACK FRAME, BLUE FRAME, 75% BARS AND RED, BLUE PLUS TEXT, RED PLUS TEXT). Press **Save**. Perform a system restart (see *Section 3.12 Restarting the Unit*).	Edits the parameter for setting the response to loss of video.

Step	Action	Result
3	Scroll to Menu 3.1.7 and edit the video test pattern to be displayed. Press **Save**.	Edits the video test pattern to be displayed.
4	Scroll to Menu 3.1.10 and edit the parameter for framesync enable (ENABLED or DISABLED). Press **Save**.	Edits the parameter for framesync enable.
5	Scroll to Menu 3.1.10.1 and edit the PAL framesync offset range (-199999 to +199999 pixels) and the NTSC framesync offset range (-199999 to +199999 pixels). Press **Save**.	Edits the PAL framesync offset range and the NTSC framesync offset range.
6	Scroll to Menu 3.1.14 and Menu 3.1.15 edit the embedded audio group (NONE, ONE, TWO, THREE or FOUR). Press **Save**.	Edits the embedded audio data IDs and audio channel.

3.7.3 Setting Down Conversion Mode

This menu allows the user to set the receiver to produce a down converted SD version of the incoming HD video source.

Note: The RX1290 provides ‘grade 2’ down conversion video quality. The suitability of grade 2 video for broadcast will depend on the intended application.

Table 3.12 Setting Down Conversion

Step	Action	Result
1	Scroll to Menu 3.1.8 and edit the parameter for down conversion enable (ANAMORPHIC, CROPPED, LETTERBOX or DISABLED). Press **Save**.	Edits the parameter for down conversion enable and the output format.

3.7.4 Setting SD Monitor Aspect Ratio

This menu allows the user to set the SD output aspect ratio.

Note: This function only applies to 4:2:0 video, and has no effect on the down converted SD output

Table 3.13 Setting Aspect Ratio

Step	Action	Result
1	Scroll to Menu 3.1.9 and edit the parameter for aspect ratio (4:3, or 16:9). Press **Save**.	Edits the parameter for the output SD aspect ratio.

3.7.5 Setting Video Delay

This menu allows the user to vary the output presentation delay.

Note: This will delay both the video and audio presentation.

Table 3.14 Setting Video Delay Mode

Step	Action	Result
1	Go to Menu 3.1.11 and edit the option displayed. Press **Save**	Edits the values for either the 4:2:0 or 4:2:2 output delay. This has a maximum value of 199 mS.

3.7.6 Setting Video Output mode

This menu allows the user to edit the analogue HD video output.

Note: This applies to the analogue connector only.

Table 3.15 Setting Video Ddelay Mode

Step	Action	Result
1	Go to Menu 3.1.12 and edit the parameter (RGB or YPbPr) displayed. Press **Save**	Edits the HD output format

3.7.7 Setting Low Delay Mode – RX1290/SWO/LDELAY

This menu allows the user to set the receiver into low delay mode.

Note: In this mode only MPEG-1 layer II audio (Musicam) audio and 4:2:0 video is supported.

This will reduce the decoding delay through the RX1290 by up to 320mS, depending on video mode.

Table 3.16 Setting Low delay mode

Step	Action	Result
1	Go to Menu 3.1.15 and edit the option displayed. (LOW DELAY MODE, NORMAL). Press **Save**	Gains access to the low delay option. There is a choice between low delay and normal mode.

3.7.8 Selecting the Audio Component

3.7.8.1 Introduction

Automatic audio component selection is based on component order in the PMT as follows:

- Audio 1 selects the first component in the PMT, Audio 2 selects the second component, Audio 3 selects the third component and Audio 4 selects the fourth component.
- Audio 1 does not select the same component as Audio 2 and vice-versa when component-PIDs are reordered in a new PMT.
- Coding type and language are manually selectable through the User PID and type parameters.

3.7.8.2 Selecting the Audio Manually

It is possible to manually select any audio component from the active Service by using the front panel controls or via the remote control interface. Select one of the audio components in the list or enter the correct PID. *Table 3.17* describes the procedure for selecting a component.

Table 3.17 Manually Selecting the Audio Components

Step	Action	Result
1	Go to the Menu 3.2 and press **Edit**. Select between Standard (the default for most applications) and AAC Downmix + 5.1decode.	Selects if the user wishes to do a AAC5.1 decode or not.
1	Go to the Menu 3.3 and press **Edit**. Select one of the audio streams or enter an audio PID.	Selects the audio component.
2	Scroll to Menu 3.3.3 and edit the Audio 1 delay adjustment (range ± 0 to 49.5ms). Press **Save**.	Edits the Audio 1 delay adjustment.

Step	Action	Result
3	Scroll to Menu 3.3.4 and edit the Audio 1 digital output format (AES3 or AC-3) and output routing (STEREO, MIXED TO BOTH, LEFT TO BOTH, or RIGHT TO BOTH). Press **Save**.	Edits the Audio 1 digital output format and output routing. Note that when the input signal is STEREO, the Audio digital output format will always be STEREO.
4	Scroll to Menu 3.3.5 and edit the clipping value (12 – 24 dB). Press **Save**.	Edits the clipping value.
5	Scroll to Menu 3.3.6 and edit the AC-3 down mix parameter (SURROUND STEREO or CONVENTIONAL STEREO) Press **Save**.	Edits the AC-3 down mix parameter.
6	Go to the Menu 3.4 for Audio 2, Menu 3.5 for Audio 3, Menu 3.6 for Audio 4 and repeat steps 2 through 5.	Selects the audio component.

3.7.9 Setting Up Asynchronous Data (RS-232)

These menu pages allow status monitoring and configuration of the low speed data.

Table 3.18 Setting Up Async Data

Step	Action	Result
1	Go to Menu 3.7 and press **Edit**. Select the data stream PID.	Selects the data stream.
2	Scroll to Menu 3.7.1 and edit the low speed data output (ENABLED or DISABLED). Press **Save**.	The unit receives and displays the correct bit-rate.

3.7.10 Setting Up High Speed Data Over Ethernet – RX1290/SWO/HSETHER

These menu pages allow status monitoring and configuration of the high speed data over Ethernet software option.

Table 3.19 Setting Up High speed Data over Ethernet

Step	Action	Result
1	Go to Menu 3.8 and press **Edit**. Select the data stream PID.	Selects the data user PID number.

Step	Action	Result
2	Scroll to Menu 3.8.1 and edit the High speed data output (ENABLED or DISABLED). Press **Save**.	The unit receives and displays the correct bit-rate.
3	Scroll to Menu 3.8.3 and edit the Forward to Gateway ON/OFF and the Gateway IP address menu. Press **Save.**	If the Forward to Gateway option is turned on, the unit will forward the data stream to the gateway address given.

3.7.11 Setting Up Teletext

Table 3.20 Setting Up Teletext

Step	Action	Result
1	Scroll to Menu 3.9. and edit the parameter for stream or PID value. Press **Save**.	Edits the parameter for choosing the appropriate component or PID if the required Teletext data is not currently present
2	Scroll to menu 3.9.1 and edit the parameter for enabling Teletext (ENABLED or DISABLED)	Enables/Disables Teletext
3	Scroll to menu 3.9.2 and edit the parameter (ENABLED or DISABLED)	Chooses if the Teletext is played out straight away or on the PTS

3.7.12 Setting Up VITC

Table 3.21 Setting Up VITC

Step	Action	Result
1	Scroll to Menu 3.10.1 and edit the parameter for enabling VITC pass-through (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling VITC pass-through.
2	Scroll to menu 3.10.2 and edit the line number for VITC to be inserted	Selects the line for VITC insertion.

3.7.13 Setting Up Closed Captions

Table 3.22 Setting Up Closed Captions

Step	Action	Result
1	Scroll to Menu 3.10.3 and edit the parameter for enabling Closed Captions pass-through (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling Closed Captions pass-through.

3.7.14 Setting Up ITS Insertion

Table 3.23 Setting Up ITS Insertion

Step	Action	Result
1	Scroll down to Menu 3.10.4 and edit the parameter for enabling ITS insertion (ENABLED (CCIR), ENABLED (FCC/UK) or DISABLED). Press **Save**.	Edits the parameter for enabling ITS insertion.

3.7.15 Setting Up VPS

Table 3.24 Setting Up VPS

Step	Action	Result
1	Scroll down to Menu 3.10.5 and edit the parameter for enabling VPS insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling VPS pass-through.

3.7.16 Setting Up WSS

Table 3.25 Setting Up WSS

Step	Action	Result
1	Scroll down to Menu 3.10.6 and edit the parameter for enabling WSS insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling WSS pass-through.

3.7.17 Setting Up Video Index

Table 3.26 Setting Up Video Index

Step	Action	Result
1	Scroll down to Menu 3.10.7 and edit the parameter for enabling Video Index insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling Video Index pass-through.

3.7.18 Setting Up Monochrome Samples

Table 3.27 Setting Up Monochrome

Step	Action	Result
1	Scroll down to Menu 3.10.8 and edit the parameter for enabling Monochrome samples insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling Monochrome samples.

3.7.19 Setting Up AMOL 1 and 2

Table 3.28 Setting Up AMOL 1 and 2

Step	Action	Result
1	Scroll down to Menu 3.10.9 and edit the parameter for enabling AMOL insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling AMOL pass-through.

3.7.20 Setting Up NTSC Pedestal Insertion

Table 3.29 Setting Up NTSC Pedestal Insertion

Step	Action	Result
1	Scroll down to Menu 3.10.10 and edit the parameter for enabling NTSC Pedestal insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling NTSC Pedestal insertion.

3.7.21 Setting Up VANC Data Insertion

Table 3.30 Setting Up VANC Data Insertion

Step	Action	Result
1	Scroll down to Menu 3.11.1 and edit the parameter for enabling VANC Data insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling VANC Data insertion. PLEASE NOTE: Any data passed by this method will overwrite any duplicate VBI information.

3.7.22 Setting Up Splice Point Insertion

Table 3.31 Setting Up Splice Point Insertion

Step	Action	Result
1	Scroll down to Menu 3.12.1 and edit the parameter for enabling VANC Data insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling Splice Point insertion.

3.7.23 Setting Up Station ID Insertion

Table 3.32 Setting Up Station ID Insertion

Step	Action	Result
1	Scroll down to Menu 3.13.1 and edit the parameter for enabling Station ID insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling Station ID insertion.

3.7.24 Setting Up AFD Insertion

Table 3.33 Setting Up AFD Insertion

Step	Action	Result
1	Scroll down to Menu 3.14.1 and edit the parameter for enabling AFD insertion (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling AFD insertion.

3.7.25 Setting Up DVB Subtitles

Table 3.34 Setting Up DVB Subtitles

Step	Action	Result
1	Scroll down to Menu 3.15.1 and edit the parameter for enabling DVB Subtitles (ENABLED or DISABLED). Press **Save**.	Edits the parameter for enabling DVB Subtitles. PLEASE NOTE: This feature is only supported for SD 4:2:0 video sources only.

3.7.26 Setting the PCR PID Menu

Table 3.35 Viewing the PCR PID Menu

Step	Action	Result
1	Go to Menu 3.16 and scroll to USER PID and edit the PID for enabling manual selection of the PCR PID.	Gains access to the selection between automatically detected PCR PID or manually entered PCR PID.

3.7.27 Viewing the Network ID Menu

Table 3.36 Viewing the Network ID Menu

Step	Action	Result
1	Go to Menu 3.17.	Gains access to the Network ID and the Original Network ID.

3.8 Setting Up the Conditional Access/Scrambling (Menu 4)

3.8.1 Introduction

Menu 4 allows the status and configuration of the Conditional Access (CA) module to be checked. The structure and content of this group depends on the CA system. The available CA options are as follows:

- Basic Interoperable Scrambling System (BISS), Mode 1 and Mode E only.
- Remote Authorisation System (RAS) and RAS 2
- Director
- DVB Common Interface

BISS (as specified in EBU Tech 3292 May 2002) is standard on all units.

3.8.2 Basic Interoperable Scrambling System (BISS) (Menu 4.4)

BISS Mode 1 is similar to RAS in that it uses a fixed control word to encrypt the data in the transport stream. Unlike RAS, the scrambling algorithm is non-proprietary, using the DVB Common Scrambling Algorithm to allow interoperability with other manufacturers' encoding/scrambling equipment.

3.8.3 Remote Authorization System (RAS) (Menu 4.1)

RAS has two levels of operation: FIXED KEY MODE and DSNG KEY MODE.

FIXED KEY MODE has a fixed control word to encrypt the data in the transport stream.

DSNG KEY MODE is used for fixed headend systems. Its main functionality is:

- Over-air addressing of Receivers for authorization/de-authorization to decrypt the transmission.
- Group operation for authorization/de-authorization.
- Periodic control word changes during transmission.

3.8.4 Director (Menu 4.3)

Director functionality includes Conditional Access, over-air software download and over-air control.

No specific set-up is required in the Multi-Format Receiver for the Conditional Access or software download. For over-air control (NCP) see *Chapter 4, Operating the Equipment Remotely*.

3.8.5 DVB Common Interface (Menu 4.2)

There is a single slot on the Multi-Format Receiver front panel to allow the insertion of a DVB Common Interface (CI) Conditional Access module (CAM) and related conditional access card.

Other than the insertion of the CAM and Access card, no specific set-up is required at the Multi-Format Receiver for the DVB Conditional Access, however DVB Common Interface functionality is only available if the RX1290/SWO/CI license has been installed.

3.9 Setting Up the Transport Stream Output (Menu 5)

3.9.1 Set-Up Procedure

Use *Table 3.37* to step through the Transport Stream Output set-up procedure using Menu 5. This allows the Transport Stream for the current Service to be output on the ASI output connectors.

Table 3.37 Setting Up the Transport Stream Output (TSO)

Step	Action	Result
1	Go to Menu 5 to enter the TRANSPORT STREAM OUTPUT setting. Press **Edit** then select one of the following: POST INPUT (i.e. as input Transport Stream); POST TS DESCRAMBLE (i.e. post TTV, RAS descrambling); POST ES DESCRAMBLE (i.e. post TTV, RAS, Common Interface, BISS, DIRECTOR descrambling).	The Transport Stream Output will be formatted according to the choice made.
2	Press **Save** to store the choice.	The Transport Stream Output (TSO) is now set.

3.9.2 Setting the Output Connector

Use *Table 3.38* to step through the Connector configuration procedure using Menu 5.1.

Table 3.38 Setting Up the Output Connector

Step	Action	Result
1	Go to Menu 5.1 to enter the Connector configuration.	Edits the Connector output function for BNC connectors 1, 2 and 3.
2	Press **Edit** then select one of the following, for each connector: DISABLED ASI HD SDI SD SDI AUTO	The Connectors output will be formatted according to the choice made.
3	Press **Save** to store the choice.	The Connector output is now set.

3.9.3 Transport Stream Output Bit-rates

The Maximum input/output rates are described in *Table 3.39*.

Table 3.39 Maximum Descrambled Transport Stream Output Bit-rates

Level of Descrambling	TSO Setting	Input	Output
None	POST INPUT	160 Mbps	160 Mbps
Common Interface, BISS or Director	POST TS DESCRAMBLE	100 Mbps	100 Mbps
Common Interface	POST TS DESCRAMBLE	55 Mbps	55 Mbps

3.9.4 Transport Stream Packet Lengths

The input transport stream packet lengths may be 188/204/208 bytes. With the transport stream output set to **POST INPUT** or **POST TS DESCRAMBLE**, the output packet length is the same as the input. With the transport stream output set to **POST ES DESCRAMBLE**, the output is always 188 bytes.

3.10 Setting Up the Alarms (Menu 6)

Menu 6 allows a selection of Alarms to be edited.

Table 3.40 Setting Up the Alarms

Step	Action	Result
1	Go to Menu 6.	Accesses the Alarms menu.
2	Scroll to Menu 6.6 and edit the BIT ERROR RATE range (9.9 E-1 to 1.0 E-8) and status (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the BER alarms menu.
3	Scroll to Menu 6.1 and edit the TRANSPORT STREAM menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the Transport Stream alarms menu.
4	Scroll to Menu 6.2 and edit the VIDEO menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the Video alarms menu.
5	Scroll to Menu 6.3 and edit the AUDIO 1 menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the Audio 1 alarms menu.

Step	Action	Result
6	Scroll to Menu 6.4 and edit the AUDIO 2 menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the Audio 2 alarms menu.
7	Scroll to Menu 6.5 and edit the AUDIO 3 menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the Audio 3 alarms menu.
8	Scroll to Menu 6.6 and edit the AUDIO 4 menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the Audio 4 alarms menu.
9	Scroll to Menu 6.7 and edit the MER menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the MER Error Rate (00.0 to 69.9) and status menu.
10	Scroll to Menu 6.8 and edit the BER menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the BER Error Rate (00.0 to 69.9) and status menu.
11	Scroll to Menu 6.9 and edit the EBNO menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the EBNO
12	Scroll to Menu 6.10 and edit the TEMPERATURE menu (NO ALARM, SET ALARM ONLY). Press **Save**.	Edits the Temperature menu.

3.11 Setting Up System Parameters (Menu 7)

This menu gives access to the Set-up Menu to set-up and edit System Parameters as well as the Multi-Format Receiver Details menu (see *Table 3.42)*.

Table 3.41 Setting Up a System

Step	Action	Result
1	Go to Menu 7.	Accesses the System menu.
2	Scroll to Menu 7.1 and edit the Operating Mode (FRONT PANEL, SERIAL REMOTE, NCP or NETWORK (SNMP). Press **Save**.	Edits the Operating Mode menu.
3	Scroll to Menu 7.1.1 and edit the LCD Contrast (LOW, MEDIUM or HIGH). Press **Save**.	Edits the LCD Contrast.
4	Scroll to Menu 7.1.2 and edit the SERIAL REMOTE PROTOCOL mode (RS232 ALTEIA or RS485 ALTEIA).	Select the interface needed for serial remote control.
5	Scroll to Menu 7.1.3 and edit the IP Address. Press **Save**.	Edits the IP Address.

Step	Action	Result
6	Scroll to Menu 7.1.3.1 and edit the Subnet Mask. Press **Save**.	Edits the Subnet Mask.
7	Scroll to Menu 7.1.3.2 and edit the Gateway address. Press **Save**.	Edits the Gateway address.
8	Scroll to Menu 7.1.4 and activate/deactivate the Restore system defaults. Press **Save**.	Edits the Restore System Defaults menu.
9	Scroll to Menu 7.1.5 and edit the Service Hunt Mode (ENABLED or DISABLED). Press **Save**.	Edits the Service Hunt Mode menu.
10	Scroll to Menu 7.1.6 and edit the Input Stream SI Type (AUTO, ATSC or DVB). Press **Save**.	Edits the Input Stream SI Type.
11	Scroll to Menu 7.1.7 and edit the Customization Key. Press **Save**.	Edits the Customization Key menu.

Table 3.42 Viewing the Multi-Format Receiver Details Menu

Step	Action	Result
1	Go to Menu 7.2.	Accesses the Multi-Format Receiver Details Menu and displays the Electronic Serial Number.
2	Scroll to Menu 7.2.1.	Displays the Software Version.
2	Scroll to Menu 7.2.2.	Displays the Firmware Version.
3	Scroll to Menu 7.2.3.	Displays the Hardware Version.
4	Scroll to Menu 7.2.4.	Displays the PLD Version.
5	Scroll to Menu 7.2.5.	Displays the Temperature.

3.12 Restarting the Unit

The **System Restart** submenu allows the user to reboot the unit without having to remove and insert the power cable.

Table 3.43 System Restart Menu

Step	Action	Result
1	Go to Menu 7.3.	Accesses the System Restart menu.
2	Press **Edit**.	ACTIVATE will be displayed.
3	Press **Save** to activate.	Unit is restarted.

Operating the Equipment Remotely

Chapter 4

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4.1 Remote Control

4.1.1 Introduction

The Multi-Format Receiver can be remotely controlled in a variety of ways. The basic control methods are:

- nCompass Control
- Third-party application using SNMP MIB protocol
- Third-party application using Alteia remote control protocol (RS-232/RS-485)
- Director (over-air)

Common for all control methods is that the Multi-Format Receiver needs to be set-up to accept the remote control handling. Once in remote control mode, it cannot be locally controlled unless the remote control is deactivated.

4.1.2 Remote Protocol Control Documentation

For information about remote control protocols contact Ericsson.

4.1.3 Configuring the Unit for Remote Control via SNMP Port

For the unit to be controlled via the SNMP Ethernet port, the control mode of the Multi-Format Receiver needs to be set to **Network (SNMP)**.

Table 4.1 Configuring the Serial Remote Port and Activating Remote Protocol (SNMP)

Step	Action	Result
1.	Go to menu 7.1.	Displays ‘OPERATING MODE’.
2.	Press **Edit**.	Displays ‘FRONT PANEL’.
3.	Press the down pushbutton and select ‘NETWORK (SNMP)’.	The settings should be set to match the external control host.
4.	Press **Save.**	The unit is ready for Remote Control.

Note: The remote control protocols are not contained as a part of the product. An additional license fee, NDA or other agreement with Ericsson may be necessary to obtain the information required to control the product remotely.

4.1.4 Configuring the Unit for Remote Control Via the Serial Remote Port

For the unit to be controlled via RS-232 or RS-485, the control mode of the Multi-Format Receiver needs to be set to **Serial Remote** and serial remote protocol must be chosen (RS-232 Alteia or RS-485 Alteia).

Table 4.2 Configuring the Serial Remote Port and Activating Remote Protocol

Step	Action	Result
1.	Go to menu 7.1.	Displays ‘OPERATING MODE’.
2.	Press **Edit**.	Displays ‘FRONT PANEL’.
3.	Press the down pushbutton and select ‘SERIAL REMOTE’.	The settings should be set to match the external control host.
4.	Press **Save.**	The unit is ready for Remote Control.

Once the communication parameters are entered correctly, set the system into remote mode for the external computer to gain control of the unit:

Step	Action	Result
1.	Go to menu 7.1.2.	Displays ‘SERIAL REMOTE PROTOCOL’.
2.	Press **Edit.**	Toggle between RS-232 Alteia or RS-485 Alteia.
3.	Chose between RS-232 Alteia or RS-485 Alteia.	The settings should be set to match the external control host.
4.	Press **Save.**	The unit is ready for Remote Control.

4.1.5 Configuring the Unit for Remote Control Over-air

4.1.5.1 Overview

For the unit to be controlled via over-air control (OAC), the control mode of the Multi-Format Receiver needs to be set to Director NCP.

Table 4.3 Activating Director NCP Remote Control

Step	Action	Result
1.	Go to menu 7.1.	Displays ‘OPERATING MODE’.
2.	Press **Edit.**	Displays ‘FRONT PANEL’.
3.	Press the down pushbutton and select ‘DIRECTOR NCP’.	The settings should be set to match the external control host.
4.	Press **Save.**	The unit is ready for OAC.

4.1.5.2 OAC Lockout

Once the unit is in OAC control mode, it is possible for the remote control operator to issue a local lockout command to the Receiver. 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 keypad.

Caution!

Ericsson Customer Services Help Desk will not be able to provide you with the Local lockout PIN, as it is uniquely created at the time of the lockout.

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

4.1.5.3 Entering the OAC Lockout PIN

Table 4.4 Entering the OAC Lockout PIN

Step	Action	Result
1.	Go to menu **#4.3.6 DIRECTOR.**	Displays ‘NCP LOCK OVERRIDE PIN’.
2.	Press **Edit.**	Displays ‘ENTER CURRENT PIN’.
3.	Enter the four-digit PIN and press **Save**.	The unit is ready for local control.

4.2 Returning the Unit to Local Control Mode

Once the unit is in remote control mode, no local controls are available. To reacquire local control, it is necessary to set the remote control parameter back to **Front Panel**.

Table 4.5 Configuring the Unit for Local Control

Step	Action	Result
1.	Go to menu 7.1.	Displays ‘OPERATING MODE’.
2.	Press **Edit**.	Displays ‘SERIAL REMOTE’ or ‘DIRECTOR NCP’.
3.	Press the down pushbutton and select ‘FRONT PANEL’ and press **Save.**	The unit is ready to be locally controlled.

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Alarms

Chapter 5

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5.1 Introduction

There are two Front Panel LEDs that indicate the status of the Multi-Format Receiver. These are used to indicate abnormal performance of the unit.

5.2 Location of the Alarm and Power LEDs

The red **ALARM** LED is used to indicate an equipment fault condition, for example a missing or faulty input signal. It should be off during correct operation, although it may be lit briefly during power up.

The green **POWER** LED is used to indicate that the equipment is locked to a transport stream when lit, and indicates correct conditions and correct system functioning.

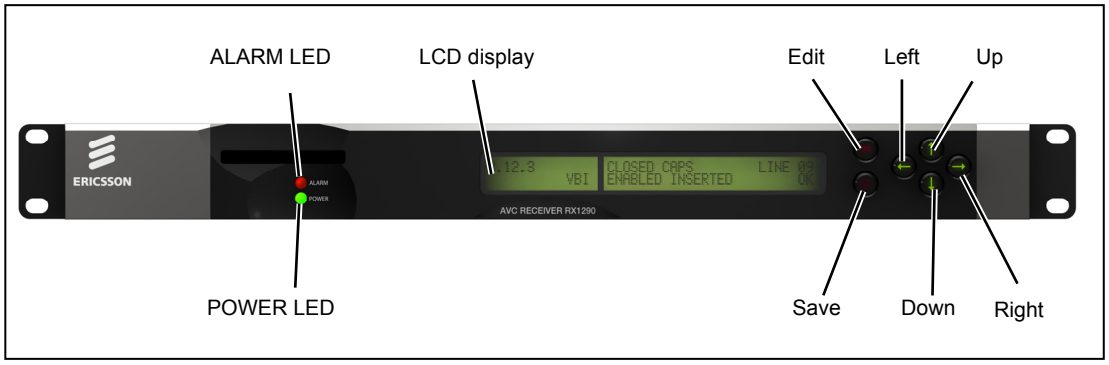

Figure 5.1 Front Panel LEDs

5.3 Alarm LED

The Multi-Format Receiver supports a summary alarm signal that is active when one or more of the individual monitored alarm conditions are active. It allows masking of unwanted alarm conditions so that they do not contribute to the summary alarm. Configuration of alarms is via the Front Panel and remote control interfaces. The state of the summary alarm is reflected by the **ALARM** LED on the front panel where red represents an alarm and off represents no alarm.

This LED provides a high-level indication of an alarm within the unit. The alarm list depends on the unit model. The unit continuously monitors for the following alarm conditions during normal operation: (if not masked, see *Annex C, Menus, Menu 6*):

- No transport stream - This alarm is raised if no valid transport stream is present.
- Video not running - This alarm is raised if no valid video is present.
- Audio 1 not running - This alarm is raised if the first audio is incorrect.
- Audio 2 not running - This alarm is raised if the second audio is incorrect.

- Audio 3 not running - This alarm is raised if the third audio is incorrect.
- Audio 4 not running - This alarm is raised if the forth audio is incorrect.
- Unit temperature - This alarm is raised if the unit exceeds an internal temperature of +65^{o}C

It is possible to signal additional alarms depending on the Transport Stream input type and optional functionality in the unit.

Satellite inputs:

- Bit Error Rate (BER) above (programmable) threshold - This is user configurable; an alarm is raised when the measured BER value is greater than the predefined threshold.
- EBNO - This is user configurable; an alarm is raised when the measured BER value is greater than the predefined threshold.

Options

Chapter 6

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6.1 Hardware Enabled Options

These options require extra hardware to be fitted to the unit. Contact the Customer Services Helpdesk for details (see *Preliminary Pages*).

6.2 DVB-S2 Input Cards (RX1290/HWO/DVBS2 and RX1290/HWO/DVBS2/IF/CONST)

6.2.1 General

The DVB-S2 Input card supports DVB-S, QPSK demodulation and DVB-S2, QPSK and 8PSK demodulation.

Two options are available. RX1290/HWO/DVB-S2 offers four L-band inputs, RX1290/HWO/DVB-S2/IF/CONST offers three L-band inputs plus an IF monitor input plus received constellation output.

6.2.2 Connector Details - L-Band Inputs

IN 1/2/3/4

Connect the L-band output of a suitable LNB to the F-type connector either directly or via a suitable attenuator giving adequate consideration to lightning and surge protection. The active input is chosen using the input **Status Menu** (Menu 2).

In most cases an attenuator will not be required. The following list summarizes the circumstances when one should be used.

When the desired input level is greater than the specified maximum permissible (-25 dBm).

When the down-lead is a short length of low-loss cable and the LNB in use has a poor return loss (7 dB min).

When the Receiver is receiving one of many carriers in a multi-carrier FDM system and the level of the wanted signal is close to the specified maximum permissible.

The specification for this connector is given in *Annex B, Technical Specification*.

Table 6.1 DVB-S2 Satellite Receiver (L-band) Connector

Input	Specification
Connector Type	F-type, Female
Connector designation	IN 1, IN 2, IN 3, IN 4 3 x L-band inputs only on RX1290/HWO/DVBS2/IF/CONST
Pin: Centre Shield	RF Input Ground/Chassis
LNB Supply	Refer to the next caution box
Impedance	75 Ω

Cautions!

The receiver provides DC power (refer to *Chapter 3, Operating the Equipment Locally*) 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.

6.2.3 Connector Details – IF Monitor Input (RX1290/HWO/DVBS2/IF/CONST)

Connect the IF Monitor input to a suitable IF frequency source e.g. a satellite modulator. The input can be activated using Input **Status Menu** (Menu 2).

IF Input

This monitor input is designed to give error-free demodulation in the presence of a wanted carrier only, for example when being fed directly from a satellite modulator.

The specification for this connector is given in *Annex B, Technical Specification*.

Table 6.2 DVB-S2 Satellite Receiver (IF Monitor Input) Connector

Input	Specification
Connector Type	BNC, Female
Connector designation	IF
Pin: Centre Shield	IF Input Ground/Chassis
Impedance	75 Ω

6.2.4 Connector Details – Constellation Output (RX1290/HWO/DVBS2/IF/CONST)

I/Q Output

Connect the I and Q constellation output connectors to a suitable display device such as an oscilloscope set to X-Y mode.

Constellation output is enabled using the Input **Status Menu** (Menu 2).

Notes: Enabling the constellation mode will disable the demodulator's output transport stream rendering the receiver unable to decode a service.

Constellation output mode is only available when decoding DVB-S2 signals.

The specification for this connector is given in *Annex B, Technical Specification*.

Table 6.3 DVB-S2 Satellite Receiver (Constellation Output) Connector

Input	**Specification**
Connector Type	BNC, Female
Connector designation	I, Q
Pin: Centre Shield	I/Q Output Ground/Chassis
Impedance	75 Ω

6.3 TTV G.703 DS3 and E3 Input Card (TT1290/HWO/G703)

The TTV G.703 input card receives a transport stream directly from a PDH network. The card is user selectable to receive from either a DS3 network or E3 network.

For technical specifications for the TTV G.703 card, see *Annex B, Technical Specification*.

6.4 IP Input Card (TT1290/HWO/IP)

The IP Input card provides a 10/100BaseT Ethernet port, on which a transport stream can be received in UDP packets at up to 50 Mbps.

The mapping of MPEG-2 TS packets into IP data frames is done according to the protocol stack shown in *Figure 6.1.* The figure shows the Protocol Stack in use when mapping MPEG-2 into IP frames and Ethernet.

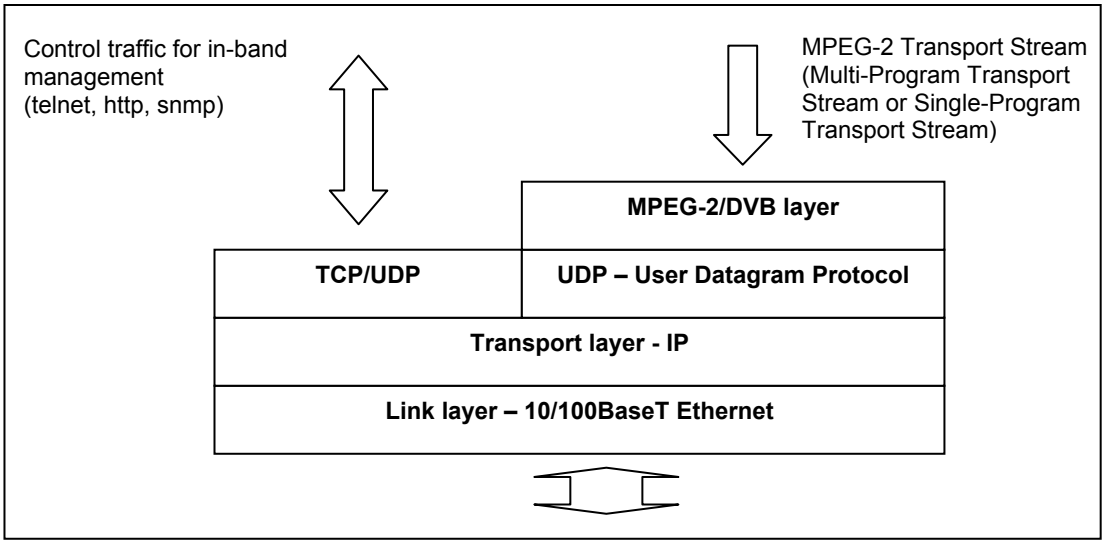

Figure 6.1 The Protocol Stack

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 6.2 shows a more detailed picture of the MPEG-2 data transfer. TS-packets are mapped in a datagram, using User Data Protocol (UDP), Internet Protocol (IP) and Ethernet.

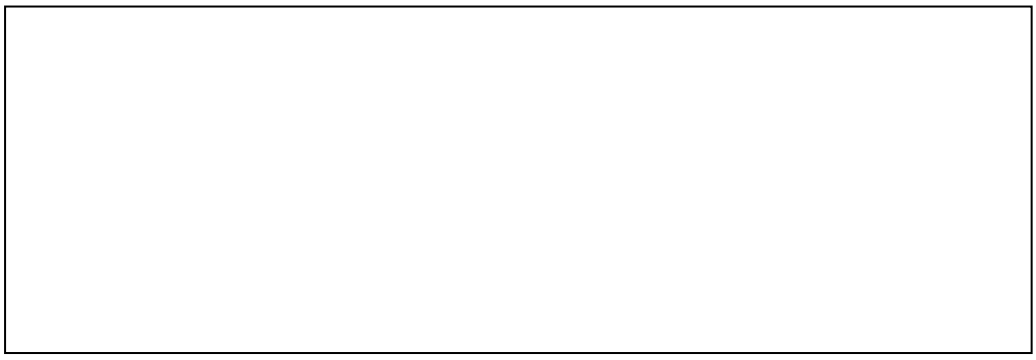

Figure 6.2 Building the Ethernet Frame

6.5 100/1000BaseT Dual IP Input – RX1290/HWO/GIGE

Dual IP NIC Input card provides a 100/1000BaseT Ethernet port, on which a transport stream can be received in UDP packets at up to 208 Mbps.

The card can receive RTP encapsulated transport streams. RTP encapsulation provides a more robust transport stream than UDP encapsulation. RTP encapsulated transport streams are resistant to service disruption related to “IP reordering”. IP frame reordering can occur inside an IP interconnection device (e.g. hub, switch, router) or when a IP/TS stream can take multiple routes to a destination. RTP encapsulation will introduce an overhead.

When you have Dual IP NIC option card installed, a few redundancy modes became available:

Use Input Ports - Port 1/Port 2/Auto.

Auto Revert Delay – delay in seconds.

Alias names: Primary Port is Port 1, Secondary Port is Port 2

6.5.1.1 Mode of Operation when input port is set to Auto

A link down or TS lock drop on the primary port would cause a switch from the primary to the secondary port. When the primary link is up again, the action depends on the user’s setup.

6.5.1.1.1 Switch back

If the auto-revert is non-zero, the unit would automatically switch back to the primary port, after linkup has been indicated for a defined length of time, this length of time is the auto-revert time the user specifies. The delay is present to allow an opportunity for the switch to boot, configure and enter normal operation.

Before the switchback to the primary port check the primary link status is up, if it is down, stay on the secondary port and wait till the primary link is up again and repeat the process again.

6.5.1.1.2 No switch back

If the auto-revert is set to zero, this indicates that the user will switch back manually, so no action is taken.

If the active port is the secondary port and the redundancy mode is set to Auto, if the link is up on the primary then it would cause an automatic switch to the primary port without checking the link up length time.

6.5.1.2 Mode of Operation when input port is set to Port 1 or Port 2

When the user sets the input port to either port 1 or port 2, a link down or TS lock drop does not cause any switch over to the other port. This mode of operation is the manual mode where the user decides what port is being used regardless of the status of the link.

6.5.1.3 Mode of Operation when switching from input Port 2 to Auto

If the active port is the secondary port and the redundancy mode is set to Auto, if the link is up on the primary then it would cause an automatic switch to the primary port without checking the link up length time.

6.6 Software Enabled Options

These options may be enabled through software license keys. Contact the Customer Services Helpdesk for details (see *Preliminary Pages*).

6.7 High Speed Data Over Ethernet (RX1290/SWO/HSETHER)

The Multi-Format Receiver can be enabled through a license key to output high speed data over the Ethernet port. The Multi-Format Receiver uses the Data-Piping protocol to de-encapsulate the data received. The data must be carried as private data on a designated transport stream PID.

Careful consideration needs to be taken to ensure interoperability with the transmitting equipment.

6.8 Dolby Digital Decoder (RX1290/SWO/AC3)

The Multi-Format Receiver can be enabled through a license key to apply Dolby Digital AC-3® decoding functionality. The RX1290 can decode a maximum of 2x Dolby Digital® AC-3® services.

6.9 RAS Mode 1 and 2 Conditional Access (RX1290/SWO/RAS)

This option enables RAS Mode 1 and 2 conditional access descrambling.

6.10 Director Functionality (RX1290/SWO/DIR5)

This option enables Director functionality.

6.11 MPEG-2 HD 4:2:2 Decode (RX1290/SWO/MPEG-2/HD/422)

This option enables MPEG-2 HD 4:2:2 decode functionality.

6.12 MPEG-4 SD Decode (RX1290/SWO/MPEG4/SD)

This option enables MPEG-2 HD decode functionality.

6.13 MPEG-4 HD, SD MPEG-2, HD 4:2:2 Decode (RX1290/SWO/MPEG-4/HD)

This option enables H.264 HD and SD and MPEG-2 HD 4:2:2 decode functionality.

6.14 DVB-S2 QPSK (RX1290/SWO/DVBS2/QPSK)

This option enables the DVB-S2 demodulator option card QPSK demodulation functionality.

6.15 DVB-S2 QPSK and 8PSK (RX1290/SWO/DVBS2/8PSK)

This option enables the DVB-S2 demodulator option card QPSK and 8PSK demodulation functionality.

6.16 DVB-S2 Low Symbol Rate (RX1290/SWO/DVBS2/LSym)

This option enables the DVB-S2 demodulator option card low symbol rate demodulation functionality.

6.17 ProMPEG FEC (RX1290/SWO/IP/PROMPEG)

This option enables the IP Input option card ProMPEG functionality.

6.18 Four Channel Audio Support (RX1290/SWO/4AUD)

This option enables the receiver to simultaneously decode four separate stereo pairs of audio. Four stereo pairs of audio supported for MPEG-1 layer 2 and AAC audio only.

6.19 AAC Audio Support (RX1290/SWO/AAC)

This option enables AAC audio decode support on the receiver.

6.20 Down Conversion (RX1290/SWO/DCONV)

This option enables down conversion of HD to SD video on the receiver.

6.21 Common Interface (RX1290/SWO/CI)

This option enables Common Interface descrambling support on the receiver.

6.22 Provider Lock (RX1290/SWO/PROV/LOCK)

This provides the option to support Provider Lock.

6.23 Web Browser Password Protection (RX1290/SWO/PW)

This provides the option to password protect the web browser of the RX1290.

The default settings for this are:

Password: **password**

Username: **username**

Preventive Maintenance and Fault-finding

Chapter 7

Contents

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7.1 Introduction

This chapter provides the schedules and instructions, where applicable, for routine inspection, cleaning and maintenance which should be performed by an operator. There are also some basic fault-finding procedures to follow in the event of a suspected failure of the RX1290 Multi-Format Receiver.

7.2 Routine Checks

7.2.1 Cooling Fans

There are no routine checks associated with this equipment other than to ensure that the unit is adequately cooled. This equipment must never be operated unless the cooling fans are working. They should be checked 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.

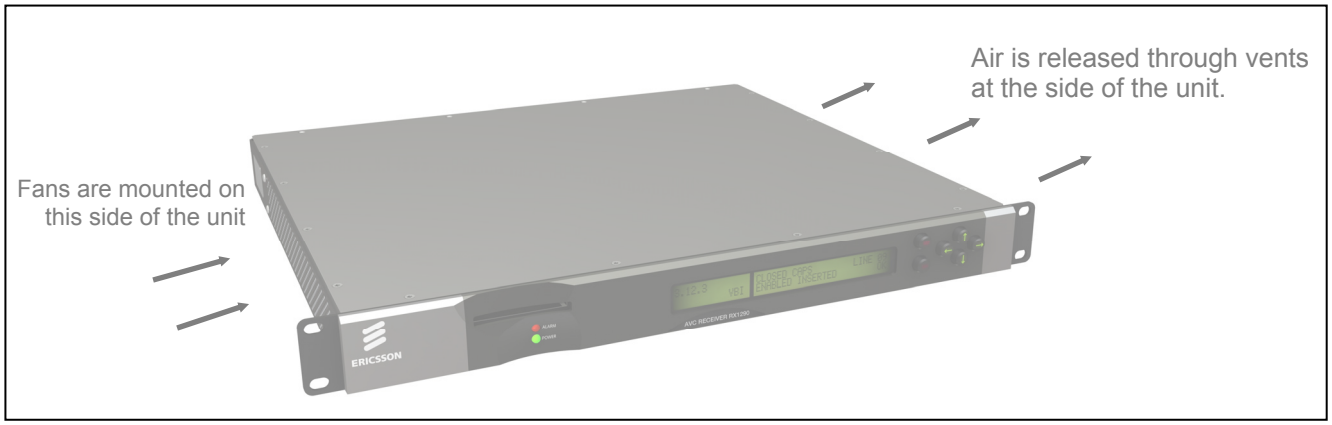

Figure 7.1 Cooling Fans Location

7.2.2 Cleaning

Unplug the equipment from the supply before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning the exterior of the Receiver.

7.3 Servicing

7.3.1 Conditions Requiring Servicing

Warning!

Removing the covers of this equipment may invalidate any warranties, cause a safety hazard or/and affect the EMC performance.

The following is a list of conditions that may indicate the need for servicing:

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.

7.3.2 Replacement Parts

When replacement parts are required, be sure only parts specified by Ericsson (or having the same characteristics as the original part) have been used. Unauthorized substitutions may result in fire, electric shock or other hazards.

7.3.3 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. Also, performance and EMC checks may be required.

7.4 Maintenance and Support Services

7.4.1 Introduction

Our primary objective is to provide first class customer care that is tailored to your specific business and operational requirements. All levels are supported by one or more service performance reviews to ensure the perfect partnership between Ericsson and your business.

7.4.2 Warranty

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

7.4.3 Levels of Continuing Ericsson Service Support

For standalone equipment, then Ericsson **BASIC Essential support** is the value for money choice for you. **BASIC** provides you with year-by-year Service long after the warranty has expired.

For systems support you can choose either **Gold Business Critical support** or **Silver Business Advantage**. These packages are designed to save you costs and protect your income through enlisting the help of Ericsson support specialists.

Call Ericsson Sales for more details.

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Call Ericsson Sales for more details.

7.5 Fault-finding

7.5.1 General

The information contained in this chapter is intended to isolate the unit as the faulty equipment if a system failure occurs. If the following information fails to clear the abnormal condition, please contact Customer Services using the information given in the *Preliminary Pages* of this manual.

7.5.2 System Defaults

The system defaults can be restored at any time using the **Restore System Defaults** option (Menu 7.1.4).

7.5.3 Preliminary Investigations

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 red alarm LED on the front of the unit is not lit. If it is, investigate the Alarm status (see *Chapter 5, Alarms*).
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.

7.5.4 Ethernet Remote Control

Caution!

Be sure to set the correct format and address via the front panel before attempting to use this control method. The Multi-Format Receiver will ignore any remote control commands if the input is not correctly set.

7.6 AC User Accessible Fuse Replacement

Caution!

This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home or business, consult your appliance dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.

The power supply used in this equipment is a wide-ranging, AC power supply unit designed for use in ambient air temperature conditions of 0°C to +50°C for 100 - 240 V AC, 50-60 Hz (see *Annex B, Technical Specification* for details). There are no links or switches to be altered for operation from different AC supplies.

The Multi-Format Receiver is designed for User Accessible Fuse Replacement.

In addition to the fuse in the supply cable plug (if appropriate) there is a fuse held in an integral fuse carrier at the AC power inlet at the rear of the unit.

Table 7.1 Fuse Information

Item	**Specification**
Fuse	Single pole, fitted in live conductor in power input filter at rear of unit.
Fuse type	5 mm x 20 mm anti-surge (T) HBC, IEC/EN 60127-2 Sheet 5
Fuse rating	4 A, 250 V AC

To replace the AC power fuse perform the following:

Warning!

Before replacing the rear panel fuse, disconnect the equipment from the supply. Failure to do this may expose hazardous voltages. Unplug the equipment from the local supply socket.

1. Ensure that power is turned off and the power cable is disconnected from the AC power inlet.
2. Ease out the fuse carrier by placing a small, flat-bladed screwdriver in the notches at the sides of the carrier.

Caution!

When replacing the power input fuse, always ensure that a fuse of the correct type and rating is fitted. Failure to do so results in inadequate protection.

3. Replace the fuse in the carrier.
4. Insert the fuse carrier back in the AC power inlet.

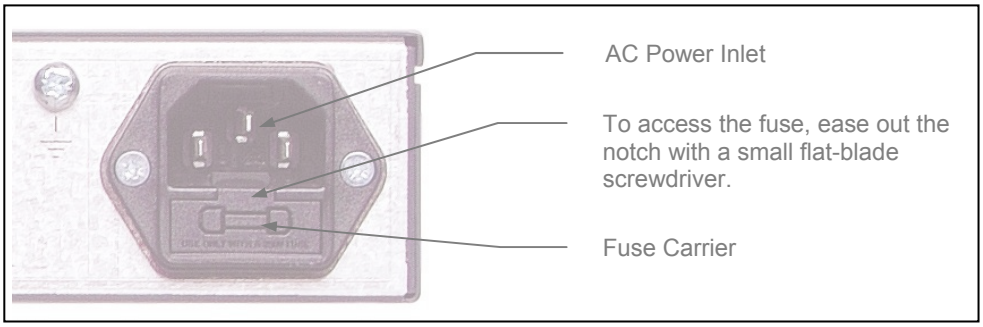

Figure 7.2 Fuse Carrier

If the replacement fuse also blows, do not continue. Disconnect the equipment and contact Customer Services (see *Preliminary Pages*) for advice.

7.7 Disposal

7.7.1 Molded Plugs

If the molded plug fitted to the mains cable supplied with this equipment is not required, use another cable. If the supplied plug is to be changed, cut it off and dispose of it safely.

Warning!

If the molded plug fitted to the mains cable supplied with this equipment is not required, please cut it off and dispose of it safely. Failure to do this may endanger life as live ends may be exposed if the removed plug is inserted into a mains outlet.

7.7.2 Equipment

Dispose of this equipment safely at the end of its life. Local codes and/or environmental restrictions may affect its disposal. Check with your local authority.

Glossary

Annex A

The following list covers most of the abbreviations, acronyms and terms as used in Ericsson 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.
5B6B	5 Binary Bits Encoded to 6 Binary Bits: Block code.
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.

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.
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 Rate: 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**co**der and a complementary **Dec**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 $V_{pk\text{-}pk}$

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 Color Video Black Sync Signal

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 600Ω. 0 dBmV is 1 mV terminated in 75Ω.

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: TTV Lan search shows – DVB Physical 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 Ericsson 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.
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 of WEB 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 a 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.

MEM	Multiplex Element Manager: A GUI-based control system, part of the range of Ericsson AB compression system control element products. The evolution *5*000 MEM holds a model of the system hardware. Using this model, it controls the individual system elements to configure the output multiplexes from the incoming elementary streams. The MEM monitors the equipment status and controls any redundancy switching.
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.
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.
PROM	Programmable Read-Only Memory: A device, which may be written once with data for permanent storage, and then read whenever required. Special types of PROM permit the erasure of all data by Ultraviolet light (EPROM) or by application of an electronic signal (EEPROM).
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: A Ericsson AB proprietary public-key encryption system used to prevent unauthorized viewing of a TV programme or programmes.
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’.
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.
TAXI	Transparent Asynchronous Tx / Rx Interface: A proprietary high speed data interface.
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.
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 Coordinate: An internationally agreed basis for timekeeping introduced in 1972 and based on international atomic time (corresponds to Greenwich Mean Time or GMT).

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).

XILINX A type of programmable Integrated Circuit.

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.

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)

Technical Specification

Annex B

Contents

List of Tables

B.1 Output

B.1.1 Supported Video Resolutions

The Multi-Format Receiver supports H.264, 4:2:0 and 4:2:2.

Table B.1 Supported Video Resolutions

Input Resolutions (H x V)	Frame Rates	Output Format (H x V)	Specification
1920 x 1080 1440 x 1080 1280 x 1080 960 x 1080	25 29.97 30	1920 x 1080 interlaced	SMPTE 274M
1280 x 720 960 x 720	50 59.94 60	1280 x 720 progressive	SMPTE 296M
All SD Formats	29.97 25	720 x 512 interlaced	SMPTE 174M

B.1.2 Supported Video Bit-rates

The equipment supports decoding of non-encrypted compressed video at rates of up to
90 Mbps MPEG-2 and 20 Mbps H.264.

Table B.2 Supported Video Rates

Coding Technology	Parameter	Limit
H.264	Level 3	10 Mbps
H.264	Level 4	20 Mbps
H.264	Level 4.1	20 Mbps
MPEG-2	4:2:0, Main Level	15 Mbps
MPEG-2	4:2:0, High Level	90 Mbps
MPEG-2	4:2:2, Main Level	50 Mbps
MPEG-2	4:2:2, High Level	90 Mbps

B.1.3 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	700mV +/- 7mV
Bar Tilt	VITS17	<0.5%
Sync Level	VITS17	300mV +/- 3mV
DC Offset	VITS17	+/- 100mV
Chrominance to Luminance Gain Inequality	Colour Bars	100 +/- 5%
Chrominance to Luminance Phase Inequality	VITS17	<20nS
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 +/- 0.3 dB
Differential Gain	VITS330	<1.5%
Differential Phase	VITS330	<1 Degree
Non-Linearity	VITS17	<5%
Jitter	VITS17	<5nS
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	+/- 100mV
Chrominance to Luminance Gain Inequality	NTC-7 comp	100 +/- 5%
Chrominance to Luminance Phase Inequality	NTC-7 comp	<20nS

Description	Test Signal	Limit
K factor K 2T	NTC-7 comp	<1%
Pulse X bar K rating		100 +/- 1%
Frequency Response (MultiBurst)	FCC Multi-burst 0.5 MHz 1.25 MHz 2 MHz 3 MHz 3.58 MHz 4.1 MHz	 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.3 dB 0dB +/- 0.3 dB
Differential Gain	NTC-7 comp	<2%
Differential Phase	NTC-7 comp	<1 Degree
Non-Linearity	NTC-7 comp	<5%
Jitter		<5nS
Weighted Luminance Noise	Luminance Ramp	<60 dB
Weighted Luminance Noise	Flat Grey Field	<63 dB
Chrominance PM Noise	Flat Red Field	<55 dB

B.1.4 Performance Figures

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 < 50nS	DC to 30 MHz < 50nS		
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	

Parameter	Value for Y, R, G, B	Value for Pb, Pr	Condition	Notes
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	2.586uS +80nS/-0nS	2.586uS +80nS/-0nS		50% to 50%
Sync amplitude Pos and Neg	300mV ± 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	>2.5V	2.2k Ω	
H and V Sync. Low Voltage	<0.5V	2.2k Ω	

B.1.5 HD SDI

HD SDI output supports:

- Embedded Decoded Audios
- Closed Captioning (EIA 708B)
- VITC
- VANC

B.2 Audio Decoding and Output Stage

B.2.1 General

- The Multi-Format Receiver is capable of simultaneously decoding four PES streams of audio from the transport stream. Each of the decoders is identical in operation, but act completely independently of the other.
- Each channel supports extraction of four 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
- Linear Audio: SMPTE 302M – 2000
- DTS Audio pass-through
- AAC
- HE-AAC
- Dolby E pass-through

Audio component selection is automatic or may be specified from the User Interface or remote interfaces. The Multi-Format Receiver 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, Audio 2 the second, Audio 3 the third and Audio 4 the fourth. These may be overridden by selecting User-specified component PIDs.

B.2.2 MPEG Audio

The Multi-Format Receiver supports decoding of MPEG audio as follows:

- Compression layers: MPEG-1 layers I and II
- Sampling rate (kHz): 48
- Maximum compressed data rate: 384 kbps (layer II)

B.2.3 Dolby Digital AC-3 Audio

The Multi-Format Receiver 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 down mixing, so that either a surround encoded stereo pair (LtRt down mix) or a conventional stereo pair (LoRo down mix) is available at the output.

The Multi-Format Receiver is not able to decode and output all 5.1 channels individually as separate channels.

It is possible to output the compressed Dolby Digital stream from the digital audio output, allowing it to be decoded to 5.1 channels by an external Decoder.

Sampling rate (kHz): 48

Maximum compressed data rate: 640 kbps

Note: Support for Dolby Digital decoding requires approval and licensing from Dolby.

The Multi-Format Receiver is able to receive audio data in the form of linear PCM digital audio data, up to 20 bits in resolution, and makes it available for output as either analogue or digital audio.

B.2.4 DTS Audio

The Multi-Format Receiver is able to detect DTS audio Modes 1, 2 or 3. DTS audio is presented in AES format at the digital audio output.

B.3 Audio Output Format

B.3.1 General

The Multi-Format Receiver 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
- Dolby Digital (AC-3) compressed format

Digital Audio embedded into the HD Serial Digital Video Output is always output using the DIDs for channel mapping specified at the user interface.

B.3.2 Analogue Audio

The Multi-Format Receiver 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.

Audio output connector type: 2 x 9 way female D-type

Output level: +18 dBm nominal clipping level. Selectable in range +12 to +24 dBm.

Output impedance: 50 Ω (nominal).

Table B.7 Analogue Audio Performance Specifications

Parameter	Specification
Output connector	Male 9 pin D-sub
Output format	Balanced
Bit-rates	32 kbps to 384 kbps
Sampling rates	48 KHz
Nominal Output Level	0dBu +/- 0.1 dB in 20 kΩ Output impedance: <20kΩ
Clipping Level	12 dBFS – 24 dBFS (step size 1dB)
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.3.3 Audio Routing

The Multi-Format Receiver supports the following routing of audio signal:

- 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.3.4 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 stereo pair 1 and 2 is ±2 ms because the PTS will be presented independently for each pair.

When using frame sync the lip sync error is up to 40 ms due to audio frame skip and repeats.

B.3.5 Supported Audio Specifications

Table B.8 Supported Audio Specifications

Specification	Description
ISO/IEC 13818-3	Generic Coding of Moving Pictures and Associated Information: (MPEG-2) Audio.
ATSC A-52	Digital Audio Compression Standard (Dolby Digital).
SMPTE 302M	Linear Audio (Ericsson's interpretation of the specification).

B.3.6 Supported Audio Bit-rates

Table B.9 Supported Audio Data Bit-rates (MPEG-2)

Mono kbps	Stereo kbps
32	64
48	96
56	112
64	128
80	160
96	192

Mono kbps	Stereo kbps
112	224
128	256
160	320
192	384

B.3.7 Digital Audio Outputs

Digital audio outputs comply with E1A-422[1] and have a maximum data rate of 3.072 Mbps.

Digital audio is output on two 9-way, D-type and four BNC connectors.

Audio output: balanced 2 – 7 Volts.

B.4 Input Specifications

B.4.1 DVB-S2 Satellite Receivers

B.4.1.1 General

Table B.10 DVB-S2 Satellite Receiver Input Specification

Parameter	Specification
L-band input	
Safety status	TNV - 1
Number of inputs	4 (RX1290/HWO/DVBS2) 3 (RX1290/HWO/DVBS2/IF/CONST)
Input connector type	F-type, female 75 Ω
Input impedance	75 Ω
Return loss	> 11 dB
Isolation between inputs	> 60 dB, typically 70 dB
L-band Frequency	
Tuning range[2]	Fc = 950 to 2150 MHz
Tuning step	1 kHz
Carrier frequency search	± 1 to ± 5 MHz

[1] EIA-422-A-1978: Electrical characteristics of balanced voltage digital interface circuits.
[2] 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.

Parameter	Specification
range	
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
IF Monitor Input	
Safety Status	SELV
Number of inputs	0 (RX1290/HWO/DVBS2) 1 (RX1290/HWO/DVBS2/IF/CONST)
Input connector type	BNC, female 75 Ω
Input impedance	75 Ω
Return loss	-19 dB typical
Tuning range	Fc = 50 to 180 MHz
Tuning Step	1 kHz
Input power level per carrier	-40 to –25 dBm
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.11*
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 = 1 to 31 MSymbol/s, (1 Msym/s min with low symbol rate license)

Parameter	Specification
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.12*
Constellation Output[3]	
Availability	RX1290/HWO/DVBS2/IF/CONST only
Safety status	SELV
Number of outputs	2 (I and Q)
Output connector type	BNC, female 75 Ω
Output impedance	75 Ω
Miscellaneous	
DVB-S Phase noise tolerance4	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)
DVB-S2 Phase noise tolerance5	-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.13*

Table B.11 shows the Eb/No requirements for DVB-S and *Table B.12* for DVB-S2 Es/No requirements to ensure error-free demodulation for all supported FEC rates.

[3] Enabling this feature disables output transport stream and renders the receiver unable to decode a service. Operational for DVB-S2 modes only.
[4] These specifications apply in the presence of thermal noise at the threshold Eb/N_0 ratio given in *Table B.11*
[5] These specifications apply in the presence of thermal noise at the threshold Es/No ratio given in *Table B.12* and assume a degradation to the thermal noise performance of 0.3 dB.

Table B.11 DVB-S2 Satellite Receiver 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 Customer Services.

Table B.12 DVB-S2 Satellite Receiver 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 Customer Services.

[6] Add 0.2 dB (0.4 dB for FEC 3/5) to any system calculation for modulator – demodulator implementation margin

B.4.2 LNB Power and Control

The Multi-Format Receiver provides LNB power and control signals through the active RF input connector. LNB power and controls are enabled through the Satellite Input Menu, see *Annex C, Menus*.

The Multi-Format Receiver 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.13.*

Table B.13 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	
Boost voltage	1 V typical	

B.4.3 TTV G.703 (DS3 and E3) OTTV G.703 (DS3 and E3) (Option Card)

Table B.14 TTV G.703 Input Specification

Input	**Specification**
Safety status	SELV
Connector type	BNC, Female
Input impedance	75 Ω
Data rate	DS3: 45 Mbps E3: 34 Mbps
Network Type	PDH
Network Specification	CCITT (ITU-T) G.703
Reed-Solomon	On/Off, Not available in 188-packet mode

[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.

Input	Specification
De-Interleaver	On/Off, Not available in 188-packet mode
Status LED	Green: Lock, Red: No Lock
Output Connector	Not in use

B.4.4 DVB-ASI Input

Table B.15 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.4.5 10/100BaseT IP Input (Option Card)

Table B.16 10/100BaseT IP Input Specifications

Input	Specification
Safety status	SELV
Connector type	8-way RJ-45
Connector Designation	10/100 BT
Signal Type	10/100BaseT Ethernet (IEEE 802.3/802.3u)
Data Rate	1.5 – 50 Mbps

B.4.6 100/1000BaseT Dual NIC Input (Option card)

Table B.17 100/1000BaseT 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

Input	Specification
	Duplex mode
Data Rate	1.5 – 208 Mbps
TS	CBR MPTS/SPTS feeds
Error correction	Pro MPEG FEC

B.4.7 Frame Sync Connector

The Decoder 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 HD 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.18 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.5 Output Specifications

B.5.1 Video Outputs

B.5.1.1 Analogue HD Video

Table B.19 Analogue Video Output Connectors

Item	Specification
Safety status	SELV
Connector type	15-way D-type
Connector designation	Video Out
Video standards	1080 interlaced
Video level (luminance)	700 mV ± 30 mV

B.5.1.2 Digital Video

Table B.20 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

Table B.21 625 Line

Description	Test Signal	Limit
Bar Level	VITS17	700mV +/- 7mV
Bar Tilt	VITS17	<0.5%
Sync Level	VITS17	300mV +/- 3mV
DC Offset	VITS17	+/- 100mV
Chrominance to Luminance Gain Inequality	Color Bars	100 +/- 5%
Chrominance to Luminance Phase Inequality	VITS17	<20nS
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 +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB
Differential Gain	VITS330	<1.5%
Differential Phase	VITS330	<1 Degree
Non-Linearity	VITS17	<5%
Jitter	VITS17	<5nS

Description	Test Signal	Limit
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.22 525 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	+/- 100mV
Chrominance to Luminance Gain Inequality	NTC-7 comp	100 +/- 5%
Chrominance to Luminance Phase Inequality	NTC-7 comp	<20nS
K factor K 2T	NTC-7 comp	<1%
Pulse X bar K rating		100 +/- 1%
Frequency Response (MultiBurst)	FCC Multi-burst 0.5 MHz 1.25 MHz 2 MHz 3 MHz 3.58 MHz 54.1 MHz	 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB 0dB +/- 0.2 dB
Differential Gain	NTC-7 comp	<2%
Differential Phase	NTC-7 comp	<1 Degree
Non-Linearity	NTC-7 comp	<5%
Jitter		<5nS
Weighted Luminance Noise	Luminance Ramp	<60 dB
Weighted Luminance Noise	Flat Grey Field	<63 dB
Chrominance PM Noise	Flat Red Field	<55 dB

B.5.2 Audio Outputs

Table B.23 Digital (Unbalanced) Audio Connectors

Item		Specification
Connector type		BNC 75 Ω socket
Connector designation		AUD 1, AUD 2, AUD 3 and AUD 4
Pin-outs	Centre Shield	Digital Audio output (AES/EBU) Ground/Chassis

Table B.24 Analogue and Digital Audio Output Connector

Item	Specification
Safety status	SELV
Connector type	2 x 9-Way D-type
Connector designation	AUDIO 1 AUDIO 2
Output level	+18 dBm nominal clipping level. Selectable in range 12 to +24 dBm.
Nominal output impedance	50 Ω
Load impedance	≥600 Ω
Compressions layers	MPEG-2 layer 1 and 2, linear audio and Dolby Digital (AC-3)
Sampling rates	48 kHz
Output formats	Analogue, AES3 and Dolby Digital AC-3

B.5.3 Data Outputs

B.5.3.1 RS-232 Asynchronous (Low-speed) Data

Table B.25 RS-232 Asynchronous (Low-speed) Data Connector

Item	Specification
Safety status	SELV
Connector type	9-Way D-type
Connector designation	RS232/RS422 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.5.3.2 High Speed Data over Ethernet

This connector is located at the back of the unit using the RJ-45 Ethernet port and is enabled through the license key (RX1290/SWO/HSETHER).

Table B.26 High Speed Data Over Ethernet Connector

Item	Specification
Safety status	SELV
Connector Type	RJ-45 (100BaseT)
Connector designation	10/100BaseT
Data rates (bit/s)	5 Mbps
Standards	ETSI EN 301 192 v.1.2.1 (1999-06), Section 4
De-encapsulation type	Data-Piping (Proprietary)

B.5.4 SNMP Remote Control Connector

Table B.27 SNMP Control Connector

Item	Specification
Safety status	SELV
Connector type	RJ-45 (100BaseT)
Connector designation	10/100BaseT
Standard	Ericsson SNMP Control MIB

B.5.5 Alarm Connector

Table B.28 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 Vdc / 30 V AC

Item	Specification
Maximum Switching Power	24 W / 60 VA
Minimum Switching Load	0.1 mA, 100 mV DC

B.6 Environmental

B.6.1 Conditions

Table B.29 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)

B.7 Compliance[8]

B.8 Safety

This equipment has been designed and tested to meet the requirements of the following:

EN 60950-1	European	Information technology equipment - Safety.
IEC 60950-1	International	Information technology equipment - Safety.
UL 60950-1	USA	Information Technology Equipment - Safety.

[8] The version of the standards shown is that applicable at the time of manufacture.

B.8.1 EMC[9]

The equipment has been designed and tested to meet the following:

EN 55022 and CISPR22	European International	Emission Standard Limits and methods of measurement of radio frequency interference characteristics of information technology equipment - Class A.
EN 61000-3-2[10]	European	Electromagnetic Compatibility (EMC), Part 3 Limits; Section 2. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3[10]	European	Electromagnetic Compatibility (EMC), Part 3. Limits; Section 3. Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current ≤ 16 A.
EN 55024	European	Information technology equipment - Immunity characteristics - Limits and methods of measurement.
FCC	USA	Conducted and radiated emission limits for a Class A digital device, pursuant to the Code of Federal Regulations (CFR) Title 47-Telecommunications, Part 15: Radio frequency devices, subpart B - Unintentional Radiators.

B.8.2 Telecommunications

If certain Option Modules (telecom interfaces) are fitted, this equipment comes within the scope of the RTTE Directive, 1999/5/EC. Compliance with the applicable essential requirements of this Directive (safety and EMC) are met by conformance with the safety and EMC standards listed above.

B.8.3 CE Marking

CE

The CE mark is affixed to indicate compliance with the following directives:

DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE

[9] The EMC tests were performed with the Technical Earth attached, and configured using recommended cables.
[10] Applies only to models of the Product using ac power sources.

COUNCIL of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility

1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. (If fitted with telecom type interface modules).

Note: The CE mark was first affixed to this product in 2006.

B.8.4 C-Tick Mark

The C-Tick mark is affixed to denote compliance with the Australian Radiocommunications (Compliance and Labelling – Incidental Emissions) Notice made under s.182 of Radiocommunications Act 1992.

Note: The C-Tick mark was first affixed to this product in 2006.

B.8.5 Packaging Statement

The Stratocell® or Ethafoam 220® polyethylene foam inserts can be easily recycled with other low density polyethylene (LDPE) materials.

B.8.6 Packaging Markings

The symbols printed on the outer carton are described below:

Handle with care.

This way up.

Fragile.

Protect from moisture.

See Reference Guide for compliance with directives details.

See Reference Guide for compliance details.

Defines country of origin.

The packaging is reusable per GB 18455-2001.

This symbol guarantees that packaging with this symbol is recyclable and will be accepted by cardboard recyclers.

Recyclable per GB 18455-2001.

B.8.7 Materials Declarations

Ericsson's products are designed and manufactured in keeping with good environmental practice. Our component and materials selection policy prohibits the use of a range of potentially hazardous materials. In addition, we comply with relevant environmental legislation.

B.8.7.1 For the European Union

For products sold into the EU after 1st July 2006, we comply with the EU RoHS Directive. We also comply with the WEEE Directive.

B.8.7.2 For China

For product sold into China after 1st March 2007, we comply with the "Administrative Measure on the Control of Pollution by Electronic Information Products". In the first stage of this legislation, content of six hazardous materials has to be declared together with a statement of the "Environmentally Friendly Use Period (EFUP)": the time the product can be used in normal service life without leaking the hazardous materials. Ericsson expects the normal use environment to be in an equipment room at controlled temperatures (around 22°C) with moderate humidity (around 60%) and clean air, near sea level, not subject to vibration or shock.

Where an Ericsson product contains potentially hazardous materials, this is indicated on the product by the appropriate symbol containing the EFUP. For Ericsson products, the hazardous material content is limited to lead (Pb) in some solders. This is extremely stable in normal use and the EFUP is taken as 50 years, by comparison with the EFUP given for Digital Exchange/Switching Platform in equipment in Appendix A of "General Rule of Environment-Friendly Use Period of Electronic Information Products". This is indicated by the product marking:

It is assumed that while the product is in normal use, any batteries associated with real-time clocks or battery-backed RAM will be replaced at the regular intervals.

The EFUP relates only to the environmental impact of the product in normal use, it does not imply that the product will continue to be supported for 50 years.

B.8.8 Equipment Disposal

B.8.8.1 General

Dispose of this equipment safely at the end of its life. Local codes and/or environmental restrictions may affect its disposal. Regulations, policies and/or environmental restrictions differ throughout the world. Contact your local jurisdiction or local authority for specific advice on disposal.

B.8.8.2 For the European Union

"This product is subject to the EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) and should not be disposed of as unsorted municipal waste."

B.8.9 Recycling

Ericsson SA TV Recycling has a process facility that enables customers to return Old and End-of-Life Products for recycling if it is required.

Ericsson provides assistance to customers and recyclers through our Ericsson and SATV Recycling eBusiness Portal.

This can be reached at: https://ebusiness.ericsson.net/.

To gain access to the Recycling site, you must be set up with a unique login and password.

To request the login, please contact tvtechpubs@ericsson.com, and include the information below:

- First/Last name
- Password request (6 numbers/characters). If you do not include this information one will be created for you.
- Phone
- Location (Country)

- Company
- Work Area (select one of the below)
  - Executive Management
  - Marketing and Sales
  - Planning/Engineering
  - Procurement/Supply
  - Project & Programme
  - Implementation
  - Operations and Maintenance
  - R&D
  - Other

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Menus

Annex C

Contents

List of Tables

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C.1 LCD Menus

C.1.1 Using the Menus

Detailed description of the use of menus is given in *Chapter 3, Operating the Equipment Locally*.

C.1.2 Menu Descriptions

This annex describes the front panel LCD menus.

When the unit is first powered up, it progresses through a series of start-up pages on the LCD display.

The menu is created in a tree structure, where each branch may contain items, new branches, or both.

An item is viewed as an information string on the left side of the LCD, with an editable or selectable item on the right side, or an information string.

A path to a new sub branch is viewed as an information string on the left side of the LCD, where the string starts with a **>** character. The **>** symbolizes the arrow pushbutton to press, to enter the submenu.

C.2 Menu Pages - Main Menu

The main menu displays the highest points of each submenu. These points represent the main functional areas of the Multi-Format Receiver.

Table C.1 Main Menu Items

Display Title: Main Menu	Description	Section
Presets	Enters the Presets menu.	*C.4*
Input	Enters the Input menu.	*C.5*
Service	Enters the Service menu.	*C.7*
CA	Enters the Conditional Access menu.	*C.7.1*
Output	Enters the Output menu.	*C.8*
Alarms	Enters the Alarms menu.	*C.9*
System	Enters the System menu.	*C.10*

C.3 The Menu Structure

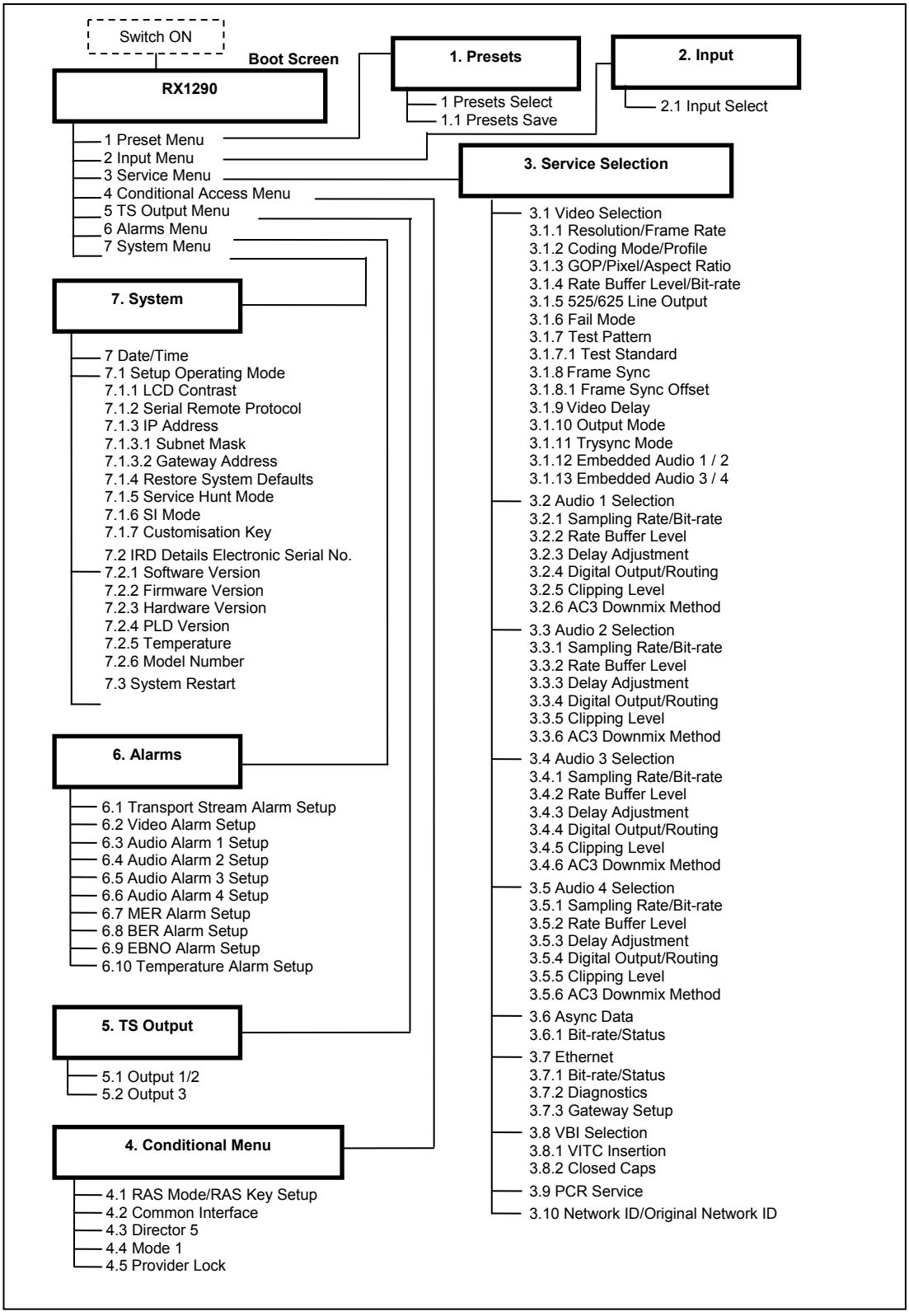


Figure C.1 Menu Structure

C.4 Presets Menu Items (Menu 1)

The **Presets** menu contains up to 40 editable preset numbers in the range 01 – 40. Selecting a Service via the Presets menu automatically reconfigures the input of the Multi-Format Receiver. Each preset can have a selected language, network name and service provider associated with it.

Table C.2 Presets Menu Items

Display Title: Presets	**Description**
Select #YY of 40 XXXXXXXXXXXXXXXXXXXXXXX	Where YY is the EDITABLE preset number in the range 01 – 40; XXXXXXXXXXXXXXXXXXXXXXX is the stored preset service name
Save XXXXXXXXXXXXXXXXXXXXXXX as #YY of 40	Where XXXXXXXXXXXXXXXXXXX is the current service name from the SDT; YY is the EDITABLE preset number in the range 01 – 40

C.5 Input Status Menu (Menu 2)

C.5.1 Overview

The **Input Status** menu is the primary reference for transport stream lock status.

Table C.3 Input Status Menu Items

Display Title: Input	**Description**	**Section**
WWWWWWWWWW ZZZ TID XXXXX Bit-rate YYY.YY Mbit/s	WWWWWWWWWW is the transport lock status (LOCKED, NOT LOCKED) XXXXX is the transport stream ID YY.YY is the Transport stream rate (YYY.YY above 100 Mbit/s) ZZZ indicates the packet byte length of the current TS (188, 204)	
Input Selection	The submenu allows the user to select the TS source.	*C.5.2*
Input Selection Option	The submenu accesses the option card parameters.	*C.5.4*

C.5.2 Input Selection Menu

The **Input Selection** menu allows the user to select the Transport Stream source.

Table C.4 Input Selection Menu

Display Title: Input	Description
Select XXXX	XXXX is the editable input source selection (ASI, SMPTE 310, any option cards).

C.5.3 DVB-S2 Option
DVB-S2 Input Option (RX1290/HWO/DVBS2 or RX1290/HWO/DVBS2/IF/CONST)

When a DVB-S2 interface is used, the Input menu allows the user to edit the parameters.

Table C.5 DVB-S2 Input Menu

Display Title: Input	Description
Input Quality	
BER[1] XX	XX is the signal quality expressed as BER
C/N YY	YY is the estimated carrier to noise ratio in dB
C/N Margin ZZ	ZZ is the estimated carrier to noise ratio margin to failure in dB
Input Select	
Source XX	XX is 1, 2 3 or 4 for RX1290/HWO/DVBS2 XX is 1,2,3, IF for RX1290/HWO/DVBS2/IF/CONST
Input LNB Frequency RR	RR is the LNB FREQUENCY in MHz
Satellite Frequency SS	SS is the SATELLITE FREQUENCY in MHz
Symbol Rate TT	TT is the SYMBOL RATE in Msym/s
Modulation UU	UU is the MODULATION Standard (DVB-S or DVB-S2)
Roll-off VV	VV is the spectral ROLL-OFF (35%, 25%, 20%)
Search Range WW	WW is the SEARCH Range in kHz
Mode XX[2]	XX is the constellation output mode (NORMAL or CONSTELLATION)
LNB Power YY	YY is the LNB POWER (ON, OFF or BOOSTED)
LNB 22 kHz ZZ	ZZ is ENABLE/DISABLE

C.5.4 TTV G.703 (DS3 and E3) Option Menu

When a TTV G.703 input interface is used, the Input menu allows the user to edit the set-up parameters

[1] BER is Post Viterbi BER for DVB-S, Packet Error Ratio for DVB-S2
[2] TT1260/HWO/DVBS2/ASI/IF/C option only. Enabling CONSTELLATION Mode renders the receiver unable to decode a service.

Table C.6 TTV G.703 Menu

Display Title: Input	Description
STATUS	
PDH Rate XXXXX	XXXXX is the framing mode of the TTV G.703 input module (None, C-Bit, M13)
RANDOMISATION XXXX STUFFING PKTS YYYY	XXXX (ACTIVE, NOT ACTIVE) YYYY (PRESENT, NOT PRESENT)
SETUP	
REED-SOLOMON DECODER XXXXX	XXXXX is the EDITABLE Reed-Solomon option. (DISABLED, ENABLED)
INTERLEAVER XXX	XXX.X is the EDITABLE Interleaver option (DISABLED, ENABLED)
INPUT SENSITIVITY XXXX	XXXX is the EDITABLE Signal Level option (NORMAL, LOW)

C.5.5 10/100BaseT IP Input Option Menu

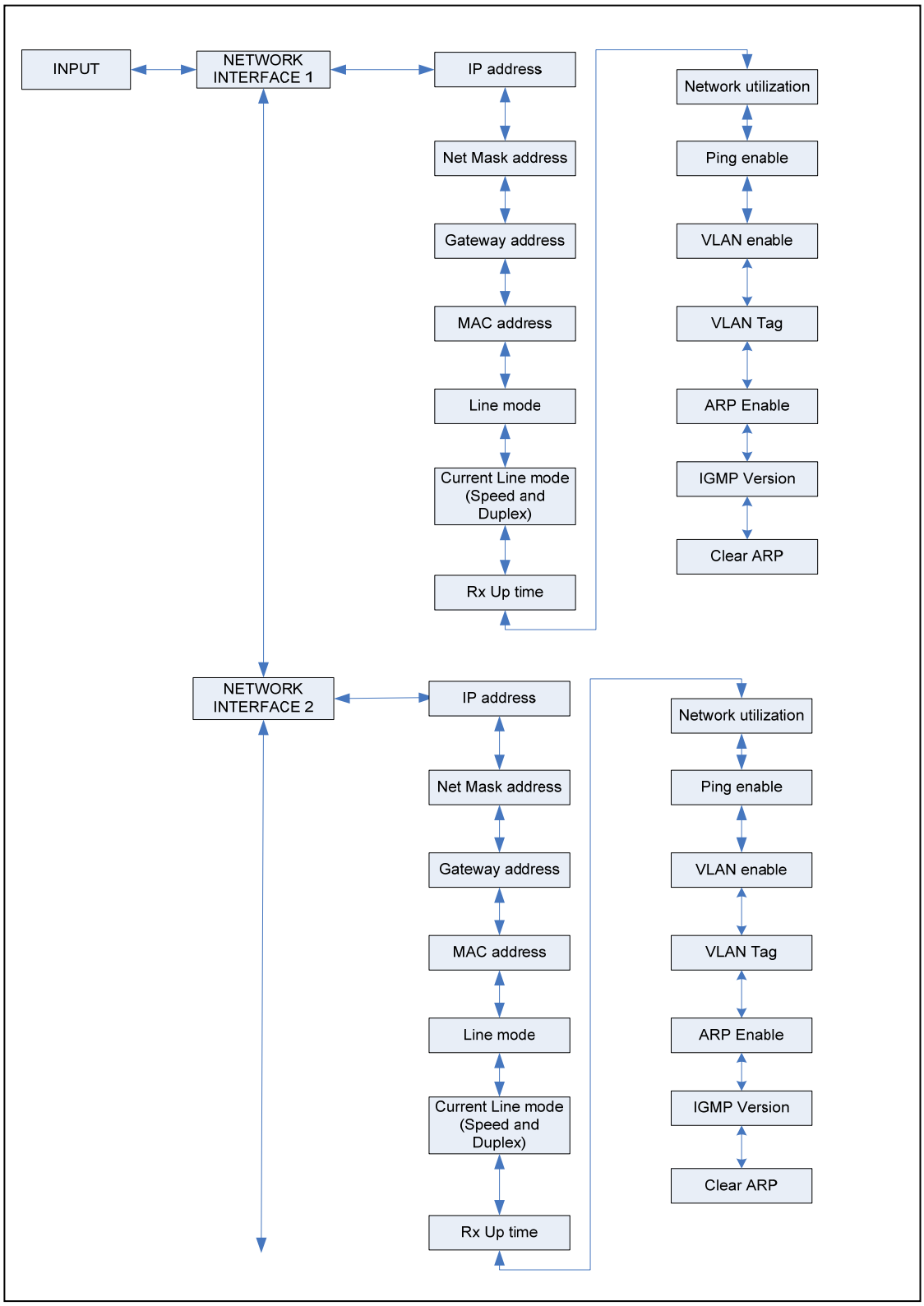
When a 10/100BaseT input interface is used, the Input menu allows the user to edit the set-up parameters

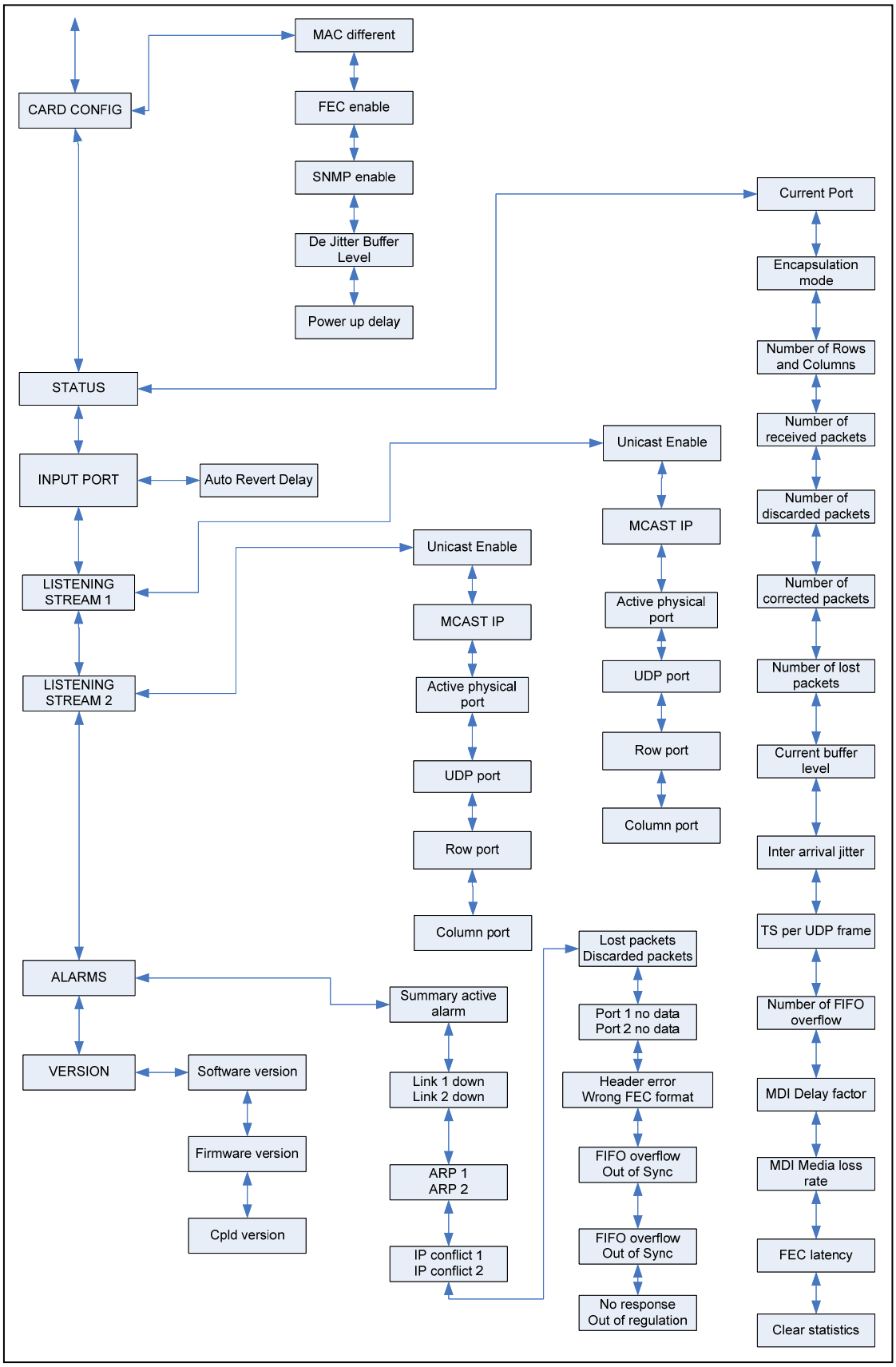
Table C.7 IP Input Menu

Display title: Input	Description
STATUS	
Last IP Received From XXXX.XXXX.XXXX.XXXX	XXXX.XXXX.XXXX.XXXX is the IP address the last MPEG-2 packet was received from.
Encapsulation Mode YYYY	YYYY (UDP ONLY, RTP ONLY, RTP FEC MODE)
XXXX	XXXX status (NO DATA, LINK DOWN, OUT OF REGULATION)
SETUP	
UDP PORT NUMBER XXXXX	XXXXX shows the EDITABLE UDP Port Number on which the IP Input Card is listening for packets.
IP ADDRESS XXXX.XXXX.XXXX.XXXX	XXXX.XXXX.XXXX.XXXX is the EDITABLE IP address of the IP input card.
NETWORK MASK XXXX.XXXX.XXXX.XXXX	XXXX.XXXX.XXXX.XXXX is the EDITABLE subnet mask of the IP input card.
DEFAULT GATEWAY XXXX.XXXX.XXXX.XXXX	XXXX.XXXX.XXXX.XXXX is the EDITABLE gateway address of the IP input card.
MULTICAST IP ADDRESS XXXX.XXXX.XXXX.XXXX	XXXX.XXXX.XXXX.XXXX is the EDITABLE multicast IP address of the IP input card.

C.5.6 100/1000BaseT Dual IP NIC Input Option Menu

When a 100/1000BaseT input interface is used, the Input menu allows the user to edit the set-up parameters.




MAC different
CARD CONFIG
FEC enable
SNMP enable
De Jitter Buffer Level
Power up delay
Current Port
Encapsulation mode
Number of Rows and Columns
STATUS
Number of received packets
Unicast Enable
INPUT PORT
Auto Revert Delay
Number of discarded packets
MCAST IP
Unicast Enable
LISTENING STREAM 1
Number of corrected packets
Active physical port
MCAST IP
UDP port
LISTENING STREAM 2
Number of lost packets
Row port
Active physical port
Current buffer level
Column port
UDP port
Inter arrival jitter
Row port
Column port
TS per UDP frame
Lost packets Discarded packets
ALARMS
Number of FIFO overflow
Summary active alarm
Port 1 no data Port 2 no data
VERSION
Software version
Link 1 down Link 2 down
Header error Wrong FEC format
MDI Delay factor
Firmware version
FIFO overflow Out of Sync
MDI Media loss rate
ARP 1 ARP 2
Cpld version
FEC latency
IP conflict 1 IP conflict 2
FIFO overflow Out of Sync
Clear statistics
No response Out of regulation

C.6 Conditional Access Menu

C.6.1 Overview

The CA Menu allows the user to enter the various keys required for the different scrambling modes.

C.6.2 RAS Mode

Allows the user to select between DSNG KEY MODE and FIXED KEY MODE

Table C.8 RAS Mode Menu

Display	Description
CA RAS DSNG KEY MODE KEY XXXXXXX	XXXXXXX is the DSNG Key

C.6.3 Common Interface

Table C.9 Common Interface Menu

Display	Description
COMMON INTERFACE DISPLAY XXXX (Displays information about common interface card inserted)	XXXX display CI card detected

C.6.4 Director 5

Contains information regarding Director V5

Table C.10 Director 5 Menu

Director 5 Display	Description
Authorization Status XXXX	XXXX display is authorized
Unique Hardware ID XXXX XXXX XXXX XXXX	XXXX XXXX XXXX XXXX displays unique hardware ID
ManuF ID XX h HW TYPE XX h Model ID XX h	XX is relevant ID codes
Download Status XXX XX XX- XX XXX	XXX XX XX- XX XXX is download status

Director 5 Display	Description
NCP Lock Override PIN XXXX	XXXX is PIN code
RESET Lock Override PIN XXXXXXXXXXXXX	XXXXXXXXXXXXX is PIN code
NCP EXTENDED TIMEOUT XXXX	XXXX enabled/disabled
POWER UP CARRIER XXXX	XXXX is clear carrier slot
EMERGENCY HOME CARRIER XXXX	XXXX is clear carrier slot

C.6.5 CA Mode

Table C.11 CA Mode Menu

Display	Description
CA MODE X BISS KEY YYYYYYYYYYY	X is CA mode to be selected YY is the BISS KEY
USER ID ONE BISS XXXXXXXXXXX	XXX is the BISS KEY
USER ID TWO BISS XXXXXXXXXXX	XXX is the BISS KEY

C.6.6 CA Provider Lock

Table C.12 CA Provide Lock Menu

Display	Description
PROVIDER ID XXXXXXX	XX Provider ID Key

C.7 Service Menu (Menu 3)

C.7.1 Overview

The **Service** menu allows access to the currently available services. This group provides a summary of the data streams associated with the decoded service. In the case of multiple streams of the same component type, each stream can be selected independently.

After making a selection (in EDIT mode using page 1), and selecting the required component data streams (using the other pages), pressing SAVE makes it the current service. The audio and data modules will decode according to the default parameters set in other pages.

Table C.13 Service Menu

Display Title: Service	Description	Section
Video	The Video signal status submenu contains information about the currently decoded MPEG-2 video.	*C.7.2*
Audio 1	The Audio 1 signal status submenu contains information about the audio format and quality of the currently decoded audio stream on the primary audio output.	*C.7.3*
Audio 2	The Audio 2 signal status submenu contains information about the audio format and quality of the currently decoded audio stream on the secondary audio output.	*C.7.4*
Audio 3	The Audio 3 signal status submenu contains information about the audio format and quality of the currently decoded audio stream on the secondary audio output.	*C.7.5*
Audio 4	The Audio 4 signal status submenu contains information about the audio format and quality of the currently decoded audio stream on the secondary audio output.	*C.7.6*
Async Data	The Async Data submenu allow status monitoring and configuration of the low and high speed data.	*C.7.7*
Ethernet Data	The Ethernet Data sub menu allows status monitoring and configuration of the High Speed Data over Ethernet.	*C.7.8*
VBI	The VBI status submenu displays the current status of the VBI components.	*C.7.9*
PCR PID	The PCR PID submenu displays the Program Clock Reference packet identifier and its status.	*C.7.10*
Network ID	The Network ID submenu displays the network ID and the Original Network ID from the current Service Description Tables.	*C.7.11*

C.7.2 Video Menu

The **Video** signal status submenu contains information about the currently decoded MPEG-2 video.

Table C.14 Video Menu

Display Title: Video	Description
XX Stream PID ZZZZ YYYY	XX is the number of video streams ZZZZ is the currently selected video stream PID YYYY is the currently selected video stream status (OK, STOP, FAIL)
Resolution XXXXXXXXX Frame Rate YY.YY Hz	XXXXXXXXX is the current video resolution (e.g. 1920 x 1080) YY.YY is the current video frame rate (25 Hz, 29.97 Hz)
Coding mode XXXXX Profile YYYYY	Coding mode is the current video coding (4:2:0, 4:2:2) Is the current video profile (ML@HL)
GOP Structure Y…..Y Pixel Aspect Ratio YYY	Y…..Y video GOP structure and length YYY is the current video aspect ratio (16:9)
Rate Buffer Level XXX% Bit-rate YY.YY Mbit/s	XXX is the current video rate buffer level fill percentage YY.YY is the current video stream bit-rate
Fail mode YYYYYYYYYYY	YYYYYYYYYYY is the editable parameter for setting the response to loss of video (FREEZE FRAME, BLACK FRAME, BLUE FRAME, 75% BARS AND RED, BLUE PLUS TEXT, RED PLUS TEXT, BLACK PLUS TEXT)
Test Pattern XXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXX is the editable video test pattern to be displayed: NONE, 75% BARS AND RED, MOVING BAR, BORDER, 100% COLOUR BARS, PATHOLOGICAL, MULTIBURST, MONITOR LINEUP, CONTRAST
Test Pattern Standard XXXXXXXX	XXXXXXXX is the editable standard for the test pattern: AUTO, 1080i 30 Hz, 1080i 29.97 Hz, 1080i 25 Hz, 1080i 24 Hz, 1080i 23.976 Hz, 720p 60 Hz, 720p 59.94 Hz, 720p 50 Hz, 480i 29.97 Hz, 576i 25 Hz
Framesync XXXXXXX YYYYYYYY	XXXXXXX is the editable parameter for Framesync enable (ENABLED, DISABLED) YYYYYYYY shows the presence of a framesync input (SIGNAL NOT PRESENT, SIGNAL PRESENT, FRAME RATE MISMATCH, SIGNAL LOCKED);
Framesync PAL Offset XXXXXX Framesync NTSC Offset YYYYYY	XXXXXX is the editable PAL framesync offset range –199999 to+199999 pixels YYYYYY is the editable NTSC framesync offset range –199999 to +199999 pixels
4:2:0 Delay XXX ms 4:2:2 Delay YYY ms	XXX is the editable parameter for delaying 4:2:0 video frames (0 to 100 ms) YYY is the editable parameter for delaying 4:2:2 video frames (0 to 100 ms)
Output Mode YYY%	YYY is the editable video output mode (RGB, YPbPr)
Trisync Mode	Trisync on (NONE, ALL, GREEN)

Display Title: Video	Description
Embedded Audio ID Group	Group 1,2,3 or 4
525 Line Output	NTSC-M, PAL-M, NTSC-MNP
625 Line Output	PAL-B/G/I, PAL-N,PAL-N CMB

C.7.3 Audio 1 Menu

The **Audio 1** signal status submenu contains information about the audio format and status of the currently decoded audio stream on the primary audio output.

Table C.15 Audio 1 Menu

Display Title: Audio 01	Description
XX Streams PID YYYY WWWW WWWW W VVV ZZZZ	XX is the number of Audio streams present YYYY is the currently selected audio1 PID ZZZZ is the stream status (OK, STOP, FAIL) VVV is the audio layer (MUS, LIN, DD) WWWWWWW is the audio language
Sampling Rate XX.X kHz Bit-rate YYY kbit/s	XX.X is the Audio 1 sample rate YY is the Audio 1 bit-rate
Rate Buffer Level	Audio 1 percentage rate buffer level
Delay Adjustment XXX.X ms	XXX.X is the Audio 1 decoding delay (range +/- 0 to 49ms)
Digital Output XXXXX Routing YYYYYY	XXXXX is the editable Audio 1 digital output format (AES3, AC-3) YYYYYY is the editable Audio 1 output routing (STEREO, MIXED TO BOTH, LEFT TO BOTH, RIGHT TO BOTH)
Clipping Level XX dB	XX is the editable Audio 1 clipping value (12 – 24 dB)
AC3 Downmix Method XXXXXXXXXXXXX	XXXXXXXXXXXXX is the editable Dolby Digital AC-3 downmix parameter (SURROUND STEREO, CONVENTIONAL STEREO)

C.7.4 Audio 2 Menu

The **Audio 2** signal status submenu contains information about the audio format and status of the currently decoded audio stream on the secondary audio output.

Table C.16 Audio 2 Menu

Display Title: Audio 02	Description
XX Streams PID YYYY WWWW WWWW W VVV ZZZZ	XX is the number of Audio streams present YYYY is the currently selected audio2 PID ZZZZ is the stream status (OK, STOP, FAIL) VVV is the audio layer (MUS, LIN, DD)

Display Title: Audio 02	Description
	WWWWWWW is the audio language
Sampling Rate XX.X kHz Bit-rate YYY kbit/s	XX.X is the Audio 2 sample rate YY is the Audio 2 bit-rate
Rate Buffer Level	Audio 2 percentage rate buffer level
Delay Adjustment XXX.X ms	XXX.X is the Audio 2 decoding delay (range +/- 0 to 49ms)
Digital Output XXXXX Routing YYYYYY	XXXXX is the editable Audio 2 digital output format (AES3, AC-3) YYYYYY is the editable Audio 2 output routing (STEREO, MIXED TO BOTH, LEFT TO BOTH, RIGHT TO BOTH)
Clipping Level XX dB	XX is the editable Audio 2 clipping value (12 – 24 dB)
AC3 Downmix Method XXXXXXXXXXXXX	XXXXXXXXXXXXX is the editable Dolby Digital AC-3 downmix parameter (SURROUND STEREO, CONVENTIONAL STEREO)

C.7.5 Audio 3 Menu

The **Audio 3** signal status submenu contains information about the audio format and status of the currently decoded audio stream on the secondary audio output.

Table C.17 Audio 3 Menu

Display Title: Audio 02	Description
XX Streams PID YYYY WWWW WWWW W VVV ZZZZ	XX is the number of Audio streams present YYYY is the currently selected audio3 PID ZZZZ is the stream status (OK, STOP, FAIL) VVV is the audio layer (MUS, LIN, DD) WWWWWWW is the audio language
Sampling Rate XX.X kHz Bit-rate YYY kbit/s	XX.X is the Audio 3 sample rate YY is the Audio 3 bit-rate
Rate Buffer Level	Audio 3 percentage rate buffer level
Delay Adjustment XXX.X ms	XXX.X is the Audio 3 decoding delay (range +/- 0 to 49ms)
Digital Output XXXXX Routing YYYYYY	XXXXX is the editable Audio 3 digital output format (AES3, AC-3) YYYYYY is the editable Audio 3 output routing (STEREO, MIXED TO BOTH, LEFT TO BOTH, RIGHT TO BOTH)
AC3 Downmix Method XXXXXXXXXXXXX	XXXXXXXXXXXXX is the editable Dolby Digital AC-3 downmix parameter (SURROUND STEREO, CONVENTIONAL STEREO)

C.7.6 Audio 4 Menu

The **Audio 4** signal status submenu contains information about the audio format and status of the currently decoded audio stream on the secondary audio output.

Table C.18 Audio 4 Menu

Display Title: Audio 02	Description
XX Streams PID YYYY WWWW WWWW W VVV ZZZZ	XX is the number of Audio streams present YYYY is the currently selected audio4 PID ZZZZ is the stream status (OK, STOP, FAIL) VVV is the audio layer (MUS, LIN, DD) WWWWWWW is the audio language
Sampling Rate XX.X kHz Bit-rate YYY kbit/s	XX.X is the Audio 4 sample rate YY is the Audio 4 bit-rate
Rate Buffer Level	Audio 4 percentage rate buffer level
Delay Adjustment XXX.X ms	XXX.X is the Audio 4 decoding delay (range +/- 0 to 49ms)
Digital Output XXXXX Routing YYYYYY	XXXXX is the editable Audio 4 digital output format (AES3, AC-3) YYYYYY is the editable Audio 4 output routing (STEREO, MIXED TO BOTH, LEFT TO BOTH, RIGHT TO BOTH)
AC3 Downmix Method XXXXXXXXXXXX	XXXXXXXXXXXX is the editable Dolby Digital AC-3 downmix parameter (SURROUND STEREO, CONVENTIONAL STEREO)

C.7.7 Async Data Menu

The Async Data submenu allows status monitoring and configuration of the low speed data.

Table C.19 Async Data Menu

Display Title: Async Data	Description
WW Streams PID XXXX YYYYYYYYYY	WW is the number of Low speed data streams present XXXX is the currently selected LSD PID YYYYYYYYYY is the stream status (PRESENT, NOT PRESENT)
Bit-rate YYYYYYYY ZZZZ	XXXXX is the Asynchronous data bit-rate (Up to 38400 bit/s) YYYYYYYY is editable control (ENABLED, DISABLED) ZZZZ is the output status (OK, STOP, FAIL)

C.7.8 Ethernet Data Menus

The **Ethernet Data** submenu allows status monitoring and configuration of the high speed data over Ethernet option.

Table C.20 High Speed Data Over Ethernet Menu

Display Title: Ethernet Data	Description
User PID XXXX YYY PIPE ZZZZ	XXXX is the currently selected HSD PID YYY is the stream status (PRESENT, NOT PRESENT) ZZZZ is the status of the service (OK, STOP, FAILED)
Bit-rate X.XX YYY ZZZZ	XXXXX is the data bit-rate YYY is editable control (ENABLED, DISABLED) ZZZZ is the output status (OK, STOP, FAIL)
Packet Lost Frame Lost	XXXXX is the number of Packets lost YYYY is the number of framed Lost
Forward to Gateway XXX Gateway YYY.YYY.YYY.YYY	XXX is the editable Gateway option (ON, OFF) When XXX is set to ON, the destination Gateway can be set.

C.7.9 VBI Menu

The **VBI** status submenu displays the current status of the VBI components.

Note: The VITC menu functionality is not supported in software version 1.0.0.

Table C.21 VBI Menu

Display Title: VBI	Description
Closed Captions XXXXXXXXXXX YYYYYYY ZZZZ	XXXXXXXXXXX indicates the presence of Closed Captions (PRESENT, NOT PRESENT) YYYYYYY is the editable parameter for enabling Closed Captions pass-through (ENABLED, DISABLED) ZZZZ indicates the status of the output (OK, STOP, FAIL)

C.7.10 PCR PID Menu

The **PCR PID** submenu displays the Program Clock Reference packet identifier and its status.

Table C.22 PCR PID Menu

Display Title: PCR PID	Description
PCR PID XXXX YYYYYYYYYY	XXXX is the PCR PID YYYYYYYYYY is (PRESENT, NOT PRESENT)

C.7.11 Network ID Menu

The **Network ID** submenu displays the network ID and the Original Network ID from the current Service Description Tables.

Table C.23 Network ID Menu

Display Title: Network ID	Description
Network ID XXXXX Original Network ID YYYYY	XXXXX is the network ID from the current SDT (or ----- when SDT not available) YYYYY is the original network ID from the current SDT (or ----- when SDT not available)

C.8 Transport Stream Output Menu

C.8.1 Overview

The **Transport Stream Output** submenu allows editing of the position of the ASI output.

Table C.24 Transport Stream Output Menu

Display Title: Transport Stream Output	Description
XXXXXXXXXXX	Position of TS output (POST INPUT, POST ES DESCRAMBLE, POST TS DESCRAMBLE).

C.8.2 Output Connector Selector Submenu

This menu allows editing of the output connector functionality.

Table C.25 Output Connector Selector Submenu

Display Title: Output	Description
Connector 1	Selection of output type (ASI, DISABLED, HD SDI, SD SDI, AUTO).
Connector 2	Selection of output type (ASI, DISABLED, HD SDI, SD SDI, AUTO).
Connector 2	Selection of output type (ASI, DISABLED, HD SDI, SD SDI, AUTO).

C.9 Alarms Menu (Menu 6)

C.9.1 Overview

The **Alarms** menu provides a summary of the alarm status.

Table C.26 Alarms Menu

Display Title: Alarms	Description	Section
Transport Stream Alarm Setup	Transport Stream alarm and relay settings.	*C.9.2*
Video Alarm Setup	Video alarm and relay settings.	*C.9.3*
Audio 1 Alarm Setup	Audio 1 alarm and relay settings.	*C.9.4*
Audio 2 Alarm Setup	Audio 2 alarm and relay settings.	*C.9.5*
Audio 3 Alarm Setup	Audio 3 alarm and relay settings.	*C.9.6*
Audio 4 Alarm Setup	Audio 4 alarm and relay settings.	*C.9.7*
Satellite BER Alarm Setup	Satellite BER alarm and relay settings.	*C.9.8*
COFDM MER Alarm Setup	COFDM MER alarm and relay settings	*C.9.9*
EBNO Alarm Setup	EBNO alarm relay settings	*C.9.10*
Temperature Alarm Setup	Temperature alarm and relay settings.	*C.9.11*

C.9.2 Transport Stream Alarm Setup Menu

Table C.27 Transport Stream Alarm Setup Menu

Display Title: Alarms	Description
IF NO TRANSPORT STREAM YYYYYYYYYYYYYY	YYYYYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.9.3 Video Alarm Setup Menu

Table C.28 Video Alarm Setup Menu

Display Title:	Description
IF VIDEO NOT RUNNING YYYYYYYYYYYYYY	YYYYYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.9.4 Audio 1 Alarm Setup Menu

Table C.29 Audio 1 Alarm Setup Menu

Display Title:	Description
IF AUDIO 01 NOT RUNNING YYYYYYYYYYYYYY	YYYYYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.9.5 Audio 2 Alarm Setup Menu

Table C.30 Audio 2 Alarm Setup Menu

Display Title:	Description
IF AUDIO 02 NOT RUNNING YYYYYYYYYYYYYY	YYYYYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.9.6 Audio 3 Alarm Setup Menu

Table C.31 Audio 3 Alarm Setup Menu

Display Title:	Description
IF AUDIO 03 NOT RUNNING YYYYYYYYYYYYYY	YYYYYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.9.7 Audio 4 Alarm Setup Menu

Table C.32 Audio 4 Alarm Setup Menu

Display Title:	Description
IF AUDIO 04 NOT RUNNING YYYYYYYYYYYYYY	YYYYYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.9.8 Satellite BER Alarm Setup Menu

Table C.33 Satellite BER Alarm Setup Menu

Display Title: ALARMS	Description
VVVV WWWW UUU XXXXX YYYYYY ZZZZZZ	VVVV is BER, or NONE WWWW is LOCK XXXXX is VIDEO YYYYYY is AUDIO1 ZZZZZZZ is AUDIO2 UUU is MER
If BER exceeds X.X E-X YYYYYYYYYYYYYY	X.X E-X is editable 9.9 E-1 to 1.0 E-8 YYYYYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.9.9 MER Alarm Setup Menu

Table C.34 MER Alarm Setup Menu

Display Title:	Description
IF MER LESS THAN XX.X YYYYYYYYYYYYY	YYYYYYYYYYYYY is editable 0 to 69.9: NO ALARM SET ALARM ONLY

C.9.10 C/N Alarm Setup Menu

Table C.35 C/N Alarm Setup Menu

Display Title:	Description
IF C/N LESS THAN XX.X YYYYYYYYYYYYY	YYYYYYYYYYYYY is editable 0 to 69.9: NO ALARM SET ALARM ONLY

C.9.11 Temperature Alarm Setup Menu

Table C.36 Temperature Alarm Setup Menu

Display Title:	Description
IF Temperature exceeds 65° C YYYYYYYYYYY	YYYYYYYYYYY is editable: NO ALARM SET ALARM ONLY

C.10 System Menu (Menu 7)

C.10.1 Setup Menu

The **Setup** submenu allows the user to edit the operating mode, LCD contrast, serial remote protocol, IP address, subnet mask, service hunt mode, and the customization key.

Table C.37 Setup Menu

Display Title: Setup	Description
Date: XX/XX/XXXX Time: YY:YY:YY	XX/XX/XXXX is the system date from the TDT YY:YY:YY is the system time from the TDT
Operating Mode	XXXXXXXXXXXX is editable:

Display Title: Setup	Description
XXXXXXXXXXXXX	FRONT PANEL SERIAL REMOTE (not supported in software version 1.0.0) NETWORK (SNMP)
LCD Contrast XXXXXX	XXXXXX is editable in the range: LOW MEDIUM HIGH
Serial Remote Protocol XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX is editable: RS-232 TTV, RS-232 ALTEIA AT ADDR YYY, RS-485 ALTEIA AT ADDR YYY where YYY is CR address from 000 to 999.
IP Address XXX.XXX.XXX.XXX	XXX.XXX.XXX.XXX is the editable IP address
Subnet Mask XXX.XXX.XXX.XXX	XXX.XXX.XXX.XXX is the editable subnet mask
Gateway Address XXX.XXX.XXX.XXX	XXX.XXX.XXX.XXX is the editable Gateway address
Syslog Address XXX.XXX.XXX	XXX.XXX.XXX is the editable Syslog address.
Restore System Defaults	Restores system defaults.
Service Hunt Mode XXXXXXXX	XXXXXXXX is the editable parameter for setting automatic service selection (ENABLED, DISABLED)
SI Mode XXX	XXX is the editable parameter for SI detection (AUTO, ATSC, DVB)
Customization Key XXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXX is the editable parameter for entering customization keys

C.10.2 Multi-Format Receiver Details Menu

The **Multi-Format Receiver Details** submenu displays the software, firmware, hardware, PLD version and electronic serial number of the CR.

Table C.38 CR Details Menu

Display Title: CR Details	Description
Electronic Serial Number XXXXX	XXXXX is the unit serial number
Software Version	XX.XX.XX is the software version number

Display Title: CR Details	Description
XX.XX.XX	
Firmware Versions XX.XX	XX.XX is the firmware 1 version number XX.XX is the firmware 2 version number
Hardware Version XXXX	XXXX is the hardware version number
PLD Versions XXXX	XXXX is the PLD 1 version number XXXX is the PLD 2 version number
Temperature XX.X	XX.X is the unit temperature
Model Number XXXXXX	XXXXXX is RX1290

C.10.3 System Restart Menu

The **System Restart** submenu allows the user to perform a software restart without having to remove and insert the power cable.

Table C.39 System Restart Menu

Display Title: System Restart	Description
Restart Activate	Software restart. Press **Edit** to cancel and **Save** to activate.

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Language Abbreviations

Annex D

Contents

List of Tables

BLANK

D.1 ISO Language Abbreviations

Languages are shown in alphabetical order.

Table D.1 ISO Language Abbreviation Table

No	Language	Abbreviation
5	ARABIC	ARA
	BASA	BAS
14	BENGALI	BEN
135	CHINESE	CHI
19	CZECH	CZE
21	DANISH	DAN
82	DUTCH	DUT
25	ENGLISH	ENG
31	FINNISH	FIN
34	FRENCH	FRE
22	GERMAN	GER
24	GREEK	GRK
40	GUJARATI	GUJ
52	HEBREW	HEB
42	HINDI	HIN
44	HUNGARIAN	HUN
50	ICELANDIC	ICE
49	INDONESIAN	IND

No	Language	Abbreviation
36	IRISH	IRI
51	ITALIAN	ITA
53	JAPANESE	JAP
55	JAVANESE	JAV
61	KOREAN	KOR
	MALAY	MAY
83	NORWEGIAN	NOR
90	PORTUGUESE	POR
94	ROMANIAN	ROM
95	RUSSIAN	RUS
27	SPANISH	SPA
112	SWEDISH	SWE
117	THAI	THA
123	TURKISH	TUR
128	URDU	URD

D.2 Non-ISO Languages

The following non-ISO1 languages are supported.

Note: Only applicable for a transport stream going to an Alteia Receiver.

[1] International Standards Organisation.

Table D.2 Non-ISO Language Abbreviation Table

Language	**Abbreviation**
MAIN	ONE
AUX	TWO
INTERNATIONAL SOUND	INT
AUDIO 1	AAA
AUDIO 2	AAB
AUDIO 3	AAC
AUDIO 4	AAD
AUDIO 5	AAE
AUDIO 6	AAF
AUDIO 7	AAG
AUDIO 8	AAH
AUDIO 9	AAI
AUDIO 10	AAJ
AUDIO 11	AAK
AUDIO 12	AAL
AUDIO 13	AAM
AUDIO 14	AAN
AUDIO 15	AAO
AUDIO 16	AAP

The non-ISO languages allow tagging of audio without reference to specific languages. The system can then transmit two languages (Main and Auxiliary) which could be any type of audio.

Note: The non-ISO languages need to be user-defined in the MEM or Mobile Contribution Encoder for them to be available.

For language codes not supported by the Multi-Format Receiver, the Receiver will list ‘undefined’ as the language descriptor. This does not affect the way the audio is selected.

Factory Defaults

Annex E

Units are shipped with the following factory default parameters. These can be restored at any time using the System Menu. All other parameters are unaffected by restoring the factory defaults.

Menu	Description	Default
#2 Input	SELECT INPUT	ASI
#2 Input QPSK/8PSK/16QAM	SOURCE	1
	LNB FREQUENCY	10750.0 MHz
	SATELLITE FREQUENCY	12168.0 MHz
	SYMBOL RATE	27.5 Msym/s
	MODULATION FEC	QPSK auto
	LNB POWER	OFF
	LNB 22 kHz	Disabled
	SEARCH RANGE	3000 kHz (5000 kHz)
	REED-SOLOMON	DISABLED
TTV G.703	INTERLEAVER	DISABLED
	SIGNAL LEVEL	NORMAL
Dual IP NIC Input	IP Address	192.168.02.101 for port 1 192.168.02.102 for port 2
	Subnet Mask	255.255.255.0
	Default Gateway	0.0.0.0
	MAC	00:20:AA:4F:XX:XX for port 1 00:20:AA:50:XX:XX for port 2 Where XX:XX is serial number
	Line mode	Auto
	VLAN	Off
	ICMP (ping)	On

Menu	Description	Default
	ARP	On
	SNMP	Off
	FEC	On if licensed
	UDP Upgrade port	61111
	IP de-jitter Buffer Level	60ms
	Redundancy mode	Use Input Port 1
	Auto Revert Delay	0
	Mcast IP Address 1/2	0
	UDP Port 1/2	0
	Column Port 1/2	UDP Port + 2
	Row Port 1/2	UDP Port + 4
#3 Service	FAIL MODE	FREEZE FRAME
	TEST PATTERN	NONE
	FRAME SYNC	DISABLED
	FSYNC PAL OFFSET	+0000
	FSYNC NTSC OFFSET	+0000
	4:2:0 DELAY	0 ms
	4:2:2 DELAY	0 ms
	OUTPUT MODE	RGB
	TRISYNC MODE	ON ALL
	EMBEDDED AUDIO DID 1	2E7H
	EMBEDDED AUDIO DID 2	1E5H
	EMBEDDED AUDIO DID 3	NONE
	EMBEDDED AUDIO DID 4	NONE
	DELAY ADJUSTMENT	+0.0 ms
	DIGITAL OUTPUT	AES3
	ROUTING	STEREO
	CLIPPING LEVEL	18 dB
	AC-3 DOWNMIX METHOD	SURROUND STEREO

Menu	Description	Default
	ASYNC DATA	ENABLED
	SYNC DATA (High Speed Ethernet Data Not Fitted)	ENABLED
	ETH.NET DATA (High Speed Ethernet Data Fitted)	ENABLED
	VITC INSERTION	ENABLED
	CLOSED CAPTION	ENABLED
	PCR PID	
#5 Output	TS OUTPUT	POST INPUT
	CONNECTOR 1	DISABLED
	CONNECTOR 2	DISABLED
	CONNECTOR 3	DISABLED
#6 Alarm	IF NO TRANSPORT STREAM	NO ALARM
	IF VIDEO NOT RUNNING	NO ALARM
	IF AUDIO 1 NOT RUNNING	NO ALARM
	IF AUDIO 2 NOT RUNNING	NO ALARM
	IF AUDIO 3 NOT RUNNING	NO ALARM
	IF AUDIO 4 NOT RUNNING	NO ALARM
	IF MER LESS THAN 0.00	NO ALARM
	IF BER EXCEEDS 1.0 E-8	NO ALARM
	IF EBNO EXCEEDS…….	NO ALARM
	IF TEMPERATURE EXCEEDS 65	NO ALARM
#7 Setup	OPERATING MODE	FRONT PANEL
	LCD CONTRAST	MEDIUM
	SERIAL REMOTE CONTROL	RS-232 TTV
	IP ADDRESS	155.155.155.201
	SUBNET MASK	255.255.255.000
	GATEWAY ADDRESS	155.155.155.001
	SYSLOG IP ADDRESS	NOT SET
	SERVICE HUNT MODE	ENABLED
	SI MODE	AUTO
	CUSTOMIZATION KEY	UNAFFECTED

Menu	Description	Default
	SW VERSION/ FW VERSION/ HW VERSION/ PLD VERSION/ ELECTRONIC SERIAL NUMBER	UNAFFECTED